Report on Currency and Finance

2021-22

REVIVE AND RECONSTRUCT

RESERVE BANK OF INDIA

REPORT ON
CURRENCY AND FINANCE 2021-22

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FOREWORD

Since March 2020, mitigating the impact of the COVID-19 pandemic has been the overarching policy priority of the Reserve Bank of India. The policy responses to this humongous crisis have been unprecedented in scale, reach and speed to minimise the loss of lives and livelihood, protect the vulnerable, safeguard the economy and financial markets, and instil confidence. As two embattled years of living with the virus hopefully draws to a close, growing adaptation and vaccination allow us to imagine a post-pandemic future in which policy attention may be redirected to rejuvenate the Indian economy and place it on a higher growth trajectory.

What is the appropriate mix of policy interventions to realise this vision? Clearly, it is not enough to stabilise the economy and pull it out of the depths to which it had plunged during the first wave of infections and the dents made by the succeeding waves. The challenge is to generate a virtuous cycle of greater opportunity for entrepreneurs to innovate and invest; businesses to attract more capital and technology; and fiscal space to manage the distributional effects of the pandemic while expanding public investment in physical infrastructure and human capital.

The resilience of certain sectors like agriculture and allied activities, information technology services, exports, digitalisation and renewable energy during the COVID-19 crisis gives us the confidence that the Indian economy can stage a strong comeback. What adds to this confidence is the way certain other sectors used this crisis to rebuild and reconfigure. These sectors would include the organised corporate sector; the financial sector; start-ups; and more recently, the manufacturing sector. Around us too, the world is changing through rearranging of supply chains, geopolitical configurations and policy strategies to new global realities, including even a rethink on globalisation and financial integration.

Accordingly, this year's Report on Currency and Finance has "Revive and Reconstruct" as its theme. Structured in six chapters, the Report draws from facets of actual experience with the pandemic, research and empirical findings to lay out a vision of post-pandemic India and how to get there. I commend the spirit of enquiry which has been the abiding motivation for the team that prepared this Report. As Einstein once said, *"To raise new questions, new possibilities, to regard old problems from a new angle, requires creative imagination"*[1]. Our expectation is that the Report will ask the right questions and provoke readers to imagine, like the team, India's post-pandemic future.

<div align="right">
Shaktikanta Das
Governor
April 29, 2022
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[1] "The Evolution of Physics", Albert Einstein and Leopold Infeld, 1938.

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A&A	Agriculture and Allied Activities		CPI	Consumer Price Index
ACS	Average Cost of Supply		CRAR	Capital to Risk-weighted Assets Ratio
AI	Artificial Intelligence			
API	Active Pharmaceutical Ingredient		CSI	Current Situation Index
ARCs	Asset Reconstruction Companies		DFIs	Development Financial Institutions
ARR	Average Revenue Realised		DFIS	Duty-Free Imports for Exporters Scheme
ASEAN	Association of Southeast Asian Nations			
			DFM	Dynamic Factor Model
ASER	Annual Status of Education Report		DISCOM	Distribution Company
ASI	Annual Survey of Industries		DPIIT	Department for Promotion of Industry and Internal Trade
ASTI	Advanced Science and Technology Institute			
			DSGE	Dynamic Stochastic General Equilibrium
AT&C	Aggregate Technical and Commercial			
			D-SIBs	Domestic Systemically Important Banks
BAI	Business Assessment Index			
BEI	Business Expectations Index		ECB	External Commercial Borrowing
BIS	Bank for International Settlements		EDB	Ease of Doing Business
BLS	Bureau of Labour Statistics		EHTP	Electronics Hardware Technology Park
BoP	Balance of Payments			
BPS	Basis Points		EMEs	Emerging Market Economies
BSR	Basic Statistical Returns		EOU	Export Oriented Units
BTP	Bio-Technology Park		EPCG	Export Promotion Capital Goods
CAD	Current Account Deficit		ESG	Environmental, Social and Governance
CCS	Consumer Confidence Survey			
CDS	Credit Default Swap		EV	Electric Vehicle
CEPA	Comprehensive Economic Partnership Agreement		FCI	Financial Conditions Index
			FDI	Foreign Direct Investment
CET-I	Common Equity Tier-I		FEI	Future Expectation Index
CII	Confederation of Indian Industry			
CIS	Change in Stock		FIs	Financial Institutions
CMIE	Centre for Monitoring Indian Economy		FMOLS	Fully Modified Ordinary Least Squares

FPOs	Follow on Public Offers	ISIN	International Securities Identification Number
FRBM	Fiscal Responsibility and Budget Management	IT	Information Technology
FTA	Free Trade Agreement	ITeS	Information Technology Enabled Services
GCF	Gross Capital Formation	KBC	Knowledge Based Capital
GCI	Global Competitiveness Index	KLEMS	K-capital, L-labour, E-energy, M-materials, and S-purchased services
GDP	Gross Domestic Product		
GFC	Global Financial Crisis		
GFCE	Government Final Consumption Expenditure	LAA	Land Acquisition Act
		LAF	Liquidity Adjustment Facility
GFCF	Gross Fixed Capital Formation	LCR	Liquidity Coverage Ratio
GFD	Global Financial Data	LFPR	Labour Force Participation Rate
GOI	Government of India	LPA	Long Period Average
GPS	Global Positioning System	LSE	London Stock Exchange
GSA	Gross Sown Area	LTROs	Long-Term Repo Operations
G-SAP	Government Securities Acquisition Programme	MEIS	Merchandise Exports from India Scheme
G-sec	Government Securities	MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
GST	Goods and Services Tax		
GVA	Gross Value Added	MNRE	Ministry of New and Renewable Energy
GVC	Global Value Chain		
GW	Gigawatt	MoSPI	Ministry of Statistics and Programme Implementation
HTM	Held to Maturity		
HYV	High Yielding Variety	MSME	Micro, Small and Medium Enterprise
IBC	Insolvency and Bankruptcy Code	MSP	Minimum Support Price
ILO	International Labour Organisation	NaBFID	National Bank for Financing Infrastructure and Development
IMF	International Monetary Fund		
INR	Indian Rupee	NARCL	National Asset Reconstruction Company Ltd.
IOS	Industrial Outlook Survey	NAS	National Account Statement
IPOs	Initial Public Offerings	NBFC	Non-Banking Financial Company
IRF	Interest Rate Futures	NDA	Net Domestic Assets
IRGD	Interest Rate Growth Differential	NDC	Nationally Determined Contribution

NDTL	Net Demand and Time Liabilities	PMJDY	Pradhan Mantri Jan-Dhan Yojana
NFA	Net Foreign Assets	PP	Percentage Point
NGFS	Network for Greening the Financial System	PPPs	Public Private Partnerships
NIP	National Infrastructure Pipeline	PSB	Public Sector Bank
NKPC	New Keynesian Phillips Curve	PSL	Priority Sector Lending
NMP	National Monetisation Pipeline	PSUs	Public Sector Undertakings
NRA-CU	Net Response of Assessment on Capital Utilisation	PVBs	Private Sector Banks
NRE-CU	Net Response of Expectation on Capital Utilisation	QPM	Quarterly Projection Model
		R&D	Research and Development
NSA	Net Sown Area	RBI	Reserve Bank of India
NSO	National Statistical Office	RCA	Revealed Comparative Advantage
NSWS	National Single Window System	RHS	Right Hand Scale
OBICUS	Order Books, Inventories and Capacity Utilisation Survey	RoA	Return on Assets
		RoDTEP	Remission of Duties and Taxes on Exported Products
OECD	Organisation for Economic Co-operation and Development	RoE	Return on Equity
OMOs	Open Market Operations	SARFAESI	Securitisation and Reconstruction of Financial Assets and Enforcement of Securities Interest
ONGC	Oil and Natural Gas Corporation		
OOPE	Out Of Pocket Expenditure		
OSMOS	Off-Site Surveillance and Monitoring System	SDLs	State Development Loans
		SEZ	Special Economic Zone
OT	Operation Twist	SIA	Social Impact Assessment
P2P	Peer-to-Peer	SLR	Statutory Liquidity Ratio
PCA	Principal Component Analysis	SMEs	Small and Medium Enterprises
PCRs	Provision Coverage Ratios	SRs	Security Receipts
PFCE	Private Final Consumption Expenditure	STP	Software Technology Park
		STRI	Services Trade Restrictiveness Index
PLFS	Periodic Labour Force Survey	STVAR	Smooth Transition Vector Autoregression
PLI	Production Linked Incentive		
PMFBY	Prime Minister Fasal Bima Yojna	SVAR	Structural Vector Autoregression
PMGSY	Pradhan Mantri Gram Sadak Yojna	SWS	State Single Window System

TCI	Trade Complementarity Index	VAR	Vector Autoregression
TFP	Total Factor Productivity	WACR	Weighted Average Call Money Rate
TOT	Terms of Trade		
TVAR	Threshold Vector Autoregression	WAP	Working Age Population
TVP	Time-varying Parameter	WDI	World Development Indicators
TVP-SV	Time-varying Parameter Stochastic Volatility	WEO	World Economic Outlook
		WHO	World Health Organisation
UAS	Unmanned Aircraft System	WITS	World Integrated Trade Solutions
UAV	Unmanned Aerial Vehicle	WMA	Ways and Means Advance
UNIDO	United Nations Industrial Development Organisation	WTO	World Trade Organisation

THE THEME OF THE REPORT

Observed patterns of pandemics in history as well as insights from epidemiology tell us that pandemics are likely to wither in intensity, with sporadic breakouts of limited impact until they become endemic. The COVID-19 pandemic will go down in history as one of the worst health crises the world has ever faced. Its economic impact may linger for many more years and confront us challenges of rebuilding livelihoods, safeguarding businesses and reviving the economy.

India suffered among the biggest pandemic-induced losses in the world in terms of output, lives and livelihoods, which may take years to recover. Economic activity has barely recovered to pre-COVID levels even after two years. India's economic rebound also faces difficult challenges from the legacy of deep-rooted structural bottlenecks as well as the scars of the pandemic. The Russia-Ukraine conflict has also dampened the momentum of recovery, with its impact transmitting through record high commodity prices, weaker global growth outlook and tighter global financial conditions. Concerns surrounding deglobalisation impacting future trade, capital flows and supply chains have amplified uncertainties for the business environment. Against this backdrop, India's medium-term growth outlook hinges critically on policy measures to address structural bottlenecks and harness emerging new growth opportunities. This year's Report on Currency and Finance accordingly has "Revive and Reconstruct" as its theme.

The Report begins by taking a deep dive into COVID-induced downturn in the economy against the backdrop of the loss of pace in activity, evident since H2 of 2016-17 and its structural and cyclical drivers. A key pivot has been the unprecedented public policy support, including progress on vaccination. The thrust of public policy action is now progressively shifting to revitalising growth – even as the fiscal policy stance aims at regenerating the capex cycle, monetary policy remains accomodative while focusing on the withdrawal of accomodation to ensure that inflation remains within the target going forward while supporting growth.

Lessons from past crises reveal the reality of a permanent loss of output, reflected in deep wounds to investment and shortfalls in capital and total factor productivity (TFP) relative to respective pre-crisis trends.[a] Potential hysteresis effects of the pandemic operating through bankruptcies and capacity destruction are not fully quantified so far and may manifest themselves through balance sheet impairments and depressed new investment demand.

Corporate balance sheets have coped with the pandemic by deleveraging and increasing liquid assets, but investment appetite that should motor a renewed capex cycle is still weak. Frail household balance sheets and labour displaced from contact-intensive activity have impacted consumption demand and quality of capital. As a result, the trend growth path of India may have shifted downwards, warranting urgency in putting in place a comprehensive range of measures for reinvigorating growth, while negotiating net-zero transition costs, deglobalisation and broken supply chains.

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[a] Cerra, M.V. and Saxena, M.S.C. (2017), "Booms, Crises, and Recoveries: A New Paradigm of the Business Cycle and its Policy Implications", *IMF Working Paper,* No. 17/250, International Monetary Fund.

IMF (2018), "Challenges to Steady Growth", *World Economic Outlook*, International Monetary Fund, October.

The rest of the Report is structured into six chapters. Chapter I titled "Scars of the Pandemic" draws lessons from the experience with the pandemic. It covers an assessment of the impact of COVID on growth in India, differentiating sectors that exhibited resilience. It explores risks to recovery and presents an assessment of the number of years that India may take to catch up with a hypothetical no-COVID trend GDP.

Chapter II presents the role of counter-pandemic monetary and fiscal policies in engineering the economic recovery. It also examines the current monetary and fiscal configuration in India from a forward-looking perspective, consistent with the theme of the Report. This chapter also studies the role of fiscal stimulus in a crisis and the importance of fiscal consolidation in normal times for growth. Given the risks to growth from inflation persisting above a threshold level, an empirical exploration seeks to identify threshold effects of liquidity on inflation as well as thresholds for public debt. The chapter presents feasible alternative paths for key parameters of debt sustainability – growth, inflation, interest rate and primary balance – to identify the likely debt consolidation path in India over the next five years, relative to the estimated threshold level of debt.

Chapter III titled "Structural Issues in Rejuvenating Growth" explores the role of structural policies in regaining India's pre-pandemic trend growth and lifting it up after the pandemic. It investigates structural impediments to growth that are, in a sense, a pre-pandemic legacy – imbalances in the agriculture sector in the form of low capital formation, declining R&D expenditure, low crop yields, lack of crop diversity and intensity, and excessive dependence on subsidies and price support schemes; inadequate investments in mining despite abundant natural resources; near

stagnation of the share of manufacturing in gross value added (GVA); languishing productivity; insufficient expenditure on education, health and R&D; and high costs of doing business. Those risks are accentuated by demographic transition, with the fertility rate dropping below the replacement rate, and a drop in labour force participation. The chapter highlights the urgent need to reverse the sustained decline in private investment through a comprehensive range of strategic reforms, covering both factor and product markets.

Chapter IV highlights the role of exports and foreign capital in pushing up India's potential output through a strategic policy reset that transforms India into a more open economy. It also highlights greater emphasis on innovations and R&D, easier access to critical inputs – both domestic and imported – and more effective trade-creating free trade agreements (FTAs) based on trade complementarities. It examines opportunities for adoption of frontier technologies for raising export potential and also underscores the need for enhancing the capacity of the economy to absorb foreign capital productively.

Chapter V addresses the modest penetration of finance in the Indian economy. This has brought to the fore the role of financial sector reforms in reactivating credit flows to the economy while managing the transition to a green economy and a digital world. In essence, the chapter asks the question: can finance lead growth in a post-pandemic recovery? In particular, the chapter assesses the role and importance of digital and green finance in reinvigorating growth.

The last chapter presents a roadmap to rejuvenate growth, with specific recommendations for reforms in different sectors of the economy, drawing on the essence of findings of the previous five chapters.

I SCARS OF THE PANDEMIC

The perturbations from repeated waves of the COVID-19 pandemic have come in the way of sustained growth recovery in India. The supply constraints pushed up shipping costs and commodity prices, thereby intensifying inflationary pressures and threatening the nascent economic recovery across the world. In India, the private corporate sector showed resilience as firms adopted new modes of operations and aligned their business strategies to the new environment. The capital expenditure push in the Union Budget for 2022-23 can provide the much needed support to achieve sustained high growth by enhancing productive capacity, crowding in private investment and strengthening aggregate demand. Though both private consumption expenditure and investment marginally surpassed their respective pre-pandemic levels in 2021-22, there is a need to strengthen the growth momentum to compensate for the lost output.

1. INTRODUCTION

I.1   The ongoing COVID-19 pandemic has been the first of its kind the world has witnessed in the 21st century. The cyclical slowdown that set in the Indian economy before the outbreak of the pandemic, got exacerbated on the back of cliff effects and scarring generated by the pandemic. Despite having witnessed one of the steepest contractions in gross domestic product (GDP) in Q1:2020-21 and being hit by three successive waves, the Second Advance Estimates of National Income released on February 28, 2022 indicate that the economy has surpassed its pre-COVID level in 2021-22, on the back of unprecedented policy support from monetary and fiscal authorities. Nonetheless, India's recovery from the pandemic, despite its innate strength of macroeconomic fundamentals, remains fragile and is yet to become broad-based.

I.2   Supply disruptions, restrained workforce participation, risks from new variants of the virus and the Russia-Ukraine war have emerged as the dampeners to global growth outlook. Fresh sanctions on Russia pose new risks accentuating supply disruptions in global value chains, and commodity price spirals hitting glass ceilings. As price pressures become more generalised globally, risk to growth might aggravate. Looking ahead, even as the growth outlook hinges on global headwinds from the Ukraine war and new variants of COVID, the shape of the recovery post-pandemic would be guided by realisation of reform dividend as also the contributions from new emerging areas such as healthcare, Information Technology Enabled Services (ITeS), and e-commerce, which could drive the future growth with adaptations to the pandemic that may become endemic.

I.3   The pandemic has caused a deep dent on livelihoods and has scarred minds, production capacities and confidence with far-reaching economic and social costs, and the post-pandemic new normal may be very different from the pre-pandemic situation. On the backdrop of the pre-existing conditions ahead of the pandemic, this chapter focuses on a macro-assessment of the economic impact of the successive waves of the

Table I.1: Episodes of Boom and Bust

(Growth in per cent per annum)

	2003-08	2008-09	2009-11	2011-14	2014-17	2017-20
Total Consumption	**6.1**	**5.5**	**6.5**	**6.1**	**7.4**	**6.3**
PFCE	6.2	4.5	5.9	6.7	7.5	6.2
GFCE	5.8	11.4	9.7	2.6	7.0	7.4
GCF	**15.3**	**-2.6**	**14.5**	**2.0**	**5.4**	**6.5**
GFCF	12.6	3.2	9.4	6.2	5.9	6.9
CIS	73.5	-51.4	56.2	-27.4	16.7	12.3
Valuables	27.8	26.9	45	-11.1	2.2	5.4
Exports of goods and services	17.8	14.8	7.3	10	0.4	4.4
Less Imports of goods and services	20	22.4	6.9	6.1	-0.2	8.5
GDP	**7.9**	**3.1**	**8.2**	**5.7**	**7.9**	**5.7**

Source: NSO.

COVID-19 pandemic on the Indian economy. In section 2, the pre-COVID slowdown is described with a view to providing a backdrop. This is followed by an impact analysis of the pandemic in section 3. Section 4 concludes the chapter with an assessment of the risks to recovery.

2. PRE-COVID SLOWDOWN

I.4   Ahead of the COVID-19 pandemic, a cyclical downturn had set in the Indian economy

from 2017-18, culminating in the lowest growth of 3.7 per cent in 2019-20 since the global financial crisis (GFC). Episodes of boom and bust over the past two decades portray 2003-08 as the sharpest and longest expansionary phase when the economy expanded at an average of 7.9 per cent – unprecedented in its recorded history (Table I.1). With the onset of GFC, GDP growth had plummeted to 3.1 per cent in 2008-09, followed by a sharp but short revival during 2009-11 on the wings of coordinated fiscal and monetary policy actions which could not be sustained, giving way to another phase of slowdown between 2011-14. Following a consumption-led brief boom during 2014-17, the economy eventually entered a phase of slowdown from 2017-18 onwards, with the GDP growth moderating for eight successive quarters before the onset of the COVID-19 pandemic.

I.5   The pre-pandemic GDP growth has mainly been consumption-led. However, over the years, the share of consumption, the backbone of India's economic growth has been declining, with gross fixed capital formation (GFCF) compensating for the decline (Chart I.1). The ratio of gross capital formation (GCF) to GDP at current prices or the investment rate, however, decreased to 30.7

Chart I.1: Movement in Consumption and Investment
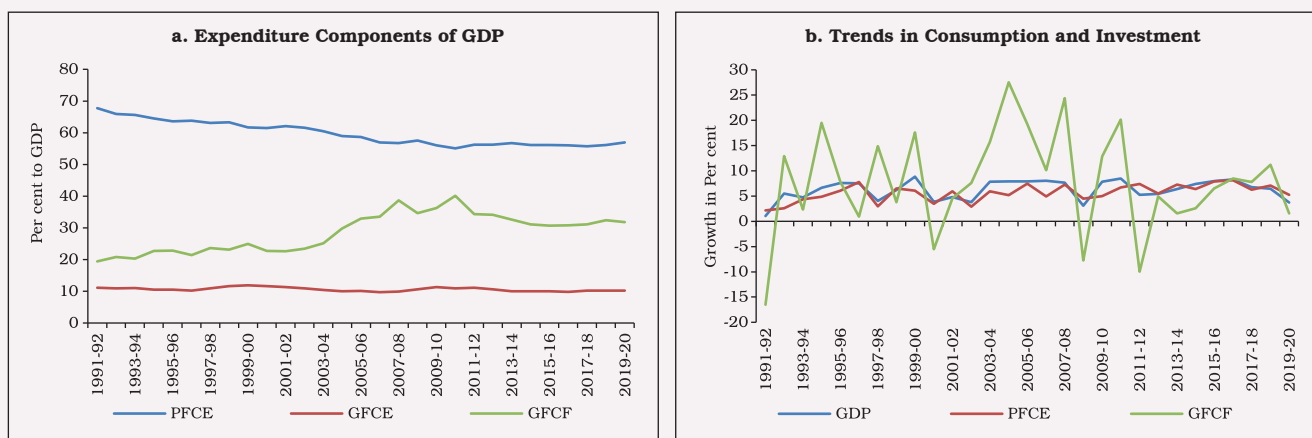
Source: NSO.

Chart I.2: Employment and Wages

a. Trends in Employment

b. Rural Wage Growth
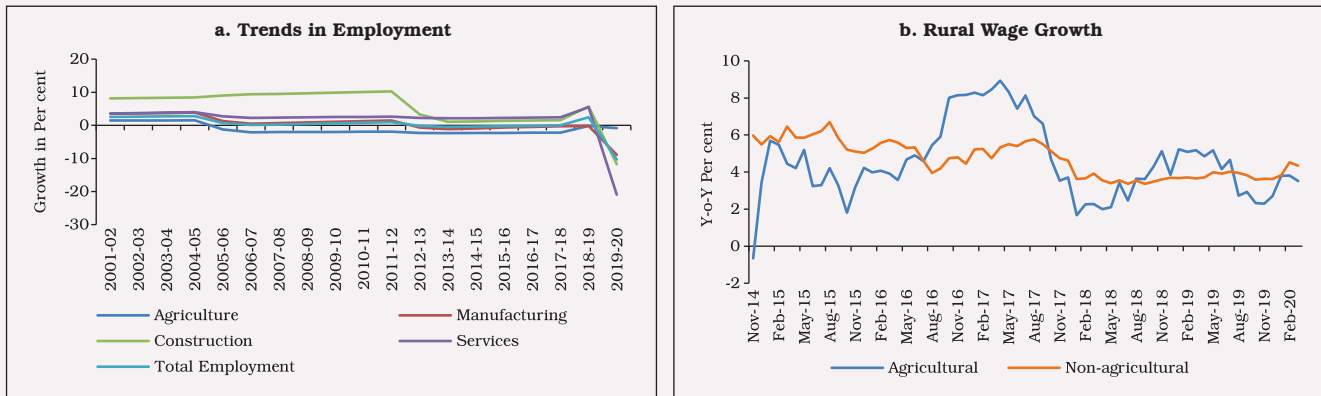
Note: Data for 2019-20 are taken from the Periodic Labour Force Survey (PLFS) Report and pertain to July-June 2019-20 and, therefore, capture the impact of the first wave of COVID while for the previous years, data pertain to April-March.
Source: RBI KLEMS Database, NSO and Labour Bureau.

per cent in 2019-20 from 32.1 per cent during 2015-16. Government expenditure provided an upward thrust to aggregate demand, excluding which the slowdown would have been deeper.

I.6   The GDP slowdown coincided with sluggishness in the labour market. The decline in employment in general, and the depressed employment in the construction sector resulted in low rural wages (Charts I.2a and I.2b). This along with high household leverage in 2017-18 and 2018-19 and domestic shocks pulled down consumption demand.

I.7   The moderation in capital formation emanated from both private corporate and household sector investments (Chart I.3). The slowdown in fixed investment by the household sector was more pronounced in 'dwellings, other buildings, and structures' which on an average had a share of 53.1 per cent in GFCF during 2011-12 to 2019-20.

I.8   Liquidity and solvency problems faced by some major non-banking financial companies (NBFCs)[1] and deterioration in asset quality of the banking sector accentuated the slowdown in

Chart I.3: Gross Capital Formation by Institutional Sectors
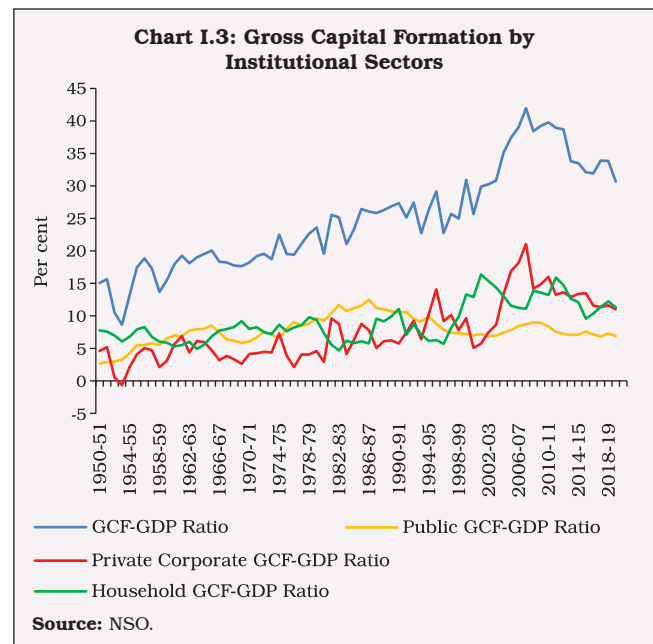
Source: NSO.

[1] Following the debt repayment default by the Infrastructure Leasing and Financial Services (IL&FS) in September 2018, the entire NBFC sector faced headwinds in terms of erosion of confidence, rating downgrades and liquidity stress. Subsequently, recognising the increasing importance of NBFCs in the financial ecosystem, the Reserve Bank has decided to implement scale-based regulation to enhance the regulatory oversight over the sector effective October 2022.

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private sector investment. The twin balance sheet crisis – banks and corporates – reinforced each other to contribute to a slowdown in the credit offtake. Loss of business and consumer confidence caused both consumption and investment to tumble. The corporate sector preferred to continue deleveraging in this environment, thus exacerbating the slowdown.

I.9   Due to growing integration with the global economy, the domestic slowdown was accentuated by the subdued global growth attributed to rising trade barriers; elevated uncertainty surrounding trade and geopolitics; idiosyncratic factors causing macroeconomic strain in several emerging market economies; and structural factors, such as low productivity growth and aging demographics in advanced economies (IMF, 2019).

I.10   Path-breaking structural reforms like the implementation of the goods and services tax (GST), enactment of the Insolvency and Bankruptcy Code (IBC), corporate tax cut, and regulatory measures to streamline the real estate sector were expected to provide renewed thrust to growth momentum when the pandemic struck.

3. POST-COVID ECONOMIC SCENARIO

I.11   After being first reported officially in Wuhan city of China at end-December 2019, COVID-19 was declared a pandemic by the World Health Organization (WHO) on March 11, 2020. Dispersed across successive waves and characterised by differentiated intensity of infections and mortality, the COVID-19 pandemic has been expansive in terms of geographical spread — touching even the remotest parts of the world. Ever since the first case of COVID-19 was reported in Kerala on January 30, 2020, India has experienced three waves of infections so far,

Chart I.4: Top 15 Countries affected by COVID-19
(percentage of total cumulative cases)

Country	Percentage
United States of America	15.8
India	8.5
Brazil	6.0
France	5.4
Germany	4.7
The United Kingdom	4.3
Russian Federation	3.6
Republic of Korea	3.3
Italy	3.2
Turkey	3.0
Spain	2.3
Vietnam	2.1
Argentina	1.8
Netherlands	1.6
Japan	1.5

Note: Data as on April 27, 2022.
Source: WHO.
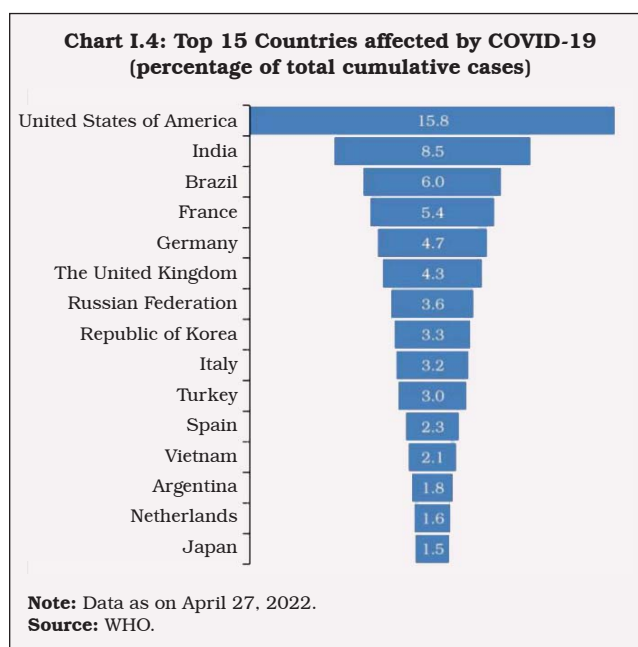
taking its total caseload to the second highest in the world (Chart I.4).

I.12   Given the suddenness of the COVID-19 shock, the Government of India imposed a strict lockdown during the first wave delaying its peak to September 16, 2020 when 0.97 lakh new cases were reported. The peaks for the second and the third waves were attained faster on May 6, 2021 with 4.14 lakh new cases, and on January 20, 2022 with 3.47 lakh new cases, respectively. The first wave, dominated by the alpha variant, was less infectious and virulent compared with the delta variant which dominated the second wave. The caseload was far higher in majority of the states during the second wave compared to the first wave. The recovery rate steadily improved to 97.3 per cent by mid-July 2021 after having declined to 81.8 per cent at the end of April 2021. The third wave, which started in the last week of December 2021 and began to subside after January 20, 2022, was dominated by the Omicron variant which was highly infectious, though less deadly, raising the hope that the

pandemic might soon become endemic. Apart from deft administrative management based on testing and isolation in micro containment zones, the success of India's vaccination programme helped in effective containment of the highly infectious Omicron variant during the third wave.

I.13   India started vaccination programme from January 16, 2021. The progress of India's vaccination programme is reflected in the percentage of total population administered with one dose at 73.1 per cent and fully inoculated population at 62.2 per cent as on April 27, 2022 (Chart I.5). India has intensified its vaccination drive by initiating precaution doses and vaccination for 12-14 old age group, in the wake of the recent surge in new variants-led cases globally.

I.14   At the height of the first wave of infections, India registered one of the deepest recessions in the world, with GDP declining by as much as 23.8 per cent in the first quarter of 2020-21

Chart I.5: Vaccination Programme in India

Note: Data as on April 27, 2022.
Source: CEIC database; MoHFW, GoI.
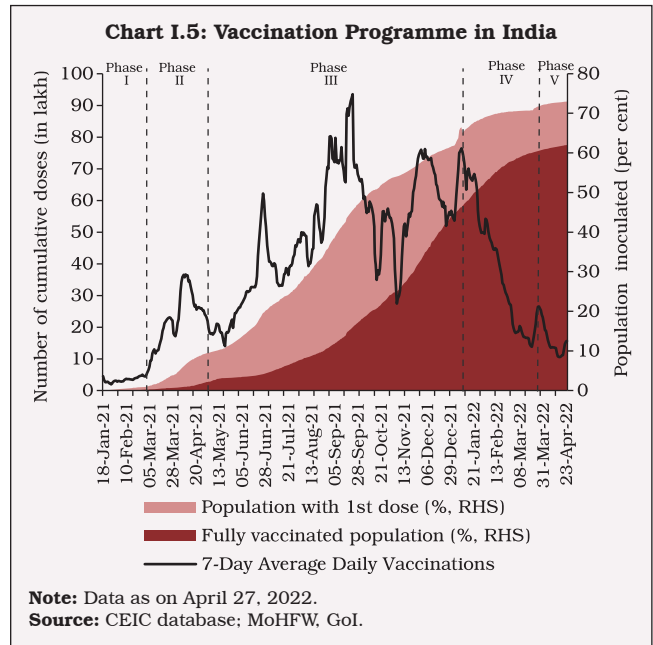
(Chart I.6a). A gradual recovery took hold during the second half of the year, as a result of which the contraction for the full financial year turned out to be far less severe at 6.6 per cent – which also placed India at a relatively better position

Chart I.6: Cross-country GDP Growth in 2020-21

a. GDP Growth during April-June 2020 (in per cent)

b. GDP Growth in 2020 (in per cent)

Source: The Economist Intelligence Unit.
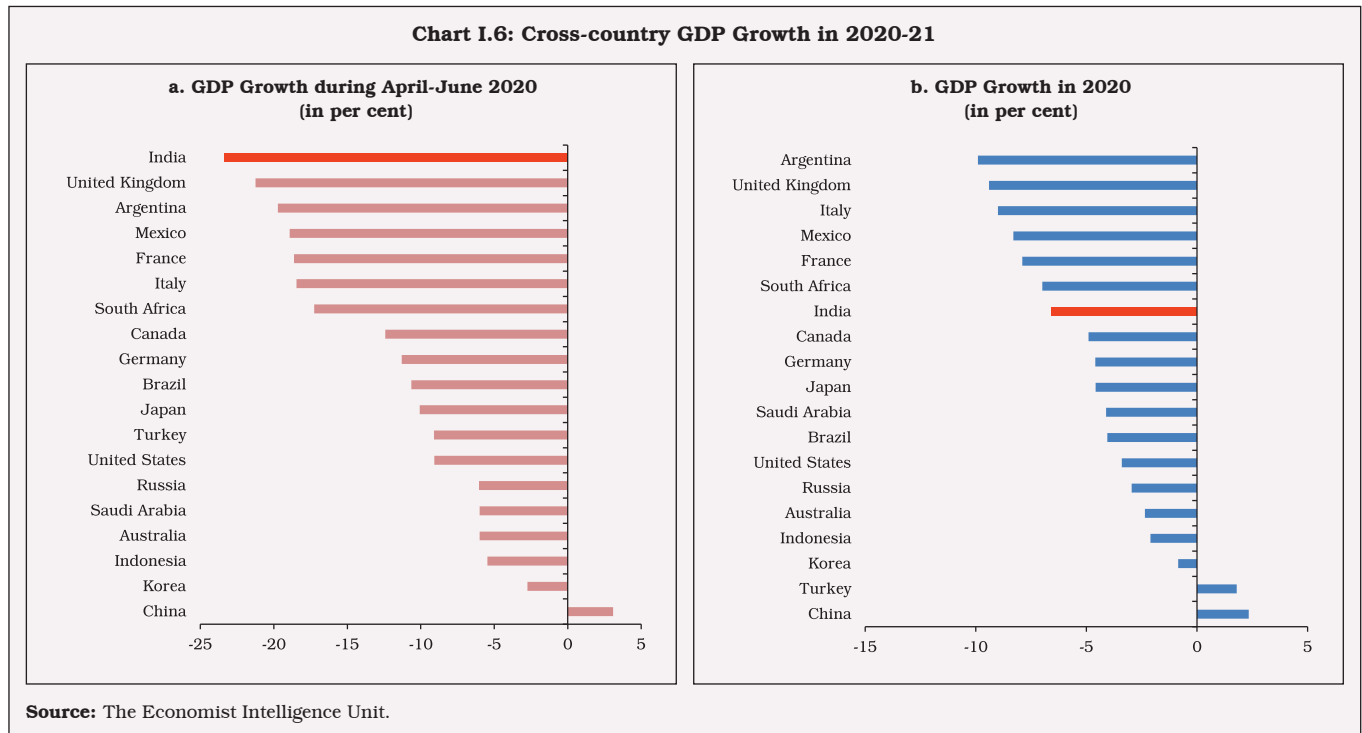
Chart I.7: Stringency Measure and GDP Growth in 2020-21

a. Average of Stringency Index

b. Stringency Measures and GDP
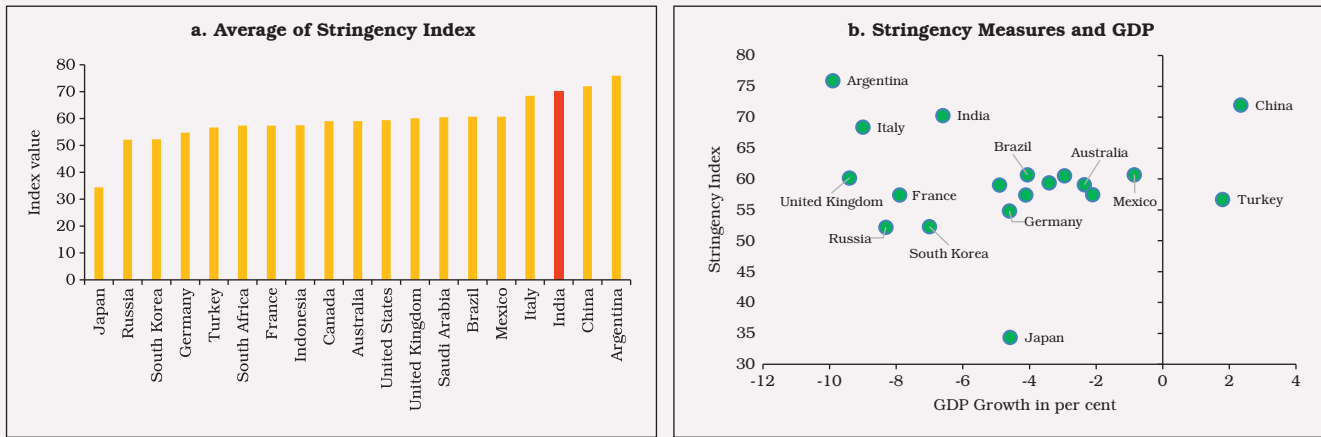
Source: Oxford COVID-19 Government Response Tracker and The Economist Intelligence Unit estimates.

among the G-20 countries in terms of annual GDP growth for 2020 (Chart I.6b).

I.15   A number of factors worked in conjunction to culminate into the most severe economic impact for India, with the stringency of the lockdown as the most cited reason. India imposed one of the most stringent lockdowns in the world in 2020 to curb the spread of the virus (Chart I.7a). Countries ranked higher in terms of stringency Index – India, Argentina, Italy and the United Kingdom – faced deeper contraction in GDP (Chart I.7b). There were, however, noteworthy outliers like China and Turkey which, despite stringent measures, were able to expand their GDP in 2020.

I.16   Apart from the direct restrictive measures, the preponderance of contact-intensive services sector in the existing structure of the domestic economy, exacerbated the economic consequences of the large pandemic shock (Chart I.8a). In case of India, as elsewhere, the services sector which includes majority of the contact-intensive and non-essential activities bore the maximum brunt of the pandemic. Second, self-employment is the pre-dominant nature of employment in India occupying the highest share

in overall employment among the G-20 economies (Chart I.8b). The majority of the self-employed workers is engaged in the informal sector with little job protection and weak social security support, accentuating the adverse economic impact of the pandemic. Third, countries could adopt alternative business continuity plans swiftly due to better access to internet. India, however, with 43 per cent of the population having access to internet in 2020, ranked low globally (World Economic Forum, 2020) [Chart I.8c]. This had hindered India's ability to shield businesses and jobs, which in turn contributed to the deeper contraction in activity. India used unprecedented fiscal support measures to safeguard livelihood and businesses and reinvigorate the economy.

I.17   The brunt of the second wave was felt in the first quarter of 2021-22. Camouflaged by statistical base effects, the level of GDP fell 8.3 per cent below the pre-pandemic (or corresponding 2019-20) level. Restricted lockdowns and a growing resilience of both firms and individuals in dealing with the infections reduced the severity of the economic impact — the economic impact of the second wave is estimated to be about one-third of

Chart I.8: Factors Contributing to the Deepest Slowdown

a. Retail, transport and hospitality (per cent to GDP)

b. Share of Self-Employment

c. Population using Internet
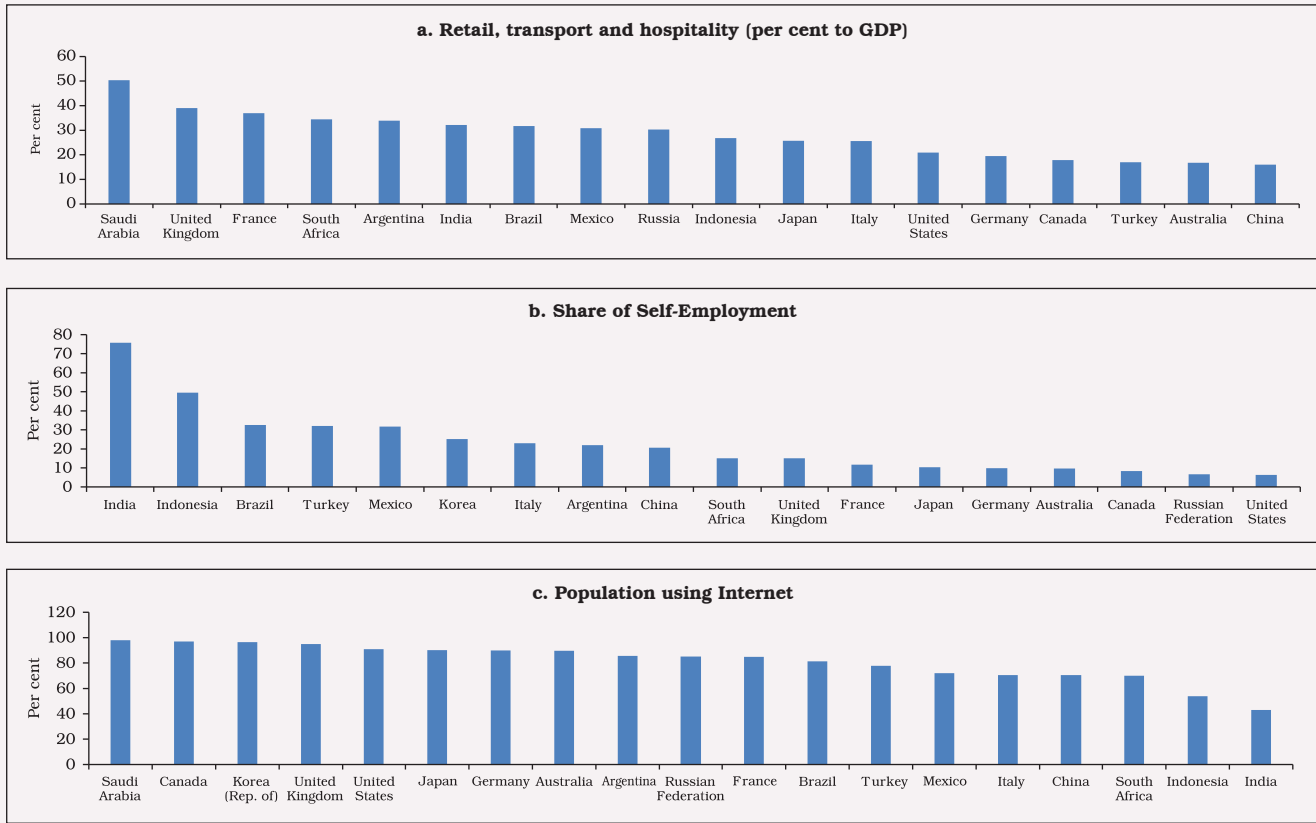
Source: CEIC database; Informal Economy Database, World Bank; World Economic Forum.

the first wave. The third wave impact is likely to be still smaller as evident from the momentum in high frequency indicators.

I.18   An overall monthly composite index of high frequency indicators shows that economic activity rebounded sharply in June 2021 with the ebbing of the second wave, and remained resilient pointing towards steady recovery till October 2021. November 2021 onwards, coal and semi-conductor chip shortages, followed by the third wave in January 2022 led to some weakening in the momentum as the index took a downturn in January and February (Chart I.9). Rural demand, in particular, lost steam after the second wave while urban demand recovered. Contagion from

Chart I.9: Economic Activity Index

Sources: CMIE database; CEIC database; and RBI staff estimates.

9
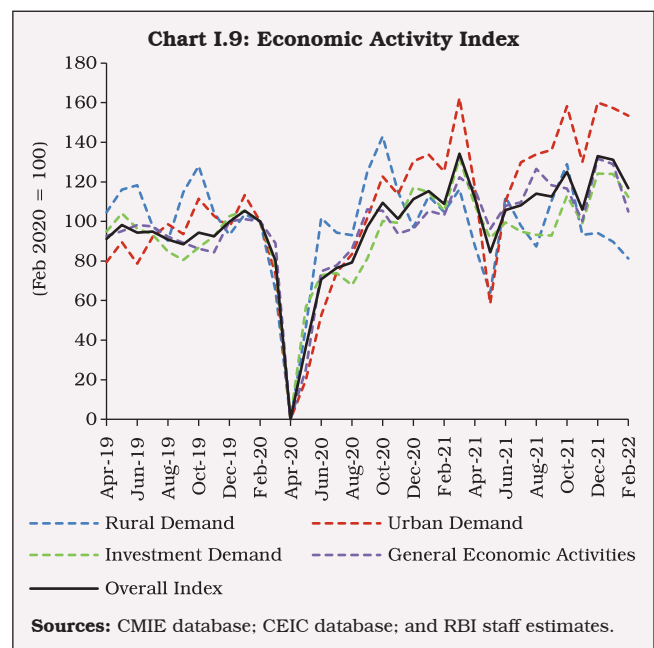
Chart I.10: Recovery in Demand and Output

a. Aggregate Demand (2019-20 = 100)

b. Aggregate Supply (2019-20 = 100)
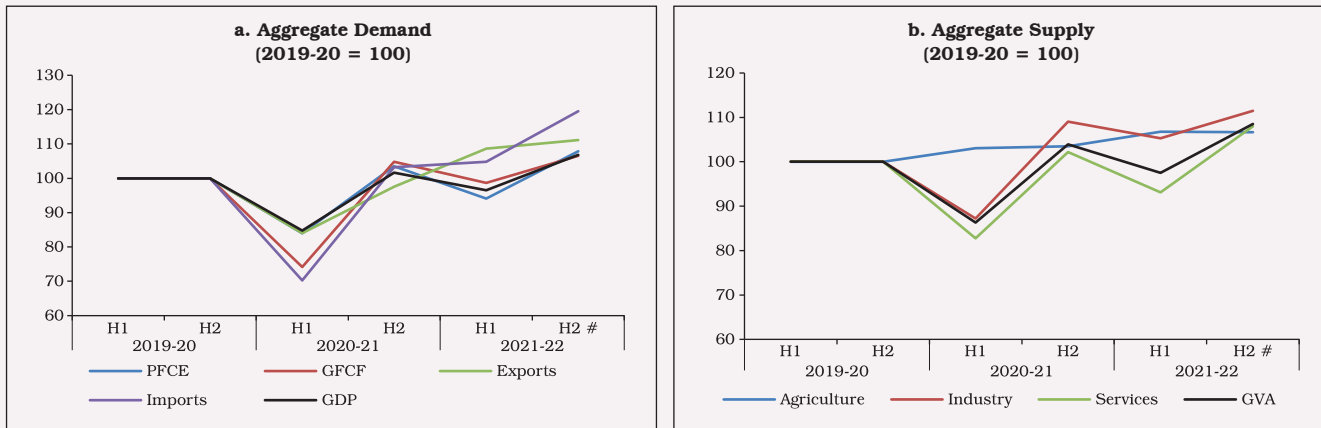
#: Implicit growth.
Source: NSO.

the Russia-Ukraine conflict dampened activity beginning March, thereby disrupting and delaying the recovery.

I.19   Despite the second wave, the turnaround in the economy in 2021-22 has been remarkable with all the components of aggregate demand surpassing the pre-pandemic levels in H2:2021-22 (Chart I.10a). GDP in 2021-22, however, is estimated to be only 1.8 per cent above pre-pandemic level suggesting lost growth over two years.

I.20   With discretionary consumption spending still lacking traction, private consumption is just a shade above its pre-pandemic level. On account of the massive hit taken by the contact-intensive activities, consumption of services contracted sharply. Consumption of durable goods – the erstwhile high growing component of total consumption, also suffered a sharp decline, while consumption of non-durable goods which include food items and other essentials held up (Chart I.11).

I.21   The current situation index (CSI) from the consumer confidence survey of the Reserve Bank

indicates a sharp fall from 85.6 in March 2020 to 63.7 in May 2020, dropping further to an all-time low of 48.5 in May 2021 with the onset of the second wave (Chart I.12). However, with the gradual abatement of the second wave, sentiments improved, though the index value remained below 100, indicating pessimism about the current economic situation. The future expectations index

Chart I.11: Growth in Private Consumption

Source: NSO.

10
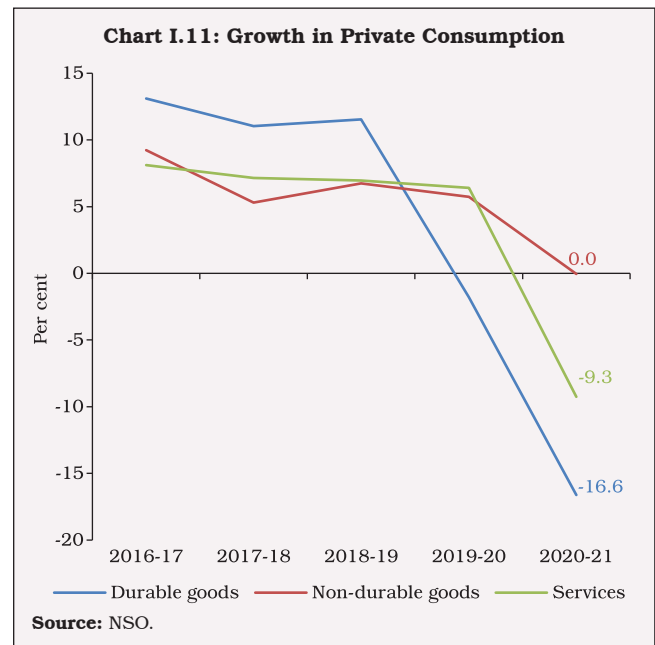
Chart I.12: Current Situation Index (CSI) and Future Expectations Index (FEI)
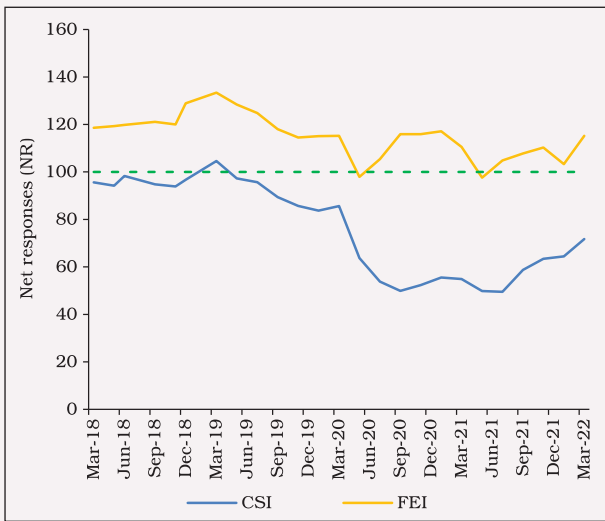
Source: CCS, RBI.

(FEI) remained above 100 indicating expectations of future recovery during most part of 2020-21 and 2021-22, except May 2020 and May 2021, when the intensity of restrictions during the respective waves of the pandemic was at a high level.

I.22   The Indian labour market witnessed a sharp deterioration during the first wave of the pandemic with unemployment rate touching a

record high and the labour force participation rate plummeting (Chart I.13.a). Reverse migration from urban to rural areas during the first wave period also resulted in a sharp increase in demand for Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) works in rural areas. The impact of the second wave and third wave was relatively muted and employment conditions have improved (Chart I.13.b).

I.23   As per the Periodic Labour Force Survey (PLFS) quarterly reports for the urban areas, casual labourers were the worst affected during the first and second waves of the pandemic, though the extent of the impact was lower during the second wave. Out of the total casual labourers working during January-March 2020, only 35.3 per cent remained in the same category during the first lockdown period of April-June 2020; nearly 50 per cent were pushed to unemployment and about 10 per cent moved out of the labour force during this period (Charts I.14a and I.14b).

I.24   Investment demand came to a standstill amid lockdown and suffered the deepest contraction during Q1:2020-21. The recovery has

Chart I.13: Labour Market Condition during the Pandemic
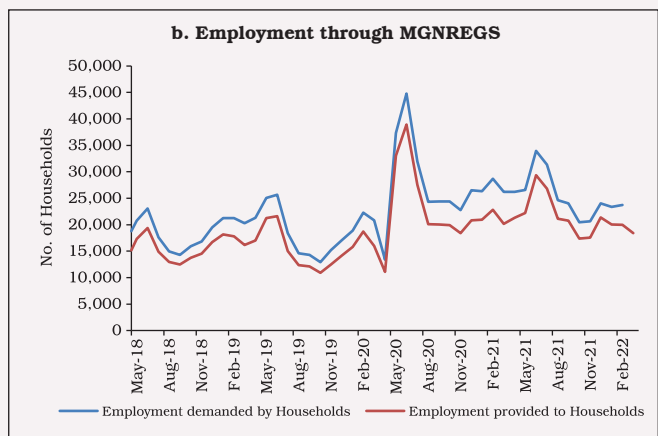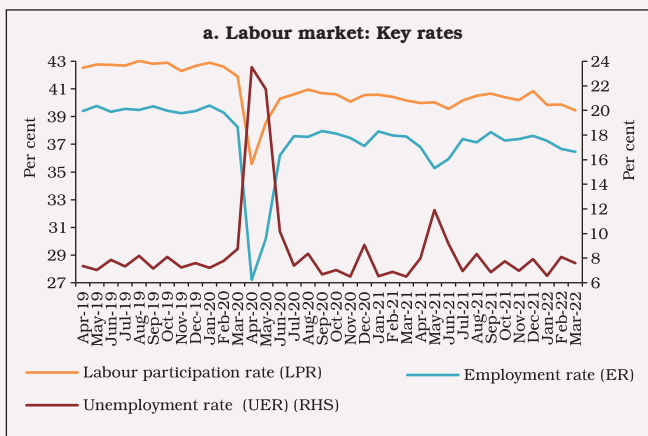
Source: CMIE database and GoI.

Chart I.14: Activity Status in Urban Areas during the Pandemic

a. Transition in Activity Status between Q4:2019-20 to Q1:2020-21 (First Wave)

b. Transition in Activity Status between Q4:2020-21 and Q1:2021-22 (Second Wave)
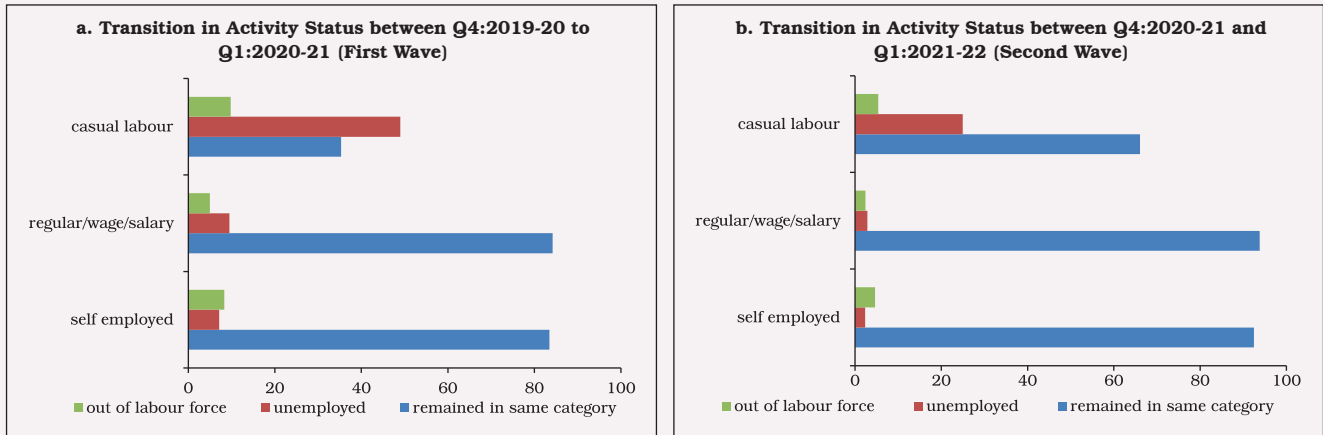
Source: PLFS Quarterly Reports, MOSPI, GoI.

been faster in GFCF primarily aided by a surge in government investment – the only sector that contributed positively to investment demand in 2020-21. Consequently, the share of government investment increased by 4.0 percentage points in 2020-21 (Chart I.15.a). On the other hand, subdued demand, inventory overhang and excess capacity held back private investment as reflected in reduced share of both corporate and household sector in total investment in 2020-21. Buoyed by the digitalisation drive

and demand for IT and ITeS, investment in intellectual property products displayed an uptick while investment in other dwellings, buildings and structure and machinery and equipment declined sharply reflecting a drag in construction and manufacturing activities in 2020-21 (Chart I.15.b).

I.25 Although overall fixed investment turned around to rise above the pre-pandemic level in 2021-22, the high frequency indicators of investment indicate a government capex-led

Chart: I.15: Investment Demand

a. Institution-wise Weighted Contribution to GFCF Growth

b. Growth in GFCF by Asset Classification
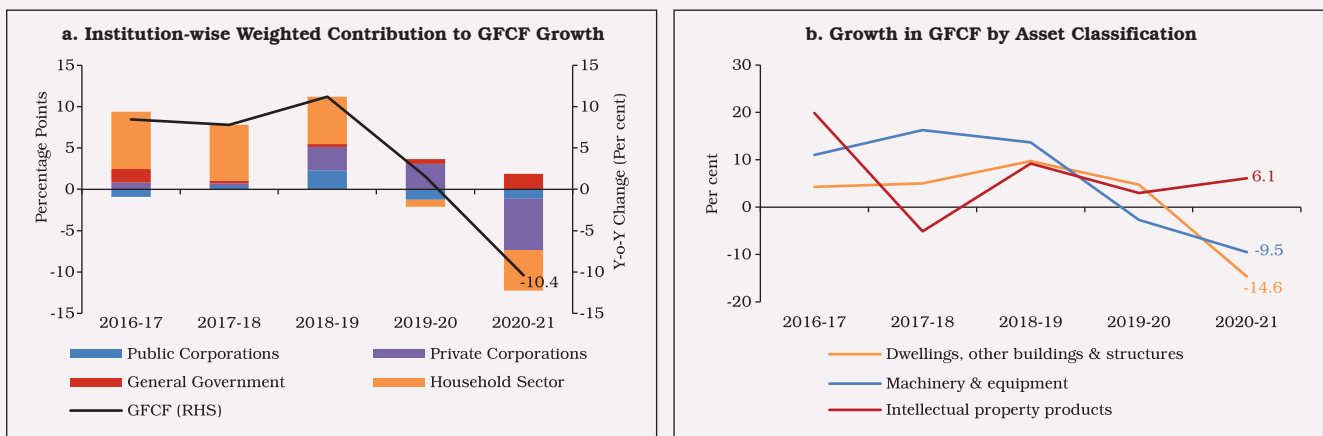
Source: NSO.

recovery with private investment remaining subdued.

I.26   Recent estimates from the Order Books, Inventories and Capacity Utilisation Survey (OBICUS) show that capacity utilisation has recovered to 72.4 per cent in Q3:2021-22 from 60.0 per cent in Q1:2021-22 (Chart I.16). Similar trend is reflected in net response of assessment on capacity utilisation (NRA_CU) and net response of expectation on capacity utilisation (NRE_CU) in the Industrial Outlook Survey (IOS), with a positive forward outlook as reflected in the NRE for Q1:2022-23.

I.27   The overall business assessment and expectation compiled from the survey responses of the quarterly IOS touched its historical low values in Q1:2020-21. A V-shaped recovery is observed in subsequent three quarters before it plummeted again sharply as the second wave hit the economy. The assessment turned optimistic immediately after the first and the second waves and the business expectations index

Chart I.17: Business Assessment Index and Business Expectations Index

Source: IOS, RBI.
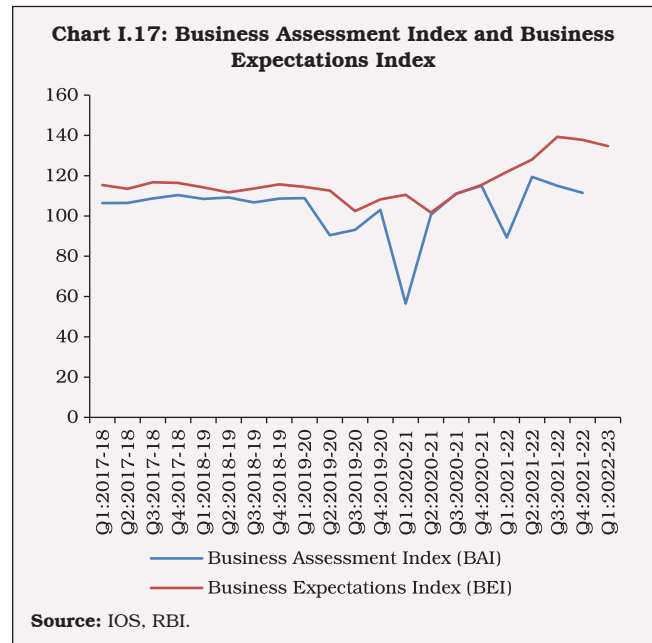
(BEI) remained above 100 since March 2020, indicating the positive outlook of the industry despite COVID induced disruptions (Chart I.17).

I.28   Another silver lining is the strong export performance that far-surpassed its pre-pandemic level (detailed in Chapter IV). A strong export performance, if sustained, could lead to additional capacity utilisation and generation and, thereby, lead to an upturn in domestic private investment cycle.

I.29   From the supply side, agriculture remained resilient throughout the pandemic period. Agriculture and allied activities were exempted from the lockdown measures and resilience also stemmed from a confluence of factors working in conjunction, *viz.*, a bountiful monsoon; adequate soil moisture; replenished reservoir levels; improved labour availability during the pandemic and favourable terms of trade for agricultural products (RBI, 2021). The industrial sector comprising manufacturing, mining and quarrying, and electricity, gas and water supply witnessed a

Chart I.16: Capacity Utilisation in Manufacturing

Source: IOS, OBICUS, RBI.
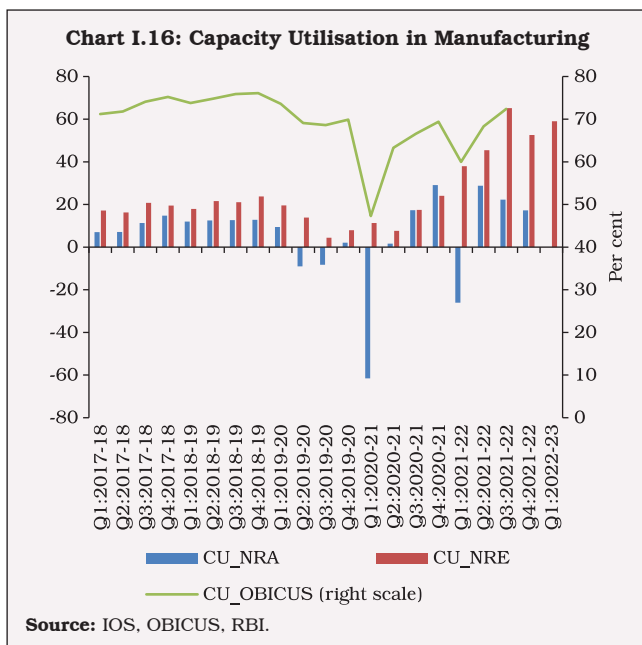
sharp decline in Q1:2020-21 with manufacturing nosediving to a record low (Chart I.10.b). Mining and quarrying, on the other hand, was lagging for some time and was in contraction even before COVID. Manufacturing which spearheaded the post first wave recovery remained resilient during the second wave.

I.30   Within services, the recovery has been heterogenous with financial, real estate and professional services and public administration, defence and other services gaining traction to surpass their respective pre-pandemic levels by 6.6 per cent and 6.4 per cent. On the other hand, recovery in trade, hotels, transport, communication and services related to broadcasting remained sluggish.

I.31   Presently, various sectors of the economy are at different stages of recovery (Table I.2). While agriculture remained resilient all through different waves of the pandemic, manufacturing and construction are on the path to recovery. After ebbing of the Omicron wave, green shoots of revival are visible even in contact-intensive services sectors.

I.32   Against the backdrop of COVID-19 induced business disruptions, the private corporate sector has shown robust resilience as firms adopted new modes of operations and aligned their business strategies to the new environment for doing business. A disaggregated firm level analysis, however, reveals uneven recovery across the weak and strong firms (Box I.1). While steady

Table I.2: Sector-wise Recovery Pattern

Sector		Trend Growth Pre-Pandemic		Growth Pandemic Period		Status
		2012-2017	2017-2020	2020-21	2021-22 over 2019-20	
1. Agriculture, forestry & fishing		3.6	5.2	3.3	6.7	Resilient
2. Mining & quarrying		2.4	2.4	-8.6	2.9	Recovering/Need Repair
3. Manufacturing		6.8	5	-0.6	9.8	
4. Electricity, gas, water supply & other utility services		6	7.5	-3.6	3.9	
5. Construction		4.2	4.6	-7.3	1.9	
6. Trade, hotels, transport, communication and services related to broadcasting	6.1. Trade, hotel and repair	8.4	8.1	-22.4	-10.9	Still Suffering
	6.2. Transport, communication and services related to broadcasting			-15.3		
7. Financial, real estate & professional services	7.1. Financial services	8.2	5.4	5.1	6.6	Resilient
	7.2. Real estate, and professional services			1.2		
8. Public Administration, defence and other services	8.1. Public Administration, defence	6.5	7.0	2.3	6.4	Resilient
	8.2. Other services			-11.5		Recovering/Need Repair
GVA at basic prices		6.6	5.9	-4.8	3.1	Recovering/Need Repair

Source: NSO and RBI Staff Estimates.

Box I.1
Did COVID-19 Expose Pre-existing Weakness in Corporate Balance Sheet?

The private corporate sector has shown resilience through the pandemic. An econometric model using listed firms' quarterly balance sheet data examines the sensitivity of the firms to the pandemic, captured by the absolute change in y-o-y profitability ratio, with specific control variables, *viz.,* age, size, industry as well as debt to assets ratio (DA), debt-service coverage ratio (DSCR) and interest coverage ratio (ICR).

$$\Delta\pi_{ij} = \alpha_j + \pi_{Q42020_i} + DSCR_{Q42020_i} + ICR_{Q42020_i} + DA_{Q42020_i} + Age_i + Size_i + \in_{ij}$$

Where π indicates profitability ratio and i and j indicate firm and industry, respectively.

In an alternate model (Table 1; column 3), the impact of the pandemic on weak and strong firms has been estimated by using the difference-in-difference (DID) method that compares the effect of an event (pandemic in this case) on the treatment group (group affected by the event) with the control group (group unaffected by the event)[2]. Following Kulkarni (2020), weak or zombie firms are defined as firms with ICR<1 and DSCR<1 in a cross-sectional model using quarterly balance sheet data of firms for the time-period March 2019-March 2021.

$$\pi_{ijt} = \gamma_t + \delta \times 1_{E=1} + \theta \times 1_{i=T} + \tau \times 1_{E=1} \times 1_{i=T} + \in_{ijt}$$

$1_{E=1}$ is the time indicator variable which takes value 1 if the observation falls in the post-pandemic period (end-March 2020 onwards) and $1_{i=T}$ is the indicator variable for treatment group (weak or zombie firms in this case). The estimated coefficient τ captures the differential impact of the event on the treatment group (in this case weaker firms) as compared with the control group. To understand the impact of the pandemic on smaller firms, the DID regression is also

Table 1: Empirical Results

Dependent Variable	$\Delta\Pi$	$\Delta\Pi$	Π	Π
	(1)	(2)	(3)	(4)
DSCR		-0.0070263**		
		(0.0017011)		
ICR	-0.0034336**			
	(0.0010129)			
DL	0.27542	0.2814185		
	(0.3828997)	(0.381821)		
Size	-0.000148**	-0.000147**		
	(0.0000496)	(0.0000496)		
Age	0.0130868	0.0093762		
	(0.0428435)	(0.0427686)		
π Q42020	-0.000013**	-0.000013**	-0.000012**	-0.0000118
	(0.00)	(0.00)	(0.000)	(0.00)
Time(δ)			-4.595627**	-2.466289
			(0.6594099)	(1.748093)
DID interaction (τ)			2.765929	0.6538439
			(1.792182)	(2.675901)
Treatment (θ)			-23.46111***	-16.23408***
			(1.213463)	(1.846779)
Industry dummy	Yes	Yes	Yes	Yes
No of observations	1143	1143	12,447	5455
R²	0.1357	0.1355	0.0918	0.0483
F	360.51	343.39	22.13	21.19
Prob>F	0.000	0.000	0.000	0.000

Note: Standard errors in parentheses. ***: Significant at 1 per cent. **: Significant at 5 per cent.

(Contd...)

[2] Since pandemic affected all the firms, there is no natural control or treatment groups in the present case. Following the methodology of Vig (2013) and Kulkarni (2020), the pre-treatment cross-sectional variation is explored to construct the treatment and control group in the present case. Here the hypothesis is that firms which had a weaker balance sheet during pre-pandemic period would be more affected by the pandemic and thus these firms constitute the treatment group.

estimated separately on a smaller sample of firms which consists of the bottom 25 per cent of the initial sample set in terms of asset size (Column 4).

The results suggest that companies with relatively sound financials indicated by higher DSCR and ICR had lower sensitivity to the pandemic. Further, larger companies and companies with higher profit in Q4:2019-20 too had lower sensitivity to the pandemic-induced disruptions. Weaker firms and weaker small sized firms suffered lower profitability even in the pre-pandemic era. Weak firms' financials deteriorated further during the pandemic.

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Vig, V. (2013). Access to collateral and corporate debt structure: Evidence from a natural experiment. *The Journal of Finance*, 68(3), 881-928.

Kulkarni, N. (2020). *Resolving Zombie Lending with Collateral Reform*. Working Paper. Centre for Advanced Financial Research and Learning (CAFRAL). https://www.cafral.org.in/sfControl/content/Speech/327202152843PMMisallocation_Creditor_Rights_II.pdf

improvement was observed for the strong firms, weak firms remained vulnerable with negative profitability, indicating a divergent recovery within the organised corporate sector (Charts I.18a and I.18b).

I.33   It is found that real estate and automobiles which were badly hit by the pandemic, the slowdown started even before the pandemic. Retail trading, hotel and restaurants, air transport services, transport logistics services, and education are some of the contact-intensive sectors in which profitability was dented by the pandemic. The spurt in profitability in consumer electronics, storage and distribution appliances

was primarily due to the increased demand during lockdown, while online marketplaces, ITES, computer software, communication equipment, drugs and pharmaceuticals, health services and business services and consultancy are some of the sectors which remained relatively unscathed from the effect of the pandemic (Chart I.19).

Impact on the Unorganised Sector

I.34   Household sector's share in gross value added (GVA) which represents the unorganised sector activity fell to its lowest since 2011-12, confirming the view that the pandemic took a larger toll on the informal economy. In the manufacturing sector, corporate sector GVA and household

Chart I.18: Corporate Performance during the COVID-19 Pandemic

a. Solvency Ratios

b. Profitability Ratios
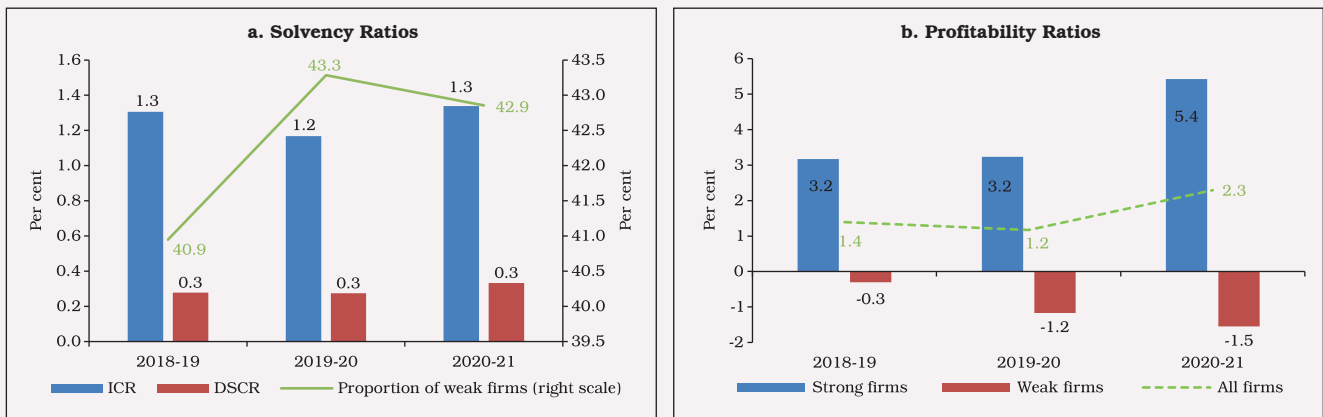
Note: Profitability ratio is captured by profit after tax (PAT) as percentage of average total income. Figures indicate median values for all the years.
Source: RBI staff estimates based on manufacturing firms' annual balance sheet data for the respective years from Prowess, CMIE.

Chart I.19: Sector-wise Impact of the Pandemic

Note: Pre-COVID and post-COVID profitability ratios are calculated as the average profit after tax as percentage of total income during March-December 2019 and June 2020-March 2021, respectively.
Source: CMIE database.
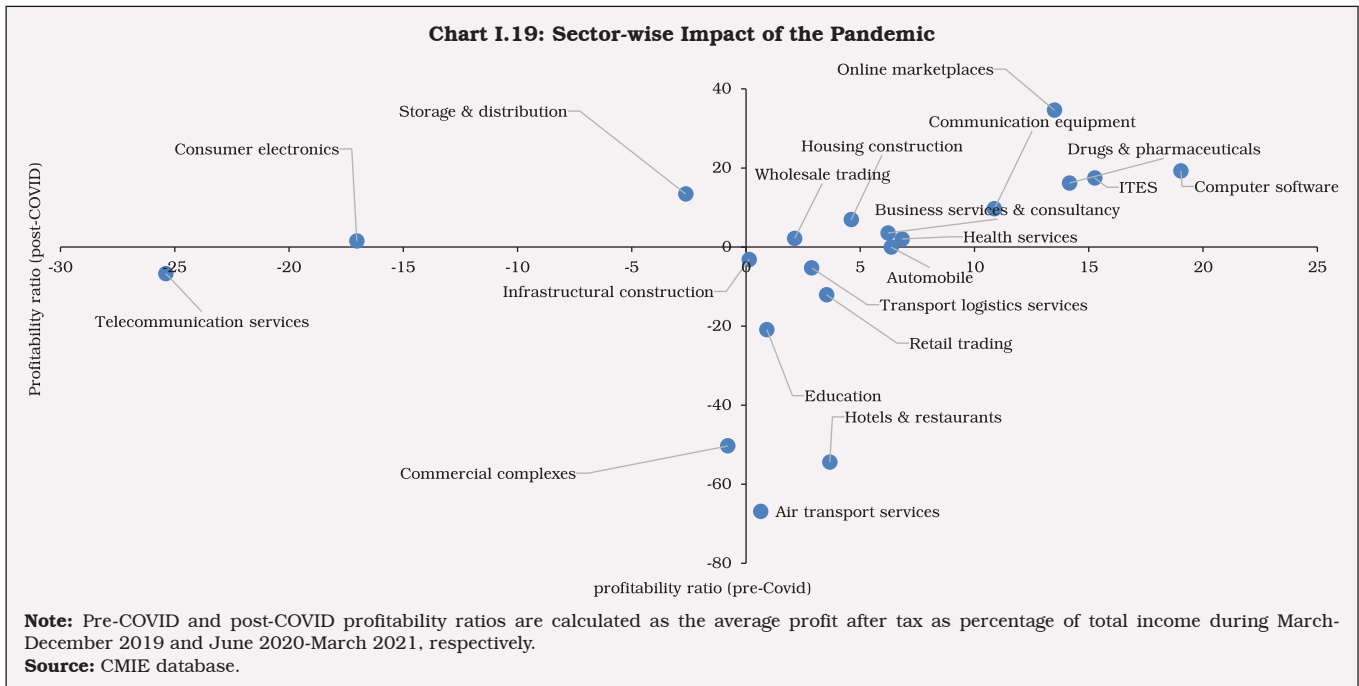
sector GVA which had broadly moved together in the pre-pandemic period, moved in opposite directions in 2020-21. While corporate sector GVA registered growth, the household sector GVA registered heavy contraction (Chart I.20).

Chart I.20: Sector-wise Growth in Manufacturing GVA

Source: NSO.
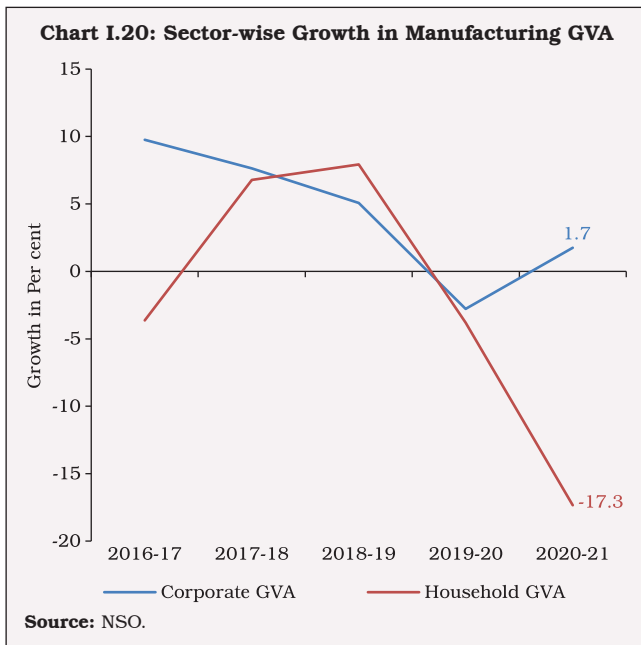
I.35   Within services sector GVA, unorganised segment, which has a higher share registered a sharp drop in 2020-21 compared with the organised sector (comprising private corporates, general government and public sector), indicating larger losses incurred in the unorganised sector (Chart I.21).

Potential Output and Scarring Caused by the Pandemic

I.36   COVID-19 has brought in steep challenges in conceptualising and estimating potential output. Using the standard statistical filtering methods such as Hodrick-Prescott (HP), Baxter-King (BK) and Christiano-Fitzgerald (CF) filters, output gap is seen as closing early in 2022-23. However, the scarring of potential output may be getting overestimated in these methods and the output gap accordingly is likely to close later than is indicated by filter-based techniques. The multivariate Kalman filter estimates of potential

Chart I.21: Organised and Unorganised Services Sectors

a. Trends in Services GVA (excl. Construction) Growth

b. Sub-Sector wise Growth of Services GVA
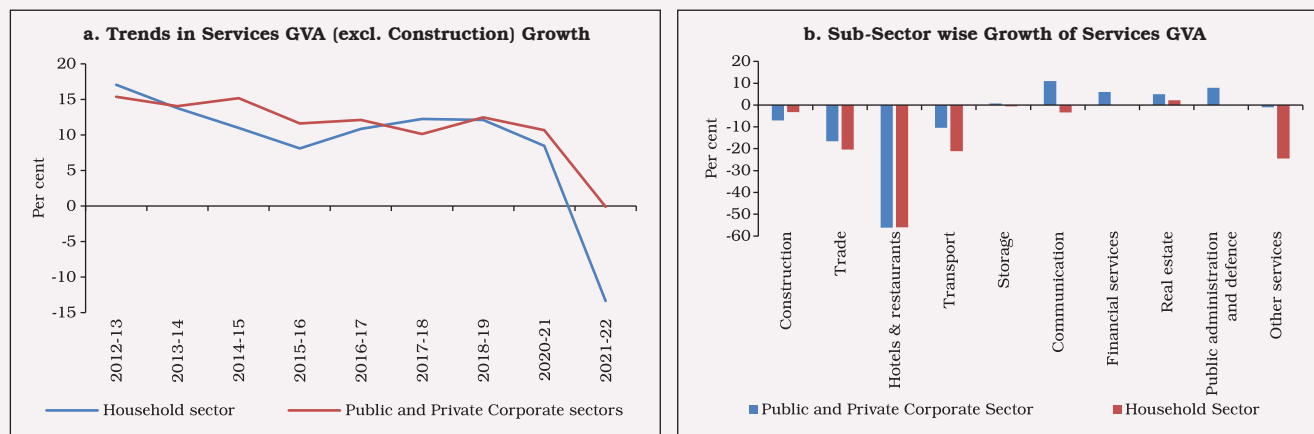
Source: NSO.

output indicate that during the pandemic period, a negative output gap of about 4-6 per cent per quarter during Q2:2020-21 through Q1:2021-22 opened up (Patra *et al.,* 2021). As per an alternative methodology proposed by Rangarajan-Srivastava (2017)[3], potential growth for 2020-21 is estimated to have declined to 5.4 per cent from 7.8 per cent in 2017-18.

I.37 During the COVID period, multiple waves and restrictive measures disrupted the supply chains and interrupted productive activity. However, demand conditions were impacted far more than the supply situation (Box I.2) as both consumer and business confidence fell and remained subpar.

I.38 In last four decades, India has faced three major shocks – the 1991 balance of

payments (BoP) crisis which was followed by a major liberalisation drive that raised India's trend growth; the global financial crisis of 2008; and the COVID-19 pandemic which hit India during early 2020 and still unfolding, and the impact of which on trend growth remains uncertain. Apart from the immediate moderation in growth caused by these shocks, they structurally altered the dynamics of growth, as observed statistically from the structural breaks in GDP growth. The Bai and Perron structural break test (Bai and Perron, 1998) identifies three break points in the post-independence period — 1979-80, 2002-03 and 2011-12 (after the GFC) (Chart I.22).[4] Risks to post-COVID trend growth can be mitigated through targeted structural reforms and policy changes as discussed in detail in the subsequent chapters.

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[3] The Rangarajan-Srivastava (R-S) model (2017) in its assessment of potential output uses a disaggregated approach for deriving relative contribution of different factors, *viz.,* total amount and sectoral allocation of investible resources in the economy, sectoral incremental output-capital ratio. The value of incremental output-capital ratio is taken as the average for the period 2012-13 to 2019-20, and the buoyancy of net indirect taxes to GVA is assumed to be 1 for 2020-21.

[4] The outcome of reform measures initiated during the decade of 1990s yielded results with lags and was manifested in a structural break around early 2000s when the growth trajectory shifted to a higher enclave until the GFC. Post GFC, once the macroeconomic stabilisation policies were withdrawn, another structural break occurred during 2011-12, after which trend growth settled at a lower level. The COVID pandemic shock is by far the largest shock in terms of the magnitude of contraction in GDP.

Box I.2
COVID-19 Shock - Relative Impact on Demand and Supply

Against the backdrop of the pandemic, using the Taylor Rule framework, a consensus trend is extracted in the form of a dynamic factor from two series — differences in output gap and differences in inflation gap — which has been used in the identification of demand pressure (Taylor, 1993; Blanchard and Quah, 1989). Phases in the business cycle that are devoid of demand-side disturbances qualify as supply-side disturbances measured as residual effects. Further, a demand-side disturbance can be disentangled into positive and negative demand pressure (+) / (-). Positive demand side pressure is identified when the difference in output gap and the difference in inflation gap are both positive. Similarly, negative demand pressure is recognised whenever the differences in output gap and inflation gap turn negative.

The consensus trend from the differences in output gap and inflation gap is extracted by using a Two-Step (TS) estimation procedure in a dynamic factor model (Doz, Giannone, and Reichlin 2011)[5].

The pre-COVID growth between the latter half of 2017 and the first half of 2019 was demand-led, which eventually collapsed during the first wave of the pandemic. Despite the presence of supply-side bottlenecks, it is observed that the economic contraction during the first wave of COVID-19 was dominated by demand-side factors (Chart 1). The steady decline in the consensus trend (TS core) in recent months implies the presence of supply-side bottlenecks.

Chart 1: Identification of Demand (+) / (-) and Supply-side Pressures

Source: RBI staff estimates.
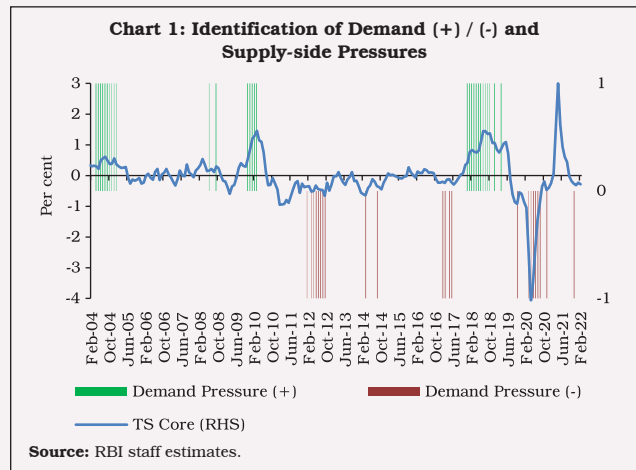
References:

Blanchard, O.J., Quah, D., 1989. The dynamic effects of aggregate demand and supply disturbances. *American Economic Review* 79, 655–673.

Doz, C., D. Giannone and L. Reichlin (2011) 'A two-step estimator for large approximate dynamic factor models based on Kalman filtering', *Journal of Econometrics*, 164(1): 188–205.

Taylor, John B (1993), "Discretion versus Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy*, 39, pp.195-214.

I.39   The pandemic is a watershed moment and the ongoing structural changes catalysed by the pandemic can potentially alter the growth trajectory in the medium-term. Sustained thrust on capital expenditure by the government, push to digitalisation and growing opportunities for new investment in areas like e-commerce, start-ups, renewables and supply chain logistics could in turn, contribute to step up the trend growth while closing the formal-informal gap in the economy.

I.40   The pre-COVID trend growth rate works out to 6.6 per cent (CAGR for 2012-13 to 2019-20) and excluding the slowdown years it works out to 7.1 per cent (CAGR for 2012-13 to 2016-17). Taking the actual growth rate of (-) 6.6 per cent for 2020-21, 8.9 per cent for 2021-22 and assuming growth rate of 7.2 per cent for 2022-23, and 7.5 per cent beyond that, India is expected to overcome COVID-19 losses in 2034-35 (Chart I.23). The output losses for individual years have been worked out to ₹19.1 lakh

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[5] In this exercise, the monthly index of industrial production (IIP) has been taken as a proxy for output while monthly consumer price index (CPI) excluding food and fuel as a measure for CPI core inflation.

Chart I.22: Structural Breaks in GDP

Source: NSO; and RBI staff estimates.

Chart I.23: Medium-term Real GDP Path

Source: RBI staff estimates.
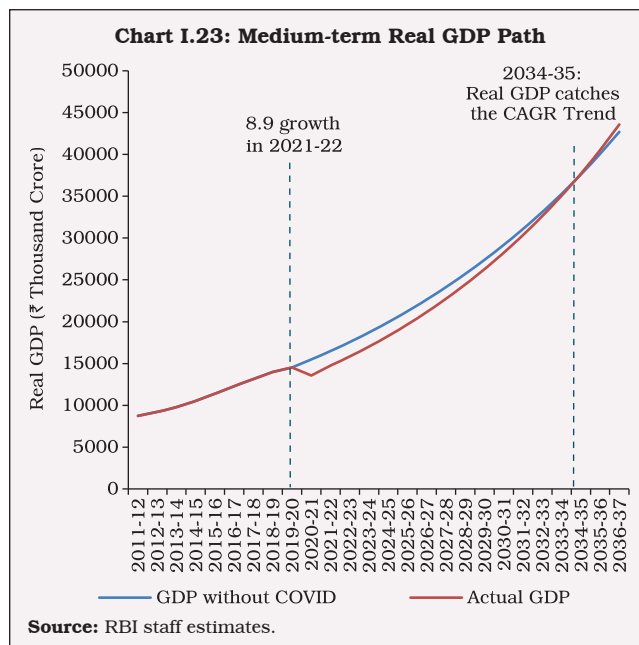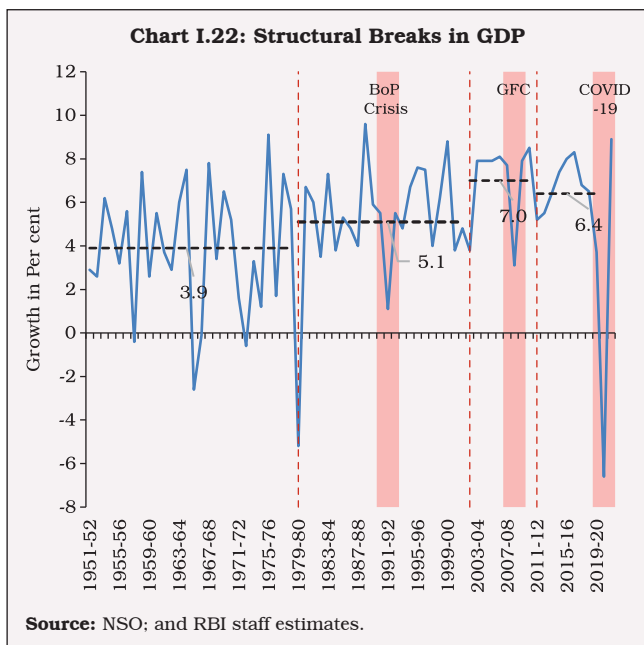
crore, ₹17.1 lakh crore and ₹16.4 lakh crore for 2020-21, 2021-22 and 2022-23, respectively.

4. Risks to Recovery

I.41   The perturbations from repeated waves of COVID-19 pandemic have come in the way of sustained recovery and the quarterly trends in GDP essentially followed the ebbs and flows of the pandemic. Following a very sharp contraction in Q1:2020-21, the economic momentum progressively picked up till it was hit by the second wave in Q1:2021-22. Similarly, the impact of the third wave, concentrated in the month of January 2022 dented partially the recovery process. "We are living in a world of Knightian uncertainty (Das 2022)", suggesting the lack of any quantifiable knowledge about some possible occurrence as opposed to quantifiable risks.

I.42   The pandemic is not yet over. A fresh wave of COVID has hit China, South Korea

and several parts of Europe. However, various economies are reacting divergently ranging from a no-COVID policy in some jurisdictions (*e.g.*, China, Hong Kong and Bhutan) on the one hand to those with relatively open borders and removal of internal restrictions (*e.g.,* Denmark and the UK). In India, the restriction levels are being dynamically calibrated at local levels in response to the evolving situation.

I.43   With   the   ongoing   Russia-Ukraine conflict, the downward risks to global and domestic growth are getting accentuated through surge in commodity prices and global supply chain disruptions. The supply constraints and longer delivery times pushed up shipping costs, commodity prices, thereby intensifying inflationary pressures and threatening the nascent economic recovery across the world. India too felt the pressure from the global supply chain disruptions with the supplier's delivery time[6] falling to its lowest point of 29.5

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[6]   Suppliers delivery time is an indicator taken from IHS Markit - Purchasing Managers' Index (PMI). Reading above 50 indicates improvement in delivery times, reading of 50 indicates no change and reading below 50 indicates slower delivery.

in April 2020. While the delivery time improved thereafter, it remained below 50 all through 2020-21 and 2021-22. The increased delivery times and higher raw material prices squeezed profits of Indian firms from Q3:2020-21 onwards. The Indian automobile sector which benefitted from consumers' preference for personal vehicles received a jolt from the global semiconductor shortages making them incapacitated to benefit from increased demand as there was a surge in waiting periods for customers. Growth risk from geopolitics-induced supply shocks looks more acute for oil importers like India who are already facing a tight fiscal position due to the pandemic related relief packages by the Government.

I.44   The capital expenditure push in the Union Budget for 2022-23 can provide the much needed support critical to achieve sustained high growth by enhancing productive capacity, crowding in private investment and strengthening aggregate demand. India must focus on building world class infrastructure *apropos* the needs of a modern economy.

I.45   With unlocking and learnings from the pandemic that are increasingly getting internalised, the time is ripe to start reconstruction. A push toward universal vaccination and booster doses in India, combined with adoption of work-from-home mode in workplaces augurs well for the future of the economy. The future work processes are changing with the help of digitalisation and India has particularly adapted well to it. In a sequel to the pandemic, India is set to unleash impulses of animal spirits and poised to move to a higher growth trajectory with digital start-ups and ventures, biomedical, pharmaceuticals and healthcare sectors emerging as new winners.

I.46   The dividends of reforms initiated to counter the pre-COVID slowdown along with additional measures and initiatives during the pandemic will help launch the economy on a sustainable high growth path. The behavioural and technological changes brought about by the pandemic may usher in a new normal which would not necessarily ape the pre-pandemic trends but would be built on a more efficient, equitable, clean and green foundations.

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The recovery in economic activity remains stimulus dependent. For restoring and recreating a policy environment conducive for private sector-led growth post-COVID, timely rebalancing of monetary and fiscal policies may become necessary given the current configurations of debt and liquidity. Government debt exceeding threshold levels exert upward pressures on the term premium and dampen growth. Time varying fiscal multipliers suggest that fiscal consolidation is not growth retarding once the economy recovers to its steady state. The debt path over the next five years, even under the best-case scenario, may further squeeze fiscal space unless strategic policy efforts covering both taxes and expenditure aim at targeted consolidation. What should be the appropriate monetary-fiscal policy mix in the post-pandemic future becomes a searing existential question for which past behavioural regularities, parametric estimates and analytical received wisdom may not provide adequate guidance.

1. Introduction

II.1   The monetary and fiscal policy response to COVID in India was swift, bold and targeted.[1] Given the enormous scale and wide-ranging nature of the fiscal and monetary stimulus and the overall theme of this report, the post-pandemic macroeconomic policy balance in India will warrant a rethink, in view of the post-COVID debate: liquidity trap limits the effectiveness of monetary policy (Krugman, 2020); fiscal multipliers are large and significantly greater than one during periods of economic slack/high uncertainty (Goemans, 2022); money-financed fiscal stimulus has larger multipliers than debt-financed stimulus (Gali, 2020); excess money injected by central banks is not always inflationary (Stella, 2021); sustainable debt levels are much higher than what one possibly thought earlier (Blanchard, 2022); and secular stagnation – particularly associated with depressed private demand and low interest rate – justifies fiscal activism (Summers and Rachel, 2019). Nevertheless, a large fiscal stimulus in emerging market economies (EMEs) post-COVID could raise the future inflation trajectory. Higher interest rates to deal with such inflation could endanger debt sustainability in a weak growth environment (BIS, 2021).

II.2   Against this backdrop, the key motivations of this chapter are to: (i) assess the impact of fiscal stimulus on growth under different macroeconomic conditions; and (ii) examine the importance of timely rebalancing of crisis-time policies to minimise risks to medium-term growth and inflation. This assessment is done against the backdrop of the existing empirical findings in India which suggest a threshold relationship between debt and GDP (at 40 per cent of GDP for the central government) beyond which further increases in debt become detrimental to growth. For every 0.3 percentage point of GDP increase in the central government's fiscal deficit or market borrowing, long-term G-sec yields could firm up by 10 bps (or even higher during periods of sharper market reactions) (GOI, 2017). The initial gains in

[1]   These measures have been comprehensively documented in RBI (2021a; 2021b) and Patra (2022).

output due to delay in monetary policy response tend to get eroded by the higher than warranted policy reaction later on, eventually resulting in a substantial deterioration in the medium-term output-inflation trade-offs (RBI, 2021c). In the context of these India specific empirical lessons, this chapter highlights that post-COVID, a return to the fiscal-monetary steady state balance could be conducive for both higher growth and lower inflation. The post-COVID period also calls for a revisit of debt sustainability.

II.3   Set against these key motivations, this chapter is organised under five sections. Section 2 examines the effectiveness of fiscal stimulus by estimating the fiscal multipliers associated with different expenditures and their asymmetric impact over the business cycles. Section 3 discusses the lessons learnt from India's own experience in the past, to draw inferences for post-COVID rebalancing. It deals with three specific empirical issues: (i) the impact of surplus liquidity on inflation; (ii) the threshold level of government debt beyond which term premia and G-sec yields start to harden; and (iii) the relationship between growth and unemployment on one hand and output gap and inflation on the other. Feasible options for public debt consolidation are explored and alternative trajectories for Government debt are evaluated in Section 4. The key policy inferences are summarised in Section 5.

2. Impact of Policy Stimulus on Growth

II.4   The impact of fiscal stimulus on growth can be assessed directly from the components of GDP – *i.e.*, the contributions of government final consumption expenditure (GFCE) and public sector capital formation to GDP growth. A more comprehensive assessment, however, can be conducted through time-varying fiscal multipliers, as the impact materialises over several quarters. In India, increase in public expenditure is found to be more effective than tax cuts whereas for dealing with a situation of economic overheating tax hikes work better than cutbacks in expenditure (Bhat and Sharma, 2021).

II.5   Against this backdrop, using a three-variable structural vector autoregression (SVAR) model (Blanchard and Perotti, 2002) with annual nominal growth in tax revenue, government expenditure and GDP for the period 1981-82 to 2019-20[2], general government (centre and states combined) fiscal multipliers for total expenditure and its components are estimated with relevant controls.[3] The estimated impact multipliers show that only capital expenditure leads to proportionately higher increase in GDP (Table II.1). However, the revenue expenditure and total expenditure multipliers are less than one – in the range of 0.72 to 0.84 – which corroborates the limited effectiveness of fiscal activism in reviving

Table II.1: Overall Fiscal Multipliers

	Impact Multiplier
Total Expenditure	0.72
Revenue Expenditure	0.79
Revenue Expenditure net of Interest Payments and Subsidies	0.84
Capital Expenditure	1.32

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[2]   The estimation is restricted to pre-COVID period as unprecedented variation in many key macroeconomic variables due to the COVID shock could have disturbed the empirical relationship.

[3]   Following the literature, control variables used for the estimation are: global growth, changes in exchange rate (Indian rupees per USD), weighted average call money rate (WACR), government debt to GDP ratio and change in Sensex, with appropriate lags. The results are robust under the unit root and the auto-correlation tests. The impact multiplier is derived by taking the ratio of the coefficient to the share of government expenditure in GDP (Blanchard and Perotti, 2002).

and reconstructing the Indian economy post-COVID. In order to identify conditions under which a fiscal stimulus can be expansionary as opposed to conditions under which fiscal consolidation can be expansionary, time-varying multipliers need to be estimated.

II.6   A smooth transition vector autoregression (STVAR) model[4] is employed to assess the impact of government expenditure on GDP in the Indian context, which captures non-linearity in the relationship and helps estimate the state-dependent multipliers for regimes of economic expansion and contraction (Auerbach and Gorodnichenko, 2012). The STVAR includes nominal GDP and fiscal variables (total expenditure, capital expenditure and revenue expenditure; one at a time) as the main variables and output gap is taken as the reference variable to define expansion and recession. Given that a sufficiently long time series data are needed to capture the upcycle and downcycle trends, the analysis has been restricted to the Centre only for which quarterly fiscal data are available for a longer time frame.

II.7   Two broad policy inferences could be drawn from the estimated multipliers (Table II.2). First, during a period of economic slack, and a post-crisis situation of sudden collapse in private demand, fiscal stimulus helps in generating growth

Table II.2: Asymmetric Fiscal Multipliers

Duration of Multiplier/ Types of Multiplier	Impact (Current)	Cumulative (Over 4 quarters)	Peak
Recession/Slowdown			
Total Expenditure	0.78	3.98	1.89
Capital Expenditure	0.43	6.66	3.41
Revenue Expenditure	0.43	3.77	2.64
Expansion			
Total Expenditure	-0.21	-0.22	0.15
Capital Expenditure	-0.13	-0.44	0.55
Revenue Expenditure	-0.28	-0.74	-0.07

Source: RBI staff estimates.

impulses that amplify through multiplier effects. Capital expenditure is particularly effective in this state of the economy, signifying the importance of quality of public expenditure even in a period of economic slack. Second, in a period of economic expansion, multiplier values turn negative, signifying the detrimental impact of expansionary fiscal policy on growth. Fiscal consolidation, thus, becomes a necessity for allowing the private sector to sustain the growth momentum and mitigating the potential drag on growth from fiscal activism once the economy fully recovers. The need for a credible medium-term fiscal consolidation plan after a crisis to safeguard the medium-term growth trajectory, thus, is corroborated by empirical assessment of the relationship between fiscal expenditure and growth for India.

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[4]   Logarithmic series for data relating to the period 1998:Q1 through 2020:Q1 are considered for the empirical estimation of the following relationship.

$$X_t = \left(1 - F(Z_{t-1})\right)A(L)X_{t-1} + F(Z_{t-1})B(L)X_{t-1} + u_t \quad \text{.........(1)}$$

$$u_t \sim N(0, \Omega_t), \ \Omega_t = \left(1 - F(Z_{t-1})\right)\Omega_A + F(Z_{t-1})\Omega_B,$$

$$F(Z_t) = \frac{e^{-\gamma Z_t}}{1 + e^{-\gamma Z_t}}, \gamma > 0, E(Z_t) = 0, V(Z_t) = 1$$

where Z_t is an index variable considering positive output gap as expansion and negative output gap as contraction, X_t is the vector of variables with fiscal variable placed before GDP, and with Cholesky type identification strategy (Blanchard and Perotti, 2002).

II.8   In India, a sizable part of the fiscal stimulus during the pandemic was also aimed at incentivising the flow of credit to stressed sectors through collateral free guarantee support and interest rate subventions. Accommodative monetary policy was also pursued alongside, which is likely to have contributed to enhancing the impact of fiscal stimulus as it ensured ample and low-cost liquidity that partly worked through these fiscal incentives. Accordingly, a four variable VAR model – with year-on-year growth in real GDP, CPI inflation (excluding food and fuel items), weighted average call money rate (WACR) and gross fiscal deficit (GFD) of the central government to GDP ratio for the period 1998:Q1 to 2020:Q1 – is estimated which suggests a statistically significant response of growth to both monetary policy and fiscal policy shocks (Chart II.1).[5] A one percentage point fall in WACR leads to 26 basis points (bps) rise in GDP growth after one quarter and a cumulative impact of 92 bps by the fourth quarter.[6] On the other

hand, the cumulative response of GDP growth to one percentage point rise in GFD-GDP ratio is found to be 43 bps by the fourth quarter.

II.9   The VAR model was further augmented with interactive dummies to ascertain whether fiscal multipliers work symmetrically over the business cycle. The findings suggest that an expansionary fiscal stance works only under economic contraction; during a period of expansion, it does not improve the growth outcome but entails adverse implications for inflation and term premium (as discussed subsequently). In contrast, monetary policy works symmetrically in stabilising output, i.e., it is effective under both expansion and contraction (Chart II.2). These findings corroborate the need for fiscal policy to take the lead in a post-crisis period to support growth, and timely fiscal consolidation to allow monetary policy to effectively stabilise the economy around the steady state during

Chart II.1: Impulse Responses to one S.D. Policy Shock

Response of GDP Growth to increase in WACR

Response of GDP Growth to increase in GFD
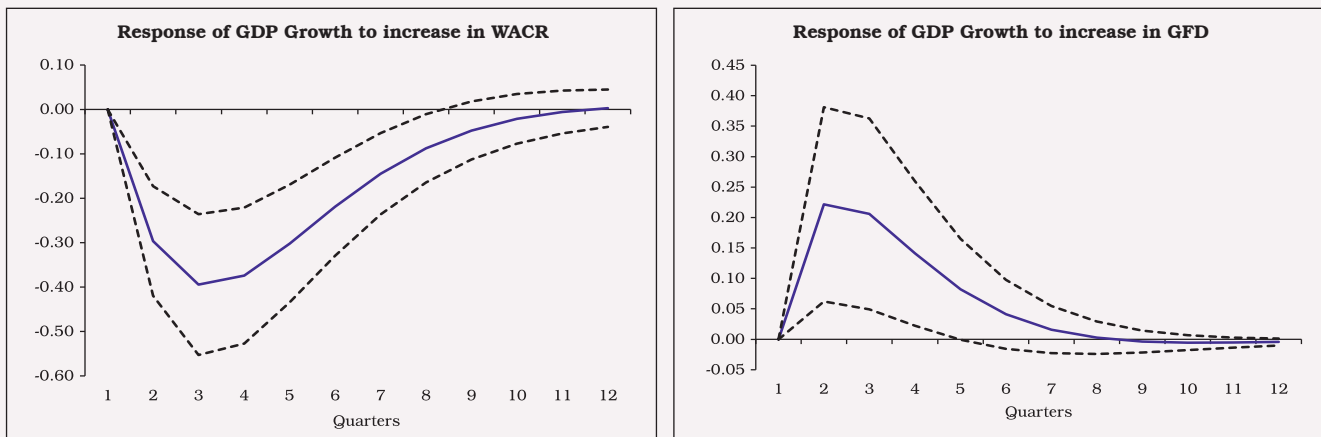
Source: RBI staff estimates.

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[5]   The effectiveness of fiscal policy is further confirmed by extending the VAR estimation to cover the pandemic period (i.e., 2020:Q2 through 2021:Q1); fiscal policy is found to have contributed to growth revival in the presence of an accommodative monetary policy.

[6]   The estimates are worked out by normalising impulse responses to a one percentage point fall in WACR and a one percentage point rise in GFD-GDP ratio.

Chart II.2: Asymmetric Responses of GDP Growth to Policy Shock

IRF of one percentage point rise in WACR during Expansion

IRF of one percentage point fall in WACR during Contraction

IRF of one percentage point rise in GFD during Expansion

IRF of one percentage point rise in GFD during Contraction
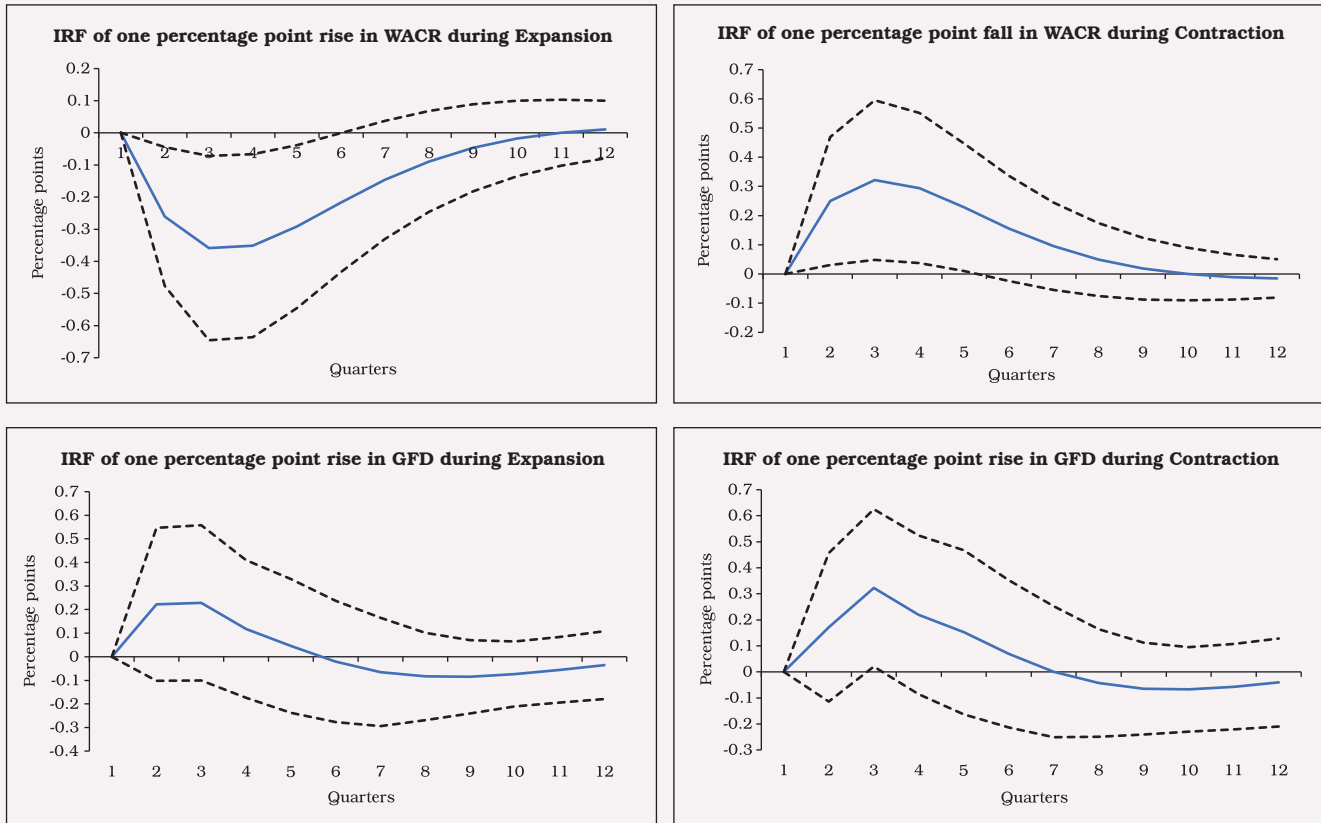
IRF: Impulse response function.
Source: RBI staff estimates.

periods of expansion. Hence, as recovery gains further momentum, fiscal consolidation should ideally precede monetary policy normalisation to minimise trade-off costs.

3. Lessons from India's Own Experience

II.10 The monetary-fiscal policy mix in India was moving into balance consistent with stated objectives preceding the outbreak of COVID-19. Nonetheless, a weakening of the growth momentum since 2017-18 prompted deferment of the fiscal deficit target and use of the escape clause. As regards monetary policy, with average CPI inflation remaining closer to the target, an accommodative stance was adopted since June 2019. Thus, stabilisation policies had retained their focus on reviving growth even ahead of the pandemic.

II.11 Set against this context, it is important to identify the threshold-level of surplus liquidity for India beyond which it could be inflationary. To examine the impact of surplus liquidity on inflation, a structural threshold VAR (TVAR) model – with GDP growth, inflation, net liquidity adjustment facility (LAF) position [as a per cent of net demand and time liabilities (NDTL)] and WACR as the key variables – has been estimated using data for the period 2000-01:Q1

to 2019-20:Q4.[7] The estimated threshold value ($\widehat{\gamma}$) suggests that net LAF surplus of more than 1.52 per cent of NDTL could be inflationary. The results show that a one percentage point exogenous increase in surplus liquidity above this threshold value could push up inflation by 60 bps on an average in a year (Chart II.3a). In a situation when the net LAF surplus is below the threshold level, however, an exogenous increase in LAF surplus does not cause any statistically significant impact on inflation (Chart II.3b).

II.12 The inflationary impact of liquidity is analysed further by using a time-varying parameter VAR (TVP-VAR) model to find out how the impact of liquidity on inflation has evolved over time. The

VAR is estimated with inflation, net LAF (as a per cent of NDTL) and WACR as the key variables – using monthly data for the period January 2012-March 2021.[8] The time-varying impulse responses show that the impact of liquidity is inflationary, with lingering persistence (Chart II.4). Moreover, the impact is largely subdued in the initial phases, but the cumulative impact increases over time. The liquidity impact on inflation in fact appears to have increased over the years. For a one percentage point rise in surplus liquidity (as per cent of NDTL) the peak increase in inflation ranges between 5 to 11 bps up to December 2017. Subsequently, the peak impact is estimated to have increased to about 20 bps. The cumulative

Chart II.3: Surplus Liquidity Impact on Inflation – Estimated Threshold Effects

a. Above Threshold Regime: CPI Inflation Response to net LAF Surplus

b. Below Threshold Regime: CPI Inflation Response to net LAF Surplus
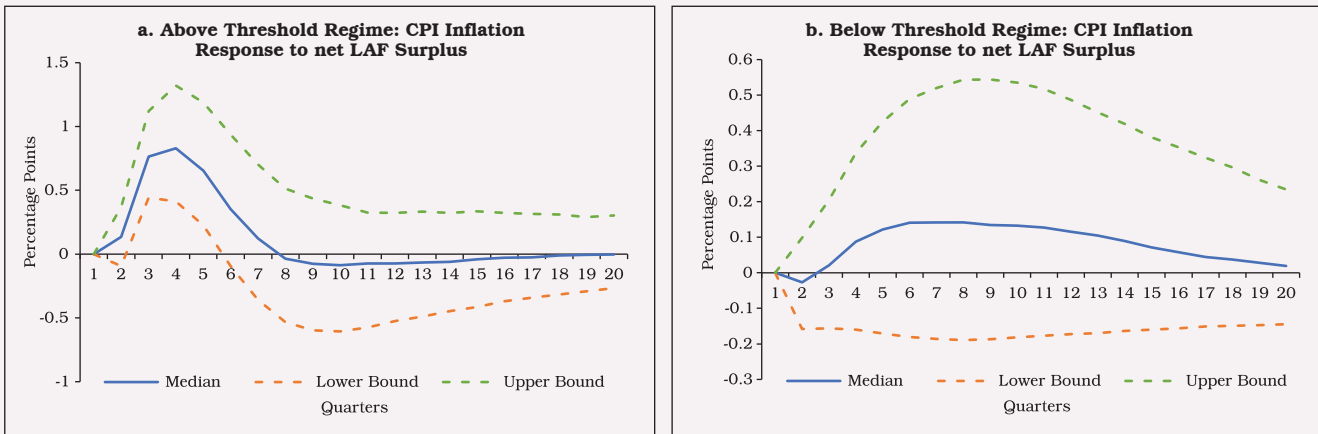
Source: RBI staff estimates.

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[7] The following TVAR model is estimated:

$$y_t = \left(\sum_{i=1}^{p} a_{1i} y_{t-i} + e_{1,t}\right) I(z_{t-d} \leq \gamma) + \left(\sum_{i=1}^{p} a_{2i} y_{t-i} + e_{2,t}\right) I(z_{t-d} > \gamma)$$

where $I(.)$ is the indicator variable and y_t is the vector of endogenous variables. The indicator function takes the value of one if its regime is realised and zero otherwise. The regression coefficients and the threshold value (γ) are estimated jointly by Bayesian method using a metropolis-hastings (MH) algorithm. The structural shocks are identified by using Cholesky approach.

[8] The following TVP-VAR with stochastic volatility model is estimated:

$$Y_t = A_{1,t} Y_{t-1} + A_{2,t} Y_{t-2} + \cdots + A_{p,t} Y_{t-p} + \epsilon_t$$

where, $\epsilon_t \sim N(0, \Sigma_t)$.

The coefficients and stochastic volatility are time varying. The standard TVP-SV model of Primiceri (2005) is followed to check for the inflationary effect of the liquidity shock over different phases in India. The model does not use quarterly GDP data as an additional relevant variable because data on net LAF are available since June 2000 when it was introduced, and hence, would not meet the requirement of sufficient number of observations to estimate time-varying parameters.

Chart II.4: Surplus Liquidity Impact on Inflation – Estimated Time-Varying Effects
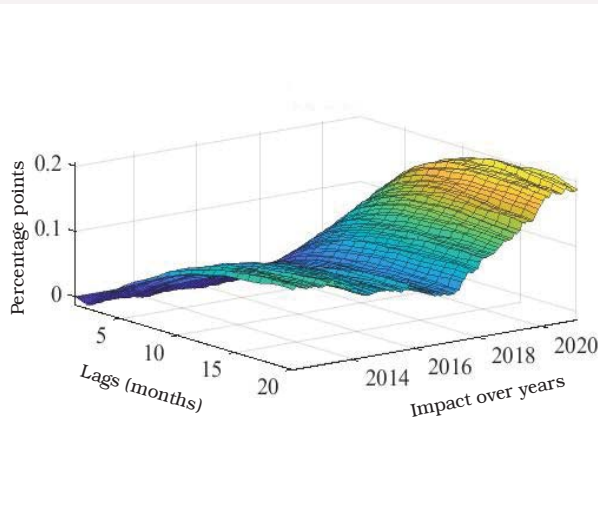
Source: RBI staff estimates.

impact over about six quarters, however, exceeds 200 bps.[9] The persistent impact of liquidity on inflation underscores the importance of timely normalisation of systemic surplus liquidity in the post-pandemic period to ward off potential risks to inflation. Even if surplus liquidity initially may not stimulate demand enough to cause inflation, an

accommodation of supply-shock induced inflation through persistent excess liquidity can create vicious dynamics in an atmosphere of frequent occurrences of supply side shocks and hardening of inflation expectations.

II.13 Estimates using data for the period 1998:Q1 to 2020:Q1 and the same four variables in a VAR as described above suggest that the impact of a policy rate cut (captured through equivalent fall in the WACR) could raise inflation by about 25 bps by the fourth quarter (Chart II.5a). Surplus liquidity reinforces the impact of interest rate cuts on inflation, but with asymmetric effects during different phases of a business cycle. The impulse-response path suggests that a reduction in the policy rate is less inflationary during a slowdown in economic activity than expansion (Chart II.5b).

II.14 Surplus liquidity, and accompanying excess money growth, can be viewed both as an endogenous process of monetary accommodation of the government's demand for money [through open market operations (OMOs) and G-sec

Chart II.5: Asymmetric Response of Inflation to One Percentage Point Change in WACR

a. Response of Inflation to lower WACR (with and without LAF)

b. Asymmetric Response of Inflation to a Fall in WACR
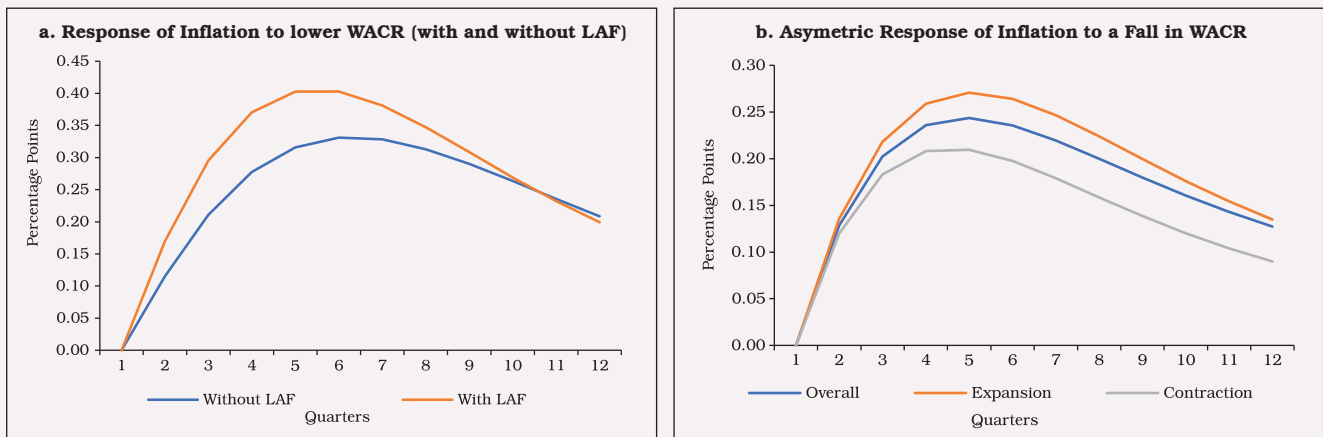
Source: RBI staff estimates.

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[9]   The inflation impact is found to be statistically significant after six months but persists thereafter for long.

Acquisition Programme (G-SAP), indirectly] and an exogenous money creation process when the central bank proactively injects excess liquidity into the system on its own to promote growth which, in turn, helps in smoother completion of government market borrowings at reasonable interest rates. The space for endogenous indirect accommodation in any normal year in India is influenced by: (a) the required increase in primary money consistent with growth in nominal GDP, and (b) the extent of automatic increase in primary money that results from net accretion to RBI's foreign assets. With the share of foreign assets in the RBI's balance sheet rising with the progressive liberalisation of the economy and surges in capital flows, the scope for indirect accommodation has fallen steadily as the share of domestic assets (acquired through open market purchases) has declined (Chart II.6a). During years when capital inflows are large, the entire increase in reserve money may result through expansion in net foreign assets (NFA), leaving no space for indirect accommodation of the fiscal requirements in monetary policy operations. In fact, there are several years when the RBI has

had to undertake sterilisation operations [*i.e.*, conduct open market sales or reduction in net domestic assets (NDA)] to offset the excessive expansion in reserve money due to increase in foreign assets (Chart II.6b).

II.15   Reflecting the above dynamics, indirect accommodation of fiscal deficit through RBI credit to the Government (as percentage of gross fiscal deficit) has fluctuated over time, with a recent peak of about 50 per cent in respect of the central government (Chart II.7).

II.16   Post-COVID, indirect accommodation was ensured through a combination of open market purchases, higher ways and means advance (WMA) limits in 2020-21, and G-SAPs as an additional instrument in H1:2021-22. Market absorption of fiscal deficit was also facilitated through the provision of ample system level liquidity and higher held to maturity (HTM) regulatory flexibility for banks. As a result, despite the record high size of the consolidated fiscal deficit (13.3 per cent of GDP), the cost of borrowings for the central government fell to a 17-year low in 2020-21 (Chart II.8).

Chart II.6: Scope for Monetary Accommodation of Fiscal Stance

a. Shares of Foreign and Domestic Assets in RBI's Balance Sheet (End-March)

b. Shares of NFA and NDA in Changes of Reserve Money
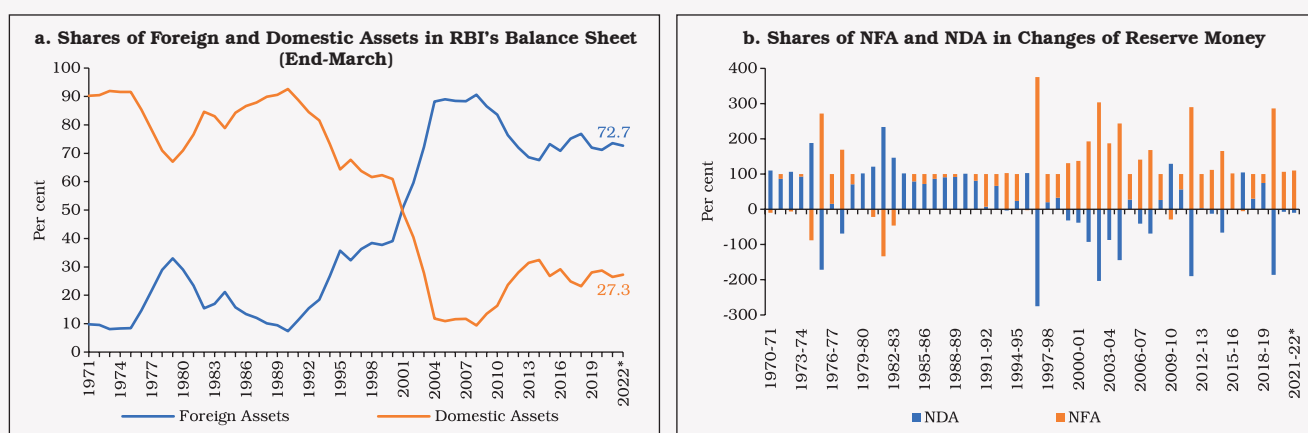
*: As on March 25, 2022.
Source: RBI staff estimates.

Chart II.7: Financing of Fiscal Deficit through Net RBI Credit to the Government

*: As on March 25, 2022.
Note: State Development Loans (SDLs) have been added as a part of open market operation and thereby form part of RBI's credit to the Government since October 2020.
Source: RBI staff estimates.

Chart II.8: Weighted Average Cost of Borrowing (Central Government)

Source: RBI.
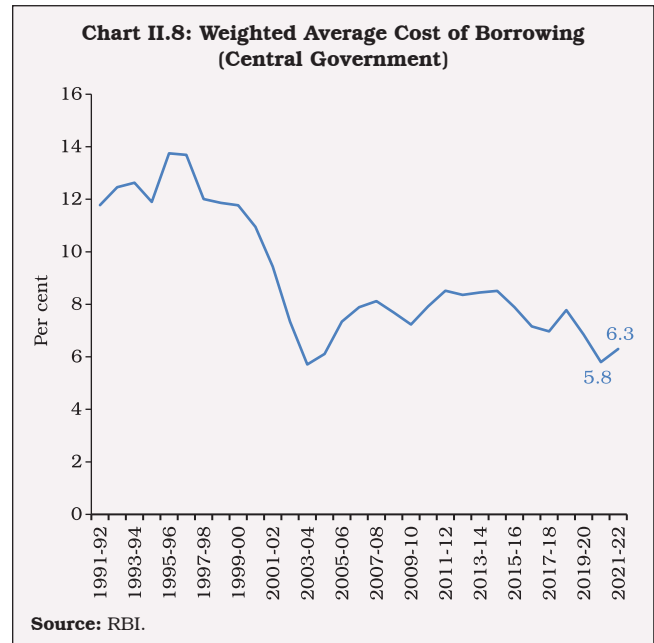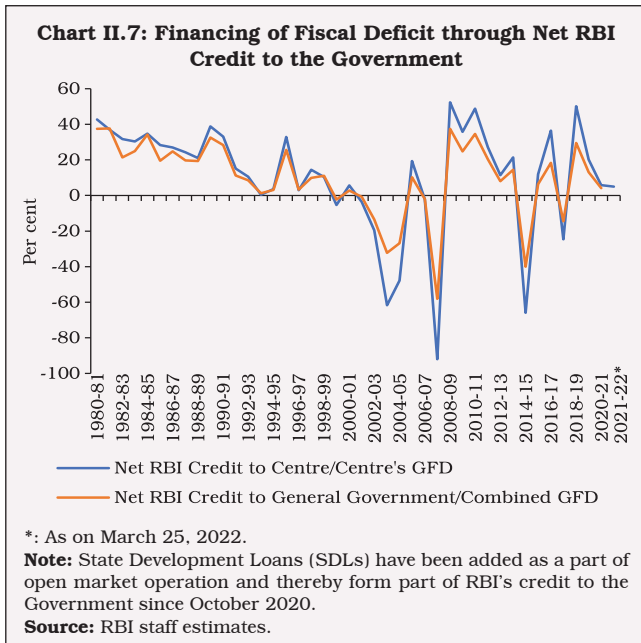
II.17   Despite fiscal consolidation in 2021-22, longer term yields witnessed sporadic and larger than warranted deviations from the policy repo rate. While concerns relating to inflation and external spillovers largely influenced short-term movements in yields, it was the overhang of high fiscal deficit and government debt that exerted sustained upward pressures on longer-term yields. It is important in this context to assess the threshold level of debt beyond which the term premium starts moving up significantly.

II.18   In standard forward-looking debt sustainability analysis, a country/region specific risk premium is often added to the interest rate outlook. When debt levels exceed a threshold level of 60 per cent of GDP for the European countries, risk premium rises by about 4 bps (as per the IMF thumb rule) and 3 bps (as per the European Commission thumb rule) for every percentage point increase in debt-to-GDP ratio (Alcidi and Gros, 2018). A 10-percentage point increase in debt to GDP ratio can thus increase term premium by about 30 to 40 bps. Since the financing cost for corporates and businesses

is linked to sovereign risk premium, a high level of government debt can depress growth – an expansionary fiscal policy at high levels of debt can become effectively contractionary (Alcidi and Gros, 2019; Mohanty and Panda, 2020). In India, an impact assessment suggests that when the central government debt exceeds a threshold value of 55 per cent of GDP, every one percentage point increase in the debt to GDP ratio causes the term premium to harden by about 22 bps in the short-run and the impact could increase to as high as 56 bps in the long-run (Box II.1).

II.19   A dynamic latent factor model, augmented with macroeconomic variables representing real activity, inflation, policy rate, global uncertainty and government market borrowing along with net LAF, is estimated to study the impact of liquidity on term premium or slope of the yield curve, following Diebold *et al.* (2006). Within the modelling framework, term premium has been extracted from the g-sec yields of maturities of 2 to 10 years, and then regressed

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Box II.1
Debt Impact on Risk Premium

In view of the sharp increase in fiscal deficit and debt in India following the response to the pandemic, an attempt is made to assess whether there is any threshold level of debt beyond which an increase in debt impacts term premia significantly. A standard two regime smooth transition regression of the following form is estimated (Teräsvirta, 1994):

$$term_t = \alpha + \beta_1 debt_t + \beta_2 debt_t \varphi(s_t; debt^*, \gamma) + \delta X_t + \varepsilon_t$$

where, $\varphi(s_t; debt^*, \gamma) = \Phi(\gamma(s_t - debt^*))$

where s_t is the transition variable which governs the regime switching; $debt^*$ is an unknown threshold parameter(s); and γ represents the slope parameter ($\gamma > 0$). The transition function $\varphi(s_t; debt^*, \gamma)$ is a continuous function and depends on $debt^*$. It is normalised to be bounded between 0 and 1, and the parameters β_1 and β_2 represent the linear and non-linear coefficients of the debt threshold.

A quarterly model is used to estimate the impact of debt on term premium by regressing term premia ($term_t$; defined as the difference between 10-year G-sec yields and 3-month treasury bill yields) on a constant and central government debt to GDP ratio ($debt_t$), while controlling for other determinants of term premia, *viz.* inflation deviation from the target (*Inf_gap*), net LAF as percentage of NDTL (*LAF*), output gap (*ygap*) and two dummy variables to capture the outlier effects of the taper tantrum (*dtaper*) and the global financial crisis (*dgfc*). The estimated results show that there exists a nonlinear relationship between term premia and debt, and debt has differential effects on term premia beyond the threshold level of 55 per cent of GDP (as against actual debt level of 59.1 per cent of GDP as at end-March 2022). The term premium increases by about 22 bps for each one percentage point increase in the debt to GDP ratio above the threshold of 55 per cent (Table 1). Following

Table 1: Estimated Parameters
(Sample: 2004Q1 - 2021Q1)

	Coefficient	t-statistics
Threshold: $debt^*$	54.85***	33.57
Slope: γ	0.66	1.52
Variable		
debt < $debt^*$	-21.32*	-1.98
debt > $debt^*$	21.73*	1.76
$term_{t-1}$	0.62***	10.17
Inf_gap_t	12.68***	3.44
$ygap_t$	-7.52***	-2.82
LAF_t	-13.54***	-2.82
$dtaper$	-202.86***	-5.18
$dgfc$	-121.12***	-2.98
R²	0.88	
LM(4) P-val	0.48	
ARCH(4) P-val	0.81	

***, **; *: Significant at less than 1 per cent, 5 per cent and 10 per cent levels, respectively.

the fiscal response to the pandemic, the central government debt level has gone up, but term premia did not harden as much as the estimates would suggest, which is because of the strong downward pull from large surplus liquidity. If the debt level continues to remain high for long, any closing of the output gap or normalisation of liquidity, or both, could raise term premium by up to 56 bps in the long-run.

Reference:

Teräsvirta, T. (1994). Specification, Estimation, and Evaluation of Smooth Transition Autoregressive Models. *Journal of the American Statistical Association,* 89(425), 208-218.

on the macroeconomic variables. The Bayesian impulse response results suggest that a one percentage point increase in net LAF (as per cent of NDTL) results in a reduction in term premium by 16 bps (Chart II.9). The increase in liquidity has a sobering effect across the yield curve, but with a relatively higher impact on longer-term rates. By reducing risk premium, the injection of liquidity flattens the yield curve.

II.20   It is perhaps prudent to step into a post-pandemic world with the sobering lessons from the recent experience that the salubrious impact of fiscal actions on growth can potentially be offset by higher inflation. Both fiscal discipline and effective management of the second order effects of supply side pressures on inflation are essential for achieving macroeconomic stability which will lay the foundation for monetary

Chart II.9: Response of Term Premia to One Percentage Point Increase in Net LAF to NDTL Ratio

Source: RBI staff estimates.
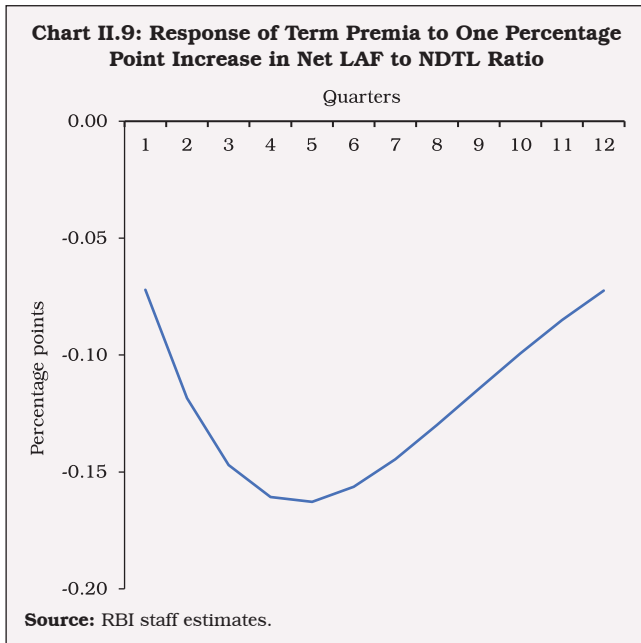
policy's endeavour to set a post-pandemic path of strong, broad-based and sustainable growth. In this context, the renewal of the tryst with fiscal prudence that is the defining feature of the Union Budget 2022-23 is a step in the right direction, especially the strategy of placing less emphasis on linear time-invariant GFD reduction and focusing on the reprioritisation of expenditure in a manner that is growth-friendly and non-inflationary. The challenge for the setting of monetary policy is the continued pursuit of an accommodative stance even as the fiscal impulse is being withdrawn especially in an environment in which persisting pressures from repetitive supply shocks threaten to undermine the credibility of the central bank. What should be the appropriate monetary-fiscal

policy mix in the post-pandemic future becomes a searing existential question for which existing behavioural regularities, parametric estimates and analytical received wisdom may not provide adequate guidance.

II.21 Empirical estimates in this section indicate that achieving a regime of low inflation and low cost of capital that is conducive to growth and investment is also contingent upon normalisation of liquidity and consolidation of debt over the medium-run. The pragmatic way forward in the post-COVID rebalancing of monetary and fiscal policies is to proceed with the existing state of knowledge on the mix while being prepared for course corrections and innovations as the path evolves.

II.22 One regularity of the pre-pandemic past could be Okun's Law or the expected inverse relationship between GDP growth and unemployment rate (Ball *et al.*, 2017). Estimates of the Okun's coefficient across geographies range from (-)0.1 to (-)0.8 – a one percentage point decline in GDP growth may raise the unemployment rate by 0.1-0.8 percentage points. For India, the data on unemployment rate and real GDP growth from 1980-81 to 2019-20[10] suggest that a decline in GDP growth by one percentage point increases unemployment rate by around 0.13 percentage points.[11] This is corroborated by evidence from the results based on periodic labour force survey (PLFS) data (Srija and Singh, 2021). In a post-pandemic environment, however,

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[10] Data on unemployment rate are collected from the International Labour Organisation (ILO) and data for a few missing years are intercalated using linear interpolation.

[11] The Okun's equation, estimated using unemployment rate and GDP growth, confirms the presence of an inverse relationship between the two.

$$\Delta Unemployment\ rate_t = 0.77\ \ -0.13*GDP\ Growth_t$$
$$t\text{-}stat\ \ \ \ (3.55)\ (-3.66) \qquad\qquad R^2 = 0.51$$

stability of the estimated parameter cannot be presumed, and permanent scarring effects on the labour market cannot be ruled out.

II.23   The output gap (both in level and changes) is a commonly used proxy of economy-wide slack/ tightness associated with cycles of economic activity (Chart II.10). A New Keynesian Phillips Curve (NKPC) estimated on seasonally adjusted quarterly data for the period 1996-97:Q1 to 2019-20:Q4 of the form:

$$\pi_t = \gamma\pi_{t-1} + (1-\gamma)E_t\pi_{t+1} +$$
$$\beta_1 X_{t-k} + \beta_2 \triangle(X_{t-1}) +$$
$$\delta Z_{t-1} + \varepsilon_t \qquad \qquad \cdots (1)^{12}$$

suggests that closing the output gap by one percentage point can raise inflation by about 20 bps with a lag of seven quarters. There is also evidence of a speed limit effect - rapid changes in economic activity may cause larger changes in the inflation rate for a given level of the economic activity (Jose *et al.,* 2021). Inflation expectations (captured by inflation trend or survey-based expectations) also play a role in influencing actual inflation outcomes in India.[13] Thus, while coordinated fiscal-monetary policy stimulus is necessary to revive growth, delayed normalisation can potentially increase inflation alongside or even ahead of economic recovery.

Chart II.10: Relationship between Inflation and Output Gap in India (1996-97:Q1 to 2019-20:Q4)
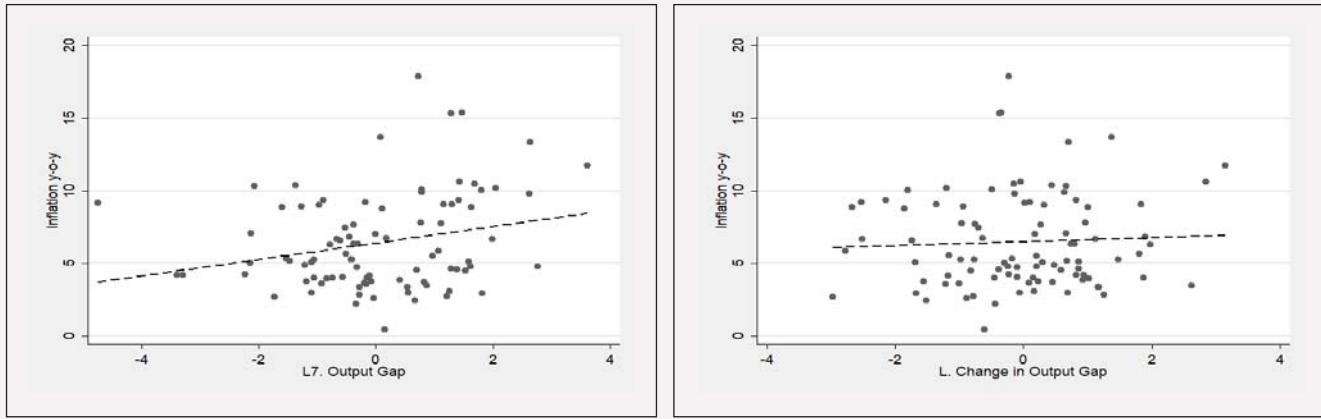
Note: L stands for lag.
Sources: NSO, Ministry of Statistics and Programme Implementation, GOI and RBI staff estimates.

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[12] where, π_t is difference in log CPI (*i.e.,* q-o-q change), X_t is a measure of economic activity represented by output gap [(actual output *minus* potential output)/potential output*100], $\triangle(X_t)$ is the change in the output gap, and Z_t is a vector of supply side factors (minimum support prices, nominal exchange rate, global non-fuel commodity prices and rainfall deviation); $E_t\pi_{t+1}$ is the expected future inflation (which is proxied by lagged inflation trend and 1-year ahead inflation expectations of households) and ε_t is the white noise term. Potential output is measured by the Hodrick-Prescott filter method. In equation (1), the coefficients of the inflation term on the right-hand side are assumed to sum up to unity, implying the existence of a vertical long-run Phillips curve. Additionally, a set of quarterly dummy variables has been used as controls in the estimation.

[13] NKPC with inflation trend as a proxy for inflation expectations (1996-97:Q1 to 2019-20:Q4)

$\pi_t = 0.01\,(0.11)\pi_{t-1} + 0.99\,(0.11)^{***}\,Trend\;Inflation_{t-1} + 0.21\,(0.07)^{***}\,Output\;Gap_{t-7} + 0.14\,(0.07)^{*}$

$\triangle(Output\;Gap_{t-1}) - 0.01\,(0.02)MSP\;variation$

$+\,0.06\,(0.04)\,Exchange\;rate\;variation_{t-1}$

$+\,0.05\,(0.02)^{**}\,Global\;nonfuel\;commodity\;price\;variation\;_{t-1}$

$+\,0.002\,(0.01)\,Rainfall\;deviation_{t-2}$

***, **, *: Statistically significant at 1 per cent, 5 per cent and 10 per cent levels, respectively. Figures in the parentheses are standard errors. These results are corroborated by estimates of NKPC with survey based inflation expectations (2008-09:Q1 to 2019-20:Q4) - with coefficients of $Output\;Gap$ and $\triangle Output\;Gap$ remaining statistically significant and of similar size.

4. Post-COVID Debt Overhang: Debt Consolidation for Stronger Economic Growth

II.24   General government debt in India surged to 89.4 per cent of GDP in 2020-21 (Chart II.11), significantly higher than the FRBM target of 60 per cent, posing risks to medium-term macroeconomic stability. Hence, an exploration of paths along which India's public debt may evolve in the medium-term, based on alternative feasible scenarios for real GDP growth, inflation, interest rate and the primary deficit is desirable in order to derive the threshold level of debt beyond which it may become a drag on GDP growth.

II.25   In a post-COVID world, there is likely to be intellectual support for tolerating higher government debt on the ground of a favourable interest rate - growth differential (Blanchard *et al,* 2021, GOI, 2021). It is important to keep in perspective, however, that the behaviour of primary balances also matters from the point of view of generating fiscal space to pay down the debt – the sufficient condition for debt sustainability. Accordingly, a credible and viable debt management for post-

pandemic times will warrant a reordering of strategy. The desirable condition of debt sustainability needs to be a path of reduction of primary deficits to balance or even a modest surplus that spreads out consequent output losses so as to minimise the cost of consolidation. The sufficient condition could be satisfied by committing upfront to reprioritising expenditure in favour of those heads that are growth enhancing and hence, qualitatively superior so that the Domar condition $(g>r)$[14] is always satisfied. Country-specific features need to condition the assessment of tolerable level of government debt reduction, including the share of interest payments and other committed expenditure in GDP as a measure of the flexibility for manoeuvre. In India, interest payment on the stock of central and state government debt is high by international standards (more than one-fifth of total expenditure) – a drag on debt consolidation (Chart II.12).

II.26   Monetary policy can help debt consolidation by keeping nominal interest rates/ costs of borrowings low for current/future debt, but that is possible only in a low inflation environment.

Chart II.11: General Government Outstanding Liabilites

Source: RBI staff estimates.

Chart II.12: Interest Payments on Government Debt

Source: RBI staff estimates.

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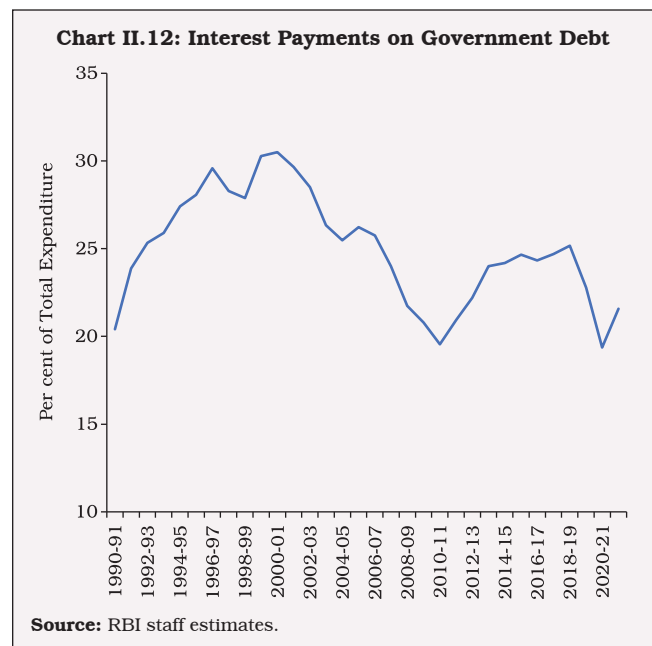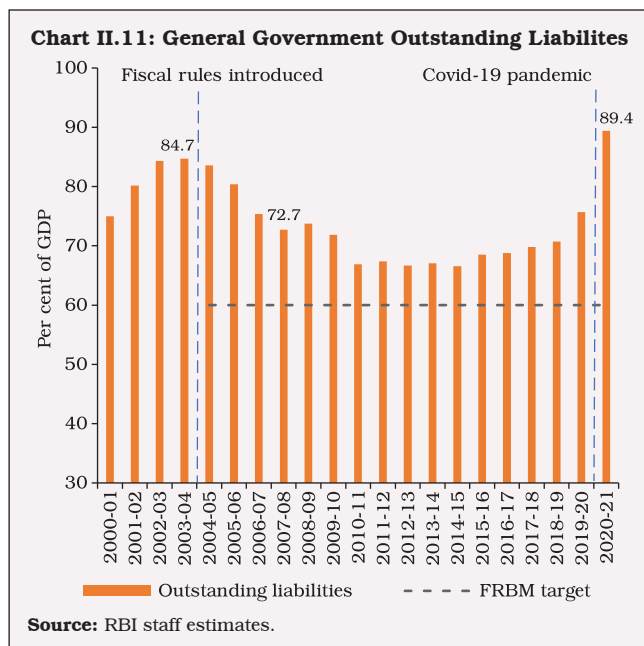
[14] g_t is the real GDP growth rate and r_t is the real interest rate.

II.27   It is against this backdrop that feasible scenarios for India are evaluated under forward looking debt projections in the equation given below[15]:

$$\Delta d_t = \left[\frac{r_t - g_t}{1 + g_t}\right] d_{t-1} - pb_t + dda_t$$

If the real interest rate exceeds real GDP growth $(r - g > 0)$ then the debt to GDP ratio can only increase further, unless it is compensated by a primary surplus.[16] In India, $(r - g)$ has consistently remained favourable in the last three decades. The debt to GDP ratio, however, actually increased during the 2010s despite negative $(r - g)$ (Chart II.13). Starting with a debt level of 89.4 per cent of GDP in 2020-21, the best consolidation efforts in the future (primary deficit of 1.5 per cent of GDP by 2026-27) and most feasible/realisable favourable $(r - g)$ outcomes could still keep the

Chart II.13: India's Decadal Debt Decomposition

Source: RBI staff estimates.
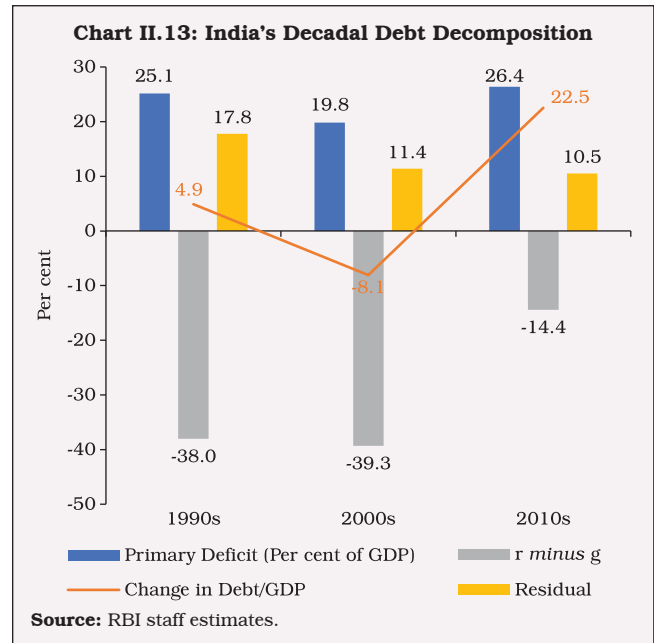
debt to GDP ratio above 75 per cent of GDP over the next five years, higher than in any year during the decade preceding the pandemic (Box II.2).

Box II.2
Limits to Consolidation of Public Debt in India Post-Pandemic

Public debt is regarded as sustainable when the primary balance needed to stabilise the debt, under both baseline and realistic shock scenarios, is economically and politically feasible and the level of debt is consistent with an acceptably low rollover risk (IMF, 2021). The debt-stabilising level of primary balance (pb$_t$*) is given by the following equation:

$$pb_t^* = \left\{\frac{r_t - g_t}{1 + g_t}\right\} d_{t-1} + dda_t$$

This implies that countries which have a negative interest rate-growth differential (IRGD) can run a primary deficit and

still have sustainable debt. In India, except for a few years, the IRGD has been consistently negative, even though its magnitude has decreased significantly over the last two decades. Historically, several debt crises have occurred globally after years of low and negative IRGD as marginal interest rates rise sharply and abruptly only a few months ahead of a default (Mauro and Zhou, 2020). Besides, debt beyond a certain threshold poses several risks *viz.*, the interest rate on public debt increases with the debt level (Laubach, 2009). High debt countries face significant risk premia that may create a feedback loop in which high-risk

(Contd...)

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[15] d_t is the debt to GDP ratio; r_t is the real interest rate; g_t is the real GDP growth rate; pb_t is the primary balance and dda_t is deficit-debt adjustment or the stock-flow adjustment comprising factors that affect debt but are not included in the budget balance (Alcidi and Gros, 2018).

[16] A key aspect of any forward-looking exercise on debt sustainability is the projection of primary balances or fiscal efforts required/feasible to stabilise debt. Unlike the simple static view presented in the above equation, in real life all key variables in the equation may be endogenous, with the relationship likely to be also both asymmetric and time-variant. For example, discretionary fiscal efforts directed at containing primary deficit may impact growth, interest rate and inflation. Fiscal multipliers being sensitive to the state of the business cycle, as mentioned earlier, the endogenous impact on other variables could vary over time. Moreover, any change in debt can also generate positive/negative spillback effects on growth, inflation and interest rate. The emphasis on a forward-looking approach in such analyses may also require taking a view on post-COVID possible trend shifts in the potential growth path and the equilibrium real interest rate.

Table 1: Debt Dynamics Tool – Key Assumptions and Results

	Historical						Projection (Baseline)					
	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Real GDP Growth	8.0	8.3	6.8	6.5	3.7	-6.6	8.9	7.2	6.6	6.3	6.2	6.1
GDP Deflator Inflation	2.3	3.2	4.0	3.9	2.4	5.6	9.7	6.0	5.0	4.5	4.0	4.0
Gross Primary Balance	-2.2	-2.2	-1.1	-1.1	-2.5	-7.8	-4.8	-3.8	-3.3	-2.8	-2.5	-2.2
Nominal Effective Interest Rate	7.8	7.7	7.7	7.5	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1
Debt (Per cent of GDP)	68.5	68.8	69.8	70.7	75.7	89.4	85.2	84.3	84.2	83.9	83.8	83.6

Note: 1. Real GDP growth for 2021-22 and 2022-23 are based on NSO advance estimates and RBI projections, respectively. 2023-24 onwards projections are based on World Economic Outlook (October 2021).

2. GDP deflator inflation for 2021-22 is based on NSO's advance estimates of nominal and real GDP.

3. A declining path of gross primary deficit is assumed in line with the union government's gradual fiscal consolidation plan of reaching GFD-GDP ratio of 4.5 per cent by 2025-26 and Fifteenth Finance Commission's indicative deficit path for states.

premia result in higher debt, which, in turn, leads to even higher risk premia (Alcidi and Gros, 2019). Furthermore, countries with higher public debt experience a larger increase in interest rate in response to a positive growth shock and adverse global volatility shocks (Presbitero and Wiriadinata, 2020).

Based on the IMF's recently released Debt Dynamics Tool, India's general government debt path is projected for the period 2021-22 to 2026-27. The historical values and baseline assumptions on GDP growth, inflation, primary balance and effective interest rate are set out in Table 1[17]. In the baseline scenario the general government debt is assessed to contract steadily to reach 83.6 per

cent of GDP by 2026-27. An analysis of debt-creating flows shows that in the projection period, debt stabilisation rests entirely on GDP growth as shocks to both primary deficit and interest rate add to the debt stock (Chart 1a). After moderating in 2021-22, debt is likely to remain sticky at around 84 per cent of GDP over the next five years (Chart 1b).

To assess stress scenarios, a 0.5 standard deviation shock (individually) is given to real GDP, primary balance and interest rate in 2022-23, which lasts until 2023-24. The results show that a real GDP shock has the maximum adverse impact as debt shoots up to 86.6 per cent of GDP in the terminal year of projection, as against 83.6 per

Chart 1: Debt Creating Flows in the Baseline and Fan Chart for General Government Debt
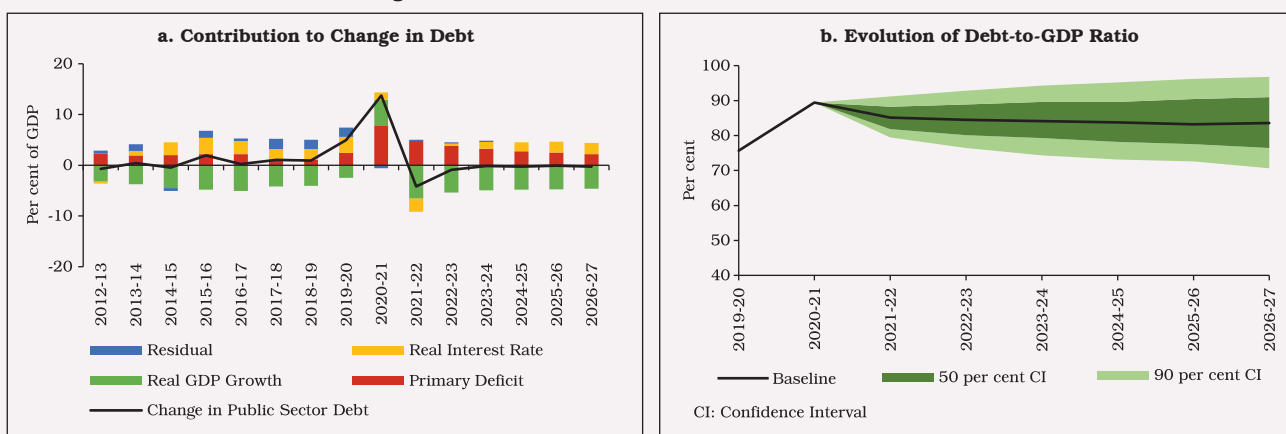
Source: RBI Staff estimates.

(Contd...)

[17] Given that India's external debt is less than 3 per cent of GDP and around 5 per cent of total debt, we have assumed that entire government debt is held domestically for this exercise.

Chart 2: General Government Debt – Stress Tests and Alternate Scenarios

a. Stress Tests

b. Alternate Scenarios
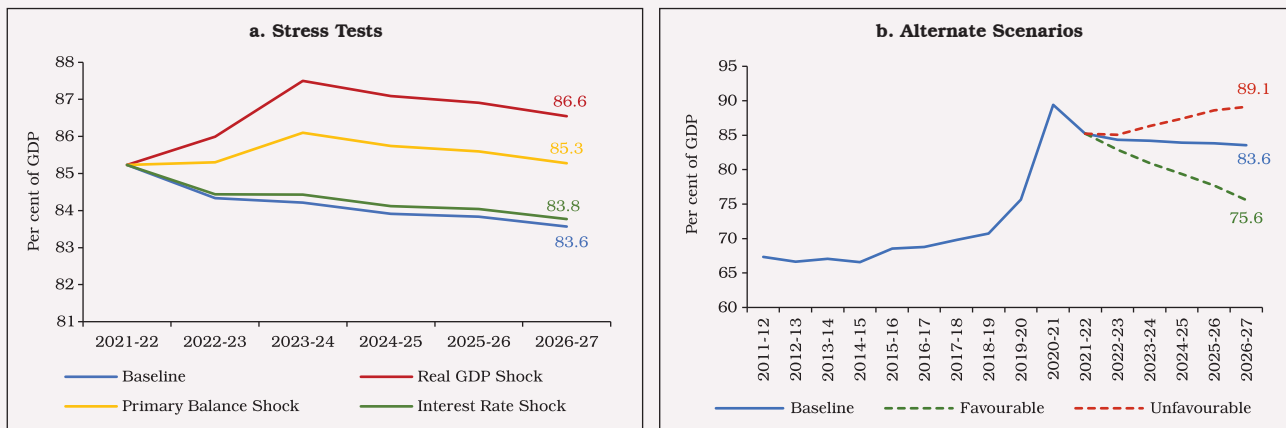
Source: RBI Staff estimates.

cent in the baseline scenario. An interest rate shock has only a modest impact on the projected debt path (Chart 2a).

In addition to the baseline scenario, we also explore both favourable and unfavourable scenarios incorporating feedback effects which work along with individual shocks. In the favourable scenario, GDP growth is assumed at 8 per cent from 2023-24 onwards, associated with slightly higher inflation (which supports debt consolidation) and primary balance is assumed to be lower than the baseline scenario (through targeted efforts at consolidation). In this setting, the general government debt is assessed to contract to 75.6 per cent of GDP by 2026-27. In the unfavourable scenario, growth is assumed to stagnate at 5 per cent of GDP from 2023-24 onwards. The primary balance and inflation are assumed to be same as in the baseline scenario. In this case, debt changes its declining trajectory after 2021-22 and expands to 89.1 per cent of GDP by 2026-27 (Chart 2b).

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II.28   Turning to threshold effects in India, an empirical estimate of the relationship between debt and economic growth for India found the threshold level of general government debt to be 61 per cent (Kaur and Mukherjee, 2012).

II.29   The following regression in quadratic form is estimated for the period from 1981-82 to 2019-20, controlling for real investment growth, trade (growth in sum of real non-oil exports and

imports) and the gross fiscal deficit (as per cent of GDP):

$$GDP_t = \alpha DEBT_t + \beta_1\ DEBT_t^2 + \beta_2\ INVEST_t + \beta_3 TRADE_t + \beta_4 GFD_t + \varepsilon_t$$

where, GDP is the growth in real gross domestic product at market prices; DEBT is the general government outstanding liabilities as per cent of GDP; INVEST is the growth in real fixed

investment; TRADE is the growth in sum of real non-oil exports and imports; GFD is the central government's gross fiscal deficit as a per cent of GDP; and ε_t is the error term.

II.30   The results find that accumulation of general government debt up to a level of 66 per cent of GDP, leads to an increase in GDP growth beyond which it impacts growth adversely (Table II.3). In fact, GDP growth may decline by 0.01 percentage points for one percentage point increase in debt/GDP ratio once the debt level exceeds 66 per cent, with the impact magnifying with higher level of debt.

II.31   This calls for adoption of bold and innovative ways to rebuild fiscal space. The government has launched the National Monetisation Pipeline (NMP) with an aggregate monetisation potential of ₹6 lakh crore, over a four-year period, 2021-22 to 2024-25, making it co-terminus with the balance period of the National Infrastructure Pipeline (2019-20 to 2024-25). Asset monetisation can potentially

Table II.3: Relationship between Debt and Economic Growth[18]

Variable	Coefficient	p-values
DEBT	0.82	0.08
DEBT^2	-0.01	0.08
INVEST	0.11	0.02
TRADE	0.09	0.08
GFD	-0.58	0.01
DUM91	-3.69	0.00
DUM08	-3.46	0.00
Adjusted R-square	0.57	
DW Statistics	1.74	
LM(2) P-val		0.60
ARCH(2) P-val		0.29

Source: RBI staff estimates.

solve the twin problems of management of existing assets by tapping private sector efficiencies and financing of new infrastructure by unlocking the value of investment made in public assets which have not yielded appropriate or potential returns so far (Kant, 2021). Furthermore, the funds received by the government are proposed to be used for creation of new infrastructure which could generate substantial multiplier effects, bridge existing infrastructure gaps, and lead to inclusive socio-economic development. Beyond innovative financing options and reorientation of expenditure towards capex to benefit from higher multiplier effects, rationalisation of expenditure and raising the country's tax to GDP ratio may have to be an integral part of the fiscal rebalancing act post-COVID.

5. Conclusion

II.32   The recovery in economic activity remains stimulus dependent, even as new risks to growth and inflation have emerged from the war in Ukraine and normalisation of monetary policy in the US. For restoring and recreating a policy environment conducive for private sector-led growth post-COVID, timely rebalancing of monetary and fiscal policies may become necessary given the current configurations of debt and liquidity.

II.33   First, large surplus liquidity that helped financial conditions to ease significantly during COVID needs to be withdrawn in a calibrated manner. This is because when surplus liquidity persists at above 1.5 per cent of NDTL, for every percentage point increase in surplus liquidity, the average inflation could rise by about 60 basis points in a year. Surplus liquidity within the threshold of

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[18]   DUM08 is a dummy variable to capture the effects of global financial crisis and DUM91 is another dummy variable to capture the effects of balance of payments crisis in India on GDP growth.

1.5 per cent of NDTL, however, is found to pose no significant risks to inflation. Since inflation exceeding a threshold of 4-6 per cent is inimical to growth[19], adequate supply-side measures to contain inflation should be the priority rather than passive monetary accommodation through ample surplus liquidity.

II.34   Second, empirical estimates suggest term premium coming under pressure once the central government debt exceeds a threshold level of about 55 per cent of GDP. While surplus liquidity is found to have a significant sobering effect on term premium, easy liquidity should not be a policy instrument to raise the tolerable level of debt in the economy. Moreover, when general government debt exceeds another critical threshold level of about 66 per cent, it is found to dampen growth.

II.35   Third, the scenario analysis suggests that even under best possible macroeconomic outcomes, general government debt may not decline to below 75 per cent of GDP over the next five years. If adverse scenarios materialise, in fact, debt may increase. A medium-term transparent strategy of debt consolidation aimed at reducing general government debt to below 66 per cent of GDP at the earliest would be important to secure the medium-term growth prospects of India.

II.36   Fourth, fiscal consolidation is unlikely to be growth retarding, as the time varying fiscal multipliers for India suggest. Once the economy returns to steady state, fiscal multipliers can change from greater than one during a crisis to less than one or even negative. The debt path over the next five years, even under the best-case scenario, will further squeeze fiscal space unless strategic policy efforts covering both taxes and expenditure aim at targeted consolidation, without relying perpetually on the wobbly comfort from a favourable interest rate minus growth condition of debt sustainability.

II.37   With monetary policy prioritising price stability and pursuing output stabilisation in an environment in which debt sustainability is sought to be achieved by fiscal prudence, the assignment rule is satisfied bringing in its train macroeconomic stability to support sustainable growth.

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[19] See RBI (2021c) for details.

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STRUCTURAL ISSUES IN REJUVENATING GROWTH

The Indian economy was baffled with several structural constraints to growth even before the outbreak of COVID. COVID induced disruptions, especially in the supply front, have posed additional challenges before the economy. The sub-optimal share of manufacturing in gross value added (GVA); deployment of the bulk of physical investment in a few capital-intensive sectors leading to low overall productivity; labour market rigidities hindering the creation of formal employment; the subsidy-heavy and low-investment imbalance in agriculture depressing yields; and weak growth dynamism in services reflect several infirmities in major sectors of the economy, which would require bold factor and product market reforms and effective implementation of several momentous reforms already announced to accelerate the growth momentum on a durable basis in the medium-term.

1. Introduction

III.1   Even before the outbreak of the pandemic, a distinct deceleration in the growth momentum had set in from H2: 2016-17 in India, triggering a public debate on the state of India's potential output in view of prolonged sluggishness in investment and productivity (Dieppe, 2021). With trend growth of 7.0 per cent (2003-20) at risk, structural reforms have been called for in order to regain and secure it as the trajectory over the medium-term (Economic Survey, 2020). In this context, this chapter addresses the structural reforms that are needed to invigorate post pandemic growth. Set against the backdrop of the transformation that is underway in the economy, the chapter examines key drivers and targeted policy interventions in the form of a range of sector specific reforms to remove bottlenecks and revive growth. The remaining part of this chapter is organised under six sections. Section 2 examines the pattern and nature of structural change in India. Drivers of

productivity growth, the relative importance of factor productivity over factor endowment in India's growth process; and resource reallocation to raise overall productivity growth is the focus of Section 3. Section 4 provides an assessment of structural impediments to growth in agriculture, industry and services, and their sub-sectors. Enabling conditions for growth at the economy level for the benefit of all sectors is the focus of Section 5. Section 6 covers issues relating to factor market, in particular land, where litigation free access at affordable cost remains a major impediment to growth.[1] Section 7 concludes the chapter and presents a set of policy priorities that could raise India's trend growth path in the medium-term.

2. Structural Transformation in India

III.2   Transformative structural change requires moving production to sectors with increasing returns or higher productivity, where strategic policy interventions play a crucial role[2]. Innovation is the

[1]   Capital, as the third critical factor, is covered in Chapter IV in the context of contribution of finance to growth.

[2]   The neoclassical school of thought, however, would suggest that structural changes could be the outcome of market forces. Even on state intervention, the strategy could differ depending on the preference for welfare economics *versus* neoliberalism.

key driver of such structural shifts (Schumpeter, 1939) and diversification (away from traditional low productive sectors) along with sophistication of production processes could be an indication of such progresses (UNIDO, 2009).

III.3   Accordingly, considerable attention has been devoted to defining and measuring structural change in the presence of productivity gaps across sectors, and even between firms in the same industry. While the two most commonly used indicators of economic progress in the literature are per capita GDP and some simple measures of productivity (such as labour productivity), the three most commonly tracked indicators of structural transformation are sectoral shares in value added, employment and consumption expenditure (Herrendorf *et al.*, 2014). It is also important to track labour productivity (output per unit of labour), which could have two broad patterns – increase in productivity within a sector due to capital accumulation or change in technology, and at the level of the economy due to labour moving from low productive to high productive sectors (McMillan and Rodrik, 2011). The determinants of structural transformation could broadly include: (a) changes in income; (b) changes in relative (sectoral) prices; (c) changes in input–output linkages; and (d) changes in comparative advantage(s) through globalisation and trade. Differences in income elasticities across sectors could be a driver of structural change. Changes in sectoral relative prices can also induce reallocation of activity to the extent that they reflect differences in technology and total factor productivity (TFP) growth. The input-output matrix, a complex web of the underlying structure of an economy, has become a major driver of structural change due to rising importance of domestic and global supply chains where specialisation in each part of the production process by different players is more important than one player specialising in all parts of the value chain. In an open economy setting, comparative advantages open up new opportunities to drive sectoral reallocation of resources.

III.4   In India, the sub-optimal share of manufacturing sector in gross value added (GVA) is an outcome of persistent structural constraints, resulting in the lowest share of manufacturing in GVA among a peer group of economies that are endowed with similar resources (Dieppe, 2021). Moreover, the bulk of physical investment in India is deployed in a few capital-intensive sectors, leading to low overall productivity in the economy. Together with labour market rigidities, this has hindered the creation of formal employment in the economy. As manufacturing productivity is considerably higher than other sectors, this incentivises the workforce to shift from low productive sectors, particularly agriculture, to manufacturing, as the global experience shows (Lewis, 1955; Kaldor, 1966; Chenery *et al.,* 1986), giving rise to a virtuous cycle of growth and investment. Indian agriculture also suffers from structural impediments, resulting in low yields and sticky cropping pattern. To correct imbalances in agriculture, the policy thrust should not only change from subsidy-led to investment-led production but also from managing scarcity to managing surpluses (Gulati *et al.,* 2020). In several services sectors such as telecommunication, transportation and logistics, retail and wholesale trade, real estate and tourism, the quality of service and growth dynamism remain less than desirable. Economic growth, in terms of simple accounting, is the sum of growth in factor inputs and productivity. Contrary to factor inputs,

productivity growth provides an opportunity to increase output without increasing inputs and incurring related costs. After the Global Financial Crisis (GFC) 2008-09, however, the world economy faces a stagnation in productivity growth (Arnold and Grundke, 2021). A peculiar attribute of factor productivity is its very high correlation with GDP growth. Productivity deceleration/stagnation appears to be an emerging risk for India, given the post-GFC global experience, and requires targeted sector-specific policy interventions.

III.5   Over the last 70 years, the Indian economy witnessed a remarkable transformation from a predominantly agriculture-based to a services dominated economy (Chart III.1). Industry's share was increasing up to 1990s after which it has stagnated.

III.6   Employment dependence on agriculture continues to remain high even after a decline in its share in total employment from around 70 per cent in 1980-81 to 41.3 per cent in 2018-19 (Chart III.2). During the same period, the employment share of industry remained

Chart III.2: Dependence on Agriculture for Employment
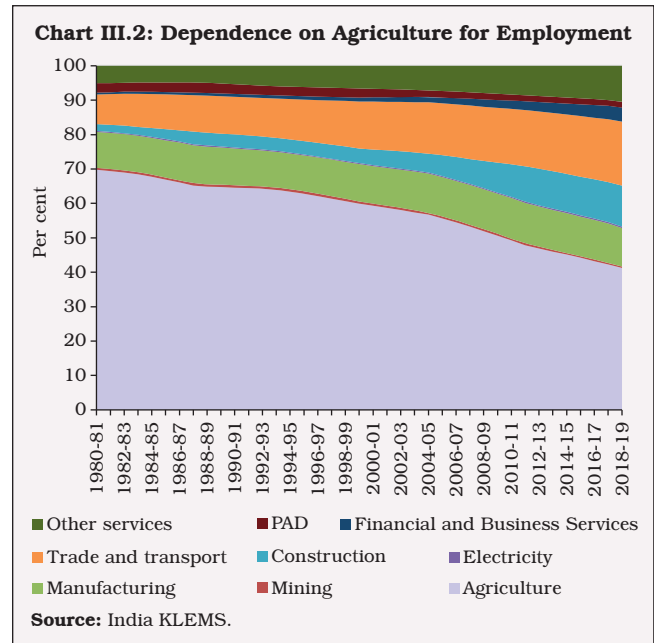
unchanged at around 12 per cent, while the share of services increased from around 19 per to 47 per cent.

III.7   A dominant share of real gross capital formation (GCF) is allocated to the industrial sector (Chart III.3).

Chart III.1: Sectoral Shares in Real GVA

Source: National Accounts Statistics (NAS) and India KLEMS.

Chart III.3: Capital Concentration in Industry

Source: NAS and India KLEMS.

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Chart III.4: Capital Stock Per Worker

Source: India KLEMS.

Chart III.5: Components of Manufacturing GVA

Source: NAS and CMIE Industry Outlook.
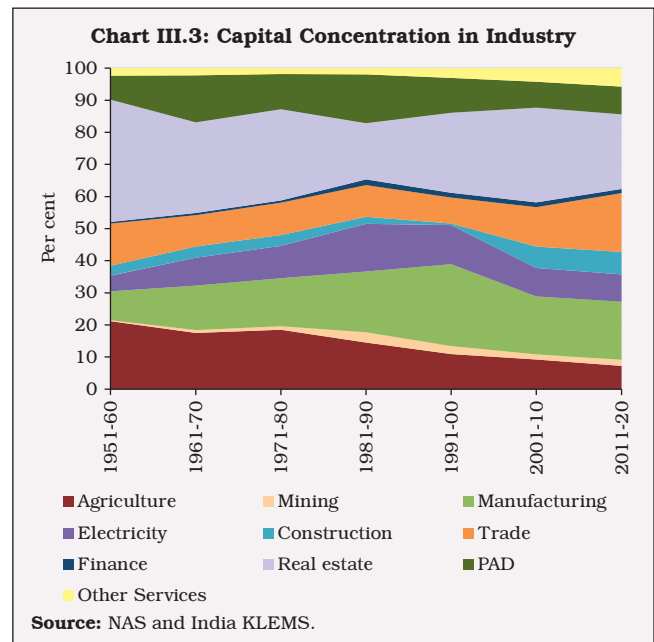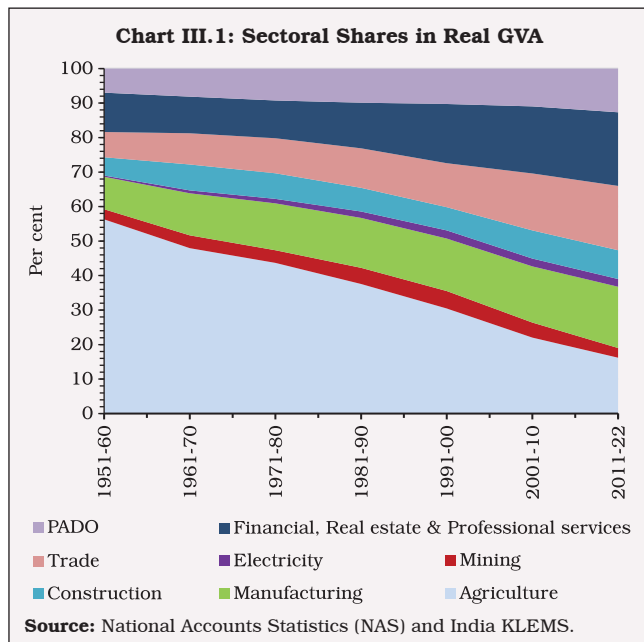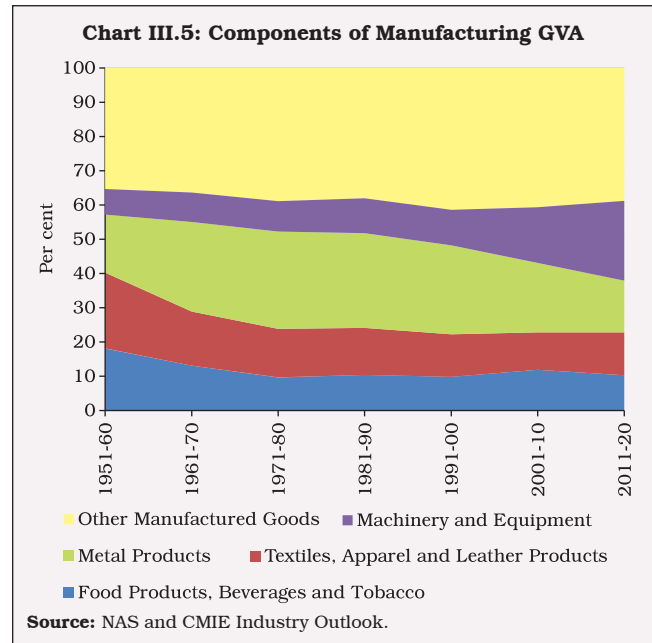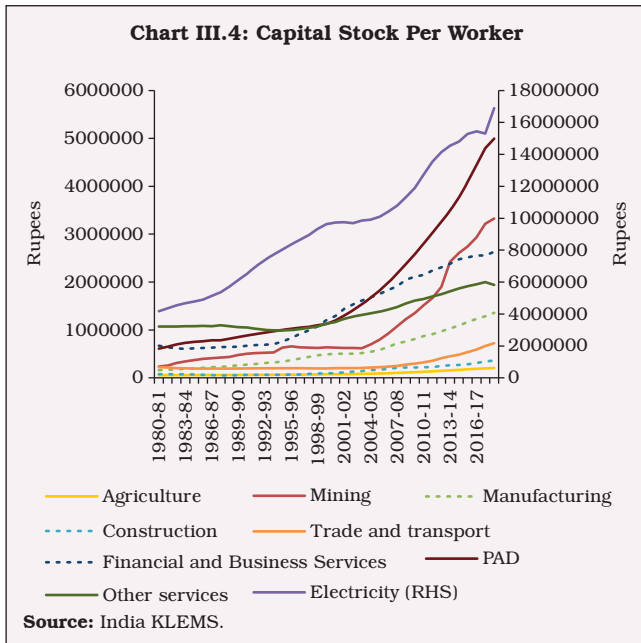
III.8   An analysis of the composition of aggregate GVA, aggregate employment and GCF shows that manufacturing has not generated commensurate employment and value addition, leading to adverse outcomes for sectoral productivity and system-wide efficiency (Chart III.4).

III.9   The share of capital intensive 'other manufactured goods' and 'machinery and equipment' in manufacturing GVA increased to above 60 per cent in 2011-20 (Chart III.5). However, labour intensive sectors such as textile, readymade garments, leather products, food products and beverages have lost ground. Stringent labour regulations have contributed to a slow growth in employment in the organised sector (Panagariya *et al.*, 2008). These regulations also result in labour market frictions which cause decreases in wages in the modern sector (Ghate *et al.*, 2016), employment of inefficient labour (Gupta and Kumar, 2012) and constrain the growth of the modern sector by deterring entry of firms and skewing firm-size distribution (Alfaro

and Chari, 2014). Other factors include low wage differentials between the non-agricultural informal sector and the agricultural sector for the unskilled work force, linguistic differences, lack of social protections such as mutual insurance provided to members of the same sub-caste networks (Munshi and Rosenzweig, 2009), and lack of cheap urban housing and poor planning in urban areas (Banerjee, 2006). More recent studies also show that policy interventions in the form of wage setting and providing unemployment benefits by the public sector may only increase the unemployment rate and increase the size of the informal sector (Ghate and Mazumder, 2019). This may also result in lowering the wage rate in the private sector.

III.10   The changing mix of GVA is also visible from the evolution of India's exports composition. The share of services in gross exports increased from around 20 per cent in 1990-91 to above 40 per cent in 2020-21, driven by skill intensive information technology (IT) and business services. Among goods exports, engineering goods' share

Chart III.6: Sectoral Decomposition of Total Exports

Services ■ Engineering Goods ■ Chemicals and Related Products
Agriculture and Allied Products □ Textile and Textile Products
Gems and Jewellery ■ Petroleum Products
Others (All Commodities) ■ Ores and Minerals
Other Manufactured Goods ■ Leather and Manufactures
Handicrafts (excluding Handmade Carpets)

Note: Items in the chart are in descending order for 2020-21.
Sources: CEIC and DBIE, RBI.

Chart III.7: An Accelerated Growth in Urban Population

—— Rural   —— Urban
—— Ratio of decadal rise of urban population to rural population (RHS)

Source: Census and CEIC.

almost doubled from around 10 per cent in 1990-91 to around 18 per cent in 2020-21 (Chart III.6). The decline in the share of labour intensive sectors in exports has adverse repercussions on employment generation and absorption of new workers migrating from agriculture sector.

III.11   In this backdrop, policy actions to alleviate labour market frictions can lift potential output, supported by re-skilling programmes. Higher subsidies towards agriculture are hardly a solution when a shift of resources from subsidies to capital investments in agriculture can yield higher output. A mix of tax and subsidy policies can, therefore, be used to modernise agriculture to reduce labour dependence on farm activities, besides boosting capital formation in more productive sectors. In this way, the problems of reverse migration of labour amidst the pandemic could be addressed and further absorption of labour in firms with higher productivity and wages can be encouraged.

2.1 Rising Role of Urban Agglomerations

III.12   Seventeen of the 20 fastest-growing cities in the world between 2019 and 2035 will be from India (Economic Times, 2020). Indian cities are likely to contribute 70 per cent of India's GDP by 2030[3]. A comparison of decadal incremental rise in urban and rural population shows that for the first time, urban areas would add more new persons than rural areas (Chart III.7). A rapidly urbanising Indian economy poses several challenges for policymakers, ranging from generation of adequate quality employment to creating a robust and inclusive infrastructure.

3. Productivity Trends

III.13 Globally, productivity growth has undergone a prolonged slowdown since 2010, after a brief recovery in the years immediately following the GFC (Chart III.8), with the

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[3]   The Economic Times, November 27, 2020.

Chart III.8: Total Factor Productivity Growth - Global Trends

Chart III.9: Labour Productivity Growth-Global Trends
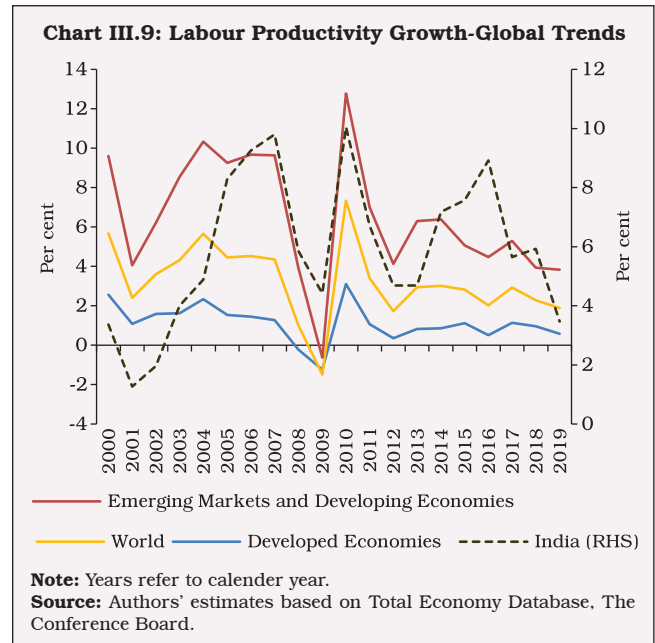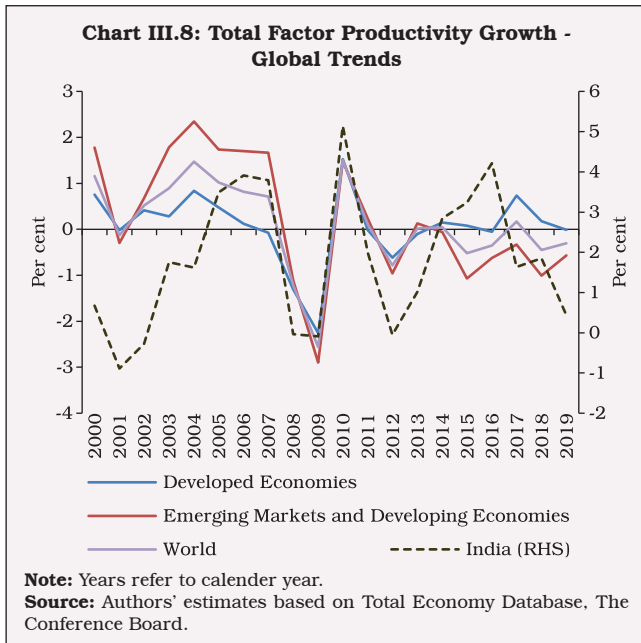
deceleration in total factor productivity (TFP)[4] being relatively sharper in emerging and developing economies. The slowdown in productivity growth has been attributed to a weakening investment climate, lower growth in employment in developed economies, reduced participation in global value chains, and fading gains from factor reallocation (Dieppe, 2021). The growing emergence of monopolistic forces across sectors and decline in dynamism of traditional firms also contributed to the loss of productivity (Parente and Edward, 1999; Herrendorf and Teixeira, 2004).

III.14 Labour productivity, measured by the value added per worker, has followed a similar trend. Despite showdown, India's average labour productivity growth for 2010 to 2019 at 6.5 per

cent was much higher than the emerging market average of 2.9 per cent (Chart III.9).

III.15 India suffered a moderate decline in TFP growth compared to the global experience with average TFP growth rate in India during 2010 to 2019 estimated at 2.2[5] per cent as against the emerging market average of -0.3 per cent for the same period. TFP growth accounted for about 30 per cent of India's aggregate GDP growth during 2014 to 2018 (Chart III.10). In fact, the acceleration of GDP growth during this period can be attributed to increase in TFP growth, as contributions from both capital and labour declined. Since 2018-19, there has been a notable slowdown in TFP growth.

III.16 TFP growth during 2014 to 2017 was mainly driven by non-market services such as

[4] Total Factor Productivity (TFP) is estimated as a residual growth in an economy's aggregate output after deducting the contributions from labour, capital and intermediate inputs from growth in gross output. In other words, TFP growth accounts for that part of growth in aggregate output which is not explained by growth in labour, capital, and intermediate inputs. TFP growth essentially measures the impact of technological progress and efficiencies in production processes, collectively called as the productivity growth in an economy.

[5] TFP being a residual of growth accounting, it is more appropriate to refer to period averages rather than TFP estimate of any single year.

Chart III.10: Decomposition of GDP Growth in India
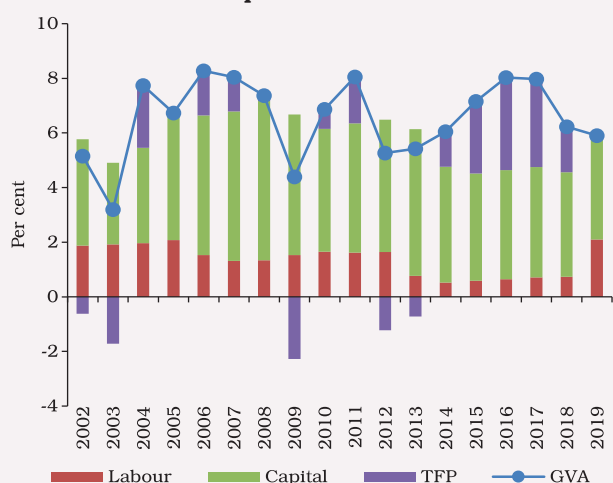
Note: Years refer to financial year (FY). FY 2019, for example refer to 2018-19, *i.e.* the financial year ending as on March 2019.
Source: Authors' estimates based on India KLEMS (available up to 2018-19).

public administration, defence, education, social works and related services (Chart III.11a). This raises doubts about the sustainability of aggregate TFP growth, given that TFP growth from market driven sectors (*i.e.,* when non-market services and agriculture are excluded) has generally

remained higher than aggregate TFP growth in years of high real GDP growth (Chart III.11.b).

3.1 Drivers of TFP Growth

III.17　The factors that support sustained TFP growth over the long run can be broadly categorised into: (i) fostering innovation at the national level; (ii) facilitating diffusion of new technologies available at the global level among domestic firms; and (iii) reducing resource misallocation, particularly skill mismatches (OECD, 2015).

III.18　In a market economy, the most innovative firms are expected to thrive. Innovation can be promoted through a pro-competition environment incentivising the entry of new innovative firms (OECD, 2015). India ranks significantly below the major developed and emerging countries in terms of innovation activities being carried out nationally (Chart III.12a)[6]. India also ranks far below other major economies in terms of aggregate research and development (R&D) expenditures, and also in the extent of participation by private business

Chart III.11: Sectoral Drivers of TFP Growth (Y-o-Y) in India
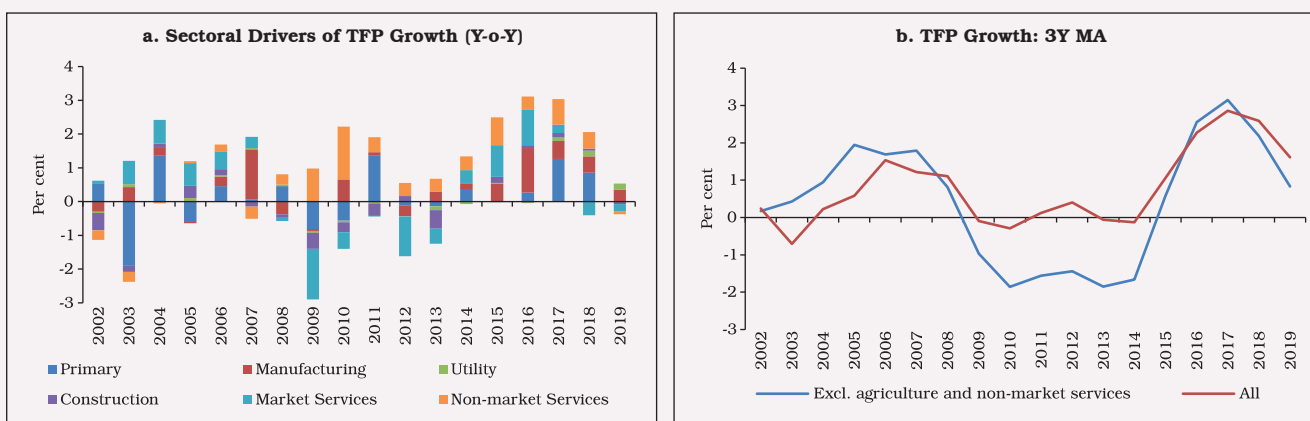
Note: Years refer to financial year (FY). FY 2019, for example refer to 2018-19, *i.e.* the financial year ending as on March 2019.
Source: Authors' calculations based on India KLEMS.

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[6]　Innovation is measured by the number of patent applications by a country's residents relative to its total population.

Chart III.12: Indicators of Innovation and Productivity-Global Comparison

a. Resident Patent Applications (2014-19 average)

b. R&D Expenditure (2014-18 average)

c. R&D by Business (2014-18 average)

d. Total Factor Productivity (2014-19 average)
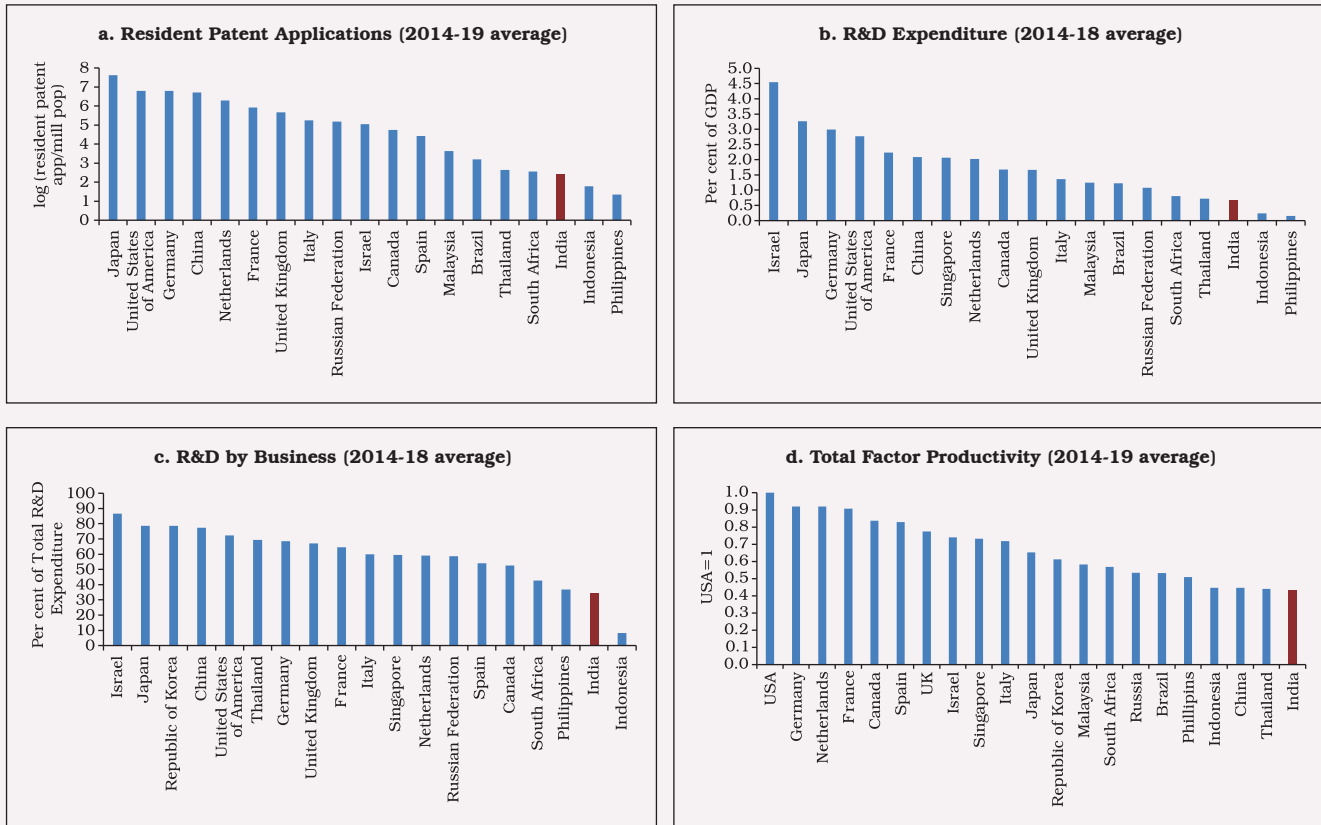
Sources: World Intellectual Property Organization (Charts III.12.a-III.12.c) and Penn World Tables (Chart III.12.d).

entities in R&D activities (Chart III.12b and Chart III.12c). In fact, the share of businesses in aggregate R&D expenditures in India is among the lowest across major countries, which implies that innovation activities in India are largely being carried out by the government and public sector enterprises (Chart III.12c). Consequently, aggregate productivity occupies the lower rung in a cross country comparison (Chart III.12d).

III.19 On the diffusion of technologies, the prominent factors are global connections *via* trade and FDI (Alvarez *et al.*, 2013; Melitz and Trefler, 2012), participation in global value chains (GVCs) (Saia *et al.*, 2015); synergic investments in R&D, skills and organizational know-how, particularly managerial capital, commonly known

as knowledge based capital (KBC) (Griffith *et al.*, 2004). Lower GVC participation across the globe since 2011 has possibly curtailed the scope for technology diffusion.

III.20 Investment demand reflected by annual average growth of gross fixed capital formation (GFCF) has decelerated since 2008, both in India and other major emerging economies. This poses a challenge to sustaining TFP growth in the future, as stepping up private sector investment in R&D activities also requires a favourable overall investment outlook. Estimates suggest that capital deepening through higher investment in machinery and other fixed assets improve TFP growth in India (Box III.1). This process could, however, yield a desirable outcome only when supported

Box III.1
Structural Determinants of TFP Growth in India

Total Factor Productivity (TFP) growth can be explained through the sensitivity of the economy to four factors: (a) capital deepening, which is represented by growth in the stock of fixed capital; (b) capital composition, which is the average rental price of capital across three major types *viz.* construction, machinery and transport equipments; (c) labour quality, which is an index of the composition of the labour force under five broad education categories[7] weighted by their average annual earnings, and (d) input use intensity measured by input growth. India KLEMS data for the period 1990-91 to 2017-18 have been used for 27 broad industries disaggregated into 6 major sectors, *i.e.,* (1) agriculture; (2) manufacturing; (3) infrastructure industries that include mining, construction, electricity, gas and water supply; (4) financial services; (5) market services; and (6) non-market services that include public administration, defence, health and education related services. Panel data estimates[8] covering these 6 sectors suggest that:

- Capital deepening generally improves TFP growth (Table 1).

- Capital composition, representing the average rental price for capital, has a negative relationship with TFP growth. An increased cost of capital, such as machineries, without any significant improvement in its productive capabilities may restrict firms from expanding its scale of operations and technological upgradation, limiting its TFP growth.

- Improvement in labour quality is observed to have a positive impact on TFP growth.

- Input growth shows a positive association with TFP growth. A disaggregated analysis suggests that these

Table 1: Determinants of TFP Growth

	With lag 1 of endogenous var	With lag 2 of endogenous var	With lag 3 of endogenous var	With lag 4 of endogenous var
Dependent Variable: Growth in TFP				
Growth in TFP-Lag 1	0.05 (0.15)	0.10 (0.09)	0.09 (0.09)	0.18* (0.10)
Growth in TFP-Lag 2	0.51** (0.24)	0.41* (0.22)	0.41* (0.23)	0.22* (0.13)
Growth in TFP-Lag 3	-0.32*** (0.08)	-0.32*** (0.09)	-0.38*** (0.09)	-0.30*** (0.07)
Growth in Capital Stock	2.89*** (1.10)	3.15*** (1.13)	3.03** (1.26)	2.68*** (0.87)
Growth in Capital Composition	-4.15*** (1.03)	-5.82*** (0.99)	-6.39*** (1.16)	-6.85*** (0.81)
Growth in Labour Quality	58.84*** (12.55)	69.26*** (17.77)	75.58*** (13.60)	75.30*** (11.47)
Input Growth-Lag 2	0.23*** (0.06)	0.29** (0.15)	0.29* (0.17)	0.23 (0.33)
Value Added Growth-Lag 2	-0.57** (0.28)	-0.54* (0.29)	-0.59** (0.30)	-0.37** (0.15)
N	138	132	126	120

Notes: Robust Standard errors in parentheses.
*, **, *** represent statistical significance at 10, 5 and 1 per cent, respectively.

effects are positive for agriculture, manufacturing and non market services. The effects are not significant for infrastureture industries and financial services.

References:

Levinsohn J., Petrin A., "*Estimating Production Functions Using Inputs to Control for Unobservables*", The Review of Economic Studies, Volume 70, Issue 2, April 2003, Pages 317–341.

by simultaneous improvement in the productivity of capital through innovations. Estimates also suggest that improvement in the education profile of the labour force improves TFP growth.

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[7] Education categories are: i) below primary, ii) primary, iii) middle, iv) secondary & higher secondary and v) above higher secondary.

[8] A two-step least-square instrumental variable (2SLS IV) approach is used to address the issue of inconsistency in the estimates for the coefficients of capital deepening, capital composition and labour quality due to their correlations with the error terms of the regression. This is also known as the endogeniety problem. This occurs when the explanatory variables are not completely exogenous. We use the contemporaneous growth in intermediate input as instrument for growth in capital stock following Levinsohn and Petrin (2003). For the capital composition and labour quality, we used the fourth lag of capital stock growth, and the second lag of change in labour-capital ratio, respectively, as instruments.

III.21 As regards reallocation of labour and capital from low productive to high productive sectors, reduction in skill mismatches within an economy is an important channel to improve aggregate TFP growth (OECD, 2015). Estimates suggest that a more efficient reallocation of labour and capital across firms can improve TFP growth by up to 60 per cent in the Indian manufacturing sector (Hsieh and Klenow, 2009). On the other hand, when this reallocation mechanism stalls, the aggregate TFP growth tends to be lower. The latest estimates for India on factor reallocation

effects suggest that the contribution of resource reallocation to aggregate TFP growth declined from 82 per cent of aggregate TFP during 2001-2010 to 42 per cent of aggregate TFP during 2011-2019 (Box III.2). The productivity increase in India after 2010 was driven mainly by within industry TFP rise and less by resource reallocation effects across industries. From a policy perspective, therefore, the focus should be on addressing market distortions, reducing skill mismatches, ensuring greater product and labour market flexibilities.

Box III.2
Resource Reallocation for Higher Productivity Growth

The 27 sector KLEMS data framework is used to determine the role of resource reallocation in driving productivity growth in India during 2000 to 2019.

Aggregate output is defined in terms of standard production possibility frontiers for estimating industry origin of aggregate productivity growth and the resource reallocation effects (or structural change). Following Jorgensen 2007[9], the resource reallocation effect is given as:

$$\text{TFP}^{PPF} = \left(\sum_j \bar{w}_j \frac{\bar{v}_{K,j}}{\bar{v}_{V,j}} \Delta \ln K_j - \bar{v}_K \Delta \ln K\right) +$$
$$\left(\sum_j \bar{w}_j \frac{\bar{v}_{L,j}}{\bar{v}_{V,j}} \Delta ln L_j - \bar{v}_L \Delta \ln L\right) +$$
$$\left(\sum_j \bar{w}_j \frac{1}{\bar{v}_{V,j}} TFPG_j^{GO}\right) \qquad ...(I)$$

The first and the second terms in the equation capture reallocation of capital and labour across sectors.The third term indicates a weighted average of industry TFP growth. The weights of the TFP are Domar weights (Domar, 1961) - improvement of TFP as the result of two effects, *i.e.,* a

direct effect of an increase in output of own industry and an indirect effect due to increase in output sold to other industries for use as intermediate inputs.

Aggregate annual average TFP growth increased from 1.33 per cent during 2001-2010 to 2.72 per cent during 2011-2019 (Table 1). During the 2000s, resource reallocation was the driver of aggregate productivity whereas post 2011, within industry TFP increase was a stronger force and contributed more to aggregate productivity growth. On an average, within industry TFP increase accounted for 58 per cent of the aggregate TFP growth during 2011 to 2019 whereas resource reallocation effects accounted for the remaining 42 per cent. In the earlier subperiod of 2000, resource reallocation contributed to 84 per cent of aggregate productivity. During both sub periods, the labour reallocation effect were relatively higher than capital reallocation, indicating faster movement of labour to high wage sectors and a relatively slower expansion of capital in industries offering higher prices for capital.

(Contd...)

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[9] Resource reallocation effects can be derived from the following growth accounting model:

$$\Delta \ln V^{PPF} = \bar{v}_K \Delta \ln K + \bar{v}_L \Delta \ln L + \text{TFP}^{PPF} \qquad ...(1)$$

$$\Delta ln V^{PPF} = \sum_j \bar{w}_j \Delta ln V_j = \sum_j \bar{w}_j \frac{\bar{v}_{K,j}}{\bar{v}_{V,j}} \Delta \ln K_j + \sum_j \bar{w}_j \frac{\bar{v}_{L,j}}{\bar{v}_{V,j}} \Delta ln L_j + \sum_j \frac{\bar{w}_j}{\bar{v}_{V,j}} TFPG_j^{GO} \qquad ...(2)$$

$$\Delta ln V^{PPF} = \sum_j \bar{w}_j \Delta ln V_j = \sum_j \bar{w}_j \frac{\bar{v}_{K,j}}{\bar{v}_{V,j}} \Delta \ln K_j + \sum_j \bar{w}_j \frac{\bar{v}_{L,j}}{\bar{v}_{V,j}} \Delta ln L_j + \sum_j \bar{w}_j \frac{1}{\bar{v}_{V,j}} TFPG_j^{GO} \qquad ...(3)$$

$$\Delta \ln V^{PPF} = \bar{v}_K \Delta \ln K + \bar{v}_L \Delta \ln L + \text{TFP}^{PPF} \qquad ...(4)$$

Subtracting (3) from (4) it can obtained

$$\text{TFP}^{PPF} = \left(\sum_j \bar{w}_j \frac{\bar{v}_{K,j}}{\bar{v}_{V,j}} \Delta \ln K_j - \bar{v}_K \Delta \ln K\right) + \left(\sum_j \bar{w}_j \frac{\bar{v}_{L,j}}{\bar{v}_{V,j}} \Delta ln L_j - \bar{v}_L \Delta \ln L\right) + \left(\sum_j \bar{w}_j \frac{1}{\bar{v}_{V,j}} TFPG_j^{GO}\right) \qquad ...(I)$$

Disaggregated domar weighted productivity trends suggest that the pattern of TFP growth is not broad-based, and there are substantial productivity gaps across sectors (Chart 1). Within industries, the top performing sector in terms of contribution to productivity includes labour intensive industries like textiles and leather; rubber and rubber products; parts and component producing sectors like machinery and transport equipment; and import intensive sectors like coke refined products and petroleum products. In services, financial and business services, which has the largest interlinkages with other sectors, productivity has been high. Market services like trade, telecom, transport and storage contributed negatively to productivity growth.

Table 1: Aggregate Reallocation Effects

Time Period	2001 to 2010	2011 to 2019
Aggregate TFP Growth	1.33	2.72
Domar Weighted Productivity		
Agriculture	-0.09	0.52
Industry	-0.05	0.76
Market Services	0.40	-0.24
Financial and Business Services	-0.19	0.17
Non Market Services	0.14	0.36
Reallocation of Capital	0.47	0.46
Reallocation of Labour	0.66	0.68

Source: Authors' estimates based on India KLEMS.

Chart 1: Sectoral Drivers of Aggregate TFP Growth
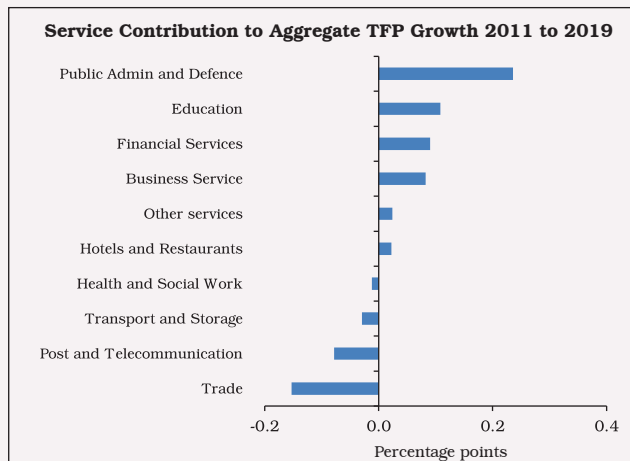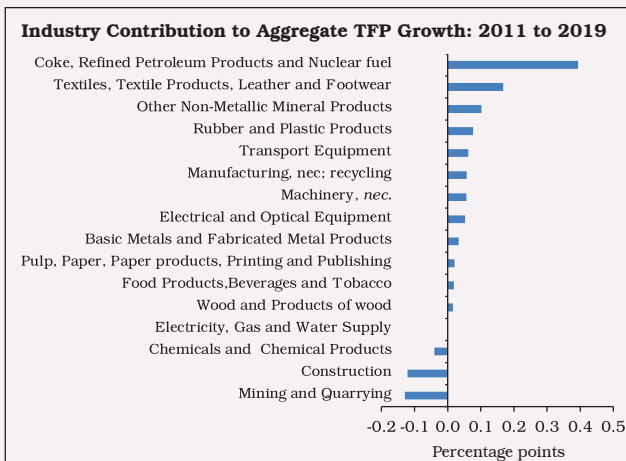
Source: Authors' estimates based on India KLEMS.

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Jorgenson, D. W., Ho, M. S., Samuels, J. D., & Stiroh, K. J. (2007). Industry origins of the American productivity resurgence. Economic Systems Research, 19(3),229–252.

Domar, D. E. (1961). On the Measurement of Technological Change, The Economic Journal, Volume 71, Issue 284, Pages 709-72

4. Structural Impediments in Key Sectors

4.1 Agriculture and Allied Activities

III.22 The agriculture and allied (A&A) sector comprises crops (both agricultural and horticultural), livestock, fishing and aquaculture, and forestry and logging. The importance of the sector arises from the point of view of food and nutrition security, the supply of raw materials to the industrial sector and the generator of demand for industrial and services output. The sector is also the largest provider of livelihood and employment.

III.23 From an initial condition of subsistence farming, food shortages and dependence on imports at the time of independence, India has

Chart III.13: Growth in Agricultural Production and GVA

a. Production Growth (Number of times)

b. Sub-sectoral Share in Agricultural GVA
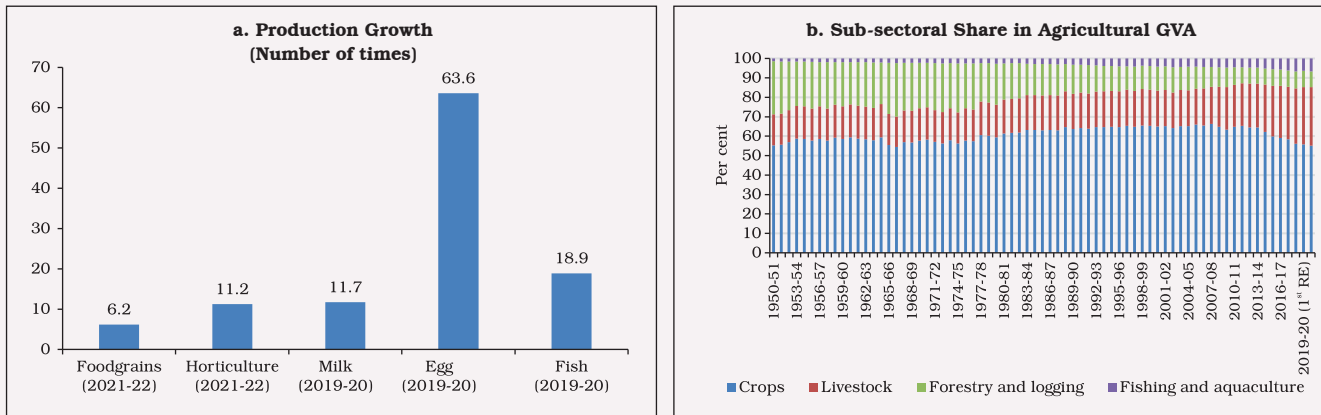
Source: MoA&FW, MOSPI.

transformed into a food surplus economy and an exporter of agricultural commodities. The country has emerged as a leading producer of cereals, pulses, vegetables, fruits, sugarcane, milk, fish, poultry and cotton in the world.

III.24   Horticulture crop production has increased 11.2 times since 1950-51 while production in the livestock sector has increased in similar large multiples (Charts III.13a and Charts III.13b) driven by rising per capita incomes and the consequent change in consumption patterns.

III.25   India's share in world agricultural exports has risen steadily from a little less than one per cent in the mid-1990s to 2.2 per cent in 2020 and in world agricultural imports from less than 0.5 per cent to 1.4 per cent (Chart III.14). The export shares of rice, marine products, meat products, groundnut, spices, fruits, vegetables, milk products, processed vegetables and fruit juices have increased.

III.26   The agriculture export policy of 2018 aimed at doubling India's agricultural exports from US$30 billion to US$60 billion by 2022; by 2020-21 these exports reached US$41.7 billion.

Low Capital Formation

III.27   Over the last decade, there has been a trend deceleration in the growth of gross capital formation (GCF) (Chart III.15a).

III.28   Public sector GCF in agriculture has stagnated during the 2010s. Growth in private GCF has also moderated, reflecting the behaviour

Chart III.14: India's Share in World Agriculture and Merchandise Trade

India's share in world merchadise export
India's share in world merchadise import
India's share in world agriculture export
India's share in world agriculture import
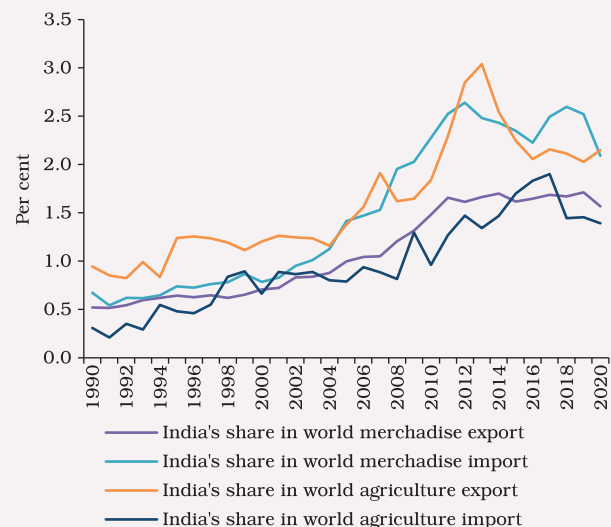
Source: FAOSTAT, MoA&FW.

Chart III.15: GCF and R&D in Agriculture
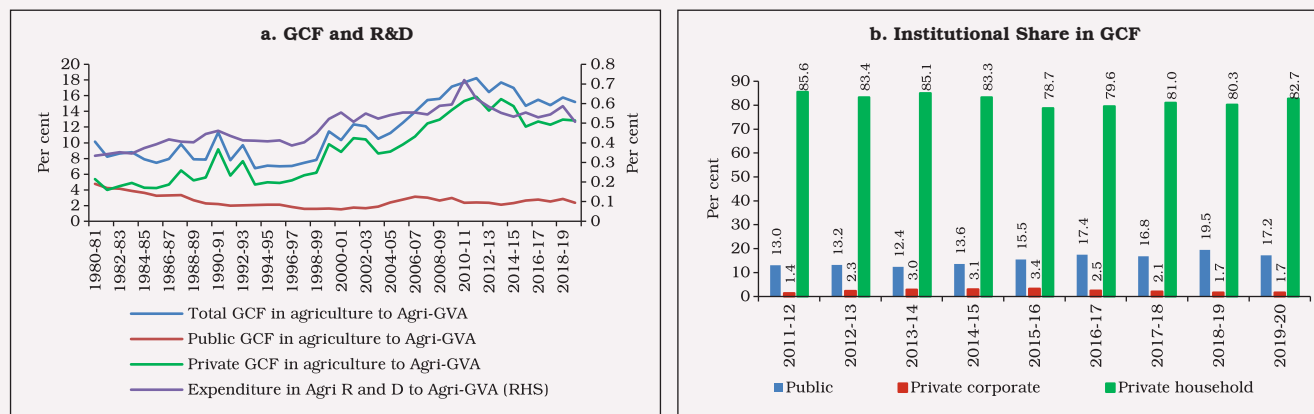
Notes: GCF: Gross Capital Formation, R&D: Research and Development Expenditure.
Source: MOSPI, MoA&FW.

of the household sector which accounts for the majority share (Chart III.15b).

III.29   As early as 2000, the Pradhan Mantri Gram Sadak Yojana (PMGSY) (Prime Minister's Village Road Scheme) was launched as a centrally sponsored scheme. The connectivity it provided to villages that had no access to the rest of the economy, except by way of foot, brought about sweeping changes in the lifestyles of many villagers in hilly terrains and boosted income levels, altered production and consumption cycles and integrated these villages with the broader Indian economy. This nationwide plan is crying out for replication across the country. Investments in rural roads have strong multiplier effects, working through improved access to better agricultural inputs, extension services and alternative rural occupations. Public investment in roads, agricultural research and development (R&D) and rural infrastructure can crowd in private investment and generate sustained impulses

of growth in agriculture (Akber and Paltasingh, 2019; Bathla, 2014).

Research and Development Expenditure

III.30   Agriculture R&D expenditure has been less than 1 per cent of agriculture GVA, which is substantially lower than some of the peer groups such as that of 1.82 per cent for Brazil in 2013 (latest available data, (ASTI, 2016)) and exhibits a declining trend. At the regional level, the excessive input use practices driven by Minimum Support Price (MSP), procurement and buffer stock policy have led to soil degradation, overexploitation of groundwater resources and declining yields. Technology adoption in terms of climate-smart agriculture techniques has also been low and skewed.

III.31   Total factor productivity (TFP)[10] growth in agriculture plays a central role in sustaining higher agriculture growth (Evenson *et al.*, 1999; Chand *et al.*, 2012). The key propellers of TFP growth

---

[10]   Total factor productivity (TFP) is the quantum of change in output not accounted for by changes in the conventional inputs such as land, labour and capital.

Chart III.16: Cross-Country Comparison of Average TFP Growth and Crop Yields

a. TFP Growth (2000-19)

Source: USDA.

b. Crop Yield (2019)

Source: FAOSTAT.
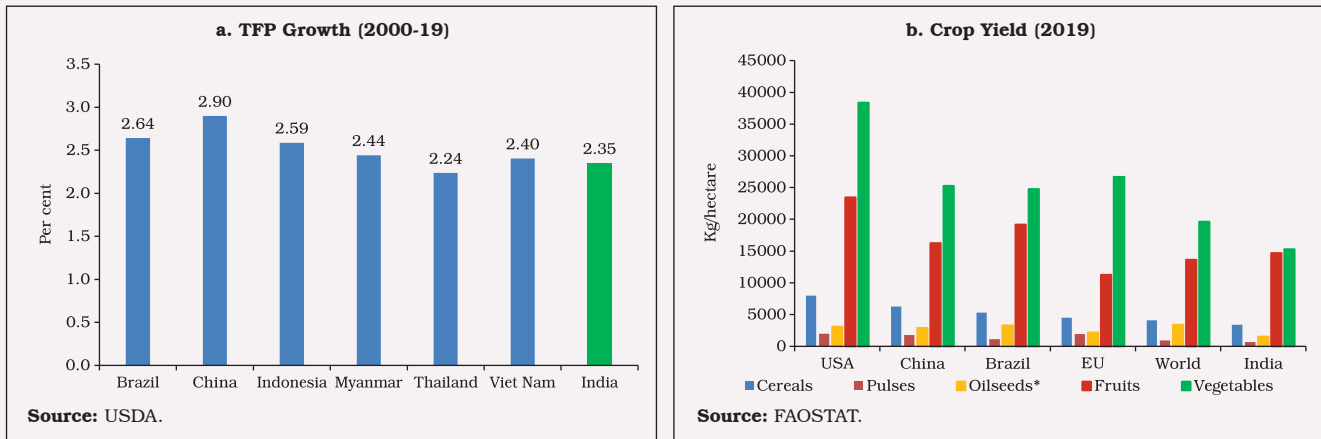
Notes: TFP index is at 2005 base year. Oilseed yield data pertains to 2018-19.

are technological innovations driven by R&D and physical and human capital accumulation (Fan *et al.*, 2007).

III.32 In India, growth in agriculture GVA is primarily driven by TFP growth, reflecting the lower contribution of factor inputs (Gulati *et al.*, 2020). Average TFP growth in Indian agriculture has, however, been lower than in several other emerging and Asian economies over the last two decades (Chart III.16a). India's crop yields also lag behind levels achieved by other countries (Chart III.16b). An empirical assessment of the determinants of TFP growth in Indian agriculture for the period from 1981-82 to 2018-19 (latest available data), shows that area under irrigation, rural roads, growth in GCF and cumulative expenditure on R&D are the most significant influences (Box III.3).

Box III.3
Determinants of TFP Growth in Indian Agriculture

TFP growth in Indian agriculture has been volatile (Chart 1).

We examined the drivers of the TFP growth in Indian agriculture, such as growth in GCF (at 2011-12 constant prices), R&D stock (cumulative expenditure in real terms)[11], agriculture credit (in reals terms), rural road length, irrigation facility (irrigated area in thousand hectares), rainfall deviation from long period average (LPA) and labour quality.

The distribution of certified quality seeds[12] (direct outcome) is used as a proxy for R&D expenditure. The results from various alternative formulations (Table 1) show that growth in GCF, distribution of certified quality seeds, research stock, rural road length and irrigated area are positively associated with TFP growth. The results are consistent with the findings of past research (Evenson *et al.*, 1999; Fan *et al.*, 1999; Chand

(Contd...)

[11] The real values were obtained by using GDP deflators.

[12] To elevate crop yields by enhancing seed replacement rate, mostly the certified/quality seeds are made available to the farmers. The contribution of private sector to the commercial seed requirement of the country stood at 58.8 per cent in 2016 (Chauhan *et al.*, 2016). Since private sector R&D expenditure data is unavailable, it has been proxied by the distribution of certified quality seeds.

Chart 1: Trends in TFP and Foodgrain Yield Growth

TFP growth = 1.2%
Foodgrain yield growth =3.2%

TFP growth = 0.7%
Foodgrain yield growth =1.7%

TFP growth = 0.6%
Foodgrain yield growth =2.0%

TFP growth = 2.4%
Foodgrain yield growth =2.2%

Agriculture TFP Growth — Foodgrain Yield Growth
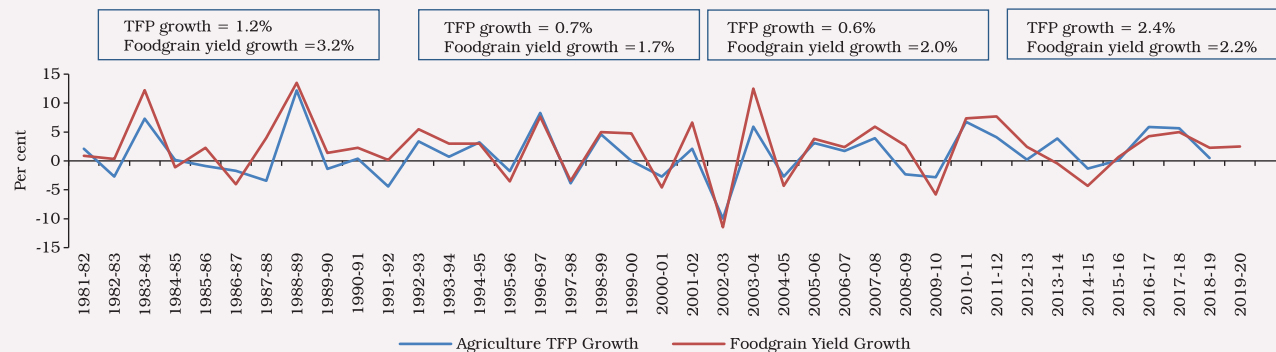
Note: Decadal average given in the boxes.
Source: KLEMS database, MoA&FW.

Table 1: Determinants of TFP growth in Indian Agriculture

	Model 1	Model 2	Model 3	Model 4
	Growth in TFP	Growth in TFP	Growth in foodgrain yield	Growth in foodgrain yield
Growth in Agri-TFP-Lag 1	-0.233 (0.15)	-0.269* (0.15)		
Growth in Agri-TFP-Lag 2	0.099 (0.12)	0.115 (0.13)		
Growth in foodgrain yield growth-Lag 1			-0.274* (0.15)	-0.272* (0.15)
Growth in foodgrain yield growth-Lag 2			-0.085 (0.15)	-0.035 (0.14)
Growth in Agri-GCF-Lag 2	0.048* (0.03)	0.030 (0.03)	0.084** (0.04)	0.059 (0.04)
Growth in cumulative R&D expenditure		0.113* (0.06)		0.153** (0.07)
Growth in distribution of certified quality seeds-Lag 1	0.067 (0.08)		0.039 (0.13)	
Growth in GDP per capita-Lag 1	0.463 (0.35)	0.392 (0.36)	0.185 (0.38)	0.043 (0.36)
Growth in Rural roads-Lag 1	0.174 (0.10)	0.169* (0.09)	0.069 (0.14)	0.069 (0.13)
Rainfall deviation from LPA (Dummy)	0.325 (1.14)	0.379 (1.11)	0.714 (1.38)	0.592 (1.30)
Growth in irrigated area	0.991*** (0.21)	0.998*** (0.19)	1.032*** (0.24)	1.092*** (0.22)
Growth in direct agri-credit-Lag 1	-0.052 (0.06)	-0.066 (0.06)	-0.039 (0.08)	-0.052 (0.07)
Growth in labour quality	2.013 (11.88)	2.199 (11.28)	20.39 (18.69)	17.949 (15.02)
National Agriculture Policy (Dummy)	-0.603 (1.42)	0.194 (1.64)	-2.23 (2.53)	-1.104 (2.34)
Constant	-4.356 (2.63)	-4.388 (2.55)	-6.29* (3.53)	-5.883* (3.36)
N	35	35	35	35
R square	0.73	0.74	0.72	0.74

Notes: Robust Standard errors in parentheses.
*, **, *** represent statistical significance at 10, 5 and 1 per cent, respectively.

et al., 2012) and recent cross-country studies that focus on the role of capital and technological innovations (Anik *et al.*, 2017; Liu *et al.*, 2020).

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Liu, J., M. Wang, L. Yang, S. Rahman, and S. Sriboonchitta (2020), "Agricultural Productivity Growth and Its Determinants in South and Southeast Asian Countries", Sustainability, Vol. 12, No. 12.

Chart III.17: Agricultural Credit in India - Size and Composition

a. Credit as Per cent of GVA

b. Composition of Loans
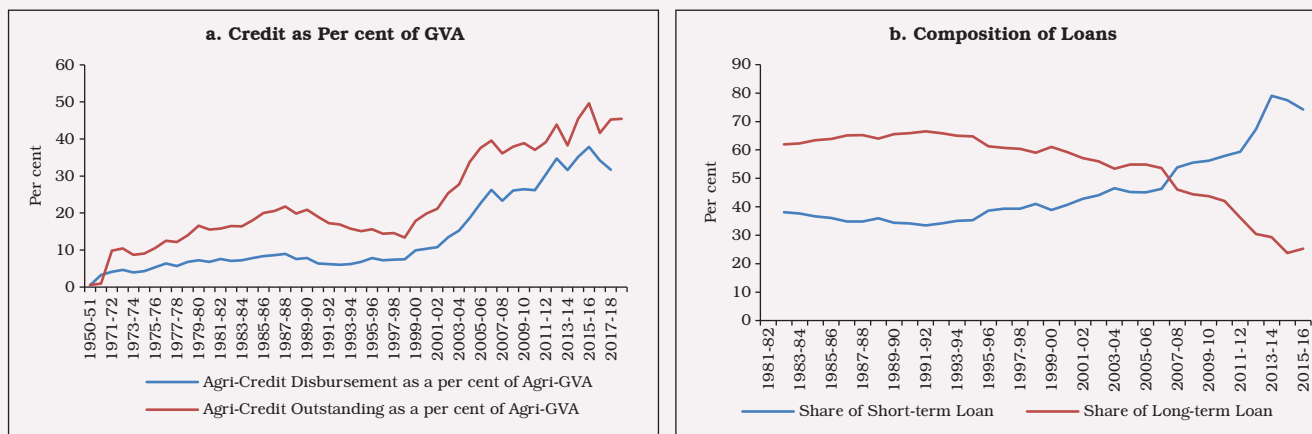
Source: MoA&FW, RBI

Credit to Agriculture

III.33 Credit flows to the A&A sector has stagnated in recent years (Chart III.17). In addition, the inter-state imbalance in usage of agriculture credit is also stark (Chart III.18).

Cropping Intensity

III.34 There are two broad options to raise production: (1) increasing the Net Sown Area (NSA) under crops, which may be difficult due to the rising demand for land from the non-agriculture sector, and (2) increasing the Gross Sown Area (GSA) by increasing the cropping intensity, which is possible if farmers adopt short-duration crops and investment in irrigation infrastructure is raised by the public and private investors. Another option is to enhance investment in R&D in agriculture to develop newer high-yielding varieties (HYV) in both agriculture and horticulture crops.

III.35 As regards NSA, it has declined to 139 million hectares in 2017-18 (latest available

data). On the other hand, GSA increased during the period primarily due to higher irrigation facilities and short-duration crops, consequently, the cropping intensity[13] has shown a gradual increase.

Chart III.18: Ratio of Agriculture Credit to State GVA (average for 2015-16 to 2019-20)
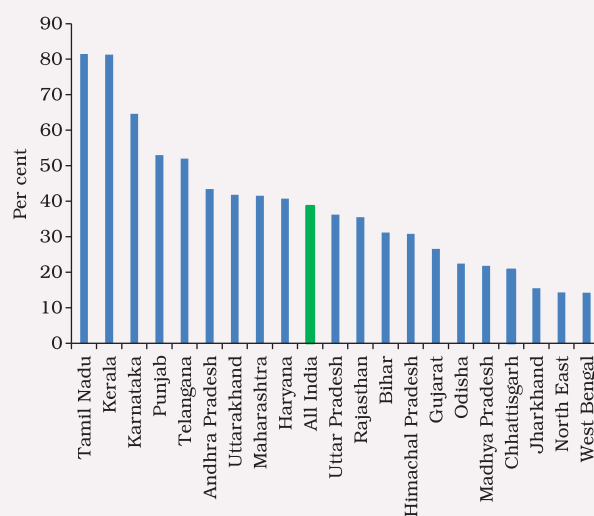
Source: MoA&FW, RBI

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[13] Cropping Intensity = GSA/NSA * 100

Chart III.19: Cropping Intensity and Irrigation Coverage Appears to have Plateaued
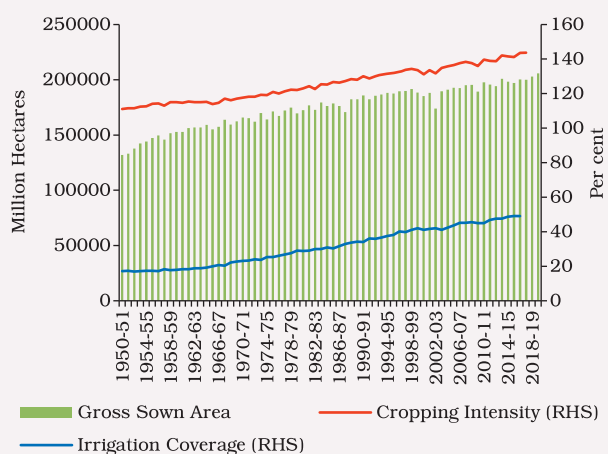
Note: For 2018-19 and 2019-20, the gross sown area has be computed summing the area under foodgrains, oilseeds, horticulture, fibre and cash crops.
Source: MoA&FW.

Chart III.20: Skewed Development in the Sources of Irrigation
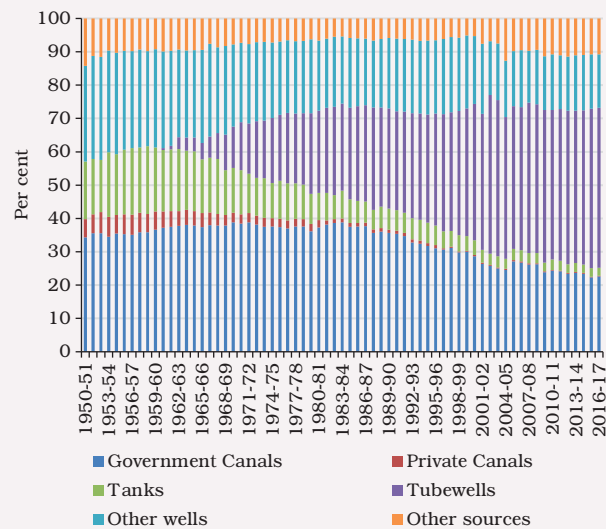
Source: MoA&FW

III.36   Irrigation coverage[14] has increased from 17 per cent in 1950-51 to nearly 49 per cent in 2017-18 (latest available data). However, despite this positive development, nearly half of the GSA continues to depend on rainfall (Chart III.19).

III.37   There has also been a skewed development in the sources of irrigation. In the recent period, the share of tubewells has been increasing significantly, which has posed the challenge of groundwater depletion - a risk to sustainability of growth in the sector (Chart III.20).

III.38   Paddy and wheat continue to garner the highest share in the gross irrigated area in the country. The various input subsidies and price incentives through MSP, backed by procurement, allow paddy and wheat this dominating position. (Chart III.21).

Farm Input Subsidies

III.39   The policy approach to support the farm sector in India has been to subsidise farm inputs such as fertiliser, power, credit, irrigation and

Chart III.21: Crop-wise Share in Gross Irrigated Area
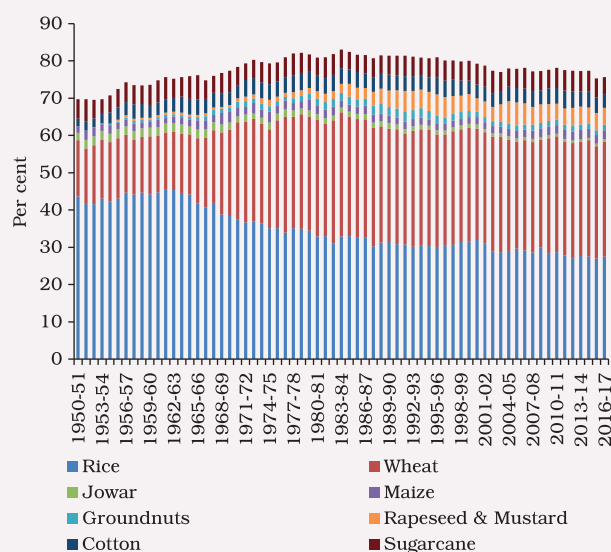
Source: MoA&FW

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[14] Irrigation Coverage = Net Irrigated Area / Net Cropped Area *100

Chart III.22: Trend of Input Subsidies and Public Gross Capital Formation in Agriculture

Input Subsidy as a per cent of Agri-GVA (RHS)
Public GCF as a per cent of Agri-GVA (RHS)
Irrigation and Power Subsidy — Fertilizer Subsidy
Insurance Subsidy — Credit Subsidy

Source: MOSPI, Fertiliser Association of India, Compiled from WTO (www.wto.org).
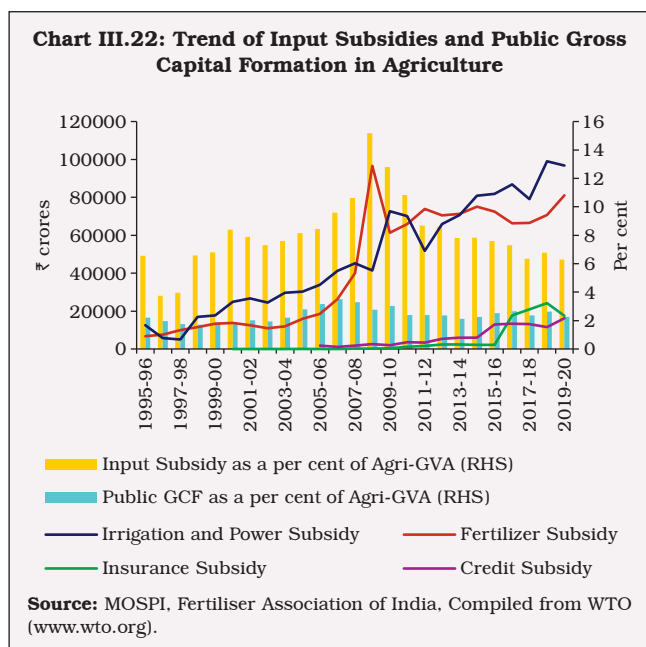
insurance in order to increase farm production rapidly by promoting technology adoption (Ellis, 1992; Gulati and Sharma, 1995; Fan *et al.*, 2007; Chand and Kumar, 2004; Gulati and Narayanan, 2003).

III.40   The significant share of input subsidies to agriculture has squeezed space for public GCF in agriculture. Though input subsidy as a per cent of agriculture GVA declined from a peak of 15 per cent in 2008-09, public GCF as a per cent of agriculture GVA continues to hover between 2 per cent to 3 per cent in the last two decades (Chart III.22).

III.41   Protecting the farmer through crop insurance led to the implementation of the Pradhan Mantri Fasal Bima Yojana (PMFBY) in 2016. Operational across all States and Union Territories,

this scheme provided financial insurance to farmers suffering crop loss due to uncertain events. The program assumed significance in a country where rainfed agriculture is predominant and where farmer's income fluctuated due to other natural calamities such as cyclones and floods. The program functions on a self-selection basis and is voluntary for participation[15]. The scheme, apart from smoothening farmer's income over the years has indirectly helped financial institutions by ensuring loan repayment capacity of farmers by insulating them from production risks. The percentage of beneficiaries in the total insurers stands at 31 per cent from 2016-17 to 2019-20 so far, with the highest number of beneficiary farmers being from Maharashtra.

4.2 Industry

III.42   As discussed in Section 2, the contribution of the industrial sector to India's growth has not been adequate relative to its potential. Almost all constituent sectors under industry face challenges that limit their contribution to growth.

Mining

III.43   India possesses one of the largest reserves of metallic, non-metallic, fuel and minor minerals. It produces as many as 95 minerals, including four fuels, ten metallic, 23 non-metallic, three atomic, and 55 minor minerals (including building and other materials) (GoI, 2021). Accounting for around 2.4 per cent of the real gross value added (GVA)[16], mining and quarrying contributes more than 10 per cent of total industry output.

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[15] PMFBY 1.0 was not voluntary; the farmers availaing loan were covered by default under the crop insurance scheme; however, the awareness among the farmers was poor. Currently, PMFBY 2.0 has been made voluntary.

[16] Mining and Quarrying accounted for 2.4 per cent share in real GVA during 2021-22 as per the second advance estimates of National Accounts released on February 28, 2022.

Table III.1: International Trade in Ores and Minerals from 2015-16 to 2019-20

(Rupees crore)

Year	Exports	Imports	Export - Import	Of which		
				Petroleum	Natural gas	Imports excluding crude petroleum oil and natural gas
2015-16	170947	738788	-567841	429400	43782	265606
2016-17	200131	809445	-609314	474219	40249	294977
2017-18	199469	1028529	-829060	563098	52366	413064
2018-19	219168	1299186	-1080018	798158	73888	427140
2019-20	189683	1151530	-961847	728112	68467	354951

Source: Annual Report 2020-21, Ministry of Mines, Government of India.

III.44   India has the largest coal reserves in the world and is the third largest producer of coal in the world. Indian coal is, however, of low calorific value with high ash content. India is the fourth largest producer of iron ore. The reserve stock of iron (Magnetite) has more than doubled since 2010. Chromite reserves increased by almost 70 per cent and the reserves of Laterite increased by 50.1 per cent.

III.45   India is self-reliant in bauxite, chromite and limestone. For magnesite, manganese ore, rock phosphate and lead, India still largely depends on imports for blending with locally available mineral raw materials and/or for manufacturing special quality mineral-based products (Chart III.23).

III.46   Starting from 2004-05, however, the share of mining and quarrying in total GVA has reduced almost by half, which appears to be a puzzle in view of natural endowments and high dependence on annual imports (Table III.1) including in a cross-country perspective (Chart III.24).

III.47   The output of three fuel minerals, *viz.* coal, crude oil and natural gas in the eight core

Chart III.23: Order of Self Sufficiency

*: Apparent demand (production+ import-export).
#: Including Apatite.
Source: Indian Bureau of Mines.

Chart III.24: GDP Size *vs.* Mining Share

Source: CEIC; MOSPI; Staff estimates.

Chart III.25: Index of Coal, Crude Oil and Natural Gas Production

Source: CEIC and Office of the Economic Adviser, GoI.
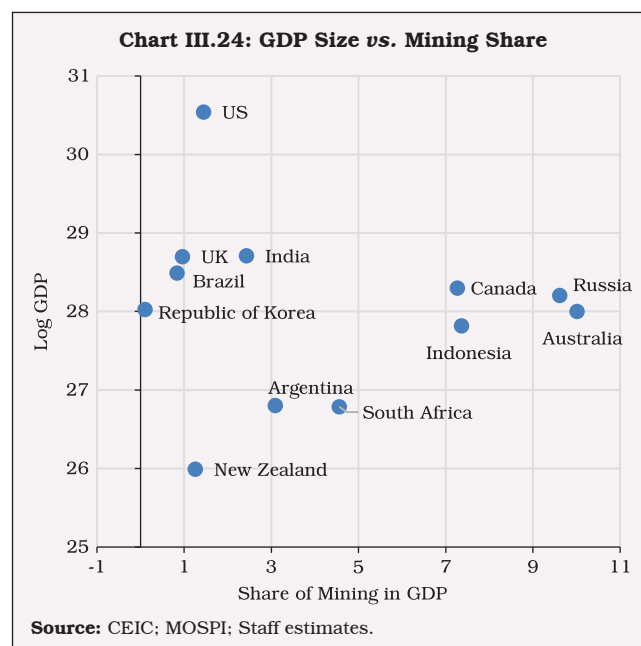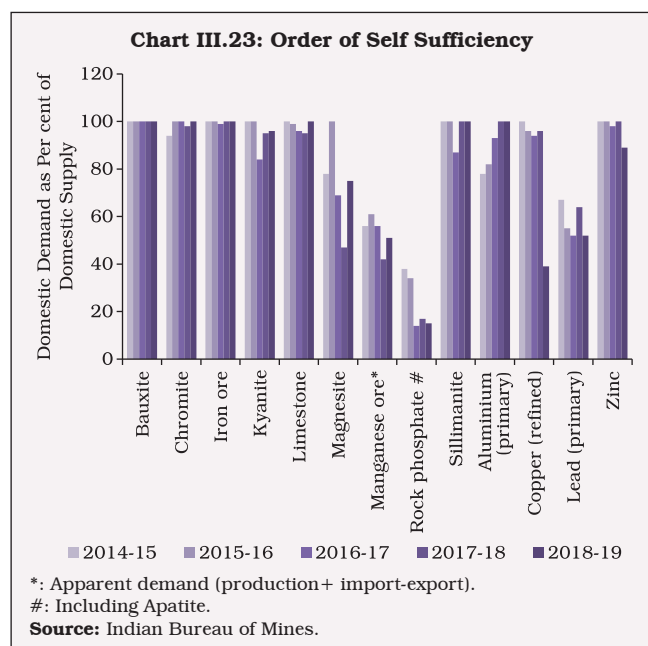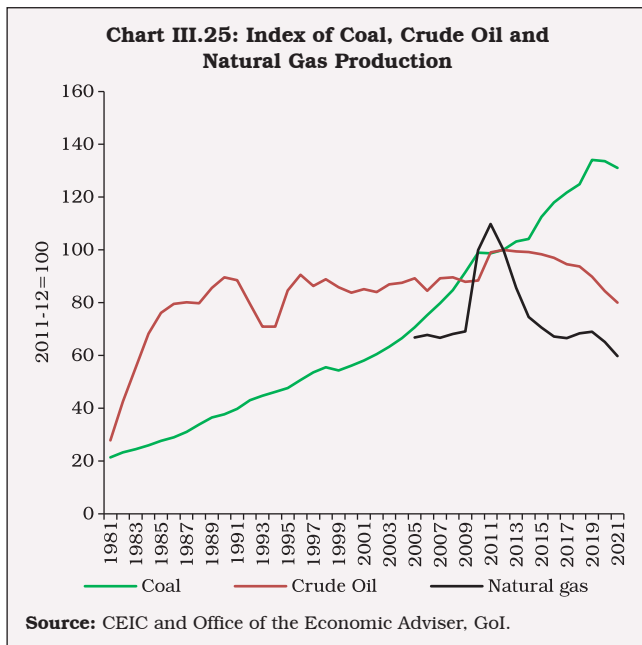
industries index is of particular relevance from the viewpoint of the country's energy security (Chart III.25). Crude oil production is almost stagnant at the levels achieved in the early 1990s and, in fact, has declined over the last 10-years. Natural gas has been witnessing a secular contraction. Crude oil and natural gas production performance largely reflects the ageing of existing fields, sand ingress, and technological limitations of domestic producers. Import dependence in these three critical minerals (for meeting domestic demand) pose significant spillover risks to India from volatility in international prices as well as from global supply chain constraints, as experienced during 2021-22. As new fields become operational by the end of 2022, some ramp up in gas production can be expected. ONGC or major private Indian players can partner with international majors for offshore and ultra-deep sea exploration for oil and gas fields. India has already launched a Deep Ocean Mission 2021-24 with a plan to extract minerals from oceans. Price deregulation

or more remunerative returns through better price realisations need to be examined afresh to create an enabling environment for investments to flow in.

Major Challenges and Policy Options

III.48 A large number of small mines (including quarries for extracting minor minerals) and rampant illegal mining complex challenges for sustainable development. The government has taken various steps in recent years, especially in 2021-22, to address these challenges (Annex Table 2). Nevertheless, a comprehensive energy planning strategy is needed so that the country's commitments to move towards net zero emission and related targets and the changing energy mix are dovetailed into energy security. India has set a target of achieving 40 per cent of electric power installed capacity from non-fossil fuel sources by 2030 in its Nationally Determined Contribution (NDC) under the Paris Agreement. At the 'Climate Change Conference' in Glasgow, India committed itself to one of the fastest transitions towards renewable sources that any country has ever undertaken. It will require to raise the country's non-fossil energy capacity to 500GW by 2030. While complete coal phase out is impractical in the context of India's energy security, it is clear that incrementally new private investments will flow into renewables to tap more solar energy and to develop grid-level storage for EV batteries network.

Manufacturing

III.49 Nations seek to raise economic growth through manufacturing because of at least four reasons. First, shifting labour from traditional, low-productivity sectors to higher-productivity

manufacturing sector can lift labour productivity (Lewis, 1955; Kaldor, 1966; Chenery *et al.,*1986). As productivity is higher in manufacturing than in agriculture, transferring resources from agriculture generates a 'structural bonus.' Second, manufacturing has the potential for productivity catch-up with the rest of the world that is often unmatched by most services. Arithmetically, this effect could be more significant when employment-intensive manufacturing expands. Third, to the extent that manufactured goods have high income elasticities of demand (higher than those of agricultural products), and are also more likely to be produced under increasing returns to scale, industrialisation sets in motion a virtuous growth cycle (Rosenstein-Rodan, 1943, Murphy *et al.*, 1989). Fourth, as income per capita increases, so does per capita demand for manufactured products. If a developing country does not have a strong manufacturing sector, it may face the risk of perpetual trade deficits (Thirlwall 1979). To cover this deficit, the economy may have to borrow or secure an equally large surplus through trade in non-manufactured goods (*e.g.*, services, minerals, food, *etc.*). Either of these is challenging for a typical developing country (Felipe, 2018).

III.50   In India, GDP and manufacturing display a high degree of co-movement, during the 40-year period from 1980-81 to 2020-21 (Chart III.26). The correlation coefficient between them for this period was found to be high at 0.8. Rolling regressions of manufacturing growth on services growth and *vice versa* (for a time window of 20-year period) suggest that manufacturing has a positive spillover effect on services growth[17] (Chart III.27). In contrast, services coefficients are found to be statistically insignificant, indicating

Chart III.26: Growth Rate of GDP and Manufacturing

Source: NAS and RBI staff estimates.
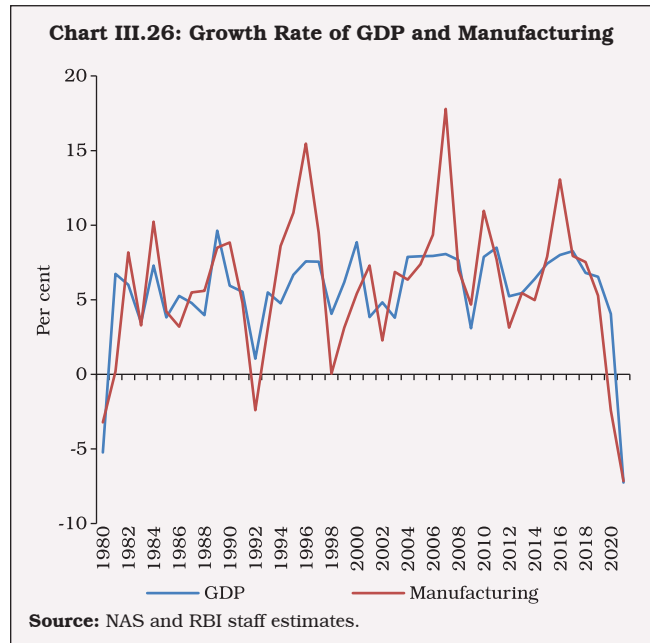
lower backward and forward inter-sectoral linkages of services with manufacturing. Therefore, targeted policy attention to manufacturing is necessary.

III.51   A decomposition of manufacturing growth between corporate and household sectors

Chart III.27: Impact of Manufacturing over Services

Source: RBI staff estimates.

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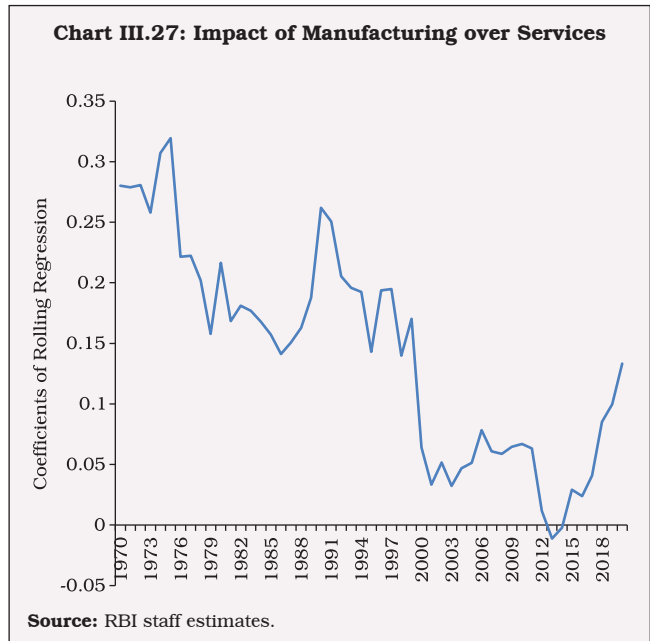
[17] The coefficient is greater than zero and statistically significant.

reveals that the slowdown is more pronounced in the household sector's output as also visible in electricity consumption (Chart III.28). An analysis of investment in fixed assets and employment trends from the annual survey of industries (ASI) reveals that the share of the top four sectors, *viz.*, basic metals, coal and refined petroleum, chemical and chemical products and other manufacturing in overall fixed investment is 56 per cent. Many other industries which are either important from an employment generation perspective or for meeting domestic and global demand of industrial goods account for a small share in fixed capital. This highlights the importance of correcting the imbalance with a focus on employment-intensive and export-intensive manufacturing.

III.52 Food products, textiles and wearing apparel provide around one-third of total employment in the manufacturing sector. Yet, their share in fixed investment has exhibited a sustained decline. Despite a manifold increase in domestic and

Chart III.28: Electricity Consumption: Industry *vs.* Others

Source: CEIC.

global demand for computers, electronic and optical products, their share in industrial fixed investment remains low. In fact, in the last two decades, the fixed investment share of this crucial sector in overall industrial investment has shrunk drastically.

III.53 India's manufacturing investment base is also narrow. A handful of capital intensive industries, metal and petrochemicals, have garnered the lion's share of physical investment. Since metals and petroleum are highly procyclical and linked to global demand conditions, India is often affected by adverse price movements worldwide. The narrow investment base of manufacturing also reflect the low employment elasticity of the sector and lower labour productivity, leading to loss of competitiveness.

III.54 The price of electricity charged to the Indian industry is considerably higher *vis-à-vis* other countries, which is the result of a policy of cross-subsidization (of agriculture and household consumption), leading to higher input costs in the economy. Electricity tariffs paid by the industry and commercial establishments are almost twice the rate at which it is sold by the electricity generating companies to the distribution companies. These factors act adversely on the overall competitiveness of the industry sector.

III.55 Thus, in a nutshell, the industrial sector has witnessed a secular trend of stunted capital formation in not only traditional employment intensive sectors but even in the fast growing sectors, *viz.*, computers and electronics. Importantly, all these sectors faced high demand in both domestic and global markets. Thus, it may be appropriate to conclude that the industrial slowdown in India has not occurred due to downturn in the business cycle, and hence,

Chart III.29: Services Growth

Source: NAS.

Table III.2: A Broad-based Slowdown in Services

Sectors	1996-2017	2017-2022
Services	**7.9**	**4.0**
Construction	7.5	3.1
Trade, hotels, transport, communication and services related to broadcasting	8.4	3.0
Financial , real estate & professional services	7.8	4.4
Public Administration, defence and other services	7.6	5.8
GVA at basic prices	6.6	3.9

Source: NAS.

countercyclical policies alone may not be enough to address the slowdown. Rather it shows a more generalised structural problem, requiring targeted policy interventions.

4.3 Services

III.56 Services represent a complex universe of heterogeneous activities. Since 2015-16 services sector growth has been showing a distinct deceleration (Chart III.29).

III.57 A sector-wise breakdown reveals that growth slowdown in services is primarily led by construction, financial services, and transport and communication services (Table III.2). The slowdown is stark in transport and communication sub-sectors (Annex Table 3).

4.4 Construction

III.58 Construction contributes around eight per cent of real GVA. It is critical to the economy for employment generation and creation of a lasting asset base. Around 5.7 crore workers are estimated to be employed directly in construction activity, which has high inter-sectoral backward and forward linkages. Importantly, expenditure on construction related activities contributes almost half of total real gross fixed capital formation (GFCF)[18].

Table III.3: Components of Construction - Share in Output (in per cent)

Year	Dwellings	Non-Residential Buildings	Roads and Bridges	Other Structures and Land Improvements	Plantation	Mineral Exploration
2011-12	34.3	33.5	5.4	25.4	0.1	1.3
2020-21	20.8	34.3	8.4	35.5	0.1	1.0

Source: RBI Staff estimates based on the NSO data.

[18] Its share declined from 58 per cent in 2011-12 to around 48 per cent in 2019-20.

64

Chart III.30: Housing Sales, Launches and Pricing

Source: RBI; and Prop Tiger Datalabs.

Chart III.31: Competitiveness Index and Infrastructure Index

Source: IMD's World Competitiveness Index.
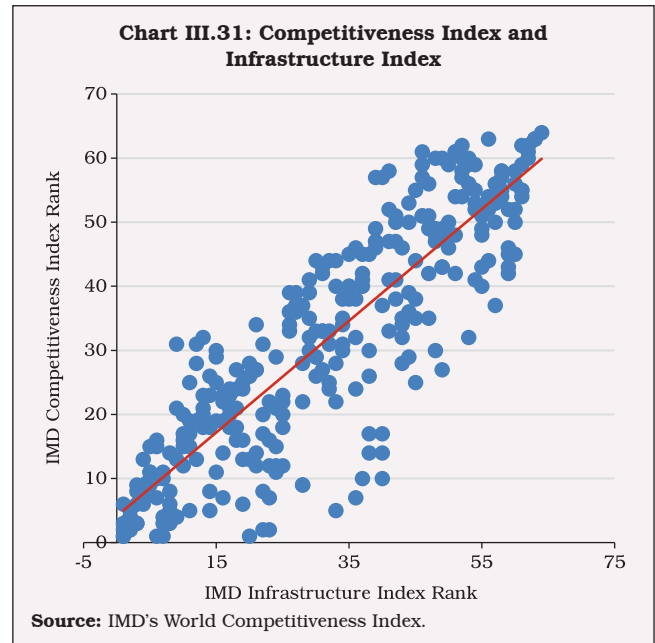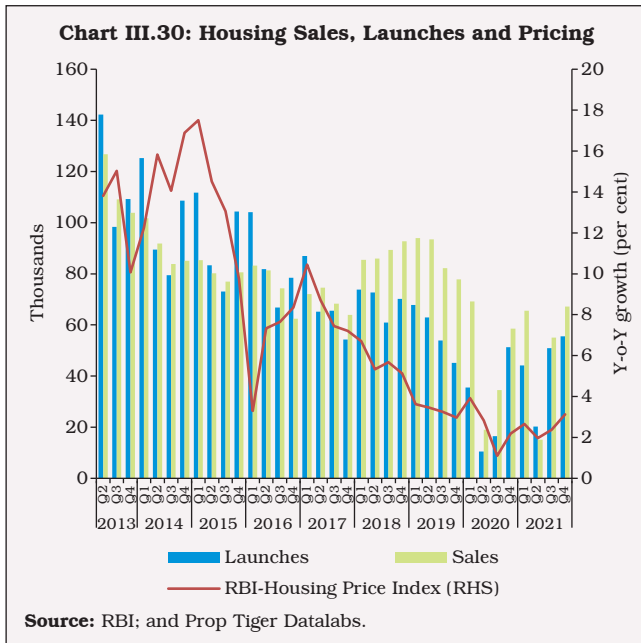
III.59 A bifurcation of construction output reveals that the share of residential construction declined to 20.1 per cent in 2019-20 from 34.3 per cent in 2011-12 (Table III.3). The count of new launches and sales of the residential units (apartments and villas) as surveyed in 10 major cities by Prop Tiger for the past few years has slackened (Chart III.30).

III.60 At the same time, the share of non-residential buildings, roads and bridges expanded from 38.9 per cent to 49 per cent. This decomposition reveals that growth retardation in construction primarily emanates from the slowdown in residential construction. The policy-induced push to construction of roads and bridges has not been adequate to compensate for the drag in the residential sector.

5. Structural Growth Enablers

5.1 Infrastructure

III.61 Availability of high-class infrastructure enhances the competetiveness of an economy

(Chart III.31). India witnessed impressive growth in several infrastructure sectors such as national highways, seaport capacity, and installed electricity generation capacity. However, expansion of railway tracks has remained relatively subdued (Table III.4).

Table III.4: Trend of Key Infrastructure Capacity (2011=100)

Year	National Highways (Kilometers)	Railway tracks*	Cargo handling capacity of ports (MTPA)	Electricity installed capacity (MW)
2011	100	100		100
2012	108	103		115
2013	112	102		127
2014	129	103	100	140
2015	138	104	109	154
2016	142	106	123	170
2017	161	108	156	182
2018	178	108	163	192
2019	187	110	170	207
2020		114	180	215

*: Running Track Kilometres.
Source: CEIC and Government of India.

Table III.5: Share of Infrastructure Sector in Real GVA and GFCF

(in per cent)

	Share in GVA	Share in GFCF
2011-12	8.8	17.7
2012-13	8.9	16.9
2013-14	9.0	18.3
2014-15	9.1	14.6
2015-16	9.1	18.7
2016-17	8.9	17.6
2017-18	8.9	19.5
2018-19	8.8	20.9
2019-20	8.8	18.9
2020-21	8.1	17.5

Source: NAS.

III. 62 By their nature, infrastructure industries are capital intensive (Table III.5). Their share in aggregate capital formation increased from 17.7 per cent in 2011-12 to above 20 per cent in 2019-20. During the same period, their contribution to the aggregate GVA remained stagnant at around 9 per cent. This asymmetry indicates that many of these sectors may struggle to generate an operating surplus in a cyclical slowdown.

5.2 Energy

III.63 India has a high degree of reliance on imported energy. With renewable energy emerging as an economical alternative to conventional energy resources and the evolution of newer technologies in the transport sector, India's imported energy dependence could shift to domestic sources in the long run. This could be promoted by rationalising investment in the energy infrastructure. Historically, the emphasis has been more towards generation capacity *vis-a-vis* transmission and distribution (Table III.6). The focus however needs to gradually shift towards transmission and distribution, with higher participation by the private entities.

Table III.6: Investment in Electricity Infrastructure by the Public Sector

(₹ crore)

Year	Generation	Transmission	Distribution
2015-16	78032	39389	49970
2016-17	57794	41932	5477
2017-18	44370	42922	16382
2018-19	43205	39735	-
2019-20 (Prov)	26658	-	-

Source: Annual Reports, Central Electricity Authority.

III.64 A peculiarity of renewable energy is dependence on location and geographical suitability. Hence, renewable energy sources are concentrated in a few states, with adequate sun-lit waste, fallow land and windy areas together accounting for 81 per cent of potential renewable energy capacity (Table III.7).

III.65 With rising electricity demand, keeping the cost of power reasonable becomes paramount for long-term growth. Electricity tariffs for businesses are higher in India than in export competitors such as Bangladesh, ASEAN economies, and China (Table III.8). In this context, renewable

Table III.7: State-wise Estimates of Potential for Solar and Wind Energy

States	Solar	Wind [Wind Power Potential at 120 mtr agl (GW)]
Andhra Pradesh	38.44	74.90
Gujarat	35.77	142.56
Karnataka	-	124.15
Madhya Pradesh	61.66	15.40
Maharashtra	64.32	98.21
Rajasthan	142.31	127.75
Tamil Nadu	17.67	68.75
Jammu and Kashmir	111.05	-
Uttar Pradesh	22.83	-
Himachal Pradesh	33.84	-
Odisha	25.78	-
Sub-total	**553.67**	**651.72**
Total	**748.98**	**695.50**

Source: Annual Report 2019-20, MNRE.

Table III.8: Price of Electricity for Businesses[19] (US cents per kWh)

Economy	2015	2016	2017	2018	2019	2020
Bangladesh	9	9	9	9	9	10
Indonesia	14	14	11	11	11	11
Taiwan, China	14	14	12	11	12	12
Malaysia	17	15	14	13	12	12
New Zealand	14	14	13	12	12	12
Canada	13	13	16	14	13	12
France	14	14	15	14	13	14
China	14	15	14	15	16	15
Hong Kong, China	15	16	15	15	15	16
South Africa	10	9	15	15	15	16
Mexico	17	14	7	7	12	17
Brazil	12	16	18	15	16	18
United Kingdom	15	16	16	16	17	18
United States	15	15	16	17	17	18
India	23	22	21	18	17	18
Australia	22	21	19	17	23	20
Japan	29	26	23	22	19	21
Pakistan	21	19	19	19	19	22
Germany	29	29	27	34	32	26
Spain	23	25	16	19	25	26

Source: Doing Business Reports, Various Rounds, World Bank.

energy can play a vital role and depress overall tariffs.

III.66   For lowering the cost of power it is also essential to reform the electricity distribution companies - closing the gap between the average cost of supply (ACS) and average revenue realised (ARR) by DISCOMs (Chart III.32). The aggregate technical and commercial (AT&C) loss or the deadweight loss - the percentage of power procured by a distribution company for which it did not receive any payment remains high. This contrasts with the experience

of advanced economies, *viz.* the UK and the US, where AT&C losses are about 6-7 per cent.

III.67   The electricity sector has a complex cross-subsidisation scheme under which high energy-consuming customers from industry and commercial sectors subsidise consumption in agriculture and domestic sectors. Based on the experience gained so far from rationalization of petroleum product subsidies, electricity pricing may also be completely deregulated. Levy of additional taxes/cess after deregulation must be eschewed as it could dilute the intended benefits of reforms.

5.3 Telecommunication

III.68   Decrease in number of private telecom players, beside the one operating in the public sector, has led to an oligopolistic market structutre. Further, the industry suffers the burden of high debt. The declining average revenue per user in this segment is noteworthy in this context. 5G and IoT are sources of future economic growth for which a viable and strong telecom industry is a necessity. Limited spectrum availability and low broadband penetration in the country are two other concerns.

III.69   There is a need to make India attractive for start-ups like Singapore or UAE by simplifying rules and regulations. According to the Department for Promotion of Industry and Internal Trade (DPIIT), start-ups in India are also employment-intensive. The potential of the start-ups could be harnessed by ensuring sufficient access to funds to the sector, both at the early stage of risk taking and when they scale up, and reducing red-tapes. Delayed

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[19] The price of electricity is measured in U.S. cents per kWh. A monthly electricity consumption is assumed, for which a bill is then computed for a warehouse based in the largest business city of the economy for the month of March. The bill is then expressed back as a unit of kWh. The index is computed based on the methodology in the Doing Business 16-20 Studies.

Chart III.32: Revenue Gap, Transmission Losses, and Power Subsidies

a. Per Unit Cost and Per Unit Revenue of Electricity

Average cost of supply ——— Average revenue (after receipt of subsidies)

b. Aggregate Technical and Commercial Losses

c. Ratio of Power Subsidy to Petroleum Subsidy (per cent)
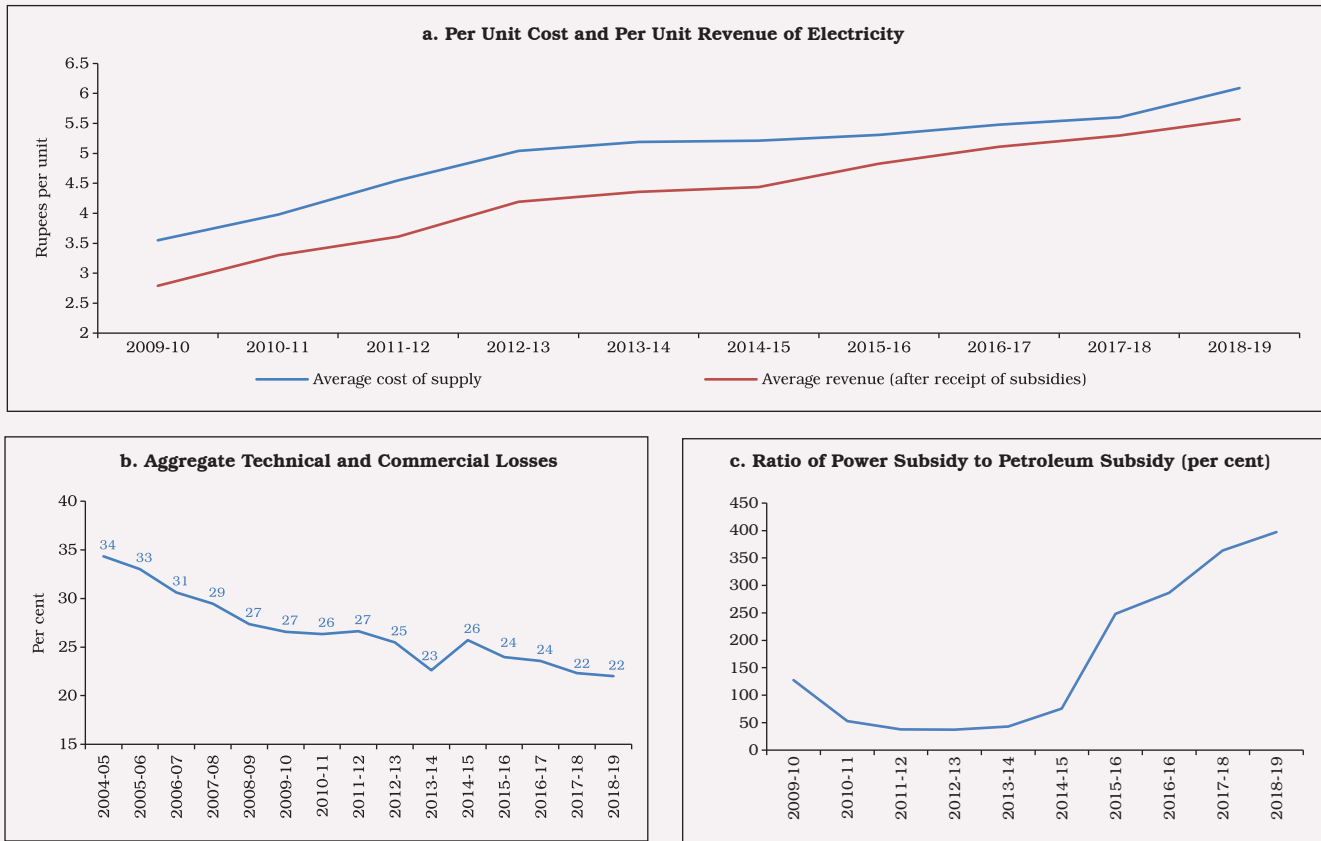
Source: Power Finance Corporation and staff estimates.

enforcement of formal contracts or business agreements impede new investment and may also dampen foreign direct investment. India lags in contract enforcement relative to other emerging countries, affecting ease of doing business (Box III.4).

Box III.4
Ease of Doing Business in India and Future Reforms

In 2020, India improved its rank to 63rd position from 77th position in 2019 in terms of ease of doing business (EDB) among 190 countries. The broad dimensions of EDB are transaction costs to start and operate a business, regulatory environment, cost of litigation, and tax structure. Based on these dimensions, the ten parameters that are used for assigning the score are dealing with construction permits, getting electricity, getting credit, protecting minority investors, paying taxes, trading across borders, resolving insolvency, enforcing contracts, starting a business, and registration of property. Based on cross-country annual data of 93 countries from 2006 to 2019, a dynamic panel regression shows that improving the EDB rank by one position can increase FDI inflows to GDP by 0.07 percentage points and real GDP growth by 0.006 percentage points (Table 1).

(Contd...)

Table 1: Impact of Ease of Doing Business on FDI Inflow and Economic Growth

Dependent Variables	FDI (% of GDP)$_{it}$	Real GDP growth$_{it}$
FDI (% of GDP) $_{i,t-1}$	0.184*** (0.0213)	
Ease of Doing Business Rank $_{it}$	-0.0696** (0.0290)	
Deposit interest rate $_{it}$	1.559*** (0.201)	
Real GDP growth $_{it}$	0.596*** (0.156)	
Real GDP growth $_{i,t-1}$		0.251*** (0.00292)
Ease of Doing Business Rank $_{i,t-1}$		-0.00632*** (0.000541)
Lending interest rate $_{i,t-1}$		-0.0612*** (0.00259)
Constant	-1.694 (2.352)	4.050*** (0.0653)
No. of Observations	1092	1092
AR(1) test p-value	0.0237	5.98e-08
AR(2) test p-value	0.280	0.0416
Hansen test p-value	0.868	0.858

Standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

India has taken several steps to improve the ease of doing business.

- The "Enforcing Contracts Portal" launched on June 29, 2021 aims to promote ease of doing business and improve the contract enforcement regime' in the country. This will provide easy access to latest commercial cases in the Dedicated Commercial Courts of Delhi, Mumbai, Bengaluru and Kolkata.

- The universal portal, *Maadhyam*, a National Single Window System (NSWS) to identify and apply for various approvals required to commence a business in India, will further help investors use central government licenses/approvals by filling a common registration form. The *Maadhyam* portal is also integrated with the State Single Window System (SWS) of all the participating states.

References

Adepoju, U. (2017). *Ease of doing business and economic growth*.

Vogiatzoglou, K. (2016). Ease of doing business and FDI inflows in ASEAN. *Journal of Southeast Asian Economies*, 343–363.

5.5 Education

III.70   Globally, efforts towards educating children suffered a major setback during the pandemic by making more than 100 million additional children fall below minimum reading proficiency levels in 2020[20]. In India, concerted efforts are required to make further progress, with a focus on skill augmentation/upgradation (Chart III.33).

III.71   It is important to recognise that rising literacy rates alone may not ensure the desired learning outcomes. Survey based results (ASER 2018) show deficiencies in quality of learning in elementary schools. The gap is also visible from the level of India's gross enrollment ratio in higher education relative to the developed and developing nations (Chart III.34).

Chart III.33: Literacy Trends

Note: Gender gap is defined as difference between male and female literacy rate.
Source: Office of the Registrar General and Census Commissioner.

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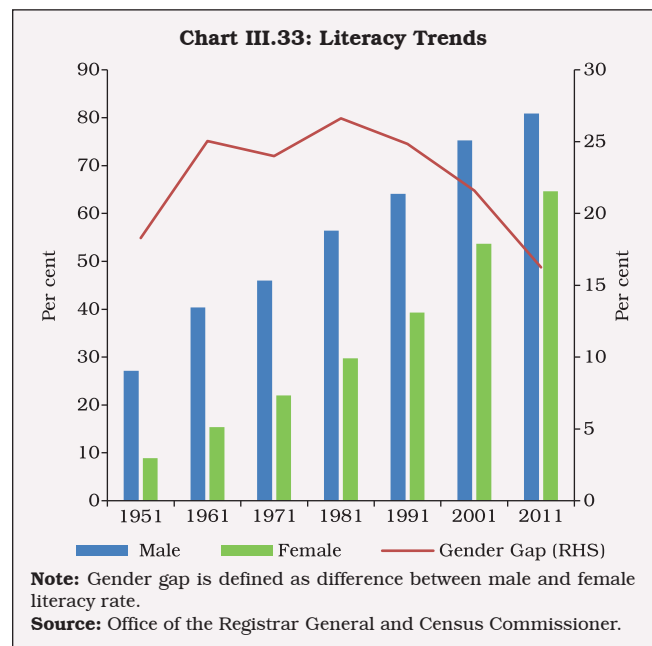
[20] As per United Nations progress report on SDG Goal 4, it is estimated that 101 million additional children and young people (from grades 1 to 8) fell below the minimum reading proficiency level in 2020 owing to the consequences of the pandemic, which wiped out the education gains achieved over the past 20 years.

Chart III.34: Gross Enrollment Ratio

Source: Our World in Data (OWID).

Chart III.35: Health Infrastructure - India *vs.* Peers

Source: World Health Organisation and World Bank.
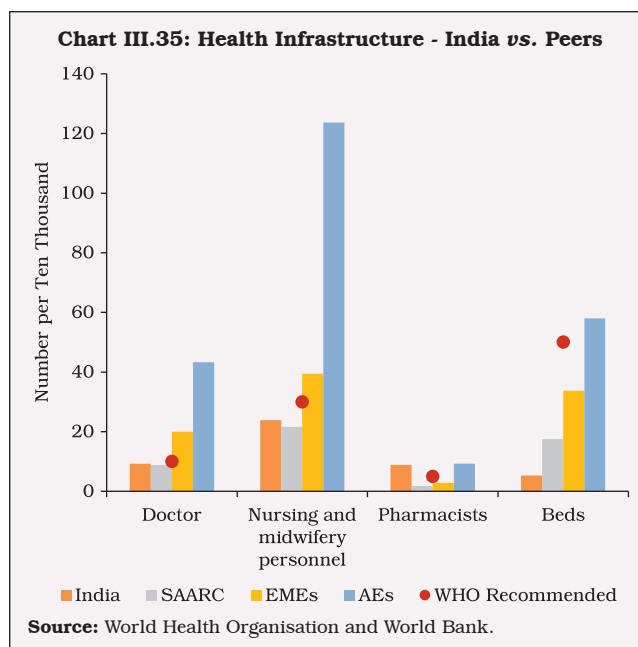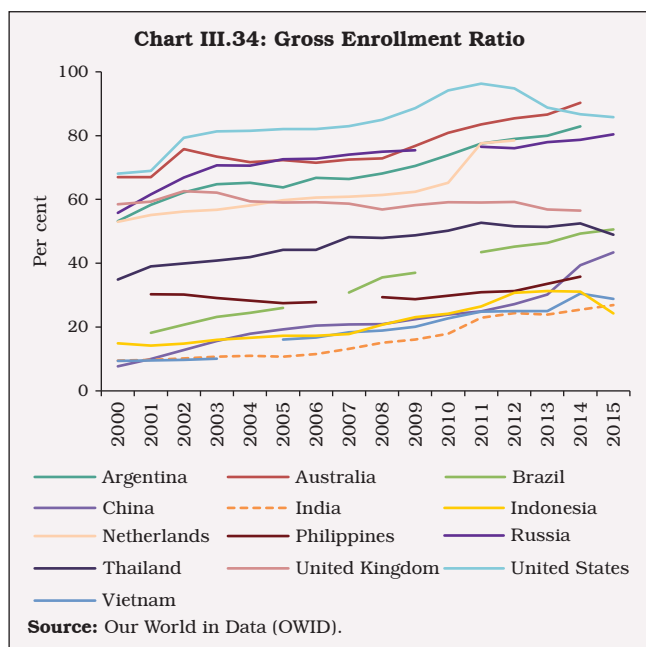
5.6 Health

III.72   The pandemic has brought to the fore the defiencies in the Indian healthcare system, particularly the poor state of the healthcare infrastructure, falling short on most of the WHO standards (Chart III.35). This has been the result of meagre public expenditure (1.26 per cent of GDP) incurred on health in India over successive decades.

III.73   Close to 75 per cent of outpatient care and 65 per cent of in-hospital care in India is provided in the private sector. India also has one of the highest levels of out of pocket expenditure (OOPE) incurred by patients among countries – highlighting the limited support from public expenditure and insurance. The private sector may have little incentives to invest in rural/semi urban areas where the gaps in healthcare infrastructure is more alarming.

III.74 Recognising glaring gaps in India's healthcare infrastructure, the government put in place a policy framework with targeted measures for implementation over the medium-term. This is

set out in the national infrastructure pipeline (NIP) policy for the healthcare sector (Table III.9).

Table III.9: Vision 2025 for the Healthcare Sector

	Current Status	Vision 2025
Health care Spending	• 1.28 per cent of GDP • Per capita spending - $63	2.5 per cent of GDP
Immunisation	Only 62 per cent children between ages 12 and 23 months are fully immunised	Mission Indradhanush Objectives to be achieved • 90 per cent immunisation
Healthcare and diagnostic	Expensive due to import dependence on medical devices and diagnostic equipment	Need to scale up India's medical devices and diagnostic equipment manufacturing under "Make in India" initiative
Health care professionals and Human resources	Shortage of well qualified doctors and support healthcare staff owing to insufficient medical colleges in the country • Pupil teacher ratio – 24 • College per lakh population - 28 • Medical colleges - 476	• New Medical Colleges in PPP basis • Overall an estimated capital expenditure of ₹1,51,019 crore would be made by both central and states governments over fiscals 2020-2025.

Source: NIP and Niti Aayog.

6. Factor Market Impediments

6.1 Land

III.75   Agriculture has a disproportionately high share in land available for use in economic activity, despite being the least productive (Table III.10). Access to land is intimately tied to protecting property rights, and by extension, expropriation procedures (OECD, 2015). Domestic legal frameworks must provide clarity on compensation to land owners in the event of expropriation and also set out the public benefit purposes for which an expropriation can lawfully occur for attracting long-term investment, including in infrastructure and industrial zones.

III.76   Since independence, India has enacted more than a hundred land acquisition laws (Yoshino *et al.*, 2018), including central and state laws which contain provisions for land acquisition, *viz.*, the Forest Act 1927, the Railways Act 1989, Electricity Act 2003, and the Special Economic Zones Act, 2005 *etc.* Post-1991, land acquisition by the government for industrial use by the private sector increased significantly, leading to episodes of discontent among the public. Therefore, the Land Acquisition Act (LAA) 1894 was replaced by the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation

Table III.10: Sector-wise Labour Productivity

Sector	Number of employees (in thousands)	Real GVA (₹ crore)	GVA per worker (in Rupees)	Labour productivity relative to the national average (%)
Agriculture	196306	18,87,145	96133	36
Industry	57120	29,51,076	516645	193
Manufacturing	53124	23,26,067	437852	163
Services	222448	79,05,981	355408	133
Total	475874	127,44,203	267806	100

Source: India KLEMS 2018-19.

and Resettlement Act, 2013. The usefulness of the present Act, however, has been questioned by several stakeholders, stating that it may stall land acquisition by making the cost of land prohibitive for industry and the procedures more cumbersome (Yoshino *et.al.,* 2018). An effort to change this law in 2015 was not successful, and the state governments were advised to frame their own land acquisition laws. Gujarat, Rajasthan, Maharashtra, Jharkhand, and Telangana have enacted new laws. Gujarat and Telangana have exempted a long list of projects from social impact assessment (SIA) and mandatory consent of landowners. They include projects of national security, defence, rural infrastructure, affordable housing, industrial corridors, and other infrastructural projects, including projects under public-private partnerships (PPPs). In Maharashtra, PPP projects have been fully exempted from the SIA and consent clauses. Telangana, Uttar Pradesh and Andhra Pradesh have reduced the notice period for public hearings under SIA from three weeks to one week. In Jharkhand, for instance, the quorum for seeking consent from the gram sabha has been reduced from half to one-third. For parity and distributional justice, however, India needs to explore laws for land pooling (Yoshino, Paul, Sarma, and Lakhia, 2018).

III.77   According to the Ministry of Statistics and Programme Implementation data, the number of stalled projects has increased sharply since 2018 for projects above ₹150 crore of investment (Chart III.36).

III.78   Since 2018, the share of stalled projects in the railway sector has increased significantly (from 11 per cent in 2018 to around 25 per cent in 2019). The average cost overrun per project shows an

Chart III.36: Delayed Projects

a: Number of Delayed Projects

b. Share of Different Sectors in Delayed Projects

Legend: Atomic Energy, Civil Aviation, Coal, Finance, Fertilizers, Mines, Steel, Petro-chemicals, Petroleum, Power, Railways, Surface transport, Telecommunication, Health & family welfare, Urban development

Source: MOSPI.

increasing trend, touching a high of 31 per cent of the original cost in 2020 (Chart III.37).

6.2 Labour

III.79 Favourable demographies and the large pool of excess labour absorbed into agriculture require industry friendly labour reforms to harness their potential as growth drivers of the future. Over the years, recommendations of various Committees on labour such as the First National Commission on Labour (1969), National Commission on Rural Labour (1991), National Commission on Labour (2002) and National Commission for Enterprises in the Unorganised sector (2009) have shaped existing labour laws. As a concurrent list subject, both the Central and State Governments have powers to make labour legislations. In 2019, the Ministry of Labour introduced four labour bills to consolidate the existing 29 labour laws. These bills relate to (1) industrial relations; (2) minimum wages; (3) social security; and (4) occupational safety,

Chart: III.37: Cost Overrun of Delayed Projects

a. Cost Overrun of Delayed Projects

b. Percentage Increase in Cost Overrun to the Original Estimate

Legend: Cost overrun (₹ crore); Cost overrun per project (₹ crore, RHS)
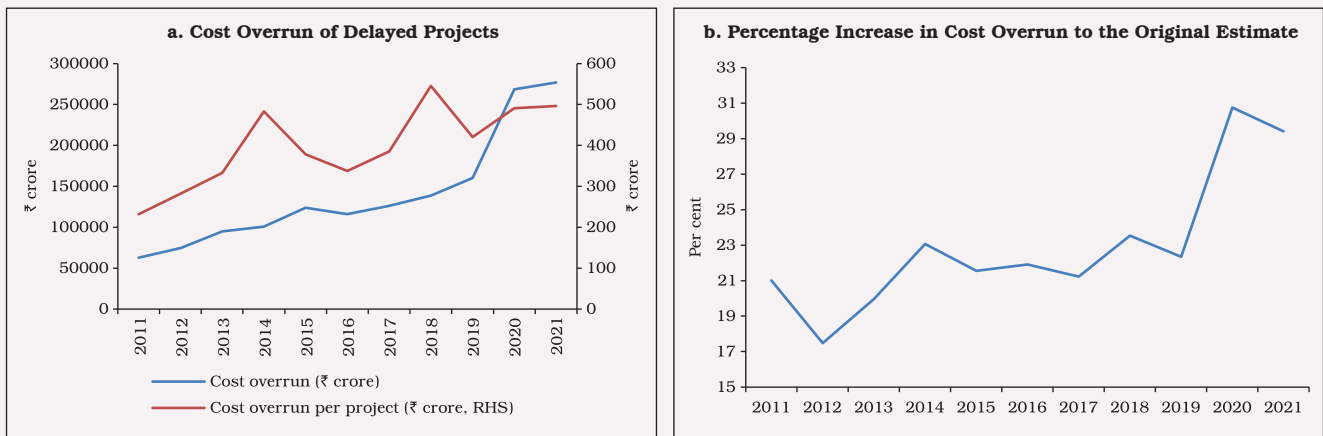
Source: MOSPI.

health and working conditions. All labour codes have been passed by the Parliament and will be implemented from the fiscal year 2022-23.

III.80 The code on minimum wages ensure that the employers pay minimum wages to their employees. The industrial relations code provides that if a firm employed more than 100 employees at any point of time in the past 12 months, it must constitute a works committee comprising members from both the employer and employees with the responsibility of nurturing amicable relationship between the employer and employees. Firms employing more than 20 workers need to have more than one grievance redressal committees to resolve issues of individual employees.

III.81 The labour code on social security envisages strengthening social security for labour through employees' provident fund, state insurance corporations, medical benefit committee, and the national social security board that will recommend schemes to unorganised workers. The code on occupational safety, health and working conditions requires every employer to ensure that the occupational place is free of hazards.

III.82 Apart from benefiting the workers, these labor codes may also be beneficial for industry. The inclusion of fixed term employment will provide flexibility to firms to hire workers according to the changing economic environment. At the same time, these codes may streamline the process of settlement of labor disputes; envisage a time bound and hassle free resolution of labor disputes; create enabling conditions for collective bargaining between the firm and workers; and

Chart III.38: Labour Force Participation Rate 2019-20

Source: PLFS 2019-20.
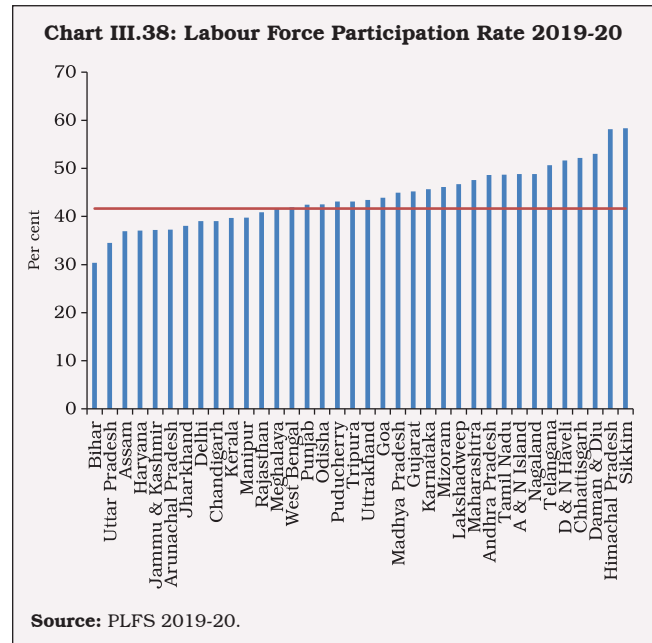
simplify the process of labor administration (filling of one return, one license and one registration). Collectively these reforms, when implemented, will improve flexibility in India's labor markets.

6.2.1 Labour Participation

III.83 As per the Periodic Labour Force Survey (PLFS), around 42 per cent of the population forms the labour force. India has one of the lowest Labour Force Participation Rate (LFPR) among the major economies, partly due to very low female LFPR (22 per cent) (WDI,World Bank), especially among poorer states (Chart III.38).

III.84 The prevalence of high informal employment is a major challenge with 71 per cent of the total employed labour force being 'self-employed' (Chart III.39). Seventy seven per cent of the self employed enterprises are small enterprises with less than six workers.

Chart III.39: High Self-Employment

Legend:
- Proprietary (Self-employed)
- PSU
- Public/Private Ltd. Company
- Non-Profit Organisation
- Others
- Government/Local Body
- Automonous Bodies
- Coperative Society
- Employer Household
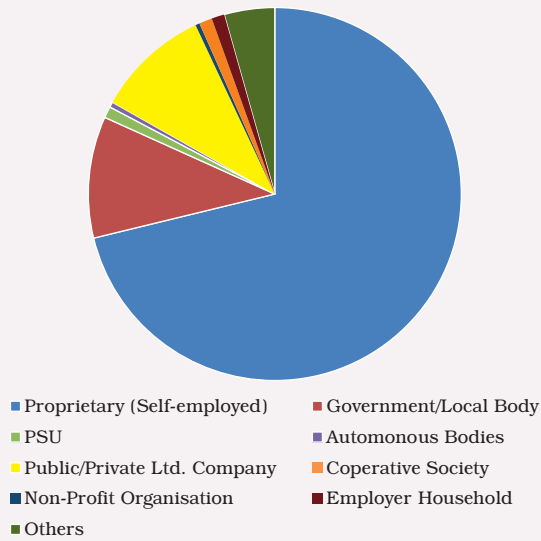
Source: PLFS 2019-20.

Chart III.41: Low Level of Job Training

Per cent (y-axis: 0 to 90)

Categories: Received Formal Training, Received Hereditary Training, Self-learning, Learning on theJob, Others, Did not Receive any Training (~78)
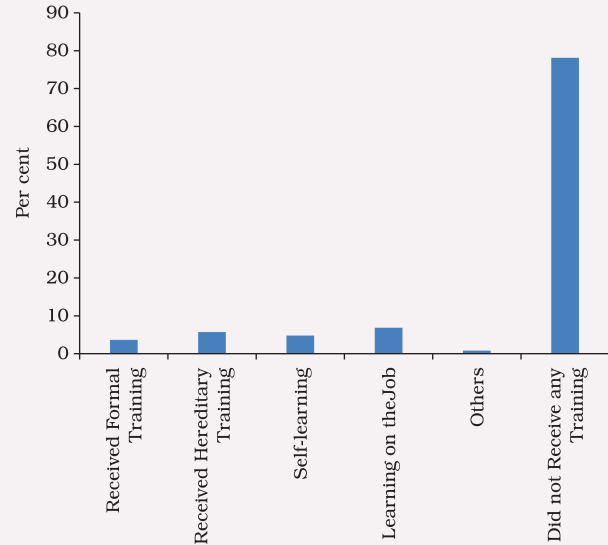
Source: PLFS 2019-20.

III.85 Seventy nine per cent of the working population do not have a written job contract in their usual principal activity (Chart III.40).

III.86 Seventy eight per cent of the working population in India have not received any type of job training (PLFS, 2019-20) (Chart III.41).

III.87 Twenty eight per cent of the population is illiterate and another 26 per cent have received only primary school education (PLFS, 2019-20). Only nine per cent of the population possesses a graduate/post graduate degree in India (Chart III.42).

Chart III.40: Job Quality - Status of Written Job Contract

Per cent (y-axis: 0 to 90)

Category	Value
No Written Job Contract	78.46
Written Contract for less than One Year	4.88
Written Contract for One to Three Years	2.32
Written Contract for more than Three Years	14.34
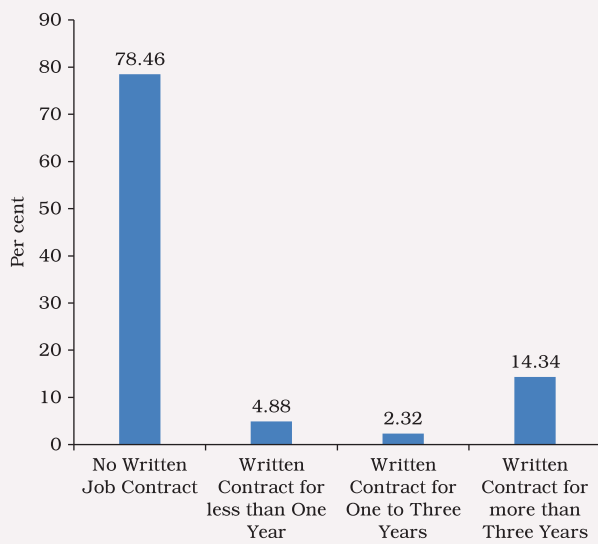
Source: PLFS 2019-20.

Chart III.42: Education Profile of India

Per cent (y-axis: 0 to 30)

Category	Value
Not Literate	27.9
Up to Primary	26.4
Middle School	16.8
Secondary School	10.4
Higher Secondary School	8.7
Graduate and Post Graduate	8.8
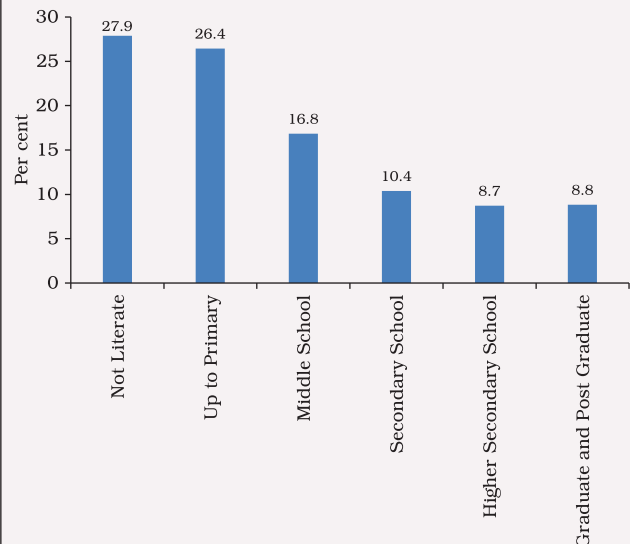
Source: PLFS 2019-20.

7. Conclusion

III.88 The Indian economy was riddled with several structural impediments to growth even before the outbreak of COVID-19 which had dampened the investment outlook. COVID induced supply disruptions and potential hyteresis effects have imposed testing challenges. Addressing these structural constraints has become central to reviving and reconstructing the Indian economy from the ravages of the pandemic.

III.89 The agriculture sector suffers from low capital formation, declining R&D, low crop yields, inadequate crop diversity and intensity, with excessive dependence on subsidies and price support schemes. India's dependence on imports of minerals, depleted natural endowment is another drag. In manufacturing, a few capital-intensive industries have garnered the lion's share of physical investment, whereas the investment share of employment generating industries and high-demand electronics and computer industries has either stagnated or contracted over the years. In the service sector, growth slowdown was primarily led by construction, financial services, and transport and communication services, due to prevalence of many sector-specific problems as discussed in this chapter.

III.90 Recognising the need for urgent and bold structural reforms, the Government has announced privatisation and asset monetisation; tax reforms (GST and corporate tax rationalisation); targeted sector-specific incentives to raise production and exports under the production linked incentive (PLI) scheme; insolvency and bankruptcy code (IBC) to improve the credit culture and resource allocation mechanism; labour reforms (four codes); and a fiscal policy focus on capex and infrastructure.

III.91 These reforms need to be augmented by other measures to reverse the sustained decline in private investment and low productivity in the economy. What is needed include access to litigation free low cost land; raising the quality of labour through large scale expansion of public expenditure on education and health and the skill India mission; reducing the cost of capital for industry and improve resource allocation in the economy by promoting competition; encouraging industries and corporates to scale up R&D activities with an emphasis on innovation and technology; creating an enabling environment for startups and unicorns; encouraging corporate investment in agriculture; addressing the challenges faced by the debt-ridden telecom industry and DISCOMs; rationalisation of subsidies that promote inefficiencies; encouraging urban agglomerations by improving the housing and physical infrastructure.

III.92 While aiming to boost India's participation in global value chains (GVCs) and raise export competitiveness, greater adoption of technology assumes critical importance. The reform package of the future hinges around (i) an ecosystem that increases the adaptability of domestic firms to state-of-the-art technology; (ii) ensuring policy certainty on royalty payments for technology transfer by foreign companies; (iii) improving domestic R&D infrastructure for innovations. The industrial revolution 4.0 and committed transition to net zero emission target will create new investment opportunities requiring greater policy emphasis on technology and green financing. The next wave of global structural transformation is likely to be powered by both technology and environmentally sustainable production processes.

III.93 A comprehensive plan is necessary to revive the rural economy of the country alongside

the existing several other policy measures (Annex - I). Organising farmers' clubs or agricultural cooperatives is a possible solution to correct the pricing imbalances by reducing gaps between farm gate prices and retail prices. In this regard, the development of a modern supply chain infrastructure needs priority attention.

III.94 Farmers are still dependent on money lenders. There is a need to adopt a viable 'whole of business' approach covering all aspects of farming. Developing numerous small-scale irrigation projects as well as using wind energy to lift water from bore wells as implemented in many western African countries can be replicated in India's drought prone areas. India is one of the most vulnerable countries to extreme weather events in the world[21]. According to the India Meteorological Department, the occurrence of extreme weather events like floods, cyclones, heat waves and droughts has increased in both frequency and intensity. Furthermore, the average temperature has increased by 1.8 degrees Celsius between 1997 and 2019 as against an increase of 0.5 degrees Celsius between 1901 and 2000. Similarly, the fall in groundwater level in Punjab, Haryana and Madhya Pradesh has exceeded the annual recharging levels.

III.95 Apart from measures already taken (Annex Table 3), the production linked incentives (PLI) scheme recognises growth opportunities in 14 key manufacturing sectors of the economy. The incentives, however, effectively compensate industries for domestic structural impediments (ranging from access to litigation free land, high cost of electricity tariff, inefficient domestic supply chain, high cost of logistics and settlement

disputes). Unless the structural impediments are addressed, these reforms may become unsustainable. Building on "Start-up India, Stand-up India", the policy ecosystem for the startups needs a dynamic framework with provision for adequate access to risk capital and globally competitive environment for doing business. The textile industry has a special place in the Indian industrial landscape owing to its labour intensive nature, particularly employment of women in the sector. For enhancing female labour participation and the associated scope to raise output, greater support to the textile sector is necessary.

III.96 The National Infrastructure Pipeline (NIP) through public-private partnerships would require a strategy for meeting the financing requirement, given limited domestic financial savings and sustainable levels of capital flows.

III.97 Labour reform with flexibility to hire and fire workers can allow firms to adjust their workforce according to economic cycles, thereby enabling them to use their resources more efficiently. This, however, could come only at the cost of lower welfare/social security of the workers. One option here could be to build an unemployment insurance fund during periods of economic boom at the firm level, which can be utilized to financially support workers up to a limited period after retrenchment. Further, many of the social security measures apply to firms having a certain minimum number of workers, which creates incentives for firms to not scale up. To address this issue, a policy option could be universal access to social security irrespective of firm size, with each firm required to earmark a certain percentage of their profit for the social security schemes for the workers.

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[21] Climate Risk Index for 1998-2017, German Watch.

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Annex – I: List of Measures for Agriculture

- The Ministry of Agriculture and Farmers Welfare, Government of India and the Indian Council of Agricultural Research (ICAR), launched a network project 'National Innovations in Climate Resilient Agriculture' (NICRA) in 2011. The project aims at strategic research on adaptation and mitigation; demonstration of technologies on farmers' fields; and creating awareness among farmers and other stakeholders to minimise the climatic change impacts on agriculture. The main thrust areas covered for strategic research are (i) identifying the most vulnerable districts/regions; (ii) evolving crop varieties and management practices for adaptation and mitigation; and (iii) assessing climate change impact on livestock, fisheries and poultry and identifying adaptation strategies.

  So far, seven climate resilient varieties and 650 district agricultural contingency plans have been developed besides assessing the risk and vulnerability of Indian agriculture to climate change. Location specific technologies have been demonstrated in 151 climatically vulnerable districts.

  State-of-the-art infrastructure facilities have been established by ICAR in the National Agricultural Research and Education System (NARES) across the country to facilitate climate change research. Unique infrastructure facilities *viz.* High Throughput Plant Phenomics, Free Air Temperature Enrichment Facility (FATE), Free Air CO2 Enrichment Facility (FACE), CO2 Temperature Gradient Chambers (CTGC), Gas Chromatography, Atomic Absorption Spectrophotometers, Environmental Growth Chamber, UV-VIS Spectrophotometer, Thermal imaging system, Psychrometric chambers *etc*. have been established at various ICAR institutes to facilitate the climate change research. The construction and operation of psychometric chambers have been undertaken for studying the effect of different environmental conditions *viz.*, temperature, humidity, and air movement on livestock, with special reference to cattle and buffaloes, environmental growth chambers with CO_2 and temperature controls and a special calorimetric system to study livestock response to heat stress. Custom hiring centres (CHCs) have been established in 121 NICRA villages to ensure the availability of farm implements for timely operations.

- The National Agricultural Research System (NARS) under the aegis of Indian Council of Agricultural Research (ICAR) comprising of ICAR Institutes and State/Central Agricultural Universities are involved in the development of new high yielding and biotic/abiotic stress tolerant crop varieties of field and horticultural crops. During the last 3 years (2018-2020) and in the current year, 1,017 new varieties of 69 field crops and 206 varieties of 58 horticultural crops have been developed.

- The Government of India has been promoting organic farming through dedicated schemes of Paramparagat Krishi Vikas Yojana (PKVY) and Mission Organic Value Chain Development in the North East Region (MOVCDNER). Farmers are provided financial assistance (₹31000/ ha / 3 years in PKVY and ₹32500/ ha/ 3years under MOVCDNER) for organic inputs including seeds, bio-fertilisers, bio-pesticides, organic manure, compost/vermicompost and

botanical extracts. In addition, support is also provided for group/ Farmers Producers Organization (FPO) formation, training, certification, value addition and marketing of their organic produce. Organic cultivation on either side of the River Ganga, natural farming, large area certification and support for individual farmers have also been introduced under PKVY to increase organic production.

- Burning of Crop residue leading to higher air pollution and health hazards has been a contentious issue within/between the States. The 'Pusa Decomposer Technology' is a new low-cost capsule technology developed by the ICAR - Indian Agriculture Research Institute (IARI), New Delhi for crop residue management. In coordination with the State Governments, the Government of India has made multiple efforts to demonstrate this technology for crop residue management across the country.

   During 2020-21, the Pusa Decomposer was provided for 5730 ha area comprising of Uttar Pradesh (3700 ha), Punjab (200 ha), Delhi (800 ha), West Bengal (510 ha), Telangana (100 ha); Confederation of Indian Industry (100 ha) and NGO and Farmers (320 ha). In-situ application of Pusa decomposer on paddy residue was demonstrated at farmers' fields in several villages of Punjab and Haryana. A slogan of "jalana nahi, galana hai" was publicised among the farmers. In addition, regular interactive sessions with farmers through online meetings, Webinars, and messaging Apps have been conducted to make them aware of this technology and to wean them away from burning. The IARI has licensed this technology to 12 companies for mass multiplication and marketing of the

Pusa Decomposer. In addition, ICAR – IARI has produced about 20000 packets of Pusa decomposer at its facility for use by the farmers.

- The Government of India has made a provision for the opening of one Krishi Vigyan Kendra (KVK) in each of the rural districts across the country. A total of 725 KVKs have been established across the country to date. The KVKs are mandated for frontline extension which act as a bridge between research organisations and the main extension system operated by different development departments of the State Governments. Considering the role and resources of a KVK, it caters to the requirement of the selected farmers of the district and provides capacity development support to State Development Departments.

- The Government of India has launched the Agriculture Infrastructure Fund (AIF) scheme to mobilise a medium - long term debt financing facility for investment in viable projects for post-harvest management (PHM) Infrastructure and community farming assets (CFAs) through incentives and financial support to improve agriculture infrastructure in the country. This financing facility will also help APMCs to upgrade their Infrastructure, which will ultimately benefit the farmers. The scheme provides financial assistance in interest subvention and credit guarantee for setting PHM projects, which will help better post-harvest management and reduce wastage. Further, the following CFA projects are eligible under the scheme: (1) Organic inputs production, (2) Biostimulant production units, (3) Infrastructure for smart and precision agriculture, (4) Projects identified

for providing supply chain infrastructure for clusters of crops including export clusters, (5) Projects promoted by Central/State/Local Governments or their agencies under Public-Private Partnerships (PPP) for building CFAs or PHM projects.

Greenhouse gas emissions and the associated climate change risks pose new concerns for the sector which include lower yields, weed and pest proliferation and large crop losses, the frequency of which could even endanger national food security.

Annex Table 1: Major Policy Reforms in the Agriculture and Allied Sectors

Policy	Objective	Expected Outcome
Agriculture Infrastructure Fund	For financing infrastructure at the farm gate as well as at other aggregation points of agricultural produce.	Better management and realization of remunerative prices for agricultural produce. Reduction of post-harvest loss and middlemen network.
Scheme for Formalisation of Micro Food Enterprises (MFEs)	Improving quality standards and production practices of MFEs.	Increased marketing opportunities for the MFE units leading to higher growth.
Pradhan Mantri Fasal Bima Yojana (PMFBY)	To provide protection to farmers through crop insurance.	Smoothen farmers' income over the years. Indirectly helps the financial institutions by ensuring the loan repayment capacity of farmers.
The Digital India Land Records Modernisation Programme	To build an all-encompassing and transparent land record management system.	Help farmers and small business men access finance from formal financial institutions using proper land titles. Multiplier effect on growth.
Kisan Rail Services (KRS)	To reduce time taken to transport the perishable agricultural produce from the production centres to consumption centres and to keep them fresh for a longer time through cold storage transport.	Increases the marketing opportunities available to farmers though quality and less expensive transportation of agricultural produce.
Animal Husbandry Infrastructure Development Fund (AHIDF)	Incentivize the investment in dairy production and processing industries, and meat production and processing industries in rural areas of the country.	Will provide integrated market for the unorganised producers of meat and milk and ensure quality products for the consumers. Stabilize the prices of these products through the integrated production, processing and marketing.
Blue revolution	To increase fish production, productivity and creation of adequate infrastructure.	Better employment and income prospects in the fisheries sector.
Fisheries and Aquaculture Infrastructure Development Fund (FIDF)	Development of infrastructure in the fisheries sector.	Better employment and income prospects in the fisheries sector.
Pradhan Mantri Matsya Sampada Yojana (PMMSY)	To enhance the fisheries sector production.	Higher production and productivity in the fisheries sector.

Policy	Objective	Expected Outcome
Agriculture Export Policy (AEP)	Promotion of export-oriented production with focus on exportable crops.	Farmers get benefit of export opportunities in overseas markets.
Mission for Integrated Development of Horticulture (MIDH)	Capacity building of farmers and technicians.	Holistic growth of the horticulture sector.
Horticulture Cluster Development Programme (HCDP)	Address the concerns of the horticulture value chain. Reduce harvest and post-harvest losses. introduction of innovative technologies and practices. Build the capacity of stakeholders.	Geographical specialisation of horticulture clusters making them globally competitive.

Annex Table 2: Major Policy Reforms in the Industrial Sectors

Policy	Objective	Expected Outcome
National Steel Policy	To attain self-sufficiency in steel production and to make India a net exporter of steel by 2025-26.	Higher economic growth by exploiting the competitive advantage in steel production.
National Mineral Policy	To increase transparency, better regulation and enforcement, balanced social and economic growth and promotion of sustainable mining practices.	Sustainable mining sector development. Addresses the concerns of persons affected by mining.
Mineral (Auction) Second Amendment Rules, 2021 and the Minerals (Evidence of Mineral Contents) Amendment Rules, 2021	End captive mining.	More participation in the mining industry and a healthy and competitive bidding process in the mining industry.
Amendments in the Mines and Minerals (Development and Regulation) (MMDR) Act	Improve transparency and efficiency in the management of coals through commercial auctions.	Bridge the gap between domestic demand and supply of coal. Boost production in other sectors such as steel, aluminium, fertilizer and cement.
Oil Sector - Hydrocarbon Exploration and Licensing Policy (HELP)	To bring more transparency in the oil sector licensing procedures.	Higher production and contribution to economic growth in the long run.
Oil Sector - Open Acreage Licensing policy (OALP)	Incentivises companies to take up oil exploration. Freedom for companies to carve out own areas for exploration and declare it to the GoI at any time of the year.	Increase in the acreage under oil exploration leading to higher production.
Petroleum and natural gas industry - Gas Pricing Reforms	Move towards uniform pipeline pricing.	Would stop the pricing discrimination based on the distance from the production locations.
Integrated Power Development Scheme (IPDS)	Strengthen the transmission and distribution networks, IT-enabling of the distribution network for all statutory towns, additional incentives for performing UDAY states, solar panels on government buildings, and schemes for enterprise resource planning (ERP), among others.	Increase the customer satisfaction and improve the reliability of power supply.

Policy	Objective	Expected Outcome
National Renewable Energy Policy (NREP)	Produce more electricity through renewable energy sources.	Higher electricity production. Higher economic growth in the long run.
MSME reforms - Emergency credit line, subordinated debt for stressed MSMEs, MSME funds of funds for equity infusion.	Support the growth momentum in the sector.	Higher growth in the long run.
Revised the definition of MSME's investment limit.	To address the concern of many successful MSMEs to grow more regarding the loss of special status and incentives.	Suports MSME growth.
MSME Sector - Disallowed global tenders up to ₹200 crores	To provide a boost to the MSME sector.	Higher marketing opportunities for the sector
E-market linkage for MSMEs	Higher marketing opportunities.	Higher income
The enhancement of minimum threshold for initiation of insolvency proceedings under the Insolvency and Bankruptcy Codes (IBC) from ₹1 lakh to ₹1 crore.	Beneficial to most of the MSMEs as they would fall below this threshold.	Higher and sustainable growth in the MSME sector.
The integrated textile parks	Set up infrastructure of international standard in the sector.	Attract foreign investment.
SAMARTH (Scheme for Capacity Building in Textile sector).	Skill development in the sector	Higher growth in the long run.
"Start-up India, Stand-up India"	To encourage start-ups in India	Higher growth in the long run.
Start-ups Intellectual Property Protection (SIPP) scheme.	Help start-ups to take help from empanelled facilitators to file and prosecute their application without any charge, fund of funds for start-ups to increase investment, income tax exemptions on a case to case basis, and the start-ups have also been provided with rebate on patent filing fees and trade mark filing fees.	Facilitate the growth of start-ups.
Production Linked Incentives Scheme	To enhance manufacturing, promote manufacturing exports and generate employment opportunities.	Higher economic growth

Annex Table 3: Movement of key services indicators

(Growth rate in per cent)

Year	Construction		Transport							Trade	IT firms revenue growth	Financial services		Telecommunication	
	Steel	Cement production	Registered motor vehicle	Registered commercial vehicles	Rail passenger	Rail freight	Aviation passenger	Aviation cargo	Port cargo	Sales tax		Bank deposit	Bank credit	Telephone subscribers	Internet subscribers
	Consumption														
1998-99		6	8	1	6	-2	1	-1	-1	9	52	20	14	22	
1999-00		14	9	6	7	6	6	14	16	18	40	17	20	26	
2000-01		-1	13	9	6	0	8	6	10	22	46	17	19	27	
2001-02		7	7	1	7	3	-5	1	4	5	12	14	23	24	
2002-03		9	14	17	5	2	9	15	9	12	17	13	14	21	
2003-04		6	9	7	5	-2	11	9	11	13	27	16	17	40	
2004-05		7	12	9	6	5	22	20	12	20	53	17	33	29	
2005-06		12	10	10	7	3	24	10	11	10	31	18	32	43	
2006-07		9	8	19	13	5	31	10	12	19	38	25	31	47	
2007-08	11	8	9	9	11	7	21	11	11	13	23	23	25	45	
2008-09	0	7	9	7	9	5	-7	-1	3	14	22	22	21	43	
2009-10	13	11	11	6	8	5	14	15	14	11	1	17	17	45	
2010-11	12	5	11	9	8	3	16	20	4	26	15	18	23	36	
2011-12	7	7	12	8	7	6	13	-3	3	24	24	15	18	12	
2012-13	3	7	10	8	5	3	-2	-4	2	17	16	15	16	-6	
2013-14	1	4	8	5	6	4	6	4	4	12	23	15	15	4	
2014-15	4	6	10	7	-1	-4	13	11	8	9	10	11	10	7	20
2015-16	6	5	10	8	0	-2	18	7	2	7	19	7	7	6	13
2016-17	3	-1	10	6	1	-1	18	10	6	11	11	10	3	13	23
2017-18	8	6	10	7	2	1	17	13	7	-32	7	6	8	1	17
2018-19	9	13	9	7	-2	5	12	6	6	-28	13	9	11	-2	29
2019-20	1	-1	8		-9	-4	-1	-7	1	8	10	8	6	0	17
2020-21	-5	-11	9		0		-66	-26	-5	10	4	12	5	2	11

Source: CMIE Economic Outlook and CEIC.

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Annex Table 4: Major policy Reforms in the Services Sectors

Policy	Objective	Expected Outcome
The National Intellectual Property Rights (IPR) policy.	Put in place an appropriate legal system for handling the IPRs, creating awareness about IPRs, encouraging IPRs, commercialization of IPRs, preventing IPR infringements, among others.	Promotion of entrepreneurship and start-ups for economic growth.
The Real Estate Regulation and Development Act (RERA).	To bring in more transparency and equity in the real estate transactions.	Protects the interests of the home buyers. Ease stress and increase investment in the real estate sector.
IT-BPM industry - Relaxation of OSP Terms & Conditions, and Consumer Protection (E-commerce) Rules, 2020.	Reduction in the compliance burden of business process outsourcing companies.	Opens opportunities for the global companies to invest in India. Bring in more women and physically handicapped persons into the labor force.
Sagarmaala Programme	Reduce the cost of transportation for foreign and domestic trade.	Opportunities for economic growth and development.
The National Waterways Act, 2016.	Identified more than hundred waterways to improve the inland water transport.	Facilitation of domestic trade.
The National Civil Aviation Policy 2016.	To connect the underserved airports with major airports in India at a relatively lower cost by subsidising the airlines.	Fast connectivity to global cities from various places in India and domestic outreach to far off places. Affordable air travel for the common masses and balanced regional development.
'National Rail Plan (NRP)' Vision 2024.	Set of forward looking measures aimed at creating capacity with a view to increasing the share of freight traffic to 45%.	Aims at preparing the railways ahead of the realisation of actual demand.
The National Digital Communications Policy (NDCP) 2018.	Universal coverage of the population through the digital modes.	Accelerate economic growth and prepare the economy for next generation developments and reforms.
'Bharatnet' initiative	Connect 600,000 villages through broadband.	Accelerate economic growth and prepare the economy for next generation developments and reforms.
Tourism - Liberalized Visa Regime	Increase the number of countries' citizens who can enter India with a valid e-visa.	To boost the tourist arrivals to India.
National Infrastructure Pipeline (NIP)	Structural reforms across 34 sub-sectors and more than 9000 infrastructure projects.	Boost the infrastructure development across several sectors of the economy.

<table>
<tr><td>**IV**</td><td>**HARNESSING OPEN ECONOMY VISTAS FOR FASTER GROWTH**</td></tr>
</table>

Exports and foreign capital are the twin engines of growth in an open economy. Post-COVID, a strategic policy reset in India can help harness these growth opportunities. Based on empirical assessment of constraints to export growth, this Chapter finds that India has revealed comparative advantage (RCA) in certain export categories; past free trade agreements (FTAs) have not been trade creating; without higher import and technology-intensity of exports, raising India's participation in global value chain may be difficult; and exchange rate stability helps promote exports. While the Production Linked Incentive (PLI) Scheme can incentivise effective diversification of the export basket, it needs to emphasise global quality benchmarks, including carbon emission standards, to be able to harness green export opportunities and to achieve ambitious exports target of US$1 trillion by 2030. Ongoing and future FTAs may need to prioritise transfer of technology and easier access to critical intermediate inputs to widen the basket of items where India can build its RCA. Greater openness to imports at lower tariff and non-tariff restrictions and FDI can not only boost exports but also enhance the capacity to absorb foreign capital.

1. Introduction

IV.1   For an open economy, trade and financial integration, including through global value chains (GVCs), can generate strong impulses of economic growth, supported by a congenial domestic policy environment. The COVID-19 pandemic disrupted global supply chains, shipping and logistics, which persist even today. Global trade volume (of goods and services) contracted by 7.9 per cent in 2020. In 2021, as world trade (goods and services) staged a robust recovery from the deep contraction in 2020, India's merchandise exports also regained momentum from pandemic lows, registering a growth of 43.8 per cent in 2021-22 and by 33.9 per cent over pre-pandemic level. Imports too revived and surged as domestic demand picked-up steam.

IV.2   The theme of this chapter is the sustainability of this rebound in exports as the Indian economy revives and reconstructs in the post-pandemic years, exploiting opportunities opening up *via* greater participation in GVCs, a focus on services exports and strategic trade integration through free trade agreements (Das, 2020). The Chapter also explores the role of strategic policies in addressing challenges and harnessing opportunities.

IV.3   The absorptive capacity of the economy in respect of capital flows can also influence the growth outlook of an emerging market economy and hence their size and composition matters. Accordingly, the chapter attempts to evaluate the growth enhancing effects of foreign capital, especially FDI, and policies for attracting growth capital. Section 2 focuses on India's export competitiveness, drilling down to sectors with cutting edge and identifies areas for adoption of frontier technologies that can potentially enhance India's participation in GVCs and raise exports. Section 3 evaluates *Aatmanirbhar Bharat*, particularly the role of imports in boosting exports. Section 4 examines the role of capital flows in

financing domestic growth and exchange rate effects. Section 5 summarises the findings and presents policy options.

2. Trade Openness, Export Competitiveness and Growth

IV.4   A virtuous model of economic growth tracks the interrelationship between exports and growth by boosting productivity through increasing returns to scale, which makes the growth process 'circular' and 'cumulative' (Verdoorn, 1949; Kaldor, 1966). Exports ease an important impediment to import purchasing power and thereby domestic demand, allowing all other components of aggregate demand, *viz.*, consumption, investment, and government expenditure to expand and break through the limits to growth that a foreign exchange constrained developing economy typically encounters in the early and intermediate stages of development. This model essentially operationalises Harrod's super trade multiplier in an open economy context. In the case of India, it is estimated that a sharp fall in the income elasticity of imports improved the contribution of net exports to GDP growth during 2013-14 to 2020-21 despite a moderation in export growth (Box IV.1).

Box IV.1
Dynamic Foreign Trade Multiplier of India

The model of balance of payments constrained growth (Thirlwall, 1979; 2013) views demand as the central force behind growth, productivity, factor accumulation and other structural changes. Thirlwall's law posits that a high income elasticity of import is a binding constraint on an export-led growth strategy. Unlike the static foreign trade multiplier (FTM), which measures the response of GDP to change in exports through the marginal propensity to import, the dynamic analogue of the Harrod trade multiplier takes into account changes in import and export intensity of an economy in identifying the maximum growth rate consistent with balance of payments equilibrium, which can be expressed as: $g = \dfrac{x}{e_m} = \dfrac{e_{x*}w}{e_m}$

where g is the GDP growth rate, x is export volume growth and e_m is the income elasticity of imports. Export growth, in turn, depends on the income elasticity of exports (e_x) and world income (w). From a macroeconomic perspective, if the income elasticity of demand for imports exceeds unity, exports must grow faster than overall output to support growth on a sustainable basis.

A cointegration and vector error correction model is used on quarterly data from 2000Q1 to 2019Q4 (the pre-COVID period) for estimating the peace-time FTM for India, the choice of the period being governed by availability of data. Estimates are also generated separately for the pre-GFC and post-GFC periods to ascertain any structural shift in the imports-GDP relationship following a major shock.

The estimated results show that the income elasticity of imports has come down in the last decade, especially after the GFC (Table 1). A combination of factors such as

Table 1: Income Elasticity of Imports

Period	Income Elasticity of Imports
Period 1: 2000Q1 to 2007Q4	2.25**
Period 2: 2009Q1 to 2019Q4	0.60**
Full Sample: 2000Q1 to 2019Q4	1.0 **

Note: Statistically significant at 5 per cent.

rising trade protectionism (both in India and world), weaker demand conditions for India's exports, and policies for securing domestic supply chains may have contributed to the decline in import elasticity. Despite average export growth moderating sharply during 2013-14 to 2020-21, India's FTM has improved on the back of a sharp decline in the income elasticity of imports (Chart 1). The deceleration

Chart 1: Export Growth and Income Elasticity of Imports
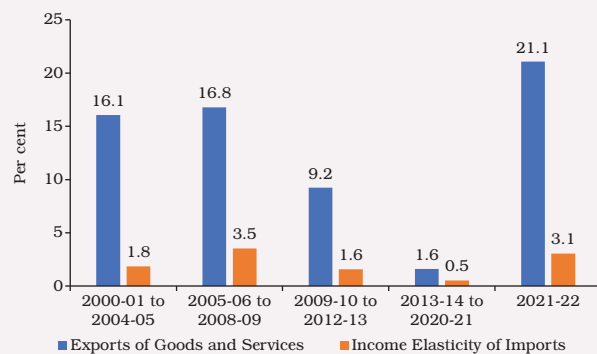
Note: Income elasticity based on annual changes in imports and GDP has been used.
Source: Authors' calculations.

(Contd...)

Chart 2: Dynamic Foreign Trade Multiplier and Actual Growth

Note: Income elasticity based on annual changes in imports and GDP has been used.
Source: Authors' calculations.

trade multiplier. In 2021-22, however, the post-pandemic pick-up in imports has weakened the FTM despite stronger export growth (Chart 2).

In the post-pandemic recovery, further improvement in FTM can result from higher export growth *via* expanding to new product lines and new markets. Substitution of imports with domestically available alternatives can also help reduce the income elasticity of imports.

References:

Thirlwall, A. P. (March 1979), "The balance of payments constraint as an explanation of international growth rate differences", Banca Nazionale del Lavoro Quarterly Review, vol. 32(128), pages 45-53.

Thirlwall, A. P. (2013) Economic Growth in an Open Developing Economy: The Role of Structure and Demand, Cheltenham: Edward Elgar.Downing College, Cambridge, CB2 1DQ, UK.

in average GDP growth during 2013-14 to 2020-21 would have been sharper without this improvement in the foreign

IV.5   In the years leading up to the pandemic, a fall was observed in India's trade openness, particularly from 2013-14. The moderation in imports was more perceptible than exports (Chart IV.1a). The sharp increase in imports during 2021-22 has lowered the direct contribution of net exports to GDP growth even further (Chart IV.1b).

IV.6   Among India's 40 major trading partners, only 15 economies, accounting for 20.1 per cent

of world import demand are projected by the IMF to grow faster than the world average in 2022-26. These 15 economies account for 31 per cent of India's total exports (Chart IV.2).

IV.7   Going forward, low growth economies may limit country's export prospects. The focus should be to not only expand the export basket to high growth economies but also to improve the intensive margin of exports in low growth

Chart IV.1: Net Exports of Goods and Services

a. Exports and Imports of Goods and Services

b. Contribution of Net Exports to GDP Growth
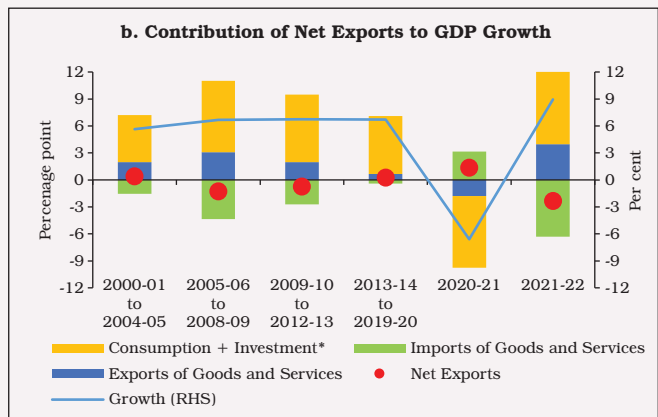
*Including discrepancies.
Source: MOSPI.

Chart IV.2: Profile of India's Major Trading Partners

■ Higher than World Average Growth (2022-26)
■ Lower than World Average Growth (2022-26)

*: Based on latest available data.
Source: ITC; IMF and Authors' calculation.
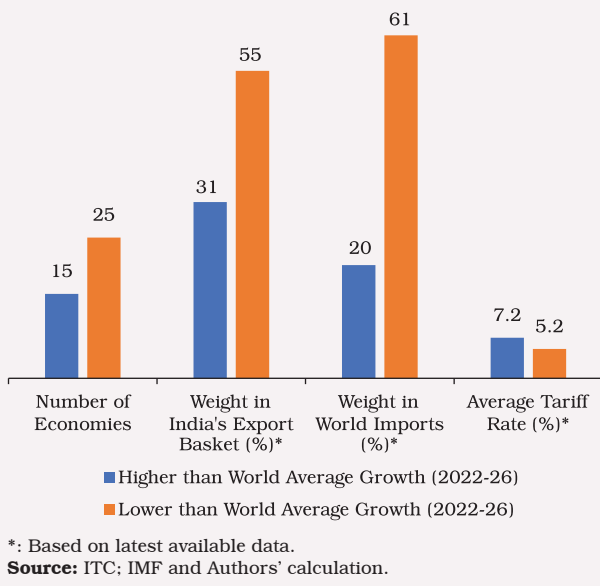
economies,[1] which account for more than two-thirds of world imports (Table IV.1).

IV.8   India's business cycle is more synchronised with that of trading partners and the co-movement has intensified further in recent years (Raj, 2017; Kaur, 2019). The correlation between the cyclical component of India's GDP and OECD+ economies[2] has increased from 0.48 during 2000:Q1 - 2009:Q4 to 0.89 during 2010:Q1 - 2020:Q4 (Charts IV.3a and b).

IV.9   In terms of static comparative advantage, a country's competitive export strengths are based on specialisation and its ability to produce certain products at lower cost than other countries. Competitiveness, on the other hand, is a function of trade policies and development strategies, *viz.*, tariffs; non-tariff measures; real exchange rates; export infrastructure; R&D and innovations.

IV.10   In the post-GFC period, India's merchandise exports have gained from the substitution effect (by gaining market share in export markets) as well as the income effect (by co-moving with global income) (Chart IV.4). India's merchandise exports need to grow at a compound rate of 12 per cent to attain the target of US$ 1 trillion by 2030. Unless supported by rapid improvement in

Chart IV.3: Growth and Trade Performance – India *versus* World
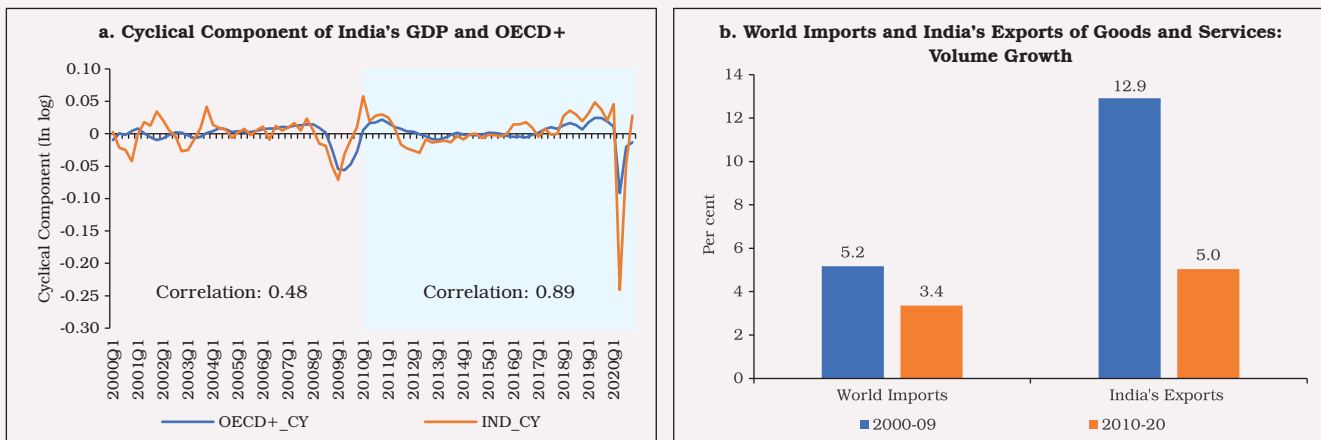
Source: Authors' own calculation based on IMF and OECD data.

[1]   Intensive margin refers to the growth of exports in such goods that are already being exported.

[2]   OECD+ group includes GDP of OECD plus five major EMEs, *viz.*, China, Brazil, Russia, South Africa and Indonesia, aggregated in an index form, weighted by their respective shares in India's exports.

Table IV.1: Country-wise Profile of India's Export Partners

Countries	Share in India's exports (%)	2022-2026 (GDP Growth Differential with World Average)*	Export Growth 2016-2020	India's share in partner's imports (%)	Partner's share in world imports (%)	Trade weighted average (2019)
United States of America	17.9	-1.3	5.0	2.2	13.8	2.4
China	6.9	1.4	20.0	1	11.8	3.4
United Arab Emirates	6.5	0.5	-10.0	10.8	1.0	3.4
Hong Kong, China	3.5	-0.7	-9.0	1.3	3.3	0.0
Singapore	3.0	-0.6	2.0	1.6	1.9	0.0
Bangladesh	2.9	3.5	8.0	16.3	0.3	14.0
United Kingdom	2.8	-1.4	-2.0	1.2	3.6	5.1
Germany	2.8	-1.7	2.0	0.9	6.7	5.1
Netherlands	2.3	-1.5	10.0	0.8	2.8	5.1
Malaysia	2.2	1.5	9.0	3.1	1.1	3.9
Saudi Arabia	2.2	0.4	5.0	4.8	0.8	5.1
Nepal	2.1	1.8	8.0	72.9	0.1	12.2
Belgium	1.7	-2.0	-3.0	0.9	1.7	5.1
Vietnam	1.6	3.4	-9.0	1.7	1.5	5.6
Indonesia	1.6	2.1	9.0	2.7	0.8	5.7
Korea	1.6	-0.9	6.0	1	2.7	8.5
France	1.6	-1.7	-1.0	1	3.3	5.1
Italy	1.6	-2.0	-1.0	1.1	2.4	5.1
Japan	1.5	-2.1	2.0	0.7	3.6	2.3
Thailand	1.4	0.2	7.0	2.1	1.2	6.7
Brazil	1.3	-1.8	14.0	2.6	0.9	10.0
Turkey	1.3	-0.2	-5.0	2.2	1.3	4.7
South Africa	1.3	-1.9	1.0	5.2	0.4	6.4
Australia	1.3	-0.7	1.0	1.8	1.2	2.5
Sri Lanka	1.2	-0.7	-5.0	19.3	0.1	9.3
Spain	1.1	-0.5	0.0	1.1	1.9	5.1
Mexico	1.1	-1.4	-2.0	1.1	2.2	4.2
Nigeria	1.1	-0.4	18.0	7.9	0.3	8.2
Canada	1.0	-1.1	10.0	0.9	2.3	3.4
Israel	0.9	0.3	-1.0	2.4	0.4	3.1
Russia	0.9	-4.9	10.0	1.5	1.3	5.5
Egypt	0.8	2.2	2.0	3.8	0.3	12.4
Oman	0.8	-0.1	-5.0	13	0.1	5.8
Iran	0.8	-1.2	3.0	10.1	0.1	12.9
Kenya	0.7	2.0	-4.0	11.5	0.1	12.0
Taipei, Chinese	0.6	-0.9	-6.0	0.8	1.6	2.0
Mozambique	0.5	3.7	19.0	9.6	0.0	7.2
Philippines	0.5	3.0	0.0	1.8	0.5	5.6
Poland	0.5	-0.2	6.0	0.8	1.5	5.1
Iraq	0.5	1.2	14.0	4.4	0.2	N.A.

N.A.: Not Available.
Note: * Red/Green implies lower/higher than world average growth.
Source: Authors' calculations based on IMF and ITC data.

net terms of trade (implying higher export prices), this export growth may seem ambitious, given that the world import volume growth is projected by the IMF to average 4.2 per cent over the next five

Chart IV.4: Trade Performance of Major Economies - Income and Substitution Effect
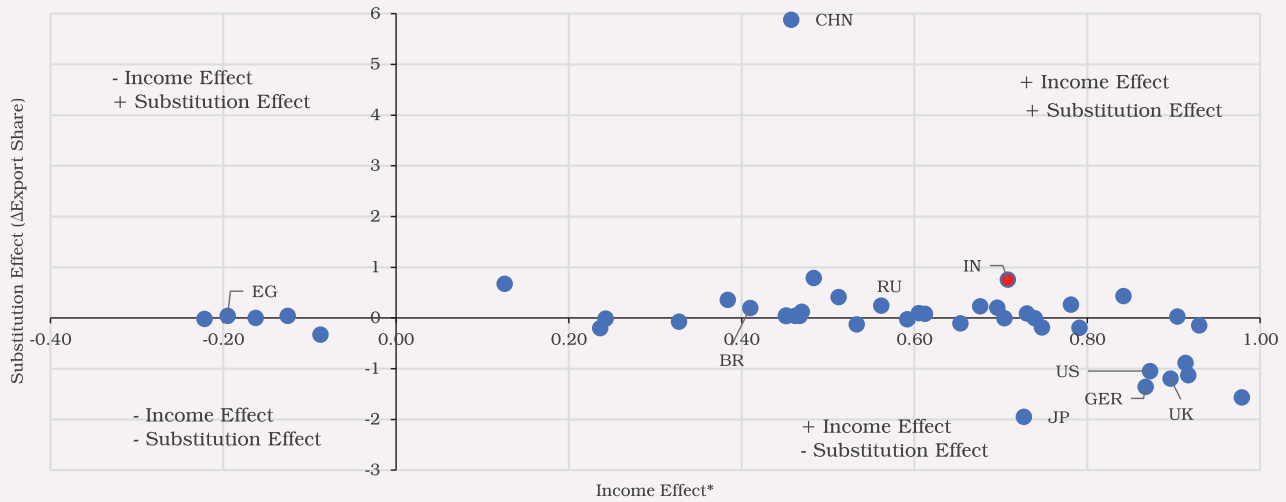
BR: Brazil, EG: Egypt, CHN; China, GER: Germany, IN: India, JP: Japan, UK: United Kingdom and US: United States.
Note: * Measured by correlation between country's export volume growth and world GDP growth during 2010-20.
Source: Authors' own calculations.

years (2022-26). Hence, substantial gains through both the income effect and the substitution effect would be necessary.

IV.11 In this context, the production linked incentive (PLI) scheme targeted at creating domestic capacity and boosting export potential could be a game changer in making Indian manufacturing globally competitive, creating economies of scale and integrating India into the global value chain. In fact, a strong manufacturing base has greater potential to absorb a low-skilled labour force as compared to services.

IV.12 While the revealed comparative advantage[3] (RCA) of sectors has shifted over the last two decades, the number of sectors with RCA greater than one remained broadly the same in 2010-20 *vis-à-vis* 2001-09 (Chart IV.5). An inter-temporal comparison shows that out of 91 sectors which currently enjoy comparative advantage (*i.e.*, RCA index greater than one), the index improved for

47 sectors but deteriorated for 44 sectors during 2010-20. Out of the remaining 167 sectors with RCA of less than one, 58 per cent gained market share by moving closer to the RCA value of 1 (Table IV.2).

Chart IV.5: Sectoral Shifts in Revealed Comparative Advantage
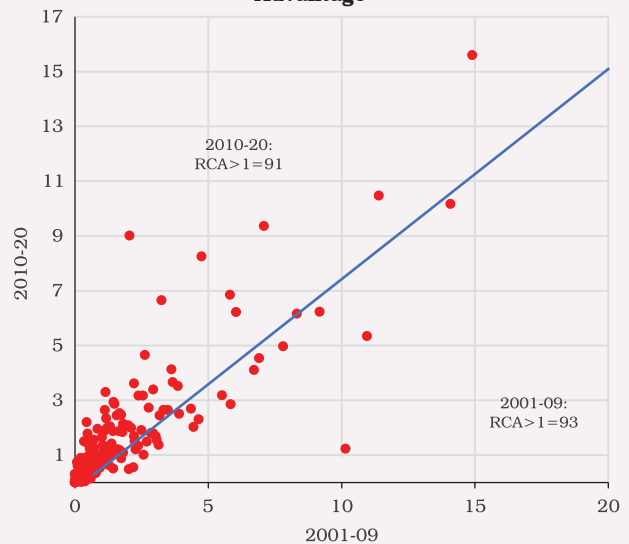
Source: Authors' Calculations; and UNCTAD.

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[3] RCA is based on Ricardian trade theory, which posits that patterns of trade among countries are governed by their relative differences in productivity. RCA index is used as a first approximation of competitive strengths of exports.

Table IV.2: Change in Revealed Comparative Advantage (2010-20 over 2001-09)

	RCA>1	RCA<1	Total
Increase	47	97	144
Decrease	44	72	116
Total	91	167	258

Note: RCA index as defined by Balassa (1965) is as follows:

$$RCA = \frac{X_{ij}}{\sum X_{ij}} / \frac{X_{wj}}{\sum X_{wj}}$$

Where X_{ij} represents country i's exports of commodity j and w represents world exports. If RCA is greater than 1, it is interpreted that the country has a comparative advantage in exports.

IV.13   An inter-temporal comparison of product group-wise comparative advantage suggests that the RCA index of exports of consumer goods improved during 2011-19. Capital goods exports gained market share but remained well below the threshold level of RCA. By contrast, the RCA for intermediate goods and raw materials was eroded reflecting a lower scale of participation in GVCs. An item-wise comparison shows that RCA improved for exports of fuels, chemicals, transportation, machinery and electrical, wood, plastic and metals during 2011-19, whereas it declined for food products, footwear, textile and clothing, stones and glass and minerals. Overall, commodity groups accounting for 58 per cent weight in the export basket gained RCA during 2011-19 (Charts IV.6a and b).

IV.14   While services exports accounted for 22 per cent of total exports globally during 2010-21, the share of India's services exports was much higher at 36 per cent. Further, world trade in services has been more resilient than merchandise trade in the post-GFC period, which provides an upside potential for growth in low labour cost economies like India. While the pandemic and the resultant supply chain disruptions severely impacted world trade in commercial services in 2020, India's net exports of services were relatively resilient, primarily on the back of robust software exports earnings. India needs to tap the post-pandemic global opportunities arising from

Chart IV.6: Revealed Comparative Advantage Index – Merchandise

Source: World Integrated Trade Solutions (WITS).
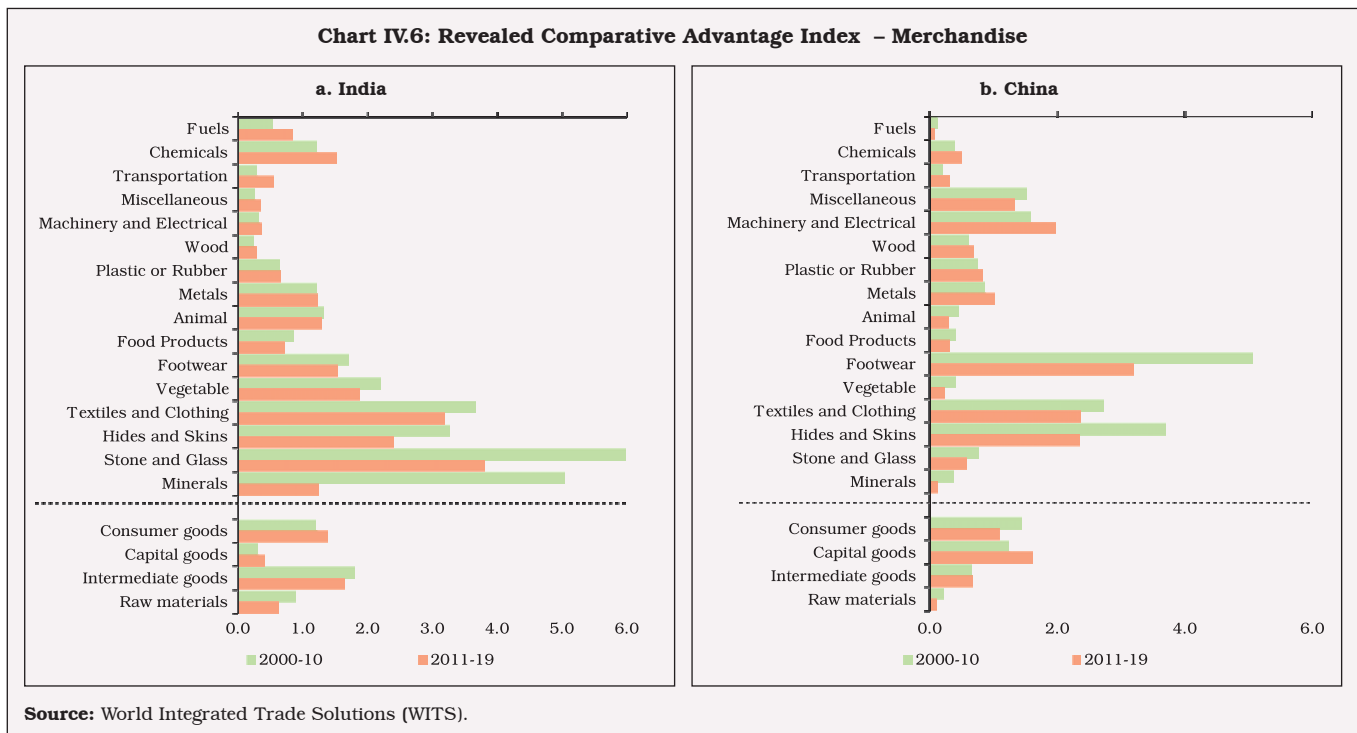
accelerated digital investment with a growing focus on contactless commerce, live commerce, and B2B consumerisation.

IV.15 Despite being the seventh largest exporter of services with a global share of 3.3 per cent during 2010-21, India enjoys comparative advantage only in computer services (including software) covered under the category of telecommunication, computer and information services. In this segment too, the RCA index has moderated during 2011-20 due to growing competition from other countries in the last few years (Chart IV.7).

IV.16 Lower RCAs across services exports reflect India's highly skewed services export basket (Chart IV.8a). In telecommunication, computer and information services and other business services, (together contributing two-thirds of India's services exports), India caters to just over 6 per cent of the global demand, implying a vast export potential in untapped markets (Chart IV.8b). In order to achieve the indicative target of services exports of US$ 1 trillion by 2030[4], the services export basket needs to be diversified. Today, IT companies

Chart IV.7: Revealed Comparative Advantage Index – Services

Source: Authors' calculations based on UNCTAD data.
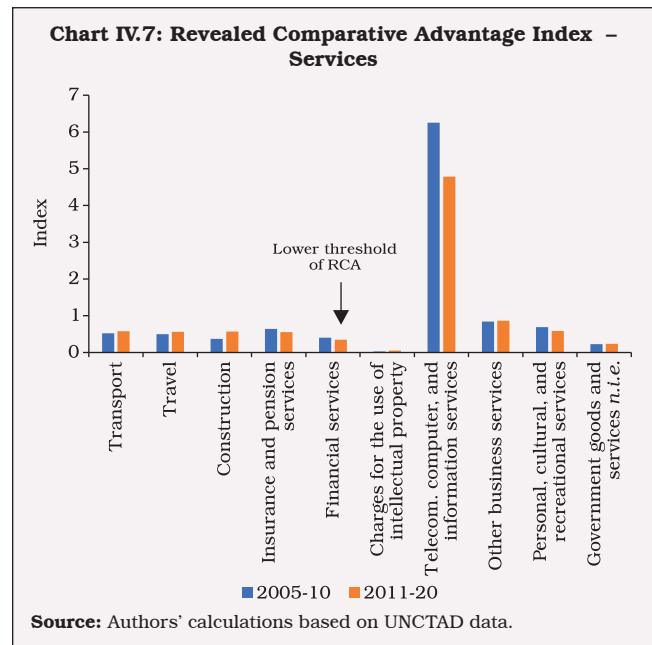
deliver computer and IT enabled services not only through Mode 1 (cross-border supply), but also through Mode 4 (movement of natural persons) and Mode 3 (commercial presence).

IV.17 India's RCA in computer services needs to be enhanced further by tapping new opportunities in this sector. Export potential in other segments,

Chart IV.8: India's Services Exports - Diversification

a. Diversification of Services Export Basket (Lower Value Means Higher Diversification)

b. Computer and other Business Services: Market Size by Country

Source: Calculations based on UNCTAD database.

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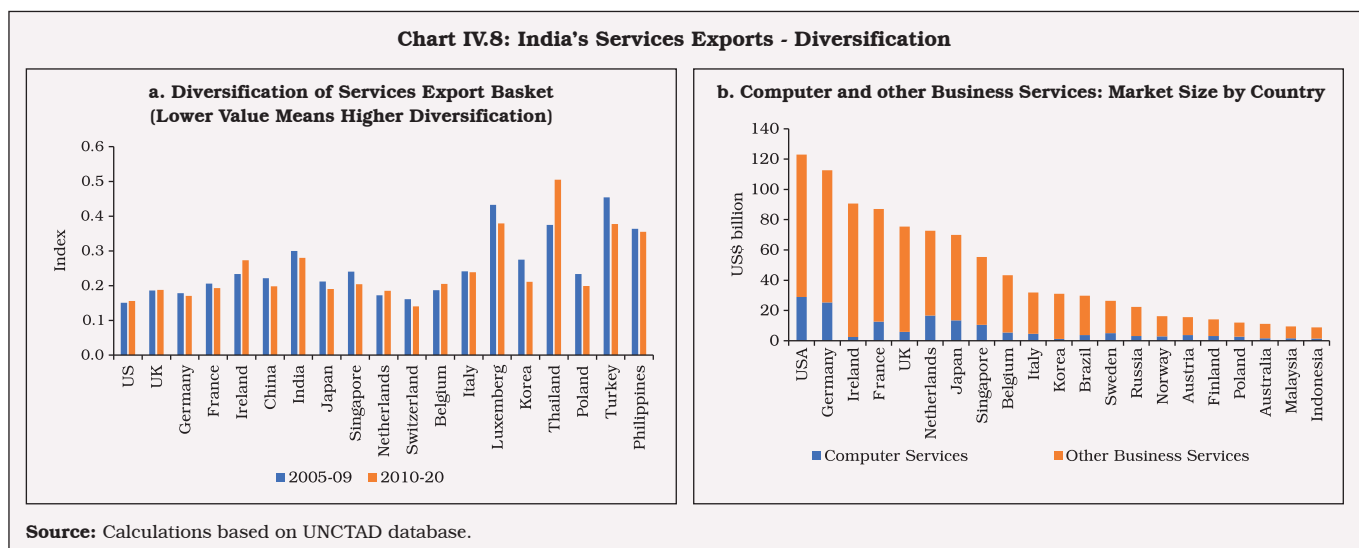
[4] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1770270 (Ministry of Commerce & Industry, November 7, 2021).

Chart IV.9: Services Trade Openness and Export Performance

a. Services Trade Restrictiveness Index and Share in Global Exports (2010-20)

b. Sectoral STRI (2020): India *vis-a-vis* OECD (High value means Lower Openess)
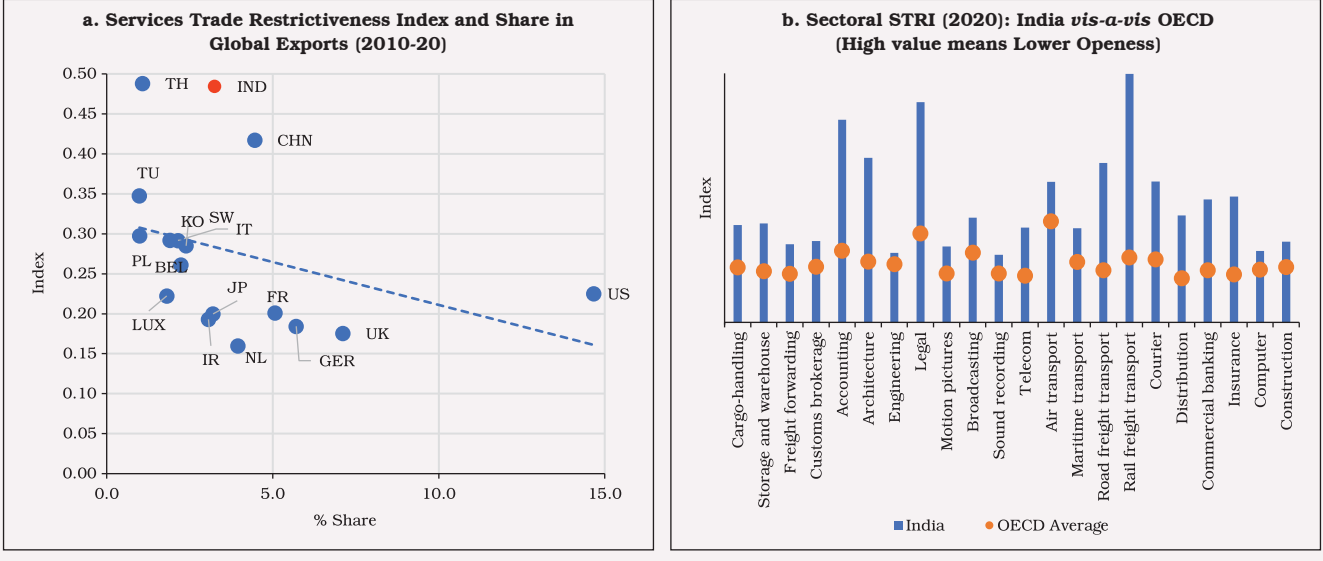
Note: US-United States, UK: United Kingdom, GER: Germany, FR: France, NL-Netherlands, JP-Japan, IT-Italy, CHN-China, IND-India, IR-Ireland, LUX-Luxemburg, TU-Turkey, SW-Switzerland, KO-Korea, PL-Poland, BEL-Belgium.
Sources: UNCTAD; and OECD.

viz., professional and management consulting services, charges for intellectual property rights, financial services, entertainment services including audio-visual and gaming, auditing services, education and healthcare, may be explored, especially through new or renegotiated FTAs. For instance, India's Comprehensive Economic Partnership Agreement (CEPA) with the United Arab Emirates (UAE) in February 2022 focuses on 11 service sectors and over 100 sub-sectors including *inter alia* business services, telecommunications, construction, education, tourism, nursing and finance, besides goods. Some segments involving digital modes for delivery of services are fraught with regulatory issues relating to data privacy, storage and localisation which may weaken the case for a push to services exports through bilateral/multilateral trade agreements. Incidentally, India's openness in services trade is lower than other major advanced economies in most of the segments, as estimated by OECD's services trade restrictiveness index (STRI) [Charts IV.9a and b]. Given India's Act East Policy and strategic partnership with East Asia and the Asia-Pacific region, there is immense potential to increase services trade with countries like Japan and Australia.

IV.18 Export market diversification can help to overcome export instability and the negative impact of net terms of trade shocks originating from concentration in a few commodities. On this metric, India fared better than other large economies during 2010-20 as its top-20 export destinations accounted for two-thirds of total goods exports. India's overall export market diversification measured by the Herfindahl-Hirschman market concentration index also shows lower concentration of exports (Chart IV.10)[5].

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[5] Herfindahl–Hirschman Index (HHI), a commonly accepted measure of market concentration, is calculated by squaring the share of each trading partner in a country's total exports and then summing up the resulting numbers. HHI can range from 0 to 1.0.

**Chart IV.10: Export Diversification by Market –
India *vis-a-vis* China and the US**

Note: Higher value of HHI indicates low diversification and *vice versa*.
Source: Calculations based on DOTS (IMF).
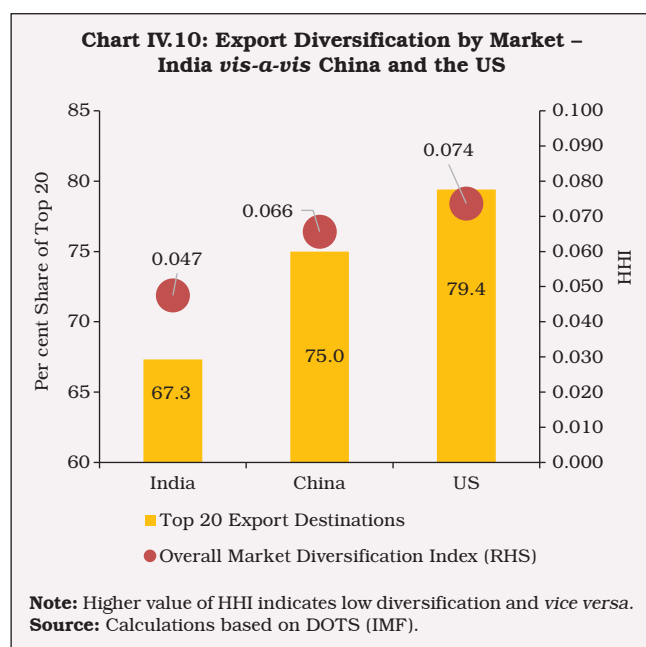
IV.19 An analysis based on the trade complementarity index (TCI)[6] shows that India's export basket has high complementarity with import baskets of Italy, Belgium, the Netherlands, the UK and Brazil, but they account for a lower share in India's total exports than other countries, *viz.,* the USA, China, the UAE and Hong Kong which exhibit modest levels of trade complementarity. Similarly, India's import basket complements exports from the USA, Singapore, the UK, Netherlands and Malaysia. As a high degree of complementarity indicates more favourable prospects for successful trade arrangements, India's exports have scope to expand in countries with high TCI (Table IV.3).

IV.20 In order to expand market overseas for domestic products, it is imperative to not only

Table IV.3: Trade Complementarity Index

India's TCI ranking with Top Exporting Countries			Major Partner Countries TCI Ranking to India		
Country	Share in total exports (%)	TCI (2019)	Country	Share in total imports (%)	TCI (2019)
USA	17.7	59.1	USA	7.34	67.6
China	7.3	55.4	China	14.07	54.7
UAE	5.7	61.2	UAE	6.76	48.8
Hong Kong	3.5	39.5	Hong Kong	3.85	57.6
Bangladesh	3.1	56.1	Bangladesh	0.26	5.7
Singapore	3.0	51.1	Singapore	3.38	67.8
UK	2.8	67.7	UK	1.42	63.6
Germany	2.8	64.5	Germany	3.32	56.1
Nepal	2.3	63.3	Nepal	0.14	23.2
Netherlands	2.2	65.9	Netherlands	0.73	67.0
Malaysia	2.1	59.6	Malaysia	2.13	61.6
Saudi Arabia	2.0	60.2	Saudi Arabia	5.59	31.5
Belgium	1.8	69.9	Belgium	1.76	59.9
Indonesia	1.7	65.7	Indonesia	3.17	55.3
Vietnam	1.7	50.7	Vietnam	1.56	40.4
France	1.6	65.0	France	1.32	55.4
Italy	1.6	72.8	Italy	0.97	54.6
Korea	1.6	61.5	Korea	3.25	61.5
Japan	1.5	64.6	Japan	2.78	56.6
Brazil	1.5	66.3	Brazil	0.63	43.5

Source: WITS.

[6] TC indicator between countries k and j is defined as:

$$TC = 100(1 - \frac{sum(|m_{ik} - x_{ij}|)}{2})$$

Where x_{ij} is the share of good i in total exports of country j and m_{ik} is the share of good i in total imports of country k. The index is zero when no goods are exported by one country or imported by the other and 100 when the export and import shares exactly match.

ease supply-side bottlenecks but also undertake reforms that facilitate a process of structural transformation from producing "poor-country goods" to "rich-country goods" by enhancing the efficiency and competitiveness of domestic industry (Box IV.2).

Box IV.2

Country and Product Identification Strategy for Enhancing India's Export Potential

As India revamps its trade policy strategy to re-engage with the rest of the world post-COVID, an effective export promotion strategy identifies markets with high growth potential and augments comparative advantage of a larger set of products in the export basket. An empirical analysis to identify India's all-weather-partners using a measure of trade frequency, *i.e.*, the number of times a country has registered as India's top-10 trade partners in the last decade may be useful. While countries such as the US, the UK, the UAE, Singapore, Hong Kong, Germany and China have consistently remained in the list of India's top-10 trade partners, trading partners such as Sri Lanka, South Korea, Indonesia, France and Brazil have made sporadic entries and exits.

The medium-term growth potential of India's top trading partners is identified on the basis of IMF's latest growth projections in the post Covid-19 period, *i.e.*, 2023 to 2026. The choice of the period ensures that a mechanical rebound on account of base effects does not overestimate the actual growth potential of a country. Next, revealed comparative advantage (RCA) is explored to gauge India's export potential.

Product differentiation is a short-run phenomenon between new trading partners and its importance dissipates over time (Herman and Lee, 2019). From the medium-term

perspective, it is imperative that India captures a greater market share, based on differentiated products, especially during a time when global supply chains are going through a major transformation. Accordingly, product classification in terms of organised exchange, referenced price, and differentiated products (Rauch, 1999) is examined, and mapped to sectoral RCAs[7] and the medium-term growth potential of India's trading partners.

The desirable country and product mix may meet the following criteria: (i) the product classified as differentiated; (ii) India's RCA in that product category *vis-a-vis* trading partners; and (iii) trade in that product with a country that has a high growth potential. This aspect is examined by applying K-means clustering[8] to identify centroids based on (a) a scatter of sectoral RCAs and country's medium-term growth potential; and (b) a scatter of sectoral RCAs and product classification (Charts 1a and b). The blue cluster represents a centroid associated with relatively high RCA value and low GDP growth. On the other hand, the green cluster represents a centroid associated with relatively high GDP growth values and relatively low RCA value. The red cluster represents relatively low RCA and low GDP growth values. A medium-term repositioning of India's trade strategies must focus on the centroids

Chart 1: Identification of a Right Mix of Trading Partners and Products based on K-means Clustering
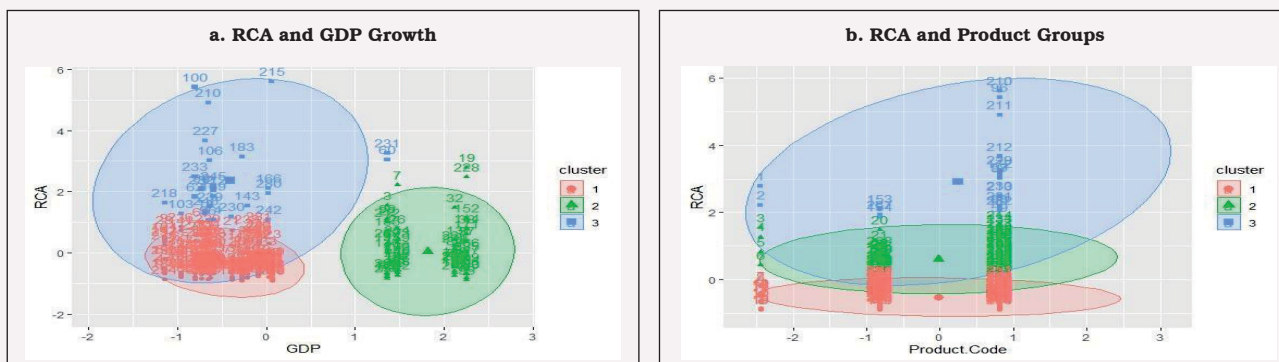
Note: Centroid clusters are based on a scatter of RCA values and product classifications across 16 key sectors. It would be desirable to reposition India's external sector away from the red and green clusters and closer to the blue cluster.

(Contd...)

[7] According to WITS, products are classified under 16 major sectors:

[8] K-means clustering method determines the centroid position from a cluster of data points by minimising the within-cluster variation. The algorithm starts with a set of randomly chosen centroids that serve as the starting points for each cluster, and then iterative (repetitive) calculations are used to optimise the centroids' positions.

that can help reap the untapped potential in high growth economies.

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Herman, Peter and Lee, Ryan (2019), "The Short-Run Effects of Product Differentiation on Trade (November 7, 2019)", *USITC Office of Economics Working Paper 2019-11-A*, Available at SSRN: https://ssrn.com/abstract=2690336 or http://dx.doi.org/10.2139/ssrn.2690336.

Rauch, James E. (1999), "Networks versus markets in international trade", *Journal of International Economics*, Vol.48, Issue 1, pp.7-35.

IV.21   There is a need to re-examine the domestic incentive structure for exporters in consonance with the WTO guidelines in order to boost exports.[9] In recent years, India's export incentive schemes have been challenged at the WTO dispute settlement mechanism. These schemes include i) Export Oriented Units (EOU) Scheme; (ii) Sector-Specific schemes, *viz.*, Electronics Hardware Technology Park (EHTP) Scheme, Software Technology Park (STP) Scheme and Bio-Technology Park (BTP) scheme; (iii) Merchandise Exports from India Scheme (MEIS); (iv) Export Promotion Capital Goods (EPCG) Scheme; (v) Special Economic Zones (SEZ) Scheme; and (vi) Duty-Free Imports for Exporters Scheme (DFIS).

IV.22   Taking cognisance of the non-compliance with WTO guidelines, the Government has introduced the Remission of Duties and Taxes on Exported Products (RoDTEP) (that replaces the MEIS) and PLI scheme for 13 sectors which are WTO-compliant. The RoDTEP scheme aims to reimburse taxes/duties/levies at the central, state and local level incurred in the process of manufacture and distribution of exported products. RoDTEP is based on the principle that taxes and levies on the exported products should be either exempted or remitted to exporters and therefore is a step towards zero-rating of exports.[10] The PLI schemes mandate investment thresholds and targets for incremental sales for availing the scheme incentives. Improvement in export competitiveness in the long-run would, however, require infrastructure and logistics support to provide exporters a level playing field in the global market.

IV.23   On India's export potential, the Bloomberg Economics ranked India at the first position among 10 Asian economies. The Confederation of Indian Industry (CII) shortlisted 31 export items which could improve India's export potential.[11]

IV.24   The large-scale digitalisation of the economy that is currently underway, along with the advances in frontier technologies such as artificial intelligence (AI), robotics, biotechnology and nanotechnology, are likely to drive economic development going forward. While telecommunications, information services, hardware manufacturing, software and IT consulting form the core of this digital economy, these frontier technologies have opened up

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[9]   WTO subsidies rules are covered under Subsidies and Countervailing Measures ("SCM Agreement"). SCM agreement classifies the subsidies into two categories prohibited and actionable.

[10]   Zero rating refers to zero taxes on inputs of final products.

[11]   This list included items such as cyclic hydrocarbons, motor cars, motor vehicles, and electrical apparatus which require the use of high, if not complex, technologies along with a moderately high investment on research and development (R&D).

avenues in digital services, cloud platforms, e-commerce, e-business, industry, precision agriculture and algorithm-driven business processes.

IV.25 Adoption of digital technologies can improve India's trade competitiveness through economies of scale, scope and speed of trade. It affects all stages of a value chain, including pre-production, production and post-production, improves access of domestic firms to new export markets and also exposes domestic consumers to new products and producers (Banga, 2019).

Firms in the financial and manufacturing sectors have been some of the early adopters of frontier technologies including AI, IoT, big data and blockchain (Table IV.4).

IV.26 Financial firms, especially new age FinTech firms, have leveraged these technologies for credit decisions, risk management, fraud prevention, trading, personalised banking and process automation (UNCTAD, 2021). On the other hand, the manufacturing sector has used these technologies for predictive maintenance, quality control and human-robot combined

Table IV.4: Frontier Technologies, Description and Early Adopters

Technology	Description	Early Adopters
Artificial intelligence (AI)	AI is normally defined as the capability of a machine to engage in cognitive activities typically performed by the human brain.	Retail, banking, discrete manufacturing
Internet of Things (IoT)	IoT refers to Internet-enabled physical devices that are collecting and sharing data and has potential applications in areas such as wearable devices, smart homes, healthcare, smart cities and industrial automation.	Consumer, insurance, healthcare providers
Big data	Big data refers to datasets whose size or type is beyond the ability of traditional database structures to capture, manage and process.	Banking, manufacturing, professional services
Blockchain	A blockchain refers to an immutable time-stamped series of data records supervised by a cluster of computers not owned by any single entity and is used as a base technology for cryptocurrencies and also enables peer-to-peer transactions.	Finance, manufacturing, retail
5G	5G networks are the next generation of mobile internet connectivity, offering download speeds of around 1-10 giga bytes per second as well as more reliable connections.	Energy utilities, manufacturing, public safety
3D printing	3D printing (*i.e.,* additive manufacturing) produces three-dimensional objects based on a digital file using less material than traditional manufacturing.	Discrete manufacturing, healthcare, education
Robotics	Robots are programmable machines that can carry out actions and interact with the environment *via* sensors and actuators either autonomously or semi-autonomously.	Discrete manufacturing, process manufacturing, Resource industry
Drones	A drone, also known as unmanned aerial vehicle (UAV) or unmanned aircraft systems (UAS), is a flying robot that can be remotely controlled or fly autonomously using software with sensors and global positioning system (GPS).	Utilities, construction, discrete manufacturing
Gene editing	Gene editing, also known as genome editing, is a genetic engineering tool to insert, delete or modify the genome in organisms.	Pharma-biotech, academic/ research centre, agri-genomic/ contract research organisations
Nano-technology	Nano-technology deals with the manufacturing of objects in scales smaller than 1 micrometre.	Medicine, manufacturing, energy
Solar photovoltaic (Solar PV)	Solar photovoltaic (Solar PV) technology transforms sunlight into direct current electricity using semiconductors within PV cells.	Residential, Commercial, Utilities

Sources: UNESCAP (2018) and UNCTAD (2021).

Chart IV.11: Expected Market Size of Frontier Technologies

a. 2018 (US$350 billion)

Artificial Intelligence, 16
Solar photovoltaic, 54
Nanotechnology, 1
Gene editing, 3.7
Drones, 69
Internet of Things, 130
Robotics 32
3D printing, 10
Big data, 32
Blockchain, 0.7
5G, 0.6

b. 2025 (US$3226 billion)

Solar photovoltaic, 344
Artificial Intelligence, 191
Nanotechnology, 2.2
Gene editing, 9.7
Drones, 141
Robotics, 499
Internet of Things, 1500
3D printing, 44
5G, 277
Blockchain, 61
Big data, 157

Source: UNCTAD (2021).

working activities. Frontier technologies currently represent a global market of US$ 350 billion, which is expected to grow to over US$ 3.2 trillion by 2025 (Charts IV.11a and b).

IV.27 India could create a digital economy of US$ 800 billion - US$ 1 trillion (equivalent to 18 to 23 per cent of India's nominal GDP) by 2025 (MEITY, 2019). As per available data, India's high-technology exports were roughly 10.3 per cent of total manufactured exports, while ICT goods exports were about 2 per cent (Table IV.5).

IV.28 There is also a need for domestic firms to reap the opportunity thrown by "green"

Table IV.5: Trade and Research and Development Statistics for India

Parameters	Value
Researchers (per million, 2010-18)	253
Technicians (per million, 2010-18)	73
Scientific and Technical Journal Articles	1,35,788
R&D Expenditure (% GDP, 2010-18)	0.65
High-technology Exports (% manufacturing exports, as of 2019)	10.3
ICT Goods Exports (% total goods exports, as of 2019)	2.0
Patent Applications Filed (as of 2019)	53,627
Trademark Applications Filed (as of 2019)	45,467
Industrial Design Applications Filed (as of 2019)	13,723

Source: World Bank Database.

industrialisation. Countries are likely to induce shifts in consumer preference for lower-emission goods and services and facilitate adoption of climate-friendly technology. Trade baskets could, therefore, undergo compositional shifts to the extent that CO_2 emission control norms are embedded into export and import baskets. India is likely to face sharper contraction in volumes of exports than imports over the long-run (OECD, 2017; UNCTAD, 2019). Mobilising green investments, adopting cleaner technologies, and promoting green collaborations to reduce carbon footprints in domestic production early could rebalance the export basket towards climate friendly goods for environment sensitive markets. India has so far not been able to tap this export potential due to institutional and infrastructure bottlenecks (Nguyen and Kalirajan, 2013).

3. Role of Imports

IV.29 Experience with the export-led growth strategies highlights the critical role of imports in raising exports and productivity (Kim, 2007 and Chen, 2020). Economies can raise participation in GVCs by importing foreign inputs to produce goods and services meant for exports (backward GVC

Chart IV.12: Import Content of Exports (ICE) Matters for Export Intensity and GVC Participation*

a. ICE and Export Intensity

b. ICE and GVC Participation Index
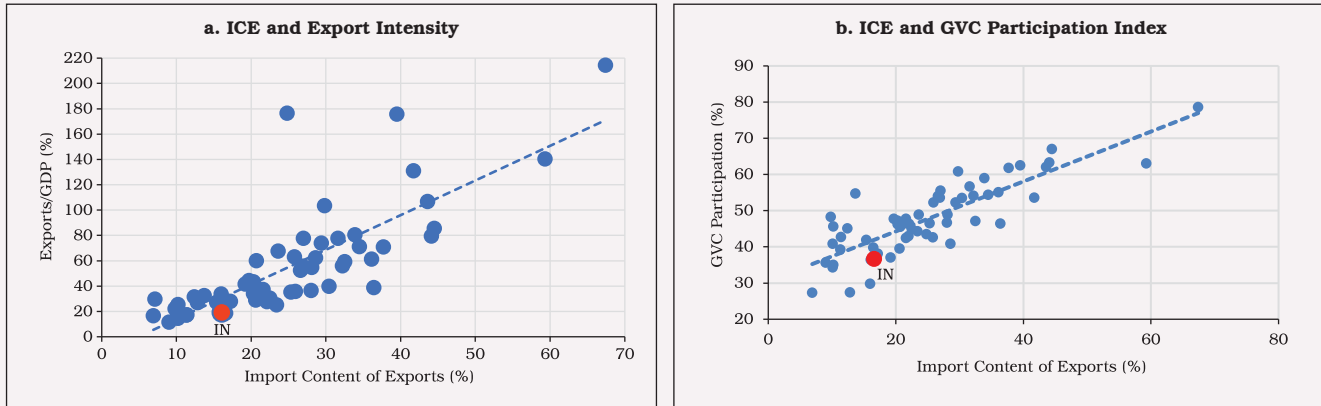
*Based on data on backward and forward GVC participation of 62 advanced and emerging market economies.
Sources: OECD, WTO and World Bank.

participation) and also by exporting domestically produced inputs to trading partners for value addition at different stages of production (forward GVC participation). Import substitution policies work against opportunities for becoming more productive and cost competitive (Charts IV.12a and b). In the case of India, it has been empirically established that higher GDP and export growth can be induced by imports (Shirazi and Manap, 2005; Maitra, 2020).

IV.30 The composition of imports also matters, including for productive absorption of capital from abroad. India's import basket has undergone a shift away from raw materials to intermediate and capital goods over the last two decades (Chart IV.13a). Nevertheless, the share of capital goods in India's total imports at 22.8 per cent is significantly lower than economies with higher export intensity (Chart IV.13b). Going forward, India's foreign trade policy must not be oblivious to the experience of

Chart IV.13: India at the Bottom as Capital Goods Importer among Major Economies

a. Composition of India's Imports by Stage of Processing (% Share)

b. Share of Capital Goods in Import Basket
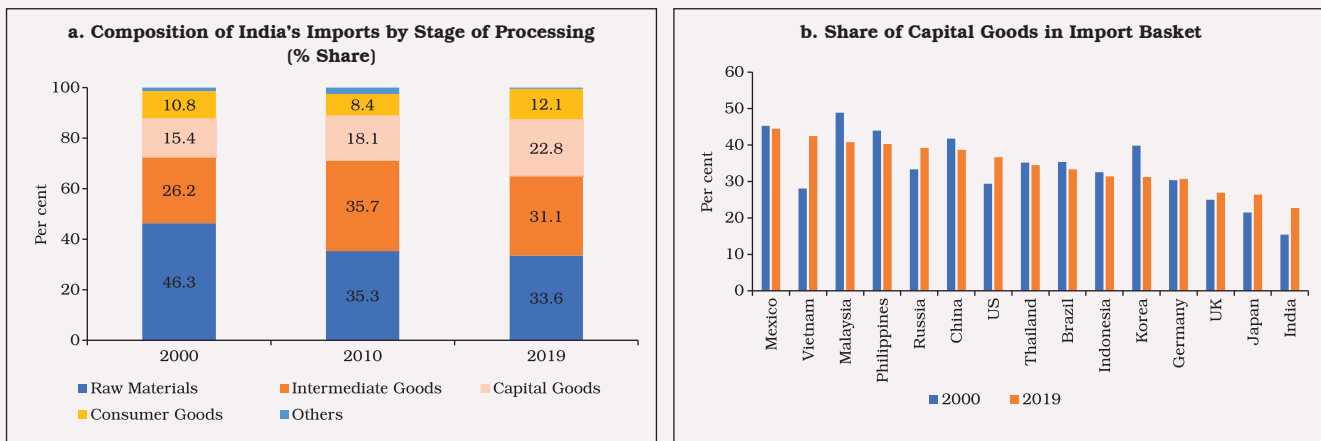
Source: Based on WITS data.

Chart IV.14: Tariff Profile of India's Imports

a. Trade Weighted Average Import Tariffs

b. India's Tariff Rate (Simple Average) – Stages of Processing (2019)
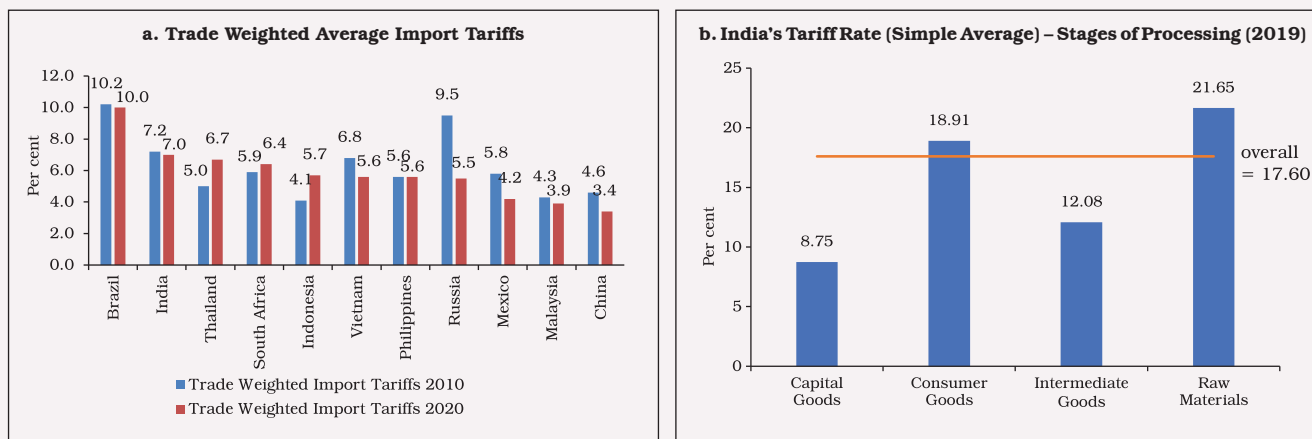
Source: WTO.

firms in most competitive economies which source foreign inputs of superior quality and improve competitiveness.

IV.31   The focus on building domestic capacities under '*Aatmanirbhar Bharat'* aims at putting in place an eco-system that strengthens the supply chains within the country for products with export opportunities. The focus is to provide incentives and create an enabling environment for the private sector for creating capacities while fostering competitiveness. The correction in the inverted duty structure is one such example in recent years, *i.e.*, lower tariffs on imports of raw materials/inputs than final goods. Downward adjustments in India's average import tariff levels, which remain higher than other EMEs, can help in further enhancing export competitiveness and higher participation in GVCs (Panagariya, 2021). India regulates its trade in agricultural commodities more intensively than manufactured products and natural resources. There is scope for a more stable and open

policy regime to promote agricultural exports (Charts IV.14a and b).

IV.32   Diversification of India's import basket away from a few source countries to a larger set of countries may also help domestic firms to become more resilient to global supply chain disruptions. At present, China accounts for 43.5 per cent of India's imports of electrical machinery and equipment, 37.8 per cent of imports of other machineries, mechanical appliances, nuclear reactors, boilers and parts thereof, and 45.6 per cent of organic chemicals. An analysis based on HS 6-digit data shows that there is a scope for diversification of India's imports to other alternative suppliers (Table IV.6).

IV.33   India's experience with various trade agreements so far may not have been encouraging (as import growth often exceeded export growth), but there is a need to secure favourable trade terms with partners for the right kind of imports that augment domestic production capacity and

Table IV.6: Commodities with High Import Dependence on China and Alternative Suppliers

	Sr. No.	Commodities at HS-6 digit	Alternative Suppliers
I. Electrical machinery, equipment and parts			
High import value	1.	Parts of telephone sets	Hong Kong, Vietnam, Korea, Singapore
	2.	Processors and controllers	Hong Kong, Malaysia, USA, Singapore
	3.	Photosensitive semiconductor devices*	Malaysia, Japan, Korea, Vietnam
	4.	Telephones for wireless network/mobile phones*	Vietnam, Hong Kong, UAE, USA
	5.	Parts of machines such as transmission/radar/reception apparatus, cameras, *etc.*	Korea, Hong Kong, Taiwan, Vietnam
	6.	Lithium-ion accumulators (such as batteries mostly used in laptops, PCs and mobile phones)	Korea, Hong Kong, Japan, Poland
	7.	Static converters (such as electric inverter, rectifier, stabilizers, *etc.*)	Germany, Hong Kong, USA, Japan
Low import value but crucial	1.	Parts of Electronic ICs and micro assemble	Malaysia, Hong Kong, Japan, Singapore, USA
	2.	Electronic ICs	Hong Kong, Singapore, Malaysia, USA
II. Machinery/mechanical appliances/nuclear reactors/boilers & parts			
High import value	1.	Data processing machines such as PCs**	USA, Germany, Hong Kong, Czech
	2.	Parts such as microprocessors, motherboards	Hong Kong, USA, Korea, Taiwan
	3.	Parts of road rollers, ships, cranes	USA, Germany, Japan, Korea
	4.	Other pumps, compressors *etc.*	Germany, USA, Romania, Italy
	5.	Air conditioners**	Thailand, Malaysia, UAE, Korea
	6.	Ball bearings	Japan, Germany, Italy, France
Low import value but crucial	1.	Agricultural/horticultural mechanical appliances	USA, Israel, Italy, Turkey
	2.	Numerically controlled shearing machines	Germany, Italy, Netherlands, Turkey
	3.	Condensers for steam/other vapour power units*	Korea, Indonesia, USA
III. Organic chemicals primarily bulk drugs and active pharmaceutical ingredient (API)			
High import value	1.	Heterocyclic compounds with nitrogen hetero-atom[s] only	Switzerland, Ireland, Germany
	2.	Penicillin and its derivatives*	Spain, Italy, Singapore
	3.	Other 'Rifampicin and its salts'	Switzerland, Italy, USA
	4.	Other heterocyclic compounds	Ireland, Japan, Switzerland, Germany

*: China's share is more than 40 per cent in world exports; **: China dominates with more than 55 per cent share in world exports.
Source: Authors' calculations based on ITC data.

make the conditions for export competitiveness more conducive (Box IV.3).

IV.34   Given the growing focus on meeting climate change goals, India's dependence on imported fossil fuels for meeting domestic energy demand needs to be reduced. India has set visionary targets to achieve 50 per cent of installed electric power capacity from non-fossil fuel sources and reduce the carbon emission intensity of its GDP by 33-35 per cent compared to 2005 levels by 2030.

In this regard, the *Aatmanirbhar Bharat* initiative may play an important role by incentivising use of lower-carbon fuels for power generation, conservation of energy, and production of greener vehicles. Lower dependence on import of crude oil and coal by switching to domestically available substitutes can also reduce the income elasticity of imports. In this direction, various measures have been undertaken, including the target of 20 per cent ethanol blending by 2023-24 and 100 per cent ethanol-run vehicles over time, the focus on

Box IV.3
India's Free Trade Agreements – For Trade Creation or Diversion?

Trade Agreements[12] as a strategy to expand trade, investment and economic cooperation is required to manage post-COVID challenges. FTA countries, however, accounted for just 21 per cent and 18 per cent of India's exports and imports, respectively, during 2017-21. In order to examine the impact of free trade and other preferential agreements on India's trade, a fixed effects model is attempted, using bilateral panel data of the following form:

$$LBEXP\ (c, t) = \alpha0 + \alpha1\ (TA)t + \gamma'\ X\ (c, t) + D\ (c, t) + \varepsilon\ (c, t)\ ...(1)$$

$$LBIMP\ (c, t) = \alpha0 + \alpha1\ (TA)t + \gamma'\ X\ (c, t) + D\ (c, t) + \varepsilon\ (c, t)\ ...(2)$$

where c represents bilateral country-wise exports/imports of India in year t. The dependent variables that capture trade relationships are measured by bilateral exports (LBEXP) and bilateral imports (LBIMP). X is a vector of other variables such as domestic GDP ($LGDP_{IND}$) and GDP of trade partners ($LGDP_{TP}$). The coefficient of interest is $\alpha1$ to assess the impact of trade agreements (Dummy TA) on India's exports and imports.

The sample covers 1995-2020 period and comprises India's 30 major trading partners that include 10 countries[13] having either FTA or any other bilateral or multilateral trade agreement with India. The results suggest that trade agreements do not have any positive and statistically significant impact on India's exports. In the case of imports, however, it is found that the trade agreements have a positive and statistically significant impact (Table 1).

Any trade agreement is more likely to benefit countries having complementary export and import baskets. Evidently, India has recorded higher trade deficits with some of the ASEAN countries in the post-FTA period, underscoring the limited benefits of FTAs due to a combination of factors

Table 1: Impact of Trade Agreements on Exports and Imports

	LBEXP	LBIMP
$LGDP_{TP}$	0.628** (0.0434)	
$LGDP_{IND}$	0.829** (0.048)**	1.244** (0.078)
Dummy_TA	-0.015 (0.047)	0.170* (0.088)
Obs.	780	780
R-squared	0.55	0.40
Year FE	Yes	Yes
Country FE	Yes	Yes

* statistically significant at 10% level.
** statistically significant at 1% level.
Note: Figures in parentheses are standard errors.

such as unequal decline in tariffs *vis-à-vis* trade partners, high cost of compliance of FTAs, and non-tariff measures continuing even after entering into FTAs. In fact, India's net imports in certain segments increased manifold. In the case of steel, 74 per cent of India's imports are from Japan and Korea at much lower tariffs under the FTAs, affecting the domestic sector (EXIM Bank, 2020).

Ongoing trade negotiations with the UK, Canada, the US, and the European region provide new opportunities, but they need to be structured strategically in terms of market access for exports and assurance on high technology imports. FTAs are more likely to benefit India through trade in services without losing the focus on merchandise trade.

Reference:

Relooking India's Tariff Policy Framework, EXIM Bank. 2020.

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efficient battery technologies, and setting up of 5,000 compressed bio-gas plants to turn municipal and agricultural wastes into energy.

IV.35 Despite these policy efforts, India's energy transition, however, may face renewed uncertainties owing to ongoing global supply chain disruptions during the post-pandemic period. A gradual switch to indigenous sources of renewable and non-renewable energy and thrust on improving energy efficiency will help achieve a reduction in dependency on imported energy, going forward. Securing energy security by diversifying from imports to indigenous sources would bode well for domestic growth as well.

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[12] FTA is signed between two or more group of countries for encouraging bilateral trade by reducing or eliminating tariff and non-tariff barriers on goods and services. Moreover, many countries have established a broad agreement known as comprehensive economic cooperation agreement which consists of an integrated package of goods, services and investment, including Intellectual property rights (IPR).

[13] The sample countries include Bangladesh, Indonesia, Japan, Korea, Malaysia, Singapore, Sri Lanka, Thailand, the UAE and Vietnam.

4. Capital Flows, Exchange Rate and Growth

IV.36   Neo-classical models of growth assume that capital flows from countries with high capital-to-labor ratios to those with relatively low capital-labour ratios. Foreign capital enables capital deficient countries with unexploited investment opportunities to grow faster as it may bring in new technologies and ease the domestic saving constraint on growth.

IV.37   Empirical evidence on capital moving from surplus to deficient countries, however, remains limited. Instead, there has been substantive evidence on high correlation between domestic savings rates and domestic investment rates, which is a puzzle in the context of perceived benefits of financial openness (Feldstein and Horioka, 1980). Further, the modest level of capital

flowing from the rich to poor countries (Lucas, 1990) is often due to a variety of bottlenecks, *viz.*, low absorptive capacity - given inadequate infrastructure - low skilled labour force and poor governance, besides higher risk of default on foreign debt. In a demand constrained model, the growth impact of foreign capital depends on how it affects domestic investment, savings and import propensities (Bhanumurthy *et al.* 2014). In general, the received wisdom is that foreign capital does not always boost long-term growth in non-industrial developing countries (Prasad *et al.* 2007).

IV.38   In the case of India, both domestic and foreign savings seem to play an important role in boosting growth, but the latter in excess of 2.5 per cent of GDP (*i.e.*, the sustainable level of CAD) appears to be growth retarding (Box IV.4).

Box IV.4
Impact of Foreign Capital on Growth

An analysis is undertaken to examine the relative roles of domestic and foreign capital in India's growth performance following the specifications suggested by Soto (2000). Data over the period 1980-2020 are used, covering various phases of domestic growth. Besides key variables, *viz.*, the investment rate (IR), the saving rate (SR) and the current account deficit (CAD), other control variables used are trade openness (XMGDP), net terms of trade (TOT), government consumption (GCON). While XMGDP and TOT augment GDP growth, GCON is expected to have a negative impact on growth as it represents distortions introduced by government interventions (Barro and Sala-i-Martin, 1995).

When the investment rate is split into the national savings rate and the CAD in order to distinguish between the effects of domestic savings and foreign savings, it is found that both sources of savings boost growth. However, the coefficient of the CAD turns out to be larger than SR, implying a greater per unit contribution of foreign savings to growth (equation 2). Coefficients of other control variables, *viz.*, XMGDP, net TOT and GCON have expected signs (equation 1) as seen in the cross-country experience.

Equation 3 which tests the presence of a non-linear relationship between CAD and growth finds that the coefficient of the squared term of CAD is negative, implying

that growth tends to be negative at very high levels of CAD (Table 1). From equation 3, the threshold CAD works out

Table 1: Impact of Domestic and Foreign Savings on Growth

Variable	Regression Coefficients		
Equation	1	2	3
C	-4.55 **	-6.72 *	-2.11
IR	0.42 *		
SR		0.28 ***	0.53 ***
CAD		1.04 **	2.31 *
CAD^2			-0.51 **
XMGDP	0.30 **	0.41 *	0.09 **
LTOT	1.13 *	1.63 *	0.55 **
LGDP(-1)	-0.02	0.01	-0.001
LGCON(-1)	-0.05	-0.08	-0.04
Adj. R^2	0.32	0.36	0.32
D.W	1.69	1.86	1.71
F-Stat	4.11	4.14	3.32
N	40	40	40

*, **, ***: Represent significance at 1per cent, 5 per cent and 10 per cent, respectively.
Note: IR: Inestiment Rate, SR: Saving Rate, CAD: Current Account Deficit (+)/Surplus(-) as ratio to GDP, XMGDP: Export and imports as ratio of GDP, LGDP; Log of real GDP, LGCON: Log of Government Consumption (constant prices), LTOT: Log of Net Terms of Trade Index and DUMS=Dummy 1 for current account surplus period 2001-03.

(Contd...)

Chart 1: Current Account Balance and GDP Growth

Current Account Balance as % of GDP
[Surplus (-) to Deficit(+)]

Note: The period 2001-03, for which a dummy variable was used in the regression equation, has been dropped.
Source: Authors' own calculations.
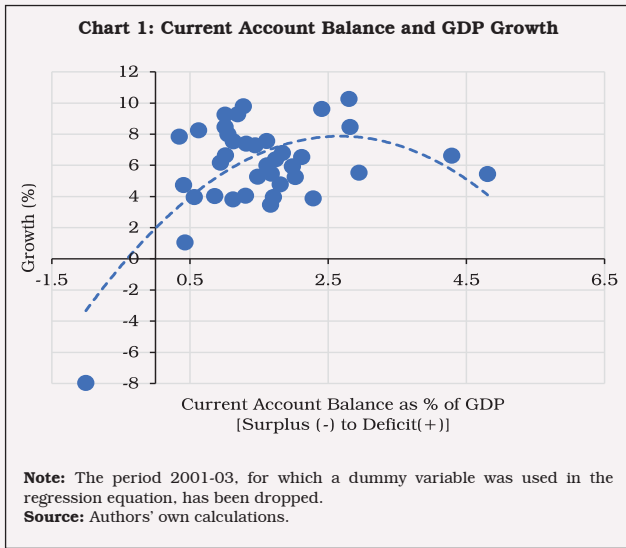
to be 2.3 per cent of GDP beyond which growth begins to decelerate. A scatter plot of India's current account balance and growth also confirms a non-linear relationship between these two variables, with the slope turning negative around a CAD level of 2.5 per cent of GDP (Chart 1).

The sustainable level of CAD can be raised by undertaking reforms that enhance the country's export potential, quality of imports and higher external funding in the form of FDI.

References:

Barro, R. and X. Sala-I-Martin (1995), *Economic Growth*, McGraw-Hill, New York.

Soto, Marcelo (2000), "Capital Flows and Growth in Developing Countries: Recent Empirical Evidence", *OECD Development Centre Working Papers 160*, OECD Publishing.

IV.39 Net capital flows to India have generally exceeded the funding requirements of the economy, as reflected in overall balance of payments surpluses (*i.e.*, build-up of foreign exchange reserves) over the last two decades (Chart IV.15). In an open economy, foreign exchange reserves contribute to growth and investment indirectly by insulating the economy from global spillovers,

Chart IV.15: Utilisation of Net Capital Inflows

Source: RBI.

containing exchange rate volatility and mitigating external vulnerability concerns.
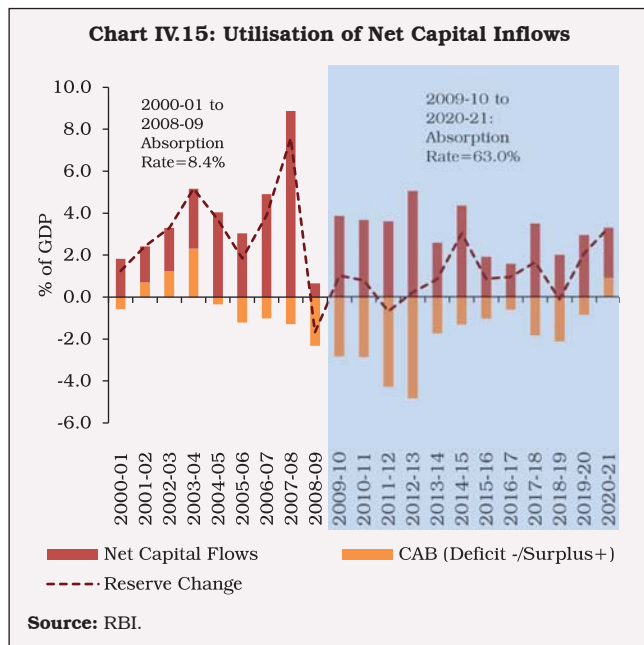
IV.40 Besides the size of foreign capital, its composition can also influence the growth outcome. The impact of FDI is widely perceived to be the largest in open economies with a skilled workforce and developed financial markets. Equity flows in the form of FDI are generally procyclical and *inter alia* driven by domestic growth prospects, implying that the latter can generate a virtuous cycle of stronger growth and higher FDI flows. While FDI benefits by diversifying the capital structure of local companies and providing positive externalities such as technology and knowledge diffusion (Mansfield and Romeo, 1980; Markusen and Venables, 1999; Blomström *et al*. 1994; Blomström and Kokko, 2002), its impact on growth also depends on whether it is for greenfield or brownfield projects.

IV.41 India has followed a gradualist approach to capital account liberalisation in order to mitigate the destabilising impact of surges and sudden stops in capital flows. Recognising the critical

Chart IV.16: Regulatory Easing of FDI in India since 1990s

a. FDI Regulatory Restrictiveness Index for India

b. FDI Stock in India
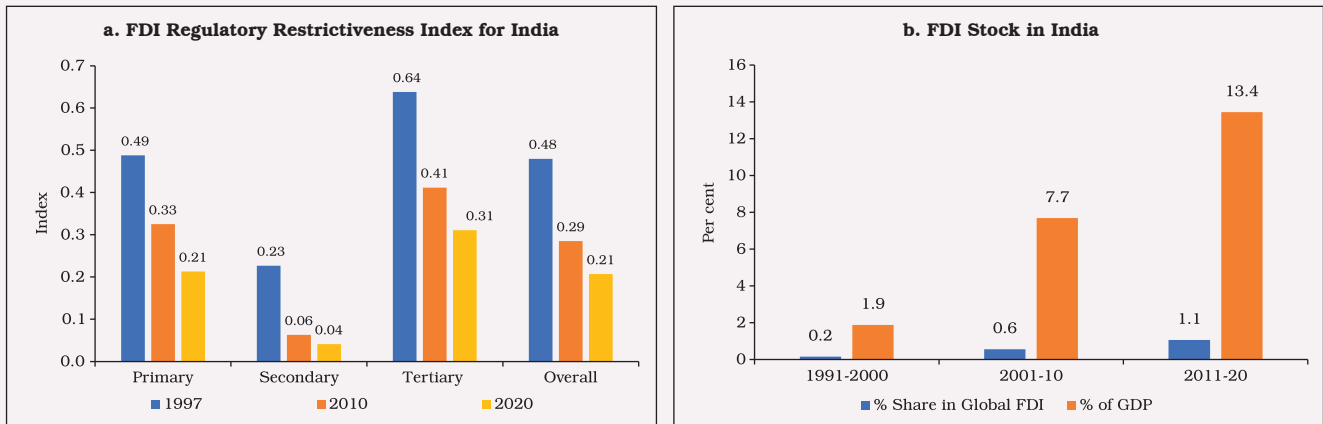
Note: Lower Index means easing of FDI policy and *vice versa*.
Sources: OECD; and UNCTAD.

role of FDI, the Government has put in place a transparent and predictable policy framework wherein 100 per cent ownership is permitted under the automatic route in most sectors/activities, except for a few prohibited sectors. Its impact is reflected in the sharp improvement in OECD's FDI Regulatory Restrictiveness Index, which measures statutory restrictions on foreign direct investment in 22 economic sectors (Chart IV.16a). In fact, the improvement in India's FDI Regulatory Restrictiveness Index from 0.23 in 1997 to 0.04 in 2020 has been remarkable in the manufacturing sector (covered under secondary sector) and is closer to the OECD's average of 0.02. Nevertheless, India's inward FDI stock at 13.4 per cent of GDP during 2010-20 is modest when compared with other EMEs, *viz*., Brazil, Chile, Thailand, Mexico, Malaysia, Indonesia and Vietnam (Chart IV.16b).

IV.42   Despite 100 per cent FDI in majority of sectors, FDI flows have remained skewed towards a handful of sectors. The PLI scheme by attracting foreign companies for domestic production can potentially generate additional exports in targeted sectors by 2026-27 (Chart IV.17).

IV.43   One of the reasons that FDI has been less than potential in India is the lack of quality infrastructure which reduces the comparative advantage of firms/industries. While raising the FDI investment limits in certain sectors, particularly at the higher end of the engineering and economic value chain (*e.g*., defence), foreign firms expect full flexibility to own proprietary technology and decide on manufacturing processes. In the post-

Chart IV.17: Export Sectors with High Capital Requirement

PLI Outlay = ~Rs.1,22,700 crore
(US$ 16.4 billion)
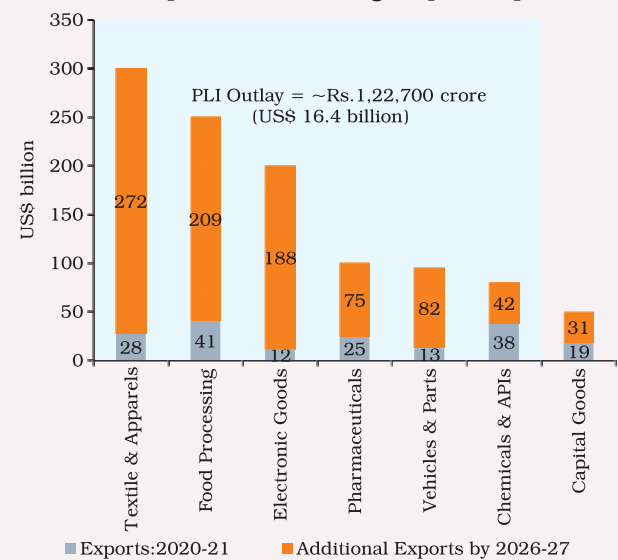
Source: Deloitte Report (September 2021).

pandemic period, building supply chain resilience has been a top priority for domestic firms. In this regard, FDI in R&D needs to be integrated with domestic innovation systems by putting in place suitable enabling provisions in the intellectual property laws.

IV.44 India's ongoing FTAs with advanced countries/regions may need to include special clauses relating to collaboration and investment promotion in the R&D sector. FDI in renewable energy sector, which has picked up in recent years, needs a further boost. The PLI scheme for High Efficiency Solar PV Modules to build domestic capacity could play a crucial role in bringing

in resources such as capital and advanced technology through FDI (PIB, 2021). In order to harness growth and employment benefits of FDI, therefore, India needs to offer itself as a feasible alternative to concentrated GVCs by providing a globally competitive manufacturing environment and strengthening its commitment towards free trade.

IV.45 As regards other capital flows, investment limits for FPIs' participation in the debt segment of domestic capital market have been significantly eased in recent years. FPIs have also been provided flexibility to undertake exposures in the domestic debt market through alternative

Box IV.5
Composition of Capital Inflows and Growth

Cross-country evidence suggests that FDI impacts growth positively, but the evidence is mixed on debt related flows (Aizenman *et al.,* 2011; Soto, 2000). In order to estimate the sensitivity of growth in India to various components of capital flows, data on real GDP (LGDPVOL), net foreign direct investment (LNFDI), net foreign portfolio investment (LNFPI), external commercial borrowings (LECB) and trade credit (LSTC) are used for the period 2000:Q2 to 2021:Q1. As these variables are found to be cointegrated of order one, confirming the existence of a long-run relationship among them, a vector error correction model is specified to estimate the long-term elasticity of GDP with respect to various components of capital flows. While the long-term

Table 1: Vector Error Correction Model

Cointegrating Equation		
Variables	**Coeff.**	**T-Value**
LGDPVOL	1.00	
LNFDI	-0.37	[-3.96]
LNFPI	-0.86	[-2.95]
LNECB	0.77	[6.39]
LSTC	-0.14	[-1.65]
ECT	-0.01	[-2.81]
Adj. R²	0.89	
F-Stat	20.65	

Note: In VECM, a lag of five quarters was used. Signs need to be inversed while interpreting the coefficients in the cointegrating equation.

Table 2: VEC Granger Causality/Block Exogeneity Wald Tests

Sample: 2000:Q2 - 2021:Q1
Included observations: 76
Dependent variable: DLOG(GDPVOL)

Excluded	Chi-sq	df	Prob.
DLNFDI	12.35	5	0.03
DLNFPI	19.00	5	0.00
DLNECB	10.41	5	0.06
DLSTC	2.14	5	0.83
All	132.28	20	0.0

coefficients of FDI and FPI are found to be positive and statistically significant at 1 per cent, the coefficient of STC is weakly significant at 10 per cent level (Table 1). The VEC Granger Causality (Block Exogeneity Wald Test) confirms the causal influence of FDI and FPI on GDP growth but not for trade credit (Table 2). Empirical results do not support any growth enhancing role of ECB.

References:

Aizenman, Joshua; Yothin Jinjarak; Donghyun Park (2012), "Capital Flows and Economic Growth in the Era of Financial Integration and Crisis, 1990-2010", *NBER Working Paper 17502.*

Soto, Marcelo (2000), "Capital Flows and Growth in Developing Countries: Recent Empirical Evidence", *OECD Development Centre Working Papers 160*, OECD Publishing.

routes, *viz.*, the voluntary retention route and the special access route. The policy framework for external commercial borrowings (ECBs) has been liberalised since 2015, particularly in terms of end-use restrictions with regard to working capital, general corporate purposes and repayment of Rupee loans availed domestically for capital expenditure subject to certain conditions. The liberalised policy framework allows greater access to funds for corporates and non-banking finance companies. Policies need to sustain the emphasis on composition of capital flows, while prioritising equity over debt flows (Box IV.5).

IV.46 Exchange rate is another key factor that can affect the viability of external sector by influencing not only the trade performance of firms, but also their ability to undertake investments, especially those with foreign currency liabilities on their balance sheets. A panel cointegration relationship between export volume (LEXPVOL) of 59 countries and their respective real exchange rates (LREER) and nominal exchange rate volatility (ERVOL), world demand (LWGDP) and other competitiveness variables [*viz.*, foreign direct investment (LFDI) and progress in global competitiveness index (GCI)] is estimated by using

Table IV.7: Exchange Rate, Competitiveness and Exports Volume – FMOLS Estimates

Dependent Variable: LEXPVOL
Total panel (balanced) observations: 531
Long-run covariance estimates
(Bartlett kernel, Newey-West fixed bandwidth)

Variable	Coefficient	t-Statistic	Prob.
LREER	-0.22	-2.41	0.02
LWGDP	0.59	7.03	0.00
ERVOL	-1.62	-1.82	0.07
LFDI	0.10	2.72	0.01
D(GCI)	0.14	1.64	0.10
Adjusted R-squared	0.97		

Note: A majority of panel unit tests confirmed the presence of common unit root process. Panel Cointegraton tests, *viz.,* Pedroni and Kao Cointegration Test confirmed the cointegrating relationship.

a fully modified ordinary least squares (FMOLS) approach for the period 2010-20, which suggests that sustained real appreciation of the exchange rate and increase in volatility have contractionary impact on export volumes (Table IV.7). Other control variables, *viz.*, LWGDP, LFDI and D(GCI) have export boosting effects.

IV.47 Empirical research has shifted focus to firm level analysis where endogeneity between exchange rate and export decisions of firms is less of a concern (Forbes, 2002; Fitzgerald and Haller, 2010 and Campa, 2004) (Box IV.6).

Box IV.6
Impact of Exchange Rate Movements on Exporting Firms

Using data up to March 2020, an unbalanced panel is set up consisting of 11,075 exporting firms, of which 3,187 firms exported services and the rest were exporters of goods. The sample accounts for about 44 per cent of India's total goods and services exports. The following fixed effects (FE) model is estimated :

$$y_{it} = \alpha_i + \beta x_t + \gamma z_t + \delta v_{it-1} + \theta t + \epsilon_{it} \qquad ...(1)$$

where, y_{it} is a firm level outcome such as export earnings, operating profit, interest payment on foreign currency loans, and addition to gross fixed capital; x_t is the independent variable of interest which is log of average exchange rate

or average exchange rate volatility at time t; z_t is a vector of other macro variables which may affect the outcome variables such as global GDP growth, inflation rate, *etc.;* v_{it-1} is a time varying firm level variable which may affect the outcome variables such as gross sales (it is taken at one period lag to ensure there is no reverse causality); t is time trend and are ϵ_{it} idiosyncratic errors.

Estimation results indicate that while exchange rate volatility has an adverse effect on export earnings of firms, the level of the exchange rate does not affect export earnings

(Contd...)

Table 1: Effect of Exchange Rate Volatility and Depreciation on Exporting Firms

	Earnings from Export	Earnings from Export
Average INR Volatility (In Log)	-4.2292*** (1.3562)	NA
Average INR-USD (In Log)	NA	-7.3396 (5.9854)
Average Inflation Rate	0.1937 (0.3111)	-0.3336 (0.2356)
Global GDP Growth	0.2058** (0.0984)	0.2905*** (0.1070)
Firm Size (Lag of Annual Sales)	0.4718*** (0.1344)	0.4717*** (0.1345)
N	50423	50423

Notes: The regressions are run on a nineteen-year panel of firms (unbalanced) with firm level fixed effects. Errors are clustered at the firm level. *p < 0.1, **p < 0.05, ***p < 0.01.

(Table 1). A 10 per cent increase in average exchange rate volatility decreases export earnings by 1.6 per cent. Among the other macro-economic variables, the effect of global GDP growth is positive and significant.

Analysing sectorally. the effect of volatility is found to be similar in magnitude for goods and services exporting firms.

In terms of size of firms, the effect of volatility is observed for export earnings of larger firms while no statistically significant effect is observed for small firms.

Analysis of firms' profits reveals that both the level of the exchange rate and exchange rate volatility affect profits of exporters, with the effect of volatility being smaller than the exchange rate level (a 10 per cent increase in volatility decreases profits by 3 per cent, while a 10 per cent depreciation of INR against the US dollar decreases profit by 21 per cent). This may be explained by the fact that exchange rates movements may affect the cost of borrowings for firms which have foreign debt. Estimation results indicate that depreciation of exchange rate increases the interest payments on foreign loans although volatility has no significant effect (Table 2). The impact of exchange rate volatility on investment decisions of firms is also investigated but it is not found to be statistically significant.

The estimation results, thus, indicate that export performance of firms is affected more by exchange rate volatility than by exchange rate levels. This is in line with the findings of Cheung and Sengupta (2013) which used firm level data and found that both exchange rate and its volatility have an impact on firms' output and exports.

Table 2: Effect on Firms' Profit and Cost of Debt

	Operating Profit (INR)	Operating Profit (INR)	Interest Payments on Foreign Loans	Interest Payments on Foreign Loans
Average INR Volatility (In Log)	-219.3699* (127.8230)		0.0505 (0.6233)	
Average INR-USD (In Log)		-1422.3789*** (366.8112)		-1.9530** (0.8820)
Average Inflation Rate	45.8780*** (13.7187)	1.7925 (14.0050)	0.0465 (0.0487)	0.0190 (0.0296)
India GDP Growth	9.2388 (15.4392)	15.0752 (12.7094)	-0.0866 (0.0983)	-0.1010** (0.0501)
Global GDP Growth	6.9624 (4.6268)	7.2449 (5.2356)	-0.0009 (0.0135)	-0.0041 (0.0156)
Firm Size (Lag of Annual Sales)	0.0507*** (0.0004)	0.0507*** (0.0186)	0.0021*** (0.0005)	0.0021*** (0.0000)
N	65832	65832	15274	15274

Notes: The regressions are run on a nineteen year panel of firms (unbalanced) with firm level fixed effects. Errors are clustered at the firm level. *p < 0.1, **p < 0.05, ***p < 0.01.

Reference:

Cheung, Yin-Wong and Rajeswari Sengupta (2013), "Impact of exchange rate movements on exports: An analysis of Indian non-financial sector firms", *Journal of International Money and Finance*, Vol. 39, Issue C, pp. 231-245.

5. Conclusion

IV.48   Enhancing the contribution of exports and capital flows to economic growth in the medium-term would require a strategic policy reset based on India's own experience so far as also the evolving global macro-economic conditions and changing trade policy practices. Growing incidents of geo-political conflicts can have economic repercussions by strengthening the case for a reconfiguration of global supply chains. India's foreign trade policy, therefore, needs to recognise the opportunities that may come along with the evolving world economic order.

IV.49   In order to benefit from the global recovery in demand post-pandemic, certain preconditions such as improving the quality of exports through greater emphasis on innovations and R&D, easier access to critical inputs - both domestic and imported - exchange rate stability and more effective FTAs based on trade complementarities would be essential.

IV.50   The growing focus on digitalisation offers immense opportunities. The early adopters of frontier technologies will have the first mover advantage by becoming more cost efficient. Small- and medium-sized businesses would need to gain access to global markets by using digital platforms and improving operational and supply chain efficiencies. Therefore, the foreign trade policy needs to foster the adoption of technologies that enhance the scope for complementarities between goods and services.

IV.51   India's ongoing and future FTA negotiations must focus not only on securing greater market access for domestic goods and services but also on better trade terms for high quality imports from partner countries and transfer of technology. The capital goods content in imports of major export-led economies is much higher than that of India.

India's recent focus on having bilateral FTAs with the USA, the UK, the European Union and Australia is a step in the right direction, though rebalancing in trade strategies is required keeping in view the changes taking place in the global economic environment. The focus of bilateral trade agreements with these advanced countries should be bilateral technology-sharing and forging partnership/alliance in sectors where indigenous capabilities may be weak. As the global trade environment is becoming increasingly complex and prone to more disputes, rules and provisions with regard to digitally enabled trade, data security issues and intellectual property rights should get adequate coverage in trade agreements.

IV.52   While incentivising domestic production through various initiatives under *Atmanirbhar Bharat* to enhance export potential, it is important that global quality benchmarks are put in place for new capacities to be created in identified sectors under the PLI scheme.

IV.53   Globally, it is well recognised that lower tariffs and easing of non-tariff measures can help a quicker global trade recovery. India has a strong services sector that contributes significantly to India's total exports but faces Non-tariff Barriers (NTBs) in other countries. In order to expand exports, India needs to rationalise its tariff and non-tariff rate structure on a reciprocal basis, and this should be accorded priority under the ongoing FTAs.

IV.54   Greater absorption of foreign capital in the economy for productive investment within the current sustainable level of CAD and raising the sustainable threshold for CAD in the medium-run through higher FDI flows and export conducive imports can raise the benefits of financial openness for India. When foreign exchange reserves exceed a certain precautionary level, further easing of

outward FDI norms and incentivisation of capital goods imports can contain the fiscal (sterilisation) cost and/or appreciation pressure on the INR. It can also help strengthen India's linkage in GVCs through a combination of trade and strategic partnerships abroad.

IV.55 The growth inducing impact of FDI is higher than foreign debt flows. Despite significant easing of norms (limits and routes), FDI inflows in the manufacturing sector remain modest compared with the services sector. Relative to the size of the economy, FDI inflows in India are also much lower than export-led economies. It is well recognised that FDI eases supply-side constraints in the economy and domestic recipient firms become more efficient and cost effective through scale economies and vertical linkages (*i.e.*, access to raw materials and technology). So far, only six sectors have accounted for about half of FDI equity flows and therefore, the policy focus should be to attract FDI in more sectors, particularly those with domestic technological gaps, *viz.*, defence, industrial machinery, agricultural machinery, electronics and earthmoving machinery. The FDI policy needs to incentivise the adoption and transfer of cleaner technologies for domestic companies.

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<table>
<tr><td>**V**</td><td># THE ROLE OF FINANCE IN
REVITALISING GROWTH</td></tr>
</table>

The pandemic's financial fallout was superimposed upon certain pre-existing vulnerabilities in India's financial sector, constraining the possibility of a finance-led growth. Going forward, credit revival hinges, among other factors, on how effectively and quickly the financial sector is de-stressed. To become conduits of growth, banks need to direct greater credit towards productive sectors of the economy. The established mechanisms of IBC, NARCL and NaBFID need to be harnessed more efficiently while lenders need to accept haircuts to kick-start the economic recovery process. Deeper and more vibrant corporate debt and stock markets will go a long way in channelising resources for growth. The long strides taken in the digital finance arena need to be leveraged to promote growth, bolster financial inclusion, and combat inequalities. In the cascade of policy priorities, greater focus needs to be given to green finance to achieve the goal of 'Net Zero' by 2070.

1. Introduction

V.1   The Indian financial sector came under severe stress during the pandemic. With illiquidity and risk aversion becoming pervasive and heightened uncertainty clouding the near-term outlook for income and employment, the Reserve Bank faced the twin challenge of preserving financial stability and mitigating the ravages of COVID-19. Through conventional and unconventional measures, financial conditions were quickly eased to avert liquidity concerns while supporting business continuity and recovery. Regulatory measures were carefully calibrated to shore up the health of the financial system. As the Indian economy recovered from the deep recession in H1:2020-21, an advocacy started to gain ground for pursuing a finance-led growth strategy, accompanied by necessary reforms (Panagariya, 2020; Kant, 2019).

V.2   Banking and market finance often complement each other and the positive effects of bank credit on growth, capital accumulation,

and productivity enhancement become more pronounced when stock markets are active and developed (Botev *et al.,* 2019). In the recent period, innovations in the realm of digital payments and FinTech — such as alternative lending, platform-based insurance, online trading, electronic remittances, crowd funding, robo-advisory services, *etc.* — have made banks and other financial institutions more efficient. A new breed of peer-to-peer lenders (P2P) has emerged, meeting the credit requirements of marginalised borrowers. FinTech is also becoming instrumental in providing a range of non-financial services, enabling a seamless customer experience to users *via* integration with application software (Bank of Japan, 2018).
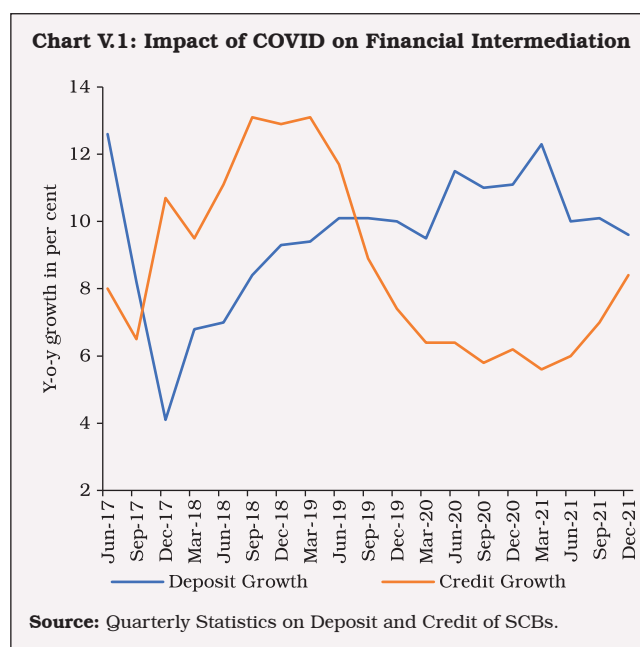
V.3   The major motivation of this Chapter is to assess the sustainability of a finance-led growth strategy and suggest reforms that could enhance the contribution of finance to growth post-COVID. The chapter begins by assessing the impact of COVID on the financial system in Section 2. India specific financial intermediation challenges faced

in the pre-COVID period, which may continue to constrain the contribution of finance to growth post-COVID, are set out in Section 3. Section 4 elaborates various policy options available at this juncture to manage challenges faced by the financial sector. Recognising that the pandemic coincided with the beginning of a new digital finance era, Section 5 evaluates its potential contribution to financial inclusion and growth. As India grapples with climate change risks and strives towards 'Net Zero' by 2070, green finance will require greater policy attention, which is addressed in Section 6. Finally, Section 7 concludes the chapter with a discussion on the way forward.

2. COVID Impact on the Indian Financial System

V.4   As a first reaction to the pandemic-related lockdowns, supply chains froze, demand declined, and precautionary/ forced savings increased due to lack of opportunities to spend, particularly on contact-intensive services. The confluence of these factors resulted in a sharp decline in credit growth even as deposits increased, affecting banks' net interest margins (Chart V.1). A fall in yields in the bond market provided a silver lining, as banks booked profits on their trading accounts. Measures such as loan moratorium, asset quality standstill and restructuring of loans provided

Chart V.1: Impact of COVID on Financial Intermediation

Source: Quarterly Statistics on Deposit and Credit of SCBs.

temporary relief to borrowers as well as lenders, although some banks faced depleted profitability. Banking stocks were affected particularly adversely as compared to other sectors, as markets priced in future asset quality deterioration, affecting shareholder wealth and confidence (RBI, 2021a).

V.5   Dispelling market concerns about potential financial stability risks, banks' gross as well as net non-performing assets (NPAs) have moderated while provision coverage ratios (PCRs), capital buffers as well as profitability indicators have improved in 2021-22, relative to pre-pandemic levels (Table V.1).

Table V.1: Impact of COVID-19 on Key Banking Indicators

(Per cent)

Indicators	Public Sector Banks			Private Sector Banks			Scheduled Commercial Banks		
	Mar-20	Mar-21	Dec-21	Mar-20	Mar-21	Dec-21	Mar-20	Mar-21	Dec-21
Capital to Risk Weighted Assets Ratio (CRAR)	12.9	14.0	14.3	16.6	18.4	18.2	14.8	16.3	16.3
GNPA Ratio	10.8	9.4	8.2	5.1	4.7	4.2	8.3	7.3	6.5
NNPA Ratio	4.0	3.2	2.7	1.4	1.4	1.2	2.9	2.4	2.0
Provision Coverage Ratio (Without write-off adjusted)	64.2	66.4	67.8	72.6	70.9	73.1	66.2	67.4	69.1
Return on Assets (RoA)	-0.29	0.29	0.54	0.51	1.22	1.32	0.11	0.70	0.86
Return on Equity (RoE)	-4.23	4.62	8.30	4.47	10.50	11.08	1.21	7.88	9.36

Source: Supervisory Returns.

Chart V.2: Stress in Large Borrowal Accounts

Note: RSA: Restructured standard advances;
SMA-1: where principal or interest payment was overdue for 31-60 days;
SMA-2: where principal or interest payment was overdue for 61-90 days.
Source: Supervisory Returns.

Chart V.3: Stock Indices-Movements

Source: Bloomberg.
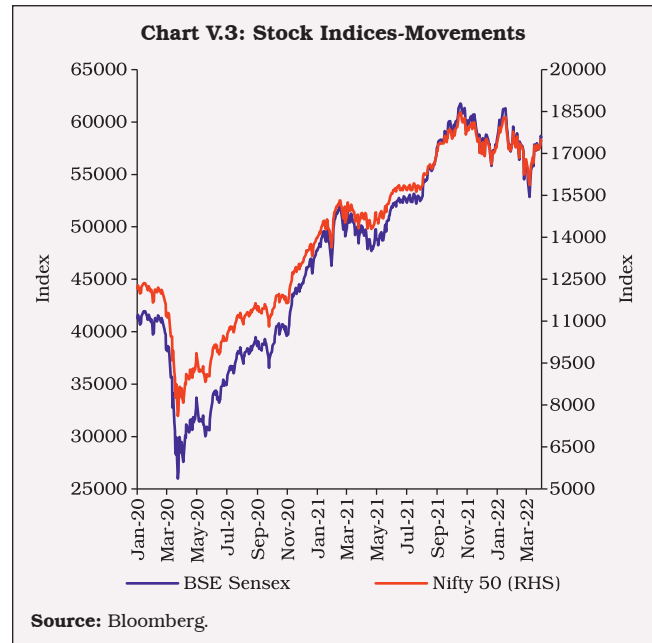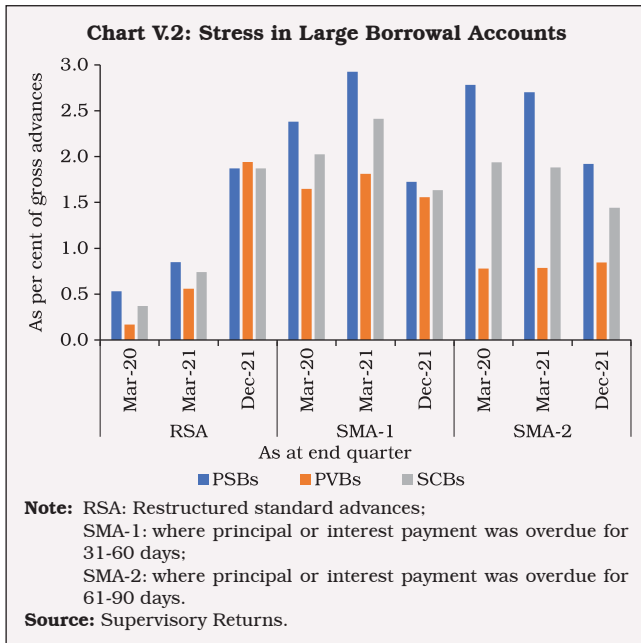
V.6   A closer look at granular data, however, reveals a more nuanced picture. Despite the recovery in economic activity since H2:2020-21, credit growth remains muted, indicative of pandemic scarring as also risk aversion of banks. Although non-banking financial companies (NBFCs) stepped up their lending operations during the pandemic period, concerns have emerged about their asset quality. Under the Reserve Bank's resolution framework 1.0 and 2.0, the restructured standard advances of large borrowal accounts have increased as compared to the pre-pandemic level (Chart V.2). As support measures start unwinding, their asset quality will become clearer and some of them may require additional provisioning.

V.7   The COVID outbreak stifled risk appetite, resulting in a hardening of money market rates, widening of risk spreads, and a drop in equity market indices. The Reserve Bank responded proactively with a flurry of policies aimed at easing financial conditions while maintaining macro-financial stability. Empirical research highlights

the healing impact of these measures on financial market conditions and borrowing costs of agents in the economy. Event study analysis around the announcement dates for Operation Twist (OT) and Long-Term Repo Operations (LTROs) indicates that these operations led to a significant reduction in G-sec yields (Das *et al.*, 2020). Moreover, the OT announcements helped reduce the term spread between 10-year and 1-Year G-secs, thereby, flattening the yield curve (Talwar *et al.*, 2021).

V.8   The Indian equity market witnessed a V-shaped recovery with the BSE Sensex and Nifty 50 doubling by February 2021 from their March 2020 lows (Chart V.3). The buoyant secondary market conditions reduced risk perceptions and enabled companies to tap resources from the primary market, particularly from June 2020. Resource mobilisation through Initial Public Offerings (IPOs), Follow-on Public Offerings (FPOs) and Rights Issues increased to record levels (Chart V.4). Stock market valuations measured by P/E ratio,

Chart V.4: Resource Mobilisation through Public and Rights Issues of Equities

Sources: SEBI, CSO and RBI Staff Calculations.
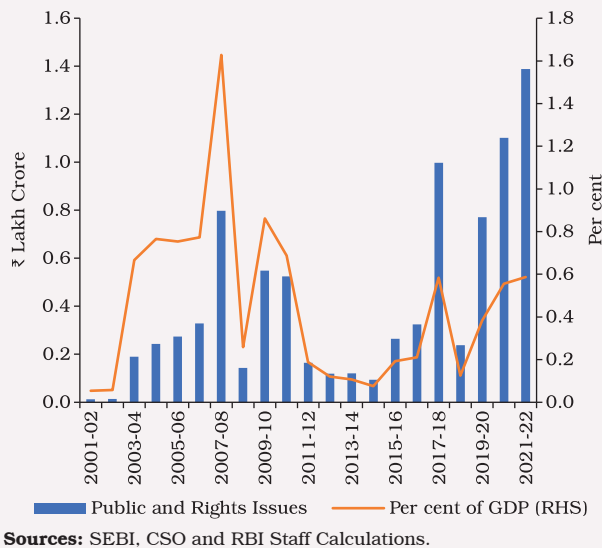
market capitalisation to GDP ratio and the cyclically adjusted 'P/E 10' (or the Shiller P/E ratio) reached above their respective long-term averages by the end of 2021 (RBI, 2021b). The recent price corrections have, however, moderated the valuations.

V.9   In the post-pandemic period, the yields on corporate bonds fell to their lowest levels since 2004. The risk premium or spread on AAA-rated 3-year bonds (over 3-year G-sec) decreased from 122 bps to 23 bps for public sector undertakings, financial institutions and banks; from 203 bps to 37 bps for NBFCs and from 169 bps to 26 bps for corporates between March 2020 and March 2022. The narrowing of spreads was also visible across the rating segments of corporate bonds. Liquidity infusion by the Reserve Bank played a key role in supporting primary corporate bond issuances which increased to a record ₹7.82 lakh crore during 2020-21 before moderating to ₹6 lakh crore during 2021-22 (Chart V.5a). Further, the number of issuances by 'A' and 'BBB' rated borrowers increased sharply during 2020-21 (Chart V.5b). Thus, Reserve Bank's measures helped in bringing normalcy to various segments of financial markets and eased financial conditions which, in turn, helped in kick-starting growth engines through the financial channel (Box V.1).

Chart V.5: Corporate Bond Market
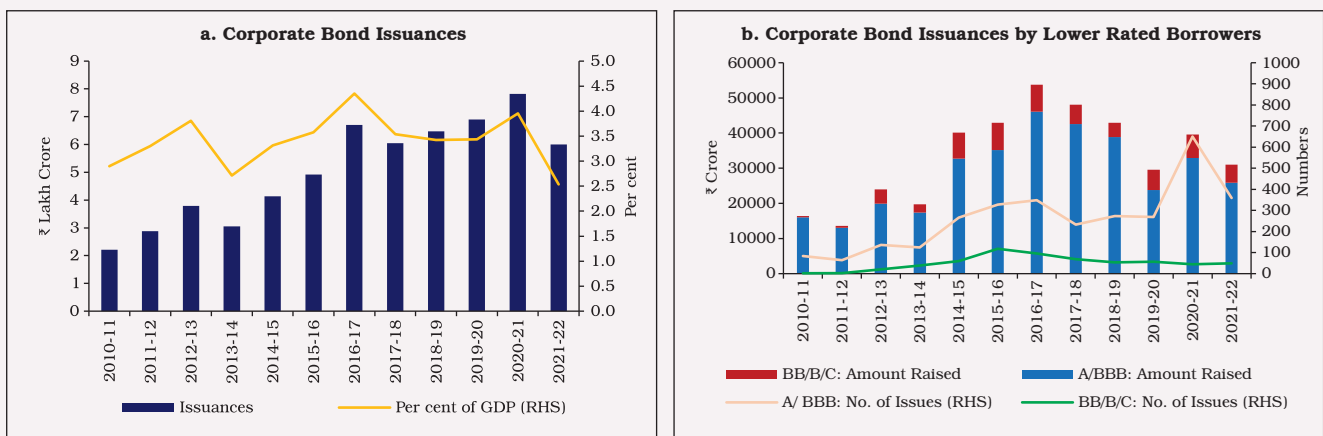
Source: SEBI, RBI, CSO, Prime Database, Crisil and RBI Staff Calculations.

Box V.1
Financial Conditions Index (FCI) and Growth

The FCI for India is constructed by applying three different aggregation techniques, *i.e.,* Principal Component Analysis (PC), Quasi Maximum Likelihood (ML) estimator, and Two-step Estimator (TS) approaches to monthly data from March 2003 to March 2022 covering a set of five different market-based indicators which are directly or indirectly affected by the Reserve Bank's monetary and liquidity measures (Table 1). Among the indicators, the market sentiment index captures forward-looking market expectations. Each indicator has been standardised and transformed to ensure comparability across market indicators. A higher FCI indicates tighter financial conditions and *vice versa*.

The outbreak of COVID-19 immediately resulted in a surge in spreads and volatility. In response to the monetary, liquidity, regulatory and fiscal stimulus measures, there was a sharp decline in the FCI, indicative of easing of financial conditions, similar to what was last witnessed in
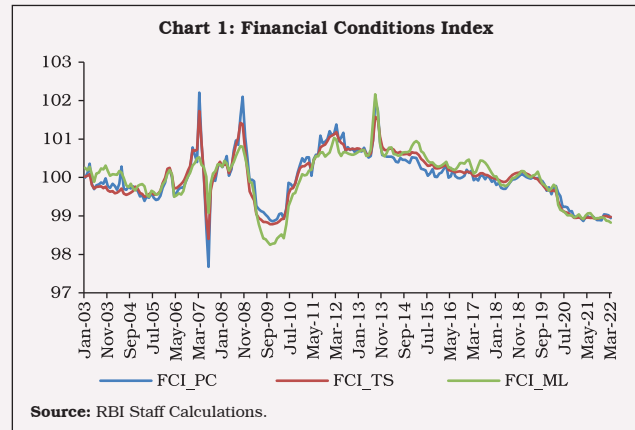

Chart 1: Financial Conditions Index

Legend: FCI_PC, FCI_TS, FCI_ML

Source: RBI Staff Calculations.

the immediate aftermath of the global financial crisis (GFC) (Chart 1).

The empirical strategy adopted for evaluating the relationship between FCI and GDP is as under:

$$y_{t+h} = c + \beta_f^h FCI_t + \beta_{y,}^h y_t + \varepsilon_{t,}^h$$

where, y_t is the (i) seasonally adjusted, year-on-year growth in GDP in quarter t, (ii) seasonally adjusted, annualised quarter-on-quarter rate of growth in quarterly GDP in quarter t; FCI_t is the value of the FCI in quarter t and h is the forecast horizon (Table 2).

The results show that for every 1 percentage point easing of financial conditions, y-o-y GDP growth is estimated to improve in the range of about 1.1 to 1.3 percentage points; thus, the GDP growth would have been lower by about 1.1 to 1.3 percentage points without the support of easy financial conditions.

Table 1: List of Variables used for FCI

Components of FCI	Measures of each component (and Source)
Term/Risk Spreads	Term spread: 10-Yr G-Sec Yields minus 91 Day T-bill rate (Bloomberg)
	Corporate Spread: 5-Yr AAA Yields minus 5-Yr G-Sec Yields (Bloomberg)
Market Volatility/ Sentiment	India's Economic Policy Uncertainty [EPU] (Baker *et al.,* 2016)
Liquidity	Weighted average call rate (WACR) minus Repo Rate (Bloomberg)
Exchange Rate	Bilateral INR/USD exchange rate (Bloomberg)
WACR	Weighted average call rate (DBIE)

Table 2: Regression Results

	(1) GDP Y-o-Y Seasonally Adjusted	(2) GDP Y-o-Y Seasonally Adjusted	(3) GDP Y-o-Y Seasonally Adjusted	(4) GDP Q-o-Q Seasonally Adjusted	(5) GDP Q-o-Q Seasonally Adjusted	(6) GDP Q-o-Q Seasonally Adjusted
Own Lag	0.64*** (0.088)	0.64*** (0.088)	0.60*** (0.089)	-0.04 (0.121)	-0.04 (0.121)	-0.05 (0.121)
FCI_ML(-1)	-1.11*** (0.385)			-2.88*** (1.302)		
FCI_TS(-1)		-1.12*** (0.383)			-2.96*** (1.292)	
FCI_PC(-1)			-1.26*** (0.386)			-3.15*** (1.288)
Constant	2.74*** (0.693)	2.75*** (0.693)	2.99*** (0.701)	7.87*** (1.17)		7.96*** (1.164)

Note: Reduction of FCI indicates easing financial conditions.

Reference:

Baker, S. R. Bloom, N., & Davis S. J. (2016), "Measuring economic policy uncertainty", *The Quarterly Journal of Economics*, 131(4), 1593 - 1636.

3. Pre-COVID Financial Intermediation Challenges

V.10 The pandemic's financial fallout was superimposed upon some pre-existing vulnerabilities in India's financial sector. Using a broader measure of flow of resources to commercial sector[1] – rather than only bank credit – as recommended by the Basel Committee on Banking Supervision (2011), it is observed that India's credit to GDP gap[2] has been negative in most of the quarters since 2014 (Chart V.6).

V.11   For more than a decade, India's saving rate, especially from the general government, has been declining, with an 18-year low in 2020-21 (Chart V.7a). Moreover, the corporate sector's demand for credit from the banking sector has decelerated partly reflecting subdued GDP growth (Chart V.7b).

Chart V.6: Flow of Resources-to-GDP Gap

Flow of Resources to GDP ratio (RHS)
HP Trend (RHS)
HP Gap

Source: RBI Staff Calculations.
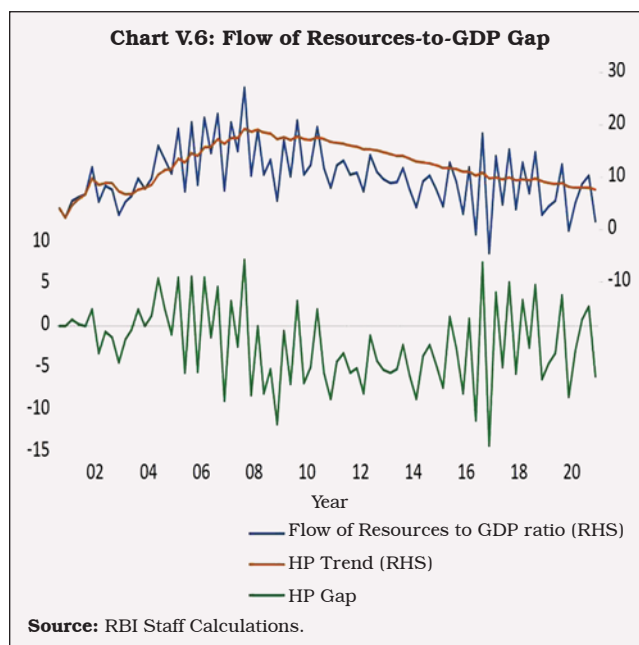
V.12   Close to 35 per cent of corporate debt liability is owed to banks (Chart V.8a). Indian corporates deleveraged during the pandemic

Chart V.7: Trends in Savings and Deposits

a. Savings to GNDI Ratio

Gross saving to Gross National Disposable Income (GNDI)

Source: National Statistics Office.

b. Deposit and Credit of Corporates

■ Deposits of Non-Financial Non-Government Corporations with SCBs
■ SCBs' Credit to Private Non-Financial Corporations

Source: RBI.

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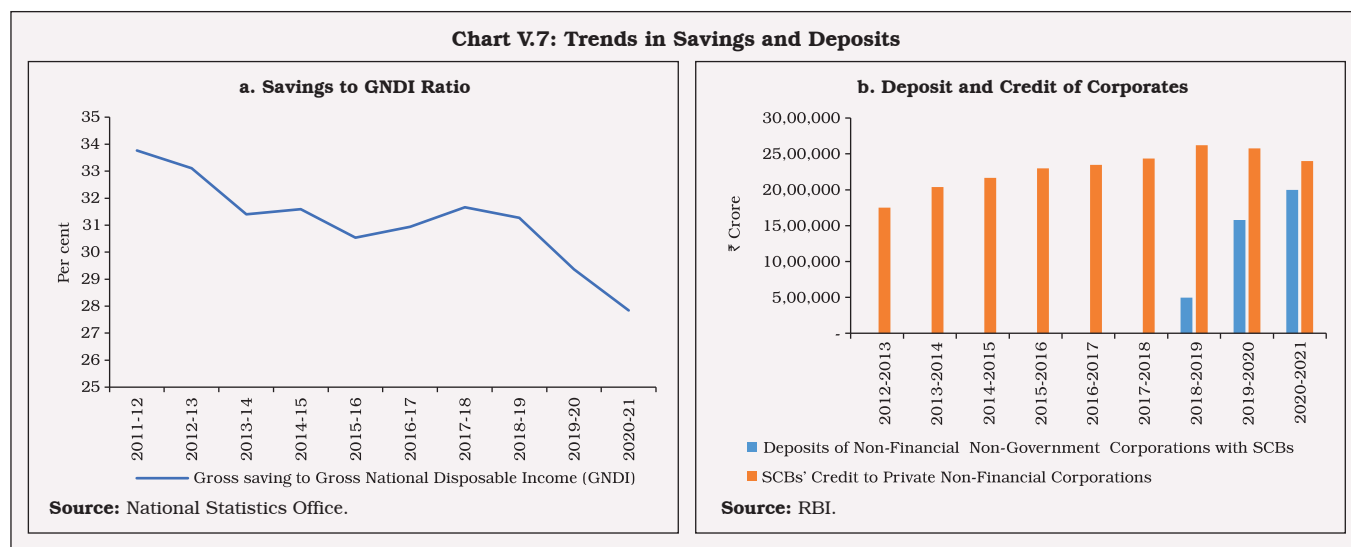
[1] Taking into account credit from banking sources alone while neglecting other sources may lead to overestimation of credit gap. In order to correct this potential bias, debt and equity issuances by non-financial entities, net commercial paper issuances, credit from NBFCs, foreign direct investment, short-term trade credit from abroad and external commercial borrowings were also incorporated to create a broader definition of finance.

[2] The credit to GDP gap is defined as the deviation of the flow of resources to GDP ratio from its long-term trend. It identifies any build-up of excess/shortfall in credit growth in the economy.

Chart V.8: Corporate Leverage in India

a. Composition of Debt of Indian's Non-Financial Firms

Legend: Banks and FIs; Debentures and Bonds; Foreign Currency Borrowings; Inter-corporate Loans; Others

b. Debt-Equity Ratio
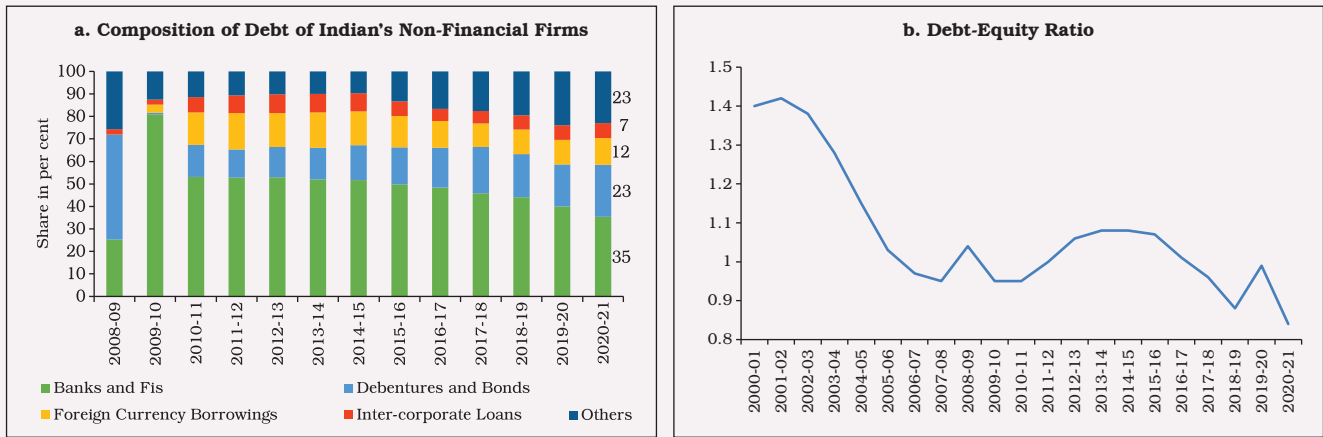
Source: CMIE.

benefitting from the low-cost ample liquidity conditions created by the Reserve Bank (Chart V.8b). In the recovery from the pandemic, larger corporates with better balance sheets will most likely move towards greater equity and low-cost debt finance. Banks' lending operations may get skewed towards smaller and more financially weaker borrowers.

V.13. The credit boom during 2003 to 2007 and the bust post-GFC suggests that beyond a threshold, the credit cycle generally turns down and amplifies build-up of stress in the banking sector (Chart V.9). Empirical evidence suggests that in the case of India these thresholds range from 16 per cent to 18 per cent credit growth, controlling for various macroeconomic factors (Box V.2).

V.14 Empirical estimates based on the average credit-to-GDP ratio (0.5), and lost growth over two years due to the pandemic led disruptions, suggest that an annualised growth of around 13 per cent in non-food bank credit will be required to achieve the target of US$ 5 trillion economy by 2026-27 – well within the estimated threshold. These estimates are, however, sensitive to

underlying assumptions about variables, sample period for estimation, and the choice of methodology.

V.15. After reaching a peak of 11.2 per cent in March 2018, the GNPA ratio declined mainly due to the resolution of stressed assets under the Insolvency and Bankruptcy Code (IBC). Write-offs of bad loans also contributed to the decline of stock of GNPAs. Although the GNPA ratio is

Chart V.9: Credit Growth and Banking Sector Stress

Legend: Restructured Standard Advances Ratio; GNPA Ratio; Growth in Credit (Y-o-Y) (RHS)
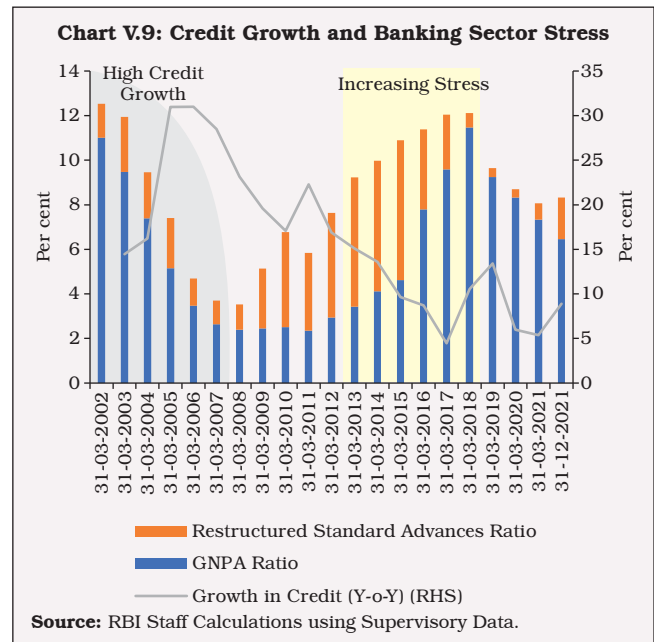
Source: RBI Staff Calculations using Supervisory Data.

Box V.2
Optimal Credit Growth in India

What is the threshold level of credit growth up to which it fuels economic growth but beyond which it results in a build-up of systemic risks? To answer this question, bank-level quarterly data from the Reserve Bank's Basic Statistical Returns (BSR) and Off-Site Surveillance and Monitoring System (OSMOS) for 29 Indian banks from 2005 to 2021 was employed. Chart 1 shows that PSBs consistently had higher NPA ratios as compared with their private sector counterparts.

A panel regression is run to empirically evaluate the relationship between gross NPAs and credit growth while controlling for various macroeconomic as well as bank-specific factors, such as capital to risk weighted assets ratio (CRAR), return on assets (RoA), operating expenses, and the asset size of banks[3]. The results confirm the existence of a non-linear relationship between GNPA and credit growth. As expected, the results also show that a higher capital adequacy ratio, higher return on assets, size (measured by total assets), and lower operating expenses are associated with lower GNPA ratio (Table 1).

Results of a threshold regression in line with Wang (2015) suggest that there is no single global minimum but an 'elbow curve' exists, with multiple turning points in the range of 16 to 18 per cent credit growth, beyond which, credit growth may lead to a rise in GNPA ratio. This is not surprising
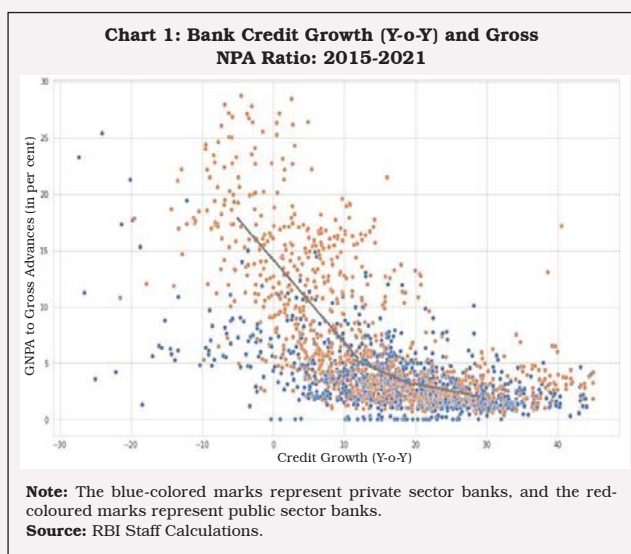
Table 1: Optimal Credit Growth

Model	1	2	3	4
Dependent variable = Gross NPA Ratio				
lag (t-i)	(t-2)	(t-3)	(t-4)	(t-5)
Bank Credit Growth$_{(t-i)}$	-0.08***	-0.06***	-0.03*	-0.03*
	(.02)	(0.02)	(0.02)	(0.02)
(Bank Credit Growth$_{(t-i)}$)^2	0.0003***	0.0003***	0.00015**	0.00012*
	(0.00)	(0.00)	(0.00)	(0.00)
Control variables				
CRAR	-0.25*	-.35**	-0.40***	-0.45***
	(0.13)	(0.14)	(0.15)	(0.16)
Return on Assets (RoA)	-3.02***	-3.00***	-2.96***	-2.81***
	(0.27)	(0.28)	(0.33)	(0.32)
Log Total Assets (Size)	-0.44*	-0.57**	-0.67**	-0.71**
	(0.27)	(0.25)	(0.27)	(0.29)
Log Operating Expenses	0.07			
	(0.16)			
GDP Growth$_{(t-i)}$	0.02	0.04	0.01	0.01
	(0.02)	(0.02)	(0.01)	(0.03)
Dummies:				
Demonetisation Dummy	1.79***	1.83***	2.06***	2.14***
	(0.41)	(0.43)	(0.45)	(0.47)
AQR Dummy	1.73***	1.99***	2.18***	2.27***
	(0.59)	(0.51)	(0.55)	(0.52)
Constant	15.34	18.10	19.5	20.4
R^2	0.69	0.65	0.61	0.60
No. of observations	1,484	1372	1260	1148
Prob>P	0.00	0.00	0.00	0.00

Note: Growth: Y-o-Y growth in per cent; Parenthesis values report standard errors.

Chart 1: Bank Credit Growth (Y-o-Y) and Gross NPA Ratio: 2015-2021

Note: The blue-coloured marks represent private sector banks, and the red-coloured marks represent public sector banks.
Source: RBI Staff Calculations.

since the period under consideration was characterised by structural regime shifts such as the Global Financial Crisis (GFC). Thresholds are lower for public sector banks (PSBs) than private sector banks. Although PSBs still claim the lion's share in outstanding credit, much of the weakening of incremental momentum in total bank credit flows has occurred against the backdrop of elevated stressed assets in their balance sheets. Private sector banks (PVBs) have used this opportunity to increase their share in lending.

Reference:

Wang, Q. (2015), "Fixed-Effect Panel Threshold Model using Stata". *The Stata Journal*, 15(1), 121-134.

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[3] To control for omitted factors that could result in biased coefficient estimates, a fixed-effects panel regression model is considered over random effect or pooled model and a 1 per cent trimmed dataset is used to rule out effects of outliers.

declining and provision coverage ratio is inching up, the stock of unresolved NPAs in banks' balance sheet remains high.

V.16   Latest stress test analysis in the Financial Stability Report, December 2021 suggests that banks' GNPA ratio may be in the range of 8.1 (baseline) - 9.5 (under severe stress) per cent by September 2022, from 6.5 per cent in December 2021, which will raise banks' provisioning and, in turn, capital requirements. While regulatory requirements like COVID-19 provisions and restrictions on distribution of dividends have helped in boosting the provision coverage ratio, further capital infusion by the Government coupled with proactive resource raising efforts by banks would be necessary for strengthening their capital buffers.

V.17   Increased provision and capital buffer requirements, which are essential for financial stability can lead to risk aversion in banks, partially dampening credit growth (Chart V.10a). In addition, banks' portfolios are getting increasingly skewed towards investment in Government securities and lending to retail sector (Chart V.10b and Chart V.11a).   While G-sec is a low risk investment, it carries the risk of transforming the system into 'G-sec investment oriented banking' if sustained for a long period. Lending to retail sector yield comparatively better returns. However, its multiplier impact to kick-start economic growth is likely to be less than credit to industries. Moreover, rising NPAs in the retail segment is another source of concern (Chart V.11b).

V.18   The corporate bond market in India has been mostly restricted to top-rated bonds. 97 per cent of the issuances and trading in corporate bond market is in just the top three rating categories of AAA, AA+ and AA. In contrast, in the US, only 5 per cent of the corporate bond market trading occurs in the top rating buckets of AAA and AA and around 75 per cent of the trading happens in the next three rating buckets of A, BBB and BB (Tyagi, 2020).

Chart V.10: SCBs' Investment and Credit

Source: RBI.

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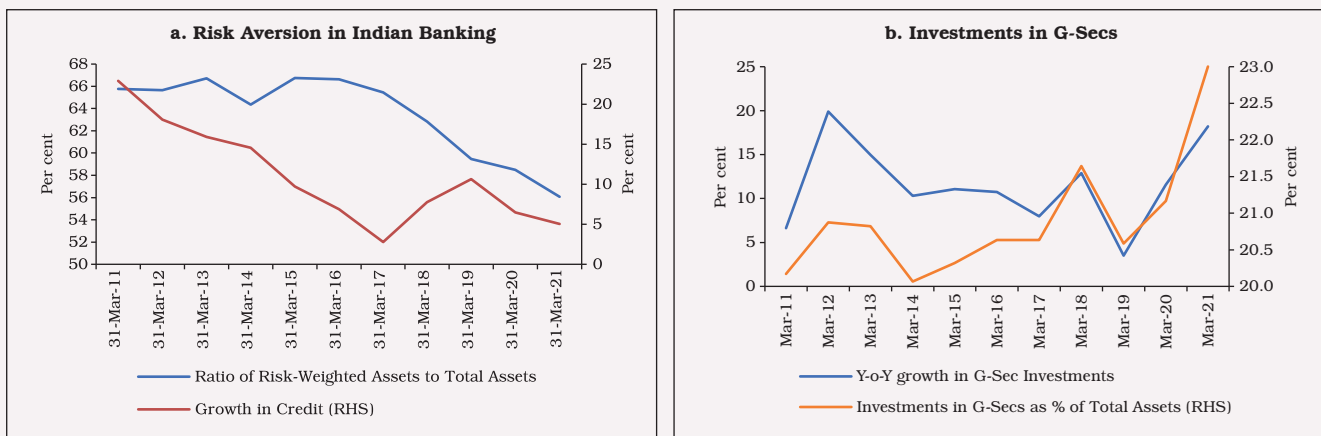
Chart V.11: Sectoral Credit and Retail NPAs

a. Credit Growth in Select Sectors

b. Asset Quality of Retail Loans
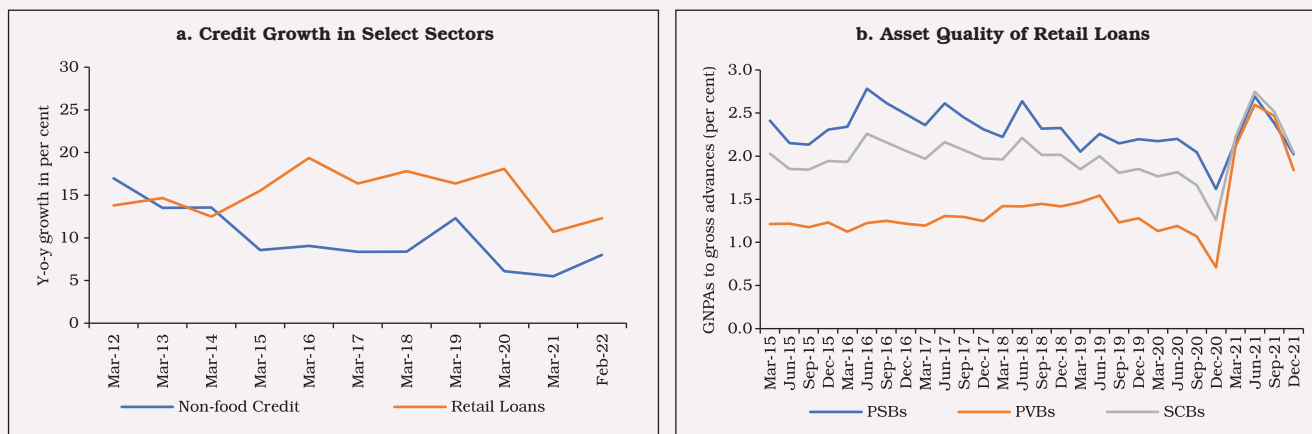
Source: RBI.

4. Reinvigorating Credit Growth – Policy Options

V.19   Empirical evidence suggests that while low-cost liquidity may be necessary, that alone is often not sufficient for ensuring a robust recovery in credit growth; rather, it also hinges on how quickly the banking sector is de-stressed (Bhadury *et al.*, 2021).

Debt Restructuring

V.20   World over, debt restructuring is used to help corporates weather financial crises. The challenges are how to facilitate and incentivise timely debt restructuring while distinguishing viable firms from the rest and how to attract new capital. In India, the overall extent of restructured accounts post-pandemic increased but still has remained low as compared to historical highs (Chart V.9).

Insolvency and Bankruptcy

V.21   The Reserve Bank's Prudential Framework coupled with the Insolvency and Bankruptcy Code (IBC), provide a framework for time-bound resolution through collective decision making by the creditors. During October-December 2021, 195 fresh cases were invoked under the IBC, marginally above the number of cases invoked in the two preceding quarters. Out of these, around 58 per cent cases were invoked by operational creditors while 35 per cent were initiated by financial creditors.

V.22   The IBC has, however, faced its share of teething troubles. Despite the central theme being speedy resolution to kick-start the economic growth cycle as opposed to 'creative destruction' through liquidation, 46.6 per cent cases resolved so far had to resort to liquidation. Also, as against the deadline of 330 days, average time taken by cases for resolution was 512 days.

V.23   In the pre-pandemic period, the recovery rate[4] under IBC was 46.0 per cent,[5] which dropped to 20.2 per cent[6] during 2020-21, partly reflecting suspension of initiation of fresh cases as

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[4]   Since inception of IBC.

[5]   Insolvency and Bankruptcy Board of India Quarterly Newsletter, January-March, 2020.
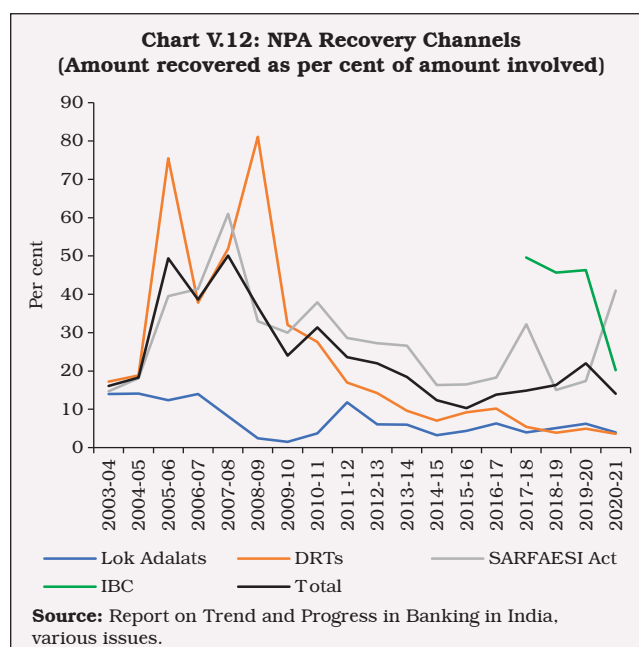
[6]   RBI (2021a).

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also the overall economic slowdown. Data for the pre-pandemic period suggests that realisation by financial creditors varies significantly across firms and sectors; typically, sectors deemed to have better economic prospects, and companies which have good organisational value received higher realisations. As the contact sensitive industries felt the brunt of the pandemic most severely, realisation from them may be much lower than the industry average, going forward.

V.24   There is a need to expand the ambit of pre-pack mechanism, presently available to MSMEs, to larger corporates. This mechanism combines the cost-effective nature of out-of-court settlements with the legal sanctity available in the IBC framework.

V.25   Another major hurdle faced by the IBC process is lack of adequate infrastructure. Although efforts have been made in recent years to increase the number of National Company Law Tribunal (NCLT) benches and to train more insolvency professionals, the capacity needs to be enhanced further.

Asset Reconstruction Companies (ARCs) and Bad Bank

V.26   Apart from recovery through various resolution mechanisms, banks also clean up balance sheets through sale of NPAs to asset reconstruction companies (ARCs) for a quick exit using provisions of the Securitisation and Reconstruction of Financial Assets and Enforcement of Securities Interest Act, 2002 (SARFAESI). While the amount recovered through ARCs as per cent of amount involved

Chart V.12: NPA Recovery Channels
(Amount recovered as per cent of amount involved)

Source: Report on Trend and Progress in Banking in India, various issues.

was significantly higher in the initial years of their inception, in the recent years it dipped before getting revived to 41 per cent in 2020-21 (Chart V.12).

V.27   Banks' reluctance to assume haircuts, especially when the counterparty is a private ARC is one of the major hurdles behind subdued appetite for this route. As such, the ARC model for debt resolution has had limited success in the Indian context. The recently established National Asset Reconstruction Company Ltd. (NARCL) has the potential to serve as an efficient mechanism to revive investor interest in primary as well as secondary markets for stressed assets and security receipts (SRs), respectively. Going forward, however, continued policy support, professional staff and transparency in operations will be essential in making the exercise cost and time effective (Herwadkar *et al.*, 2022).

Capital Infusion in Banks

V.28   The Government has infused ₹2.9 lakh crore in the last five years in PSBs, including the recapitalisation of ₹ 4,600 crores[7] in 2021-22 (Chart V.13). This helped PSBs to improve their CRAR to 14.3 per cent by December 2021 from 11.8 per cent in March 2016. Capital infusion has also helped many weak PSBs to come out of the prompt corrective action framework.

V.29   Absence of market discipline, implicit government guarantees, and repeated unconditional recapitalisation of PSBs could pose a moral hazard problem. To deal with it, an incentive mechanism should be established and banks with better performance in terms of loan recovery and asset quality improvement should be given priority in terms of access to fresh capital. However, capital infusion should not become a substitute for better governance and risk controls.

Chart V.13: Capital Infusion by the Government in PSBs

Source: data.gov.in, Press Information Bureau and various Gazette notifications of Government of India.
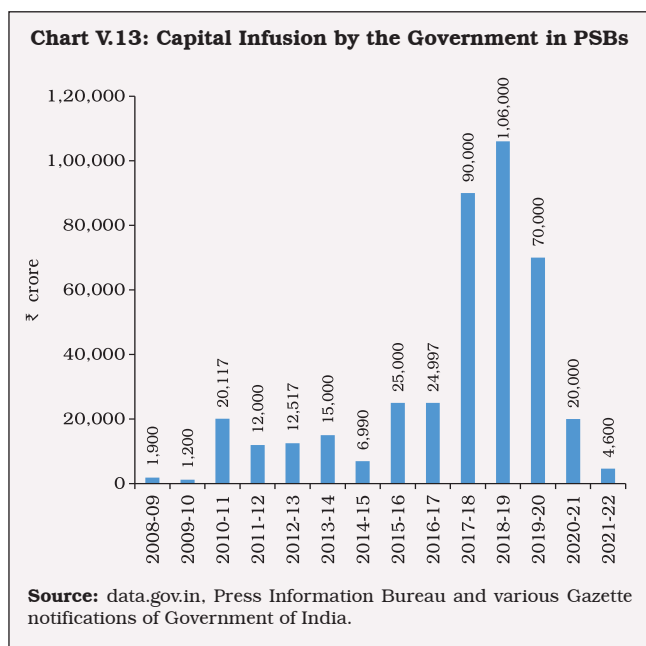
Bank Consolidation

V.30   Notwithstanding some initial hiccups, factors like government ownership, similar pay structure and career progression avenues for staff, and common core banking solutions helped smoothen the operationalisation of bank mergers in India in recent years. Mergers helped strengthen the capital buffers of banks. Although it is difficult to isolate the impact of mergers from other forces acting concomitantly, the improvement in provisions helped in containing the net NPA ratios (RBI, 2020c).

V.31   In the Indian context, there are concerns that such consolidation measures may increase the market power of merged institutions and could result in neglect of local needs leading to reduction in credit supply to some categories of borrowers, particularly small firms, thereby, adversely affecting financial inclusion[8]. Consolidation could also result in less competition by giving fewer choices to the customer and may also result in non-competitive pricing of products. Going forward, to increase competition in the area and foster innovation, the Reserve Bank's 'on tap' licensing policy for universal and small finance banks may be used effectively. The too-big-to-fail concerns will be addressed through additional Common Equity Tier-I (CET-I) capital requirements for domestic systemically important banks (D-SIBs).

Development Financial Institutions

V.32   While the existing financing models for infrastructure seem to be faltering, the credit needs of the sector remain strong. Against this

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[7]   The government had budgeted ₹20,000 crore for capital infusion in PSBs for 2021-22 which was revised to ₹15,000 crore in the revised estimates for 2021-22. The Government has infused ₹4,600 crore in Punjab & Sind Bank in February 2022 through non-interest bearing (non-transferable) special Government of India security.

[8]   RBI (2013), 'Discussion Paper on Banking Structure in India - The Way Forward', August.

backdrop, the setting up of the National Bank for Financing Infrastructure and Development (NaBFID) as a Development Financial Institution (DFI) in India is expected to shift the burden of long-term financing away from commercial banks. Moreover, apart from extending long term credit, NaBFID is expected to play an active role in the development of bonds and derivatives market necessary for infrastructure financing.

V.33   International experience suggests that going forward, NaBFID will have to tread a fine line between two contradictory goals: being profitable as well as pursuing developmental goals of the economy. To meet the first goal, it will have to invest prudently and generate returns; on the other hand, balancing social and financial returns can be a complex, time-consuming, and sometimes contradictory affair, especially in light of difficulties in measuring the social impact of a project (Dickinson, 2019).

Development of Corporate Debt Market

V.34   Development of a vibrant corporate bond market in India remains crucial for meeting the financing requirement of corporates and the infrastructure sector and thereby achieving India's growth aspirations. In recent years, a slew of reform measures have been undertaken in this area[9]. Despite these, the corporate bond market remains shallow and skewed in favor of larger sized firms, high-rated and financial sector issuers (Ganguly, 2019). In the secondary bond market, mutual funds are the only major active players, contributing around 40 per cent of the trading

volumes (Tyagi, 2020). There is a need to further reduce the large number of International Securities Identification Number (ISIN), facilitate more active repo market and draw more players, particularly institutional investors to improve liquidity in the market. While institutional investors like insurance companies, pension funds and provident funds are typically allowed to invest in high-rated papers only, retail participation in the bond market is also limited in India, which needs to be enhanced. The recent Credit Default Swaps (CDS) directions issued by the Reserve Bank are expected to go a long way in developing the corporate bond market, especially the lower rated one, and pave the way for more and better resource allocation in long-term loan markets.

V.35   Since inflows into debt markets help in improving depth and liquidity, Foreign Portfolio Investment (FPI) limit in government debt has been progressively expanded. Investment in State Development Loans (SDLs) has also been gradually liberalised to strengthen domestic markets. FPI investment limits are under-utilised due to liquidity considerations. The proposed institutional framework to provide liquidity to mutual funds and other participating institutional investors in the corporate bond market, particularly during times of stress, may instill confidence amongst the market participants. A credit enhancement mechanism offering partial or full guarantee on corporate bonds can also help in moderating the risk perception of infrastructure projects to levels compatible with risk appetite of investors and attract greater fund flows.

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[9]   These include, *inter alia*, introducing electronic book building mechanism for increasing transparency in the private placement market, tri-party repo trading on exchanges for encouraging trading interest, improving liquidity in secondary market trading through consolidation and re-issuances by the same borrower under the minimum number of International Securities Identification Numbers (ISINs) and mandating large corporates to raise one-fourth of their borrowings through the corporate bond market.

Development of Stock Market

V.36   Although India's stock market capitalisation to GDP has witnessed a phenomenal rise, it is still lower than several other major economies, suggesting an untapped potential of equity markets in unlocking growth. Traditionally, Small and Medium Enterprises (SMEs) have relied on bank finance to meet their requirements, as they face several impediments in accessing the equity market, such as admission cost and listing requirements, lack of liquidity, educational gaps, limited ecosystems, and tax treatment, all of which require attention by regulators and policy makers alike (Nassr and Wehinger, 2016). The establishment of the BSE SME platform in March 2012 and the NSE SME platform (also known as Emerge) in September 2012 attempts to address these issues. Since the inception of these platforms, 633 small and medium companies have mobilised ₹ 7,777 crore of equity capital till 2021-22. These developments could promote investment in SMEs and, together with securitisation and other non-bank debt financing instruments, encourage an enhanced allocation of risk and risk taking, thereby supporting growth. Going forward, with the proliferation of new age FinTech solutions resulting in ease of access, participation of individuals in stock market may rise further, with greater allocation of their savings being channelised into equity markets through direct participation as well as indirect participation through mutual funds. There has been a flurry of IPO listings of new-age technology companies on domestic stock exchanges in 2021-22. As India is estimated to be the third largest start-up ecosystem in the world (PIB, 2022), traction in their listings could be pivotal in India's start-up growth story.

5. Leveraging Digital Finance and Start-ups for Reinvigorating Growth

V.37   Digital finance encompasses a host of new financial products, financial businesses, finance-related software, novel forms of customer communication and interaction delivered by FinTech companies and innovative financial service providers, which has been instrumental in promoting growth, bolstering financial inclusion, and combating inequalities (Gomber *et al.*, 2017). Cross-country analysis indicates that increase in digital financial inclusion is expected to boost real GDP growth (Khera *et al.*, 2021).

V.38   Digital lending allows lenders to grant collateral free loans while ensuring repayment by relying on actual transaction data, individual characteristics, and repayment behaviour to decide the borrower's eligibility for loans. This may enable consumption smoothing of marginalised borrowers. In the US, FinTech lenders reduced processing time by about 10 days, or 20 per cent of the average processing time (Fuster *et al.*, 2019). In China, digital finance is found to be positively correlated with food, clothing, house maintenance, medical care, education, and entertainment expenditures (Li *et al.*, 2020). Digital finance can also help boost output by making resource allocations easier. Many FinTech companies provide working capital, relying on the borrowers' revenue or sales data to make their lending decisions. Digital lending can serve as an alternate source of financing for capital strapped Micro, Small and Medium Enterprises (MSMEs) that lack traditional collateral. Easing of MSME credit limits may have a positive influence on general employment and equity. Governments

may use FinTech to transfer salaries, conduct procurement, taxation, and payment for public services through electronic modes. Adoption of digital payment systems can induce increased formalisation of enterprises (Klapper, 2019) and aid in combatting tax evasion.

FinTech in India

V.39   Over the past few decades, India has witnessed a remarkable growth in its digital ecosystem, supported by a robust policy foundation, expansion of smartphones, internet coverage, digital literacy, as well as pro-active participation by the private sector (Saroy *et al*., 2020; Gandhi, 2016). Banks and FinTech firms could be viewed as strategic complements, as they have different comparative advantages, and hence a collaborative partnership between the two would permit them to focus on their respective core competencies (Mundra, 2017). The Reserve Bank, as the regulator and supervisor of the country's payment and settlement systems, has been playing an active role in the digital transformation of the country through timely and calibrated impetus to payments infrastructure and regulatory framework.

V.40   The Government of India played an active role in the digital revolution, creating a robust and highly scalable public infrastructure, popularly known as *India Stack,* and incorporating data privacy and security in the design of these digital public goods (D'Silva *et al*., 2019).

V.41   The Pradhan Mantri Jan-Dhan Yojana (PMJDY), launched in 2014, combined with a rapid reduction in mobile internet tariffs, and rising interest of investors in Indian digital business, helped in expansion of access to financial services (Chart V.14). The integration of Digital India with real economic activity is expected to foster technology-led economic growth.

Constraints to FinTech and Digital Payments

V.42   While digital finance can provide the much needed growth impetus, if unchecked, it could result in certain concerns that need to be appropriately addressed. Since digital lending mainly originates from debt and equity rather than from deposits, digital lenders' supply of funds could be more procyclical and volatile due to lack of standard credit guidelines. Further, credit activity outside the prudential regulation space

Chart V.14: Moving towards Digital India

a. Wireless Data Use and Tariff

b. FinTech Funding in India
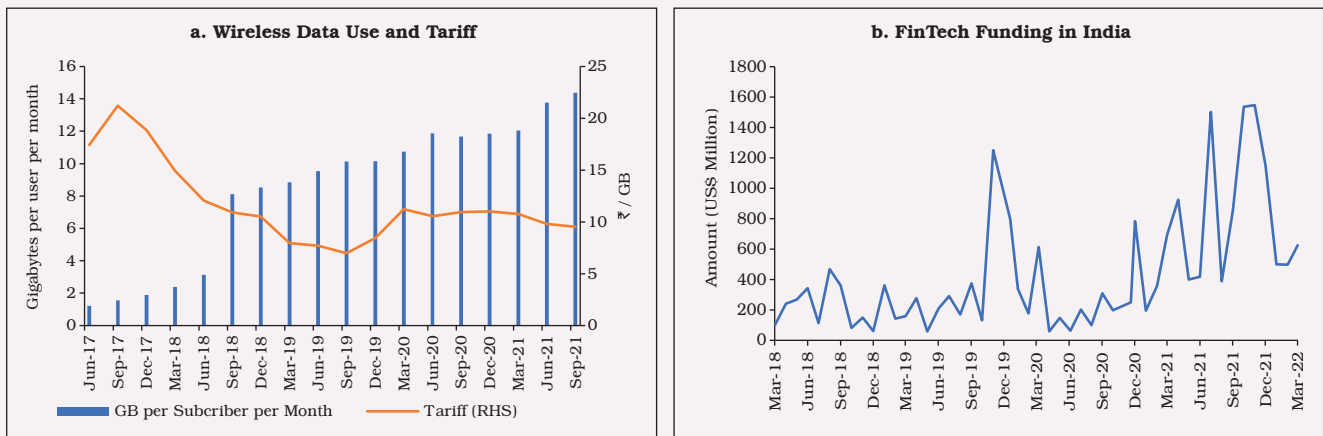
Source: Department of Telecommunications, GoI and Tracxn (accessed on April 5, 2022).

could render credit-related countercyclical policies less effective.

V.43   Data privacy poses concerns in the absence of adequate legislation and demarcation of statutory rights and obligations of service providers and other stakeholders. Data mining driven by sheer profit maximization objective could reproduce and perpetuate existing patterns of discrimination and exclude vulnerable sections (Barocas and Selbst, 2016). As the Indian population becomes data-rich with increasing internet and mobile coverage, the next challenge might be empowering consumers through adequate legal and regulatory support.

V.44   With increasing dominance of BigTechs in digital payments, there could be an acceptance of data-fueled oligopoly for cheap services. Digital literacy and healthy competition could alleviate some of these concerns, and therefore, there is a need for re-aligning incentives to foster smaller, more innovative firms (Saroy *et al.*, 2020). Since FinTech unbundles services across a wide number of domains, it is necessary to clearly demarcate responsibilities of various regulators over relevant aspects of the business entity and to ensure the existence of adequate avenues for regulatory collaboration. This may be done with the overarching goal of facilitating innovation through competitiveness, while ensuring a level playing field.

6. Green Finance for Sustainable growth

V.45   For a smooth transition to 'Net Zero', green finance has become a public policy priority world over as climate risks are believed to be far reaching, non-linear, and mostly irreversible in nature. Appropriately adapted macro-financial models may help to generate and analyse various scenarios involving transition risks of climate-

related disasters on the economy. Such risk evaluations, however, are complex as they must incorporate interactions among all the stakeholders having portfolio and balance sheet exposures to natural calamities and carbon pricing.
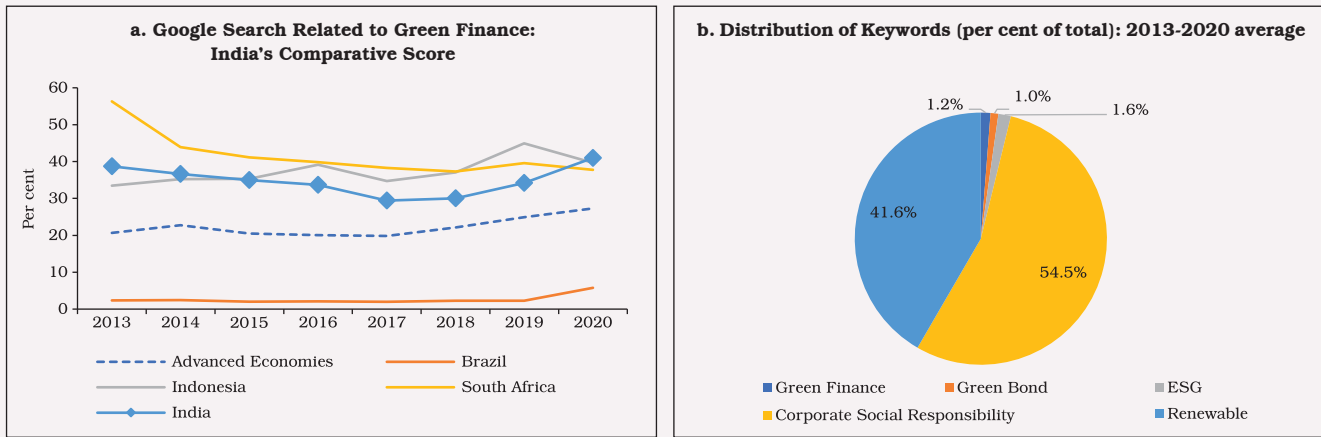
V.46   The Reserve Bank has taken proactive policy measures to promote green finance. It has joined the Central Banks and Supervisors Network for Greening the Financial System (NGFS) in April 2021. The Indian government has committed to reduce the total projected carbon emissions from now till 2030 by one billion tonnes, reduce carbon intensity of the economy by more than 45 per cent by 2030, and achieve 'Net Zero' emissions by the year 2070. The Reserve Bank is actively sensitising the public, investors and banks regarding the need, opportunities, and challenges of green finance through its regular reports and other communications. The Google Trends Data, that analyses the popularity of top search queries in Google Search, indicate that awareness about green finance and climate risks has been gradually improving in India (Chart V.15).

V.47   The Reserve Bank has included small renewable energy projects under its Priority Sector Lending (PSL) scheme in 2015, and its guidelines were further revised in 2020 to suit market conditions. SEBI recently revised its sustainability and social responsibility reporting requirements for top-listed companies, starting in 2022-23. Future Environmental, Social and Governance (ESG) research will require authentic data, as well as benchmarks and alerts (Ghosh *et al*, 2021).

V.48   Once the current health crisis ends, the focus could shift to climate change and carbon pricing (RBI, 2021d). The Union Budget for 2022-23 announced the issuance of sovereign green bonds as part of its overall market borrowing programme, with revenues going to public sector projects that help reduce the economy's carbon intensity. Given

Chart V.15: Google Searches on Green Finance

a. Google Search Related to Green Finance: India's Comparative Score

b. Distribution of Keywords (per cent of total): 2013-2020 average

Source: RBI Staff Calculations using google search data.

the large size of the domestic market and low penetration of green instruments, the potential for green finance is vast. Considering that a climate-related mitigation plan may result in a change in financial valuation or credit rating for certain business entities or sectors, a well calibrated policy framework is required to pursue the target.

V.49 From a regulatory perspective, banks have a sizable portion of their portfolios invested in industries that are indirectly but heavily reliant on fossil fuels. Several of these, including basic metals, electricity, and textiles have a low interest coverage ratio and high outstanding NPAs. This underlines the vulnerability of the banking sector to climate risks, that may require constant monitoring (Ghosh *et al.,* 2022).

V.50. Effective co-ordination among policy stakeholders is essential to reduce information asymmetries. This can be accomplished through dissemination of high-quality data by policymakers, stakeholders, and market participants. It would significantly contribute to greater public awareness, reducing maturity mismatches, borrowing costs and re-establishing efficient resource allocation (Ghosh *et al.,* 2021).

V.51 The Reserve Bank has already taken several regulatory initiatives aimed at promoting sustainable finance, mitigating climate risk, and establishing the necessary foundations for conducting climate scenario analysis and stress testing. The stress tests could be designed by using a Dynamic Stochastic General Equilibrium (DSGE) model capable of assessing the differential impact of climate risks on brown *versus* green industries and banks. The other possibility is to harness machine learning algorithms for generating alternate stress scenarios. These exercises will provide an insight into possible policy designs and implementation, paving the way for a sustainable and enduring recovery.

7. Conclusion and Way Forward

V.52 The pandemic's financial fallout was superimposed upon pre-existing vulnerabilities in India's financial sector, constraining the possibility of a finance-led growth. The underlying conditions are favourable and finance led growth is a viable option, but it must be driven forward by strategic initiatives that rejig and convert pre-existing weaknesses as well as architecture into opportunities.

V.53   Banks need to be de-stressed from legacy burden and nudged to direct greater credit towards productive sectors of the economy. Priority sector norms and Statutory Liquidity Ratio (SLR) have been viewed by some analysts as preemptive, distorting efficient resource allocation. While the SLR requirements are being gradually reduced to align them with the Liquidity Coverage Ratio (LCR), reforms in the PSL space have been also undertaken. Of late, the PSL norms are used to channel resources for a greener and more sustainable finance.

V.54   To avoid the moral hazard problem of government recapitalisation of PSBs, an incentive mechanism should be established and banks with better performance in terms of loan recovery and asset quality improvement should be given priority in terms of access to fresh capital. However, capital infusion should not become a substitute for better governance and risk controls. In the medium term, it is necessary to wean away PSBs from their dependence on government recapitalisation; this will be an important pre-condition to achieve greater privatisation of the sector. To increase the competition in the banking sector and to introduce innovation, the Reserve Bank's 'on tap' licensing policy for universal and small finance banks may be used effectively.

V.55   For quicker and more effective resolution, the IBC infrastructure needs to be strengthened by increasing the number of NCLT benches and by training more insolvency professionals. Lenders need to accept haircuts to kick-start the economic recovery process. The pre-pack mechanism—which combines the cost-effective nature of out-of-court settlements with the legal sanctity available in the IBC framework—is presently available to MSMEs. It needs to be extended to larger corporates as well.

V.56   For the NARCL exercise to be cost and time effective, continued policy support, professional staff and transparency in operations will be essential. NaBFID will have to tread a fine line between two contradictory goals: being profitable as well as pursuing developmental goals of the economy. It may avoid past mistakes of erstwhile development finance institutions to rely on subsidised finance and instead focus on developing the corporate debt market and attracting resources from insurance, pension, and provident funds.

V.57   Reforms in the corporate bond market could aim at broadening the domestic and foreign investors' base, providing greater choices for investment suitable for varying risk appetites and developing a liquid secondary market.

V.58   New-age companies, which often have riskier business models, are increasingly resorting to IPOs. It is important to ensure adequate disclosures about risk factors affecting their business to maintain investors' confidence in the primary market. It is imperative for the regulator to ensure transparency and good corporate governance practices so that the secondary market functions smoothly, and the process of IPO is not used only as an exit mechanism.

V.59   Going forward, the economy's growing reliance on the digital ecosystem will be helpful in harnessing the benefits of low-cost resource allocation and distributive efficiency. Care however needs to be taken to protect the stakeholders from digital frauds, data breaches and digital oligopolies. Recognizing the vastly altered financing requirements of start-ups and unicorns, a policy framework for attracting risk capital needs to be put in place. While the financial sector withstood the pandemic shock well, climate change risks and frequent natural

calamities call for inclusion of green finance and other sustainable growth objectives in financial sector policies. These measures are expected to pave the way for a more developed and efficient financial system, which in turn should help in greater financial inclusion, reduce vulnerabilities to shocks and promote investment and growth.

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A POLICY AGENDA FOR POST-COVID-19 INDIA

VI.1 History is dotted with pandemics that mankind has suffered but endured: "The oak fought the wind and was broken, the willow bent when it must and survived."[1] This pandemic too shall pass. In its wake will arise both challenges and opportunities. The post-pandemic strategy of revival and reconstruction will shape India's renewed tryst with its developmental aspirations. Three lessons are stark. First, never again should we be taken unprepared. Pandemics will recur and remain hard to predict. Hence, we must build policy space in good times and public health must be its centre-piece. Second, structural transformation is a process not an event; so structural reforms must be continuous, aimed at building resilience against shocks. Third, crises like pandemics leave scars, including on the psyche, such as deprivation and poverty. Healing them must be a policy priority. The post-pandemic recovery must embrace all. It calls for designing a new growth frontier, which could be strong, inclusive, resilient, durable, and sustainable over the medium-longer horizon in line with overall development goals of a country (Das, 2021).

VI.2 Economic progress rides on seven wheels - aggregate demand; aggregate supply; institutions, intermediaries, and markets; macroeconomic stability and policy coordination; productivity and technological progress; structural conditions; and sustainability. The blueprint of reforms proposed in this chapter broadly covers these seven areas as the future gets reshaped by new forces such as adaptation to digitalisation, biomedical, pharmaceutical and healthcare innovation and initiatives underway for a cleaner and greener world.

VI.3 Some useful insights about alternative medium-term growth trajectories can drive this agenda. Drawing on two alternative growth models, *i.e.,* (i) a standard growth model in the neo-classical tradition (Sinha, 2017; Hevia and Loayza, 2012), which involves decomposing different components of growth into total factor productivity (TFP), human capital growth and growth in capital, and (ii) an endogenous economic growth model (Barro and Sala-i-Martin, 1992; Alogoskoufis and Kalyvitis,1996) [Annex 1], the steady-state growth works out to 6.5 per cent (Chart VI.1). Scenario analysis suggests a feasible range for the medium-term steady state growth of 8.5 per cent to 6.5 per cent for GDP under the first approach and 8.6 per cent to 6.5 per cent under the second approach. The upper estimate of the growth trajectory is consistent with reform measures outlined in this chapter*.

VI.4 Timely rebalancing of monetary and fiscal policies will likely be the first step in this journey. First, the large surplus liquidity overhang has to be withdrawn - every percentage point increase in surplus liquidity above 1.5 per cent of NDTL causes average inflation to rise by 60 basis points in a year. Monetary policy has to assign priority to price stability as the nominal anchor for the future growth trajectory. Second, growth is at

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*A team comprising Sarat Chandra Dhal, Debojyoti Mazumder and Saurabh Sharma worked on growth models for this chapter.

[1] Jordan, R. (1993), "*The Fires of Heaven: Book Five of 'The Wheel of Time'.*" Macmillan.

Chart VI.1: Medium-term Growth Scenarios

GDP Growth Scenario (Approach 1)

Better Case   Worse Case   Baseline Case

GDP Growth Scenario (Approach 2)

Worse case   Baseline Case   Better case

Note: Dotted and dashed lines indicate intermediate scenarios.
Source: RBI staff estimates.

risk once general government debt exceeds a threshold of 66 per cent of GDP. Reducing debt to more sustainable levels that are compatible with the growth trajectory being envisaged for a post-pandemic Indian economy will be daunting. Even under best possible macroeconomic outcomes, general government debt may not decline below 75 per cent of GDP over the next five years. If adverse scenarios materialise, debt may, in fact, rise to 90 per cent of GDP in 2026-27. A medium-term strategy of debt consolidation aimed at reducing debt to below 66 per cent of GDP over the next five years is, therefore, important to secure India's medium-term growth prospects. With monetary policy prioritising price stability and pursuing output stabilisation in an environment in which debt sustainability is sought to be achieved

by fiscal prudence, the assignment rule is satisfied, bringing in its train macroeconomic stability to support sustainable growth.

VI.5   Addressing structural constraints is central to reviving and reconstructing the Indian economy from the ravages of the pandemic. The Government has announced privatisation and asset monetisation; tax reforms (GST and corporate tax rationalisation); targeted sector-specific incentives to raise production and exports under the production-linked incentive (PLI) scheme; insolvency and bankruptcy code (IBC) to improve the credit culture and resource allocation mechanism; labour reforms (four codes); and a fiscal policy focus on capex and infrastructure. These reforms need to be

augmented with other measures to reverse the sustained decline in private investment and low productivity in the economy. What is needed includes access to litigation free low-cost land; raising the quality of labour through large scale expansion of public expenditure on education, health and the Skill India Mission; reducing the cost of capital for industry and improving resource allocation in the economy by promoting competition; encouraging industries and corporates to scale up R&D activities with an emphasis on innovation and technology; creating an enabling environment for start-ups and unicorns; encouraging corporate investment in agriculture; addressing the challenges faced by the debt-ridden telecom industry and DISCOMs; rationalisation of subsidies that promote inefficiencies; encouraging urban agglomerations by improving the housing and physical infrastructure.

VI.6 Recent labour reforms could enhance flexibility for firms to adjust their workforce according to economic cycles, thereby enabling them to use their resources more efficiently. This, however, could come only at the cost of lower welfare/social security of the workers. One option could be to build an unemployment insurance fund during periods of economic boom at the firm level, which can be utilised to financially support workers up to a limited period after retrenchment. Further, many of the social security measures apply to firms having a certain minimum number of workers, which creates incentives for firms not to scale up. To address this issue, a policy option could be universal access to social security irrespective of firm size, with each firm required to earmark a certain percentage of their profits for the social security schemes for the workers.

VI.7 Boosting India's participation in global value chains (GVCs) and raising export competitiveness hinges on greater adoption of technology. Policy support for this drive must emphasise (i) an ecosystem that increases the adaptability of domestic firms to state-of-the-art technology; (ii) ensuring policy certainty on royalty payments for technology transfer by foreign companies; and (iii) improving domestic R&D infrastructure for innovations. The industrial revolution 4.0 and committed transition to a net-zero emission target will create new investment opportunities powered by technology and environmentally sustainable production processes. Building on "Start-up India, Stand-up India", the policy ecosystem for the start-ups needs a dynamic framework with provision for adequate access to risk capital and globally competitive environment for doing business. The PLI scheme recognises growth opportunities in 14 key manufacturing sectors of the economy. It is important that global quality benchmarks are put in place for new capacities to be created in identified sectors under the PLI scheme.

VI.8 A comprehensive plan is necessary to revive the rural economy. Organising farmers' clubs or agricultural cooperatives is a possible solution to correct the pricing imbalances by reducing gaps between farm gate prices and retail prices. In this regard, the development of a modern supply chain infrastructure needs priority attention. There is a need to adopt a viable 'whole of business' approach covering all aspects of farming to break farmers' dependence on money lenders.

VI.9 In order to benefit from the post-pandemic global recovery in demand, certain preconditions such as improving the quality of exports through greater emphasis on innovations

and R&D, easier access to critical inputs - both domestic and imported - and more effective FTAs based on trade complementarities would be essential. The growing focus on digitalisation offers immense opportunities. The early adopters of frontier technologies will have the first-mover advantage by becoming more cost efficient. Small and medium-sized businesses would need to gain access to global markets by using digital platforms. IT companies can gain in the world market by undertaking investments in next-generation technologies. The use of frontier technologies in delivery of services would also increase the domestic value-added content in manufacturing and improve the competitiveness and exportability of domestic goods. In particular, the MSME sector can benefit from business-to-consumer e-commerce export opportunities by improving operational and supply chain efficiencies.

VI.10 India's ongoing and future free trade agreement (FTA) negotiations may focus not only on securing greater market access for domestic goods and services but also on better trade terms for high quality imports from partner countries and transfer of technology. The focus of bilateral trade agreements should be bilateral technology-sharing and forging partnership/ alliance in sectors where indigenous capabilities may be weak. As the global trade environment is becoming increasingly complex and prone to more disputes, rules and provisions with regard to digitally enabled trade, data security issues and intellectual property rights should get adequate coverage in trade agreements. In order to expand exports, India needs to rationalise its tariff and non-tariff rate structure on a reciprocal basis, and this should be accorded priority under the ongoing FTAs.

VI.11 Greater absorption of foreign capital in the economy for productive investment within the current sustainable level of CAD and raising the sustainable threshold for CAD in the medium-run through higher FDI flows and export conducive imports can raise the benefits of financial openness for India. Further easing of outward FDI norms and incentivisation of capital goods imports can contain the fiscal (sterilisation) cost and/or appreciation pressure on the INR. It can also help strengthen India's linkage in GVCs through a combination of trade, FDI and strategic partnerships abroad. The policy focus should be to attract FDI in more sectors, particularly those with domestic technological gaps, *viz.,* defence, industrial machinery, agricultural machinery, electronics and earthmoving machinery. The FDI policy also needs to incentivise the adoption and transfer of cleaner technologies for domestic companies which would enhance domestic firms' ability to meet strict product specifications in foreign markets.

VI.12 Stronger growth and associated improvement in the outlook for income and employment is critical for raising the savings of households. As demand recovers on the back of policy stimulus, enhancing the capacity of the financial system to propel stronger and inclusive growth must be prioritised.

VI.13 Broadening and deepening of financial markets and increasing their liquidity and resilience has to be the cornerstone of financial sector policies. The inherent objective is to help allocate resources and minimise risks that are inherent to a finance-led growth strategy.

VI.14 It is necessary to wean away PSBs from their dependence on the government for recapitalisation. On a positive note, a beginning in

this direction has already been made with larger and stronger PSBs raising significant resources from the market. Stronger corporate governance norms in the banking segment is a priority area. Efforts need to be made to strengthen the compliance culture that adapts to norms not only in letter but also in spirit.

VI.15 Going forward, the economy's growing reliance on the digital ecosystem will be helpful in harnessing the benefits of low-cost resource allocation and distributive efficiency. Care, however, needs to be taken to protect the stakeholders from digital frauds, data breaches and digital oligopolies. Recognising the vastly altered financing requirements of the start-ups and unicorns, a policy framework for attracting risk capital needs to be put in place. Given the large long-term financing requirements of the infrastructure sector, NaBFID may have to scale up quickly and explore ways to attract resources from insurance, pension and provident funds. Climate change risks and frequent natural calamities call for including green finance and other sustainable growth objectives in future financial sector policies. These measures are expected to pave the way to a more developed and efficient financial system which, in turn, should help in greater financial inclusion, reduce vulnerabilities to shocks and promote investment and growth.

Annex 1: Alternative Growth Models and Medium-term Growth Scenarios

Approach 1: Growth Decomposition

According to the neoclassical approach, a standard production function entails that

$$Y_t = A_t K_t^{1-\alpha}(h_t L_t)^\alpha \qquad \text{...(1)}$$

where, Y_t is output, K_t is the aggregate capital stock, h_t is the human capital per worker, L_t is the total number of workers present in the economy, A_t is the TFP and α is the labour income share. The capital stock accumulation process is specified as

$$K_{t+1} = (1 - \delta)K_t + I_t \qquad \text{...(2)}$$

with δ: rate of depreciation, I_t: new investment (capital formation). The labour-employment process takes the form of

$$L_t = \varrho_t \varphi_t N_t \qquad \text{...(3)}$$

where, ϱ_t : work participation rate; φ_t : working age population to total population ratio; and N_t: total population. Using the above set up and log-linear approximations, the derived per capita output growth path could be represented as,

$$g_{y,t+1} = g_{A,t+1} + \alpha\big(g_{\varrho,t+1} + g_{\varphi,t+1} + g_{h,t+1}\big) + $$

$$(1-\alpha)\left[\frac{\frac{I_t}{Y_t}}{\frac{K_t}{Y_t}} - \delta - g_{N,t+1}\right] \qquad \text{...(4)}$$

where, $g_{j,t+1}$ represents the growth rate of the variable j.

The above equation offers some important insights. First, the TFP growth (g_A) has a direct effect on overall GDP growth of the economy. Second, the larger labour share of income (α) implies higher contribution of the labour force participation rate, working age population to population ratio and human capital per worker to

output growth. Finally, *ceteris paribus,* the same level of investment share in output can lead to different output growth depending on the level of the capital-output ratio (*K/Y*). Investment's contribution to growth reduces as the capital-to-output ratio goes up in the economy. So, an investment-led growth strategy may work at lower levels of capital stock accumulation but could eventually exhibit diminishing returns unless supported by reforms that focus on growth of productivity, human capital and higher labour force participation.

Approach 2: Endogenous Growth Model

The model presented here follows the seminal works on endogenous growth owing to Barro and Sala-i-Martin (1992) and Alogoskoufis & Kalyvitis (1996). We consider a partial equilibrium model with unit measure of infinitely lived identical competitive firms who take the available technology level and the available public infrastructure stock as given but individually choose the labour input and the investment level at time *t*. Firms face an investment adjustment cost.

The production function is like the earlier specification.

$$Y_{i,t} = F(K_{it}, L_{it}; \boldsymbol{A_t}) = \boldsymbol{A_t} K_{it}^{1-\alpha} L_{it}^\alpha \qquad \text{...(5)}$$

where, i represents firms; all firms use the same production function *F* with effective labour (*L*) and capital (*K*) and constant returns to scale. α is the labour income share, which ranges between 0 and 1. $\boldsymbol{A_t}$ represents effective TFP level which is assumed to be given to the firms. Firms only choose their labour input and take the investment (*I*) decision. Apart from the wage bill, firms face an adjustment cost for investing. The total cost of investment is $I\left(1 + \frac{b}{2}(I/K)\right)$, where

$b > 0$. Additionally, firms pay tax at the rate T_y to the government. The government uses the tax revenue to spend on its own consumption and on building public capital stock.

The TFP (A_t) represents an exogenous technology level A_0 and implicitly captures the impact of public capital or infrastructure $(K_{G,t})$ from which every firm gets benefits without the problem of congestion. More precisely, we assume $A_t \equiv A_0 K_{G,t}^\alpha$. Therefore, a rise in public infrastructure stock increases productivity of private capital and labour. Government spending is financed by the tax revenue. So,

$$T_Y Y_t = g Y_t + I_{G,t} \qquad \text{...(6)}$$

where, $I_{G,t}$ shows additional capital invested for building public infrastructure, Y_t is the aggregate output, and g is the share of government consumption expenditure to output. The flow of the public capital is governed by the following rule,

$$\dot{K}_G = I_{G,t} - \delta_G K_{G,t} \qquad \text{...(7)}$$

$\dot{K}_G$ represents change in K_G with respect to time and δ_G is the public capital depreciation.

Firm i maximises its present discounted value of the lifetime profit by choosing its labour input and investment level for each period. Firms do this exercise subject to the private capital flow rule as

$$\dot{K}_{it} = I_{it} - \delta K_{it} \qquad \text{...(8)}$$

where, δ is the rate of depreciation of the private capital. The present discounted value of the lifetime profit is represented as

$$V_i(0) = \int_0^\infty e^{-\bar{r}t} \left[(1 - T_Y) Y_{it} - w L_{it} - I_{it}\left(1 + \frac{b}{2}\left(\frac{I_{it}}{K}\right)\right) \right] dt \qquad \text{...(9)}$$

where, w is real wage rate.

Average interest rate $\equiv \bar{r} \equiv \int_0^t r(v) dv$, which is policy determined.

The relevant technique to solve the problem is to create a Hamiltonian function as

$$J_{it} = \left[Y_{it} - w L_{it} - I_{it}\left(1 + \frac{b}{2}\left(\frac{I_{it}}{K}\right)\right) + \lambda_{it}\left(I_{i,t} - \delta K_{i,t}\right) \right] \qquad \text{...(10)}$$

where, λ_{it} is the shadow price associated with the flow of capital, $\dot{K}_{it}$. The present value of that shadow price is therefore, $q_{it} = \lambda_{it}\, e^{\bar{r}t}$. The first order conditions are (a) $\partial J_{it}/\partial L_{it} = 0$, (b) $\partial J_{it}/\partial I_{it} = 0$ and (c) $\dot{\lambda}_{it} = -\partial J_{it}/\partial K_{it}$, which result into the following three equations:[1]

$$\alpha(1 - t_Y) A_t (K_{it}/L_{it})^{(1-\alpha)} = w_t \qquad \text{...(11)}$$

$$q_{it} = 1 + b(I_{it}/K_{it}) \qquad \text{...(12)}$$

$$\dot{q}_{it} = (\bar{r}_t + \delta) q_{it} - (1 - t_Y)(1 - \alpha) A_t (L_{it}/K_{it})^\alpha - b/2(I_{it}/K_{it})^2 \qquad \text{...(13)}$$

Given the same wage rate faced by the firms (equation 11), all firms make homogenous choices. That is, the variables chosen by firms can be written independent of i which makes the aggregation of output of all firms easy. After some algebraic rearrangements using the government budget (equation 6), private and public capital flow equations (equations 7 and 8) and the first order conditions listed as equations (11) to (13) along with suitable log linearisation it can be shown that, there exists a (saddle path) stable steady state growth rate, defined as $\frac{\dot{K}}{K} = \frac{\dot{K}_G}{K_G} = \gamma^*$ and $\dot{q} = 0$.

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[1] The transversality condition is $\lim_{t \to \infty} q_{it} e^{-\bar{r}_t t} K_{it} = 0$.

The model suggests that if private capital and public capital keep growing at a constant rate, then the economy can sustain a growth path which is endogenous to the economy, even by keeping the exogenous technology level and the size of the effective labour force constant. If the exogenous technology improves, then the economy can maintain a higher long run growth path. Reduction in government's consumption expenditure ratio also promotes higher growth in the long run.

For generating medium-term growth scenarios, the parameter values relevant for India in Table 1 are used.

Under the first approach, historical KLEMS data are used to identify feasible baseline and extreme scenarios. As per KLEMS data for the period of post globalisation the median growth rate of TFP (g_A) works out to 1.1 per cent which is assumed for the baseline specification. The labour force participation rate (LFPR) growth (g_ϱ)

in the recent PLFS reports of 2019-20 shows a remarkable rise in the last two years. On the other hand, there was a declining trend in LFPR growth according to the World Bank database in the last decade. Taking cue from both sets of information, the representative central tendency of LFPR growth is used to simulate the model. To approximate the growth rate of working age population (WAP) and the population growth rate, relevant data are sourced from the World Bank. Both being demographic parameters, they are not changed for building the best-case and worst-case scenarios. For investment to GDP ratio *(I/Y)*, the average gross fixed capital formation (GFCF) as a percentage of GDP is taken from the Handbook of Statistics on the Indian Economy, RBI. The capital income share $(1 - \alpha)$ of the manufacturing sector is assumed to be 0.7 as suggested by the KLEMS estimates. The depreciation rate of private capital δ is taken as 10 per cent (Banerjee and Basu, 2019). The depreciation rate of public capital (δ_g)

Table 1: Parameter Specifications

Sl. No.	Parameters	Baseline Case		Best Case		Worst Case	
		Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
1.	g_A (technology)	1.1%	-	2.4%	-	-0.8%	-
2.	α (labour income share)	0.3	0.3	0.3	0.3	0.3	0.3
3.	g_ϱ (lfpr)	1.1%	-	2.1%	-	0.1%	-
4.	g_φ (wap)	0.4%	-	0.4%	-	0.4%	-
5.	g_h (skill)	1.11%	-	2.2%	-	0.6%	-
6.	g_N (population)	1.01%	-	1.01%	-	1.01%	-
7.	δ (dep)	0.1	0.1	0.1	0.1	0.1	0.1
8.	I/Y	31%	-	31%	-	31%	-
9.	b	-	5.45	-	5.45	-	5.45
10.	T_y (tax-GDP)	-	0.25	-	0.25	-	0.25
11.	δ_G (dep, pub)	-	0.14	-	0.14	-	0.14
12.	g (revenue exp-gdp)	-	0.16	-	0.157	-	0.163
13.	r	-	1.01%	-	1.01%	-	1.01%
14.	A_0	-	1	-	1.01	-	0.99
15.	L^α		1.6		1.6		1.6

is assumed to be higher than δ and is set at 14 per cent. While the real policy interest rate (r) remains negative during the recovery from the pandemic shock, following Behera *et al.* (2017), a positive 1 per cent real policy interest rate is assumed for the economy in the medium-term. The tax rate *(T$_y$)* is pegged at 25 per cent and revenue expenditure of combined government (excluding interest payment and subsidies) to GDP is set at 16 per cent for the baseline case. The A_0 term which represents technology augmented labour supply is set at 1 for the baseline. The aggregate employment measure adjusted by labour income share is estimated using the KLEMS manufacturing data. The marginal adjustment cost of investment (b) is conventionally assumed to be high if human capital adjustment cost is not considered explicitly in the model (Barro and Sala-i-Martin, 2004), and accordingly is set at 5.45.

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