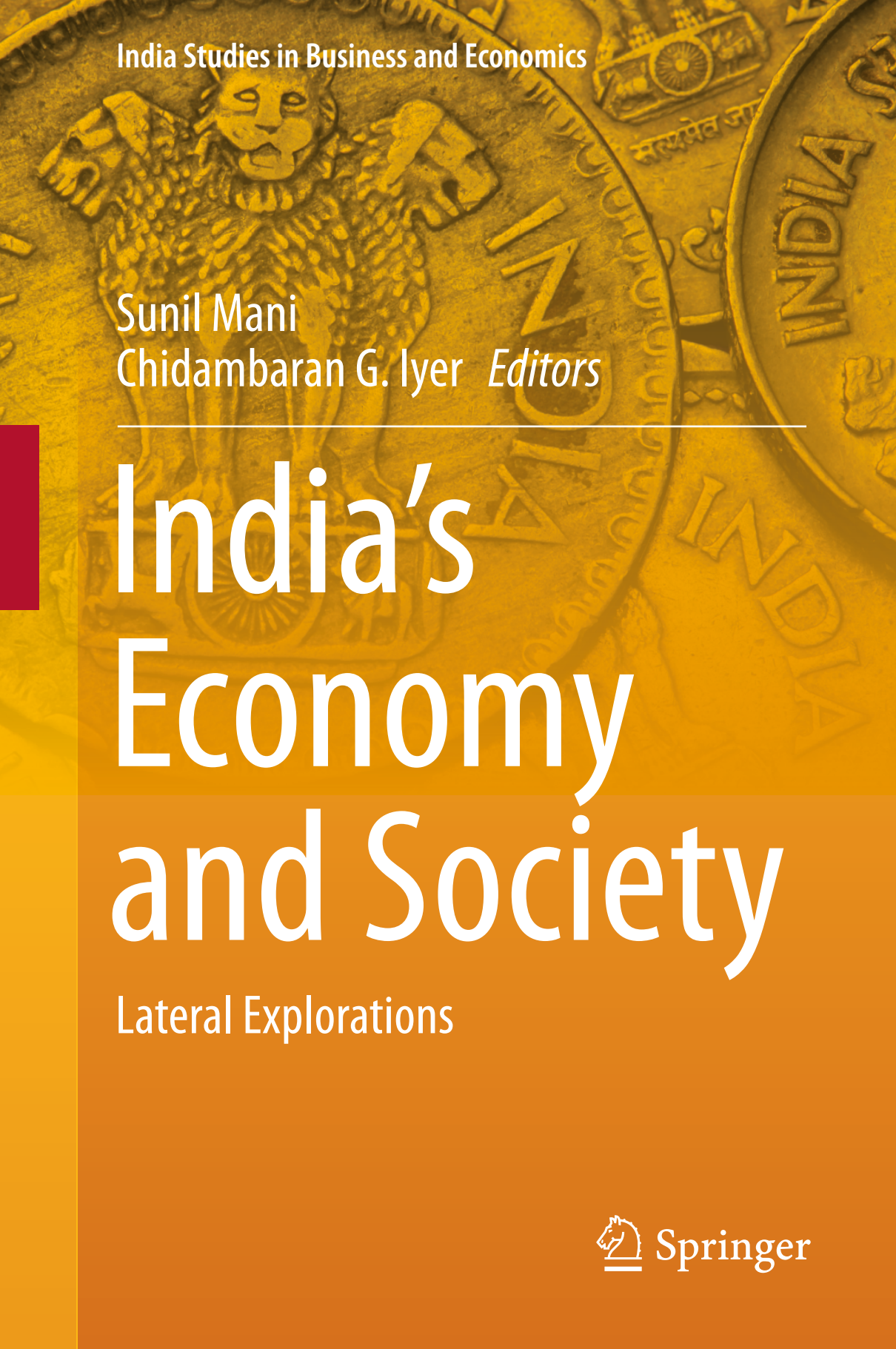
India Studies in Business and Economics
Sunil Mani
Chidambaran G. Iyer Editors
India's Economy and Society
Lateral Explorations
Springer

India Studies in Business and Economics

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Editors

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Foreword: A Post-liberalization India

Three decades or more. That is approximately how we would date the advent of economic liberalization. Some put it at 1984 and some at 1991 or later. Markets began to be liberated and government constrained. Government enterprises were disinvested, import tariffs were reduced, and there was an eruption of the flow of capital, goods, and services across borders. Markets became predominant, and government intervention slowly reversed course.

It wasn't that government was pushed to just downsize. Much of the imperative was to introduce institutional adjustments that are more market like in the performance of government functions. Government was reconstructed in order to complement the requirements of a liberalized economy. The economic pressures on government were to improve infrastructure to support the momentum of growth and to implement changes in the regulatory system so as to impart confidence to entrepreneurs and investors.

In these three decades, however, there has been a slow but sure reversal in the role of markets and government. It is instructive to trace this path and to fathom some of the reasons for this reversal.

Firstly, the thrust on transparency and the emergence of a democratic project led to complications for governability. Extensive effort was devoted to the project of actualizing the idea that government behaviour should be guided by the determination of the people. Greater transparency was touted as the mechanism through which accountability improves which in turn leads to better public services. The Right to Information Act that was passed by the coalition government of the United Progressive Alliance in 2005 was designed to improve transparency and accountability. The government did try unsuccessfully to introduce amendments to the Act so that file notings of comments made by officials on proposals would not be disclosed. It heralded an era where elected officials were in principle constrained from making ill-advised decisions. Popular sovereignty heralded a shift in the wielding of discretionary power by bureaucrats and technocrats.

It is a hypothesis worth exploring whether this levelling effect of transparency stirred those marginalized in political and policy participation and precipitated demands on the governance system that eventually tested its capacity to respond. It resulted over time in an entrenchment of a distrust towards governing elites and

a reduced regard for policy pronouncements by experts. Gradually, on one reading, the popular narrative was about how for an inclusive social and economic order vigilance was required over the power of elected leaders to govern. Populism gained ground as did the reduced engagement in reasoned public discourse. As the political system struggled with the increased burdens on government, there was a decline in governability.

As we pursued the agenda of liberalization, there was concurrently an expansion of the government due to the amplification of the democratic project and the pressure from organized interests and their accommodation by the state. This clearly showed up in the growth of government budgets and deficits. As elected leaders were reluctant to refrain from catering to increasing demands on the state and interest groups did not display self-restraint, there emerged gradually mechanisms to reign in the economic spread of the state. Rules were put in place to improve fiscal discipline and to curtail the responsiveness to the sway of popular demands. The Fiscal Responsibility and Budget Management Act is an example of a mechanism that sought to promote fiscal prudence. No sooner had the Act been legislated, the government found ways to deviate from the targets for revenue and deficit that were set. This heightened the notion of a reduction in governability.

Secondly, regulatory changes did little to create more jobs and did not have much impact on the promotion of entrepreneurship. It was not just the sway of national interest groups that affected state capacity. Increasing participation in a globalized world required the state to garner the support of agents in globalized markets. It obliges the state to make neutral the regulation of business and to signal impartiality in investment disputes so as to attract investors. It calls for the upgradation of infrastructure such as airports and ports so as to garner the benefits of participation in world trade. Improvement in institutional capability has become a mechanism that is seen as influencing growth. One such formal change that captured the imagination of the government is the ease of doing business (EoDB). High rankings in this are interpreted as signals that the regulatory environment is more conducive to starting and operating a business. The government focused on certain aspects of the rankings to improve by 79 positions to obtain the 63rd rank in the EoDB Ranking 2020. For instance, in the regulation around construction permits the rank improved from 184 in 2014 to 27 in 2020. This was made possible by focusing on a decrease in the number of procedures (reduced to an average of 18 procedures) and the time taken (reduction on average by 34% in terms of number of days) to obtain construction permits. The cost of obtaining these permits reduced from 23% to 5% of per capita income. The government focused on the method of the rankings to obtain this improvement. The ranking for instance covers just the cities of Mumbai and Delhi, and the data is sought from professional architects and structural engineers. The rank overlooks the issue that adopting a formal regulation is no assurance about the performance of a regulation. The factors that make for an effective state differ across countries, and the phase of development was disregarded.

Lack of creation of productive jobs is another lacuna, as the labour force is growing at a faster pace than the number of jobs. The Economic Survey of 2017 had pointed out that the country was able to add just 135,000 jobs in 2015 in eight labour-intensive

or export-oriented sectors whilst at the time the working age population looking for jobs grew by over 10 million. It is well known that small firms (those with 20 or fewer workers) employ 75% of manufacturing workers but produce about a tenth of manufacturing output. Too often the debate in India has been about emphasizing trade liberalization that allows economies of scale and enables improvements in firm productivity that, in turn, is positively related to employment growth. What does not receive emphasis in the literature on growth and jobs is that a significant factor in small firms not having entrepreneurs who pursue profitable new opportunities—via developing new products or processes—is their lack of high-quality formal education. An important determinant of productivity is tertiary education and its associated managerial human capital. Informal firms are often not productive because of the low level of human capital of the entrepreneurs who run them. This lack of human capital affects not just their operational effectiveness and performance but also their ability to raise finance. Though human capital is tacit and idiosyncratic to the firm as it is rooted in the organizations' unique routines, it is a non-financial indicator of future earnings and an intangible asset that attracts external funding. Formal financial institutions would more easily lend to skilled entrepreneurs who have some form of third-party verifiable managerial control systems such as books of accounts. It is the shortage of educated entrepreneurs that is the most significant limitation on entrepreneurship and the transformation of small firms into units pursuing scale economies. As a country, we have not paid enough attention to this constraint on growth. The schemes promoting entrepreneurship are focused only on the generation of new types of businesses whilst ignoring that their [businesses'] ability to scale up and become sustainable depends on the human capital of the entrepreneurs apart from the availability of venture capital and private equity funding. Of lower order in importance, though far from trivial, would be the ease of doing business, licencing, corruption, and the legal system.

It did not help that there have been setbacks from demonetization and the administrative burden especially on SMEs from the introduction of the GST that was dubbed as the good and simple tax. The abolition of the central sales tax did help create a national market, and the GST did remove a large number of taxes; but the multiplicity of rates rather than having just three has left open issues of classification between the 12% and 18% rates. There is an apparent contradiction that has never been addressed that if the consumer will be burdened less, then how is it that there will be more tax revenue as a share of GDP obtained from the tax. Unsurprisingly, the tax has not been a buoyant source of revenue. Finally, the impact of the announcement of the lockdown with a view to prevent the spread of COVID-19 with just a few hours' notice and without a recognition of the difficulty to those in the informal sector who would be without jobs or incomes has never been acknowledged with remorse.

Thirdly, the unsustainability of credit-fuelled high growth has been an endemic part of the recent Indian experience. Although the period of liberalization was celebrated for achieving high (and occasionally double digit) growth especially during the 2004–2005 to 2008–2009 period, it is insufficiently appreciated that this outcome was special—an investment boom that was financed by capital inflows and by a credit

boom. Non-food bank credit doubled during this period, and firms perceiving opportunities leveraged themselves with high debt. As debt piled up, things began to go amiss. Costs surged as land and environmental clearances became difficult to obtain, interest rates rose as the RBI sought to quell double-digit inflation, and the rupee depreciated from an average of Rs. 40 to a dollar in that period to Rs. 60–70 at the time of repayment of dollar-denominated debt.

Whereas in most countries, creditors would have triggered bankruptcies, in India, companies sought financial accommodation with requests for principal payments to be postponed. Banks besides restructuring loans extended fresh funding to stressed firms to tide them over till demand recovered. There was a long period of regulatory forbearance that ended with an Asset Quality Review by the RBI in April 2015 that required a recognition of non-performing assets on the balance sheet of banks. India's long tryst with the twin balance sheet crisis got officially recognized. By August 2015, the government proposed to infuse Rs. 70,000 crore to recapitalize banks, and in May 2016, the Insolvency and Bankruptcy Code (IBC) was enacted followed closely by the constitution of the National Company Law Tribunal as a special court to handle resolutions. The large inventory of stressed assets has despite these measures continued to be a challenge as the impaired assets of the banking system were 15.7% of advances of banks (Rs. 16,88,600 crore) as of December 2019 according to Credit Suisse which had first brought the problem to light in 2012. A continuing challenge for the economy is to leverage the IBC so as to make space for fresh lending that can support economic growth. During the pandemic, an amendment to the IBC was introduced that suspends the initiation of insolvency proceedings for any default arising during the COVID-19 period. In June 2019, a dilution in what constitutes a default was introduced into the IBC and introduced discretion in liquidation of borrowers. As defaults rise in this period, banks will be reluctant to take defaulters to the NCLT for insolvency proceedings as in this period buyers for stressed assets will be few and far between. Banks will then have to take a haircut and will require increased recapitalization. This will be a drag on economic growth.

Fourthly, India is marked by caste and gender gaps in the economy that confine economic performance and individual self-actualization. There is a male-skewed sex ratio at birth, and female labour force participation rate (LFPR) is abnormally low with men 3.7 times as likely as women to be working. Women are subject to gender-based violence and have limited decision-making power within the family. Declining LFPR of females has been found to be due to factors such as responsibilities of childcare and care of the elderly. Female LFPR declined in agriculture with the growth of mechanization and increased in urban areas with the growth of regular salaried jobs. Non-availability of jobs in the vicinity and security issues with increasing crimes against women has also negatively affected women's LFPR. The expectation that with development and the sectoral shift towards services and increased female education women should enter the labour force has been belied in the aggregate though there has been an increase in their employment in white-collar jobs. Patrilineality that provides men privileges over women, the special role sons have in rituals, and inheritance traditions have also had a negative impact on women. There has been no attempt in the

recent past to address these issues, and social programmes have instead been focused on Ujjwala gas connections, free toilets via Swachh Bharat, Jan Dhan banking, and the like. These have had limited impact as gas cylinders re-ordering is not substantial, there is still open defecation, and about 30% of Jan Dhan accounts are active.

Fifthly, recently economic policy has been reversing steps towards the past. An important part of the reforms of 30 years ago which is the reduction in tariffs on trade has been set aside, and tariffs have been raised over the past three years along with incentives for import-substituting production. India's earlier experience with this type of policy regime resulted in an industry that penalized consumers. It is the case that China has blocked market access, but that is an insufficient reason for not participating in free trade agreements. India's competitiveness issues are best addressed via domestic policy changes whilst it engages with the Regional Comprehensive Economic Partnership. The RCEP allowed tariff cuts to be ushered in over a period of 20 years which is sufficient time for a country to coordinate actionable programmes that work in its favour.

Slowly and surely, the role of markets in promoting growth has been reversed, and the role of government enhanced. Government constraints have been freed and fiscal discipline is being eroded as funds are committed to the rejuvenation of the public banks and to offset the decline in consumption and investment. The state is increasingly faced with an economy where the workforce experiences joblessness and low wages as new technologies—digital, biotechnology robotics—are labour saving. Inequality is growing as the productivity growth emanating from new technology accrues to its owners and to individuals whose skills complement those technologies. A state that is committed to the future should support these activities and seek to renew social contracts through social welfare transfers whilst making them fiscally affordable. The standard policy advocacy is for an arm's length approach in business–government relationships. However, history belies this approach, and the future is stark unless we allow flexibility in this relationship whilst ensuring that government is insulated from corruption and favouritism. The reality is as Mariana Mazzucato has expressed that we need a developmental state that is entrepreneurial, and it is well to recall that high-tech companies such as Apple and Intel received financial support from the government before going public. Economic growth is as much about states as about markets.

Growth that relies on capital inflows or that is credit-fuelled as occurred in the past is short-lived. And it is not high growth that we as a country should aim for but rather for transformational growth. The economic landscape is still dominated by informal sector enterprises and household production, and these are hardly the source of dynamic growth given that few of them grow out of informality. Our growth has been ushered via non-tradable services in construction, transport, hotels and restaurants, and financial intermediation. Many of these services are not technologically dynamic, and whilst they absorb labour and act as a safety net for those leaving agriculture, they do not spread and result in economic dynamism. Whenever growth falters, we tend to think of public investment as a key to kick-start it again. Though it does crowd in private investment, the fundamental drivers of growth are important to be focused on: structural transformation of the economy to high-productivity

economic pursuits, improvements in governance and institutions, and investments in the acquisition of skills by the workforce. Additionally, the norms and networks that enable people to act collectively or social capital that is inclusive are important bulwarks against cronyism in economic policy. Our economy requires entrepreneurs who are socially responsible and who see development issues as a challenge to which they should respond. Cronyism is much discredited today and has a negative connotation. But unless politicians, bureaucrats, and entrepreneurs are cronies in promoting and attributing high value to institutions of governance that enhance the social value, the change for the better could be a distant dream. This book provides many insights and is a useful guide for policymakers and citizens to the social and economic issues of our times and enhances our understanding of how we may promote growth with inclusion.

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Preface

India's economy was one of the fastest-growing economies in the world until about 2017–2018. Thereafter, the economy has been on a downward spiral, and the coronavirus pandemic which set in around the beginning of 2020–2021 has forced its economy to the negative growth territory for the first time in many years. The crisis has affected different sectors of the economy differently. However, what is important to note is that some of the sectors and notably sectors like agriculture have already been in a crisis of sorts even before the onset of the pandemic. For the economy as a whole, even the high growth phase was not accompanied by a concomitant rise in employment, forcing many commentators to refer to the phase as a jobless growth one. Since 1991, the economy has been liberalized, and in the more recent period, the government has been preoccupied with improving the ease of doing business and also in incentivizing the startup ecosystem so that many technology-based ventures could be created and nurtured. It has brought in a number of important policy pronouncements in a wide array of topics such as land acquisition, in domestic manufacturing, agricultural marketing, banking, science, technology and innovation, and in social sectors such as in health and education. The Indian economy not only has become complex but also is changing so fast that students and policymakers find it difficult to keep themselves abreast of these changes. To understand these issues as well as commemorate its 50th Foundation Year, CDS organized a conference on India's economy and society, which focused on eight broad aspects of the economy that are rarely discussed together, namely agriculture, industry, innovation and technology, infrastructure, international trade, health and education, labour and employment, and gender issues. The 15 essays contained in this book take the reader through a critical analysis of current issues in these seven broad aspects, which we believe presents a holistic view of the economy. Each of these essays presents the reader with an analysis of the key issues in their domains, the key questions, data sources, and references to further reading in the concerned topic. As we march into the new decade, we believe that a broader perspective of the Indian economy is needed for students as well as for policymakers. It is with this aim in mind that we have edited this collection of essays; we do hope that this is a small step in that direction and will prove to be useful for students of Indian economy at the postgraduate level, policymakers, and even to those in business and industry who want to expand their outlook

on the broad external environment within which they operate. Earlier versions of most of the essays in this book were presented in a conference on India's economy and society which CDS organized on February 7 and 8 as part of its 50th Foundation Year celebrations. The centre has been at the forefront of think tanks in the country in initiating and driving conversations on a number of important topics relating to India's economy such as commercialization of agriculture, stagnation in industrial growth, trends in the country's human development, and trends in and implications of international migration and in performance of country's innovation system. The essays contained in the book revisit some of these old debates given more recent data and policy changes. The essays bring the reader in contact with the current debates in the chosen areas. This book along with an earlier book, *Kerala and the World Economy*, is thus an appropriate tribute to the contributions which the CDS has made to the academic community both in India and abroad.

Several people have worked behind in making this book a reality. First and foremost is S. M. Mohanakumar who worked within a tight time schedule in preparing the manuscript. He was always cheerful and very pleasant to deal with. Thanks are also due to Tilak Baker who did a round of language editing of the chapters. G. Praveen from the Director's office helped us to liaison with the authors of individual chapters prodding them to submit their respective manuscripts on time. We are also grateful to our research students, Aritri Chakravarty, Binod Kumar Behera, Manikantha Nataraj, Madusudhan Nag, Basit Abdullah, Parijata Pradhan, I. D. Rajesh, Sourish Dutta, Vaidik Chakraborty, Himangshu Kumar, Likhita Tirunagiri, Shraddha Jain, Sachu R. Sunny, Sandeep Pandey, Rajkumar Byahut, Ladlenla Lama, and Papaiah Koppula, for acting as rapporteurs to the various sessions in the earlier mentioned seminar.

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Trivandrum, Kerala, India

Sunil Mani
Chidambaran G. Iyer

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Dr. Mani has published several articles in refereed international and national journals, authored and edited books, and contributed chapters in books. His latest books include the one co-edited with Franco Malerba and Pamela Adams, *Rise to Market Leadership, New Leading Firms from Emerging Countries*, and *Kerala and the World Economy.*

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Abbreviations

AB-PMJAY	Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana
ADJ	Additional District Judge
AI	Artificial intelligence
AICTE	All India Council for Technical Education
AIIMS	All India Institute of Medical Sciences
AISHE	All India Survey on Higher Education
ANMs	Auxiliary nurse midwives
API	Active pharmaceutical ingredients
APMC	Agricultural Produce Marketing Committee
ARV	Antiretroviral
ASEAN	Association of Southeast Asian Nations
ASI	Annual Survey of Industries
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homoeopathy
BBBP	Beti Bachao Beti Padhao
BEC	Broad Economic Categories
BFSI	Banking, financial services, and insurance
BHEL	Bharat Heavy Electricals Limited
BHIM	Bharat Interface for Money
BJP	Bharatiya Janata Party
BOT	Build, operate, and transfer
BPL	Below poverty line
BRICS	Brazil, Russia, India, China, and South Africa
CACP	Commission for Agriculture Costs and Prices
CAG	Comptroller and Auditor General
CAGR	Compounded annual growth rate
CBHI	Central Bureau of Health Intelligence
CDC	Centers for Disease Control and Prevention
CDS	Centre for Development Studies
CEmOC	Comprehensive Emergency Obstetric Care
CEO	Chief Executive Officer
CEPA	Comprehensive Economic Partnership Agreement
CHE	Catastrophic health expenditures

CHIS	Comprehensive Health Insurance Scheme
CMCHIS	Chief Minister's Comprehensive Health Insurance Scheme
CMIE	Centre for Monitoring Indian Economy
CNC	Computer numerical control
CPI	Consumer price index
CRM	Cross-region marriages
CSIR	Council of Scientific and Industrial Research
CSMBS	Civil Servants' Medical Benefits Scheme
CSO	Central Statistics Office
CSR	Child sex ratio
CT Scan	Computed tomography scan
DBT	Department of Biotechnology
DeiT	Department of Electronics and Information Technology
DFID	Department for International Development
DFIs	Development financial institutions
DMEs	Directory manufacturing establishments
DPIIT	Department for Promotion of Industry and Internal Trade
DPT	Diphtheria–pertussis–tetanus
DST	Department of Science and Technology
EAC-PM	Economic Advisory Council of the Prime Minister
ECE	Electronics and Communication Engineering
EEPC	Engineering Export Promotion Council
ELG	Export-led growth
EPC	Engineering, Procurement, and Construction
EPO	European Patent Office
EPWRF	Economic and Political Weekly Research Foundation
ERP	Effective rate of protection
EU	European Union
EUA	Emergency Use Authorization
EVs	Electric vehicles
FAME	Faster Adoption and Manufacturing of Hybrid and Electric Vehicles
FAO	Food and Agriculture Organization
FAPAFS	Farmers (Empowerment and Protection) Agreement of Price Assurance and Farm Services
FCI	Food Corporation of India
FCSC	Farmer Common Service Centre
FDI	Foreign direct investment
FES	Freight equalization scheme
FIs	Financial institutions
FLFPR	Female Labour Force Participation Rate
FPC	Farmer producer company
FPI	Foreign portfolio investment
FPTC	Farmers' Produce Trade and Commerce
FRP	Financial risk protection
FTAs	Free trade agreements

FY	Financial year
G&D	Gender and development
GATE	Graduate Aptitude Test in Engineering
GB	Gigabyte
GCF	Gross capital formation
GDP	Gross domestic product
GER	Gross enrolment ratio
GERD	Gross domestic expenditure on research and development
GFC	Global financial crisis
GFCF	Gross fixed capital formation
GLIS	Government Land Information System
GOI	Government of India
GQ	Golden Quadrilateral
GSDP	Gross state domestic product
GST	Goods and services tax
GVA	Gross value-added
GVCs	Global value chains
GW	Gigawatt
GWh	Gigawatt hours
HAL	Hindustan Aeronautics Limited
HAM	Hybrid annuity model
HC	High Court
HCFP	Healthcare funds for the poor
HCV	Hepatitis C virus
HDD	Hard disk drive
HE	Higher education
HEIs	Higher education institutions
HH index	Herfindahl–Hirschman index
HHP	Hand-held phones
HIIT	Horizontal intra-industry trade
HIV	Human immunodeficiency virus
HS	Harmonized system
HSR	Health systems research
HWCs	Health and wellness centres
IBRD	International Bank for Reconstruction and Development
ICE	Internal combustion engine
ICF	International Classification of Functioning, Disability, and Health
ICICI	Industrial Credit and Investment Corporation of India
ICTs	Information and communication technologies
IDA	International Development Association
IDBI	Industrial Development Bank of India
IDFC	Infrastructure Development Finance Company
IFC	International Finance Corporation
IICT	Indian Institute of Chemical Technology
IIFCL	India Infrastructure Finance Company Limited

IIPA	Indian Institute of Public Administration
IIPS	International Institute for Population Sciences
IIT	Indian Institute of Technology
IIT	Intra-industry trade
IL&FS	Infrastructure Leasing and Financial Services Limited
I-MAK	Initiative for Medicines, Access, and Knowledge
IMF	International Monetary Fund
IMPRINT	Impacting Research Innovation and Technology
IPCL	Indian Petrochemicals Corporation Limited
IPO	Indian Patent Office
IPP	Intellectual property products
IPR	Intellectual property rights
ISPs	Integrated steel plants
IT	Information technology
ITA	Information Technology Agreement
ITI	Industrial Training Institute
JPO	Japan Patent Office
JRF	Junior Research Fellowship
KALIA	Krushak Assistance for Livelihood and Income Augmentation
LAAR	Land Acquisition, Rehabilitation and Resettlement
LACs	Land acquisition collectors
LCD	Liquid-crystal display
LDCs	Lower division clerks
LED	Light-emitting diode display
LIC	Life Insurance Corporation of India
LMICs	Low- and Middle-income countries
LR	Land readjustment
MCA	Ministry of Corporate Affairs
MCAs	Model Concession Agreements
MCI	Medical Council of India
MDGs	Millennium Development Goals
MDR	Merchant discount rate
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MHRD	Ministry of Human Resource Development
MIS	Market Intervention Scheme
MNCs	Multi-national corporations
MNEs	Multi-national enterprises
MoHFW	Ministry of Health and Family Welfare
MOSPI	Ministry of Statistics and Programme Implementation
MOT	Maintain, operate, and transfer
MSBY	Mukhyamantri Swasthya Bima Yojana
MSDE	Ministry of Skill Development and Entrepreneurship
MSME	Ministry of Micro, Small, and Medium Enterprises
MSP	Minimum support price
MSRDC	Maharashtra State Road Transport Corporation

NASSCOM	National Association of Software and Service Companies
NBS	Nutrient-based subsidy
NCAER	National Council for Applied Economic Research
NCDs	Non-communicable diseases
NCR	National Capital Region
NDA	National Democratic Alliance
NDMES	Non-directory manufacturing establishments
NEFT	National Electronic Fund Transfer
NEP	National Education Policy
NGO	Non-governmental organization
NHAI	National Highways Authority of India
NHDP	National Highway Development Programme
NHSRC	National Health Systems Resource Centre
NIAID	National Institute of Allergy and Infectious Diseases
NIH	National Institutes of Health
NITI	National Institution for Transforming India
NLEM	National list of essential medicines
NPAs	Non-performing assets
N-PDF	National Post-Doctoral Fellowship Programme
NPK	Nitrogen, phosphorus, and potassium
NPV	Net present value
NRF	National Research Foundation
NRIs	Non-resident Indians
NSDP	National state domestic product
NSDP	Net state domestic product
NSSO	National Sample Survey Organisation
OAEs	Own account enterprises
OBCs	Other Backward Classes
OD	Origin–destination
OECD	Organization for Economic Cooperation and Development
OEMs	Original equipment manufacturers
OOP	Out of pocket
OOPE	Out-of-pocket expenditure
PA	Private aided
PCB	Printed circuit board
PDS	Public distribution system
PFCE	Private final consumption expenditure
PFHIS	Publicly Funded Health Insurance Scheme
PHE	Professional higher education
PHEIs	Professional higher education institutions
PISA	Programme for International Student Assessment
PLFS	Periodic Labour Force Survey
PLI scheme	Production-linked incentive scheme
PLI	Production-linked incentive
PMGSY	Pradhan Mantri Gram Sadak Yojana

PM-KISAN	Pradhan Mantri Kisan Samman Nidhi scheme
PMO	Prime Minister's Office
PMRF	Prime Minister Research Fellows
PNDT Act	Pre-Natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act
PPA	Power purchase agreement
PPI	Private participation in infrastructure
PPP	Public–private partnership
PPP	Purchasing power parity
PSBs	Public sector banks
PSEs	Public sector enterprises
PSU	Public sector undertaking
PTAs	Preferential trade agreements
PUA	Private un-aided
PWD	Public Works Department
QRs	Quantitative restrictions
R&D	Research and development
RBI	Reserve Bank of India
RCA	Revealed comparative advantage
RFP	Request for proposal
RGJAY	Rajiv Gandhi Jeevandayee Arogya Yojana
RKVY	Rashtriya Krishi Vikas Yojana
RMNCH	Reproductive, Maternal, Neonatal, and Child Health
RSBY	Rashtriya Swasthya Bima Yojana
RTGS	Real-time gross settlement
RTI	Right to Information
S&T	Science and technology
SAS	Situation Assessment Survey
SCs	Scheduled Castes
SCTIMST	Sree Chitra Tirunal Institute of Medical Sciences and Technology
SDE	Software development and export
SDGs	Sustainable Development Goals
SERB	Science and Engineering Research Board
SHI	Social Health Insurance Scheme
SIA	Social impact assessment
SLR	Statutory liquidity ratio
SMEV	Society of Manufacturers of Electric Vehicles
SNA	System of National Accounts
SOEs	State-owned enterprises
SPMF	Shyama Prasad Mukherjee Fellowship
SPV	Special-purpose vehicle
SRB	Sex ratio at birth
SRF	Senior Research Fellowship
SRHR	Sexual and reproductive health and rights
SSIs	Small-scale industries

STEM	Science, Technology, Engineering, and Mathematics
STs	Scheduled Tribes
TBT	Technical barriers to trade
TCS	Tata Consultancy Services
TDS	Tax deducted at source
THE	Total health expenditure
TiVA	Trade in value-added
TPU	Thermoplastic polyurethane
TRAI	Telecom Regulatory Authority of India
TRIPS	Trade-Related Aspects of Intellectual Property Rights
TRS	Telangana Rashtra Samithi
TSDR	Telangana Social Development Report
UAE	United Arab Emirates
UCS	Universal Coverage Scheme
UHC	Universal Health Coverage
UK	United Kingdom
UMPP	Ultra Mega Power Projects
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNSD	United Nations Statistics Division
UPA	United Progressive Alliance
UPI	Unified Payments Interface
US	United States
USAID	United States Agency for International Development
USD	United States Dollar
USFDA	United States Food and Drug Administration
USPTO	United States Patent and Trademark Office
UTI	Unit Trust of India
VAJRA	Visiting Advanced Joint Research
VIIT	Vertical intra-industry trade
WDR	World Development Report
WEST	Wheebox Employability Skill Test
WHO	World Health Organization
WITS	World Integrated Trade Solution
WPI	Wholesale price index
WRPE	Women's role in the planned economy
WTO	World Trade Organisation

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Chapter 1
Introduction

Sunil Mani

India's economy was one of the fastest growing till about 2017–18. Thereafter, the economy has been on a downward spiral, and the coronavirus pandemic which set in around the beginning of 2019–20 has forced its economy to the negative growth territory for the first time in many years. The crisis has affected different sectors of the economy differently. However, what is important to note is that some of the sectors and notably sectors like agriculture have already been in a crisis of sorts even before the onset of the pandemic. Even the high growth phase was not accompanied by a concomitant rise in employment, forcing many to refer to the phase as a jobless growth one. Since 1991, the economy has been liberalized and in the more recent period, the government has been preoccupied with improving the ease of doing business and also in incentivizing the startup ecosystem so that many technology-based ventures could be created and nurtured. It has bought in a number of important policy pronouncements in a wide array of topics such as land acquisition, in domestic manufacturing, agricultural marketing, banking, and in social sectors such as in health and education. The issues have become complex and fast changing, such that students and policymakers find it not that easy in keeping abreast of these changes. The 15 essays contained in this book take the reader through a critical analysis of current issues in seven broad aspects of the economy such as agriculture, industry, innovation and technology, infrastructure, international trade, health and education, labour and employment, and gender issues. The essays together present the reader with analysis of the key issues in each of these seven parts, the key questions, data sources, and references to further reading in the concerned topic. It is hoped that the collection will be useful for students of Indian economy at the postgraduate level, policymakers, and even to those in business and industry who want to understand the broad external environment within which they operate.

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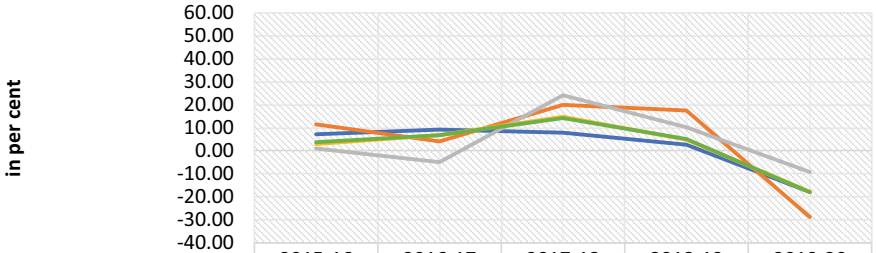
The purpose of the chapter is to provide a broad introduction to the array of topics that have come up for in depth examination in the book. The first section will discuss the current economic crisis facing the country, both at the macroeconomic level and at the external sector. The section will also discuss the response of the government to dealing with the economic crisis. The second section will focus on the opportunities provided by the pandemic which also provides a way out of the crisis. The third section outlines the structure of the book, and the fourth and concluding section distils out the unique features of the book.

1.1 Manifestation of the Economic Crisis

The rate of growth of India's real GDP has declined from 7% in 2017–18, to 6.1% in 2018–19 and then to 4.2% in 2019–20 (Reserve Bank of India, 2020). In fact, the GDP growth rate has been declining over all the quarters of 2018–19 and 2019–20. It has further turned negative in the first two quarters of 2020–21 which has made the economy fall into a recession, technically speaking. Further, there are many tell-tale signs of the crisis in terms of a significant rise in unemployment and especially youth unemployment, stagnation in rural farm income leading to a distress in rural areas (agitation and marches by farmers, increase in the rate of suicides by farmers in some cases), significant decline in corporate and overall investments with adverse consequences for not just the current production activities, but future activities as well. An important manifestation of the crisis was a statistically significant and continued decline in passenger vehicle sales. It declined by a whopping 18% in physical number terms in 2019–20. See Fig. 1.1. Further, the bad loans (non-performing assets) in the commercial banks have been piling up (at present it accounts for 12% of all loans) leading to a banking crisis which further affects the rate of growth of credit in the economy. The external sector too has not been doing well with the rate growth of both exports and imports turning negative (Fig. 1.2a) leading to a negative trade deficit (Fig. 1.2b). The current account balance, like in previous years, has been propped up by invisible items—the most notable of it being software exports and remittances by Indian workers abroad. Further, Indian economy has become less open as judged by two indicators of globalization, both of which has declined during the time (Fig. 1.2b). Although there has been significant reduction in trade deficit, it is largely due to reduction in imports caused by a decline in the manufacturing activity and the fact that the country still had a trade surplus in services trade.

There is now fair amount of consensus among economists, of different persuasions, that the present economic crisis has been caused by a shrinkage in aggregate demand. For instance, according to Reserve Bank of India (2020), private final consumption expenditure (PFCE), which constitutes 57.2% of aggregate demand, recorded its lowest growth in a decade in 2019–20. So, any effort to jump start the economy must include packages for stimulating aggregate demand. But that does not appear to have been achieved by the stimulus packages announced by the government.



	2015-16	2016-17	2017-18	2018-19	2019-20
Passenger Vehicles	7.23	9.26	7.91	2.70	-17.88
Commercial Vehicles	11.51	4.14	20.00	17.55	-28.75
Three Wheelers	1.05	-4.89	24.19	10.27	-9.19
Two Wheelers	3.01	6.89	14.84	4.85	-17.76
Quadricycle#					50.24
Grand Total	3.78	6.81	14.26	5.14	-17.97

Fig. 1.1 Rate of growth of sales of vehicles in India, 2015–16 through 2019–20. *Source* Computed from data on sales in numbers provided in Society of Indian Automobile Manufacturers (SIAM), https://www.siam.in/statistics.aspx?mpgid=8&pgidtrail=14

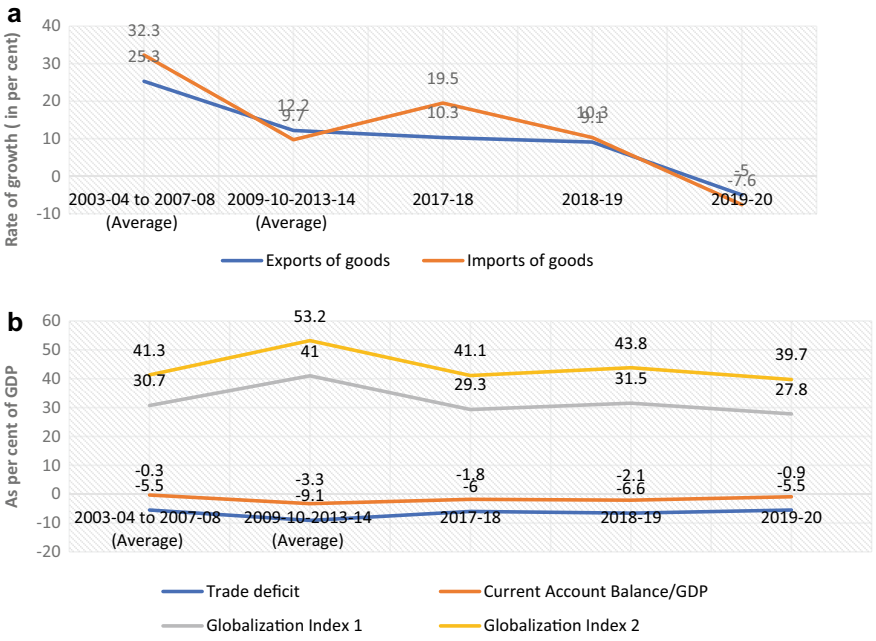


Fig. 1.2 **a** Rate of growth of exports and imports of goods, 2003–4 through 2019–20. **b** Indicators performance of external sector. *Source* Reserve Bank of India (2020). *Notes* Globalization Index 1 = (Exports of goods + Imports of goods)/GDP * 100; Globalization Index 2 = (Exports of goods and services + Imports of goods and services)/GDP * 100. *Source* Reserve Bank of India (2020)

1.1.1 Government's Response to the Crisis

India's high economic growth performance started sputtering from the first quarter of 2018–19. Ever since the rate of growth has been continually slowing down across the seven consecutive quarters, the more than two-month lockdown necessitated by the coronavirus has further accentuated this fall. On June 1, one of the three big credit rating agencies, Moody's Investor Services, downgraded India's sovereign rating to the lowest investment grade 'BAA3' from 'BAA2' and also maintained the outlook from 'stable' to 'negative'. Economists have been clamouring for a stimulus package, addressing primarily at impacting the aggregate demand, for quite some time. Although the RBI and the government had announced stimulus packages to the tune of about Rs 9.92 lakh crores, it was only after the Prime Minister's speech on May 12, a much larger package was announced. This package when taken together with the earlier ones amounted to Rs 20.97 lakhs or about 10% of the GDP of the country. See Table 1.1.

(i) The stimulus package although very much welcome in reversing the economic slowdown and in managing the COVID-19-induced lockdown and the consequent loss of jobs and incomes was addressing more on the supply side than on the demand side. In fact, there is considerable consensus among economists across a wide spectrum that what is required is demand-side stimulants which can increase the purchasing power of ordinary people leading to increase in output and its growth. But there is also a counter argument that supply-side restoration through credit flows, collateral-free and guaranteed, for MSMEs, which carry no immediate fiscal outlay, but could later on also generate incomes from which consumer demand will flow.

(ii) Size of the package has come in for some debate especially among financial analysts. Almost 12 such different estimates are available (Table 1.2) ranging from as low as 0.7% of GDP to 1.3%-woefully short of the 10% of GDP claimed

Table 1.1 Overall stimulus package provided by the Atmanirbhar Bharat Package (Rs in crores)

Item	Amount
Part 1	594,550
Part 2	310,000
Part 3	150,000
Parts 4 and 5	48,100
Subtotal	11,02,650
Earlier measures including PMGKP	192,800
RBI measures (actual)	801,603
Subtotal	994,403
Grand total	2,097,053

Source Press Information Bureau, https://static.pib.gov.in/WriteReadData/userfiles/Aatma%20Nirbhar%20Bharat%20%20Presentation%20Part%205%2017-5-2020.pdf (accessed on June 6, 2020)

Table 1.2 Differing estimates of the size of the stimulus package

Financial analyst	Size (as a percent of GDP)
Morgan Stanley	0.7
Philip Capital	0.9
Nomura	0.9
Edlweiss	1.0
Jeffries	1.0
HSBC	1.0
Kotak	1.0
Citi Bank	1.0
Elara	1.0
Bank of America	1.1
Deutsche Bank	1.1
Motilal Oswal	1.2
UBS	1.2
CARE	1.3
Heterodox Economists' Collective	1.5

Source Own compilation

by the government. There is also some confusion regarding the GDP figure (denominator) that is used for converting the fiscal stimulus as a percentage of GDP.

An international comparison is of the stimulus packages announced by different countries is not that straightforward due essentially to non-comparability of the data, announcement of packages in instalments at different points in time and also the use of normalizing factor (namely as a percent of GDP). Given all such imperfections, Fig. 1.3 presents the comparison of stimulus packages across countries. Although countries at the top are mostly developed nations, many emerging countries too have stimulus packages which are substantial in nature. In the figure, India is shown to have a stimulus package almost as much as by China.

(iii) The central government has used the current crisis to dismantle inter-state barriers on movements of agricultural produce and also for creating a legal framework for a kind of contract farming. The legislation, proposed as part of the stimulus package, will enable traders to buy farm produce from farmers directly anywhere in the country, even outside the regulated market yards. But by doing this along with other legislative changes aimed at more remunerative prices for farmers, the centre seems to have usurped on the territory of the state as far as agriculture is concerned.

(iv) The government seems to have used the package as a convenient way to push through further liberalization and in some cases privatization of certain critical sectors. Under some cases, this can lead to adverse consequences for the overriding goal of enhancing self-reliance in the economy.

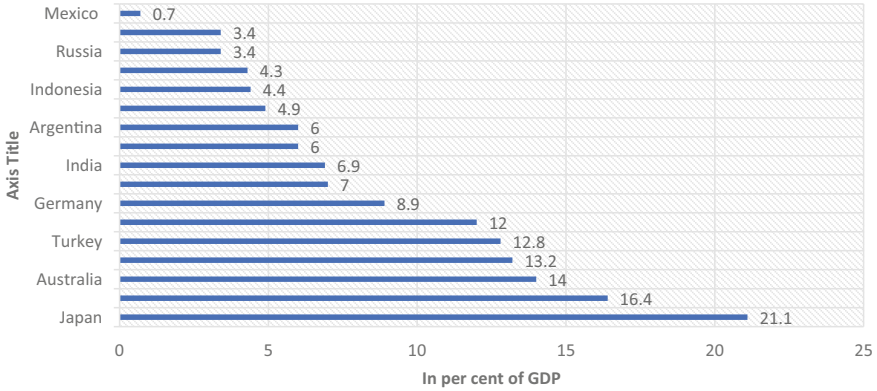


Fig. 1.3 Fiscal stimulus to deal with coronavirus crisis (as a percent of GDP as on October 2020). *Source* Computed from Statista (2020)

(v) The package announced for the short-term internal migrants was also shown to be a paltry amount when you take it on a per capita basis.

(vi) The package has once again revealed the fiscal conservatism of the central government and its reluctance to relax the stringent ceiling on fiscal deficit to GDP ratio; and

(vii) A welcome relief in the package is the increased fiscal space given to the state governments even though under some conditions.

At the time of writing, it is too early to judge whether the stimulus package has had any effect on stimulating economic activity. The quarterly estimates of GVA at basic prices showed that the rate of growth of GVA in the second quarter of 2020–21 has improved compared to the first quarter in the same year, although the growth rate is still in the negative territory (National Statistical Office, 2020). However, commentators like Nagaraj (2020) have questioned these estimates on methodological grounds.

1.2 COVID-19: Opportunities for India in the Health Industry

COVID-19, which is sweeping the world so rapidly and with much ferocity, has not spared India either. Although strictly going by health metrics such as the density of cases and death per million, India, fortunately, has been spared the worst scenario although even going by these metrices her case is the worst in Asia. The spread of coronavirus has been very uneven across the subcontinent, but the government has responded to it with one of the most stringent lockdowns in the world (Global Change Data Lab, 2020).

An important aspect of the SARS-CoV-2 virus which causes COVID-19 is the fact that there are no therapeutic drugs for its treatment, and medical devices, personal protective equipment for its management, and containment of its spread are either too costly or are in short supply. India can play an important role in this as the country boasts of a robust pharmaceutical industry which is highly export oriented and at the same time the least import intensive among the most export-oriented industries in India (Reserve Bank of India, 2020). Despite this, the country is not among the top ten exporters of medical goods in the world, exports of medical goods from the country are still largely in the form of drugs and pharmaceuticals, and the share of other medical goods such as personal protective equipment and medical devices is still very low. And these are the areas where the country has an immense potential as India is essentially a frugal innovator and has demonstrated, time and again, to produce goods at very cheap rates.

According to the *New York Times Vaccine Tracker*, there are 78 coronavirus vaccines under development as on 15 December 2020, of which 7 are approved for early use (Fig. 1.4). In fact, at the time of writing, one of the 4 candidate vaccines in clinical evaluation has made much progress (Table 1.3).

However, in all these cases, fast-tracked R&D projects and clinical trials are in progress all over the world.

Regarding therapeutic drugs, two existing anti-viral drugs have been shortlisted and one among them is showing some early results, based on US National Institute of Allergy and Infectious Diseases (NIAID) trials, that it can speed recovery in

Phase 1* - 41	**Phase 2**- 16**	**Phase 3***- 16**	**Limited use****- 5**	**Approved*****- 2**

*Notes:** Testing for safety and dosage, ** Expanded safety trials, *** Large-scale efficacy tests, **** Approved for early or limited use, *****Approved for full use

Fig. 1.4 Coronavirus vaccines under development as on 15 December 2020. *Source* Zimmer et al. (2020)

Table 1.3 Four vaccines for COVID-19 that is about to be released for wider use (as on 7 December 2020)

Company	Type	How effective (in percent)	Cost per dose (USD)
Oxford Uni-AstraZeneca	Viral vector (genetically modified virus)	62–90	4
Moderna	RNA (part of virus genetic code)	95	33
Pfizer-BioNTech	RNA	94.8	20
Gamaleya (Sputnik V)	Viral vector	92	10

Source Roberts (2020)

infected patients. An important characteristic of all the health-related technologies whether it is a vaccine, a therapeutic drug, or a medical device is the fact that it will have to be manufactured and made available at a very low price that it can be afforded by public health systems the world over. This is where India can come in, as it has build up considerable technological and manufacturing capabilities to manufacture and distribute large quantities of these technologies at prices which are significantly lower than is available at present across the world including that of China. Three such areas that may be highlighted where India's response has been noticed internationally is in vaccine research and its manufacturing, preparedness, and ability to manufacture generic versions of the so-called game-changer drugs and frugal engineering in designing and manufacturing medical devices such as invasive ventilators and N95 equivalent masks. Further, some of the states in India have shown that it is possible to contain the pandemic in a short period, provided that the government can win the trust of the civil society, in general, to comply fully with the various stringent measures like a complete lockdown and that the governments in question place paramount importance to the technical advice provided by their respective public health authorities. These are explained in some more specific details below:

(i) **Vaccine research and manufacturing**: There are six Indian firms which are active in research on a vaccine for COVID-19. The details of these are in Table 1.1. Among all these, the Serum Institute of India is one of the more interesting ones, as it is considered to be the world's largest vaccine maker by several doses produced and sold across the world. The company is 53 years old, employs 7000 persons, and operates from plants in India, the Netherlands, and the Czech Republic. A lion's share of the 20 different vaccines that it manufactures is exported to 165 countries at an average price of US 0.50 cents a dose, earning it the reputation of being the cheapest vaccine manufacturer in the world which makes it eminently eligible for participating in the quest for a cheap vaccine against coronavirus. Its partnership with Oxford Vaccine Group for a promising under-trial COVID-19 vaccine aims to have the vials ready for commercial use by September–October 2020 as the Oxford vaccine has become the bellwether with success being reported from the US National Institute organized trials on the rhesus macaque (Table 1.4).

(ii) **Therapeutic drugs**: The two drugs that are presumed to be effective in treating COVID-19 are hydroxychloroquine and remdesivir. The former, after some initial trials, is now considered to be not effective, although the largest manufacturer of this drug in the world, accounting for about 70% is an Indian pharmaceutical company, Zydus Cadila. The latter drug has now passed some trials in the USA and has received an emergency use authorization (EUA)[1] from the U.S. Food and Drug Administration (USFDA) as reported above.

[1] See USFDA (2020), https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-issues-emergency-use-authorization-potential-covid-19-treatment (last accessed on May 1, 2020).

Table 1.4 Indian pharmaceutical companies active on COVID-19 vaccine research (as on 30 April 2020)

Company	Number	Details
Zydus Cadila	2	• The company announced that it has initiated an accelerated research programme with multiple teams in India and Europe developing a vaccine for COVID-19 based on two approaches • The first approach is cantered on the development of a DNA vaccine against the major viral membrane protein which is responsible for the cell entry of the novel coronavirus • The second approach focuses on developing a vaccine against COVID-19. This will use a live attenuated recombinant measles virus, designed to induce long-term specific neutralizing antibodies
The Serum Institute of India	1	• Has partnered with American biotechnology firm Cadagenix to develop such a vaccine, and expects it to be ready by early 2022 and with Oxford Vaccine Group to manufacture the vaccines being developed by them • The company is aiming to manufacture 4–5 million doses
Biological E	1	
Bharat Biotech	1	• Bharat Biotech and the US-based FluGen along with virologists at the University of Wisconsin-Madison have begun the development and testing of a unique vaccine against COVID-19 called CoroFlu
Indian Immunological	1	• Has entered into a research collaboration agreement with Australia's Griffith University to develop a lead vaccine candidate for coronavirus • As part of the cross-continental collaboration, scientists from IIL and the university will develop a 'Live Attenuated SARS-CoV-2 vaccine' or COVID-19 vaccine using the latest codon de-optimization technology
Mynvax	1	• Startup developed by IISc, Bangalore

Source Biswas (2020), WHO (2020), Economic Times, April 16, 2020, https://economictimes.indiatimes.com/industry/healthcare/biotech/pharmaceuticals/six-indian-companies-working-on-covid-19-vaccine-many-challenges-in-finding-a-preventive-experts/articleshow/75160500.cms?from=mdr (last accessed on May 2, 2020)

The drug, remdesivir, in recent clinical trials, has shown to shorten recovery time for seriously ill COVID-19 patients. The National Institutes of Health (NIH) began a randomized controlled trial of the drug for the treatment of COVID-19 patients. The details of the trial are not available, but what is available is only an announcement by NIH on its website. But the website also

mentions that more detailed information about the trial results, including more comprehensive data, will be available in a forthcoming report.[2]

Some important domestic pharma companies including Cipla, Glenmark, and Dr Reddy's, according to the industry sources, have started working on the development of the drug which is under patent protection until 2035.[3] The companies are hoping that Gilead, which owns the drug patent, will grant them licencing provisions as it did with hepatitis C drug Sovaldi in 2014, so that domestic manufacturing can then commence. For the present, according to the 'Bolar exemption[4]', the companies are allowed to formulate the drug, strictly for the R&D purposes. It is understood that key pharma companies have started the process to develop the drug's active pharmaceutical ingredients (APIs).

A public laboratory belonging to the CSIR network of laboratories, the Indian Institute of Chemical Technology (IICT) has developed a convenient and cost-effective synthetic process for producing the antiviral drug Favipiravir.[5] IICT has transferred the entire process and significant quantities of pharma-grade API of Favipiravir to one of the largest domestic pharma companies, Cipla. The company has approached the regulatory authority for conducting clinical trials for treating COVID-19.

(iii) **Medical devices**: India has at present at least one domestic manufacturer, AgVa, of invasive ventilators who can supply it for 20% of the going international price of these ventilators. In more recent times, a startup, Nocca Robotics (NR), which is incubated by Indian Institute of Technology, Kanpur (IITK) is in the process of commercializing a low-cost ventilator which according to the developers will cost only about 6% of going international price of ventilators. A US-based engineering simulation company, Ansys, has entered into an agreement with the IIT Kanpur led consortium to assist in its development. NR is expected to manufacture about 30,000 ventilators by May 2020 although more recent information about the progress of this project is not forthcoming. Apart from ventilators, there are some other devices such a diagnostic test kit has been developed by a public laboratory, Sree Chitra Tirunal Institute of Medical Sciences and Technology (SCTIMST). The product called Chitra GeneLamp-N can confirm COVID-19 in two hours or so, at a low

[2] See National Institute of Health (2020), https://www.niaid.nih.gov/news-events/nih-clinical-trial-shows-remdesivir-accelerates-recovery-advanced-covid-19 (last accessed on May 2, 2020).

[3] https://www.businesstoday.in/latest/trends/coronavirus-gilead-to-partner-with-local-firms-for-remdesivir-production-in-india/story/401387.html (last accessed on May 5, 2020).

[4] The exemption enables generic drug manufacturers to use an inventor's pharmaceutical drug before the patent expires, which not only aids in the early launch of generic versions of the drug once the innovator drug's patent term ends, but also promotes further R&D. In India, the exemption is set out in Sect. 107A of the Patents Act and is comparatively broader than its US equivalent.

[5] Preliminary results of favipiravir's (viral RNA polymerase inhibitor) moderate antiviral effect on COVID-19 have emerged from a study in China, although the parent company of the drug (Fujifilm Pharmaceuticals, Japan) has not confirmed the drug's efficacy. Favipiravir (Avigan) is approved in Japan and China for influenza and is investigational for use in COVID-19.

cost of less than INR 1000 per test. SCTIMIST has also developed very cost-effective swabs for collecting oral and nasal specimens for COVID-19 suspected persons and also for developing a viral transport medium which is designed to retain the virus in its active firm during its transportation from the collection point to the lab[6] and these technologies have been successfully transferred to manufacturing firms in Kerala and Gujarat. Still another example of a COVID-related frugal innovation is an N95 equivalent mask developed by an Indian Institute of Technology, Delhi (IITD) incubated startup, ETEX. The KAWACH, developed by ETEX, the mask is at par with N95 in terms of proper fitting, and engineered filtration layer that could provide up to 98% filtration efficiency and costs less than INR 45 per piece. In short, India's manufacturing sector has responded very well in terms of developing a whole host of COVID related, but frugal technologies that are at the same time affordable.

What we have mapped out above is by no means an exhaustive list of frugal medical devices. These are the more important ones which are immediately required for COVID-19 detection and its management, and they confer two important advantages to the country. First, they increase the supply of quality medical devices which are immediately required for COVID-19 management at extremely affordable prices. Second, such efforts reduce our dependence on importation of medical devices of questionable quality and exorbitant prices.[7]

The three factors that can hamper India's technological response COVID-19 is its ability to identify new ways of financing R&D projects in this area and also in effecting changes in the international governance rules concerning Intellectual Property Rights and especially patents which makes it easier for domestic technology development in this crucial fight against COVID-19 and finally reducing the lack of coordination between government policies.

(i) **Financing of innovation**: Innovations to contain COVID-19 are of two types. Those relating to vaccines and therapeutic drugs, and those relating to various types of medical devices. The former type (say Type 1) of innovations may involve, relatively speaking, more formal R&D even if it is for generic versions of already introduced drugs. The latter type (Type 2) of devices may not require formal R&D, and it will in most cases involve some form of reverse engineering of the already existing type of devices. In terms of financing innovation, Type 1 will require both R&D tax incentives and research grants. While in Type 2, research grants and sometimes even equity financing will be the right type of instrument: equity finance is required for establishing new startups. However, in both cases, public technology procurement will be a very useful instrument that can assure a market for the newly developed technology. One of the main modes of financing innovation in the country has been through offering a very generous R&D tax regime (Mani, 2014), although the generosity of which has

[6] See the Press Release, Press Information Bureau (2020).

[7] The recent controversy over imports of rapid antibody test kits is an illustration of such difficulties. See, https://www.bbc.com/news/world-asia-india-52378265 (last accessed on May 3, 2020).

been reduced over time. Studies (Mani, 2018) have shown that the empirical evidence on the effectiveness of this incentive to spur additional investments in R&D, in general, has been questionable. Estimates on revenue loss on account of this incentive computed and presented by the Union Ministry of Finance in its receipt budgets have shown that it has increased from Rs 2839 crores in 2005–06 to Rs 8309.95 crores in 2019–20. We argue that given its performance record as an incentive for enabling firms to commit more resources to R&D and also given the urgency dictated by the pandemic, the government should consider either targeting the tax incentives only to health-related technologies or convert it to a research grant system whereby projects in this priority area are funded with some less stringent conditions on outcomes. Whatever is the policy decision on this suggestion, as Gans (2020) has argued that governments need to bear in mind the following two important aspects while designing their policy instruments for financing innovations to find effective solutions in health-related technologies. They are (i) 'the usual way of rewarding innovative activity breaks down because governments and donors will put pressure on innovators to reduce the price'; and (ii) 'the urgent nature of the crisis means that governments need to failure-tolerant in pursuing a wide variety of approaches to solve a given problem'. According to Gans (2020), the most tried and tested method or policy instrument that encompasses both (i) and (ii) types of failures is the instrument of public technology procurement where the public health authorities offer a credible commitment to purchase all of the innovations at a pre-determined price that is remunerative enough for the innovators.

(ii) **Governance rules on Intellectual Property Rights**: An important area where much clarity is required is on the role of IPRs and especially patents which if it is not allowed to be reformed very quickly can stand in the way of many of these frugal innovations not reaching the masses in the shortest possible time. This is because the pharmaceutical industry, and indeed the digital industry are the two that are most affected, either positively or negatively, by the TRIPS compliant patent regime that was put in place in India since 2005. Even within the short window of time, one could see the negative effect of patents. We could cite four recent incidents during the coronavirus pandemic to buttress our concern.

First, is the case of the American MNC pharmaceutical company, Gilead, whose drug, remdesivir, has received a EUA[8] from USFDA. According to Gilead itself, the company has in early March 2020, sought and was subsequently granted an orphan drug designation for the remdesivir as a potential treatment for COVID-19. Orphan drug designation is granted by the USFDA in situations where the disease affects fewer than 200,000 patients in the USA, although the numbers involved even in the US were significantly higher. The orphan drug status confers many benefits to the

[8]See the press statement by the company, https://www.gilead.com/news-and-press/company-statements/gilead-sciences-statement-on-request-to-rescind-remdesivir-orphan-drug-designation (accessed on December 19, 2020).

recipient such as generous tax concessions, and it also results in a waiver of the requirement to provide a paediatric study plan before the submission of a New Drug Application—a process that can take up to 210 days to review.

But subsequently, the company has submitted a request to the USFDA to rescind the orphan drug designation it was granted, for the investigational antiviral remdesivir, for the treatment of COVID-19 and is waiving all benefits that accompany the designation. Further, Gilead is planning to give away free of charge 1.5 million vials of the drug which is currently available with it as the drug was developed earlier for treating another viral disease, Ebola. But according to the USA-based advocacy group, Initiative for Medicines, Access & Knowledge (I-MAK),[9] Gilead, is a company with a poor reputation for charging very high prices in drugs for treating rare diseases. This could be seen in the context of pricing of hepatitis C where the company bought the drug that cured hepatitis C of a small company, and then charged exorbitant prices which put that medicine beyond the reach of the public health system.[10] It is also important to realize that the remdesivir was developed and tested by two US universities, Vanderbilt and Emory, and its recent field trial for its efficacy for treatment of COVID-19 was publicly funded. All these will naturally necessitate it to be priced very cheaply. Given Gilead's poor record and the company applying for an orphan drug status, I am not sure whether the company will allow the Indian drug manufacturers to make generic versions of the drug while the remdesivir still has a valid patent. However, the Indian patent office could issue a compulsory license to deal with this issue as it has done once in the past. This will of course, crucially, depend on the price which Gilead is planning to charge for a dose of the drug.

Second, is the case of N95 face masks where again the monopoly position for its manufacturing is held by the US MNC, 3 M. While 3 M is not the only producer of N95s, it is the largest domestic manufacturer accounting for over 70% of the market. The company holds 441 patents[11] in the US that mentions 'N95' or 'respirator and the latest respirator-related patent granted to 3 M was approved just on April 7, 2020.[12] It is this fact of patents that explains the shortage of this crucial personal protective equipment that is exposing the front line health workers to the dangerous effects of this highly contagious virus. The IITD incubated startup ETEX with its *Kawach* mask does appear to have circumvented this problem although the Damocles sword of a patent infringement litigation is very much hanging on its head.

Third, is the scandal of sorts that has erupted in the development of convalescent plasma therapy. There is now some consensus that once a patient recovers from

[9] See I-MAK, https://www.i-mak.org/2017/10/25/first-ever-us-patent-challenges-gilead-hepatitis-c/ (accessed on December 19, 2020).

[10] The source of this information is from press statement by Professor Aaron Seth Kasselheim, Professor of Medicine at Harvard Medical School. The Kasselheim statements are to be found in Kolata (2020)

[11] See https://docs.google.com/spreadsheets/d/1SCCCKsGBNC8NmbsydtJfag3wwBl384Fc6hvFMntQfT0/edit#gid=689748996 (accessed on December 19, 2020).

[12] See https://www.healthpolicy-watch.org/the-netherlands-joins-covid-19-ip-pool-initiative-kentucky-governor-requests-3m-release-n95-patent/ (accessed on December 19, 2020).

COVID-19, his or her blood contains antibodies in its plasma that can fight the virus. Those antibodies can be extracted from a donor's blood and given to a severely ill patient via transfusion, with the hope that the donor's antibodies will help the patient recover. The therapy needs blood samples taken from recovered COVID-19 patients. Given the competition for these samples has resulted in a shortage of sorts. A Mumbai-based Indian company specializing in the development of polyclonal antibodies is supposed to have charged USD 50,000 for just a millilitre of blood and acted as a middleman to a California-based biopharmaceutical company, specializing in the manufacturing of antibodies (Bradley, 2020).

Fourth, instead of lessening the hold of patents, the USA continues to treat India as a country where the patent system is very weak, especially as far as pharmaceuticals and medical devices are concerned and have continued to place India in its Priority Watch List. The recently released report by the Office of the United States Trade Representative (2020) gives solid expression to this long-standing concern of the USA. It is surprising that despite the explicit recognition of the stifling effect of patents, the USA has continued with its oft-repeated efforts and calls for further strengthening the IPR regime in India. See Box 1 for the details. As the Box reveals, the US continues to campaign for repealing of Sect. 3(d) of the Indian Patent Act which places a higher bar on the inventiveness criteria for especially pharmaceutical drugs and also has managed to water down one of the most unique features of our patent system, namely the requirement of a working patent.

Time is now ripe for a complete rethinking on the policy on patents in general and those for health-related technologies in particular. Systematic recent analysis (Boldrin & Levine, 2008, 2012) has shown that the patent system appears to have broken down and companies use patents as a strategic instrument for maintaining or creating barriers to entry to new firms so that they can continue to maintain their monopoly and also to make excessive profits. A stricter patent regime which has been carved out by TRIPS compliance has led to a bourgeoning of patent ligations. In fact, Jaffe and Lerner (2011) have shown the fact that many companies and especially those from the USA make much more revenue through patent litigation rather than earning royalties through licencing their patents. In fact, the market for disembodied technologies and especially those related to health-related technologies have become very imperfect over the years. The COVID-19 has brought to focus the IPR scene. There are now many positive developments which are purely voluntary efforts by universities and advocates of an open science or patent pool movement. Companies too have changed their rigid or sometimes even unacceptable stands on patents because of strong opposition from especially the media. Table 1.5 summarizes a selection of the more important ones reported in the press recently.

It is essential that to ensure effective and quick development of vaccines and therapeutic drugs and indeed the type of medical devices that are required for dealing with COVID-19, we require as Mazzucato and Torreele (2020) have argued, (a) a mission oriented public–private partnership in achieving clearly defined common goals; and (b) in order to maximize efficiency of R&D projects in this area, given the fact that all the skill sets that are required for a successful launch of a vaccine,

Table 1.5 State of flux in the patenting arena in the context of COVID-19

Company or organization	Name of drug	Actions
AbbVie	Kaletra—antiviral drug thought to be effective as a therapeutic drug for COVID-19	• Relinquished its patent right but only after the Israeli government issued a compulsory license to manufacture a generic version of the drug
Biotechnology Innovation Organization https://www.bio.org/policy/human-health/vaccines-biodefense/coronavirus	Vaccine for COVID-19	• More than a third of its 1000 members are now working on coronaviruses • New collaborations between arch rivals Glaxo Smith Kline of UK and Sanofi, France
Labrador Diagnostics	Diagnostic tests for detecting COVID-19	• Filed a patent lawsuit against US startup BioFire for developing diagnostic tests for detecting COVID-19 • Consequent to very strong opposition to this from the media have backtracked
Gilead	Remdesivir—the drug that is now received an EUA for treating COVID-19 patients	• Made a U-turn in its attempt to secure an 'orphan drug' status for its drug so that it could have enjoyed tax concessions
Open Covid Pledge https://opencovidpledge.org/pledge/	All companies having technologies for dealing with COVID-19	• Companies could make pledge to make their respective IPs free of charge
Fighting coronavirus together at the University College London, UK https://covid19research.uclb.com/	All companies having technologies for dealing with COVID-19	• At present UCL itself has made its Venture breathing aid (CPAP) free of charge. This involves a design and manufacturing package

Source Compiled from Palmer and Mancini (2020), Pearcey (2020)

drug or device are not available, an open collaboration straddling firms and nations are required. Fortunately in vaccine development, one is able to see elements of both (a) and (b).

Box 1: USA's Reasons for Continue to Putting India in the Priority Watch List

- Patent issues continue to be of particular concern in India as long-standing issues remain for innovative industries. The potential threat of compulsory licenses and patent revocations, and the narrow patentability criteria under the India Patents Act, burden companies across different sectors.

- Patent applicants continue to confront costly and time-consuming pre- and post-grant oppositions, long waiting periods to receive patent approval, and excessive reporting requirements.
- India is moving forward on trying to resolve burdensome patent reporting requirements by issuing a revised Manual of Patent Office Practice and Procedure and considering revisions to Form 27 on patent working.
- The pharmaceutical industry reports concerns as to India's continued use of the threat of compulsory licensing to coerce right holders to lower pharmaceutical prices. Right holders also reported growing concerns over the expansive application of patentability exceptions to reject pharmaceutical patents.
- In the pharmaceutical sector, Sect. 3(d) of the India Patents Act also remains problematic. One implication of its restriction on the patent-eligible subject matter is the failure to incentivize innovation that would lead to the development of improvements with benefits for Indian patients.
- India maintains extremely high customs duties directed to IP-intensive products such as medical devices, pharmaceuticals, Information and Communications Technology (ICT) products, solar energy equipment, and capital goods.

Source Office of the United States Trade Representative (2020).

(iii) **Improving coordination between government policies**: And still another constraint to domestic technology development especially in a fast track mode which COVID-19 demands are to reduce the contradictions in public policies. An all too frequent instance of this lack of coordination is between domestic manufacturing policies especially phased manufacturing requirements and trade policies. The existence of some free trade agreements (FTA) has further complicated this issue. A recent case in point is in the domestic manufacturing of mobile phones which continues to depend heavily on imported inputs from partners in Southeast Asia with whom India has an FTA. A further issue that requires careful analysis is the practice of allowing importation of the technology which the state has supported to be developed or even in the process of being developed. So when domestic R&D projects are about to reach its logical conclusion, the government allows importation of the very same technology, often enough on weighty on technological considerations. The recent experiences of telecommunications equipment and the case of the semi high-speed train are cases to illustrate this. However, there appears to be some coordination of all S&T work towards COVID-19 coordinated by the Office of the Principal Scientific Adviser to Government of India.[13]

[13]This could be found here: https://vigyanprasar.gov.in/covid19-newsletters/ (last accessed on December 17, 2020).

To sum up our argument, there are very many instances of successful frugal innovations in India's health-related technology industry consisting of vaccines, drugs, and medical devices of various types. COVID-19, although an extremely unpleasant and debilitating episode in our country's world's history, offers an excellent opportunity for these domestic technological capabilities to be expressed systematically as it will be immensely useful not just for India but for the world at large in managing or even getting rid of the pandemic (if the vaccines that are being developed proves to be effective in immunizing the population) itself. In fact, it is now very clear that without these innovations our economy can, however, it also raises the role of the state in supporting this research and manufacturing activity by designing financial instruments for supporting the innovation and manufacturing activities and removing the barriers imposed by a very restrictive and stifling patent regime and by reducing lack of coordination between government policies and agencies. India could thus carve out an important niche as the true pharmacy to the world in this extraordinary time.

1.3 Structure of the Book

Against this background, the book is structured into seven broad parts. In the first part, there are two chapters on various dimensions of the agricultural sector in India which has come up for much discussion. The chapter by Himanshu focuses on understanding the current crisis in India's agricultural sector which has forced the farmers to agitate vociferously at several points in more recent times. The chapter, based on detailed data unearths succinctly the genesis of this crisis, the public policy response from the government in easing the crisis and the challenges for the sector in the years to come. The analysis of the relevant fact shows that the crisis is a result of long neglect of structural factors by successive governments since the early 1990s. The crisis has manifested itself in terms of declining incomes for the farmers. The crisis has been aggravated in recent years by policies which have contributed to shifting terms of trade against agriculture, rising input prices and declining output prices. Exogenous shocks such as demonetization have also appeared to have led to an intensification of the crisis. The response of the government in the form of loan waivers and cash transfers is unlikely to resolve the primary contradiction in the agrarian economy. The recent attempt to withdraw state support to agriculture through various reforms, According to Himanshu is further likely to worsen the situation of farmers' incomes. This chapter is followed by another one by Parmod and Yasmeen on supply chain management of food grains in the country. This issue has now become very topical in few of the three farm laws and the recent agitation by farmers from especially Punjab against these laws. The chapter shows the inexorable link that exists between supply chain management and rural development. It proves this by showing how a mismanaged supply chain management system has a deleterious effect on farm income.

The second part focuses on industrial sector and also on innovations and technology issues in the country. The first chapter in this part by Ramaswamy analyses trends in regional concentration of industries especially after episodes of industrial liberalization. The two research questions that are sought to be answered in this chapter are: (i) the reasons as to why the distribution of Indian industry continues to be dominated by just three states in the Indian union, namely by Maharashtra, Gujarat and Tamil Nadu; and (ii) the sources of this uneven distribution despite policies to the contrary by individual state governments in making their own states attractive for industrial investments. The chapter maps out the path dependences in the maintenance of this lopsided distribution further reinforced by various contemporary policies. The next chapter by Smitha Francis and Murali Kallummal is a specific industry study which has become so rare in India. The industry analysed is the electronics hardware manufacturing industry, and it seeks to analyse the nature of FDI-driven engagement of Indian electronics firms in industry value chains. The chapter presents an alternative of measuring the participation of an industry in the Global Vale Chain (GVC). The form that is examined is an FDI firm in India which imports components and other inputs from abroad to serve a large and growing domestic market. A host country can benefit from such GVC participation only when efforts are made to improve the local value addition. The third chapter deals with Science technology and Innovation policies and outcomes. The chapter analyses the performance of the country's investments in and output of innovation in terms of both conventional innovation indicators such as investments in R&D, trends in patents, trends in and structure of high technology exports, emergence and growth of technology-based startups. The period covered in the chapter is the post 2000 period which is characterized by the enunciation of a large number of policies that impact on the S&T performance of the country. These policies range from a new IPR policy to financing of R&D to a number of specific technology policies dealing with a variety major emerging technologies. This is followed by an analysis of the progress of the county in terms of achieving the Sustainable Development Goal no: 9 in terms of 'Industry, Infrastructure and Innovation. Further, it maps out the inputs to S&T policy in terms of human resources development in science and engineering, financing of essentially R&D in industry and the policy support for the emergence of technology-based startups etc. Finally, the chapter surveys the progress of the country with respect to adoption of new technologies such as Industry 4.0 basket of technologies, automation and its potential effects on manufacturing employment, the growth of domestic manufacturing in certain high technology industries such as cell phones, electric vehicles and the diffusion of a cashless economy in India.

The third part contains two papers on the infrastructure sector. Of the two, the paper by Sebastian Morris discusses the policy aspects financing infrastructure projects. Approaches that recognize the specific kind of market failures, in the policy and design of infrastructure, greatly reduce the financing costs and improves the ability of to attract finance in the private provisioning of infrastructure. This is particularly so in the case where there are dual market failures arising out of both the natural monopoly and the appropriability failure aspect. Thus, investments in sewerage and water, city roads, multimodal facilities, solid waste, public health care, the challenges

have proven beyond the current ability of the state. Debilities in the financial markets stem from the weaknesses of the public sector banks. Risk shifting on to the public sector banks by private investors have been very common. Policy must move to internalizing interest rate change risk in all PPPs. It must also tighten the conditions under which renegotiation is possible so that the state is not pushed to bearing the downsides of privately provided infrastructure.

The next chapter in this part is on land transfer for development projects is by Ram Singh and he provides a critique of the traditional mechanisms to transfer land from agriculture to other developmental activities. It is shown that that both the market mechanism and the *Eminent Domain* have several serious shortcomings, especially in the Indian context. Eminent Domain (Land Acquisition) Law empowers governments to take away private properties for public purpose. In many cases, the affected owners approach the court to seek enhanced compensation. Indeed, disputes and litigation over compensation is an international phenomenon. Ram Singh compares the compensation provided by the Government (executive) and the Courts (judiciary). His analysis indicates that the compensation for expropriated properties is regressive—Compensation for high-value [low-value] properties is greater than [less than] their market value. Therefore, it is argued that the land pooling mechanism is a better alternative for ensuring availability of land for development as it is more efficient and equitable than traditional means of land transfers.

The fourth part has one chapter by Partha Pratim Pal and Swathysree analysing engineering exports from India. The sector is selected for in-depth examination as it is not only the largest segment of the Indian manufacturing industry but also the largest net foreign exchange earner. However, the sector has seen increasing its import dependence, and domestic firms in the sector have lost market share both in domestic and international markets. Against this background, the paper looks at the changing pattern of exports of India's engineering goods sector and attempts to identify products with most export potential. The authors find that though intermediate and capital goods are the ones that is mostly driving the country's engineering exports, India has also an increasing trade deficit in these goods. The analysis of export competitiveness reveals a strong negative relationship between India's competitiveness and global market size, i.e., India is found not to be competitive in those products with large market size and vice versa. Though the two-way trade in intermediate goods is an indicator of integration to global value chains, the strong global market presence in resource-intensive low value-added goods and the extremely limited final goods exports suggests that India is struggling to develop competitiveness in high-value adding segments of engineering goods. The chapter concludes with some policy prescriptions, namely that the government needs to shift its focus from the protection of intermediate goods towards improving domestic technological capability to increase domestic value addition and export competitiveness. In this way, the findings of this chapter is somewhat similar to Chap. 5 by Smitha Francis and Murali Kallummal.

The fifth part has two chapters focusing on two important aspects of the economy which has a direct bearing on the human development index of the country. These are

on health and on higher education—two sectors which have assumed much significance these days: the health sector being in the limelight in view of the pandemic and the higher education sector in view of the recent path breaking policy change in the form of the *New Education Policy 2020*. The chapter by T K Sundari Ravindran and Neena Elezebeth Philip undertakes a detailed review of health reforms in India and examine whether the country is moving towards the state goal of Universal Health Coverage (UHC) which will make health services accessible to all. The chapter discusses major health financing reforms and private sector engagement in health in India from the perspective of their contribution to UHC. Based on existing evidence, the chapter argues that recent health reforms in India have made limited contributions to access with financial risk protection for socially and economically marginalized groups. Inequalities in coverage by health services have been accentuated and the less privileged bear a disproportionate burden of catastrophic health expenditures. Drawing on the experiences of lower-middle-income countries in Asia, such as Thailand and Vietnam that have achieved near-universal health coverage, the chapter concludes with stating the much-needed reforms that are urgently needed for India to move anywhere close to achieving UHC. The chapter by Pradeep Kumar Choudhury and Amit Kumar tracks the changes professional higher education (PHE) in the country. The chapter discusses four different dimensions of PHE: (i) trends in and patterns of growth in professional higher education; (ii) inequalities in access; (iii) barriers to participation; and (iv) household financing of professional higher education. The authors find striking regional inequality in the growth of PHE in India in the last decade (2010–2019)—close to 40% of professional higher education institutions are located in southern region while it is less than 10% in central, eastern, and north-eastern regions. It is also found that students belonging to poor households are considerably underrepresented in PHE.

The chapter by Jayan Jose Thomas in the sixth part contests the widely cited argument that the slow expansion of manufacturing employment in India has been on account of the rigidities in the country's labour market. The growth of employment in India's organized manufacturing sector, which remained stagnant at 8–9 million between the early 1980s and the early 2000s, accelerated to reach 15 million by 2017–18. Nevertheless, employment in the manufacturing sector as a whole (organized and unorganized sectors combined) decelerated, especially during the recent years (from 61.3 million in 2011–12 to 60.2 million in 2017–18). The reasons for the lacklustre performance of the manufacturing sector in India lie outside the sphere of labour. To begin with, the slowdown in the growth of investment, especially since 2007–08, created severe bottlenecks for industrial expansion, especially for the small units. The other major constraints include inadequate access to bank credit for the small firms and the increasing dependence of India's manufacturing growth on imported components. Greater domestic investment and well-directed industrial policies are important to achieve faster generation of decent jobs in Indian manufacturing.

The seventh and final section contains four chapters that discusses various dimensions of gender in India, an aspect that is relatively under explored in books on Indian economy. The findings of these four chapters clearly show that a critical understanding of India's economy and society is not complete without discussing the role of gender. The first chapter in this part is by Mary John who examines the issue of

missing girls—the long term worsening trends in overall sex ratios which continued to decline during the post-independence phase. A new moment in our understanding of this phenomena comes with the women's movement's discovery of the abuse of amniocentesis testing for sex determination and its subsequent normalization through pre-natal ultrasound as part of ordinary maternal care during a pregnancy. Mary in her chapter argues that this new moment is distinctive in the Indian context in more than one way: It is urban-led and most visible among non-poor 'small families' aspiring to have the right kind of family of one boy and one girl. While dominant approaches to sex selection see it as the core of Indian culture (son preference); or alternatively as part of the continuum of violence against women, Mary suggests that the lens of political economy might have its own insights to offer, and that gender stereotypes are becoming more complex than simple accounts of preference and daughter aversion would suggest. The next chapter by Paro Mishra is an ethnographic study interrogating Haryana *Kalyanams*—popular name for marriages between men from Haryana and women from Kerala. The chapter thus illustrates the complexity of marital mobility in cross-region marriages (CRM) in India. CRM are an outcome of local male marriage squeeze created due to sex ratio imbalance and changing gender relations in north India. Media attention to these marriages is largely negative and replete with stories of trafficking and exploitation of brides from Bihar, Bengal, Odisha, Assam, and Bangladesh married into Haryana. However, in Kerala–Haryana marriages, the popular narrative changes. The better position of Kerala in comparison to Haryana, as expressed in its gender development indicators, is used to present Kerala brides as completely in control of their marital destiny and as agents of change and transformation in rigidly patriarchal Haryanavi society. The third chapter in this part is by Padmini Swaminathan who forcefully argues that macro-economic policies centrally anchored in the discipline of conventional Economics cannot accommodate gender concerns. It also provides a brief overview the shifts in 'Gender and Development' literature emphasizing in particular the contribution of feminist economists. Feminists' continued efforts to move towards transformation of society to achieve gender equity finds articulation in the manner in which the Sustainable Development Goals of Agenda 2030 have been formulated. Using the Telangana Social Development Report, 2018 as a case, the chapter not only demonstrates what a 'gender' reading of secondary data can reveal but also the fact that the findings of the Report are in sync with the concerns raised by feminists over the various Sustainable Development Goals and Targets of Agenda 2030. The fourth and final chapter in the book This paper examines a report that was published in 1947—on women's role in the planned economy. The report was prepared by the subcommittee appointed for this purpose, and its mandate was both novel and expansive. It was to examine women's lives and the roles women played in three different yet related settings: the family, the economy, and social institutions. The chapter draws on this report to indicate the issues at stake for those who were fascinated by the idea of planning, as such and used it as a context to bring together the household and the world of labour, marriage and money and property and progeny. A dissenting note appended to the report gives the reader an indication of how planning appeared to hold both practical as well as utopian possibilities for women.

1.4 Unique Aspects of the Book

The structure of the book, as outlined above, gives a holistic picture of India's economy and society. The unique features of the book are listed below:

- The book begins with a detailed and empirically supported papers on the recent crisis in India's agricultural sector and the reforms in the agricultural markets, both of which are issues extreme current importance.
- Financing of infrastructure projects by public sector commercial banks have been one of the prime reasons for the banks to be saddled with huge NPAs.
- For the first time, a paper discusses the merits and demerits of the market mechanism and land acquisition law for transferring land from current to developmental purposes.
- Detailed analysis of what happened to regional concentration in manufacturing industries after economic liberalization and why concentration in manufacturing has remained within some states have been explained.
- Critical examination of India's electronics manufacturing industry and the extent to which it is inserted into the Global Value Chains for electronics manufacturing.
- Detailed analysis of India's engineering exports and shows that the country is stuck at the bottom of the ladder in terms of moving up the value chain in this sector.
- Maps out the performance of the country in terms of investments in and output of Science, Technology and Innovation, a critical analysis of the public policies for its promotion and the diffusion of new and emerging technologies in the economy and especially the Industry 4.0 basket of new technologies.
- Analysis of recent changes in labour laws and its impact on employment growth especially in the manufacturing sector of the economy is examined.
- Critical analysis of those crucial aspects in health in terms the country's efforts to achieve Universal Health Coverage and the performance of professional higher education reforms which has a direct impact on human development in the country is discussed.
- This is the first time that a book on Indian economy is also addressing the question of gender issues and especially role of gender in development.

The book thus serves to aid an informed and nuanced discussion of some of the country's pressing issues confronting not just her economy but the society as well.

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Part I
Agriculture

Chapter 2
The Crisis in Indian Agriculture: Genesis, Response and Future Prospects

Himanshu

2.1 Introduction

The COVID-19 pandemic, apart from creating a health crisis across the world has also led to sharp decline in economic activity across the world. Most countries resorted to some form of economic lockdown resulting in decline in economic activity. Among major countries, Indian economy was the worst affected with the economy contracting by 23.9% in the first quarter of 2020–2021. While the lockdown and the disruptions caused by the pandemic definitely contributed to the sharp decline in gross domestic product, it is also true that the severity of the impact was also higher because of the underlying slowdown in the economy since 2018–2019. The Indian economy has been slowing down since the fourth quarter of 2017–2018.

It is at this time that the agricultural sector is seen as the saviour of the economy, leading to demand push and income growth. Contrary to the trend of general slowdown in the economy, the agriculture sector is the only one which has shown an increasing trend. This is also true for the first quarter of 2020–2021 which witnessed agriculture bucking the trend and remained the only sector with positive growth. Figure 2.1 plots the quarterly growth rate of agricultural GDP and the overall GDP for the Indian economy.

The fact that the agricultural sector is showing trends opposite to the overall economy has been seen as a sign of optimism for even the post-pandemic revival of

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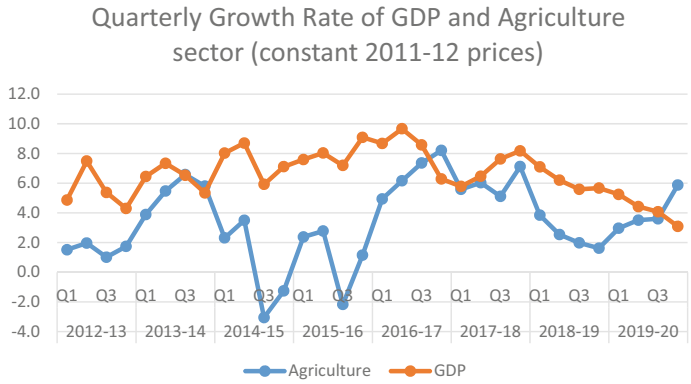

Fig. 2.1 Quarterly growth rate of agriculture and total GDP. *Source* Ministry of Statistics and Programme Implementation (MOSPI), Government of India

the Indian economy. While the agricultural sector has performed better compared to other sectors of the economy, a careful analysis of the disaggregated data suggests that not only the hopes on agriculture pulling up overall economy hugely misplaced but also that the aggregate growth rates of agriculture are hardly an indicator of the sector performing better than rest of the economy.[1] The optimism on agriculture pulling up the overall economy has also led to the government enacting several reforms in agricultural marketing. During the monsoon session of 2020 three key legislations, namely, The Farmers' Produce Trade and Commerce (Promotion and Facilitation) Bill, 2020 (FPTC), the Farmers (Empowerment and Protection) Agreement of Price Assurance and Farm Services Bill, 2020 (FAPAFS), and the Essential Commodities (Amendment) Bill, 2020 were passed amid protests by the opposition parties without any discussion in Parliament. Most of these reforms are the continuation of earlier efforts to streamline the agricultural marketing regulations. However, these have not generated similar enthusiasm among the farmers with the passage of these reforms leading to widespread protests throughout the country.

A careful analysis of trends in agricultural growth and incomes from farming suggests that contrary to the understanding that agriculture has been doing well in recent years, particularly since 2014, agriculture has been going through a period of severe and unprecedented distress. It is not an exaggeration that the agricultural state has been in a state of perpetual crisis ever since independence. While there have been episodes when agriculture has performed better compared to the non-agricultural sector, but the recurrence of the crisis over the decades also emphasises the unfinished nature of agrarian transformation needed for a dynamic and fast moving economy. The present crisis in agriculture is different from the earlier episodes not just on the nature and severity of the crisis but also the factors which have contributed to this crisis. The current crisis in agriculture is largely a result of an accumulation of

[1] See Damodaran (2018) and Sen (2016) for some reasons for the current crisis.

distress over the last decade or so, driven by changes in the nature of production as well as the nature of economic policy.

Compared to earlier episodes where the crisis was a result of disruption in production or weather-induced factors, this time the crisis has intensified at a time when agricultural production has not declined significantly. While the twin droughts of 2014 and 2015 aggravated the crisis, the genesis and its subsequent intensification have been a result of factors unrelated to monsoon failure. Most important among them has been the sharp decline in price realisation of agricultural output since August 2014. While some of this was created by external factors, a large part of the blame on intensification of the crisis lies on the neglect of the agricultural sector since 2012–2013. But what makes the crisis also severe is the decline in overall economic activity in the non-agricultural sector. The rural non-farm economy which used to play the role of supplementing the rural economy during times of agricultural crisis has seen severe demand deflation driven by declining agricultural productivity, decline in rural informal sector and stagnant wages since 2013. Further, unlike previous episodes when parts of agricultural economy were affected and was localised regionally, this time the agricultural sector has suffered throughout the country with the crisis affecting all sectors and crop groups, although to varying degree.

The present chapter is a brief attempt to understand the nature of the current crisis in agriculture. The second section presents an outline of the genesis of the crisis. We examine the role of agricultural investment and price policy which aggravated the agricultural situation. We then examine the situation in the non-farm sector. Section three looks at some of the initiatives of the government in recent years and its likely impact on agricultural sector in general and on incomes in particular. Finally, the paper concludes with some conjectures on the likely future trend in agriculture.

2.2 The Genesis of the Crisis

As mentioned earlier, Indian agriculture has seen episodes of high growth and productivity but has also seen recurrent distress. While this has been the long standing issue with agricultural distress being the defining feature, the causes of the distress have changed over time as with changing agriculture. However, the crisis this time is not just restricted to the agricultural sector but has also affected the rural non-farm sector with implications for overall economic growth and employment in the economy. The non-farm sector which has been an equally important part of rural economy lately, has also been under stress with most of its sub-components witnessing lower growth compared to the 2004–2005 to 2013–2014 period. Along with farmers whose incomes have declined in real terms, the wages of manual casual workers has seen sharp deceleration in growth rate with real wages in agriculture as well as non-agricultural sector stagnating in the last five years. Taken together, casual workers and cultivators account for almost two-thirds of all workers in the rural economy and a decline in their real incomes has contributed to one of the worst demand deflation in recent years. The decline in demand has now manifested in different ways and

have impacted the growth rate of overall economy with the growth in 2019–2020 at 4% being the lowest since this government took over.

The current situation in many ways mirrors the crisis in the agricultural sector during 1997–2003. The crisis was a result of prolonged period of demand deflation led by collapse of agricultural prices (which contributed to terms of trade shifting against agriculture) and a sharp slowdown in agricultural wages. There was also a sharp increase in farmer suicides. The growth rate of agriculture during 1998–2004 was 1.76% per annum. However, the rural economy bounced back after 2004 with growth rate of agriculture accelerating by more than double to 3.84% per annum between 2004–2005 and 2012–2013 based on the old GDP series. The revival of agriculture was led by increase in credit availability to agriculture, increase in agricultural investment and policies which helped in shifting the terms of trade in favour of agriculture. The increase in MSP during the UPA government may have been partially contributed to food inflation during the second term of UPA but it also led to higher incomes for farmers and a general increase in wage rate unprecedented since the 1980s. MSP of paddy increased from 560 per quintal in 2004–2005 to 1310 per quintal in 2013–2014 while that of wheat increased from 640 per quintal in 2004–2005 to 1400 per quintal in 2013–2014, both increasing by more than two times. The increase in income in the hands of farmers certainly contributed to increase in demand in the rural economy which was reflected in higher purchase of durables, and also to higher demand for non-farm employment, largely led by increase in private construction. At the same time, the non-farm sector also benefited from increased transfer from central and state governments through various rural development and food security programmes such as the national employment guarantee scheme and the expansion in the public distribution system. The net result was an equally sharp increase in non-farm incomes and fastest reduction in poverty in the last three decades.

The incumbent National Democratic Alliance (NDA) government led by Prime Minister Narendra Modi promised to double farmers' income by 2022. That appears to be an uphill task given that farmer incomes have declined in real terms not just during this government's tenure but have been declining since 2011–2012. While there are no reliable and robust estimates of farmer income, the background paper outlining the strategy and action plan for doubling farmer's income by the NITI Aayog shows a trend of declining farmer income since 2011–2012 (Chand, 2017).[2] As against a growth rate of farmer income at 5.52% per annum between 2004–2005 and 2011–2012, income of all farmers declined at 1.36% per annum between 2011–2012 and 2015–2016. For cultivators, the growth rate of income decelerated sharply from 7.46% per annum between 2004–2005 and 2011–2012 to 0.44% per annum between 2011–2012 and 2015–2016 (Fig. 2.2). Extending the calculations using the methodology suggested by the NITI Aayog to 2017–2018, it is seen that the trend of deceleration in growth of farmer and cultivator income has continued.[3] In fact, the

[2]Chand (2017), "Doubling Farmer's Income: Rationale, Strategy, Prospects and Action Plan", NITI Policy Paper No.1/2017, NITI Aayog.

[3]Since there has been frequent revisions to the estimates of GDP including a recent one released by the CSO on 31 January 2019, it is difficult to get a conclusive trend on these. The trends mentioned

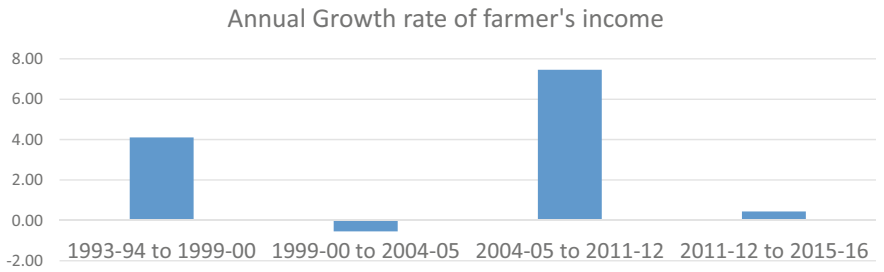

Fig. 2.2 Annual growth rate of farmers' income. *Source* Chand (2017)

period after 2011–2012 has been the longest such episode where farmers have seen real incomes grow at slowest pace.

Incidentally, this has happened at a time when, based on the new series of national accounts, agricultural growth rate is 3.08% per annum between 2013–2014 and 2018–2019,[4] which although lower than the 3.5% per annum between 2004–2005 and 2013–2014 under the UPA government,[5] is not bad considering the back to back droughts of 2014 and 2015. However, this picture of a buoyant agricultural sector is only part of the story. A break up of the various sub-sectors of agricultural sector shows a story of stagnation of crop sector output in the last five years. Figure 2.3 gives the gross value added in various sub-sectors of agriculture and allied sector. The crop sector which has seen a sharp deceleration in real GVA growth during the first four years of this government, with growth in real terms at only 0.3% per annum. Note, it was actually declining for the first three years of this government (2013–2014 to 2016–2017). What makes it significant, is the size of the crop sector which is two-thirds of agricultural sector GDP as well as the number of farmers dependent on it. The crop sector which accounts for 56% of total agricultural output and employs majority of farmers has seen the lowest growth in the last two decades. In comparison, the crop sector grew at 3.3% per annum during the 10 years of the UPA regime. The sectors which have shown high growth within the agricultural sector between 2013–2014 and 2018–2019 are livestock sector (8.1%), forestry (3.1%) and fisheries at 10.9% per annum. It is certainly a puzzle as to what contributed to high growth of 8.1% in livestock when the crop sector has seen negligible growth. This

here are based on estimates from the annual publication of national accounts. While these will show some increase given that estimates of growth in agricultural GVA has been revised upwards, these are unlikely to match the growth rate of income during UPA years.

[4]2018–2019 figures are based on advance estimates released by the Central Statistical Office (CSO).

[5]There are two different estimates of GDP prior to 2011–2012 from two different sources. One of these is the estimate of back series as part of the National Statistical Commission's committee on real sector statistics. This was subsequently withdrawn and a separate back series was released by the NITI Aayog. Both of these show completely opposite trend in growth rate of national income. While the NSC report does provide estimates for years before 2004–2005, the NITI Aayog report only provides it up to 2004–2005. However, there is clarity as to which one is officially accepted figure. To avoid any confusion, there is no attempt to merge the two series and we have used the 2004–2005 series for estimates pertaining to UPA years and earlier.

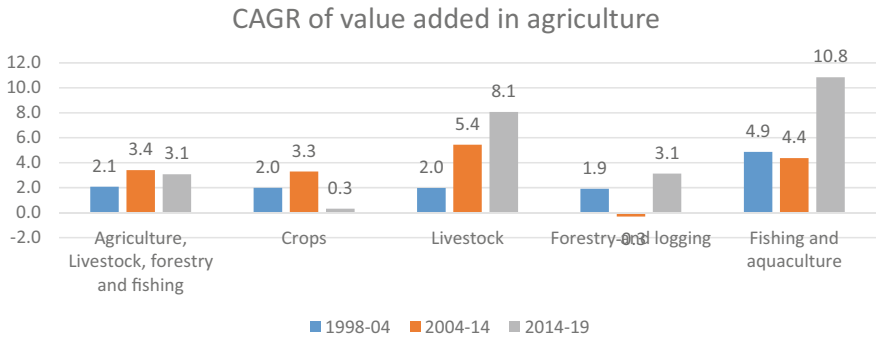

Fig. 2.3 Gross value added (GVA) at basic prices by economic activity (at 2011–2012 prices). *Source* Revised estimates of national accounts released on 30th September 2020

is not only against past trends but is also difficult to believe given other indicators of livestock economy in the last five years. Whether the agricultural growth rates are for real or statistical artefact may not be known but the slowest growth of crop sector does confirm the story of declining incomes of farmers, majority of whom depend on crops for subsistence.

The decline in gross value added in the crop sector was not driven by any particular crop group but was observed for almost all crop groups suggesting an overall deterioration. While the drought of 2014 and 2015 did contribute to stagnation in overall agricultural output which recovered in 2016–2017 which was a normal monsoon year, this was not the case with the crop sector with gross value added in crop sector being lower than the previous normal monsoon year of 2013–2014. Even within the crop sector, it was only the horticulture and allied sector, which showed a sharp recovery with decline in all other crops.

Clearly what matters for wellbeing of rural residents, both agricultural and non-agricultural households, is the growth in the dominant sector of crop sector. But as the disaggregated data shows, this sector has seen a sharp slowdown in growth rates. While this partly explains the decline in rural demand which has now spilled over to the other sectors of the economy, it also limits the ability of the agricultural sector to pull up the overall economy. However, the real issue that needs to be analysed as to why the crop sector witnessed a sharp slowdown in growth rates. Part of the answer lies in the nature of agricultural policies followed in the last here decades but it was also a result of external shocks which acted as catalyst.

2.2.1 Rising Costs and Falling Profits

Declining GVA in crop sector is not just a result of weather fluctuations which affected the output in the first two years of this government but also of cumulative neglect over the years, which intensified further during the five and half years of this

government. Some indication of distress in agricultural sector were already visible since 2011–2012. While the agricultural sector rebounded after the crisis of 1998–2003 with recovery in farmer incomes, it was short lived and had started showing signs of stress since 2012–2013. The sharp rise in real casual wages at more than 6% per annum during 2008–2013 along with rising fuel and input costs had already squeezed the profit margin of farmers since 2011–2012. Rise in petroleum prices had already led to increase in irrigation costs.

Following the introduction of Nutrient Based Subsidy (NBS) scheme for fertilisers in 2010, fertiliser prices had also increased sharply leading to decline in fertiliser usage. Fertiliser consumption which increased from 16.7 million tonnes in 2000–2001 to 28.1 million tonnes in 2010–2011 started declining after the introduction of NBS regime, declining sharply to 26 million tonnes by 2017–2018. Figure 2.4 presents the trend in total fertiliser consumption along with break up by different fertilisers. Figure 2.5 shows that the decline on overall fertiliser consumption meant that per hectare fertiliser consumption declined after NBS at 1.5% per annum as against 5% growth in the decade before that. As Chand and Pavithra (2015) show, it also led to worsening of fertiliser mix (see Fig. 2.6).

All this together contributed to a squeeze in farmer incomes. This is visible, for instance, from the trend in tractor and power tiller sales where tractor sales increased from 2.47 lakhs in 2004–2005 to 6.97 lakhs in 2013–2014 and then declined subsequently to 5.82 lakhs in 2016–2017. Similarly, for power tillers, sales rose from 17,481 in 2004–2005 to 56,000 in 2013–2014 but declined to 45,200 in 2016–2017. The squeeze in farmers' income also resulted in declining offtake of credit and increase in debt burden. As seen in Fig. 2.7, agricultural credit which was growing at more than 20% per annum between 2008 and 2011 declined to average of 15% per annum between 2011 and 2016 before declining further to less than 5% per annum by the end of 2017.

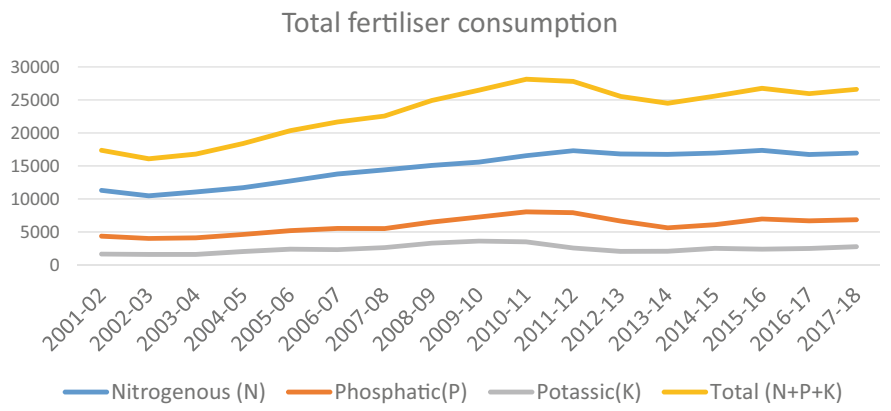

Fig. 2.4 Total fertiliser consumption (000 tonnes). *Source* Agricultural Statistics at a Glance 2018

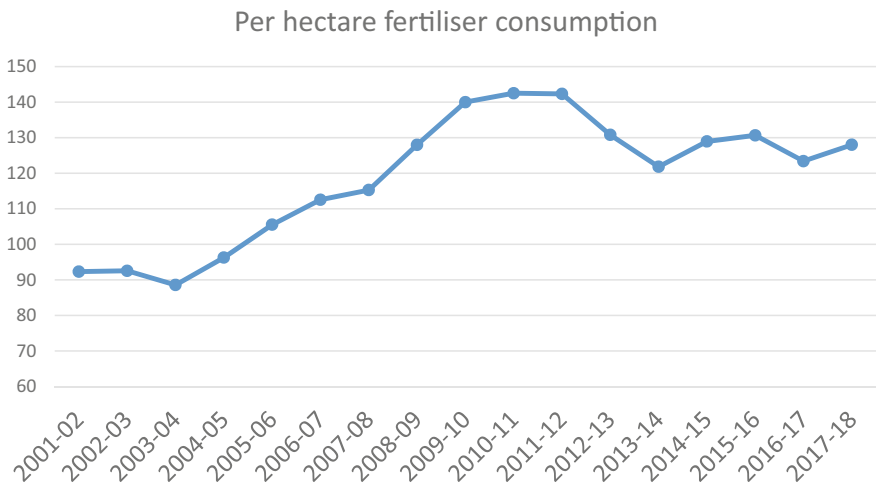

Fig. 2.5 Per hectare fertiliser consumption (kgs). *Source* Agricultural Statistics at a Glance, 2018

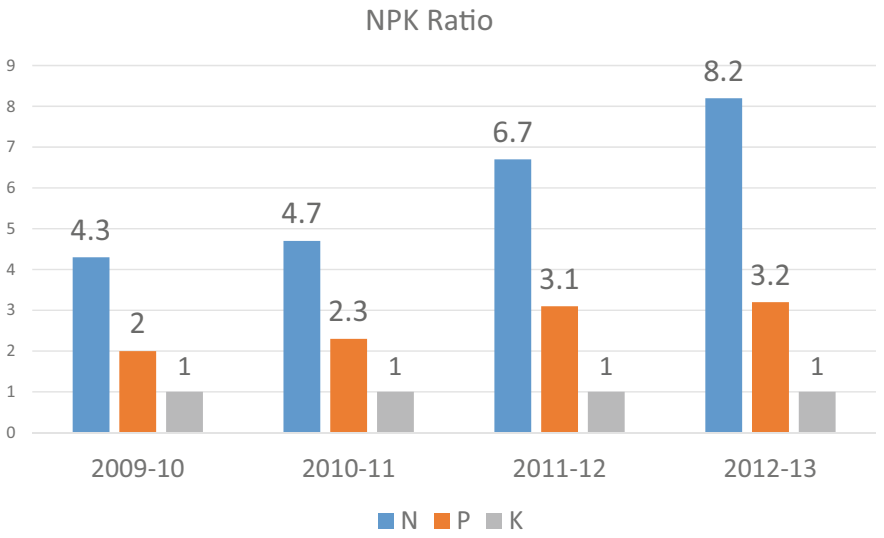

Fig. 2.6 NPK ratio of fertiliser consumption. *Source*Agricultural Statistics at a Glance, 2018

The twin droughts of 2014 and 2015 were against this background of rising input costs and squeeze in farm incomes. Adverse weather conditions contributed to a decline in agricultural output. But the farmers also suffered from two associated factors. The first was the decline in agricultural commodity prices following a sharp collapse of international prices coinciding with the fall in petroleum prices. The decline in crop output prices which started with the collapse of petroleum prices

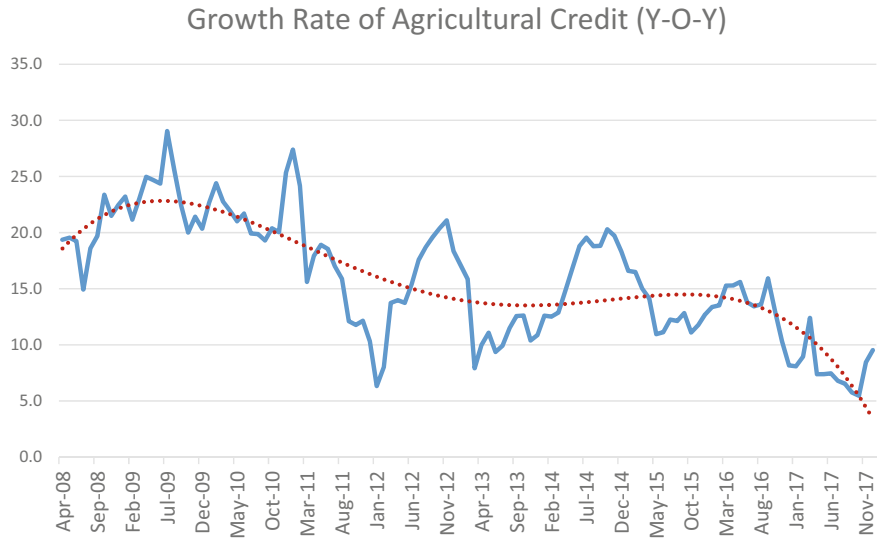

Fig. 2.7 Annual growth rate of agricultural credit. *Source* Reserve Bank of India

in August 2014 quickly spread over to agricultural commodities, first to cash crops which witnessed a sharp collapse in domestic prices following international prices but soon spread to other crops as well. Figure 2.8 presents the trend in monthly food price index from the Food and Agriculture Organisation (FAO).

Both these factors, adverse weather conditions and the fall in international prices, came as a shock to the agricultural sector which had already started showing signs of stress because of increasing input prices. These were further aggravated by the response of the government which further contributed to building up of the crisis.

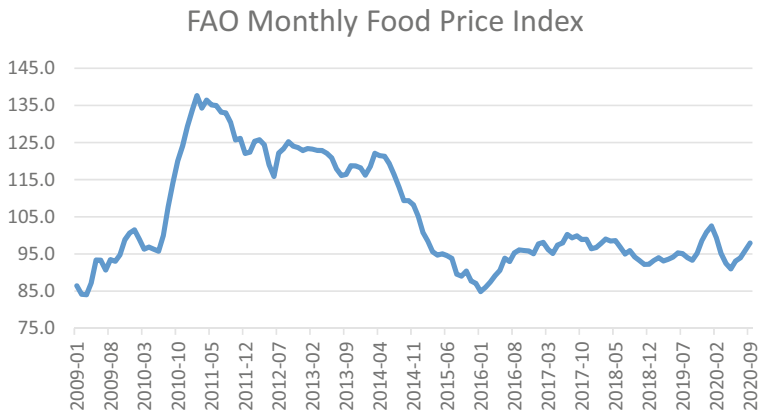

Fig. 2.8 Monthly food price Index (FAO, 2002–2004 = 100). *Source* FAOSTAT

The first was the sharp cut back in agricultural expenditure with major cutbacks in agriculture related schemes. The first full budget of this government in 2015–2016 witnessed a decline in agriculture budget by almost one-fourth in nominal terms compared to the 2013–2014 budget. Although it improved in 2016–2017, it still remained lower than the agricultural budget of 2013–2014. Secondly, even though the government was the beneficiary of large windfall gains following the sharp fall in petroleum prices, these were not passed on to the consumers, leaving them with an unchanged input bill. While the terms of trade had already started moving against agriculture after 2011–2012, it continued further in the next two years. Figure 2.9 gives the terms of trade between farmers and non-farmers. Last time the index of terms of trade had moved against farmers was the 1997–2003 period. It had recovered after that with the index moving up from 85 in 2004–2005 to 103 by 2010–2011, driven by generous MSP increases and a general rise in food inflation. But it declined soon after and has remained at this level after that.

The third factor which contributed to the worsening of the agrarian situation was the decline in real investment in agriculture. At a time when all indicators of rural economy were suggesting a worsening of agricultural situation with decline in farmers' income, the response of the government was to reduce the already meagre investment going into agriculture. Investment in agricultural sector declined sharply under this government with real investment declining at 1% per annum during the four years of this government for which data is available. Figure 2.10 gives the real investment in agriculture since 2011–2012, and Fig. 2.11 presents the investment/output ratio in agriculture at current prices. While investment/output ratio was

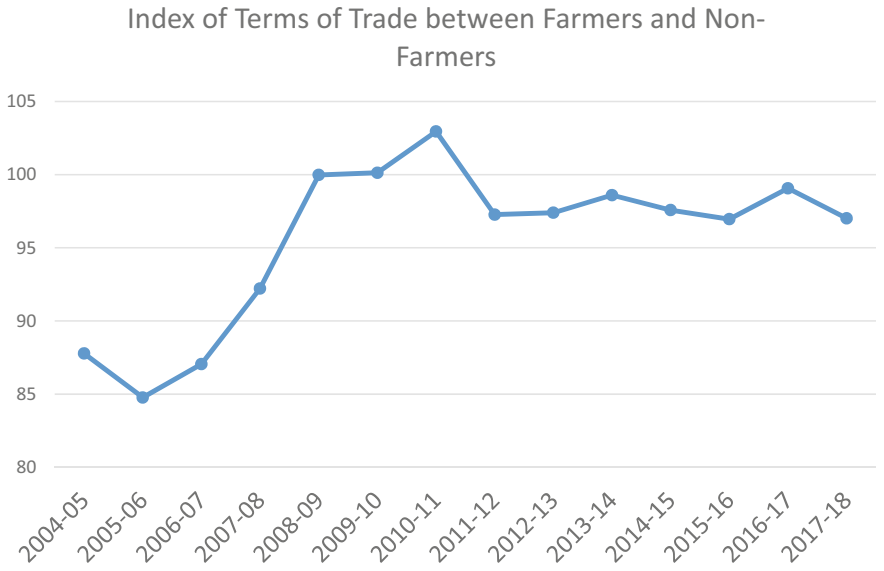

Fig. 2.9 Index of terms of trade between farmers and non-farmers. *Source* Agricultural Statistics at a Glance 2018

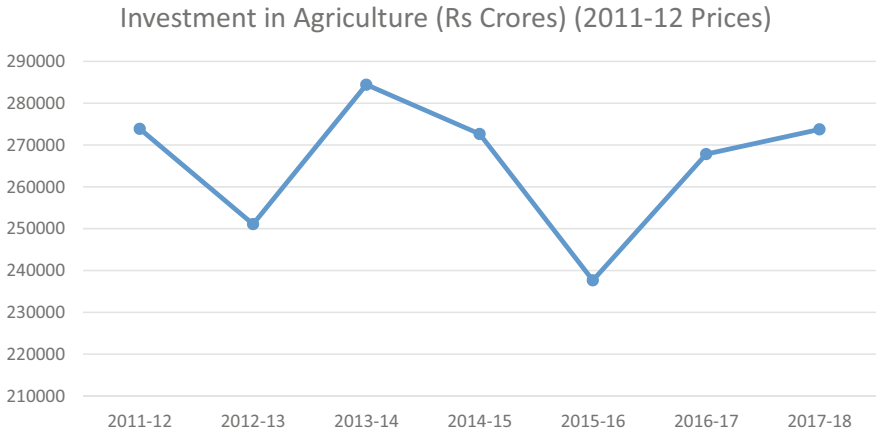

Fig. 2.10 Investment in agriculture and allied sectors (2011–2012) prices). *Source* National Account Statistics

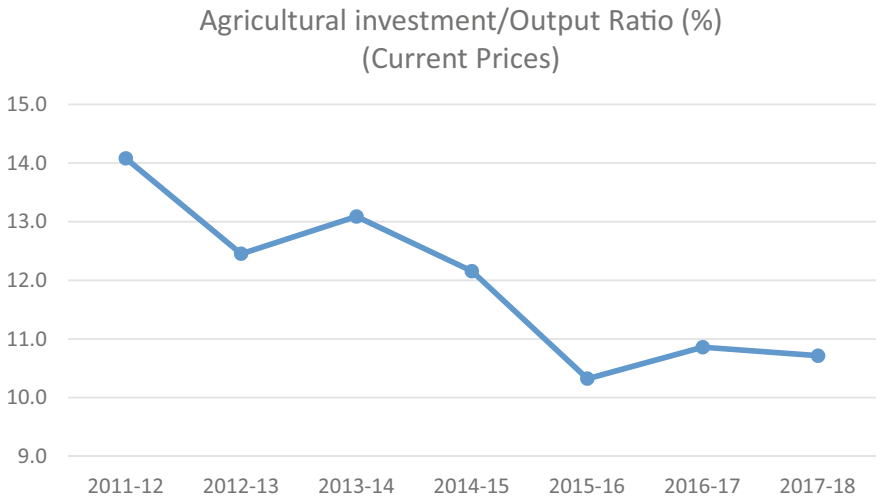

Fig. 2.11 Investment/output ratio in agriculture. *Source* National Account Statistics

14% in 2011–2012 and declined to 13% by 2013–2014, it declined sharply to around 10% in 2017–2018. The decline in agricultural budget and investment in agriculture, in the context of drought, further aggravated farmers' distress.

2.2.2 The Non-farm Sector

While the distress in the agricultural sector had already been building up since 2012–2013, one of the reasons which aggravated the crisis was also the slowdown in the non-farm sector. The non-farm sector has been gaining importance in the rural economy for some time now. It is visible from the national accounts estimates which suggest an increasing share of rural non-farm sector in output as well as employment with decline in absolute number of workers in agriculture since 2004–2005. By 2011–2012, agriculture was not the dominant employer for the overall economy, although it remained important in rural economy. While the aggregate data may not capture fully the extent and the importance of rural non-farm economy in sustaining the rural economy, evidence from village surveys clearly points out to its increasing importance.[6] The rural non-farm economy was not just a driver for income and employment diversification but also contributed to the significant poverty reduction between 2004–2005 and 2011–2012. However, the rural non-farm economy had also started showing signs of stress with deceleration in the construction sector. This slowdown was reflected from the national accounts but is captured strongly from the wage data.

Real rural wages which rose at more than 6% per annum between 2008 and 2012, started declining since November 2013 (see Figs. 2.12 and 2.13) and continued to decline until October 2018, the latest period for which data is available. Since May 2014, real wages of agricultural labourers have grown at the rate of 0.77% per annum until October 2018, whereas it has grown only at 0.02% per annum for non-agricultural labourers. For construction workers who are among the largest group

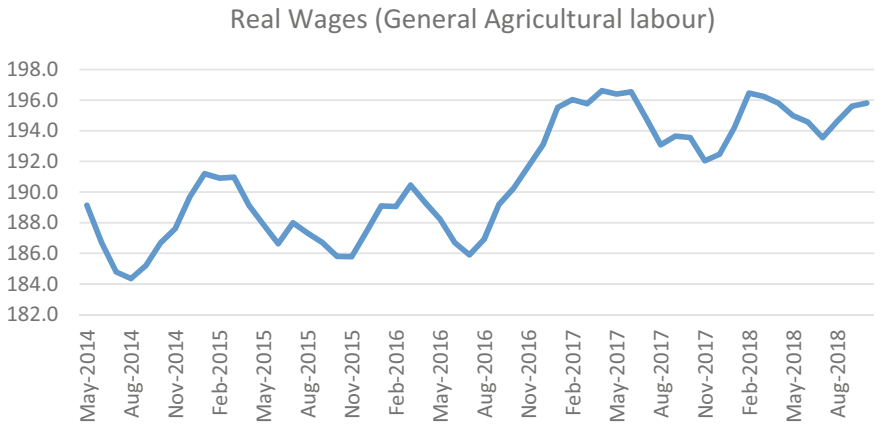

Fig. 2.12 Real wages of general agricultural labour (2011 prices). *Source* Wage Rate in Rural India, labour Bureau. *Note* Real wages have been obtained by deflating nominal wages by CPIR

[6]For an overview of changes in rural economy and the role of non-farm economy, see Himanshu et al. (2016) and (2018).

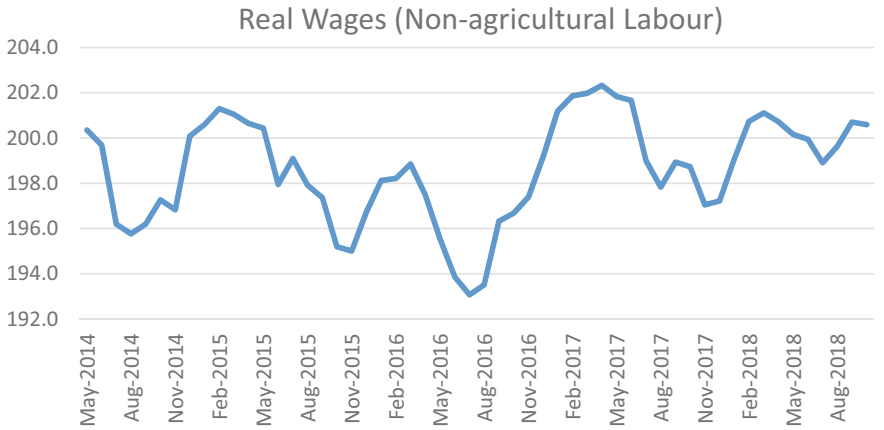

Fig. 2.13 Real wages of Non-agricultural labour (2011 prices). *Source* Wage Rate in Rural India, labour Bureau. *Note* Real wages have been obtained by deflating nominal wages by CPIR

of workers outside agriculture, real wages during the same period has declined by 0.24% per annum. For all agricultural occupations together, the growth rate of real wages during this period was 0.55% per annum. The deceleration in real wage growth and stagnation in real wages was reversed in July 2016 which was a normal monsoon year after two years of drought. However, this could not be sustained with real wages again stagnating after May 2017, most likely as a result of the demonetisation of November 2016, which disrupted agricultural activities as well as rural non-farm sector. Both these sectors are largely informal in nature and suffered immensely due to withdrawal of cash in the system. Since August 2017, real wages of casual workers in rural areas have declined for both agricultural and non-agricultural sector with a sharper decline in non-agricultural wages than agricultural wages.

The decline in real wages was driven by the decline in agricultural production and also a slowdown in the non-farm sector, particularly construction and manufacturing. Construction sector grew at 7.9% per annum between 2004–2005 and 2012–2013. However, the growth decelerated sharply to only 3.5% between 2014–2015 and 2017–2018 which affected the demand for non-farm labour. What also contributed to the deceleration in real wages was the cut back in public spending, which had actually contributed to rising wages between 2007–2008 and 2012–2013. Not only did the overall expenditure on Mahatma Gandhi National Rural Employment Guarantee ACT (MGNREGA) decline after 2011–2012, even the person days of work generated had started declining. The NDA government's attitude to MGNREGA can be summed up by the speech of the Prime Minister in the parliament where he declared that it should be seen as a symbol of failure of the UPA.

The deceleration in growth of real wages contributed to a general decline in demand in rural areas. The cumulative impact was felt not just on agricultural demand but also on non-agricultural goods and services. However, unlike the agricultural

sector where unforeseen circumstances such as weather shocks and collapse of international prices had a role to play, the decline in rural non-farm sector was entirely a domestic creation. Partly, it was the attitude of the NDA government which looked at rural development interventions such as MGNREGA and so on as legacy of the previous UPA government and therefore not deserving the government's attention. It was also a result of the wilful neglect of the agrarian distress which contributed to the slowdown in non-farm sector.

The final factor which contributed to the worsening situation in agriculture was the decline in agricultural exports. Unlike the international trend where prices of food articles declined by 40% between 2014 and 2016 following the collapse of petroleum prices, the impact in India was much lower with decline in food prices by only 6%. But the decline in international commodity prices affected the demand for Indian agricultural in international markets, where the collapse in international prices along with the almost negligible decline in domestic prices made Indian agricultural exports uncompetitive. As a result, agricultural exports which had increased from a low of $8.8 billion in 2004–2005 to $42.8 billion in 2013–2014, declined to $32.09 billion by 2015–2016 before recovering to $38.5 billion in 2018–2019. At the same time, imports which amounted to $3.8 billion in 2004–2005, increased to $15.03 billion in 2014–2015 and further to $16.9 billion in 2016–2017. Figure 2.14 gives the trend in agricultural exports since 2009–2010.

The decline in exports and increase in imports hurt domestic producers. One of the reasons domestic prices remained high making Indian produce uncompetitive was that unlike international trends, the decline in petroleum prices did not materialise in lower energy costs for Indian farmers. While the government benefited

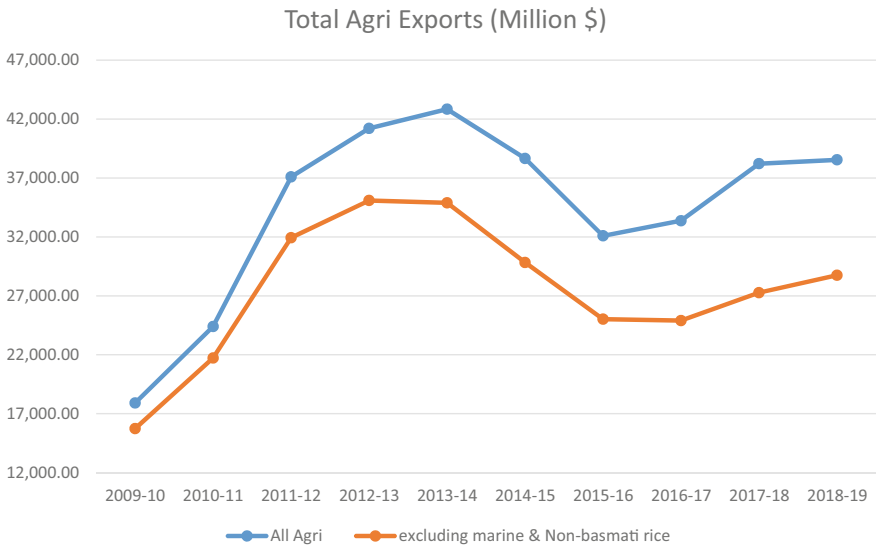

Fig. 2.14 Value of agricultural exports (million $). *Source* Agricultural Statistics at a Glance

from lower petroleum prices, increase in taxes ensured that the benefit of cheaper energy costs were not transmitted to the farmers. The price competitiveness of Indian agricultural exports was also hurt by the ad hoc export-import policy which put unnecessary export restrictions denying the farmers from exploiting international markets. An unfavourable exchange policy and imports resorted by the government also contributed to unfair competition from international agricultural commodities whose prices were lower than domestic prices.

2.2.3 Exogenous Shocks and Intensification of Agrarian Distress

Government policy was not only responsible for neglecting agriculture during the crucial two years of 2014–2016 but also contributed actively to deepen the crisis. Fortunately, the resilience of Indian farmers was strong enough to result in some revival in 2016 when the weather turned favourable. Agricultural growth rebounded to more than 6.3% in 2016–2017 and followed it up with 5% in 2017–2018. A revival of wage growth was also witnessed where growth in wage rate in both agricultural and non-agricultural sector which had plummeted to −1.1 and −3.0% in July 2016, respectively, accelerated sharply to reach a high of 5% in agriculture and 4% in non-agriculture in by May–June 2017.

Unfortunately, the recovery was short lived. Farmers who had harvested a bumper crop in Kharif 2016 found themselves unable to sell once demonetisation was announced on 8th November 2016, which contributed to acute misery among the farmers. Most of the trade in agriculture is cash based and the absence of cash in the market led to huge losses for most of them. It also affected the non-farm sector which was showing signs of revival following the normal monsoon of 2016. The net result was a continuation of the crisis of profit realisation by the farmers with job losses. Real wages which had shown a sign of acceleration in wage rate growth also reversed the trend with deceleration in wage rate growth since May 2017. By October 2018, the last month for which data has been released by the labour bureau, real wage rates are lower for agricultural as well as non-agricultural labourers.

While demonetisation affected adversely the agricultural sector and the non-agricultural sector, the hasty introduction of Goods and Services Tax (GST) further added to the woes of the informal non-farm sector. The combined impact of demonetisation and GST was a further slowdown in the rural non-farm sector.

While the crop economy was under severe distress, it was further compounded by the problems in the livestock economy. Cattle economy is an integral part of the agrarian economy, particularly for small and marginal farmers. The agrarian economy also suffered from the adverse situation created by the political mobilisation against cattle trading. Several incidents of lynching of cattle traders and tightening of regulation for cattle trade by state governments led to sharp reduction in volume of cattle trade. Livestock economy which used to provide emergency cash and in

some cases was also a necessary diversification in rural economy also contributed to decline in rural incomes. The increase in stray cattle left by farmers after the cows are no longer lactating added to the cost of farming with labourers engaged to protect the fields from stray cattle. The net impact of these was a sharp reduction in income opportunities that were available to farmers along with increase in cost of cultivation. The non-crop economy not only contributed to additional income but also acted as insurance against losses in crop cultivation.

The cumulative impact of all these factors resulted in one of the sharpest declines in rural demand. This was obvious from the deceleration of rural wages and slowdown of non-farm sector in rural areas with the worst impact being the decline in demand for agricultural produce. Reduced domestic demand and external opportunities resulted in a collapse of prices in the domestic market. The fact that agricultural markets were fragmented also did not help the farmer realise the price for his produce. The collusion and cartelisation of agricultural markets only contributed to farmers being squeezed out from the demand that was coming from urban areas. Interestingly, while international prices were declining faster after the 2014 price collapse, Indian markets did not witness collapse of prices except for some commercial crops. However, it was the demand deflation in domestic economy and worsening of the rural economy which led to a situation where food price inflation turned negative in the last six months. Since August 2017, food price index from the Wholesale price index has not seen any growth (Fig. 2.15).

Clearly, the crisis this time is not driven by collapse of agricultural output. The genesis of the crisis lies in the broader policies that the Indian economy has followed in the last three decades since the economic reforms of 1991. The crisis is embedded

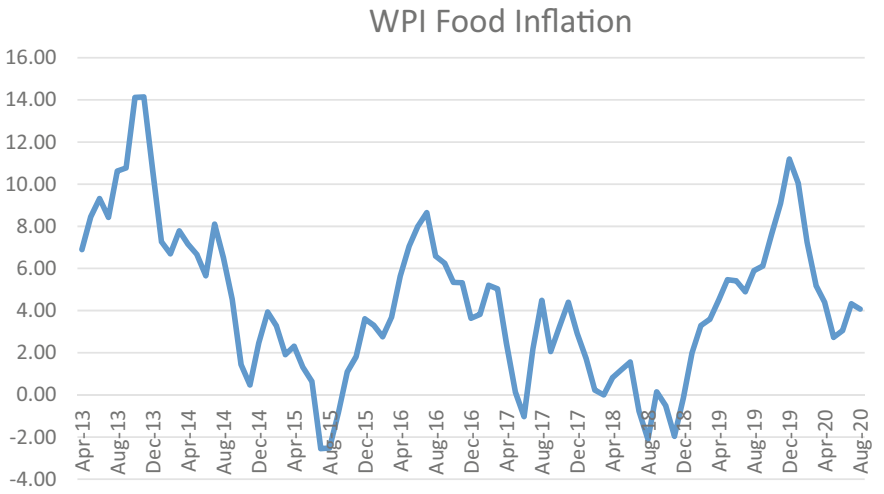

Fig. 2.15 Wholesale price index food inflation (Y-O-Y). *Source* Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Government of India

in the larger political economy architecture following the structural adjustment policies, which prefers lower inflation as the objective of fiscal and monetary policies. Since food and agricultural commodities constitute a significant part of consumption basket, the objective of lower inflation also implies keeping food inflation low. The second component of the structural adjustment policies which seek to keep the fiscal deficit under control also emphasise reduction in subsidies and revenue expenditure on agriculture and rural development. Failure to adhere to the principal of low inflation invited censure from the rating agencies which seek to keep the real value of the foreign investments intact. Inflation erodes the real value of these investments. While there is no substantial evidence either against undertaking expansionary fiscal policies when there is surplus capacity and demand deflation or that overall inflation is driven largely by food inflation, successive governments have continued to maintain inflation targeting and fiscal fundamentalism as non-negotiables. The implication of the deflationary policies has been felt largely by the farmers and rural population at the cost of keeping the middle classes and the foreign investors happy. But even when there is acute crisis in the countryside, governments have avoided using the available fiscal space to increase demand in rural areas.

It is also clear that the current spell of low agricultural prices are not a result of overproduction as some would suggest. Not only is the aggregate growth rate of crop agriculture lower than the UPA years, the increase in agricultural output is nowhere close to the increase in production observed during 2004–2005 to 2013–2014 except for pulses. For example, food grain production increased at 3.3% per annum between 2004–2005 and 2013–2014 but has only increased at 1.8% per annum during the four years of this government between 2013–2014 and 2017–2018. Although pulse production has improved with growth rate of 7% per annum between 2013–2014 and 2017–2018, higher than the corresponding growth rate of 4.3% per annum during 2004–2005 and 2013–2014, the collapse of prices is much likely due to the large imports of pulses. In case of oilseeds, production increased at 3.35% per annum between 2004–2005 and 2013–2014 but has declined at 1.1% per annum in the last four years. Soybean, one of the crops which has seen sharp collapse in prices has seen output grow at 8.8% per annum between 2004–2005 and 2013–2014 but has seen output decline at 7% per annum in the last four years. This is also true for non-food commercial crops such as cotton which saw production increase at 9% per annum between 2004–2005 and 2013–2014 but have seen output decline at 0.7% per annum in the last four years. Figure 2.16 gives the comparative growth rate between two periods of 2004–2005 to 2013–2014 and 2013–2014 to 2,017,018. Further, unlike the period between 2004–2005 and 2013–2014 when the production increase was accompanied by rising prices for almost all crops, prices of all major crops have either declined or have remained low. The current spell of low and declining prices is certainly not due to over production as has been claimed by government and some sections of media and nor is it a result of international prices which have not shown any sharp decline, after declining between 2014 and 2016. In fact, international prices of most crops have recovered from the low of 2016.

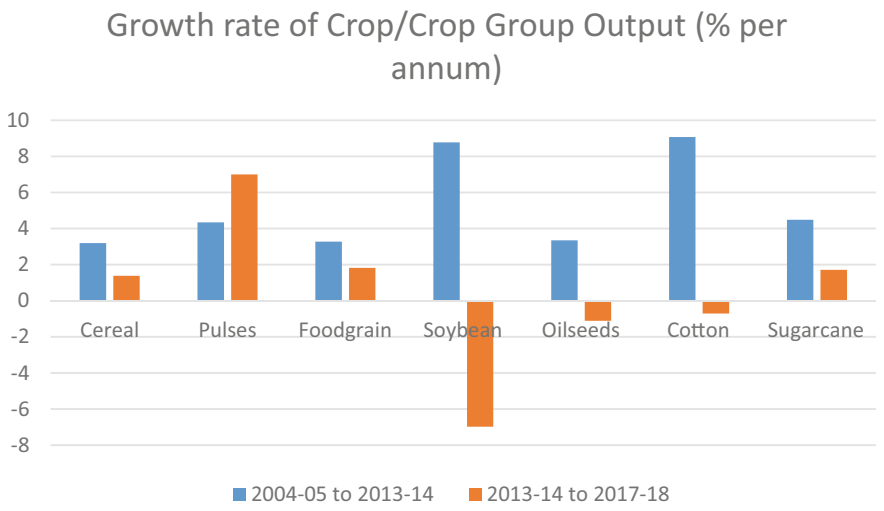

Fig. 2.16 Growth rate of crop/crop group output (% per annum). *Source* Agricultural Statistics at a Glance, (2018), Government of India

2.3 The Response to the Crisis in Agriculture

One way to gauge the response of the government and its commitment to agriculture is the budget allocated to agriculture. While the budget of ministry of agriculture increased almost ten times from Rs. 2167 crores in 2003–2004 to Rs. 21,609 crores in 2013–2014 during the UPA years, the budget allocation during the present government declined by one-fourth to Rs. 16,646.35 crores in 2015–2016 in the first full budget of this government. It increased to Rs. 20,400 crores in 2016–2017, which is still lower than the budgeted allocation for 2013–2014. In normal course, governments would increase budgeted expenditure on agriculture, particularly in drought years, but the experience of the two budgets after the droughts clearly showed a lack of concern for agriculture by the present government. While the budget allocation do show some increase in 2017–2018 and 2018–2019, much of this was due to smart accounting where the amount spent on interest subsidy which was earlier reflected in the budget of the finance ministry was brought in to the budget of agriculture ministry. Excluding the interest subsidy component, the overall budget on agriculture increased at 26% per annum during the UPA years but has increased only at 8.7% per annum under this government. It is also important to note that except 2016–2017, in none of the years has the actual expenditure been close to the budget allocation. The marginal increase in agricultural budget in recent years has largely been on subsidy on interest and on insurance premium. But it has come at the cost of decline

in investment in agriculture. Real investment in agriculture declined at 1% per annum during the first four years of this government.[7]

While the government continued to reduce investment in agriculture with marginal increase in agricultural budget, the cut down in some of the vital schemes such as Rashtriya Krishi Vikas Yojana (RKVY) also impacted the agricultural sector. This happened at a time when the agricultural sector was not only dealing with back to back drought but also sharp collapse in agricultural prices after August 2014. With international prices also being low, the situation soon escalated into a full-fledged agrarian crisis.

In the context of the increased protests by the farmers and resulting politicisation of the farmer's crisis, the response has largely been of three kinds—Loan waivers, MSP increase and some form of direct income transfers have found favour with political parties and have also been implemented in several states. The total amount of loan waiver announced so far is almost Rs. 190,000 crores with promises of more after the elections.

While there is some justification for providing relief to farmers unable to pay their debt due to unforeseen circumstances such as monsoon failure and price collapse, loan waivers have now become the dominant way of addressing agrarian crisis. The last big loan waiver was in 2008 when the UPA government announced a national loan waiver with loans worth Rs. 70,000 crores being waived. Given the extent of indebtedness and the crisis in agriculture following the drought and price collapse after 2014, there is some justification for these interventions. The last data on extent of indebtedness among farmers is available from the Situation Assessment Survey (SAS) of 2012–2013. According to the SAS, 52% of all farmers in the country had outstanding debt with an average debt of Rs. 47,000. However, there is large regional variation with higher incidence in southern states with 93% farmers indebted in Andhra Pradesh and 83% in Tamil Nadu. At the all India level, 60% of these loans were from institutional sources with the remaining accounted for by local money lenders and other informal sources. The data also show that the extent of dependence on non-institutional sources was much higher for small and marginal farmers with more than 50% loans for these groups coming from non-institutional sources.

While loan waivers are desirable in some cases and necessary in case of extreme indebtedness, it comes with its own set of problems. There are the usual issues of moral hazard which penalises the sincere and rule abiding farmers. It gives rise to a tendency to default by the farmers if the loan waivers are not a one-time solution but keep appearing every decade, which is the case this time with multiple loan waivers within a span of two years. It also contributes to deterioration in the performance of banks which are also stressed with large non-performing assets with likelihood of lower repayments. However, the real problem with loan waivers is that they contribute little to providing a solution to the problem of declining farm prices which are seen as the primary reason for worsening of the crisis.

[7]If we take into account the latest GDP statistics that have been put out. In terms of the old series, it was 2.3%.

Even the attempts to increase MSP are unlikely to help raise prices in rural areas. The idea of providing a fixed mark-up over the cost of cultivation has been quite dominant for some time now. It was also among many recommendations of the Farmers Commission chaired by Dr. M. S. Swaminathan. The recommendation of providing MSP at 50% of costs was also promised by political parties including the BJP which took advantage of the agrarian unrest during the run up to the 2014 election. But its own performance once it assumed power was contrary to its promises. Not only did the government raise MSP only notionally, it also used administrative measures to reduce procurement. The bonus that was given by the state governments was also discontinued. But it finally had to respond to the pressure to raise MSPs by announcing increase in the 2018 budget. MSP for Paddy was increased by Rs. 200 from Rs. 1550 to Rs. 1750 for kharif 2018, 13% increase over the last year. MSP increase for other crops varied between 3.7% for moong to 45% for nigerseed. MSP makes a significant dent for paddy and wheat for which there is a proper distribution mechanism in the form of the Public Distribution System (PDS) but not as much for other crops where there is almost negligible procurement. Even for paddy and wheat, the impact has been muted since the market prices were higher than the announced MSP. However, the MSP raise has also been stifled by uneven policies of excessive procurements and low redistribution. As a result the granaries of Food Corporation of India (FCI) are now full with much larger quantities of food grains than is required as buffer norms. Figure 2.17 gives the actual stocks versus the buffer norms since 1991.

Other than loan waivers and increasing MSP, the third kind of response to the agricultural crisis has been of direct benefit transfers to farmers, and this is more

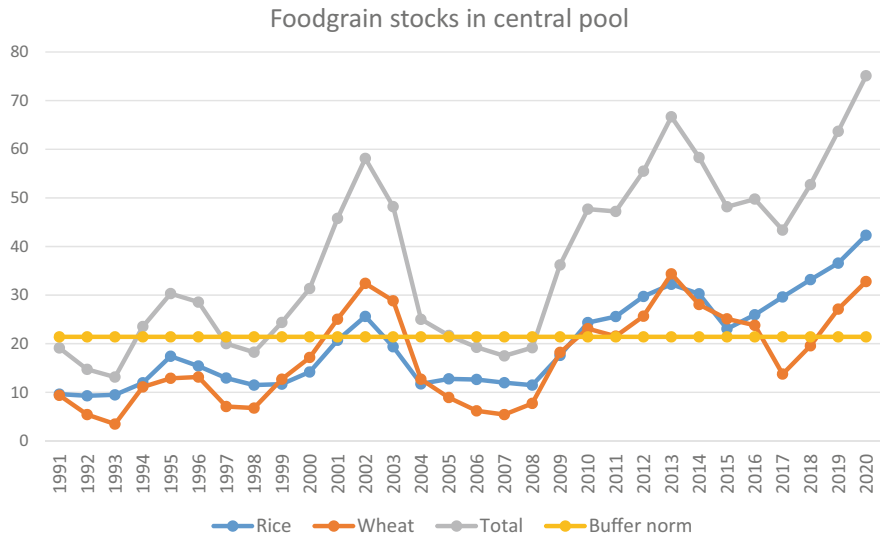

Fig. 2.17 Food grain stocks in central pool. *Source* Food Corporation of India

recent. Such income transfers have so far implemented fully only in Telangana. Similar schemes, with some variation, have been proposed in Odisha and Jharkhand which are going for legislative assembly elections this year. The direct income support scheme in Telangana was seen as a political success with the Telangana Rashtra Samiti (TRS) retaining power in the state with thumping majority in the assembly elections. The Rythu Bandhu scheme of Telangana government provides Rs. 4000 per acre for every season to all the farmers of the state, with an annual budget of Rs. 12,000 crores. The scheme in Jharkhand is similar to the Rythu Bandhu scheme with an enhanced payout of Rs. 5000 per acre to 22.76 lakh farmers at the cost of Rs. 2250 crores to the state government. The third scheme is the Krushak Assistance for Livelihood and Income Augmentation (KALIA) which has been started by Odisha government. Unlike Telangana and Jharkhand, KALIA does not provide income transfer on the basis of land holding but on the basis of households as unit. The payout at Rs. 10,000 per family per year also extends to sharecroppers and landless agricultural labourers.

Similar to the state schemes, the central government also announced direct benefit transfer scheme of Pradhan Mantri Kisan Samman Nidhi scheme (PM-KISAN) which was announced with retrospective effect as part of union budget 2019. As part of the scheme, the central government provides an annual transfer of Rs. 6000 to be paid in three equal instalments to roughly 14 crores small and marginal farmers. The first instalment of the scheme was delivered before the elections. While the national scheme does not include sharecroppers and wage labourers, its coverage among the farmers has also not been comprehensive. In a recent evaluation of the scheme, Varshney et al. (2020) report that only 30% farmers received the benefit. But even for those who did receive the benefit, only 52% was spent on agriculture from the first instalment. By the second instalment, the share of expenditure on agriculture had dropped to 22%.

Finally, the recent reforms in the form of the three bills passed in the parliament eek to reform the agricultural marketing system. The basic purpose is to enable the farmers greater choice and allow freedom to sell anywhere. Projected as historic reforms in agriculture, through these Bills the government promises freedom to the farmers from the "villainous and exploitative" Agricultural Produce Marketing Committee (APMC) mandis and from the middlemen who charge commission from trade in these mandis. The attempt to reform the functioning of the mandis is nothing new and has been in process for the last two decades starting from 2001 when the Expert committee on agricultural marketing submitted its report. Since then three different model APMC acts have been proposed by previous governments (in 2003, 2007, and 2013) and in 2017 by the current government none of which led to the kind of protests that have been witnessed over the last two weeks. Out of 36 states and union territories, 18 states have already enacted reforms allowing for establishment of private market yards/private markets (10 have framed rules), 19 states have enacted reforms allowing for direct purchase of agricultural produce from agriculturists by processor/bulk buyer/bulk retailer/exporter (14 have framed rules), 20 states have enacted contract farming acts (12 have framed rules). Kerala and Bihar do not have APMC mandis and Tamil Nadu has a different system. Most states have exempted

levy of taxes and fees on sale of fruits and vegetables. Most of these reforms were enacted by the state governments and rules were framed with farmers welcoming these changes, even though the changes were suggested by the centre.

Rather than welcoming the freedom from mandis, this time farmers are on the streets fighting for restoring the primacy of the mandis in agricultural trades primarily because APMC mandis are an essential part of the agricultural trading ecosystem, with which farmers have a long history of engagement. While they may have a confrontationist attitude to the functioning and administration of mandis, they also share a symbiotic relationship with mandi middlemen and the mandis extending beyond the simple matters of transaction in agricultural produce. The middlemen are source of information, input and sometimes credit without collateral.

Further, unlike earlier reforms where the focus was on strengthening the functioning of APMC mandis while allowing for greater private market access and participation, the current FTPC bill bypasses the APMC altogether creating a separate structure of trading. In any case, mandi trade accounts for less than one-fourth of total agricultural trade with rest accounted by private markets/traders. The absence of regulation and exemption from mandi fees creates a dual market structure which is not only inefficient but will also encourage unregulated trade detrimental to the primary purpose of providing market access to farmers for better price discovery and assured prices. Most farmers realise that the FTPC bill is not delivering on the promise of freedom to farmers but freedom to private capital to purchase agricultural produce at cheaper prices and without any regulation or oversight by the government. Farmers also realise that this will eventually lead to shifting of trade from regulated APMC mandis to private markets without any commitment to investment in infrastructure and regulation from government. With an unequal and differentiated terms of engagement, the decline and disappearance of APMC is only a matter of time not a matter of debate.

The fear of the reforms undermining the mandi system is not unfounded. Previous experiments with doing away with APMC has led to disastrous consequences. A notable example in the regard is the case of Bihar which abolished the APMC mandis in 2006. Critics of the APMC system had promised then that this will ensure better prices to farmers in Bihar and will also bring in large investments in market infrastructure by the private players, something similar to what the current reform promises.[8] Before the abolition of APMC mandis, Bihar had 95 market yards of which 54 had infrastructure such as covered yard, godowns and administrative buildings, weighbridge, processing and grading units. In 2004–2005, state agricultural board earned 60 crores through taxes and spent 52 crores of which 31% was spent on developing the infrastructure. Most of the infrastructure now is in dilapidated condition. With no revenue to maintain the infrastructure, the situation has worsened over time. During the same time, no major investment has come in from the private sector.

How did the abolition of APMC impact agriculture in Bihar? In 2019, National Council for Applied Economic Research (NCAER) conducted a study on Bihar agriculture (NCAER, 2019). The study reported increased volatility in grain prices

[8] See Gulati et al. (2020).

after 2006 which affected the decision of farmers to adopt improved cultivation practices and crop choices negatively. It concluded that the repeal of APMC and the consequent increase in price volatility could be one of the reasons for low growth of agriculture in the state. It concluded, "Farmers are left to the mercy of traders who unscrupulously fix a lower price for agricultural produce that they buy from farmers. Inadequate market facilities and institutional arrangements are responsible for low price realisation and instability in prices". Most farmers surveyed also reported high storage cost in private warehouses. The need for immediate cash also meant that they were forced to sell at whatever prices the private traders offered. Field studies in recent years have also reported charging of market fee in the private unregulated markets from traders as well as farmers without any infrastructure for weighing, sorting, grading and storage.

Bihar is among the leading producer of maize in the country and third largest producer of fruits and vegetables after Uttar Pradesh and West Bengal. For maize, this year most farmers reported getting a price of Rs. 1000–1300 per quintal as against the official Minimum Support Price (MSP) of Rs. 1850. Wheat procurement in the Rabi season this year has been 39 million tonnes. The procurement in Bihar was only 5000 tonnes. Compare this with 13 million tonnes of procurement in Madhya Pradesh which has same yield of wheat as Bihar. Wheat farmers in Bihar reported receiving prices which were 10–15% lower than MSP. Both states are going for crucial elections in November this year. The difference between the two states is that unlike Bihar, Madhya Pradesh over the years has strengthened the existing APMC infrastructure and is now the leading state for wheat procurement.

The Bihar experiment has important lessons for future marketing reforms in agriculture. Benefits of the reforms will only accrue to farmers if these are also accompanied by equivalent investment by the private sector in creating the physical infrastructure and institutional mechanism to allow greater participation of farmers. While this did not materialise even after decade and half of abolition of APMC in Bihar, even in other states there has been negligible investment by the private sector in creating the infrastructure and institutional mechanism. By attempting to shift the trade away from the APMC to non-APMC trading areas, the act is unlikely to ensure better price realisation for farmers without necessary regulatory framework. But it is also likely to lead to decline in APMC infrastructure if the APMCs fail to generate enough revenue for upkeep and development of market infrastructure.

2.4 Concluding Remarks

The current crisis in agriculture is serious. While factors such as drought and collapse in international prices may have aggravated it, it is basically a result of neglect of the agrarian economy by the present government which has also contributed to worsening of the situation through series of policy steps. The roots of the crisis are however in broader political economy paradigm that India has followed since the early 1990s. It has not only resulted in increased frequency of such extreme episodes but has also

seen the intensity increase over the years. Unfortunately, the solutions proposed and implemented are not only inadequate to prevent such crisis but may actually end up reinforcing the problems, in the long run. The latest fad of cash transfers is also a part of this broader political economy architecture which sees cash transfers as a panacea for all the problems in agriculture. Propagated by a group of influential economists (Gulati et al., 2018) these are now part of the mainstream discourse not just for the solution to agrarian crisis but also for corruption, malnutrition and jobless growth that the economy has seen in the last two decades.

The biggest appeal for the cash transfer scheme is its supposed simplicity. It is certainly popular and politically rewarding, but it is unlikely that it will solve the crisis in agriculture. If there is one message from the previous analysis, it is clearly that the crisis in agriculture is not just of low incomes in agriculture. The genesis of the current crisis lies in the faulty and ad hoc export import policy, lack of infrastructure, low investment and cartelisation and collusion in agricultural markets which have prevented farmers from realising the market prices for agricultural produce. It is the combination of these along with the twin droughts of 2014 and 2015 which created the current crisis in the first place. It is also true that the situation worsened due to the sudden shocks of demonetisation and the hasty implementation of GST which affected the rural economy adversely. Cash transfers are not a solution to any of these and are definitely no guarantee of protection against unforeseen events, whether natural or policy induced. It is certainly not a substitute for the structural reforms needed in agriculture. The current crisis may have worsened due to the sharp fall in agricultural crop prices but is ultimately a result of multiple failures of policy. Further, it is a crisis which is as much agricultural as it is caused by the failure of the non-farm sector in creating enough jobs as is evident from the deceleration in real wages in rural areas.

Some of these income transfer schemes, such as the Telangana model, are also regressive with the amount of transfer proportional to the land owned. In case of the national scheme which is targeted to the small and marginal farmers, the real problem is also of identifying the beneficiaries. Given that the current crisis is a result of demand deflation in rural areas, it may revive rural demand in the short and medium run. But it is certainly not free and costless. It comes at a cost which is decline in investment as well as decline in other rural development expenditure. With most state governments already committed to loan waivers, it does impact states' ability to invest in agriculture. The income transfer scheme will further erode the fiscal capacity of states.

While proponents of cash transfer scheme may argue that such a scheme is non-distortionary and therefore more efficient, it does nothing to correct the imbalance that has arisen due to movement of terms of trade against agriculture or against price transmissions from international markets. With agriculture diversifying into horticulture and crops with large trade exposure, increasing monetisation and mechanisation of agriculture with rising input costs has also been seen. What is needed is larger investments in improving access to better technology, extension programmes to enable farmers to take advantage of new technology, market infrastructure, storage and warehousing infrastructure and easy and assured supply of credit. Cash transfers

absolve the government from all such obligations. Rather, by taking away precious fiscal resources, it makes the farmer more vulnerable to both market as well as non-market induced risks by reducing investments in basic infrastructure and other support measures necessary to support agriculture. Cash transfers and loan waivers may not be the solution to the agrarian crisis but are surely a recipe for an agriculture which is far more vulnerable and crisis-prone than even what it is currently.

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Chapter 3
Supply Chain Management of Food Grains in India

Parmod Kumar and Yasmeen

3.1 Introduction

Agriculture forms the basis of any economy and it is linked with development and growth of all other sectors and determines the overall food security and development of its people. Indian agriculture sector still has lots of bearings on overall growth and development of the country particularly that of rural development. Though, the contribution of agriculture to India's GDP is gradually declining with the country's broad-based economic growth, still the agricultural sector is the largest economic sector and it plays a major role in socio-economic fabric of India (IDFC, 2013). Indian agriculture sector is undeniably the largest livelihood provider as 69% of the population lives in rural areas and 3/4th of them have their livelihood from agriculture and allied activities.

The role of agriculture in economic development has remained slow although transformation of GDP from primary to secondary and tertiary sector has been fast but transformation in employment is still happening at the very slow pace. Viewing to the historical experience of the West, economic development was seen as mechanism requiring a speedy structural transformation of the economy from one predominantly targeted on agriculture activities to complicated modern industrial and service sector. As a result, the first role of agriculture was to provide sufficient affordable food and man power to the increasing industrial economy that was thought to be a dynamic and leading sector within the overall strategy of economic development (Visaria, 2015). Agriculture sector plays an imperative part in any strategy of economic progress, especially for a country like India where still half of the population is employed and earn their livelihood from this sector.

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Urban-rural relationships are multi-dimensional and evolving. The farm sector has long been providing food for the urban population whereby the composition of agricultural turnout has been dynamic in response to changing urban consumption patterns. Agricultural surplus historically has been sold out through trade goods markets whereas rural economy has undergone speedy transformation within the recent years. The recent developments like emergence of high value and exotic commodities; modernization of markets through trade; future trading; and the emergence of organized retail powerfully transforming farming sector. However, agriculture remains at the centre of rural sustenance although the farming economy has been fast transforming in many straightforward ways.

A World Bank review accomplishes that agricultural and rural growth rates are expected to have a 'robust, instant, and favourable impact' on financial condition of the rural people and overall rural development (World Bank, 2015). Agriculture plays a crucial role in the poverty reduction, upliftment of standards of living of low- and middle-class individuals and economic improvement in the livelihood of rural areas where poorest live in rural and far flung areas that have agriculture as the solely source of employment (Mehta, 2012). It has been found that poor financial condition in most poor countries is concentrated in rural areas. Growth in agriculture sector and within the rural economy has been extremely useful to scale back financial condition (Lone & Sen, 2014). Agricultural growth is crucial to make sure national food security, alleviate financial condition and cut back rural–urban disparities as sixty-nine per cent of the rural population rely on agriculture and allied activities together with animal husbandry and fisheries for their livelihood (Bhirthal & Negi, 2012).

3.2 Supply Chain Management in Agriculture

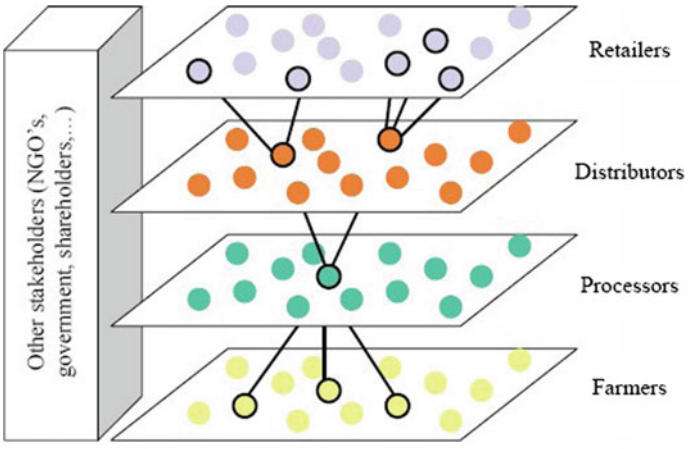
Supply chains are involved with flow of products and knowledge between supply chain member organizations—procurement of materials, transformation of materials into finished products and distribution of these products to final customers. Today's information-driven, integrated supply chains are empowering organizations to shrink inventory and prices, add product worth, extend resources, accelerate time to promote and retain customers. The supply chain success is however dependent on activity coordinates across the supply chain to generate value for customers by increasing the profitability of each link within the supply chain. In addition, supply chain management is the integrated method of creating value for the top users or final consumers.

The supply chains of diverse agricultural commodities in India, however, are fraught with challenges confining from the inherent difficulties of the agriculture sector. The agri- supply chain system in our country is suffering from a number of issues like supremacy of small/ marginal farmers, split and patchy supply chains, absence of scale economies, short level of processing/value addition, insufficiency of selling and marketing infrastructure etc.

The success of processing-based supply chain management is determined by improved relationship between warehousing and transportation for firms as a result of reduced inventory and higher reaction time to consumer requests for merchandise and services. Supply chain management enters a provisional stage wherever different firms join forces to integrate manufacturing, procurement, transportation and distribution to effectively participate within the marketplace. This stage is assisted by the employment of telecommunications, electronic information interface and different technological improvements that creat transfer of data across useful areas between firms.

3.3 Food Supply Chain Networks

In an agri supply chain there are a number of functionaries working in a complex network. Figure 3.1 depicts a generic supply chain at the organization close to the context of a whole supply-chain network. Every firm is positioned in a network layer and belongs to a minimum of one supply chain, i.e., it usually has numerous suppliers, farmers, processers and consumers working simultaneously at any point of time with a set of governing rules and regulations held by various stakeholders, NGOs, government and shareholders.



Schematic diagram of a supply chain from the perspective of the processor (bold flows) within the total FSCN (based on Lazzarini et al. 2001)

Fig. 3.1 Diagram of supply chain

3.4 Key Objective of the Study

The main objective of this study is the following:

> To examine the challenging issues within the key areas of food grains production, namely rice and wheat as these two cereals are critical for agriculture and belong to one of the top priorities of the national policies (e.g., technology, extension, irrigation, agricultural machinery, etc.); and identify diverse stakeholders related to key areas in wheat and rice and provide their importance and roles.

3.5 Supply Chain of Food Grains

A food supply chain refers to an outline of the systematic movement of the food from the farm to the consumer. This comprises numerous intermediary processes of production, processing, distribution and consumption. A food supply chain typically may be taken to be a domino like motion wherever modifications at any level within the chain have an effect on the complete supply chain and these changes often mark themselves in the form of change in costs and the value of final produce. In a food supply chain, the resources and materials flow downstream for the assembly of products and provision of services whereas the cash paid by the customer flows into the reverse direction within the chain. The amount of intermediaries within the chain is oftenly remarkably high. These intermediaries are necessary in the chain in the sense they act as a substitute for infrastructure wherever none exists. However, over the years a layer of intermediaries has full-grown most of which add very little value to the produce but jointly they add considerably to the ultimate price though raising the cost. Agricultural commodities bear a series of operations like harvesting, threshing, winnowing, bagging, transportation, storage, processing and exchange before they reach the market/ultimate consumer and as evident from numerous studies across the country, there are widespread losses in crop output at each of these stages (Sinha, 2009). A recent estimate by the Ministry of Food and Civil Supplies, Government of India, puts the whole preventable post-harvest losses of food grains at ten per cent of the entire production or in terms of volume to the tune of twenty-two million metric tonnes that is like the whole food grains produced in Australia annually. These losses would be enough to feed about 70–100 million individuals, i.e., approximately 1/3rd of India's poor. Thus, it's evident that the post-harvest losses have impacted not only the small and large producers but at the aggregate the economy as a whole.

3.6 Supply Chain of Wheat and Rice

Wheat and rice markets are different from other agricultural commodities as government controls wheat and rice procurement for price stabilization and nation's food security. Contributors in wheat and rice supply chain are suppliers of inputs like

seeds, fertilizers, pesticides and insecticides, producer farmers, commission agents, different government procurement firms such as Markfed, Central Warehousing Corporation, bulky millers of wheat and rice and the ultimate consumers. Input suppliers include major chemical manufacturing firms, government distributors, wholesaler, retailers and even tiny retail outlets that sell minor quantities of seed, fertilizer, manure and chemicals to peasants at the village level. Wheat is an ancient crop which consumes less water than rice and is concentrated mainly among most of the peasants within the north- west India. Most of the farmers within the Indo-Gangetic belt have been cultivating rice and wheat on same land in rotation for years instead of choosing different crops like pulses, oil seeds and vegetables. Supply chain of wheat and rice in the major production belt in states like Uttar Pradesh, Punjab, Haryana, Madhya Pradesh and Rajasthan involves lesser stakeholders as compared to other states in the west and east where the crop is produced but in lesser quantity. In Punjab and Haryana, even marginal and small farmers sell their produce to the commission agents in the regulated markets known as APMCs. In the eastern states like, West Bengal and Odisha, the marketing takes place in terms of rice and not paddy by involving the services of local millers. The large farmers sell their produce through manufacturing units or millers while small holders sell either through village traders, village shandies or small dealers operating alongside villages and in the production belt. Commission agents based mostly in APMCs charge a pre-determined commission on the sale of wheat and rice, which generally is imposed on buyers and not the sellers (farmers) (Tables 3.1 and 3.2).

Table 3.1 Supply and demand balance for wheat (1000 metric tonnes)

Wheat	2013–14 Apr–Mar	2014–15 Apr–Mar	2015–16 Apr–Mar	2016-17Apr–Mar
Area (1000 Ha)	29,069	29,865	29,434	30,121
Yield (Kg/Ha)	2988	3176	3135	3214
Production	86,870	94,880	92,300	96,500
Beginning stocks	15,364	19,952	25,000	24,000
Imports	2	4	0	1
Total supply	102,236	114,836	117,300	120,500
Exports	872	6500	5000	4500
Food use	76,200	77,836	78,800	79,450
Seed, feed, waste, other	5212	5500	6000	7780
Total use	81,412	83,336	84,800	87,230
Ending stocks (government)	19,952	25,000	27,500	31,140
Total distribution	102,236	114,836	118,500	124,300

Source https://www.ncaer.org/downloads/Reports/Agriculture

Table 3.2 Supply and demand balance for rice (Thousand tonnes)

Rice	2013–14 Oct–Sep	2014–15 Oct–Sep	2015–16 Oct–Sep	2016-17 Oct–Sep
Area (1000 Ha)	42,860	43,970	43,200	45,600
Yield (Kg/Ha)	2239	2395	2356	2415
Production	95,980	105,310	101,800	110,540
Beginning stocks	18,444	20,359	23,373	24,511
Imports	0	0	0	0
Total supply	114,424	125,669	125,173	135,051
Exports	2774	10,376	7000	8500
Food use	89,091	89,920	91,273	96,410
Seed feed waste other	2200	2000	2200	2400
Total use	91,910	91,920	93,473	94,120
Ending stocks (government)	20,359	23,373	24,700	26,000
Total distribution	114,424	125,69	122,500	130,100
Stocks to use ratio %	22	25	26	28

Source https://www.ncaer.org/downloads/Reports/Agriculture

Food Corporation of India (FCI) is the largest national procurement and distribution agency of wheat and rice in India. FCI was originated to guard the interest of farmer and consumer, keeping the buffer stocks for national food security and distribution of food grains throughout the country through the system of public distribution system. The milling activities vary across rice and wheat and the same or different millers may operate in milling of both or either one of these commodities. Wheat is processed into four products: bread flour, cake flour, semolina (suji) and bran whereas rice processing involves shelling of paddy into rice, cleaning, polishing and packaging. The process of milling generates a few by-products which are crucial raw material for other manufacturing industries. For example, the by-products in terms of wheat husk and de-oiled rice bran cake are very precious raw material for the feed industry for preparing animal feed. Similarly, rice husks are used as a base for manufacturing soap. With the advances in technology, presently rice husk and rice stubble has also become important raw material for energy generation though thermal power plants.

The big processing firms like ITC, Pillsbury, Aashirwad, Pantaloon Food, Dawat, Kohinoor, India Gate, 24 Mantra Organic, Patanjali etc., have entered in wheat and rice milling business and post Model APMC Act 2003 started processing directly from farmers. The big retailers generally procure the processed wheat and rice products directly from these large processors. On the other hand small retailers still depend on small traders and wholesalers and regional distributors who operate within the

periphery of village or small towns. The central and state procurement agencies, like Food Corporation of India, NAFED and several agencies operating in states purchase wheat and rice from farmers through commission agents working in the regulated mandis or what is known as APMCs. Commission agents generally charge commission which varies from state to state but generally lies between 1.0 and 2.5% on the sale of grains. After the sale, the commission agents after deducting their commission transfer the balance amount to the sellers who generally are farmers. The sale of the produce takes place generally at the minimum support price declared by the Commission for Agriculture Costs and Prices.

3.7 Supply Chain Management of Rice

The rice is the staple consumption cereal in India and it is consumed by both rural and urban population. Therefore demand for rice is throughout the year although there may be some element of seasonality in the states where wheat is also a staple consumption, especially in the north and western parts of the country. Therefore the foremost function of supply chain in rice remains its regular supply or availability throughout the year. A good supply chain management framework is crucial for well-organized sourcing, processing, distribution and selling and therefore meeting the consumer demands while not facing a scenario of lost sales. Production of rice and its efficient distribution throughout the nook and corners of the country remains one of the foremost priorities of supply chain management functioning in the economy.

A traditional basic framework of rice supply chain usually follows the multi stage supply chain system which includes the functionaries such as farmers, the chief producers of paddy, middlemen or agents, rice processing industries, distribution agents and retailers who provide interlinked upstream and downstream of supply chain. Throughout the long supply chain, several activities happen at each stage that have an effect on the function of the next stage and therefore each stage needs to co-operate with the next within the specified manner. To understand the entire supply chain system in an elaborate way, the paper describes an in-depth supply chain framework. Figure 3.1 depicts a comprehensive picture of the entire supply chain activities presently being practiced within the rice sector in the country. It is clearly discernible from the figure which particular category of producers or the supply chain needs the role of intermediaries and where it is sourced and distributed directly to the next stage of the supply chain.

Primary stage of the rice supply chain is controlled by the paddy farmers who supply paddy to the rice processing firms either directly or through intermediaries depending on their size of holdings and the amount of surplus generated for the market. The farmers producing rice can be classified into small and large land holdings depending on the land area operated by them which could be either owned or leased-in area, their production capability and reach-ability to the market. The large holders are generally those who involve in organised production for commercial purpose and they generally involve in large scale mechanised production. The

second variety of farmers are small land holders who work on small farms having low yield and generate low surplus after keeping stock for home, seed and feed requirements. Based on the type of production, we can divide the rice farmers into two types: Organic farmers and inorganic farmers. In the first variety are those who carry out their cultivation using manure, compost and also the approved natural substances without any use of the factory-made chemicals, fertilizers and pesticides, insecticides, fungicides and also the herbicides. Inorganic farmers use factory-made chemical fertilizers and pesticides for cultivation of paddy.

The distribution channels of organic paddy are similar for both large and small farmers as there are no intermediaries involved in organic produce which is directly sent to the rice processing companies. The production of organic rice is based on the prior demand on the orders of rice handling firms. Since, organic paddy is produced without using any chemical fertilizer, there is some loss of productivity as compared to inorganic paddy and there is some premium on price of organic paddy and therefore it is produced based on prior order only. The whole activity of production that uses solely natural contents, at each stage of the assembly of crop additionally needs the produced paddy should not contain any sign of the chemicals and pesticides and thus needs the constant observation and management measures. Therefore this requirement makes it necessary for the rice processing companies to directly procure the organic paddy from farmers no matter of their land size while not involving any middleman. On the opposite, the method for inorganic farming is totally different depending on the size of land holdings as well as total output produced. The rice processing firms adopt different supply chain plans for large land holding farmers and the smaller ones in the supply chain of paddy.

Large land holding farmers generally follow direct sale channels to the millers either avoiding middlemen completely or at least reducing the number of intermediaries to gain higher access in the price offered by the millers. Rice processing firms realise that it is profitable to obtain directly from farmers because it reduces their procurement price as well as intermediary cost and other supply chain cost. However, in some cases the paddy farmers with large land holdings, are either not able to directly offer the inorganic paddy to the millers as a result of low demand by the millers or they do not wish to sell their entire produce in a single lot and hold on a portion of it to be sold later to gain access to increased price in the off season, or due to any other reason. Therefore, they need following an indirect mode of distribution usually through several intermediaries for the sale of their paddy.

Supply chain method isn't as direct for the tiny land holding inorganic farmers. Inorganic farmers with small land holdings either sell their paddy in 'mandi', a marketplace within the town areas or they sell in village shandies or traders who buy at the farm gate. In the case of output produced by tiny farmers, the processing units purchase either directly or through agents from the mandi, which is considered as a convenient place for the small paddy farmers to sell and also for rice processing companies to procure. In other cases, the rice processing companies procure paddy through middlemen or agents, who purchase the paddy from small farmers in small quantities and then sell them in bulk to the rice processing companies. Direct procurement from small farmers is not profitable for the rice processing firms as their charges

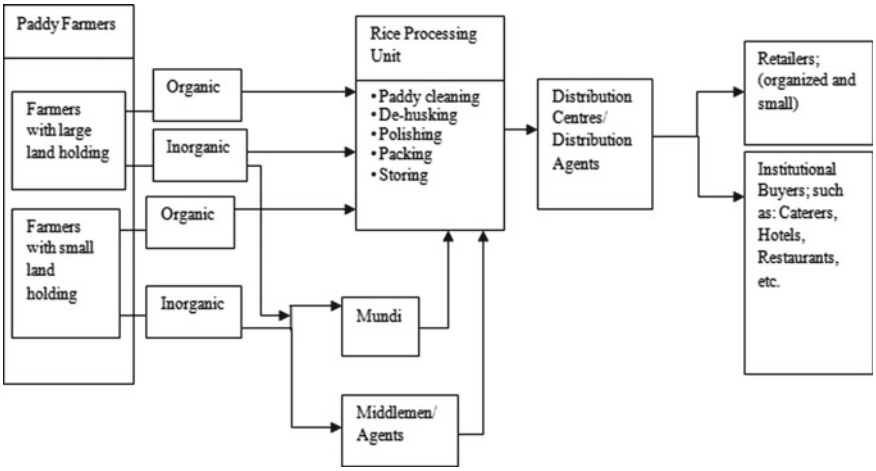


Fig. 3.2 Detailed rice supply chain process. *Source* Sharma et. al., (2013)

for logistics are higher relatively to the price of sourcing through 'mandies' and 'agents' (Fig. 3.2).

3.7.1 Methodology

The study of value chain of rice and wheat was undertaken in Davangere district of Karnataka. The district was purposively selected because this district is the leading producer of rice and many rice mills are operating in this district. Also, the farmers grow wheat and the marketing of the wheat with the three main marketing channels is highlighted in the present paper.

3.7.1.1 Economic Analysis of Rice Value Chain

In Rice Value Chain, a chain starts with the assembly of a primary good, i.e., paddy at the farm level and ends with the consumption of the ultimate product and it includes all the economic activities carried out between these phases like marketing, wholesaling, processing, retailing, delivery at the end of ultimate consumer.

3.7.1.2 Marketing Channel Involved in Marketing of Rice

The study identified various marketing channels of paddy, rice and its associated products in the respective study area. Two different marketing channels relating to paddy and rice were found in the study area. First, paddy marketing channel

Table 3.3 Rice marketing channel in respective study area

Sl. No.	Market channel	No. of respondents in davangere district
1	Manufacturer—Miller—Wholesaler—Retailer—Consumer	46
2	Manufacturer—Commission Agent—Miller—Wholesaler Retailer—Consumer	18
3	Manufacturer—Itinerant Merchant—Miller— Wholesaler—Retailer—Consumer	–
4	Manufacturer—Wholesaler (Paddy)—Miller—Wholesaler (Rice)—Retailer—Consumer	22
5	Manufacturer—Miller—Retailer —Consumer	10
6	Manufacturer—Miller—Consumer	4
Total		100

Source Author's calculation through primary survey

was producers to millers which passed through various intermediaries and second was rice marketing channels from millers to ultimate consumers helped again by a chain of intermediaries. Various marketing channels were identified in our field survey of Davangere district as reported in Table 3.3 with reference to the corresponding respondent preferences. In the study region channel-I was found most common channel of marketing. This may be due to a large number of mills are operating in its surrounding/vicinity and thus, millers were directly purchasing produce from farmers.

Each producer selected marketing channel based on various reasons. The important reason behind the selection of a particular marketing channel was mainly economic condition of the farmers. Family condition and prices prevailing in the market were also important reasons behind selecting an effective marketing channel. Although farmers were facing some compulsions in choosing a particular market channel, still some farmers tried to select a market channel which availed them better market price.

3.7.2 Value Addition to Paddy by Farmers

Table 3.4 reveals the value addition to paddy, in Davangere district that was sold by farmers at various competitive market prices. The farmers were adding value through drying, marketing and storing of paddy. The value addition done through these activities was found to be 8% amounting to Rs.133 in case of value addition due to drying, and value addition due to marketing of produce was estimated at 7.45% amounting to Rs.124 and 9.98% amounting to Rs.166 in case of storing of produce, in Davangere district of Karnataka. It was found that value addition done by farmers

Table 3.4 Value addition to paddy by farmers in different activities in Davangere (Karnataka)

Value addition activity	Price	Davangere (Karnataka)	
		Value addition (Rs./q)	Value addition (%)
Value addition due to drying	Wet paddy Price	1660.50	8.0
	Dry paddy price	1793.35	
	Drying cost	13.22	
	Marketing margin (value addition)	132.85	
	Net marketing margin	119.63	
Value addition due to selling in market place	Farm gate price of paddy	1661.10	7.45
	Market price of paddy	1785	
	Marketing cost	20.49	
	Marketing margin (value addition)	123.9	
	Net marketing margin	103.41	
Value addition due to storing Paddy	Price before storingpaddy	1661.10	9.98
	Price after storing (average 3 months)	1827.00	
	Storing and marketing cost	50.49	
	Marketing margin (value addition)	**165.9**	
	Net marketing margin	115.41	

Source Author's Calculation through primary survey

through storing of paddy was high and more profitable (market margin Rs. 166 per quintal) than to drying and marketing of produce.

3.7.2.1 Value Addition of Paddy Wholesalers

Table 3.5 shows that in the study area, average purchasing price of paddy by wholesalers was Rs. 1749 per quintal whereas their average selling price of paddy was found to be Rs. 1824 per quintal. Average value addition by the paddy wholesalers was Rs.76 per quintal that was 4.32% of total cost in Davangere district. The total marketing cost of paddy was Rs. 59 per quintal. Total marketing cost included variable cost of Rs. 46 per quintal and fixed cost accounted to Rs. 13 per quintal respectively.

Table 3.5 Marketing costs and value addition by paddy wholesalers

Items		Davangere (Karnataka)	
		Rs./quintal	Value addition (%)
Purchase price of paddy		1748.66	4.32
Selling price of paddy		1824.33	
Marketing cost	Variable cost	45.79	
	Fixed cost	13.25	
	Total	59.04	
Value addition (marketing margin)		75.67	
Gross margin		29.88	
Net margin		16.63	

Source Author's Calculation through primary survey

3.7.2.2 Value Addition to Paddy by Rice Miller (Processor)

Once the produce moves to mills, paddy is processed to either to get the raw rice or parboiled rice. For this, mills are of two types where milling process is done to produce the raw rice by the milling units. In the case of parboiled rice mills they engage in both parboiling and then milling or they can also mill rice without parboiling. This, in the process, parboiling mills can produce both parboiled rice and raw rice.

Rice millers are the significant actors in the rice value chains. These rice mills are the real entities which add value to paddy in transforming the product into consumable form. The main part of the rice value chain work takes place in rice mills only by converting paddy into rice. However, the rice mills add value to the product in addition to milling activities. In the study it was observed that rice millers were adding value to rice in three different forms, i.e., milling, cleaning and polishing. Thus, they were purchasing of paddy, milling of paddy, and selling of rice. It was observed that in the area under study, rice milling system was a combination of both modern as well as traditional rice milling. The validation was done that both the modern large-scale mills as well as traditional mills were operating simultaneously. The presence of large number of rice mills in the state was due to higher production of rice and also the crop was grown in two seasons because of which there was no shortage of inputs for rice millers in Karnataka.

Table 3.6 shows description of products obtained from the milling of one quintal of paddy and price of different products and their gross value in Indian Rupees. The fine rice obtained from one quintal of paddy was 69.5 kg and per unit price of fine rice was Rs 34.7 per kg and including other by-products price total income from one quintal of paddy was Rs 2844 in the study area namely Davangere. In addition to rice, the milling of rice also produced some broken rice, rice bran and rice husk. Bran was used as raw material to oil industry while husk was used mainly as fuel purpose for parboiling and such other activities. Bran was also used in energy production.

Table 3.6 Products obtained from one quintal paddy

Products	Amount (Kg)	% of total	Per unit price (Rs)	Total value (Rs)
Davangere, Karnataka				
Rice	69.5	69.5	34.7	2411.65
Broken rice	6.8	6.8	18.05	122.74
Bran	5.4	5.4	12.37	66.79
Husk	17.8	17.8	13.64	242.79
Weight loss	0.5	0.5	–	14.20
Total	100	100		2843.97

Source Author's Calculation through primary survey

Table 3.7 shows that rice millers added value of total Rs 1068 per quintal by purchasing paddy, converting paddy into rice and marketing rice within Davangere district. They added 60.63% extra value in their whole activities in the study area. Value addition was calculated based on per quintal paddy and final selling price calculated and summing up the selling price of products produced from conversion of one quintal paddy i.e., rice, bran, husk and broken rice**.** To obtain one quintal rice, millers have to use about 1.43 quintal of paddy which added value of about Rs 935 in the selected district (Table 3.8).

Table 3.7 Costs and margins of rice millers

Item		Davangere (Karnataka) Rs./q	
Purchasing cost of paddy (i)	Variable cost	59.72	74.02
	Fixed cost	14.3	
Milling cost of paddy (ii)		234.41	
Selling cost of rice (iii)		43.58	
Gross cost (iv) = (i) + (ii) + (iii)		352.01	
Purchase price of paddy (v)	Farmers	1759.82	
	Paddy wholesalers	1765.31	
Return from paddy (vi) (rice and by – product price)		2843.97	
Weight loss (vii)		14.20	
Total return excluding losses (viii) = (vi) − (vii)		2829.77	
Marketing margin (value addition) (ix) = (viii) − (v)		1068.12	
Net marketing margin (x)		716.11	

Note (Return from one quintal paddy was calculated by adding all the selling of main product and by-products obtained from paddy i.e. rice, bran, husk and broken rice. Weight loss was deducted from total return.)
Source Author's calculation through primary survey

Table 3.8 Value addition to per unit rice by miller

Item	Davangere (Karnataka)	
	Amount (kg)	Total value (Rs.)
Required amount of paddy (i)	143.88	2534.66
Obtained rice (ii)	100	3470
Value addition (Rs) (iii) = (ii) − (i)	935.34	

Source Author's Calculation through primary survey

3.7.2.3 Value Addition to Rice by Retailers

Rice retailers were the final actors in the rice value chain and they were the important source for rice delivery to common people in the society. The total marketing cost of rice retailers in the state constituted Rs. 49 per quintal, which included total variable cost of Rs. 41.5 per quintal and total fixed cost of Rs. 7.5 per quintal in Davangere district. Rice retailers'payment was mainly for the transportation of rice and accounted for Rs. 20 per quintal in the district. It was reflected from the foregoing discussion that the stakeholders involved in rice value marketing chains were commission agents, paddy wholesalers, millers, rice wholesalers and rice retailers. It was also observed that selling of paddy by farmers directly to rice millers fetched farmers much better price as it was better option for millers also to purchase directly from producers than from paddy traders. In the case paddy moves from the field to the mill though various intermediaries in the form of regulated market, commission agents etc., or through traders and other agents, there was cost involved at each stage and thus there was extra margin created which reduced the farmers' share in the price paid by the consumer for the ultimate produce of rice.

3.8 Supply Chain Management in Wheat

Wheat (Triticum aestivum L.) is one of the most vital cereal crop consumed by the bulk of world's populations in various forms as it is the foremost staple food for about 2 billion people world over. Wheat provides nearly 55% of the carbohydrates and 20% of the food calories consumed across the globe (Fernie, 2005). Wheat is cultivated over a large range of climate but it needs cold season during sowing and growing stage and very hot and dry climate at the time of harvest. India's whether especially in the north and north-west is most suitable for growing wheat. India ranks second in wheat production with a harvest of 96 million tonsduring the year 2018–19.

3.8.1 Supply Chain of Wheat in India

In India, wheat is mostly traded in the Agricultural Produce Marketing Committee (APMCs), which are established in each state or in each major manufacturing region by the Government. The APMCs which generally surround the production belt are supposed to bring in producer and traders together for the auctioning of the produce to take place at the mandi platform. In the APMC there are commission agents who are licensed functionaries and are supposed to arrange traders for helping farmers to dispose off their produce through a transparent bidding. These commission agents facilitate agreement with farmers and wholesalers on behalf of traders. Further, the commission agents contract with consolidators on the farmer's side and wholesalers on the retailer's side. These consolidators and commission agents charge their fees as a share of the contract. These numbers of intermediaries and their percentages vary across markets and across states.

3.8.2 Issues in Supply Chain in Wheat

Agriculture in India is still suffering not only with production issues but also lacking a transparent price discovery. Within the agriculture sector, the grain supply chain has remained unchanged. A large amount of the agricultural produce is still traded in unorganized markets, with organized business accounting for simply two per cent of the market. A big percent of output, especially perishables are wasted because of improper handling, infestation, deprived logistics, insufficient storage and transportation. Secondary, the intermediaries take giant share of the earnings that ought to head to farmers. Thirdly, post-harvest losses are approximately 25–30% in India in some of the commodities. Indian consumers pay 3–4 times the price realised at the farm gate, as compared to developed countries where the consumer pays one and a half to two times the farm gate price. A large share of the amount paid by the consumer is usurped by traders, commission agents, wholesalers and retailers. These intermediaries lack coordination which leads to poor management and inefficient information flow. Like all other commodities, wheat production is also suffering from the ailments of marketing and poor supply chain management.

3.8.3 Economic Analysis of Wheat Value Chain

3.8.3.1 Pre Intervention Value Chain

Wheat is notified product and farmers generally sell their produce in numerous regulated markets. Under Minimum Support Price (MSP) the Food Corporation of India

procures wheat directly from producers at their procurement centres which generally operate though APMCs and commission agents. However the entire wheat is not procured by the FCI and also not in all the states. A large share of the wheat produce is still marketed though private sector only. Producers bring the crop to assembling markets. Additionally, the distribution of wheat is handled by arhatias within the mandi, then it moves to stockists, cleaning units and then the processing units before reaching the consumer through distribution channels of wholesalers and retailers. The marketed surplus of wheat has been projected to be about 40–50% of production, which is sold out by the producers through various different channels.

The value chain of wheat at present can be categorized into production-distribution or activity-marketing channels. As mentioned above some of the states like Punjab and Haryana where APMC network is very strong, most of the wheat produced moves through APMCs traded through the commission agents. The other states where APMC network is poor, the produce moves through various intermediaries, traders and agents working at the village level. The APMC and other channels mentioned above mostly work in terms of wheat grains. In addition to grains, the other channel is for processed products of wheat like wheat flour, catering to the institutional buyers such as hotels, canteens, etc., and urban and rural households, respectively. In addition to these two channels, there is the third one, which deals with the consumers from foreign countries like the Middle East, Algeria, Indonesia etc.,who can purchase both wheat grains as well as processed and packaged wheat products. There are total post-harvest losses of 5–9% within the storage, handling, transportation of wheat at each stakeholder' point.

3.8.3.2 Post Intervention Value Chain

The post-harvest value chain is also viewed in terms of one extra channel being developed into value added products through start-ups in fortified atta (wheat flour), wheat flakes etc., being processed by large players like ITC (Aashirwad atta), Kellogs and so on. Also, farmer producer companies (FPC), or farmer producer organisation have also started evolving to undertake primary processing, grading, sorting, and storage activities and also promote alternate markets. The post intervention value chain map for wheat is also visualised together with the production-distribution or activity-marketing channels: cleaned and graded wheat grain and value added products like wheat flour. Such farmer producer companies can undertake storage, drying, cleaning, grading, sorting and packaging of manufacture activities. These companies may offer other connected services in terms of input assistance, custom hiring and enabling business to business connectivity.

Farmer producer organisation can additionally organise small producers to raise their bargaining power to either sell their produce in a competitive market or can join together in making further value addition to the farm produce. These farmer producer organisation and company interventions would profit farmers by giving them suitable storage facility and drying systems. This will enable farmers to completely and positively impact the post-harvest losses which might cut back to two to three per

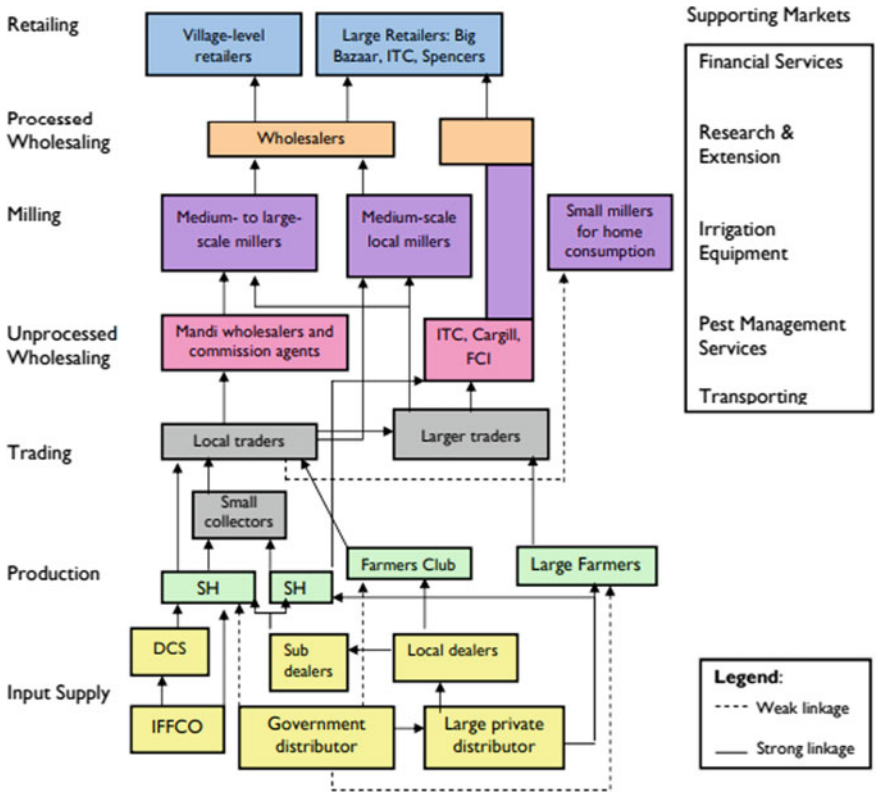


Fig. 3.3 Detailed wheat value chain process. *Source* McCarthy et al., (2008)

cent of such losses. Additionally, It would also enable farmers to recover the holding period of the produce through better storage system. Farmers can avoid glut selling and they can delay their sale to gain better price from the market Fig. 3.3.

3.8.4 Marketing of Wheat

3.8.4.1 Marketing Channels of Wheat

Important marketing channels which were witnessed in the study region:

1. Producer → village merchants → wholesaler → or regulated market → retailer → consumer
2. Producer → wholesaler or regulated market → retailer → Consumer
3. Producer → retailer → Consumer.

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3.8.4.2 Marketing Cost and Margin

Marketing cost of any commodity comprises of the total amount paid by the producer farmers from loading his produce from the farm and the produce reaching to the ultimate consumer. The marketing margin includes all charges or profits realized by different middlemen at different stages. The chain of marketing cost, marketing margin and price spread of wheat grain from producer to ultimate consumer is divided into following sub heads:

1. Charges paid by the producers
2. Charges paid by the village merchant/wholesaler/retailer
3. Total margins of village merchant/wholesaler/retailer
4. Price-spread with different channels.

The details of marketing cost and margins spread across different marketing channels of wheat are given in Table 3.9.

Wheat marketing includes range of middle men like traders, merchants, etc., from farm producers to final consumers. It includes a series of village traders, distributers/regulated market and retailers. The statistics in the table shows that among all the channels on average in channel 2nd the marketing cost plus margin were found to be the lowest, i.e., Rs. 330 per quintal of wheat followed by channel 3rd, Rs. 435 per quintal and channel 1st Rs. 447 per quintal, respectively. The

Table 3.9 Marketing cost and margins at different marketing channels of wheat

Sl. No.	Particulars	Channels		
		I	II	III
1	Producers sale price	1840	2100	1910
2	Producers marketing cost	0	40	20
3	Producersnet price	1840	2060	1890
4	Village merchant marketing cost	35	–	–
5	Village merchant margins	125	–	–
6	Village merchant marketing cost Or Wholesaler purchase price	2000 2000	– 2100	– –
7	Wholesaler marketing cost	25	25	–
8	Wholesaler margins	110	110	–
9	Wholesaler sale price	2135	2235	–
10	Retailer purchase price	–	–	1910
11	Retailer marketing cost	20	20	70
12	Retailer margins	132	135	345
13	Retailer sale price Or Consumer purchaser price	2287 2287	2430 2430	2345 2345

Source Author's Calculation

study discovered that due to additional number of market functionaries in channel 1st (village merchant, distributor and retailers) the selling charges and margins were highest in this channel, i.e., Rs. 447 per quintal. Furthermore, in marketing channel 3rd(Producer—wholesaler-retailer—consumer) the retailers realised the highest margins of Rs. 345 per quintal. The marketing channel which emerged the most efficient was the regulated market channel in which producers received highest price, i.e., Rs. 2100 per quintal. The regulated marketing channel was followed by producer—retailer—consumer whereby farmers obtained Rs 1910 per quintal. The least efficient channel was the channel 1st whereby there were three to four intermediary players, i.e., village merchants, wholesalers, commission agents and retailers as mentioned earlier more number of intermediaries means less share of producer in consumer's price.

3.8.4.3 Price-Spread in Marketing of Wheat in Different Channels

The details of price spread observed in the supply chain of wheat in our selected sample are presented in Table 3.10. The statistics in the table reveals that the farmers' share in consumers' rupee on average varied in different channels and highest producer's share in consumer's rupee (86%) was observed in the channel 2nd, due to least marketing cost and margins for the intermediaries in this channel. Although marketing cost was 3.5% in channel 1st and channel 2nd but the latter was most efficient whereas the former was the least efficient due to higher marketing margins in the former case, 16% compared to only 10% in the latter case. Channel 3rd was lying between these two in which case although marketing cost was the highest, 3.8% but marketing margins were lesser (around 15%).The producer's share

Table 3.10 Price spread and producer's share in consumer price in different channels (%)

Sl. No.	Particulars	Channels		
		I	II	III
	Marketing cost	3.50	3.50	3.84
1	Producers	–	1.65	0.85
2	Village merchant	1.53	–	–
3	Wholesaler	1.09	1.03	–
4	Retailer	0.87	0.82	2.99
	Marketing margins	16.05	10.08	14.71
1	Village merchant	5.47	–	–
2	Wholesaler	4.81	4.53	–
3	Retailer	5.77	5.56	14.71
	Total Cost + margin	19.55	13.58	18.55
	Producer's share in consumer rupees	80.45	86.42	81.45

Source Author's calculation

in consumer price was 86% in channel 2nd, around 81% in channel 3rd and around 80% in channel 1st. This finally reveals that with the rise in the number of market functionaries, there is a greater reduction in producer's share in consumer's rupees.

3.9 Brief Summary and Conclusions

The production of agricultural commodities has increased tremendously over the decades in India and in this process the country has not only become food secure but also exporting food grains since the early 1990s. This has become possible because of continuous efforts of the government in terms of technological interventions as well as various subsidy programmes. The production, supply and distribution of agricultural commodities, especially the food grains are largely influenced by government rules and regulations. However, over time as India moves towards surplus of these commodities, it's been felt that there's a requirement to re-orient policies and rules associated with agricultural commodities. Consequently, the government has initiated agricultural policy reforms associated with reforming marketing in agriculture and entry of private sector investment in the post harvest technologies. Besides, there are abundant rules and regulations and infrastructural gaps which create hurdle in the free flow of agricultural commodities from farm to fork. Absence of integration among various stakeholders leads into fragmented value chain each functionary working in isolation resulting into inefficiency not only in marketing but also in the production process. In such a value chain, every participant of the chain acts self-sufficiently with very little or no collaboration in physical and knowledge flow.

Food grains are the critical demand for human survival. The food security needs to be backed by availability of food at reasonable prices with satisfactory quality. The supply could also be assured by additional production or by reduction in wastage. In the Indian context, the food security is ensured mainly by the availability of wheat and rice. To stay competitive, wheat and rice producers and processing units ought to adopt the newest supply chain methods. The processing units have to target on co-ordination, collaboration with farmers and consumers for efficient flow of processed rice and wheat. Demand consolidation can facilitate inventory reduction. Focus should be created on marketing style. It is essential to revamp the supply chain of rice and wheat for improved performance as well as healthier services to the consumers.

The study has been conducted on supply chain analysis of food grains with respect to rice and wheat. Overall, understanding and analysing the existing supply chain helps to find out the weak and strong linkages between the stakeholders and processors. It suggests where to intervene by identifying the leverage points in order to improve the overall performance. Strengthening the existing value chain needs a holistic multi-stakeholder process and synergy between stakeholders wherein it helps to analyse the social and economic impacts. Further, supply chain analysis helps to prioritize research and enhances the income of stakeholders involved in the basic structure.

The study observed two kinds of supply chain in rice whereby organic and inorganic rice were having different set of players in the value chain. Similarly, large commercial farmers were selling their produce with lesser number of intermediaries compared to small and tiny subsistence oriented farmers. In the case of wheat we observed three sets of supply chains, out of which the one in which farmers sold through regulated markets was the most efficient. In summary, the study observed that in order to increase efficiency in the supply chain there is requirement of direct sourcing of wheat and rice by the processor and millers from the farmers and cutting down the long chain of intermediaries.

Analysis of the potential impacts of decentralization of the procurement and distribution system by making state governments responsible for procurement indicates that the overall impacts on supply, demand, prices and trade will be small. At the same time, this approach can lead to substantial budgetary savings by reducing procurement and public stockholding to meet public distribution needs and also allow further scope for efficient private traders to participate in grain marketing.

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Part II
Industry, Innovation and Technology

Chapter 4
Regional Concentration of Industries in India: What Does the Recent Data Say and How to Understand the Implications? A Perspective

K. V. Ramaswamy

4.1 Introduction

In 1991, India liberalized industrial policy regulations and removed all restrictions regarding location of industries. However, the policy continued the licensing requirement for setting up an industry within 25 km of cities with population more than one million.[1] Private investment and location choice of manufacturing plants have been freed of state directions and determined by market incentives. Twenty years later, we find that three states of Maharashtra, Tamil Nadu and Gujarat together accounted for more than 47% of manufacturing output produced by 14 major states of India. India's manufacturing landscape shows striking regional concentration and spatial disparities.

Why economic growth in India has not been successful in changing the regional spread of manufacturing activity? Why the spatial distribution of Indian industry continues to be dominated by Maharashtra, Gujarat and Tamil Nadu? Are we not concerned with balanced regional development? Have the market forces following market-oriented development strategies exacerbated spatial imbalances? Can we correct them by traditional fiscal incentives? How industrial dispersion policies stand up to scrutiny given the recent emphasis on manufacturing and export-led development? Should policymakers be alarmed about this increasing spatial concentration? If not, why not? These are the key questions often raised in the context of industrial development policy. They are also related to the issue of inter-state disparities in per capita income and federal fiscal transfers. This paper, however, has a very limited objective of examining recent changes in regional concentration of manufacturing

[1] Environmental pollution and other local use related restrictions was continued.

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industries and the factors driving the change towards greater concentration. What are the policy implications or more accurately does it suggest straight forward implications for regional industrial policy? Towards this end, the paper briefly discusses certain key factors, industrial policies and growth processes that could be driving the observed regional concentration of manufacturing activity in India. I have analysed in particular the inter-state differences in the entry of new factories and their regional distribution by employment size in the post-reform period. I have drawn greater attention to the spatial distribution of large factories and the observed tendency of co-location of relatively larger plants in industrially advanced states. I have discussed some factors having their origin in early industrial regulation (history matters!) and other contemporary growth factors reinforcing the regional concentration of industries. In the concluding section I have provided my perspective on the interpretation of regional concentration and its policy implications.

4.2 Spatial Concentration of Manufacturing: Recent Trends

I have examined the distribution of manufacturing output in 14 major states of India as shown in Table 4.1. The data for Bihar, Madhya Pradesh and Uttar Pradesh have been

Table 4.1 Distribution of manufacturing GSDP by state

State	1980–81	1993–94	2004–2005	2011–2012
Maharashtra	24.1	22.9	20.9	21.5
Tamil Nadu	11.6	12.1	10.6	11.6
Gujarat	8.6	11.2	13.5	14.4
Uttar Pradesh	8.2	9.5	9.4	9.7
West Bengal	11.8	7.2	5.7	4.6
Andhra Pradesh	5.3	6.7	6.7	7.8
Madhya Pradesh	5.6	6.1	2.6	1.6
Karnataka	4.9	5.9	7.5	6.6
Bihar	5.9	4.1	6.0	3.3
Punjab	3.1	3.7	3.6	4.0
Haryana	2.6	3.3	5.0	4.9
Rajasthan	2.9	3.3	3.9	5.3
Kerala	3.3	2.5	2.5	2.1
Orissa	2.2	1.6	2.3	2.6
Above-14 States	100	100	100	100

Note Shares are calculated using the values at current prices. For the years 2004–05 and 2011–12, the 2004–05 Series has been used

Source Estimates based on Time Series available at: http://www.epwrfits.in/

adjusted by including data on Jharkhand, Chhattisgarh and Uttarakhand, respectively. These 14 states have large populations and account for a large share of organized manufacturing activity in India. They have more than 93% of India's population and their estimated share in India's registered manufacturing output was 79% in 2004–05. I have examined the distribution of total manufacturing GSDP because the unregistered factories contribute substantial part of total manufacturing employment and produce significant (but varying) share of manufacturing output. In the beginning of 1980s, the top three states in terms of their share in manufacturing output were Maharashtra, West Bengal and Tamil Nadu (Table 4.1). Together their estimated share in manufacturing gross state domestic product (GSDP) is found to be 47.5% in 1980–81. These three states had received 56% of the industrial licenses issued between 1953 and 1961.[2] In 1970–1, their combined share of value added in registered manufacturing was above 50%. Between 1970 and 1980, there was little redistribution of value added except for the fall in the share of West Bengal (Mohan 1993, p. 18). The share of these three states in total registered manufacturing output was higher than their share in total NSDP in the 1970s. In other words, the spatial inequality of registered manufacturing was probably increasing in the 1970s.[3] It started declining in the 1980s with the share of West Bengal experiencing a decline of more than 3 percentage points between 1980–81 and 1993–94. The composition of the top three states had changed by 1993–94 with Gujarat replacing West Bengal as the third most important manufacturing state. We find that in 2011–12, the share of top three states, namely, Maharashtra, Gujarat and Tamil Nadu together accounted for 47.5% of GSDP of the major 14 states (Table 4.1). In between, the share of top three states had declined to 46.2% in 1993–94 and then to 45 per cent in 2004–05.[4] More important question that one could ask is what has happened to the spread of organized manufacturing activity? The reason is simple because organized manufacturing is the driver of productivity growth and accounts for relatively larger share of total manufacturing output. Is it getting concentrated in a few states?

I have estimated the trends in HH index of spatial concentration in organized manufacturing. The spatial Herfindahl–Hirschman index (HH index) of concentration defined as follows:

$$\text{HH Index} = \Sigma(s_i - x_i)^2 \tag{4.1}$$

[2]Lall and Chakravorty (2007).

[3]The estimation of spatial inequality indexes for the 1970s is not undertaken by us. The estimates of HH index reported by Mohan (1993) are absolute HH indexes and are not comparable with ours by definition.

[4]In another context, we had examined the manufacturing distribution in 21 states after including the recently carved out states. The top three states, namely Maharashtra, Gujarat and Tamil Nadu, are found to have a combined share of 44.5% in 2015–16, the latest year for which data for all the 21 states is available. The above-mentioned three states are observed to have dominated way back in the year 1993–94 (Ramaswamy, 2019).

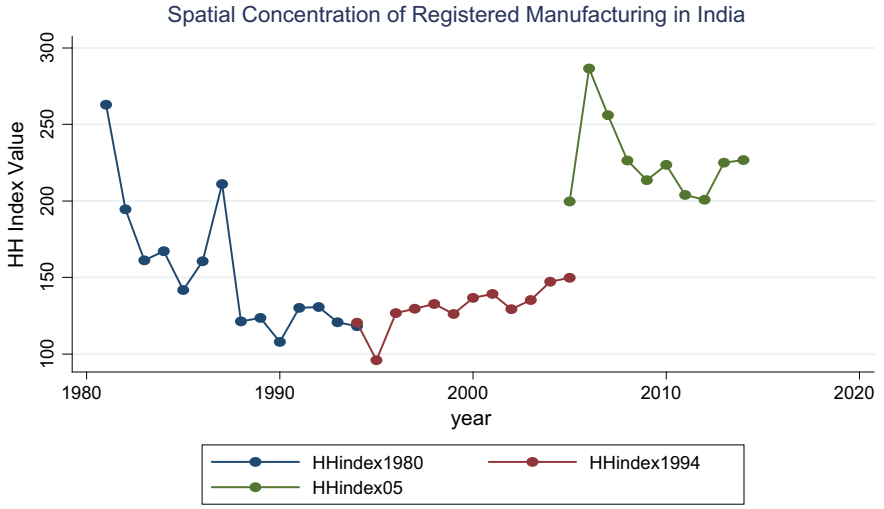

Fig. 4.1 Index of spatial concentration in registered manufacturing output in India: 1981-2014

where s_i is the share of the ith state in total manufacturing sector output and x_i is the share of the ith state in the aggregate economy output.[5] The HH index is a relative index that measures the extent to which an individual sector (manufacturing in our case) is spatially concentrated within a country. It involves a comparison of manufacturing output share of the ith state relative to its share in total economy output. The spatial HH index is estimated for the 14 major states of India for the period 1980–81 to 2013–14 and is shown in Fig. 4.1. The computed values of HH index show an upright U shape and provide support to the proposition that spatial concentration in manufacturing output has been rising in recent years.

It is obvious that spatial concentration of manufacturing output was declining in the 1980s. The years after 1990 do not show the kind of steep falls except in the year 1994–95. Spatial concentration in Indian manufacturing clearly shows an increasing trend particularly after 1995–96. The HH index is observed to attain the peak value in the year 2005–06, and one could see it decline somewhat in the years after 2010. But it is above the levels of HH index observed in 1990s and in the first half of 2000s. Evidently, we could argue that spatial concentration has been increasing in the post-reform years. The industrial decline of West Bengal in particular and stagnation of the eastern states of Bihar and Orissa have been the factors causing the decline in the 1980s. Correspondingly, the rise in spatial concentration levels could be directly attributed to the continuing dominance of Maharashtra, Tamil Nadu and Gujarat as the top three states with substantial share of manufacturing output.

[5]GSDP in the manufacturing sector and the aggregate GSDP have been used to measure the respective variables.

4.2.1 Registered Manufacturing: Spatial Concentration of Factories

Two important and related questions in the context of our discussion are as follows: Can we examine the changes in the distribution of factories and the entry of factories across states in recent years? Can we see the corresponding changes in the state-wise distribution of workers employed in registered manufacturing? Fortunately, the answer is yes. The number of factories and workers has continuously risen beginning 2004–05, and their growth rate has substantially slowed down after 2011–12.[6] I have estimated the changes in spatial concentration of registered factories and workers between 2004–05 and 2015–16 in twenty-one selected states of India. The data source for the registered sector is the Annual Survey of Industries (ASI), and source for the unregistered sector is the enterprise surveys conducted by the National sample Survey Organization (NSSO).[7]

In order to capture the change in subnational concentration of factories and workers, I have estimated the absolute version of HH index of concentration.[8] The absolute HH index is measured by the formula $\Sigma^n s_i^2$, where **n** is the total number of factories (workers) and s_i is the share of the ith state in the total number of manufacturing factories (workers). If all the n states in India have the same size, then the value of HH is equal to $1/n$. This is an absolute measure where the actual distribution is compared to the uniform distribution of the relevant variable under consideration like factories or workers in our case. The value of HH ranges between zero and 10,000 (maximum concentration) when the shares are expressed in percentages. A higher value of the HH index indicates greater spatial concentration of factories (workers). It gives greater weightage to larger states, and it has been an important index of concentration along with 3-firm concentration ratio in the area of industrial economics. Our estimates of the HH index for the three selected years for the registered sector and the unorganized sector (more later) is presented in Table 4.2. They do not show any sign of decline in the subnational concentration of factories (workers) in registered manufacturing.

A closer look at the changes in the distribution of factories across states and the entry of new factories (Net Entry) is possible, and it is revealing (Table 4.3). The three top states (Tamil Nadu, Maharashtra and Andhra Pradesh) have a combined share of 42.2%, 44.3% and 42.7% in 2004–05, 2010–11 and 2015–16, respectively. The increase in the number of factories in the state of Telangana is responsible

[6] See Ramaswamy (2019). In the year 2010–11, the number of factories has gone up sharply because of change in the method of recording codes for number of factories. See Pandey & Shetty (2014) for details. This should not affect our results because our focus here is with the distribution of factories across space.

[7] The ASI covers the organized (or registered) manufacturing sector. It considers industrial units registered under the Sects. 2m(i) and 2 m(ii) of the Factories Act, 1948 and Bidi and Cigar establishment registered under the Bidi and Cigar Workers (Conditions of Employment) Act, 1966

[8] We have used the absolute version because the relative concentration measure is affected by extreme values of small-sized subnational units (states in India).

Table 4.2 Spatial concentration indices for Indian manufacturing

	Registered Sector[a]		
	2004–05	2010–11	2015–16
	HH index	HH index	HH index
Factories	914	957	916
Workers	891	867	898
Net value added	975	1009	1092
	Unregistered Sector[b]		
	2005–06	2010–11	2015–16
	HH index	HH index	HH index
Establishments	871	837	826
Workers	897	928	887

[a]Author based on Annual Survey of Industries (ASI) of respective years
[b]Author based on NSSO enterprise surveys of respective years

for large improvement in the share of Andhra Pradesh. In terms of the absolute number of net entry of factories, Tamil Nadu topped the list with 21% (15,795) of the total (73,746) net entry of factories between 2005 and 2011. Andhra Pradesh contributed 14% (10,714) of total net entry followed by Maharashtra with 12% (8980) and Gujarat with 10% (7679) of net entry during the same period. Punjab is another significant state that has attracted 7% (5195) followed by Uttar Pradesh (5%), Karnataka (4%), Rajasthan (3%), Himachal Pradesh (2.1%) and Uttarakhand (2.7%). This pattern of net entry has enabled the top three states to maintain their top positions in the year 2010–11. A substantial slowdown in net entry has taken place in the period between 2011 and 2016 with the addition of only 21,272 factories against an addition of 73,746 factories in the earlier period (2005–2011). The two top losers were Maharashtra and Tamil Nadu which accounted for only 1.5 and 2.3% of the total net entry, and their combined net entry was only 801 factories against 24,775 factories in the earlier period (2005–2011). Punjab is found to have experienced negative net entry indicating that the total number of factories actually declined in the year 2016 relative to the year 2011. Of the 21 states, only Haryana is observed to have a larger number of net entry of factories (the estimated number is 1986) during 2011–2016 compared to the earlier period. Himachal Pradesh and Uttarakhand are found to be the two specific states that have experienced significant decline in net entry in the second period that may be directly attributed to the withdrawal of tax incentives offered by the central government. We may recall that the excise tax incentives were withdrawn in 2010 and the corporate tax incentive had ended by 2012.[9] Two states with relatively higher net entry are Karnataka (2251) and Andhra Pradesh (4928) that helped them maintain their overall share in the total number of factories in the year

[9]In 2003, the Government of India introduced tax-incentive package in order to induce industrial investments and employment in the states of Uttarakhand and Himachal Pradesh that include 100% excise duty exemption among other things. See Ramaswamy (2019) for details.

Table 4.3 Distribution of factories and net entry of factories in registered manufacturing by state: 2005–2016

		State-wise distribution of Factories			Net entry of factories: 2010–11-over-2004–05	Net entry of factories: 2015–16-over-2010–11	Net entry of factories: 2015–16-over-2004–05
	States/UTs	2004–05	2010–11	2015–16			
1	Maharashtra	14.4	13.6	12.4	8980	318	9298
2	Gujarat	10.3	10.4	10.8	7679	3144	10,823
3	Tamil Nadu	16.0	17.9	16.5	15,795	483	16,278
4	Karnataka	5.8	5.2	5.7	3126	2251	5377
5	Andhra Pradesh[a]	11.8	12.8	13.8	10,714	4928	15,642
6	Uttar Pradesh	7.3	6.7	6.7	4174	1535	5709
7	Haryana	3.3	2.9	3.5	1628	1986	3614
8	Jharkhand	1.2	1.2	1.2	897	327	1224
9	West Bengal	4.6	4.0	4.1	2127	1068	3195
10	Rajasthan	4.4	4.0	4.0	2432	877	3309
11	Madhya Pradesh	2.3	2.0	2.0	1184	214	1398
12	Chhattisgarh	1.0	1.1	1.3	1015	679	1694
13	Punjab	5.7	6.2	5.5	5195	−249	4946
14	Orissa	1.3	1.2	1.3	787	412	1199
15	Himachal Pradesh	0.5	1.1	1.2	1557	557	2114
16	Kerala	4.2	3.4	3.3	1424	663	2087
17	Assam	1.3	1.4	1.7	1085	1095	2180
18	Uttaranchal	0.6	1.3	1.3	1987	239	2226
19	Goa	0.4	0.3	0.3	65	71	136
20	Delhi	2.4	1.9	1.7	764	−144	620
21	Bihar	1.3	1.4	1.6	1131	818	1949
	Above 21 States	100	100	100	73,746	21,272	95,018

[a]Includes Telangana

Note Share refers to the share of each state in the sum of 21 selected states

Source ASI Summary Results for Factory Sector of respective years

2016. Taking the entire period together, we find that more than 80% of net entry has taken place in the states with above the Median number of factories consistent with the observed estimates of HH index of concentration in recent years.[10] What about the subnational distribution of employed workers in registered factories? The outcomes

[10]The state of Haryana with 4339 factories can be classified as the median state in 2004–05.

are similar with the three top states in 2015–16, namely Tamil Nadu, Maharashtra and Gujarat, are found to have contributed more than 46% of the total net addition 43 lakh workers over the entire period between 2005 and 2016 (Ramaswamy, 2019). In short, a disproportionate number factories and workers have gone to the initially industrialized states during the last decade. The emergence of relatively new centres of manufacturing like Haryana, Karnataka, Andhra Pradesh including Telangana, Rajasthan and Uttarakhand has prevented further concentration of manufacturing activity.[11]

4.2.2 Net Entry of Factories by Employment Size

An earlier study indicated that net entry is higher in states with larger share of factories in the initial year (2009–10) with few exceptions (Ramaswamy, 2019).[12] A relevant question in this context is whether relatively large factories have entered the more industrialized states in the post-reform period. It is important to examine the pattern of new entry by employment size of factories across states since the 1990s. It will tell us more about the locational advantages of these developed states. This demands that we estimate the gross entry of new plants across states in different employment size categories over a given time period. The ASI data does not enable us to measure gross entry because it does not capture the difference between plants that newly enter the industry, incumbent plants expanding their workforce size, and the set of plants undergoing workforce reduction. The number of plants exiting the industry is also hard to distinguish from missing plants due to non-reporting. Bearing this data limitation, I have presented two pieces of evidence that should help us to answer this question. First, I find that the net entry of factories in the employment size classes 100–499 and 500–1999 is relatively high in the top three states with some exceptions between 2009–10 and 2015–16 (Table 4.4). More than 47% of net entry in the employment size class 100 to 499 has taken place in the top three states of Maharashtra, Tamil Nadu and Gujarat in the same period. They are also found to have more than 57% of net entry in the employment size group 500 to 1999. Second, I have estimated the distribution of large factories defined as those with more than 100 workers factories by their year of entry measured by the reported year of initial production (Table 4.5). Two subperiods have been distinguished, namely 1995–2004 and 2005–2015 to measure the cohort of entering plants. Of the total number of 11,714 large factories that started manufacturing in the years between 1995 and 2015, a large proportion of them (44%) were located in the top three states of Maharashtra, Tamil Nadu and Gujarat. This finding of net entry by year of entry further substantiates

[11] States that maintained their employment shares have been Karnataka, Haryana, Uttar Pradesh and Uttarakhand. See Ramaswamy (2019).

[12] This is based on the net entry of factories during 2009–10 and 2015–16 in three selected representative engineering industries (see Ramaswamy, 2019).

Table 4.4 Net entry by factory size: selected states

	2009–10	2015–16			2009–10	2015–16		
	Factory size				Factory size			
State	100–499	100–499	Absolute change	Share in total entry %	500–1999	500–1999	Absolute change	Share in total entry %
Andhra Pradesh	1219	1241	22	0.5	322	392	70	4.2
Bihar[a]	318	644	326	7.5	56	57	1	0.1
Delhi	280	215	−65	−1.5	60	50	−10	−0.6
Gujarat	1858	2269	411	9.4	417	593	176	10.6
Haryana	780	1127	347	8.0	218	302	84	5.1
Himachal Pradesh	242	363	121	2.8	52	84	32	1.9
Karnataka	1062	1398	336	7.7	361	556	195	11.7
Kerala	599	607	8	0.2	258	345	87	5.2
Maharashtra	2618	3490	872	20.0	620	992	372	22.4
Madhya Pradesh[a]	592	689	97	2.2	200	222	22	1.3
Odisha	238	182	−56	−1.3	53	54	1	0.1
Punjab	748	844	96	2.2	202	216	14	0.8
Rajasthan	600	761	161	3.7	125	158	33	2.0
Tamil Nadu	3696	4481	785	18.0	869	1272	403	24.3
Uttar Pradesh[a]	1870	2570	700	16.1	338	468	130	7.8
West Bengal	785	981	196	4.5	190	241	51	3.1
Above 16 states	17,505	21,862	4357	100	4341	6002	1661	100

[a]Bihar, Madhya Pradesh and Uttar Pradesh include Jharkhand, Chhattisgarh and Uttarakhand, respectively

Source ASI Summary Results for Factory Sector of respective years

the locational attractiveness of states with substantial share of manufacturing output (top three states) and the tendency of co-location of large plants.

However, factories with less than 50 workers have continued to dominate the size distribution within the states particularly in highly industrialized states. Therefore, the average factory size within each state could be misleading as the number of factories in the size class (0–49) is found to be high across the states, which is likely to weigh down the average employment size of factories. A more interesting question is whether they have higher share of the total number of medium size factories in the formal manufacturing sector? It is pertinent to examine the share of different states

Table 4.5 Distribution of large factories by year of entry and by state

	Year of entry	Year of entry	Year of entry
State	1995–2004	2005–2015	1995–2015
Andhra Pradesh	3.2	5.3	4.4
Assam	3.0	1.3	2.1
Bihar	1.8	3.1	2.5
Chhattisgarh	1.2	1.1	1.2
Delhi	0.6	0.5	0.5
Goa	1.0	0.3	0.6
Gujarat	12.6	10.1	11.2
Haryana	7.8	5.8	6.7
Himachal Pradesh	1.2	4.0	2.8
Jharkhand	1.0	0.8	0.9
Karnataka	6.9	5.3	6.0
Kerala	3.0	1.6	2.2
Madhya Pradesh	2.1	1.5	1.8
Maharashtra	12.7	15.4	14.2
Orissa	1.2	1.2	1.2
Punjab	5.2	1.9	3.3
Rajasthan	3.2	3.3	3.3
Tamil Nadu	19.7	18.3	18.9
Uttar Pradesh	7.5	7.8	7.7
Uttarakhand	0.6	8.3	5.0
West Bengal	4.5	3.1	3.7
All India	100	100	100
Total factories	5030	6684	11,714

Note Large factories are those with above 100 total workers (Regular + Contract workers)
Source ASI Unit level data of respective years

in employment size classes in the size distribution and ask whether the leading states have a higher share in the larger size groups particularly in the size classes 100–1999. This turns out to be true as evident from the Table 4.6.

4.2.3 What About the Unregistered Sector?

Is there a concentration in the unregistered manufacturing sector? The unorganized manufacturing is a very heterogeneous group with three different types of enterprises, namely own account enterprises (OAEs), non-directory establishments (NDMES) and directory manufacturing establishments (DMEs) with 1–6 workers with uneven

Table 4.6 State-wise share of number of factories by size-class of factories: 2015–16

States	0–49	50–99	100–199	200–499	500–999	1000–1999	2000–4999	5000 & Above
Andhra Pradesh[a]	17.0	6.9	4.9	6.7	6.2	7.1	6.3	3.7
Bihar[a]	3.1	3.1	4.2	1.3	1.0	0.9	1.2	4.8
Delhi	1.7	1.6	1.1	0.8	0.9	0.8	0.0	0.0
Gujarat	10.2	10.2	10.0	10.9	9.5	10.6	9.6	5.8
Haryana	3.3	4.2	4.8	5.6	5.1	4.8	3.7	4.2
Himachal Pradesh	1.2	1.6	1.8	1.5	1.8	0.7	0.1	0.0
Karnataka	4.9	5.6	5.8	7.2	9.5	8.8	11.0	22.0
Kerala	3.8	2.9	2.6	3.0	4.8	7.5	4.6	1.2
Maharashtra	11.0	14.9	14.5	17.9	17.8	14.2	9.9	4.9
Madhya Pradesh[a]	3.7	3.0	3.2	3.1	3.2	4.6	4.2	10.6
Odisha	1.7	0.7	0.8	0.9	0.9	0.8	1.5	3.5
Punjab	6.4	6.7	4.6	2.9	3.4	3.9	3.9	0.2
Rajasthan	4.8	5.7	3.5	3.4	2.8	2.3	3.6	2.1
Tamil Nadu	15.0	20.5	20.3	20.7	20.1	23.2	29.3	31.9
Uttar Pradesh[a]	7.5	8.8	12.7	10.5	9.1	5.4	5.2	2.5
West Bengal	4.7	3.7	5.1	3.7	3.7	4.5	6.0	2.6
Above 16 states	100	100	100	100	100	100	100	100

[a]Andhra Pradesh, Bihar, Madhya Pradesh and Uttar Pradesh include Telangana, Jharkhand, Chhattisgarh and Uttarakhand, respectively

Source ASI Summary Results for Factory Sector 2015–16

quality of data.[13] I have estimated the distribution of workers in urban DMEs for five selected years not reported here (Ramaswamy, 2019). The top three states in 2005–06 with high shares of urban DMEs are found to be Maharashtra, Gujarat and Tamil Nadu. West Bengal is found to have lost shares consistently with a share of 10.6% in 2005–06 down from 15% in 1984–85. The same study had compared the distribution of establishments and net entry in three selected years 2005–06, 2010–11 and 2015–16 corresponding to the NSSO surveys of unincorporated enterprises excluding construction and reported a high share in terms of net entry of unregistered establishments in West Bengal (Ramaswamy, 2019).

[13]I have chosen to neglect OAEs as they are mostly household enterprises and dominant in the rural segment of the unorganized manufacturing.

Table 4.7 Distribution of employment and value added in manufacturing by state [Census sector]

	Employment		Value added		Employment	Value added
State	1959	1965	1959	1965	1977–78	
West Bengal	23.1	21.9	23.2	21.6	15.0	12.2
Maharashtra	21.1	19.6	26.6	24.7	17.8	24.9
Gujarat	10.3	8.4	9.7	8.4	8.3	10.0
Andhra Pradesh	4.8	5.4	2.4	3.1	7.1	4.8
Karnataka	3.6	4.1	3.2	4.5	5.0	4.9
Tamil Nadu	6.9	8.7	6.5	8.9	9.5	10.1
UP	8.0	7.5	5.7	6.3	10.0	6.4
Bihar	6.1	5.3	8.3	7.1	5.9	5.2
India	100	100	100	100	100	100

Source Dasgupta (1998)

4.3 Roots of Regional Manufacturing Concentration

The current trend and the structure of regional concentration of manufacturing can be traced to certain early policy changes and agglomeration inducing growth processes. They may be broadly discussed under the following heads.

4.3.1 Recession of 1965–67 and Industrial Delicensing[14]

In the year 1960, West Bengal and Maharashtra have had similar percentage shares of total factory employment. The share of West Bengal and Maharashtra was similar in total factory output in the Census sector, the segment that covers all factories with above 100 workers in the year 1965 (Table 4.7). However, it is important to note that West Bengal was the leading producer of machinery both electrical and non-electrical machinery and also other metal products by 1960. Its share in Metal products was 40%, was 42% in electrical machinery, 47% in Rail-Road equipment, and 24% in non-electrical machinery. Similarly in the sample sector (factories with less than 50 workers), its share in metal products was 22%, 37% in electrical machinery and above 10% in non-electrical machinery.[15] This is obviously because of its locational advantage of being closer to the key input industry namely steel. In 1960, West Bengal's share in iron and steel in the Census sector was 39% of all India value added. The external shock came in the form of drought and the recession. The two consecutive recessions of 1965–66 and 1966–67 due to droughts impacted West Bengal relatively

[14]This section draws much from Dasgupta (1998).

[15]The estimates for the sample sector are those reported by Banerjee (1982).

severely, and it lost its dominance in manufacturing in later years. Transport equipment (railway wagons) and metal products were the important engineering industries that suffered from lack of investment demand. The key reason for this outcome was the decline of public sector investment. Following droughts[16] the fiscal situation of the central government had deteriorated adversely affecting public investment particularly in transport and communication sectors (Joshi and Little 1987). At the same time, the central government delicensed several steel-using industries like castings and forgings, structural steel products, electric motors, billets, etc. that encouraged private investment in locations away from West Bengal due to the policy of Freight Equalization Scheme (more on this below). Other states like Maharashtra and Tamil Nadu recovered much faster from the recession of 1965–67 and attained better industrial growth. In the Census sector (factories with more than 100 workers), more than 117 thousand workers lost their jobs between 1965 and 1970 in West Bengal. During the same period in Tamil Nadu and Maharashtra, the net job creation was 95 thousand and 55 thousand.[17] By 1977–78, the dominance of Western and Southern states was largely in place (Table 4.7).

4.3.2 Freight Equalization Scheme and Its Adverse Effects

A regulatory policy that had the unintended effect of neutralizing the locational advantage of industries in mineral-rich states of Bihar and West Bengal was the policy of Freight Equalization Scheme (FES) introduced in 1952. The aim of FES was to promote the dispersal of industries across regions of India by providing access to intermediate inputs at a uniform price. To achieve this objective, the FES equalized across states the prices of intermediate inputs namely, iron and steel, cement and fertilizers.[18] The focus of FES for iron and steel was the manufacturing sector, while the FES for cement and fertilizers had the construction and agriculture as focus sectors. Under this policy, the government fixed uniform prices for the transport of pig iron and steel products (steel sheets) from centres of production to user location. As a result, all users of iron and steel (downstream producers using them to produce other processed products) irrespective of their location could get them at the same price. In other words, producers of machinery and other products located far away from the steel mills could get cost savings relative to those producers located close to the steel mills. This kind of savings expressed as a proportion of the finished product price served as effective rate of protection (ERP) to engineering firms located 2000 kms away from the steel mills. In short, there was no incentive for user industries to locate

[16]The war with Pakistan in 1965 had led higher defence expenditures and the inflation due to droughts had imposed restrictive fiscal policies.

[17]My estimate is based on Dasgupta (1998), Table 10, p. 3055.

[18]The freight equalization scheme was in operation for pig iron, steel, cement, petroleum products and nitrogenous fertilizers (Planning Commission, 1978, p. 11). Our focus will be only on iron and steel.

themselves in Bihar and West Bengal (the states with Integrated Steel Plants (ISPs) till the year 1971). A government committee actually attempted to estimate the relative cost savings for different steel-using firms and found them to rise with the input-transported distance. The maximum was found to be 2.6% for a distance of 2000 kms (Planning Commission, 1978). This is apparently relatively small advantage, but we know small price advantages could cause large effects in a spatial competition. The Committee in fact stated that they could not examine the effect of FES on profitability but recognized that '…even low differences in prices and costs can have sometimes fairly significant differences on profitability differential…' (Planning commission 1978, p. 18). Investment in machinery industries (broadly the category capital goods) did not take off in Bihar and West Bengal while it flourished in the Western states of Maharashtra, Gujarat and the southern states of Tamil Nadu and Karnataka. A recent unpublished study (Firth and Liu, 2018) has tested the proposition that over the period 1950–51 to 1990–91, the relative growth of engineering industries (selected user industry groups) is actually faster in those states located away from the states with ISPs in 1956 (Bihar and West Bengal). Their econometric exercises have supported this proposition. They have also presented data which shows that the share of Bihar and West Bengal in engineering industries declined more than their share in industries not using steel between 1950 and 1970.

In short, the policy of FES certainly played a role in the decline of Bihar and West Bengal as dominant industrial states by undermining their comparative advantage in intermediate goods industries. In this context, the concept of linkages (a 'la Hirschman) that underlined the technological relationships among its various sectors either through input purchase (backward linkage) and output disposal (forward linkage) are of crucial importance. The idea of exploiting growth in forward linkage industries through access to cheap steel because of locational advantages was simply not harnessed. The FES was abolished in January 1992.[19] One unintended effect of FES perhaps is that it aided the rapid growth of firms in import substituting industries located closer to the markets in western and southern states and the consequent rise in the spatial concentration of manufacturing in India. Several other centripetal factors have played their role in this spatial outcome.

4.3.3 Policy for Planned Dispersion and Unbalanced Outcomes

Absence of spatial dimension in Indian planning models was pointed out very early in the literature on planning models (Bhagwati and Chakravarthy 1969: p. 28). An

[19] A natural question that can be raised is whether the abolition of FES encourages iron and steel industries to move back to states with ISPS. The econometric result based on data covering the period 1990–2014 does seem to support this proposition. The question whether FES has led to irreversible agglomeration economies or not is a difficult empirical question not pertinent to our discussion here.

adverse consequence was that different states competed for the planned industrial capacities and that resulted in uneconomic scales in different locations (Bhagwati and Desai, 1970: p. 268–269). This is contradistinction to the planning objectives given expression in the Five-Year Plan documents that included widespread diffusion of industry and regional balance among the major aims of planned development. The Industrial Policy Resolution of 1956 emphasized the importance of progressive reduction of inter-regional disparities in development but argued that power, water and transportation facilities need to be made available to the industrially lagging regions in order to attract industries.[20] The Third Five-Year Plan document made a remarkable observation to quote 'As resources are limited, frequently advantage lies in concentrating them at those points within the economy at which the returns are likely to be favourable' (Planning Commission, 1961, Chap. 9, p. 142). Later policies apparently could not adhere to this principle and often projects were selected overriding the criterion of relative rates of return to investment. Several instruments were brought into use during the 1970s and 1980s in order to achieve the desired objective of industrial dispersal.[21] They mainly fall into two types[22]: (i) policies that impacted inter-regional distribution of industry and (ii) policies that affected intra-regional distribution of industries. The important ways of influencing industrial location have been the use of industrial licensing policy to direct investment into backward or 'no-industry' districts,[23] prohibiting heavy industry from metropolitan areas; the location of public sector plants in backward states (Bihar, Madhya Pradesh and Orissa), and pricing policy for intermediate inputs (more on this below). All these impacted inter-regional distribution. Furthermore, *within*-state distribution of industries were influenced by another set of policies that included the central government capital subsidy schemes, transport subsidy for industries in hilly backward areas, income tax concessions for new industrial units in backward districts that permitted 20% deduction of profits in the computation of taxable income, and financial assistance at below normal lending rates by financial institutions. The fiscal-financial policy mix is reported to be quite successful as the share of backward areas in the financial assistance sanctioned and disbursed by the All India Financial Institutions is found to be between 40 and 50% since the mid-1970s. In the 1980s, the concept of growth centres was advocated instead of selection of backward areas as a strategy of industrial dispersion. These selected growth centres were eligible for special assistance for a decade to achieve adequate level of industrial progress.

Several important outcomes in terms of industrial location and state assistance are relevant for our discussion.[24] They are:

(i) Location of industrial units (including public sector units) in industries (excluding raw material industries like steel) is found to be concentrated near

[20] This is more akin to the view build infrastructure first and industries follow!

[21] The discussion in this paragraph is based on Sekhar (1983), Marathe (1989) and Mohan (1993)

[22] See Sekhar (1983) for an early discussion of these policies and Marathe (1989, Chap. 8) for an informative discussion.

[23] A no-industry district is one in which there are no licensed or registered industrial units.

[24] All the three are based on Marathe (1989), Chap. 8.

a few urban areas, for example, engineering industry in Bengaluru. Access to educated and skilled labour was an important consideration.

(ii) More benefits of capital subsidy accrued to industrially advanced states like Maharashtra, Gujarat, Tamil Nadu and Karnataka, that is those with relatively more large-scale units.

(iii) Flow of concessional finance for backward districts was found to be favourable to districts in advanced industrial states and those districts near established industrial centres in a given state.

(iv) More than 40% of the total number of selected growth centres was found to be in industrially advanced areas.

In short, the advantages of established centres of industrial activity are found to be overwhelming by the entrepreneurs despite the state-directed investment promotion policies and regulations. The policy environment underwent a dramatic change in 1991 with the removal of industrial licensing system.

4.4 Factors Reinforcing Concentration

4.4.1 Public Sector Investment and Domestic Capital Formation

Public investment and its growth and distribution over the years have been the well-known factor influencing regional dispersal of industries. A standard method of measuring changes in public investment has been to examine 'gross block', a measure of fixed capital and the changes in gross block over time. An early study examined the distribution of gross block in 14 major states of India (Kumar, 2000). The study estimated the cumulative per capita non-strategic investment (Investment in 27 public sector enterprises coming into operation after 1965–6). The top 4 states in the period 1985–94 are found to be Maharashtra, Gujarat, Andhra Pradesh and Tamil Nadu (Kumar (2000), Table 4.4, p. 3686). The distribution of aggregate gross block of all public enterprises is also found to be high in the state of Maharashtra in the year 1998. The data on aggregate gross block is little misleading as it includes mining sector and other non-manufacturing companies like petroleum PSUs. It is useful to look at the distribution of gross fixed capital formation in the manufacturing sector (Table 4.8). In the years of trade and industrial liberalization, investment has flowed to three top ranking industrialized states of Maharashtra, Gujarat and Tamil Nadu, and followed by Karnataka.

Another associated factor reinforcing agglomeration tendency has been the inflow of FDI and its uneven distribution across states. One should recognize that a large proportion of the volume of FDI inflows has been into non-manufacturing sectors. However, the distribution of FDI strongly favoured the three leading states of India, namely Maharashtra, Gujarat and Tamil Nadu (Mukherjee, 2011). The flow of FDI

Table 4.8 Distribution of investment: 1980–2005*

State	1980–90	1993–2004	2002–2005
Andhra Pradesh	7.5	5.4	6.5
Bihar	5.5	4.1	3.5
Gujarat	10.5	18.3	16.8
Haryana	2.8	1.5	4.4
Karnataka	4.1	7.6	8.2
Kerala	2.1	1.6	1.1
Madhya Pradesh	8.8	6.8	5.3
Maharashtra	19.4	18.9	18.9
Orissa	4.1	3.3	4.0
Punjab	4.6	3.0	3.1
Rajasthan	3.9	2.5	2.6
Tamil Nadu	9.7	11.4	13.4
Uttar Pradesh	9.8	9.8	8.8
West Bengal	7.0	5.9	3.2

Note *Cumulative Investment over the respective years
Source Annual Survey of Industries (ASI) various years and EPWRF (2002)

not surprisingly has followed the development regions of India, a typical example of positive feedbacks in economic development.

4.4.2 Distribution of Exports by State and Net Entry

A large proportion of India's manufactured exports originates in Maharashtra, Gujarat and Tamil Nadu followed by Karnataka (Table 4.9). It is fairly well known that since the mid-1990s, India's exports of capital and skill (human-capital) intensive products have grown faster relative to unskilled labour-intensive exports (Kochar et al. 2006; Veeramani 2011). We will be largely correct in presuming that a significant proportion of these exports would have originated in these four states since the late 1990s if not earlier. The group of engineering industries and the chemical including pharmaceutical are representative of capital and skill-intensive industries. All the top four states have a large share of these two types of industries in their output structure. New factory entry into these industries has been relatively more in the states of Maharashtra, Gujarat and Tamil Nadu rather than in the states of West Bengal and Bihar (Ramaswamy, 2019).

Table 4.9 Distribution of manufacturing exports by state in India

	State	1991–1999	2000–2008
1	Maharashtra	21.1	22.7
2	Gujarat	14.2	24.3
3	Tamil Nadu	10.3	7.7
4	Karnataka	5.1	9.7
5	Andhra Pradesh	5.7	5.6
6	Uttar Pradesh	6.0	4.0
7	Haryana	4.2	2.7
8	Odisha	3.2	2.2
9	West Bengal	6.2	3.3
10	Punjab	3.3	2.2
11	Rajasthan	2.7	2.2
12	Kerala	2.4	1.7
13	Madhya Pradesh	4.7	2.8

Source Pradhan and Das (2016)

4.5 Should We Worry About Increasing Regional Concentration?

Why is this not a worrying or alarming situation? Why are agglomeration economies critical for India at this juncture? What should be the policy response? I argue that this is not necessarily unwelcome trend in terms of economic efficiency. Firms in India, it is widely accepted, have continued to suffer from relatively high production costs due to regional variations in energy costs, transportation networks, domestic taxes and other regulatory costs among other factors. Therefore, firms have chosen to agglomerate in selected locations in industrially advanced states. Two sources of external economies have been critical for Indian firms. They are the access to intermediate inputs including components and ancillary services (localization economies) and the access to skilled labour (human capital externalities). The logic of locating in a relatively advanced industrial area is to take advantage of agglomeration economies to offset higher costs of operation in an environment of institutional constraints. This is not surprising for several reasons. First, advanced countries like the USA, UK and Spain among others have gone through stages rising regional industrial concentration. Studies show that geographic concentration will have beneficial effects till about US$10,000 GDP per capita (2006 prices) (Brulhart and Sbergami, 2009). In other words, India can be seen to be very much in the rising part of the bell curve consistent with the Williamson's inverted-U shaped relationship between spatial income inequality and economic development. Second, large proportions of Indian manufacturing firms operate at suboptimal scale by international standards and suffer from lack of internal economies of scale in several industry groups. The cost savings from agglomeration economies are more important for their cost competitiveness and

growth. Agglomeration benefits are required to offset many other disadvantages of suboptimal scale and size-dependent regulatory costs. Third, international evidence suggests that agglomeration contributes to firm-level productivity growth. Between 2000 and 2007, agglomeration is shown to have contributed about 14% of aggregate firm productivity in China (Hu et al., 2015). Fourth, Chinese firms are found to grow in size if they are found to be located among larger firms. Moreover, co-location of large firms has been observed to contribute more to productivity growth. A central result is that more than the number of factories (factory population), factories would like to be surrounded by relatively bigger factories. This is consistent with the evidence from China (Li et al., 2012). We have observed some signs of co-location of larger factories in top three states in the post-reform period the years of market-driven locational choice. In conclusion, I would venture to say that it is too early in India's stage of economic development to foster micro-interventionist location-based policies of different kinds to achieve greater regional dispersal of manufacturing. The optimal industrial location policy is the one that develops backward regions in terms of physical infrastructure, workers with industrial training, access to finance, and facilitating institutions. Then firms will have an incentive to locate their new plants in such areas, and spatial disparities can be expected to decline over time.

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Chapter 5
Indian Electronics Industry's FDI-Led GVC Engagement: Theoretical and Policy Insights from a Firm-Level Analysis

Smitha Francis and Murali Kallummal

5.1 Integrating into Global Value Chains

For nearly three decades now, successive Indian governments have continuously liberalised the national FDI regulatory framework in ambitious drives towards attracting foreign direct investments (FDI). These have been carried out presumably for achieving East Asian-like industrial development, which was perceived as FDI-driven export-led growth under passive industrial policies.[1] But in addition to unilateral liberalisation of FDI policies with these aims, India dramatically increased her participation in bilateral and regional free trade agreements (FTAs) from around the mid-2000s with the purported objective of enabling the country's integration into global value chains (GVCs). The argument has been that the reduction/elimination of tariffs and enlargement of markets through these FTAs will significantly help increase export-oriented FDI from multinational corporations (MNCs) linked to GVCs and enable India to expand exports (Francis, 2015; Francis & Kallummal, 2013). India's FTAs, especially with the East and Southeast Asian economies, were argued to offer mutually beneficial linkages to the partner countries through dynamic industrial restructuring within the region. Both the India-ASEAN Free Trade Agreement (FTA) and the India-South Korea Comprehensive Economic Partnership Agreement (CEPA) came into force in January 2010 and was followed by India's CEPA with Japan in 2011. The ensuing production restructuring was expected to lead to

[1] Francis (2019) called this the flying geese 'syndrome'. See Rao and Dhar (2018) for an analysis of the nature of the policy regime and its outcome on the kind of FDI inflows that India has attracted and Francis (2019) for an analysis of FDI policies in the specific context of GVCs.

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greater competition and improved efficiency; as well as gains from greater inter- and intra-industry specialisation, economies of scale, and learning-by-doing.[2]

In particular, the electronics industry was expected to benefit from these FTAs with ASEAN, South Korea and Japan—countries deeply integrated into electronics value chains regionally and globally. For imports originating from South Korea, Japan and the ASEAN countries, the FTAs extended and deepened tariff liberalisation in the electronics industry (Francis, 2016, 2019).[3] With the strategic nature of the electronics industry because of its cross-sectoral applications and economy-wide productivity-enhancing impact, these FTAs were argued to improve India's export competitiveness through greater access to 'more competitive' electronics parts and components from these countries and increased FDI-led global value chain (GVC) integration.

However, when we account for the various types of incorrect classifications within official FDI data, the electronics manufacturing sector has received only a tiny part of the total FDI into India. A comprehensive analysis of what are considered 'real FDI' inflows[4] by Rao and Dhar (2016) showed that such inflows into the electronics sub-sectors namely (i) office, accounting and computing machinery, (ii) radio, television & communication equipment and (iii) medical, precision & optical instruments, watches, were quite small. An analysis by the authors based on similar individual FDI inflow data compiled from the newsletter of the Department for Promotion of Industry and Internal Trade (DPIIT) found that such inflows into 106 firms involved in either manufacturing or trading of electronics products totalled US$ 2.7 billion during 2004–14. The number of foreign-invested firms in electronics manufacturing firms alone was 63, which attracted total foreign investment of about US$ 1.8 billion. The remaining 43 firms were involved in only trading of electronic products. Based on official data from April 1, 2000 to June 30, 2015, NITI Ayog (2016) also found that the electronics industry received only $1.68 billion or 0.66% of the total FDI inflow of $258 billion FDI inflow.

Based on available evidence, some analysts have already pointed out that such low levels of inward FDI into India's electronics industry is in fact related to the liberal FDI policy regime in place since 1991 and the nature of trade liberalisation in the industry. The latter meant that large foreign original equipment manufacturers (OEMs) and electronics manufacturing service providers have had no incentive to invest in local production in India (Ernst, 2014; Francis, 2016; Saripalle, 2015). As a result, they typically set up only final assembly plants (Ernst, 2014, p. 8). The low levels of average inflows led Rao and Dhar (2016) also to raise doubts about the extent of localisation of production by these foreign-invested companies. In fact, electronics had become the second largest import among India's imports by 2017–18.

[2] See the literature review in Francis (2015).

[3] Detailed analysis of the tariff liberalisation under these three FTAs at the HS 6 digit level and HS 8 digit level can be found in Francis (2019) and Francis and Kallummal (2020) respectively.

[4] Rao and Dhar (2016) consider foreign investors as belonging to two broad categories: one, who merely seek return on their investments and the other perceiving the host country operations as integral to their global operations. The first category essentially comprises a host of financial investors such as PE funds and FIIs. The second category is considered as real FDI (RFDI).

The issue of the extent of local production undertaken by foreign-invested electronics firms is of critical significance in light of the fact that the NITI Ayog has continued to recommend that India needs to forge more FTAs to realise duty-free markets for Indian electronic products, while attracting large-scale foreign investments to become globally competitive (NITI Ayog 2016, p. 23). The NITI Ayog study recommended to the government to introduce ten-year tax holiday to anyone investing $1 billion and creating 15,000 jobs in electronics industry in order to bring much-needed large-scale manufacturing to India's electronics industry. The logic provided for the high investment thresholds is that only firms that promise to create substantial number of good jobs and help build up the industry will use the tax benefits. According to NITI Ayog, such firms also promise to support domestic small and medium enterprises (SMEs) as ancillaries (ibid., p. 24). The same expectations appear to underlie the implementation of several government promotional schemes for the development of the industry, including the Production-Linked Incentive (PLI) Scheme introduced in 2020. The hope is of generating a large volume of export-oriented foreign investments into the industry with the expectation that the latter will build up the domestic supplier base. It is therefore important to understand the impact existing policies have had on foreign investors' operations in the country, as reflected in their participation in electronics value chains and contribution to export performance, as well as the extent of their local linkages vis-a-vis import intensity.

There have been studies looking at the contribution of foreign-invested firms to exports, imports, productivity, foreign exchange earnings, etc. at the macro level and in specific industries. Such papers are reviewed in Rao and Dhar (2016, 2018), Verma (2015, 2019) and Francis (2019). Studies like Verma (2015, 2019), Saripalle (2015), etc. established the heavy import dependence of foreign-owned firms in India, which points to the absence of significant backward linkage creation by them. Saripalle (2015) in fact found that import dependence in the electronics firms surveyed in Tamil Nadu increased with their size. The Annual Census on Foreign Liabilities and Assets (FLA) of Indian Direct Investment Companies published by RBI since 2012–13 has shown that the net export earnings of foreign subsidiaries in the manufacturing sector were negative, including in computer, electronic and optical products.

From the perspective of the present study, the most relevant recent work is that of Verma (2019), which analysed 469 select manufacturing sector FDI firms to understand their intra-firm trade through related party transactions for 2014–15 and 2015–16. Related party transactions comprise trade in goods and services as well as other transactions such as royalty payments, between an Indian subsidiary and the firms affiliated with its parent firm across countries, as well as the holding company (more discussion follows in Sect. 5.3). Complementing studies like Rao and Dhar (2016, 2018), Verma (2019) established that a majority of the selected FDI manufacturing firms, in particular, subsidiaries, were associated with net foreign exchange losses on the current and trade accounts of the BoP, even after more than ten years of operations in India. Further, more than two-thirds (70–72%) of foreign exchange outflows and total foreign trade flows of the studied manufacturing sector subsidiaries were linked to some foreign related party. This in turn was found to be significantly associated with transfer pricing manipulation and profit shifting conduct associated with

the emergence of tax havens. Again, electronic products and computers were among the high-technology sectors that experienced the highest levels of intra-firm trade. Verma (2019) also found that about 30% of intra-firm exports and more than half of intra-firm imports during 2014–15 and 2015–16 by the sample FDI companies were conducted with India's FTA partners. The study mentioned that the substantial shares of intra-firm trade in goods and services for subsidiary firms in various high-technology sectors can be interpreted as reflecting the possibly significant involvement of Indian subsidiaries in their parent firms' production networks, as buyers of input or finished goods or technology.

However, there has been no systematic attempt in the literature to examine the nature of engagement of foreign-invested firms in industry value chains, including from the perspective of the implications of such FDI-led GVC integration for India's manufacturing sector development. Against this backdrop, the present paper explores Indian electronics industry's FDI-driven engagement with global value chains within a new analytical and methodological approach and presents the case study analysis of a major foreign subsidiary's engagement in electronics industry value chains.

Following this introductory section, Sect. 5.2 presents a critique of the existing approaches in the literature on assessing GVC participation, which are based on analysis of intra-industry trade (IIT) or on trade in value added (TiVA). Section 5.3 presents an alternative methodology for examining GVC participation. Using this methodology, Sect. 5.4 presents the detailed case study of a 100% foreign subsidiary, Samsung Electronics India Ltd., to analyse the nature of FDI-led value chain engagement by Indian electronics industry, while linking the findings to the policy dynamics in the industry. Drawing upon the findings, Sect. 5.5 makes concluding observations on the implications of this type of FDI-led GVC engagement for Indian electronics industry and makes policy suggestions.

5.2 A Critique of Existing Approaches to Assessing GVC Participation

Typically, developing country firms' engagement in GVCs has been considered to happen through any or a combination of the following possibilities:

1. An export strategy of foreign-invested firms located in the developing country;
2. Direct entry into export markets by indigenous firms; or
3. Indirect entry of indigenous firms through sub-contracting or other non-equity forms of foreign alliance.

Lead firms of value chains are continuously evolving strategies for generating and maintaining their core competencies and shareholder value, in response to, and often causing, policy changes across countries. They also dynamically change their organisational structures in response to multiple other factors, including technological changes. Given the developments in organisational structures involving functional and geographic fragmentation these have lead to, GVCs have grown in scale

of operations and network complexity, involving multiple supplier-buyer relationships. There are various degrees of lead firm's investment, technical support, subcontracting, and control in network firms. Increasingly dense networks have emerged, which involve arms-length market transactions, internalised transactions and those in between,[5] geared to an increase in vertical and horizontal integration along value chains, with trade and investments organised within them (Francis, 2019, p. 75). Whatever the form of relationship between lead firms and their network/value chain participants, the underlying business model built on asymmetric governance relations lies at the heart of lead firms' cost-cutting and rent maximisation strategies within GVCs, as William Milberg and Deborah Winkler established in their classic 2013 book 'Outsourcing Economics'.

There have been several advances in the FDI literature to deal with the constantly evolving complexities in value chains and different types of relationships between lead firms and other value chain participants including foreign affiliates. Yeaple (2003) had found that many firms engage in horizontal (market-seeking) and vertical (efficiency-seeking) FDI simultaneously, and placed them in a catch-all category called 'complex FDI'. Baldwin and Venables (2010) argued that most production disintegration processes are complex mixtures of two types of configurations—'spiders' and 'snakes'. Hanson et al. (2001, 2005 cited in Baldwin & Okubo, 2012) had already documented that sometimes foreign affiliates also act as wholesale distributors, while other affiliates produce for export to third markets (export platform FDI); or add value to inputs sourced from their parents/fellow subsidiaries/affiliates. Baldwin and Okubo (2012) considered all affiliates with intermediate levels of local sales and local sourcing as relating to 'networked FDI'. With the differentiation between vertical and horizontal FDI blurred, networked FDI concept seems to come the closest to understanding the various roles and forms of foreign affiliates within GVCs. However, this concept of networked FDI is still inadequate to capture the prevalent GVC complexity, as it leaves out non-equity forms of engagement utilised by MNCs to engage and control various nodes of their value chains across different countries/industries.[6]

But even as internationalisation of both production and the services around it has given rise to complex value chains, the lack of reliable data on everything other than trade has traditionally meant that value chains are typically viewed as involving trade in goods that happens to be concentrated in parts and components. Thus, it has been generally considered in the literature that production sharing between countries by MNCs involved in regional or global value chains typically leads to an expansion in two-way trade (simultaneous increase in exports and imports) between those countries, in particular, intra-industry trade (IIT) in intermediate goods. IIT has been differentiated as: IIT in horizontally differentiated (i.e. similar priced) products and IIT in vertically differentiated products (i.e. differing by quality, and hence, price) (Fontagné et al., 2005). Both HIIT and VIIT can be considered as part of GVC trade

[5] Arms-length transactions are inter-firm transactions between non-related parties, and internalised transactions are intra-firm transactions between related parties.

[6] See the detailed critique and discussion in Chap. 3, Francis (2019).

given that GVCs increasingly involve horizontal and vertical production sharing strategies.[7] However, VIIT is considered to be characterised by differences in created capabilities (rather than static factor endowments). At a very disaggregated level, a comparison of unit prices in VIIT between bilateral partners has therefore been used to analyse the difference in technological capabilities between any two trading partners.

Detailed analysis of India's bilateral intra-industry trade (IIT) till 2014 was carried out by Francis (2019) using this methodology in the case of all the major electronics trade partners of India. This study showed that the observed rise in both horizontal and vertical IIT contributed to India's rising trade deficit with each of the partners. However, the analysis based on trade data even at the 6 digit level did not provide conclusive evidence to suggest that the observed increase in intra-industry trade (IIT) in the electronics industry was due to India's involvement in electronics industry GVCs.

There is a need therefore to re-consider our understanding of intra-industry trade and its usefulness in understanding value chain involvement, also because of the following aspects that have been neglected. As discussed in Francis (2019), not all increase in two-way trade observed in India's electronics trade at the HS 2 digit level is considered as IIT. An example of such a case is the following: even as there was significant two-way trade in HS Chap. 84 (non-electrical machinery), the country was importing hard disk drives as an intermediate into the production of a final good, computer, for the domestic market. This comes only under imports and therefore is a case of inter-industry trade when we use the above methodology (and therefore gets eliminated in the first step of delineating one-way trade from two-way trade). That is, intermediate imports used for final good production in India—for domestic consumption (or backward participation in GVCs)—are not considered as part of India's participation in GVCs in this methodology. Similarly, the computer input/output units exports (manufactured domestically) that go into foreign production/consumption, is actually part of GVC trade, but it does not get captured in this methodology because as they come only under exports (again, one-way trade). So this kind of forward participation in GVCs is also not considered in this methodology. Thus, IIT analysis using even disaggregated trade data at the 6 digit level (and in some cases even at the 8 digit level) leaves out several forms of GVC engagement.

These problems in using IIT as the key feature in identifying GVC trade arise from the conceptualisation that GVC participation is erroneously considered only as 'importing-to-export'. Under the current understanding, foreign-invested firms in the Indian electronics industry contribute to the vertical integration strategy of their parent firms by importing raw materials or intermediate products into the country, either for exporting higher value-added intermediate products to other countries or for exporting final products. However, we argue that imports for domestic production should also be considered as part of GVCs, even if the network is not coordinated centrally, especially in an industry like electronics. This is all the more critical given that the incentives offered to lead firms by overlapping FTAs with cumulative rules

[7] See the detailed discussion in Chap. 4, Francis (2019).

of origin can lead increased import intensity of their production for the domestic market (more later).[8]

Input-output (I/O) analyses have been considered to provide a useful alternative to trade data, given that they classify goods according to their use (as intermediate or as final good), and also include information on inputs of and in services sectors (Francis, 2019). As Baldwin and Lopez-Gonsalvez (2013: 8) clarified, a nation's imported intermediates from a given partner usually contain intermediates from third nations and even from the nation itself. When the recursion is fully worked out—so that the origin of all primary factor inputs in exports is identified—we have 'value-added trade'. This is how studies began examining gains from GVC engagement after the Trade in value-added (TIVA) dataset was jointly released by the OECD, WTO and UNCTAD in May 2013.

However, it must be noted that there is no internationally agreed methodological framework for measuring trade on a value-added basis (IMF 2013: 7). Measures of trade on a value-added basis have therefore focused on the use of international input-output (IO) tables, which have been constructed by combining the national input-output tables available from national statistical agencies. Given that trade in value added aims to capture only the domestic content/value that countries add to goods and services (and not the gross value of goods and services traded), it is expected to give a relatively better picture of the benefits of GVC participation. However, as noted by Baldwin and Lopez-Gonsalvez (2013, p. 11), value-added trade data differs from I2P 'importing-to-produce' and 'importing-to-export' measures in that they are much further removed from real-world trade flows. Working out the recursion involves simultaneous manipulations of all nations' input-output tables. Further, errors in any of the national IO tables will produce errors in all value-added trade flows.

An equally or more important drawback is again with the conceptualisation and definitions underlying the assessment of GVC participation using the TiVA database. Most studies define backward integration, backward participation index, etc. based on the value of imported inputs in the overall exports of a country or for exports of a particular industry. Even though later revisions began considering forward participation (domestic value addition going into exports),[9] the major disadvantage is that imported inputs going into production for the domestic market or domestic consumption are excluded, as in the case of IIT. Including the latter into the assessment of GVC participation has significant implications for developing country policymaking.

5.3 A New Methodological Approach

Assessing a country's participation in GVCs therefore consists of a number of conceptual and methodological aspects which need to be combined in a new analytical

[8] See Chap. 3, Francis (2019), pp. 103–105. See also Francis and Kallummal (2020).

[9] See Banga (2013), Gupta (2016) and Banga (2016).

framework. In contrast to existing approaches, it is proposed that a new framework should combine macro policy aspects of trade and financial/investment liberalisation and industry-specific policies with firm-level business strategies for achieving competitiveness. This will enable us to derive information about value chain network relations that are currently missing in GVC analyses based on existing approaches.

Following Francis (2016, 2019), it is hypothesised that rapid trade liberalisation under the ITA-1 and the subsequent WTO-plus liberalisation under India's comprehensive FTAs with East and Southeast Asian countries that are integrated into GVCs have significantly changed the incentives facing producers in the Indian electronics industry. At one level, in the context of a liberal investment policy regime that had nil or ineffective industrial policy measures in place to develop competitive indigenous production, backward linkages and technological capability build-up, deep trade liberalisation under overlapping FTAs removes the tariff-hopping and other policy-driven incentives for MNCs to maintain parallel operations in India along with other countries for the same product lines (Francis, 2015; Francis & Kallummal, 2013). That is, while enlarging the market, FTAs drives MNCs to rationalise their operations to exploit the locational advantages of existing operational bases, in the absence of industrial policies that require local manufacturing. local manufacturing, wherever, while MNCs can meet the demand in specific regional or even global markets in particular products through affiliates in particular countries, they will choose to close similar production facilities in others (Kumar, 2007). At another level, in the absence of industrial policies to build up national technological capabilities and a competitive domestic supplier base, deep and broad trade liberalisation changes the incentives for indigenous firms' also in different ways. Such tariff liberalisation sans industrial policy will:

- increase their incentives for importing intermediate products from FTA partners to carry out local assembly of final products; or
- completely remove their incentive to undertake any local production/assembly and lead to increased imports of electronics final products; or/and
- increase incentives for outward FDI. (Francis, 2019).

These in turn has implications for domestic firms' engagement in GVCs. If intensive and extensive trade liberalisation (as under India's overlapping FTAs with ASEAN, South Korea and Japan) has led to increased imports of intermediate products for final assembly in India, or imports of final products directly from partner countries to serve the domestic market by foreign-owned/invested or indigenous firms, India will be serving largely as the market for final products in some value chains. This is also clearly a part of GVCs, especially when the import for domestic production is part of the overall division of labour strategy of a foreign-invested firm. Electronics industry can be considered a typical example of this. This means that the forms of developing country firms' engagement in GVCs discussed in the beginning of Sect. 5.2 must incorporate MNCs' strategy to serve developing country domestic markets based on imports from their networks.

In order to be able to fathom the connections between trade and investment liberalisation, firm strategies, and the accompanying production and trade restructuring

arising from GVC engagement, we therefore propose that GVC engagement needs to be examined at the firm-level through an analysis of intra-firm and inter-firm transactions of foreign-invested companies. This makes it possible to evaluate their equity and non-equity forms of value chain engagement, import intensity and domestic backward linkages, contributions to exports, technological upgrading, etc.

In this paper, we analyse the nature of value chain participation of a 100% foreign subsidiary, namely Samsung India Electronics Private Limited. Samsung has been an active player in consumer electronics and handheld phones. In particular, the company has been among the largest TV and smart phone sellers in India since many years.[10] The choice of the firm is justified by the fact that the government has been focusing its promotional schemes (including the recently-launched PLI scheme) for developing a domestic electronics ecosystem by actively seeking FDI from lead MNCs and their sub-contractors into the mobile phone segment.

One of the major sources of data for the case study analysis are the foreign exchange transaction disclosures and related party transaction disclosures of the company available in its annual financial statements across years available from the Ministry of Corporate Affairs (MCA). Related parties cover holding company, ultimate holding company, fellow subsidiaries, joint ventures, promoters, subsidiaries, associates, key management personnel and other related entities.

Typically, there are several transactions between a host country subsidiary with its parent firm/holding company as well as with fellow subsidiaries and associates. These intra-firm transactions involve:

- trade in goods (sale or purchase of fixed assets, finished goods, raw materials and components, etc.);
- trade in services (including software, communications, etc.);
- income transfer in other ways such as income from sales support undertaken by the Indian firm for the parent firm;
- expenses incurred by the Indian firm on account of royalty payments;
- expenses incurred by the Indian firm on account of remuneration (and other employee benefits) of key foreign management personnel;
- expenses incurred by the Indian firm as fee for technical assistance or consultancy received (legal and professional fees), advertisement, travelling, warranty, repairs and maintenance, etc.

[10]In general, Samsung has dominated the smart phone market since 2013. Although it had lost market share and the top rank to the Chinese firm Xiaomi in between, by the second quarter of 2018, Samsung had accounted for the largest market share of 29% of the Indian smartphone market again. See Tech Desk (2018) 'Samsung beats Xiaomi as top smartphone vendor in India in Q2 2018: Counterpoint', Indian Express, 25 July, https://indianexpress.com/article/technology/mobile-tabs/samsung-leads-xiaomi-in-q2-2018-smartphone-shipments-counterpoint-5274207/. But subsequently, Xiaomi had again topped the Indian mobile market. According to the 2020 quarter 3 data, Samsung's share went up to 24% and it became the top smart phone again after 2 years since Q3 2018. https://telecom.economictimes.indiatimes.com/news/samsung-pips-xiaomi-to-become-indias-top-smartphone-brand-after-2-years-report/78913110.

- expenses incurred on account of financial transactions including dividend and interest payments related to inter-corporate deposits, equity infusion, loan guarantees, loans and advances, etc.

For capturing the trade within related parties, we consider only the holding company, ultimate holding company, fellow subsidiaries and associates.[11] Given that related party transactions reflect not just the patterns of trade in goods, but also services, analysis of related party transactions offers a picture of the Indian subsidiary's relative position with the global value chain of the parent firm.

However, the details of foreign transactions and related party transactions are frequently under-reported or even unreported by many companies. Further difficulty arises from the fact that there are numerous ways in which these related party transactions are reported by companies. There is no uniformity in the manner of reporting of the above-listed categories, not just across countries, but often even between different years for the same company. Another disadvantage faced by researchers while using the related party information in Annual Reports, even where they are provided, is the aggregation of parts and components trade under 'raw materials'. Often, the break-up of traded goods between final goods and raw materials is not provided at all. Product information under raw materials, final goods, etc., is also unavailable. Moreover, the break-up of expenses on the purchase of goods between imports and indigenous purchases, or the product-wise composition of exports or imports are also not available.

It must also be noted that while related party disclosures have been mandatory since 1 April 2004 under the Indian Accounting Standard (Ind AS) 18, these disclosures relate only to 'material transactions' or transactions in excess of 10% of total related party transactions of the same type. Moreover, these are all accounting statements, which only reflect the financial aspects of such transactions. Although the financial statements contend that all related party transactions have been entered into in the ordinary course of business and have been carried out at an arm's length, studies have shown that these are significantly prone to transfer mispricing.[12]

To overcome some of the above-mentioned issues with company reports, we supplemented the information on related party transactions and other firm-level information from the Annual Reports and CMIE Prowess database, with firm-level customs trade data for 2018–19 from a commercial research firm. In addition to product details, the trade data included supplier and buyer names and their addresses, port of origin/destination and their export and import values in 139 major HS 8 digit

[11] The firm having significant control over the Indian company holding more than 50 per cent ownership is considered as the holding company. In this case study, the holding company is Samsung Electronics Co. The ultimate holding company is the Samsung Group (South Korea). Firms under common control by the parent/holding company are grouped as fellow subsidiaries and other firms under the Samsung Group are considered as associates. All other firms are considered as unrelated firms.

[12] See the in-depth analysis in Verma (2019).

level electronics imports and exports belonging to HS chapters 84, 85 and 90 (hereafter referred to as 'major electronics imports/exports'), wherever the firm has been among the top five importers or exporters in any of these products.[13]

Major electronics exports/imports were arrived at using the following methodology. In the first step, a list of 2056 products were identified at the HS 8 digit level as electronics products, which includes the OECD's list of ICT products, the WTO's ITA-1 and ITA-2 lists of products and a few other products identified by the authors as electronics products following technological advancements. Out of these products, top 100 exports and top 100 imports based on their average shares in the total during 2017–18 and 2018–19 were selected.[14] In the final step, after clubbing all these top traded products belonging to HS Chapters 84, 85 and 90, a unique list of 139 'major electronics products' at the HS 8 digit level was obtained.[15] In the case of the firm selected for the present case study, these major electronics products constituted 83% of the company's total imports and as much as 96% of its total exports in 2018–19.

5.4 Nature of FDI-Driven GVC Participation: A Case Study

Samsung India Electronics is a 100% subsidiary of the South Korean conglomerate, Samsung Electronics Company Limited.[16] It was incorporated in India in 1995 and has engaged in manufacturing and trading of electronics products in the following five business segments:

(a) Audio visual: This segment covers operations relating to colour televisions, colour monitors, audios, digital video players, video disc players, camcorders and cameras.
(b) Home appliances: This segment covers operations relating to washing machines, air conditioners, refrigerators and microwave ovens.
(c) Network: This segment covers operations relating to setting up of Network Infrastructure.
(d) Handheld phones.
(e) Software development and export.

[13] It must be noted that while the Annual Reports give an assessment of the extent of related party transactions in services too, the trade data excludes services.

[14] This was due to the financial implications of purchasing the full set of data covering the 2056 products. The firm-level trade data was purchased under the ICSSR project from private market research companies.

[15] These 139 top traded electronics products constituted average shares of about 79% of India's electronics imports and 66% of electronics exports during the two-year period 2017–18 to 2018–19.

[16] According to the Annual Report, while Samsung Asia Pte. Ltd., Samsung's Singapore-based subsidiary, is a second promoter, it held just 18 out of the total number of 216,787,504 shares.

Although audio visual products like colour TVs and household appliances such as refrigerators and washing machines used to dominate Samsung's operations in India traditionally, it emerged as a major mobile phone 'producer' by the mid-2010s.

In the ensuing analysis, we first use the information available from the Annual Reports to examine the importance of the company's related party transactions for assessing the Indian subsidiary's value chain participation. This analysis covers the trends in the years from 2006–07 to 2018–19. We then analyse customs trade data for 2018–19 for examining the nature of the company's recent network transactions on the goods side.

5.4.1 Findings from Annual Reports

Samsung has long been a domestic market-oriented subsidiary as seen from the fact that the majority of its production and sales has been directed towards the domestic market. The share of total revenue coming from domestic market sales, which was 95% in 2006–07 went up to 97% during 2009–11, before coming down to 95% again in 2012–13. Foreign exchange earnings accounted for just about 10% of gross income in 2008–09, before halving to 5% in 2012–13. While forex earnings mainly owed to software exports earlier, there has been an increase in goods exports in recent years. Consequently, there was a decline in the share of domestic sales to 92% of total revenue in 2017–18. With a dramatic rise in goods exports during 2018–19 dominated by mobile phones (as we will see later), the share of domestic sales in total revenue declined significantly to about 79% in that year. Foreign exchange earnings thus comprised about 21% of gross income in 2018–19 (Table 5.1). Out of the nearly 21% revenue share of exports, goods exports constituted as much as 19.3% in 2018–19.

But even as the share of foreign exchange earnings in Samsung India's gross income went up from only 5% in 2012–13 to 21% in 2018–19, the company's total foreign exchange expenditure kept increasing continuously. Net foreign exchange outflows from Samsung India went up from Rs. 169.9 billion in 2012–13 to Rs. 431.2 billion in 2018–19.

Imports had constituted as much as 98% of total forex expenditure in 2006–07.[17] Although this share declined slightly to 95.3% in 2012–13, it continued to account for 95.7% of Samsung's forex expenditure even in 2018–19.

Break-up of the goods imports figures available for four years until 2010 revealed that they were dominated by raw materials and components in the range of 62–67% in the earlier years, before dropping to 57% in 2009–10. In fact, imports constituted about 79% of the total raw materials and components consumed by the company

[17] In 2007–08 and 2012–13, this share came down on account of a rise in the share of royalty payments to the South Korean parent firm by the Indian subsidiary.

Table 5.1 Composition of Samsung India's revenue in terms of markets & products, 2017–19

Revenue component	2017–18	2018–19	2017–18	2018–19
	Rs. Million		Percent share	
Turnover/Revenue from operations (1 + 2)/A + B	593,709	706,277	100.0	100.0
1. Domestic revenue (goods & services)	544,073	558,350	91.6	79.1
2. Export revenue (goods & services)	49,343	147,315	8.3	20.9
A. Total revenue from sale of products (A.1 + A.2)	568,877	682,780	95.8	96.7
A.1 Total domestic turnover for goods	530,244	546,714	89.3	77.4
Domestic sale of manufactured goods	418,097	379,916	70.4	53.8
Domestic sale of traded goods	112,147	166,798	18.9	23.6
A.2 Total export turnover for goods	38,633	136,066	6.5	19.3
Export sale of manufactured goods	5020	84,829	0.8	12.0
Export sale of traded goods	33,613	51,237	5.7	7.3
B. Total revenue from sale of services (B.1 + B.1)	24,539	22,885	4.1	3.2
B.1 Domestic revenue for services	13,829	11,636	2.3	1.6
B.2 Export revenue for services	10,710	11,249	1.8	1.6

Source Authors' calculations based on annual report, 2018–19

in 2009–10.[18] On the other side, the share of finished goods in total imports which ranged between 29 and 32% in the first three years increased to 39% in 2009–10.

In the case of Samsung's related party transactions also, it was observed that purchase of raw materials and components dominated total expense outflow to related parties only until 2010–11. Its share in total related party expenses, which had stood at 71% in 2006–07, decreased to 64% in 2008–09 before coming down further to only 35% in 2012–13. A total of 105 related parties (the holding company, 79 fellow subsidiaries and 25 associates) were identified on the basis of Samsung India's Annual Reports from different years.[19] In general, import of raw materials and components occurred from Samsung's other subsidiaries abroad, except in 2011–12 when the share of the holding company was greater. Significantly, in 2009–10, all imports of raw materials and components were purchased from the parent firm.

However, as seen in the case of total imports, related party expenses too came to dominated by purchase of finished goods in 2009–10 with a share of 60% of the total. Although purchases from fellow subsidiaries had dominated final goods imports too until 2008–09, in 2009–10, Samsung India obtained as much as 78% of its finished goods imports from the parent firm. The share of the parent firm in finished goods imports went up to 91% in the subsequent years and stood at 99% in 2012–13. Indeed,

[18]Further, imported spare parts constituted an average share of 66 per cent of total spare parts consumed between 2006 and 2011.

[19]The holding company Samsung Electronics Co.'s consolidated subsidiaries totaled 240 in number globally, as of 31 December 2019. It must also be noted that the holding company Samsung Electronics itself is only one of a total of sixty domestic affiliates of the Samsung Group headquartered in South Korea. Forty-four affiliates were unlisted.

as a result of these shifts in the composition of purchases from the parent firm, it is observed that that parent firm accounted for the majority of Samsung India's total related party expenditure from 2009–10 onwards.

The increased trend in the purchase of finished goods from 2009 onwards reflects the impact of production rationalisation carried out by the parent firm in anticipation and response to the preferential trade liberalisation that India was carrying out with ASEAN countries and South Korea under the Free Trade Agreement (FTA) with ASEAN and the Comprehensive Economic Partnership Agreement (CEPA), respectively, both of which came into force in 2010. These shifts in Samsung India's procurement clearly indicate that the India-South Korea CEPA had changed the parent firm's incentives to shift the procurements of the Indian subsidiary so dominantly in favour of itself. However, in 2018–19, the share of raw materials and components in total imports went back to the range in the pre-2010 years and again stood at 66%. This indicates that the intervening years between 2012–13 and 2018–19 saw further re-organisation of its value chain configuration by the lead firm to make use of the cumulative rules of origin under the ASEAN FTA, which sought to consolidate existing production bases in Thailand, Malaysia, China, etc. while setting up/expanding the production base in Vietnam. This validates the arguments in Francis (2015; 2019) that in the absence of pro-active industrial policies that generate incentives for localisation in order to increase domestic value addition, these FTAs nullified incentives for local sourcing by large MNCs.

An example of the reorganisation of production facilities accompanying trade liberalisation under FTAs is observed in the case of monitors. Samsung India was initially producing LCD monitors along with flat panel TVs, LED TVs, etc. But during 2007–08, the company discontinued its monitor line operating from its manufacturing facility at Noida (NCR) to gain cost advantage from imports of monitor (more later) while the ASEAN FTA was being finalised. Similarly, the company also started importing TVs and refrigerators from Thailand and other countries.

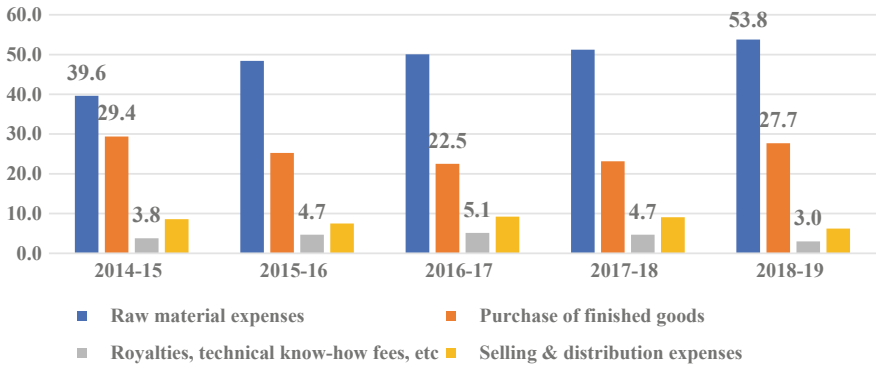

Fig. 5.1 Major components of the Indian subsidiary's operating expenses (per cent shares). *Source* Authors' calculations based on CMIE PROWESS data

These observations are corroborated in Fig. 5.1. Between 2014–15 and 2018–19, the share of raw materials in Samsung's operating expenses increased steadily. At the same time, the share of finished goods, which registered a decline in 2016–17, also went up again in 2018–19. In 2018–19, the subsidiary's total imports constituted nearly 85% of its total expenses on the purchase of merchandise goods (combining raw materials and final goods).

On the other side, in the case of income from related parties, there has been significant fluctuation in composition across years. Income from export sales and reimbursement of marketing, service and other expenses dominated total income from related parties in 2006–07 and 2007–08. Income from software exports dominated in 2009–10 and 2011–12, while it was again goods exports that dominated in 2009–10 and 2012–13. The share of reimbursement of marketing, service and other expenses was roughly steady and averaged about 35% until 2011. This was distributed among the holding company, subsidiaries and associate firms.

What is very significant to note is that when we consider the balance between purchases and income from related parties, there was net outflow from Samsung India towards its group firms. Net outflow, which amounted to Rs. 12 billion in 2006–07 and Rs. 41 billion in 2009–10, went up continuously and amounted to Rs. 577 billion in 2018–19. Clearly, while the findings relating to the earlier years and 2018–19 reflected different business strategies, the lead firm continued to consolidate its value chain transactions involving goods and services within its group, despite the policy initiatives related to Make in India intended to increase domestic electronics production (whether for India, or the world), especially for mobile phones.

In the ensuing analysis, we analyse the goods trade between the Indian subsidiary and its related parties in greater detail using customs trade data to corroborate the above findings.

5.4.2 The Indian Subsidiary's Trade Networks

It is evident from Table 5.2 that a significant share of Samsung's increased exports between 2016–17 and 2018–19 was on account of exports of mobile phones, both smart phones and push button type mobile phones. There were also re-exports of mobile phone parts and mobile phone sub-assembly from India.[20]

It must be noted that according to the Annual Reports, in the late 2000s, the Indian subsidiary was exporting colour monitors, colour televisions and washing machines to Bangladesh, Nepal and Sri Lanka and colour TVs to Maldives. However, the 2018–19 export data (Table 5.2) shows a distinct drop in TV exports compared to 2016–17. News reports reveal that Samsung had stopped local TV production in October 2018 after the government imposed 5% duty on open cell TV panels (the single most important part in TV production). The policy change was meant to increase local value addition as part of the Make in India. But Samsung had started

[20]This is also reflected in the 2018–19 Annual Report.

Table 5.2 Top exports by the Indian subsidiary (HS 8 digit level) (Million USD)

S. no.	HS code	Product	2016–17	2018–19
1	85171290	Smart mobile phones	44.5	1107.1
2	85423900	Other ICs (other than memories & amplifiers; mobile phone parts re-exports)	1.5	31.8
3	85177090	Parts of telephone sets and telecom equipment other than PCBs (mobile sub-assembly for re-export)	NA	31.3
4	84181090	Other combined refrigerator freezers, fitted with separate external doors	4.7	10.2
5	85171210	Push button type mobile phones	1.4	9.4
6	85287219	LED TV	10.5	1.6
7	85322990	Other fixed capacitors (mobile phone parts)	NA	1.3
8	90138010	Liquid crystal devices (LCD panel)	0.1	0.9
9	Samsung's total exports of 139 major electronics products (Million USD)*		64	1194
10	Share of the above in the firm's total exports (%)		52.5	95.7

Source Authors' calculations based on firm-level customs trade data
Note The analysis is based on products where the subsidiary was one of the top five exporters of the 139 major electronics exports by India in each year
*The 2018–19 total for 139 products constituted 59% of the company's total exports in 2018–19

imports from Vietnam through the FTA route. These changes are reflected in Table 5.3 on the company's imports, which reveals that LED TV imports by the firm went up significantly between 2016–17 and 2018–19. It was after this duty was removed in June 2019 that the company re-started local TV production in 2019. Imports of refrigerator freezers had also increased in 2018–19, along with video monitors, base stations, etc.

But the most important change is the sharp increase in all types of mobile phone parts and components among the top 21 imports by the subsidiary (Table 5.3), parallel to the sharp increase in mobile phone exports observed in Table 5.2. Mobile phone-related imports ranged from PCBs, ICs, camera modules, LEDs, etc., to different machines for mobile phone production lines, as well as headphones/earphones, cables/connectors, etc.

It is therefore evident that even as the share of exports in the firm's total revenue went up to about 21% in 2018–19 solely on account of increased mobile phone exports, such exports were accompanied by a corresponding sharp rise in particular in the imports of mobile phone parts and components as well as machinery for their production. This confirms the low value addition that was happening domestically

Table 5.3 Top imports by the Indian subsidiary (HS 8 digit level) (Million USD)

Sl. No.	HS code	Product	2016–17	2018–19
1	85177090	Parts of telephone sets other than PCBs	531.0	1797.0
2	85176290	Other machines for mobile phone production line	–	1301.4
3	85423900	Other ICs (other than memories & amplifiers)	419.5	1022.5
4	85258020	Digital cameras and their parts	–	383.0
5	85287219	LED TV ('For software testing & development purpose only')	5.6	308.0
6	85177010	Populated, loaded or stuffed printed circuit boards (Mounted PCBs)	–	211.3
7	85340000	Unmounted PCBs	81.9	117.0
8	84181090	Other combined refrigerator freezers, fitted with separate external doors	54.7	73.3
9	85322990	Other fixed capacitors (for mobile phones)	21.2	52.3
10	85182900	Other loud speakers, whether/not mounted in their enclosures (for LCD TV)	36.4	51.3
11	85183000	Headphones, earphones & combined microphone/speaker sets (for mobile phones)	41.9	43.1
12	85285900	Video monitors other than cathode-ray tube; n.e.c. ('for demo purpose only')	10.6	42.5
13	84798999	Other machines (for mobile phone production line)	–	40.6
14	90138010	Liquid crystal devices (LCD) (including panels)	137.0	33.0
15	85044090	Others (Automatic voltage regulators and stabilisers)	13.8	31.1
16	85079090	Other parts (for mobile phone)	13.9	25.4
17	85444299	Cable with connectors (for mobile phones)	2.5	18.2
18	84807100	Injection/compression type moulds for rubber/plastics	6.5	16.9
19	85411000	Diodes, other than photosensitive or light-emitting diodes (for mobile phones)	9.4	16.5
20	85011019	Other motor with output ≤37.5 w (for mobile phones)	16.4	16.5
21	85176100	Base stations	–	11.3
22		The firm's total imports of 139 major electronics products (Million USD)*	1402	5612
23		Share of the above in the firm's total imports (%)	32.8	83.1
24		Total imports of the firm (Million USD)	4276	6752

Source Authors' calculations based on firm-level customs trade data
Note The analysis is based on products where the subsidiary as one of the top five importers of the 139 major electronics imports by India in each year
*This total constituted 70% of the company's total imports in 2018–19

for the expanded mobile phone production, not just for domestic sales, both also for exports. This contradicts the conclusion in Misra and Shankar (2019) that the PMP led move from the earlier consumption-driven imports to production-induced imports in the mobile segment was a desirable outcome. On the other hand, it is confirmed that the pattern identified in Verma (2019) that the Indian subsidiary contributed to the net foreign exchange outflows from India during 2014–15 and 2015–16 because of its high import intensity, continued into 2018–19 even after its exports increased significantly.

5.4.3 Analysis of Network Relations Based on Import Origin and Export Markets

An analysis of the country of origin of the Indian subsidiary's major imports based on port and their originating country based on the supplier firms' address[21] gives us some valuable insights into the actual supplier networks of the Indian subsidiary.[22]

Vietnam was the single largest import origin country based on port data with a 50% share in total major imports, and was followed by China (22%). However, when we considered origin country on the basis of the supplier firms' address, Vietnam's share stood at just about 15%, while it was South Korea which was the single largest originating country with a share of about 65% (Table 5.4). This implies that a significant part of imports from Vietnam were being sourced from South Korea. That is, there was possibly a re-routing of South Korean exports via Vietnam, thus artificially inflating India's imports from Vietnam. Indeed, out of the 50% share of imports registered from Vietnamese ports, as much as 30% was observed to originate from the holding company (South Korea), about 10% came from fellow subsidiaries in different countries (Singapore, Japan, South Korea, China, Netherlands, the US, etc. apart from Vietnam itself) and the remaining 10% came from unrelated firms. This points to the misuse of the rules of origin under the ASEAN FTA. Until now, the latter was believed to have occurred mainly in the case of Chinese exports getting re-routed through Vietnam since 2017.[23] In this case, it appears that the South Korean parent firm was utilising the ASEAN FTA more than it was using the South Korean CEPA with India to re-route the group's exports to the India subsidiary through Vietnam.

When the supplier firms' country was considered, some part of the imports originating from China based on port was also observed to be sourced from South Korea as well as from Hong Kong and Singapore. Consequently, a total of about 65% of

[21] The supplier information in the trade data threw up a total number of 215 firms as import suppliers to the Indian subsidiary. Supplier information on about 6% of the total imports was missing in the data.

[22] While trade data gives the actual port of origin country, shipping bill address gives the address of the company sending the consignment.

[23] See the discussion in Francis and Kallummal (2020).

Table 5.4 Indian subsidiary's major imports based on country of origin, 2018–19

Country of origin based on Port	Share in Samsung's major imports	Share in Samsung's major imports based on supplier firm's address
Vietnam	50.2	14.6
China	22.1	3.7
South Korea**	19.9	64.9
Taiwan, Province of China	1.8	NA
Japan	1.7	0.8
Thailand	1.0	0.1
Singapore	0.7	4.6
Hong Kong, China	0.5	6.1
Mexico	0.5	0.01
Malaysia	0.5	0.01
Philippines	0.4	0.03
Indonesia	0.4	0.3
Portugal	0.2	NA
Malta	0.1	0.00
Brazil	0.018	0.02
United States	0.009	3.6
Germany	0.005	NA
Slovakia	0.004	0.000004
Costa Rica	0.003	0.0001
France	0.002	NA
Netherlands	0.002	0.02
Hungary	0.001	0.0003
United Arab Emirates	0.001	NA
Egypt	0.0003	0.0003
United Kingdom	0.0002	0.4
Austria	0.0002	NA
South Africa	0.00004	0.00004
Denmark	0.00003	0.00003
The firm's major electronics imports in 2018–19 (Million USD)*	5612	5612

Source Authors' calculations based on firm-level customs trade data
Note The analysis is based on products where the subsidiary as one of the top five importers of the 139 major electronics imports by India in each year
*This total constituted 70% of the company's total imports in 2018–19
**This includes products for which the country of origin based on port was South Korea and the same was maintained as origin based on supplier address even though supplier address was unavailable

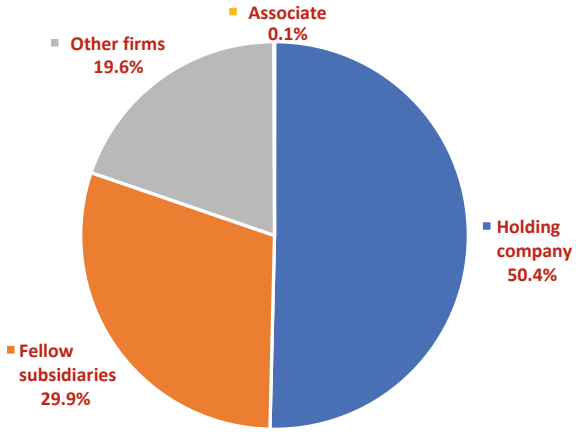

Fig. 5.2 Indian subsidiary's suppliers by type of relationship, 2018–19*. *Note* The analysis is based on products where the subsidiary as one of the top five importers of the 139 major electronics imports by India in each year. *Source* Authors' calculations based on firm-level customs trade data

the Indian subsidiary's major imports in 2018–19 originated in South Korea on the basis of the address of the supplier firms, while Vietnam's share stood at 15%.

Out of the 22% share registered from Chinese ports, about 5% was observed to originate from the holding company, about 15% came from fellow subsidiaries in different countries and 3% came from unrelated firms. As a result, China's share was just about 4% on the basis of supplier firms' address. On the other hand, the share of the US stood at 3.6% based on supplier address, while it was only 0.01% on the basis of port. All the major imports from the US were from one fellow subsidiary.

The discrepancies in the shares of the two types of origin revealed in Table 5.4 indicate that the actual production bases were possibly being disguised by the lead firm/holding company. In the case of South Korea, the lead firm itself accounted for more than 50% of the major imports by the Indian subsidiary, followed by about 7% by the Korean subsidiaries and another 8% from associate firms in South Korea.

Overall, while the parent firm accounted for more than 50% of the value of major imports by the firm in 2018–19, fellow subsidiaries across countries supplied another 30%, and associate firms supplied 0.1% of the total (Fig. 5.2). That is, a whopping total of 80% of the Indian subsidiary's major imports were supplied by related parties. At the firm level, after the South Korean lead firm, the second largest share of major imports of the Indian subsidiary came from the Hong Kong subsidiary.

While the holding company dominated in the case of South Korea, fellow subsidiaries dominated in the case of the US, Taiwan, Hong Kong and Singapore (Table 5.4). In the case of Japan, unrelated parties (other firms) were the dominant suppliers. The share of unrelated firms were significant in the case of China and Vietnam too.

Surprisingly, the huge discrepancies in the shares accounted by supplier country by port and by supplier address was not observed in the case of exports—between country of destination based on port and destination based on buyer's address. Almost all of the exports went to developing countries (Table 5.5). The UAE was the single

Table 5.5 Markets for Indian subsidiary's major exports, 2018–19

Country of destination based on Port	Share in the firm's 139 major exports	Share based on buyer firm's address
United Arab Emirates	53.9	53.9
Russian Federation	17.6	17.6
South Africa	8.2	8.2
Vietnam	3.2	0.3
Morocco	2.6	2.6
Jordan	2.5	2.5
Sri Lanka	2.3	2.0
Kazakhstan	1.7	1.7
Turkey	1.6	1.6
Ukraine	1.4	1.4
Nepal	1.3	1.3
China	1.2	0.3
Bangladesh	0.5	0.5
The firm's major electronics exports in 2018–19 (Million USD)	1194	1194

Source Authors' calculations based on firm-level customs trade data
Note Based on customs trade data for 139 major electronics products, which accounted for 59% of the firm's total exports in 2018–19

largest market accounting for about 54% of the Indian subsidiary's exports in 2018–19, and Russia accounted for another 18%. The other major export markets were South Africa, followed by Morocco, Jordan and Sri Lanka.

When we analysed the origins of imports in terms of the supplier firms' relationship with the Indian company, it is significant to note that the holding company, or the lead firm, was the single largest source for the imports of mobile phone production line machinery as well as for semiconductor chips (Table 5.6). Clearly, the latter segments account for the largest value share within the production chain. In the case of most mid-range parts and components, including mounted PCBs, fellow subsidiaries dominated. On the other side, unrelated firms were significant import suppliers mainly for parts and components with lower values such as unmounted PCBs, speakers, etc. The Indian subsidiary's dependence on unrelated firms was the highest in the case of camera modules, even though it was procuring these components from one of the South Korean group subsidiary also.

It is well known that the upstream segments of applied R&D and design, and the downstream segments of marketing and retailing in electronics industry value chains are dominated by the lead firms. According to industry sources, if we leave out the marketing segment, the value chain decomposition for a high-tech electronics product consists of about 30–65% for product idea/innovation, R&D and product design; 30–50% for components; and 5–20% for assembly, depending on the complexity of the

Table 5.6 Supplier firms for top ten imports by type of relationship, 2018–19

Top ten imported products and their suppliers	Value and respective shares for each product (Million USD and percent share)
Parts of telephone sets other than PCBs	1797.0
Fellow subsidiaries	53.1
Holding company	28.7
Unrelated firms	18.2
Other machines for mobile phone production line	1301.4
Associate	0.01
Fellow subsidiaries	0.02
Holding company	95.7
Unrelated firms	4.3
Other ICs (other than memories & amplifiers)	1022.5
Fellow subsidiaries	27.9
Holding company	58.2
Unrelated firms	13.9
Digital cameras and their parts (camera module)	383
Fellow subsidiaries	8.6
Unrelated firms	91.4
LED TV ('For software testing & development purpose only')	308.0
Fellow subsidiaries	0.1
Holding company	93.1
Unrelated firms	6.8
Populated, loaded or stuffed printed circuit boards (Mounted PCBs)	211.3
Fellow subsidiaries	83.1
Holding company	9.7
Unrelated firms	7.3
Unmounted PCBs	117.0
Associate	0.0004
Fellow subsidiaries	62.0
Holding company	0.9
Unrelated firms	37.1
Other combined refrigerator freezers, fitted with separate external doors	73.3
Associate	0.03

(continued)

Table 5.6 (continued)

Top ten imported products and their suppliers	Value and respective shares for each product (Million USD and percent share)
Fellow subsidiaries	1.9
Holding company	98.0
Unrelated firms	5.9
Other fixed capacitors (for mobile phones)	52.3
Associate	0.0004
Fellow subsidiaries	61.5
Holding company	7.9
Unrelated firms	30.5
Other loud speakers, whether/not mounted in their enclosures (for LCD TV)	51.3
Associate	0.0002
Fellow subsidiaries	60.9
Holding company	3.3
Unrelated firms	35.9

Source Authors' calculations based on firm-level customs trade data
Note The analysis is based on products where the subsidiary as one of the top five importers of the 139 major electronics imports by India in each year

products. It is evident that with such high import dependence in parts and components (in addition to production machinery) for the high and mid-value segments of the production chain for mobile phones, the Indian subsidiary's share in value addition remained very low, despite the increase in its mobile exports in 2018–19.

The case study also brought out the very heavy dependence of the Indian subsidiary particularly on the holding company and fellow subsidiaries, especially in the mobile phone segment as well as in LED TV, refrigerators, etc. This is because the kinds of localisation achieved by the company in 2018–19 for mobile production related mainly to: increase in the localisation of die cut parts by adding new vendors; printed vinyl localisation for export buyer; mobile phone new parts localisation in the case of CAM Deco and TPU cover; and increase in the percentage of mould localisation to support instant launching of new models. Localisation in the case of refrigerators included: increasing the percentage of mould localisation to support instant launching of new refrigerator models, strengthening jig localisation by adding new local vendor, and outsourcing of assembly to local vendor. Similarly, technology absorption in the Indian plants largely related to increasing the efficiency of operations, energy conservation, etc., and appear relatively minor in the case of product innovations, apart from the software R&D that was happening. Strikingly, the share of R&D in total turnover of the company declined from 0.27% in 2008–09 to 0.15 in 2012–13 and to just 0.05% in 2018–19. All these findings buttress the arguments in Francis

(2019) that the FTAs had created perverse incentives for the domestic manufacturing and innovation ecosystem in the Indian electronics industry.

5.5 Conclusion

The case study analysis presented in the paper revealed the nature of value chain engagement of a principally domestic market-oriented foreign-invested firm in India. The findings of the Indian subsidiary's network transactions with related parties validate our argument that 'importing-for-domestic sales' needs to be considered as one of the forms of GVC engagement by foreign-invested firms in developing countries, which the current conceptualisation of GVC participation as 'importing-to-export' excludes. India must factor this form of GVC participation into the policy formulation process, while putting in policy incentives aimed at large foreign firms.

Clearly, the implications of linking into GVCs change for developing countries when we use this alternative way of measuring participation in GVCs using firm-level data. While the production restructuring associated with FTAs was expected to lead to improved efficiency in the participating countries, the case study points out that the gains expected from greater inter- and intra-industry specialisation and economies of scale accrues basically to the lead MNC (the holding company), which control and coordinate the network transactions within its subsidiaries and associate firms. Even in a producer-driven GVC expected to deliver more to participating firms in terms of dynamic gains (relative to buyer-driven GVCs), the largest part of the value creation throughout the production process was done and captured by the holding company, followed by its subsidiaries, especially in the region. There has been very heavy dependence of the Indian subsidiary on the holding company and fellow subsidiaries, especially in the mobile phone segment as well as for LED TV, refrigerators, etc. This value share of the holding company in the production chain is in addition to the value share arising from its ownership of the design and branding of the various products. It was also seen that even when the share of exports in the firm's total revenue went up, such exports were accompanied by a sharp rise in imports of parts and components. The findings support the argument made in Francis (2015; 2019) that tariff liberalisation sans industrial policy reduces or nullifies incentives for local sourcing—including in the case of large MNCs, in the absence of factors that make local procurement 'attractive' for them[24] or that 'induces' them to increase local procurement through pro-active policies.

When the literature considers GVCs as offering an opportunity for developing countries to integrate faster into the global economy and achieve rapid export growth and industrial upgrading, the latter is expected to materialise as supplier firms learn

[24]This would primarily involve the presence of a technologically advanced local parts and components supplier base and a significantly larger numbers of high skilled production engineers than India currently churns out. In addition, the drag of the energy and logistics sector on manufacturing competitiveness has been well acknowledged.

from the association with the MNCs. However, the FDI-productivity-investment nexus cannot be achieved sustainably without establishing the linkages of foreign-invested firms (and imported technology) with a homegrown supplier base. The policy expectation that providing incentives to attract and facilitate a large volume of export-oriented foreign investments into the industry for local assembly will in itself lead to the build-up of the domestic supplier base is misplaced. The liberalisation of tariffs under FTAs without the concomitant pursuit of a coherent industrial policy aimed at increasing domestic value addition within the economy by creating the required backward linkages does not lead to the sustainable development of a domestic production base. Despite having the advantage of a large domestic market, unlike China, India had no policies linking foreign-invested firms and the domestic supply base, which could have let to spillage effects, competition and technological upgrading among domestic firms. Consequently, tariff-only trade liberalisation and FDI liberalisation sans industrial policy have seen government's policies for facilitating local electronics assembly lead to continuing high import dependence on parts and component imports, instead of final goods imports. Lack of focussed policy thrust needed for overcoming foreign producers' prevrese incentives for imports, negatively impact the ability of domestic parts and components suppliers to achieve economies of scale.

Breaking this cycle requires the ownership of productive assets and internalisation of knowledge to be built up indigenously through the pro-active type of industrial policies, which have been practised by the countries where lead firms and tier-1 suppliers originate. At one level, the government needs to promote R&D-intensive companies, both indigenous and foreign-invested ones,[25] and at another level, domestic backward linkages by foreign-invested firms need to be promoted through ingenious incentivisation. Simultaneously, government must handhold indigenous producers in high-end parts and components in prototype development after competitive selection processes, by facilitating their commercialisation and scaling up through guaranteed domestic market access for fixed time periods and ensure dynamic competitiveness through regular evaluation of policy incentive structures. The criticality of government support for the scaling up of R&D-intensive indigenous companies in advanced

[25]Mani (2007) pointed out how the public sector agency, Centre for Development of Telematics (C-DoT) was extremely successful not only in generating technologies, but also in transferring the generated technology to a host of public and private sector enterprises. Although C-DoT was very successful in building up a good number of component suppliers, these firms did not have in-house R&D and were dependent entirely on the technologies that they received from the public laboratory. This became a serious handicap for the latter, as C-DoT failed (for lack of strategic technology foresight) to move on quickly to newer telephone switching technologies and also failed to foresee and make the switch to mobile telephony. Neither did India have a strategy in place to make its leading state-owned equipment manufacturer, ITI, a national champion, as Mani (2006) emphasised. These have been major policy failures in the Indian electronics industry's earlier development trajectory. The more recent policy efforts also have serious design failures due to the continued faith by policymakers on large MNCs to establish a domestic parts and components manufacturing base on the one hand, while keeping out the advanced indigenous SME parts and components firms from these policy initiatives and from government procurement on the other hand. See Menon and Francis (2020).

electronics parts and components production cannot be overemphasised as they are the backbone of all digital devices and digital equipment, existing and yet to come.

This calls for revamping the PLI Scheme to take care of the above aspect. This could include linking the incentives to benchmark 5–6% of annual turnover on R&D and research facilities (especially on new, greener materials and processes) over a number of years, the number of patents filed in India based on research in India, etc. Moreover, the findings about possible misuse of the ASEAN FTA by re-routing of the parent firm and subsidiaries' exports to the Indian subsidiary through Vietnam highlights the need for tightening and re-formulating the rules of origin under the ASEAN FTA, as we have been arguing for some time. Wherever required, tariff liberalisation must also be adjusted to be in sync with the protection accorded by PTA partners to their indigenous firms through national standards and other policies.[26]

For India as an FDI host country, the manner in which localisation is achieved for increasing domestic value addition will decidedly determine the extent of medium-term and long-term beneficial impact of FDI-led GVC participation. Only those forms of GVC engagement that increases domestic value addition will help build up the investment and aggregate demand required to make the process sustainable.

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[26] See the discussion in Kallummal (2019).

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Chapter 6
India's Performance in Science, Technology and Innovation: The Post 2000 Scenario

Sunil Mani

6.1 Introduction

India was one of the fastest growing large countries in the world before the onset of the coronavirus pandemic. Over the period since 2015, her ranking in a number of international ranking frameworks has shown a dramatic improvement. For instance, she has improved her ranking in World Bank's *Ease of Doing Business 2019*, India along with China with 13 reforms between them are among the 10 top improvers.[1] In the *Global Innovation Index 2019*, India has jumped five places in 2019 to occupy the 52nd rank (out of 129 countries). In the following, we undertake a survey of the country with respect to innovation and technology especially in the period since 2015. India has also continued to make continued progress in space technology in terms of both designing and launching satellites. A recent 2016 articulation of the start-up ecosystem in the country has made India to be the world's third-largest start-up ecosystem having approximately 9000 start-ups in the country (c2019). *Further, India has the largest number of unicorns in the start-up space with their number increasing from 15 in 2018 to over 52 in 2019—a threefold increase.* The 2014 announced *Make in India* programme has sought to increase the domestic manufacturing of a whole host of high technology products such as cell phones to electric locomotives, and the government has announced a number of new technology strategies in the fields of new and emerging technologies such as artificial intelligence (AI) and robotics, blockchain technology, Internet of Things, national electric mobility mission plan and so on. The move towards a cashless economy and the introduction of the goods and services tax (GST) have endeavoured to increase the size of the

[1] In 2019, India's rank in ease of doing business is 77 out of 190 countries. See World Bank (2018).

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formal economy in the country. Through the establishment of the National Institution for Transforming India (NITI Aayog) in 2015, an attempt has been made to transform the country through, inter alia, the generation of new ideas. Further, a number of flagship technology-based projects like the *Smart Cities Mission* and *Digital India Programme* have been initiated. This is the specific context in which we undertake a survey of the performance of the country with respect to Science and Technology matters especially in the period since 2015.

Although India has been maintaining a respectable growth rate in GDP, there has indeed been a fall in her savings and investment rates which can have a deleterious effect on her future growth performance. Although the high growth phase during the 2000s have reduced the poverty ratio, inequality in the distribution of income seems to have increased. On the positive side, many of the flagship programmes such as the *Swach Bharat* for instance appears to have increased the sanitation performance. Other programmes have increased access to electricity and financial inclusion. Inflation targeting by the RBI has kept the retail consumer prices under check. India has made good progress in achieving some of the SDG targets especially those under SDG 9 on industry, innovation and infrastructure. Despite having many legal instruments to deal with environmental issues and especially both air and water pollution, air quality in some of the major cities in the country is a matter of serious concern so much to say that it precipitated interventions by the supreme court in the country. The recent elections have put in place a stable government in power and thus improving the chances for stable public policies for maintaining a sustainable form of development in the years to come. It is against this brief background that we analyse the health of the country in terms of its performance in Science and Technology.

6.2 Innovation Inputs and Outputs

The literature on innovation measures innovation of a country in terms conventional and new indicators. The conventional indicators are further classified into input and output indicators. New indicators are in the form of results of innovation surveys. As far as India is concerned, we have data only on conventional input and output indicators such as investments in R&D and patents granted. Countries such as India has a positively skewed distribution of firms with a larger number of small and medium type of firms which neither invests in R&D nor do they patent their inventions, but many of them do innovate through non-R&D routes and keep their inventions, which are mostly incremental in nature, as trade secrets. So, using R&D expenditure and patents can underestimate the total amount of innovations in the economy. But given extreme paucity of data and given the fact that reasonably good quality data on R&D investments and patents granted are readily available, we employ them to measure innovation outcomes.

6.2.1 Overall Research Intensity

We start by analysing the trends in gross domestic expenditure on R&D (GERD), which has been steadily increasing over time, both in current and constant prices increasing even by as much as five times between 2005 and 2019. However, as Fig. 6.1 shows, despite this absolute increase, the GERD to GDP ratio has been stagnating around 0.75% over the last several years. There are six features of India's GERD which merit a closer attention. First, India has the lowest GERD to GDP ratio among the BRICS countries. Second, the ratio has even been declining since 2014. Third, India appears to be having a sort of moving target for its overall research intensity. In fact according to the S&T policy of 2003, the country was supposed to reach a GERD to GDP ratio of 2% by the terminal year of the 10th Five Year Plan, namely by 2006–07. The draft of new Science, Technology and Innovation Policy, 2020, which is the fifth one in the series of innovation policies in the country, does not even put a target for the GERD to GDP ratio. Fourth, there has been an increase in the share of the private sector in the performance of GERD (Fig. 6.2) and a steady decline in the share of the government. Business enterprises in the private sector now accounts for about 42%of GERD, and we consider this as a very desirable trend. This is because when R&D is performed by business enterprises, the probability that the research results are converted into commercialisable products, and processes are higher compared to research being done by the government. Experiences of countries such as Japan, Korea, Taiwan and even China support this line of argument. Fifth, within the business enterprise sector (or industrial sector), performance of R&D is concentrated in industries such as pharmaceuticals, automotive and Information Technology and a host of defence industries and within these industries a few firms. Sixth, GERD performed by the public research councils has got reduced to 42% of the total in 2017–18 (Fig. 6.3). Efforts are now more on effecting more spillover of government research to civilian uses. During earlier times, this was very much limited. One of the notable examples of this sort of spillover of government research to civilian uses was the establishment of the Electronics Corporation of India (ECIL) in

Fig. 6.1 Trends in GERD to GDP ratio, 2007–08 and 2018–19. *Source* Department of Science and Technology (2017, 2020)

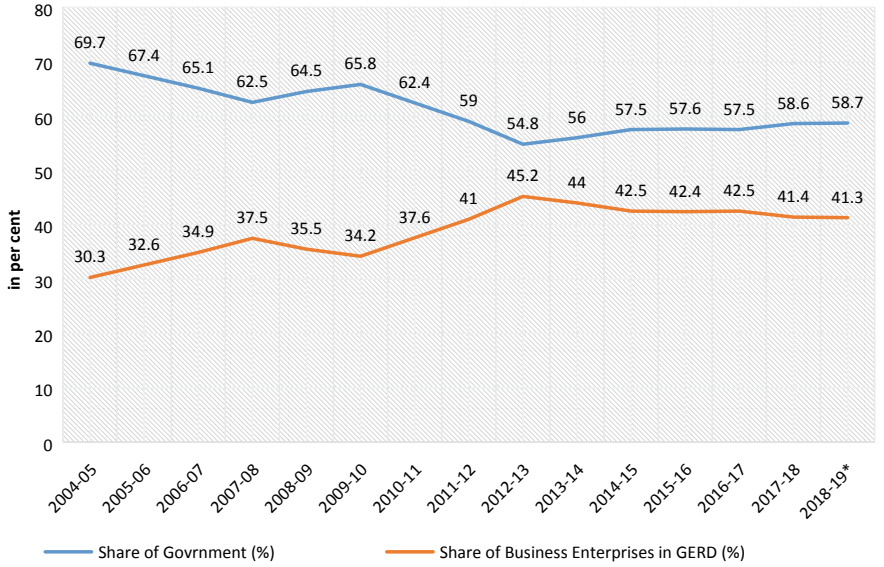

Fig. 6.2 Changes in the performance of GERD. *Source* Department of Science and Technology (2020). *Notes* 1. Government here means Central government ministries and departments + State governments + Higher education; 2 Business enterprises here means private sector enterprises plus public sector enterprises; and 3. * Data for 2018–19 are estimates

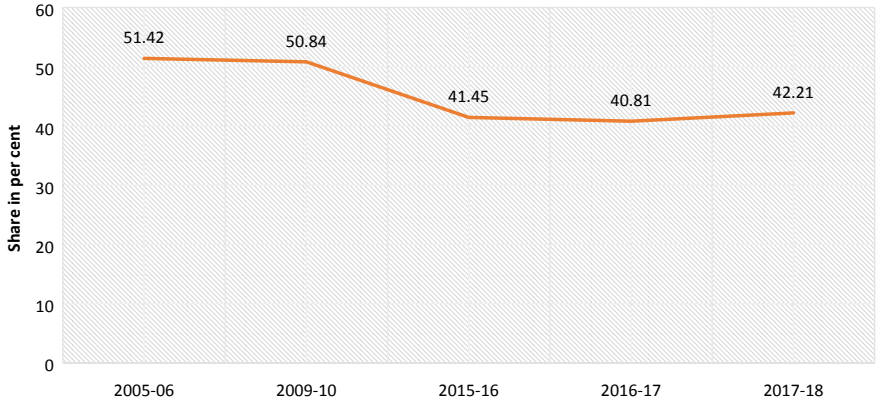

Fig. 6.3 Decline in the share of GERD by research councils, 2009–10 and 2017–18. *Source* Department of Science and Technology (2020)

1969. It grew out of the research done at the Bhaba Atomic Research Centre (BARC) to productionise electronic instruments for nuclear applications (Mani, 1992).

However, despite the low R&D investments as revealed by a low GERD to GDP ratio India's scientific publication record has been impressive (Mani, 2020). See

Table 6.1 Distribution of patents granted by IPO according to nationality of the inventor- pre versus post TRIPS phase

	Indian	Foreign	Total	Share of foreign (%)
Average pre TRIPS Compliance (1993–94 through 2004–5)	559	1120	1678	67
Average- post TRIPS Compliance (2005–6 through 2007–18)	1455	3862	8061	74

Source Controller general of patents, trademarks, designs and geographical indications (various issues)

Fig. 6.4. During the period 2011 through 2019, scientific publications from the country have increased at an annual rate of 9%. The country has already overtaken Japan. In terms of discipline-wise publications, new and emerging technologies like AI and robotics now account for about a third of the total. But publications in engineering has been stagnating at around 8 to 9%. There are three other aspects of science production that warrants public policy intervention. First, India has one of the least globalised science production record in the sense that only about 18% of the scientific publications have a co-author from abroad. Recently, enunciated policies like the *Atmanirbhar Bharat* and the difficulties placed in scientific collaboration with foreign partners are only going to make it even more. Many new and emerging technologies require distributed research teams across space. Second, India has not produced any Nobel laureates in science and medicine in recent times. Third, serious questions have also been raised about the quality of instruction and learning outcomes in Science and Maths education at school level although India will be participating in the *Programme for International Student Assessment (PISA)* tests of the OECD for the first time in 2021.

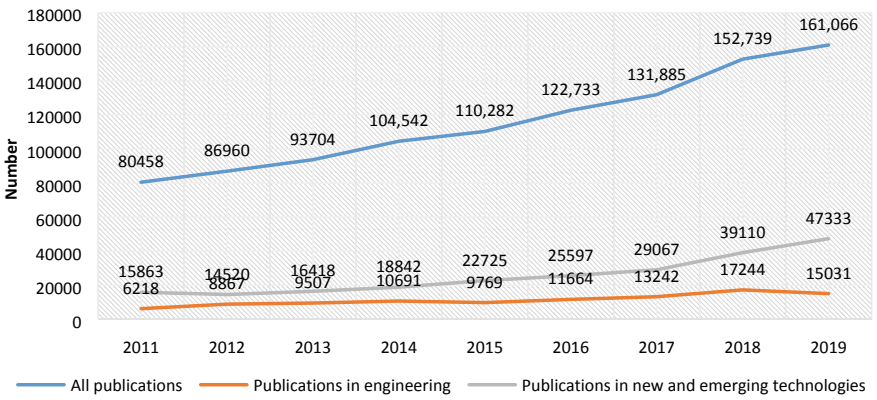

Fig. 6.4 Trends in publications in science and engineering from India. *Source* Compiled from Scopus (excluding Arts. Humanities and social Sciences), data treatment by science metrix

There are two important findings with respect publications: (i) It appears that Indian scientists have become more productive in 2019 compared to 2011 as the amount of R&D investment required to produce one scientific publication has got slightly reduced in 2019 compared to 2011 and (ii) As can be seen later, India's scientific publication record in all technologies and especially in new and emerging technologies is far greater than her record in patenting. This apparent anomaly requires an explanation. One hypothesis is that publications are almost entirely done by government research institutes and universities while patenting is largely by business enterprises. With India too conforming to international norms of measuring work done in universities and research institutes which is largely in terms of the number and quality of publications, there is a greater urge for scientists to publish more in refereed international journals.

6.2.2 Investments in Intangibles

An aspect that is hardly discussed in the literature on India's innovation performance is the investments by the corporate sector especially in intellectual property products (IPPs). IPPs include investments in R&D, mineral exploration, software and databases, etc. India's national accounts statistics have started reporting investments in IPP from 2011 to 2012 onwards, and these investments on an average form about 4%of her GDP and about 14% of gross fixed capital formation (GFCF). Further, the ratio of IPP investments to GDP and to GFCF has been increasing during the period 2011–12 through 2017–18 (Mani, 2020). Intangible investment which is largely at the level of firms spillover to other companies and thereby benefit the industry as a whole in which the specific firm is located. Increase in intangible investments can lead to higher productivity and economic growth in the future. Further trade in intangibles too have been growing, and it is interesting to note that the country has a surplus in trade in intangibles when exports of software services are included, but it is negative when exports of software services are excluded. Trade deficit in intangibles is concentrated in three areas: royalties and license fees which includes charges for the use of trademarks, franchises and similar rights and other royalties which includes the license fee for patents. India has, of course, a growing positive trade balance in R&D services, but these services are largely created and exported by MNCs operating from the country to their parent companies located especially in the USA (Mani, 2020).

6.2.3 India's Patenting Output

Investments in R&D are an input to innovation. Not many firms do R&D in India and not many R&D projects actually result in commercialisable output. So, one can

get a better idea of the quantum of innovations happening the country by examining the country's patenting record.[2] This is attempted below.

6.2.3.1 Patenting Trends Within India

Both the number of applications and patents granted has shown a spike after TRIPS compliance (Fig. 6.5). This is indicated by the average number of applications, which is about 39, 000 per year in the post TRIPS compliance phase compared to around 9000 per year in the pre-TRIPS period (Table 6.1). Similarly, in terms of patents granted, it has increased to about 8000 per annum in the post TRIPS compliance period compared to around 1600 in the pre-TRIPS phase. But the most perceptible change is the much of the patents granted by the IPO has gone to foreign inventors. This used to be about two-thirds of the total in the pre-TRIPS phase which has now increased to almost three-quarters of it.

The preponderance of foreign inventors is even more pronounced in pharmaceutical patents. In order to measure the relative contribution of foreign and domestic inventors, we took all the pharmaceutical patents (a total of 867) that were granted by the IPO between 2005 and 2020. In fact, foreign inventors dominate in all the drug patents by a very wide margin.

The foreign dominance could still be seen when one examines the top applicants and assignees. Detailed data on this are available for only two recent years, 2016–17 and 2018–19. Top applicants are almost entirely foreign telecommunications or electronics companies; although in the assignee list, there are three Indian entities, two companies and the CSIR. Although the private sector enterprises account for a significant portion of investments in R&D, only one of them figure as a top patent assignee.

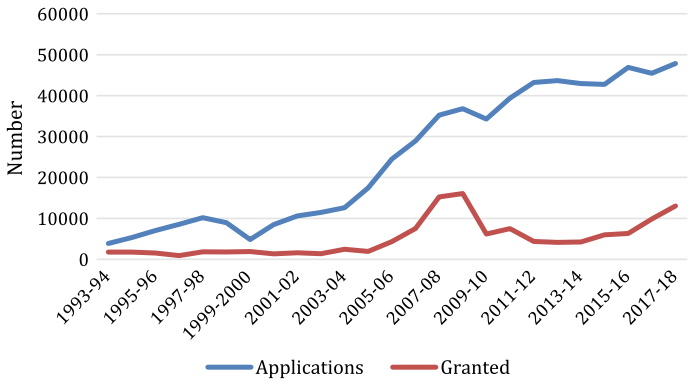

Fig. 6.5 Trends in patent applications and grants at the IPO. *Source* controller general of patents, trademarks, designs and geographical indications (various issues)

[2]This section is based data and analysis contained in Mani (2020).

Conspicuous by their absence is India's domestic pharmaceutical companies which are neither the list of top applicants nor assignees.

There is considerable concentration in the spatial distribution of patenting. Four states, namely Maharashtra, Karnataka, Tamil Nadu and Delhi account for nearly two-thirds of patent applications during the post TRIPS phase. Even within these states, innovative activities are very likely to be concentrated in their respective capital cities which are major industrial centres in the country. This spatial concentration is likely to remain at the present level. This is of course nothing unique or new as in most countries in the world, innovation activities are likely to remain concentrated in a few centres.

Industry-wide distribution of patents shows an unexpected pattern with engineering sectors like mechanical, electrical, electronics and computer hardware technologies accounting for about 39% of the total patents granted during the post TRIPS phase. Chemicals and pharmaceutical patents accounting for only a third of all patents granted. This follows the worldwide trend of the engineering industry having the largest number of patents as the firms in the industry uses patent as an entry deterring strategy.

There is no systematic publishing of data on patents by the IPO. So, it is not possible to have an understanding of firm-wise patents applied for in key technologies such as pharmaceuticals. Further computer software services, which India has an international leadership, were not allowed to be patented under the Indian Patent Act until 2017. As per Sec. 3 (k) of the Patent (Amendment) Act, 2002, computer programme cannot be patented per se.[3]

However, a software can be patented if it is attached to an invention and that it is a component of such invention. To avoid the claim of sec. 3 (k), it is essential to show that a hardware is an essential part of the invention along with the software or computer programme. The guidelines for examination of computer-related inventions announced in 2017, as discussed above, have of course relaxed this requirement.

An interesting aspect of domestic patenting is the increased patent applications from both start-ups and MSMEs together accounting for about 2% of the total number of patent applications at IPO (Fig. 6.5). This is a desirable trend as with proper policies and support systems the start-ups of today can be graduated to become technology intensive large companies of tomorrow. Countries such as Singapore and Israel are good models to follow in this regard. This increased applications from start-ups are also due to an important change in patent rules. In the case of start-ups and firms willing to file their patents firms willing to file patents for new innovations

[3]The above view was also expressed by the Joint Parliamentary Committee while introducing Patents (Amendments) Act, 2002:

> "In the new proposed clause (k) the words "per se" have been inserted. This change has been proposed because sometimes the computer programme may include certain other things, ancillary thereto or developed thereon. The intention here is not to reject them for grant of patent if they are inventions. However, the computer programmes as such are not intended to be granted patent. This amendment has been proposed to clarify the purpose."

first in India, the government has made a special provision to speed up the patent application process time within 6 to 12 months upon receipt of the application as against the normal route which takes 5 to 7 years.

6.2.3.2 Trends in Patenting Abroad by Indian Inventors

Similar to the trends shown by our analysis of the Indian Patent Office data, there has been a spike in the number of patents granted to Indian inventors at the USPTO, especially since 2006 (Fig. 6.6). The average number of patents granted up to 2005 was about 178. This has since spike to about 2600 per annum in the post TRIPS compliant period to reach about 5400 patents in 2019. Another interesting finding is that both China and India were similar in their patenting record until 2005. Thereafter, China has a much better record and in 2019 has almost four times the patents which India has.

There are three other findings with respect to the USPTO data. They are:

- Majority of the patents have been secured by MNCs operating from India
- Most of the patents, technology-wise are in computer implemented inventions
- In terms of location, the most important innovation hotspot is the city of Bangalore in Karnataka state. Bangalore is the most important location for innovative activity in the country as Bangalore alone accounts for about 64% of the patents granted to Indian inventors at the USPTO.

Another important aspect is that many MNCs and particularly those from the USA uses India as a base for doing R&D and creating IPRs. The export of R&D services from India has been increasing by around 40% in nominal terms per annum during the period 2004 through 2008: exports of R&D services which were just USD 118 million in 2004 is now touching almost USD 4 billion in 2018. Some of the MNCs are now using India as a base to create their patents in new and emerging technologies. According to the press release[4] from IBM, the firm was granted 9262 patents in

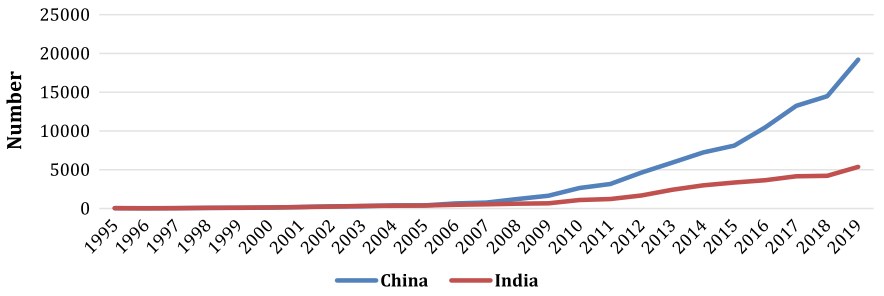

Fig. 6.6 Trends in patents granted to Chinese and Indian inventors at the USPTO. *Source* USPTO (2020)

[4]IBM (2019).

2019, and a large number of these patents were based on R&D conducted by the Indian affiliate of IBM although the press release does not specify the exact size of Indian affiliates' contribution to the overall patenting record of IBM. However, there is little or no evidence of these foreign R&D centres interacting with Indian firms and institutions.

Data constraints prevent us from repeating this analysis with patents secured by Indian inventors in other jurisdictions such as EPO, JPO, Korea, etc. It is seen that Indian pharmaceutical firms have been filing relatively speaking more patents in these jurisdictions than at USPTO. In fact, India's national innovation system is now dominated by the sectoral system of innovation of her IT services industry rather than by the sectoral system of innovation of her pharmaceutical industry. Numerically, the number of patents secured in computer implemented innovation far outweigh those obtained by her pharmaceutical industry. And this is an interesting change that has taken place although majority of the patents granted to Indian inventors in the area of computer implemented inventions.

6.3 Support Systems for Promoting Innovation

The two important components that support the promotion of innovation in an economy are the supply of scientists and engineers and the availability of suitable financial schemes.

6.3.1 Human Resource Development in Science and Engineering

The density of researchers engaged in R&D per 10000 labour force has increased very slowly from 9 in 2005 to just 11 in 2015—the latest year for such data is available. Over the period since 2015, the government has put in place a number of incentive schemes for increasing the supply of scientific manpower. The following table (Table 6.2) summarises the main initiatives in this regard.

However, the outturn of graduates in STEM subjects continues to be only a little over quarter of the total number of graduates in the country (Table 6.3). Within the STEM, the ratio of science graduates continues to be more than Engineering and Technology graduates. The newly announced National Education Policy 2019[5] envisages the establishment of a new National Research Foundation (NRF) that will focus on funding research within the education system, primarily at colleges and universities.

[5]Ministry of Education (2020).

Table 6.2 Main initiatives for improving the supply of scientific manpower

• In February 2018, the Union Cabinet has approved implementation of "Prime Minister Research Fellows (PMRF)" scheme, which will promote the mission of development through innovation, at a total cost of Rs 1650 crore (US$ 245.94 million) for a period of seven years beginning 2018–19
• In February 2018, Union Government of India announced a grant of Rs 1000 crore (US$ 155.55 million) for the second phase of Impacting Research Innovation and Technology (IMPRINT), a fund created by Department of Science and Technology and Ministry of Human Resource and Development
• The Government of India granted Atal Innovation Mission with US$ 24.84 million will boost the academicians, entrepreneurs and researchers to work towards innovation
• In July 2018, Atal Innovation Mission along with MyGov launched "Innovate India Platform" with the aim of providing a common point for all the innovation happening across India
• The Department of Biotechnology (DBT) launched the Boost to University Interdisciplinary Departments of Life Sciences for Education and Research (DBT-BUILDER) scheme to boost advanced education and promotion of interdisciplinary research and technology development
• The Council of Scientific and Industrial Research (CSIR) launched 30 skill/training programmes in the areas of leather processing; paints and coatings; electroplating and metal finishing; industrial maintenance engineering; bioinformatics; mechatronics; glass beaded jewellery, etc.
• The fellowships/schemes awarded/sanctioned during the four years 2014–15 to 2017–18 include:
– CSIR Junior Research Fellowship (JRF)and National Eligibility Test (NET): 10,687
– Senior Research Fellowship (SRF)-Direct: 1792
– Shyama Prasad Mukherjee Fellowship (SPMF): 158
– CSIR JRF-GATE (for Engineering & Pharmaceutical Sciences): 116
– CSIR Research Associateships (RA) to pursue postdoctoral research: 525
– CSIR Senior Research Associateships (SRA): 324
– CSIR Nehru Science Postdoctoral Research Fellowship Scheme: 41

Source India brand equity foundation

However, there is very little quantitative evidence to show that the demand for STEM graduates especially for research has increased as the investments in R&D has not kept pace with the increases in GDP.

Another of repeated concern about India's human resource, especially in STEM subjects is the widely varying quality of it and hence employability. At one end of the spectrum, there are prestigious higher education institutions such as the Indian Institutes of Technology, the Indian Institute of Science, the Indian Institutes of Science Education and Research, the alumni of which have a very high reputation. In fact, the CEOs of some of world's leading technology companies such as Microsoft and Google are Indian's who have had their initial education at these premier institutes. On the contrary, there are a large number of provincial universities which are not that well organised. The wheebox employability skill test (WEST) has been conducted over the six year period 2014 through 2019 to measure the employability of graduates from the country shows that one out of every two graduates passing out from

Table 6.3 Outturn of science, engineering and technology graduates in India (Values are in numbers, shares are in percent)

Column 1	Column 2	Column 3	Column 4	Share of total higher education	Column 5
	Engineering and Technology (E&T)	Science	Ratio of science to E&T	E&T	Science
2011–12	602,948	768,145	1.27	9.10	11.59
2012–13	700,721	901,168	1.29	9.40	12.09
2013–14	868,516	934,853	1.08	11.89	12.80
2014–15	921,231	1,037,619	1.13	11.87	13.37
2015–16	966,409	1,061,630	1.10	12.41	13.64
2016–17	1,003,548	1,232,239	1.23	12.56	15.42
2017–18	963,288	1,287,475	1.34	12.06	16.12
2018–19	912,789	1,302,569	1.43	11.35	16.20

Note Graduates include those passing out with under graduate, post graduate, MPhil and doctoral degrees in STEM subjects
Source Ministry of Education (various issues)

the country's university system is not employable (Fig. 6.7). Among the technology domains, the employability rate is the highest for Electronics and Communication Engineering (ECE) and Information Technology courses, while civil engineering has the lowest. According to this study, employability among ITI and Polytechnic

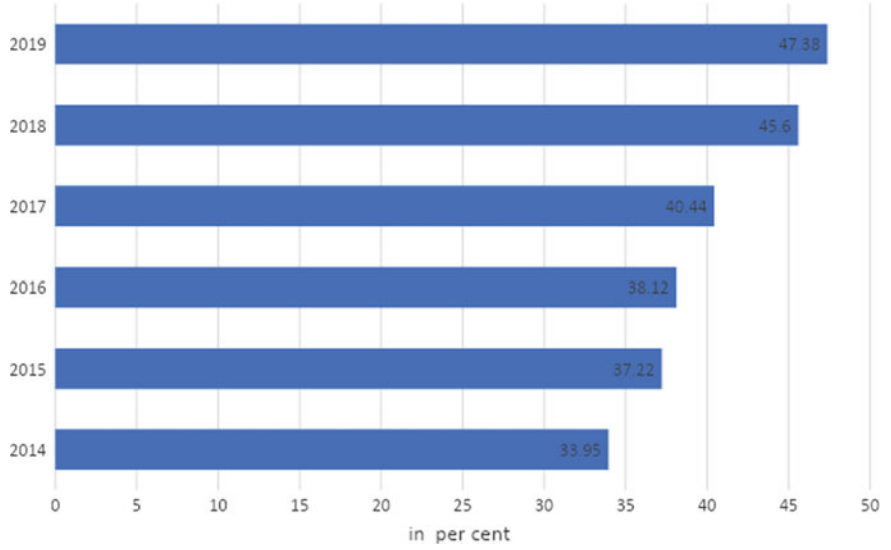

Fig. 6.7 Employability of Indian graduates. *Source* Wheebox (2019)

students' is a big challenge. Apparently despite the kind of focus on improving quality of such tertiary education, employability of ITI and Polytechnic graduates has been falling primarily due to lesser focus on industry alliances and core employable skills.

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India has been experiencing cross-border movement of highly skilled personnel to abroad and primarily to the USA for quite some time. In fact, data compiled by the US National Science Board (2019), shows that in 2017, about 50% of the foreign-born individuals in the USA with an S&E highest degree were from Asia, with those from India (23%) and China (10%) as the leading countries of origin. This continued brain drain has to be seen as a knowledge asset and efforts made to take advantage of the presence of these extremely qualified Indian diaspora in their host locations abroad for ideas and projects back home in the country. Recently, the government has put in place schemes which deal with brain drain. The first one is the 2017 introduced Visiting Advanced Joint Research (VAJRA) faculty scheme by the DST which enables non-resident Indians (NRIs)s and overseas scientific community to participate and contribute to R&D in India. The newly created Science and Engineering Research Board (SERB) is charged with the responsibility of implementing the scheme. VAJRA faculty will undertake research in S&T priority areas of the country where technological capability within the country is lacking. The VAJRA faculty will engage in collaborative research in public-funded institutions. The second is the National Post-Doctoral Fellowship Programme (N-PDF) which provides PDF fellowships to Indian research scholars with doctoral degrees for a period of two years. This too is administered by the SERB and has apparently awarded 2500 fellowships over the last two years. The scheme is essentially to encourage Indians with Ph.Ds. in STEM subjects to remain in the country or those who have gone abroad for doctoral degrees abroad to return home as the main route for brain drain is the education route, whereby students go abroad for higher studies and then decide to stay back in those host locations by taking up employment.

Sabharwal (2018) has shown, based on a field study that some amount of reverse brain drain from the USA to India is occurring. According do this study, "better career prospects in India, namely ample funding available for research, less competition for grants, ability to work on theoretical topics and freedom in research objectives emerged as the key factors that prompted return. Government programmes and increased research funding in India have improved job opportunities and security in the country for scientists and engineers, who are deciding more frequently to leave faculty positions in the USA to return home". Given the small sample of just 83 returnees, generalization of the findings of this study is in some doubt.

6.3.2 *Financing of R&D*[6]

India's tax regime with respect to the performance of R&D by business enterprises has evolved over time. There are four important features of this scheme that have to be emphasized. The first one is that there are no restrictions on the use of the Intellectual Property Right (IPR) arising from the tax treated R&D to be used within India. The second one is that both domestic and foreign companies, which satisfy the other conditions, are eligible to seek the subsidy. But the R&D must be conducted within India. The third one is that if the firm is in a loss situation, unused benefits may be carried forward for the next eight years, but it cannot be carried back to earlier years. The fourth one is that qualifying expenditures include wages, supplies, utilities and other expenses directly related to R&D, and the deduction of R&D expenditures shall be net of the grants, gifts, donations, etc.

The R&D tax subsidy manifests itself in terms of the amount of tax foregone, which the Ministry of Finance has been estimating on a regular basis. Over the years, the amount of tax foregone as a result of this subsidy scheme has grown at an annual rate of 17% per annum and now accounts for about 8% of all corporate subsidies (Fig. 6.8).

Over the years, the tax regime has become one of the most generous ones in the world (Mani, 2014). The union budget for 2016–17 reduced the tax incentives for performing R&D in business enterprises from 200 to 150% from 2017 to 18 onwards

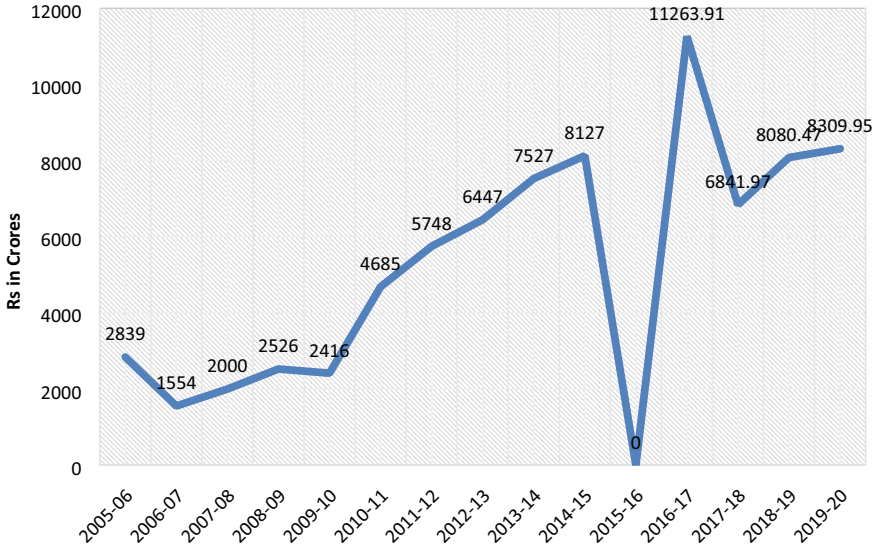

Fig. 6.8 Trends in revenue foregone as a result of R&D tax incentive. *Source* Ministry of Finance (various issues)

[6]This section is based on Mani and Nabar (2016).

and up to and including 2019–20. From 2020 to 21 onwards, the tax incentive will be further reduced to just 100% of R&D. Simultaneously, the finance minister has also announced a patent box type of incentive for the first time, wherein income received in the form of royalties and technology license fees received by Indian companies are taxed at a reduced rate of 10% from the fiscal year 2016–17 onwards. The introduction of patent box encourages output of R&D, while the reduction of R&D tax incentives reduces the incentives for input to innovation. While an advance announcement of an R&D tax policy is credit worthy as it makes the policy a stable one, whether the government is justified in becoming less generous towards R&D investments by firm requires a systematic analysis of the elasticity of R&D expenditures with respect a reduction in the unit cost of performing R&D.

6.3.3 Promotion of Technology-Based Start Ups

Innovations could be promoted in two ways. First, the government could encourage existing enterprises to commit more resources to R&D and thereby increase innovations through increased investments in R&D. The main instrument that was used for this purpose was the R&D tax incentive as mentioned earlier. Second, the government has improved the ecosystem for start-ups to emerge by providing them with a range of incentives through the *Startup India* initiative since January 2016. This incentive system ranged from "Simplification and handholding", "Funding support and incentives" and "Industry-academia partnership and incubation". One of the main barriers to the creation of start-ups was the availability of risk capital, and one source of it is from angel investors. But there was a long pending income tax issue known as the angel tax.[7]

In order to resolve this issue, the union budget for 2019–20 has stipulated that the "start-ups and their investors who file requisite declarations and provide information in their returns will not be subjected to any kind of scrutiny in respect of valuations of share premiums. Further, the budget has also extended tax breaks to investments in start-ups. In short, the proposals in the recent budget is a logical sequencing of the government's efforts towards improving the ecosystem for start-ups, and the number of start-ups in the country has been increasing steadily since 2016–17, and a total of 26,804 start-ups have been recognized by the Start-up India portal by 31 December 2019.[8]

Although there has been a significant improvement in the ease to which start-ups could be established and evolved in India since 2016, there is considerable concentration of start-ups in Maharashtra (read as the metros of Mumbai and Pune), Karnataka (read as Bangalore) and Delhi. In terms of industries, most of the start-ups are in the services sector with IT services in the lead. There are very few start-ups

[7] Angel tax refers to the income tax payable on capital raised by unlisted companies through the issue of shares where the share price is seen in excess of the fair market value of the shares sold.

[8] Department for promotion of industry and internal trade (2020).

in manufacturing. Start-up India has also been working with various line ministries such as water and sanitation and agriculture to development start-ups that will help specific problems faced by these sectors. In this way, the emergence of new start-ups may result in innovative solutions to the problems faced in terms of sanitation and in developing technologies and solutions that may address specific problems faced by the agricultural sector.

6.4 Promotion of New and Emerging Technologies

India's commitment to sustainable energy usage and reducing depends on fossil fuels has two broad components. First is the policy of encouraging the generation of green energy, and second is hastening the diffusion of electric vehicles. Much progress has been achieved on both these fronts since 2015. These are discussed below.

6.4.1 Generation of Green Energy

The total installed capacity in green energy sources (wind, solar, bio-power and small hydro) in 2018 is about 72.6 GW, with wind energy accounting for about 48% of the installed capacity followed by solar energy another 34% (Fig. 6.9). As a percent of total installed capacity in electricity generation, green energy sources have risen from 13% in 2015 to 22% in 2018.

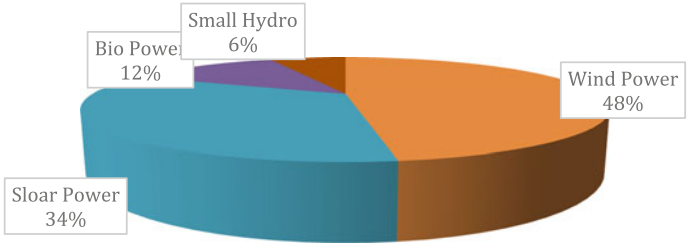

Fig. 6.9 Sources of green energy in India (installed capacity in GW), 2018. *Source* India brand equity foundation

As part of its Paris Agreement commitments, the Government of India has set an ambitious target of achieving 175 GW of green energy capacity by 2022 implying that the current installed capacity must increase 2.5 times to reach the agreed strategy. Green energy sources are expected to help meet 40% of India's electricity needs by 2030. The country has many achievements in the field of green energy generation. These are[9]:

- India is ranked fourth in wind power, fifth in solar power and fifth in green power installed capacity as of 2018;
- As of October 2018, India ranked fifth in installed green energy capacity;
- The aim of the government to achieve universal household electrification is also a boon for the power sector. India added record 11,788 MW of green energy capacity in 2017–18; and
- India has one of the lowest capital costs per megawatt for photovoltaic plants.

The government has accorded a high priority for generating green energy and in the recent union budget for 2019–20 has allocated USD 728.32 million to the sector. Consequent to all these encouraging policies and programmes, the generation of green energy in India is on an upward trend since 2016–17 (Fig. 6.10).

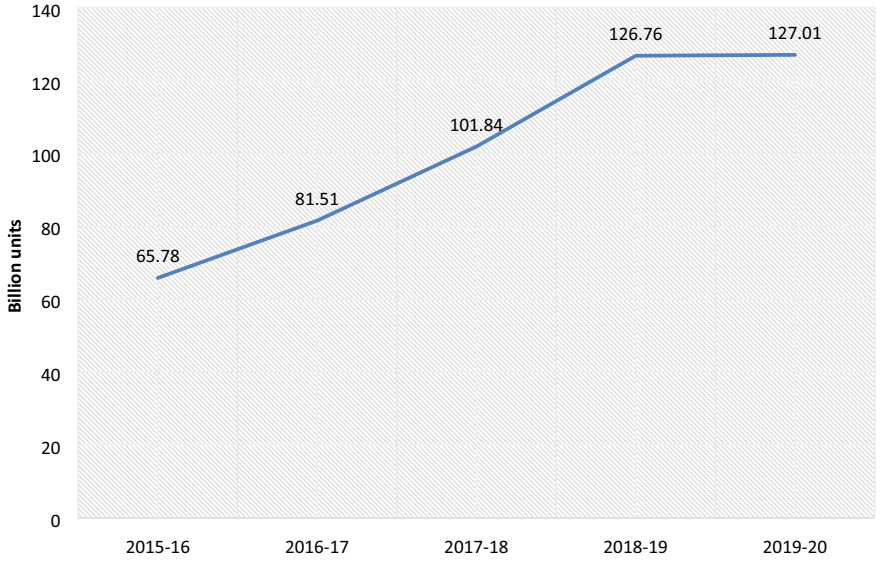

Fig. 6.10 Trends in the generation of green energy in India (in billion units). *Source* India brand equity foundation

[9]The source of this information is from India Brand Equity Fund, https://www.ibef.org/uploads/industry/Infrographics/large/Renewable-Energy-Infographic-May-2019.pdf (accessed on October 5, 2020).

Box 6.1: Central government policies for encouraging the generation and diffusion of green energy

Repowering Policy	• Promote optimum utilisation of wind energy resources by creating facilitative framework for repowering • An interest rebate of 0.25% over the interest rebate offered to new wind energy projects will be provided • All fiscal and financial benefits offered to new wind power projects will be extended to repowering projects
Wind-Solar Hybrid Policy	• Aims to achieve a hybrid wind-solar capacity of 10GW by 2022 • Hybridisation of the two technologies will help in: – Minimising variability – Optimal utilisation of infrastructure including land and transmission systems
Renewable Purchase Obligations (RPOs)	• RPOs are a mechanism by which state electricity commissions are obliged to purchase certain percentage of power from renewable energy sources • Also, floor prices of the RPO have been set to provide certainly to companies. The floor price has been se US$ 144 per megawatt
Scheme for Development of Solar Parks and Ultra Mega Solar Power Projects	• Aims to set up 25 solar parks and ultra-mega solar power projects targeting 20,000 MW of solar power installed capacity by 20–19–20

Source IBEF (2019)

Both the central and individual state governments have policies for encouraging investments in green energy. Box 6.1 summarises the main policy initiatives at the central government level.

Although most of the states in the country have now explicit policies on the installation, generation and use of green energy, only a handful of them have actually achieved some success with the southern states of Karnataka, Tamil Nadu, Andhra Pradesh and Telangana at the top.

6.4.2 Diffusion of Electric Vehicles

The government have been considering a policy proposal to ban all internal combustion engine (ICE)-driven two-wheelers under 150 cc by 2025, and three-wheelers by 2023. Approximately 80% of all vehicles sold in India are two and three-wheelers. However, the EV industry in India is at a very nascent stage. According to the society of manufacturers of electric vehicles (SMEV), 2.18 lakh EVs were sold, which worked out to just 1% of total vehicle sales. There are, at present, more than 4 lakh electric two-wheelers and a few thousand electric cars that are being used in India. The industry volumes have been fluctuating, mostly depending on the incentives offered by the government. More than 95% of EVs on Indian roads are low-speed electric scooters (less than 25 km/hr) that do not require registration and licenses. The country has been providing a fair amount of fiscal incentives for faster diffusion of EVs through essentially a scheme called faster adoption and manufacturing of hybrid and electric vehicles (FAME). In March 2019, the government announced phase 2 of the FAME scheme with a total outlay of Rs 10,000 crores for three years till 2022. As part of this policy, fiscal incentives are offered by the government for the purchase of electric buses, three-wheelers and four-wheelers to be used for commercial purposes. Plug-in hybrid vehicles and those with a sizeable lithium-ion battery and electric motor will also be included in the scheme, and fiscal support offered depending on the size of the battery.[10] The target is to incentivize the purchase of 7090 electric buses by state transport undertakings, 35,000 four-wheelers, 50,000 three-wheelers and 20,000 hybrids. Further, the government had already moved the GST council to reduce the GST rate on electric vehicles from 12% to 5%. So the government's policy, so far, has been subsidising the purchase of EVs by potential consumers. The target is to have 1000 charging stations across the country by 2030.

The 2019–20 union budget has continued this practice and has further extended this by providing income tax relief to potential purchasers of EVs. This is by way of providing additional income tax deduction of Rs 1.5 lakh on the interest paid on loans taken to purchase electric vehicles, and this works out to a benefit of around 2.5 lakh over the loan period to the taxpayers who take loans to purchase EVs.

However, apart from price subsidies, there are two main technological barriers to a faster adoption of EVs. They are (i) the availability of charging stations at reasonable distances and (ii) the availability of Lithium-ion batteries. The union budget for 2019–20 does address itself to the domestic manufacturing of lithium storage through the provision of investment-linked income tax exemptions under section 35 AD of the Income Tax Act, and other indirect tax benefits. In the past, such incentive induced investment promotion has not succeeded in effecting the required investments. Further, the ministry of power (2018) through a notification in December 2018 delicensed public charging stations provided they meet the standard specifications and protocols laid down. Charging stations at private residences are also allowed.

[10]The centre plans to roll out an incentive of Rs. 10,000 per kilowatt (kW) for two-, three- and four-wheelers, based on the size of their batteries.

6.4.3 Digital Economy and Industry 4.0

India has one of the largest and fastest growing telecommunications networks in the world. Further, there has been fast diffusion of the Internet especially in the urban areas, and the government has been making a conscious attempt to extend it to the rural areas as well. The total number of Internet subscribers in 31 December 2018, stood at 604.21 million and 86.95% of these subscribers are broadband subscribers (Telecom Regulatory Authority of India, 2019). In 2018, out of the 1176 million mobile phone subscribers, approximately 578.2 million are wireless data subscribers, and their data usage has increased from 828 GB in 2014 to 46,404 GB in 2018. This phenomenal growth of data usage mimics the growth of wireless communication, and this has been fuelled significant reductions in the cost of data (6.11). This has led to the growth of the digital economy. Examples of these are E-commerce, app-based food ordering and cab hailing services, hospitality booking services, etc., (Fig. 6.11).

Digital economy is at the heart of what is referred to as Industry 4.0. According to UNCTAD (2019), digital economy affects all sustainable development goals (SDGs) and is closely associated with seven state-of-the art technologies such as blockchain, data analytics, artificial intelligence, 3D printing, Internet of Things, automation and cloud computing and is fuelled by data. There are seven technologies which are subsumed under Industry 4.0, and the country appears to have a specific policy or programme addressing either its generation or diffusion (Table 6.4).

Much of the adoption of Industry 4.0 technologies have remained only within the government. One such technology that has been extensively used within the

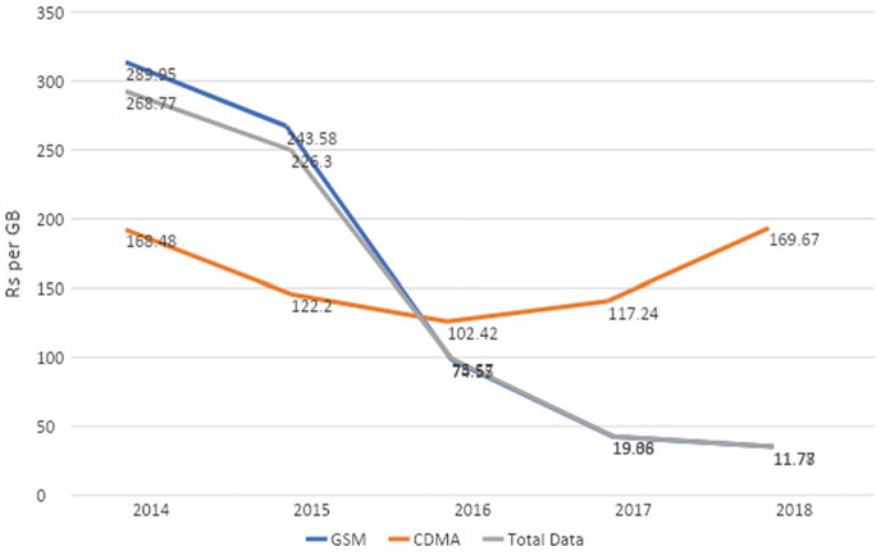

Fig. 6.11 Average cost to subscriber per GB of wireless data, 2014–18. *Source* Telecom regulatory authority of India (2019)

Table 6.4 Policies and actions by government with respect to Industry 4.0 technologies

Industry 4.0 technologies	Policies and actions by Government
Blockchain technology	• Reserve Bank of India set up a unit in August 2018 to research/supervise new emerging technologies for studying the blockchain application in creating a decentralized as well as cashless banking system • NITI Aayog is exploring opportunities for deploying blockchain technology in drug and fertilizer industries • While government of Karnataka has shown interest in exploring blockchain technology, Telangana government has announced using this advanced and secured technology to digitize land records as well as upgrade other data. Three other Indian states such as Andhra Pradesh, Maharashtra, and Kerala have started pushing the blockchain agenda aggressively • To drive blockchain technology adoption across industries Mumbai-headquartered Tata Consultancy Services (TCS) has collaborated with Microsoft and R3 enterprise blockchain software firm • A survey conducted by London-based blockchain consulting firm, Dappros, has found out that India has 19,627 blockchain developers, second only to the United States (having 44,979 blockchain developers) Source: Bhattacharyya (2019)
Data analytics	• There have been several programmes for using big data analytics for E-governance • Among the state governments, Telengana has a formal policy on data analytics, https://www.telangana.gov.in/PDFDocuments/Telangana-Data-Analytics-Policy.PDF
Artificial intelligence	• NITI Aayog has published (in July 2018) a national strategy on AI(https://niti.gov.in/writereaddata/files/document_publication/NationalStrategy-for-AI-Discussion-Paper.pdf) • The AI strategy is one of leveraging AI technologies for improving healthcare delivery provision of education, improving agricultural yields, for enabling smart cities infrastructure, smart mobility and transportation
3D Printing	Low adoption, no specific policy

(continued)

Table 6.4 (continued)

Industry 4.0 technologies	Policies and actions by Government
Internet of things	At the national level, there is an IoT policy. The objectives of this are • to establish a sizeable IoT industry in the country by 2020 • This will also lead to increase in the connected devices from around 200 million to over 2.7 billion by 2020. It has been assumed that India would have a share of 5–6% of global IoT industry • To undertake capacity development (Human & Technology) for IoT specific skill-sets for domestic and international markets • To undertake research & development for all the assisting technologies • 4. To develop IoT products specific to Indian needs in the domains of agriculture, health, water quality, natural disasters, transportation, security, automobile, supply chain management, smart cities, automated metering and monitoring of utilities, waste management, oil & gas, etc. Further details: https://meity.gov.in/sites/upload_files/dit/files/Draft-IoT-Policy%20%281%29.pdf
Automation	• The Council for Robotics & Automation (AICRA), a not-for-profit organization is the apex body, setting up standards in Robotics & Automation and education industry in the country. It has been providing support systems to institutions in areas such as quality assurance, information systems and train-the-trainer (TTT) academies either directly or through partnerships • Multipurpose industrial robots have been diffusing in India's automotive sector primarily. See the discussion of it below in 6.4.4
Cloud computing	• Department of Electronics and Information Technology (DeiT) has published a strategy paper on cloud computing titled, *Government of India's GI Cloud (Meghraj) strategic paper in 2013*(https://meity.gov.in/writereaddata/files/GI-Cloud%20Strategic%20Direction%20Report%281%29_0.pdf) • Meghraj, the National Cloud of India has since been set up by the National Informatics Centre (NIC), https://cloud.gov.in/. A number of cloud-based services are available, but these are restricted to only government departments and no even to public sector enterprises • Another draft policy on cloud computing has been announced in 2015 (http://www.mpac.gov.tt/sites/default/files/file_upload/publications/Government%20Cloud%20Initiative.pdf) • TRAI published yet another discussion paper on cloud computing in 2015 (https://main.trai.gov.in/sites/default/files/Cloud_Computing_Consultation_paper_10_june_2016.pdf)

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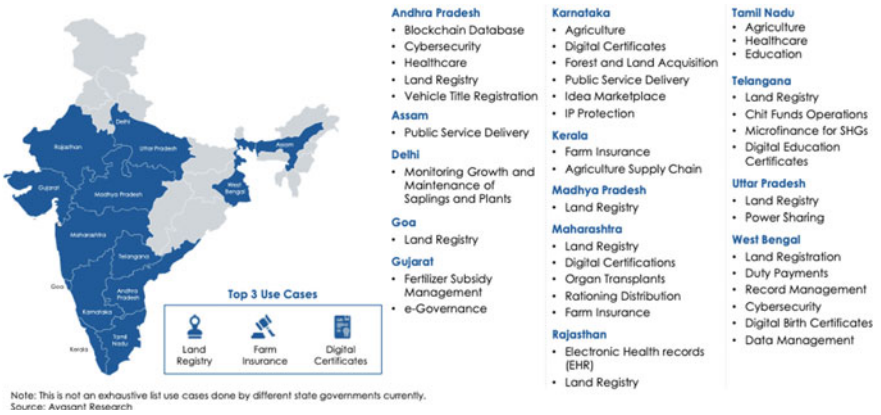

Fig. 6.12 Diffusion of blockchain technologies in India. *Source* NASSCOM Avasant India (2019)

government is the blockchain technology which in some form or other has been used by nearly half of the state governments (Fig. 6.12). The three major uses are in preparing land registry, farm insurance and in issuing digital certificates.

Government does play an important role as a facilitator for diffusing the seven assistive technologies for Industry 4.0 diffusion. In fact, the following four policies or missions are along these lines:

- National Manufacturing Policy 2017
- National Programme on Artificial Intelligence
- Centre of Excellence on IT for Industry 4.0
- Mission on Cyber-Physical Systems.

The adoption of Industry 4.0 is at a very preliminary stage in the country for following four reasons: (i) the size of India's organized manufacturing sector is very small: the share of manufacturing sector in India's gross value added at basic prices in 2018–19 is 18% (Reserve Bank of India, 2019); (ii) shortages of investment, infrastructure, know-how and lack of cybersecurity norms, (iii) High cost of digital technologies although data has become cheaper, (iv) Skill and talent gap which was discussed earlier. However, with programmes such as *Make in India*, the size of her manufacturing sector is likely to increase in the future and the new manufacturing and service sector firms which are in the process of getting established could skip stages and could start with new and modern manufacturing technologies in the Industry 4.0 format. Industry 4.0 involves coming together of digital and physical world and digitalisation of manufacturing process-based cyber-physical systems.

6.4.4 *Diffusion of Automation Technologies*[11]

Anxiety about the prospect of technology displacing jobs on a large scale is currently dominating academic and public debate not only abroad but in India as well. A number of different occupations are likely to see an increased rate of automation in the near future. However, while studies have shown that this is likely to have an adverse effect on employment, they have all used the occupation-based approach to arrive at their conclusions. A task-based approach can give a more accurate estimate of the effect of automation on manufacturing employment in India. Employing a comprehensive dataset from the International Federation of Robotics, the nature and extent of diffusion of industrial robots into the manufacturing industry in India is also analysed. This is based on the detailed analysis contained in Mani (2019).

The manufacturing sector accounts for the lion's share of delivered robots in India. However, within manufacturing, most of the robot installations are in four industries: automotive, electrical and electronics, metal, chemical, rubber and plastics. In 2017, there was a 27% increase in the number of delivered robots compared to the previous year. On average, the number has increased by 64% per annum during the period under consideration. An analysis of the industry-wise operational stock of industrial robots shows that robot use is highest in the automotive industry, followed by plastics, rubber and chemicals, and metal. In short, it is the growth of the automotive industry that accounts for most of the growth in robot installations in India. Thus, the pattern in India is very similar to the international pattern. Robot usage in India is confined to two tasks, namely welding and soldering, and handling and machine tending. Within the former, it is almost entirely concentrated in arc and spot welding. Material handling involving plastic moulding and machine tools accounts for the second largest share. This resembles the pattern observed historically even in developed countries. This finding has deep implications for employment. Industrial robots have hitherto been used for tasks that are inhospitable for human labour and where a lot of precision is required. However, in order to understand the employment implications of robot use, one has to analyse the density of robots per unit of employment. The density of robots in India is one of the lowest among robot using countries. Density is an important indicator of the labour-displacing effect of industrial robot use. Figure 6.13 provides estimates of robot density in two different industries: the manufacturing industry and the automotive industry. Although both industries are showing an increase in robot density, it is much higher in the automotive industry than the general manufacturing industry. Since the automotive industry in India is dominated by affiliates of multinational companies, with the parent companies having a long history of using industrial robots in various manufacturing operations, it is only natural that their affiliates in India will be using industrial robots. The total employment in all the industries using industrial robots does not exceed 10% of total manufacturing employment, and within these industries, only few tasks are automated. So, for the present automation does not present a serious threat to manufacturing employment. However, with automation technologies fast developing, many

[11] This section is based on Mani (2019).

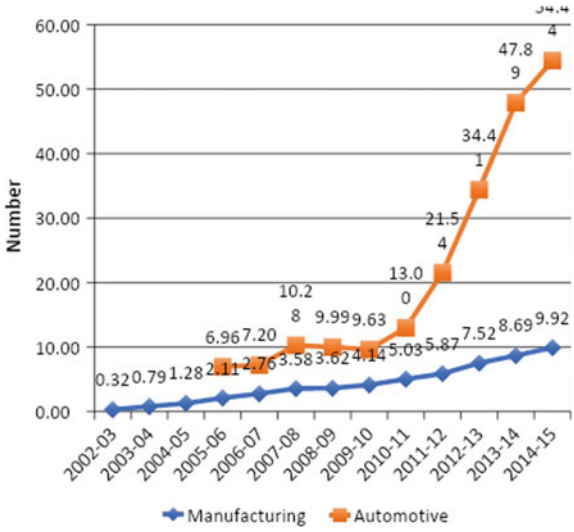

Fig. 6.13 Density of industrial robots in India, manufacturing versus automotive. *Source* Mani (2019)

tasks that we thought previously were not automatable can now or in the foreseeable future be automated, and so the future of jobs in India too may be affected with the onslaught of many sophisticated automation technologies.

6.4.5 Emergence and Growth of a Cashless Economy

On 8 November 2016, Government of India demonetized two of its largest circulating bank notes, which accounted for about 86% of the notes in circulation at that time. The sudden and abrupt decision has attracted considerable attention from commentators, much of it, journalistic. However, there has also been a very quick and detailed analysis of this event which is now referred to as the most significant economic event of recent times. The objectives and the design and implementation of the scheme have drawn much flak from all quarters, although there has been very little opposition to this measure from anywhere in the country. On the contrary, a survey done among slum dwellers in Mumbai showed the counter-intuitive result that despite experiencing a fall in their monthly incomes by as much as 10%, majority of those suffering the fall welcomed the demonetization policy. Although it was not the initial objective, over time government has shifted the aim to ushering in a cashless economy, which *inter alia* may promote better tax compliance and hence more tax collection. In order to promote the growth of a cashless economy, a number of incentives have been put in place. Nevertheless, the growth of a cashless economy, in terms of value of such transactions, has been much less than what was observed during the period of demonetization and in terms of value it shows a steep decline (Fig. 6.14). Currency in circulation as a percent of GDP has in 2018–19 reached

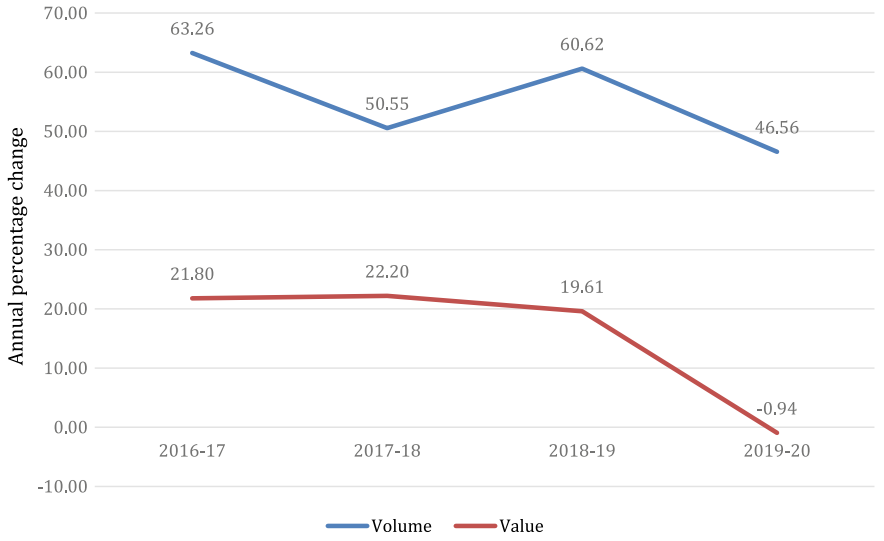

Fig. 6.14 Growth of a cashless economy. *Source* Computed from Reserve Bank of India (2020)

11%- just a percent less than before demonetization implying that people have been returning to cash for transactions.

So in order to encourage cashless transactions, the budget has proposed two policy changes with respect to transactions:

- A tax deducted at source of 2% on all cash withdrawals exceeding Rs 1 from an account in a bank or a post office; and
- Traders and business establishment whose annual turnover is more than Rs 50 crores will need to offer low-cost digital modes of (such as BHIM UPI, UPI, Aadhaar Pay, debit cards, NEFT and RTGS to customers). Customers and merchants will be exempted from paying the Merchant Discount Rate (MDR).

It will be useful to have more positive encouragement to cashless transactions rather than negative ones.

6.5 Conclusions

The five year period 2015 to 2020 has been an important one for India. For the first in its recent history, the country has a stable governance environment, especially with respect to policy making. A large number of policies that impact on the S&T performance of the country has been enunciated, and the country is in the process of publishing a new Science, Technology and Innovation Policy 2020. These range from a new IPR policy to financing of R&D to a number of specific technology policies dealing all the major emerging technologies. But these country's GERD

to GDP ratio is continuing to be less than unity, and patenting record by its own domestic corporations, research institutes, universities and individuals is still very low. On the positive side, intangible investments primarily by its private corporations have been on the increase. The country continues to suffer from shortages of good quality human resource in science and engineering is not only low, but has also been stagnating. High-skilled migration from India has been increasing and not enough students are enrolling for science and engineering degree programmes. However, the shortages in S&E graduates coexist with unemployment among these graduates implying low employability of the graduates. The government has put in place a number of policies and schemes to remedy the situation.

Regarding new and emerging technologies like Industry 4.0 basket of technologies, government must put in place R&D programmes to develop these crucial technologies that will define a nation's technological competitiveness in the future but also to diffuse the generated technologies among its business forms. Institutions such as the economic advisory council of the Prime Minister must take up on the task of monitoring the S&T health of the country.

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Part III
Infrastructure

Chapter 7
Financing Green and Brownfield Private Infrastructure in India

Sebastian Morris

7.1 Introduction

Prior to the reforms of 1991–92 and 1992–93 of the Narashima Rao government, the public sector as whole invested as much as 52% of the total investments (gross capital formation—GCF) taking place in India. The highly successful reforms brought that down to under 25% over the decade following the reforms. Although cold privatization of public sector units was not a success, the slew of measures including delicensing, abolition of the Industrial Policy Resolution of 1956—that had reserved many sectors for state enterprise—openness on foreign investments and a general movement towards a laissez faire economy were factors in this relative decline. Unlike what was believed by many commentators including those supportive of the reforms, this relative decline in public investments was very important to the success of the reforms since public investments were known to be very inefficient in terms of both cost and time overruns.[1]

[1] Morris (1990, 2003a, b, 2003).

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7.2 Macroeconomic Performance and Infrastructure

7.2.1 The NHDP

From 1997–98 with the slowdown, there was little further fall in the share of public investments despite the many measures to increase private investment in infrastructure. While in areas requiring little regulation or any recast of subsidies—oil refining and mining, airlines, courier services, telecom (where the regulatory and licensing approaches were essentially right), private investment continued, after having completely dominated the manufacturing sector over the period since then. Private investments in infrastructure require detailed second-generation reforms (appropriate regulation, public–private partnership (PPP) formats, legal changes making possible private ownership and holding of publicly directed assets, non-distortionary ways of subsidization), given the market failure/s in these sectors. That kind of second-generation reforms being deeper and requiring a more specific understanding of sectors have yet to take place in many sectors—urban and municipal infrastructure sectors, city transportation, electricity among others.[2] The slowing down of private investments in the period after 1997–78 was one of the causes of the overall economic slowdown. Reforms in the right direction in infrastructure have been few and far between since then, but when they have taken place the impact has also been large.

Indeed the revival of the Indian economy from 2003–04 can in a large measure be traced to the National Highway Development Programme (NHDP)—also popularly called the Golden Quadrilateral (GQ), which because of the essential correctness of approach, resulted in very large private investments in the highways. These were instrumental in lifting the economy out of the recession from 2003–04 onwards. The setting up of a road fund which was nearly ring fenced, instituting a new land acquisition act specific for highways, an improved EPC format for procuring roads, a build operate and transfer (BOT) format for PPPs and most importantly a workable annuity model for PPPs, besides the strengthening of the organization to drive the programme—the National Highway Authority of India (NHAI), the focus on the Quadrilateral, and allocative efficiency being upheld, all together created the framework for large private and public investments to take place into the highway sector. Such strategic action that could effectively create public and social value on the scale of the GQ has not been witnessed in any other sector, by the country since the early 2000. Indeed, it was quickly followed by the programme of building village roads—the Prime Minister's Gram Sadak Yojyna (PMGSY) which also saw administrative and contracting innovations to liberate Indian villages from poor last mile connectivity. Remarkably, these two programmes have remained the major conduits

[2]Cf. Morris (2002), that brings out in detail the governance reforms required for commercialization of infrastructure in India.

for state spending in a way that is not wasteful, even to date, with hardly any others despite the many initiatives of the governments since then.[3]

The period over which growth was maintained at a high level through fiscal action saw larger than before investments in the infrastructure structure. The growth of 8.5% achieved over 2003–04 to 2007–08 saw the capital formation rise to as high as 37% of GDP, before it declined somewhat with the monetary tightening that took place as the RBI acted against a supply-side inflation from 2007 onwards by raising the cash reserve ratio, and the last two/three quarters before the GFC when it did not any more accommodate capital inflows but instead allowed the rupee to appreciate from around Rs. 45 to a dollar to Rs. 39 on the eve of the GFC. However, this period of growth was led by service exports, the rise of manufacturing and with "normal" demand from the infrastructure sectors although the high growth had been kick started by the spending on the GQ as mentioned before. Since the fiscal stimulus after 2008–09 saw a large part of counter action take the form of investments in infrastructure, the share of infrastructure in gross capital formation rose in the period from 2008–09 onwards till 2011–12 after which growth has slowed down considerably.[4]

7.2.2 Intended Large Role for PPPs

The 12th Plan (2012–17) laid out a programme for infrastructure, including in areas of dual (natural monopoly and appropriability) market failure (sewerage, city roads, municipal water, sanitation), that was to have a large part of the same provided through private investments. The role envisaged for PPPs was considerable and had the Plan (with an assumed growth rate of 9%) materialized, and the target for PPPs would be larger than for any other country in the world.

However, the fiscal stimulus was withdrawn, and as growth slowed down, the targets did not seem achievable and the plan itself was scaled down. With growth fall from 2011–12 onwards, the infrastructure sectors especially those that had been privately financed went into deep trouble, and the problems hurt the banking sector as well—especially the PSU banks, with their non-performing assets (NPAs) rising very rapidly.

[3]Thus, recent initiatives like "Swatch Bharat", "Smart Cities" and many others remain little more that uncoordinated and weak administrative initiatives without a strategy or a functional design, when the potential of creating clean and functional urban spaces could have resulted in massive infrastructural construction that would have created humongously large public value as well.

[4]Morris (2014). See also Morris and Kumari (2019) for a physical indicators-based re-estimation of the growth since 2011–12, which shows that the growth especially of manufacturing and trade and transportation has been much lower than what the official GDP figures would indicate.

7.2.3 Response to Global Financial Crisis

The large fiscal stimulus to counter the demand recessionary effect of the Global Financial Crisis (GFC) has generally been blamed for the banking crisis from which the country has still not overcome. However, it is not the act of the counteraction of macroeconomic demand fall, through the fiscal mode including through enhanced infrastructure spending that was per se the cause of the problem, as much as the fact the lending to infrastructure projects was based on ritualized assessment by the banks, and there were crucial deficiencies in the format for PPPs and their structuring. Also in the specific case of electricity generation, there were large risks to the state arising out of the bidding formats.[5] Of course some increase in the NPA levels is only to be expected when there is a slowdown, with the fiscal stimulus having been withdrawn. Inherent organizational and governance weaknesses of the public sector banks made them particularly vulnerable, and as we will argue bids by developers in many sectors may have been made to exploit this vulnerability as well.

Since 2011–12, when growth fell off sharply to under 6%, the rate of capital formation also fell to reach 30% or less over the next three years. Infrastructural investments also suffered. But from 2016–17 onwards as the government enhanced the investments on highways now calling it the "Bharatmala" Project, with a hybrid annuity model (HAM), since in its reckoning the earlier annuity model was limiting. Indeed, the NHDP and the PMGSY have been the only programmes that have allowed the government to enhance spending without sacrificing public and social value, since the core aspects of the design, bidding and other arrangements under the NHDP that had been developed during 1999–2002 in the Vajpayee era remain essentially functional and value creating.

The privatisation of the two airports at Delhi and Mumbai, while they did result in much improvement in the value to consumers, came at costs significantly larger than what they need have been. Since our focus is on financing, we will not go over the experience sectorally, but would bring out the experience of financing private infrastructure and the lessons from the same.

The Maharashtra State Road Transport Corporation's (MSRDC's) much commented success in the excellent design and construction of the Mumbai–Pune expressway is remarkable for its near uniqueness. The personal involvement and leadership of the CEO of the MSRDC were responsible. MSRDC still retains some of the capabilities that it then had. However, the experience of that highway has been exceptional. More generally, the woes arising out delays and cost overruns have been typical. Cost overruns of the order of 40–60% and delays of the same order continue in government projects. That means a significant loss of value in capital formation and hence of the growth rate that is possible for the same savings rate. The shift of investments from the public to the private sector, while it would generate rents when

[5] Pandey (2014).

with lax design or regulation, nevertheless in a large way avoids the social loss that happens when projects have large cost overruns due to extra spending to create the assets and to the assets being delayed in being put to production.[6]

7.3 Financing Publicly Owned Infrastructure

Financing public infrastructure when built and owned by government should not pose large problems in financial design since the government as the sovereign, and as an entity that can operate beyond the tenure of the longest loan that can be raised in the market, is expected to have the lowest cost of finance and could potentially take up projects with large gestation periods and long asset lives. However, inefficiencies in implementation, pricing and management, and in the loss of social value, would only get partially reflected in the accounts of the government, that being usually on a cash flow (single entry) basis. The cost of delays for example would not get reflected, unless a notional interest during construction is incorporated. Similarly, the risks in returns to the project would not get captured—at least not fully—if the project has recourse to government funds; so that the low financing costs for the project could underestimate the risks and the value created. Implicit "guarantees" or assurances which are always there even when without formal guarantees can keep the visible financing costs "low".[7]

7.3.1 Implicit Assurances Can Be Exploited

Through SPVs, it is possible to remove the benefit of recourse to government's budget as a whole for projects carried out through public SPVs. But then markets have a way of leveraging the implicit assurance by bringing projects to a situation where much public interest is involved to tie the government down to its debt commitments, even when the risks manifest much after the project is in place, but which could have been anticipated by debt markets.

Consider a risky project by government, say of a tunnel or a turnpike, which is financed by raising debt in the market without government guarantees. If the project does not have cash flow to cover debt repayments, then the market instead of taking a loss could work to a concentration among debt holders who could then force the government to "honour" the debt payments of a project that was not formally guaranteed in the first place. This means that the initial premium that such finance would have attracted may systematically undervalue the risks, given such a probability of forcing the hand of the government.

[6] Morris (2003a).

[7] Morris (2003b).

7.4 Financing Privately Owned/Built Infrastructure

The challenges in private financing of infrastructure, especially in the case of PPPs, would require understanding of the issues in government financing as well, since the involvement of government is active here as one of the parties. Even in the case of regulated entities where the ownership is entirely private, to the extent that there is asset specificity, and the industry is regulated, there would be an interface with government/regulatory/appellate authority that goes beyond what is the case in the case of industries without market failure. When, additionally, the goods/services are seen as being merit goods or necessities, there is always the additional aspect of government acting on behalf of consumer interest, which of can course affect the private financing through markets or otherwise in these sectors.

7.4.1 In PPPs Governments Are Always Involved

PPPs do not take away the government. When annuities are involved, government is essentially creating contingent liabilities to cover these annuities while the private entity puts in the risk capital. Obviously, governments need to constrain themselves on the amount of such contingent liabilities they can take. In the Indian case, the RBI has put in place measures that limit the exposure of state governments in this manner.[8] As the fiscal squeeze was put on state governments to meet the expenditure reduction that was part of the reform of 1991–92, 92–93, state governments had responded with increases in expenditure made by their own state-owned enterprise (SOEs) and by giving guarantees to other entities some of them in the private/municipal sectors. The RBI's measures which were instituted from around 1999 soon put a near stop to these approaches by the state governments, although they continue to use the losses of state-owned enterprises to cover programmes whose budgets have not been technically assented to the legislative assemblies.[9]

[8] RBI (1999).

[9] One of the reasons for the state governments' reluctance to divest out of electricity, despite all the state systems being ready for divestment, is that then they would then not be able to pursue bad but populist policy unless they took the cost on to their own budgets. The ability to pile up the deficits and then pressure the central government for debt forgiveness continues. It was hoped that the debt forgiveness instituted once in 2002, (GOI, 2001, 2002) would not have to be done again. But then that has not been the case since now after nearly 15 years, the state distribution companies' balance sheets have been muddied with another similar dispensation now being proposed, without real reform on the distribution and subsidization side, by the government. Clearly reform has to be real and have relevance to the problem, rather than being derived out of doctrinaire positions. Similarly, large investment heavy sectors like irrigation, sewerage, bus transport, which could be easily divested from to reform and enhance public value, continue to be used wastefully, even when reform could actually have been politically rewarding.

7.4.2 Endogenous Risks and PPPs Versus EPC

Consider a PPP. For simplicity, we would consider an annuity highway project. Let us imagine that the design, unit costs, methods and technologies are symmetric as between a government department constructing the highway and the same being done by a private entity that has to raise some part of the funds in the market or through institutions.

In bidding out projects, the public comparator can easily be considered in terms of the annuity payable (or the annuity equivalent of tolls discounted at the cost of capital for the "prime" private party) vis-à-vis a reference annuity. Government can set up a reference or reserve annuity based on its unit costs, assuming a life of the asset that is realistic—30 years in this case, and a return that is say 3% above the yield of a 30 year bond that it could float. This is say $9 + 3\% = 12\%$. The annuity so determined now becomes the highest annuity that any private developer could bid for. This would serve as a public comparator. Even when governments and developers see the same unit costs, the failure of the state in construction of an experience good like roads would give enhanced value in case done by the private capital through PPPs. It is precisely because it is virtually impossible to have low maintenance costs by building a shoddy road that gives value to a BOT/annuity format in building roads.

7.4.3 Improvement in EPCs in Possible

There is a large opportunity to correct the problems in EPC frameworks, which as yet is only partly addressed by the many authorities that procure roads in India. It is only the National Highways Authority of India (NHAI), which has a reasonable organization, and the requisite autonomy to support EPC. The improved EPC which was part of the NHDP was certainly helpful. Of course, it could have become far more capable by developing skills and competencies in network design, and in integrating highways with regional and urban transport networks, which are almost entirely absent. The necessity of sound organization at the operational level is because roads (as much as many other assets) are actually experience goods. Their quality cannot be assessed after the top surface has been laid. Only a responsible and incorruptible supervision that checks for the correctness and functionality of each layer can ensure that what the procurer signs off on is a good asset. That capability having been virtually destroyed in Indian Public Works Departments (PWDs), compounded by their archaic procurement formats, make them procure roads that are "guaranteed" to fail with the next monsoon. It is this inadequacy in supervision, compounded by the poor engineering procurement construction(EPC) formats that is common to most PWDs that gives well-crafted PPPs a great value over what is otherwise possible.[10]

[10]Public procurement has its frailties and cannot be replaced by procurement that is akin to procurement by private parties. Yet they can be designed to be far more effective than is the practice in

The lack of financial resources with government is hardly an argument for PPPs since governments can always raise money cheaply if the same is used in efficiently creating social and public value. That PPPs are more in sync with government accounts which are on cash flow basis is of course more correct and gives some advantage to PPPs. However, if there are ex-ante limits to the amount of contingent liabilities governments can create, with the same being linked in some way to current revenues/outlays (as should be), then the financial argument disappears and only the arguments of better design, better construction and more efficient operations and lower prices through the ability to access markets (otherwise not possible for the public sector[11]) would hold.

7.4.4 Duration of Financial Markets

Yet there may not be (or should not be) bids for the same by the private sector, in case there are no sources of finance with a tenure of 30 years. If corporate bond markets do not go beyond[12] say 15 years, then private firms would face interest rate (change) risk, which would not permit them to bid effectively for the project. Managing with loans of tenure of 15 years (assuming that the loan on the same terms can be rolled over after 15 years) exposes them to this risk. When financial institutions (FIs) are not supported by the state, loans from FIs would also have the same problem. Indeed FIs like banks would only offer term loans of much lower tenure. In this case because the concession period is say 30 years (being the life of the asset) which is much higher than the tenure of the finance available, worthy developers responsible to their shareholders would not be able to participate. However, some developers with little reputation and not answerable to their diffuse shareholders, but only to promoters, could bid "taking on this risk", but with the intent to shift the same on to others in case the same materializes, thereby resulting in adverse selection. That would keep worthy developers out. This "risk taking" can result in a high probability of winner's curse with abandonment risk being faced by the government. There are of course several possible solutions to the same.

7.4.5 The Concession Period

One is to limit the concession period to 15 years which matches the tenure of markets in which the developer can raise funds to result in financial closure. Then there is the

India. See Pandey (2003) to for a discussion on the issues of relating to the private sector in public procurement.

[11] As for instance to access cheaper labour markets, given the "schism" in labour markets that is widely observed in many late industrializing countries.

[12] Markets that go beyond this tenure are very thin and/or are very heavily discounted in India.

problem of intergenerational pricing as when the tolls have to be higher than "cost" to reflect this shorter concession period over which all costs are recovered. But this may not be very large as between a concession period of 15 years and 30 years. However, it opens the door to what is to be done after 15 years. Of course, there must then be a transfer clause necessarily, and in order to avoid the risk that the developer does not maintain the road well, over the last few years, it is imperative to either withhold payments for the last two years, to the year after the transfer (which is expensive); or to build in a clause where the current developer gets a handicap to bid for the same asset as an maintain operate and transfer (MOT) project after the concession period of 15 years. The "handicap" can easily be worked out knowing variances in costs across the private sector and acceptable "loss" to cover this risk. In most cases, a 5% preference over the lowest annuity bid for the MOT after 15 years would be adequate since most of the costs after 15 years would be operational costs, which can easily be assessed and anticipated.

7.4.6 Covering Interest Rate (Change) Risk

Another way out is that the FIs who do the lending, then assess this interest rate risk and insist on equity well beyond those suggested as a norm by the government, to cover this risk. Then the bidder would have to bid beyond the reserve annuity, or above those who are not constrained by such assessment. This again would bring in adverse selection if there are players of the latter type in the market. However, if development finance institutions (DFIs) can cover this risk (through instruments such as takeout financing), then there should not be a problem even if the concession period is well beyond the tenure of the market[13] This was acutely realized by the Infrastructure Development Finance Company (IDFC), and the instrument was created early enough to support private capital in infrastructure. However, there being no compulsion to use the same, developers taking recourse to covering their interest rate (change) risk would be at a disadvantage, creating therefore an adverse selection problem despite the existence of a mechanism to cover this risk. There is, therefore, a need in the PPPs (in India most notably) to internalize the cost of covering the interest rate risk; i.e. the RFPs must lay down that the bidders must necessarily cover themselves if their bids are to be considered. That would of course raise the cost somewhat but would lead to large gains in terms of risk reduction, making for fewer failures of PPPs and hence of enhanced scope for private sector development. It would also allow for a somewhat lower level of due diligence required on the part of the banks, without exposing them to too large a mismatch between the tenure of their assets and liabilities.

[13]For the role of DFIs in a liberalized market that leads to development of financial markets, see Varma (2004).

7.4.7 Annuities and Tolls Linked to Cost of Capital

Alternatively, governments can cover this risk by linking a portion of the annuity to the interest rate on the debt instrument with the thickest market—a 10- or 5-year bond in the Indian case. Although the portion of the annuity to so cover is not very accurately determined, that is not important. Such an approach could for example make an irrigation or dam project efficiently financed by the private sector with additional benefits that come from efficient design and management. Or equivalently, the cost of covering the risk can be compulsorily borne by the buyer, which is effectively the same as the previous one.

7.4.8 Role of BSFIs

Of course, this limitation of the capital market need not result in adverse selection if the banks and FIs that lend to the developers without exception understand this rather simple problem and insist on covering the same either with an option like take out financing or through a higher equity contribution.[14]

7.4.9 Failure of Indian PSU Banks

Unfortunately, the Indian public sector banks, having created a ritualized assessment process, and being subject to government suggestion, cannot be relied upon to have gone through the assessment diligently. Even if some particularly independent senior manager attempted to so, he would have been overruled by the need for "objective" (ritualized and itemized) assessment, or by the risk shirking behaviour of directors /senior managers to follow each other to not lose business.[15] Indeed, most of the developers were borrowing at tenures of 5–8 years with interest being reset every one or two years! Since the equity to debt ratio was also as per the standard in the RFP, and the PPPs could only look to fixed annuities or to tolls whose rates were not in their control, the problems that the PPPs ran into in the period of rising interest rates were only to be expected. We may even suggest that many of the private developers

[14]It is important to realize that in competitive industries where revenue streams can rise due to price changes, as in the cases where there are no market failures, lending can be over much shorter tenure, and equity proportions can adjust, or be made to adjust to reflect these risks.

[15]The very same organizational aspect would in a situation when banks are being blamed for all the evils in the credit market, lead to excessive conservatism and debilitating approach to lending as is the case today. See discussion later in the text.

took this risk knowingly since they always could pressure the government on one side to renegotiate the contracts. Additionally they could dump the negatives on the ever willing to be the losers that the public sector banks are.[16]

7.5 New Models

In the NHDP, the new "Hybrid Annuity" Model (HAM) was put in place. This provided for a capital grant of 40% of the project construction cost (bid value of the project cost, i.e. the NPV of the construction and operating costs since these are non-overlapping in time) to be paid out over the construction period. And the annuities subsequently (fixed) to cover the rest of the bid value over the concession period. Government may or may not toll. The annuities as well as the capital grant are adjusted upwards with inflation based on a weighted average of CPI and WPI. Thus, in the HAM, the traffic risk as in the annuity model is on the government. This is not a major deviation from good project structuring, since the alternative of lane availability-based annuity would anyway have the same risk allocation. However, since there is early recovery (given the 40% support that happen before revenues), there could be some addition to the project abandonment risk. Since there is also a deemed termination clause, which was not there in either the BOT or the annuity model that it replaced, that route could be used by making arguments that "force majeure" like conditions exist, to quit early, in case of major difference between costs as estimated and as likely happens. These probabilities are apparently not very large. The indexation of both annuities and construction cost with inflation does reduce considerably the interest rate (change) risk that we mentioned earlier, since inflation over the longer period does track the interest rate.

7.5.1 Partial Coverage of Interest Rate Risk

However, since the inflation has been lower than the interest rate by much over 2% (high real interest rate policy of the RBI), if the same approach to macroeconomic policy continues, the HAM is likely to result in higher costs.[17] The interest build up though during construction is on the bank rate +3%. Since the bank rate is a dead rate in a regime where the repo is used, it would have been better to use the repo rate. But in India, since the repo window has often been not fully open, it is much better to have used the low end (1 year) bond yield rates with a premium over the same.

[16] An insight due to Prof. Ajay Pandey, shared with me over several discussions. See also Pandey (2014) for risk shifting behaviour more generally by the private sector.

[17] Many of the UKs PPP were contracted for during the period of high interest rates. Since then rates have fallen, especially so after the quantitative easing that followed the GFC. That has made annuity out payments very large to the chagrin of those arguing for PPPs. Had the annuities been indexed to bond rates, this should not have happened.

They could also be based on triple A corporate bonds with a term of around 5 years or more where the market in thick enough.

Since in the annuity models, there is no tolling by the developer, even when the tolls may be viable, but tolls could be levied by the NHAI, the framework provides an ample opportunity to move from cost-based tolling to allocative use efficiency-based tolling, even as in BOT projects the private sector does essentially cost-based regulated tolling.[18] Even for the private sector, a congestion charge that is negative or positive, and dynamically allocated, can be collected to accrue to the government with a view to manage traffic over a network.

Since it is well known that selective tolling can be distortionary, unless driven from the congestion angle, as the network develops (multiple paths for the same origin—destination (OD)), there can be major gains in both social use value, and in the cost by resorting to differential tolling that takes into account optimal traffic considerations as well. They could then move to being dynamic as well. Similarly on BOT projects, the private entity must have the option of tolling under the regulated toll to enhance traffic flow as the network develops.[19]

The operations period once the construction happens is 15 years. Since anyway much of the interest rate risk is covered through inflation linked payments, or can be covered through an explicit incorporation of the interest rates in the annuities, the concession period can be made long enough to match the actual asset life, and the same approach with modifications to suit the sector, can be used in other sectors such as irrigation, bridges, logistics, to name a few.

7.6 Network Effects

7.6.1 Efficient Network Design

Network effects can be very large when the network densities are very high as in the highway sector. In India where the central place densities are high, very high traffic on arterials (GQ and GCross for example) is less a reflection of the OD and more one of route availability. To "planners" going by demands over segments as they are

[18]Unfortunately, the NHAI has not recognized the opportunity that is there even now (despite low network densities and alternatives today). Thus on the Ahmedabad–Vadodara stretch, the very large 6+ lane national highway sees very little traffic because the tolls are higher than on the Expressway (4+ lane). Had the tolls been rationalized to give trucks a lower relative toll on the Highway, and cars a relatively lower toll on the Expressway, the separation of truck and car traffic, would have improved the value to (including safety) to users, and enhanced the revenue for government as well.

[19]Today though this would only be of academic interest, since the tolls are very high in India constituting a significant part of cost to operators and road users. Equally importantly when a highway is being expanded, or in part redone to provide for underpasses or service roads, tolling continues without the value to road users, which actually could be challenged in a court of law. It is important that tolling is not carried out when the road is broken, under construction or under large-scale traffic diversion.

visibly revealed and not by OD, the value of grids like networks and networks with multiple paths gets obfuscated. In the long run through national grid networks, with spurs to major urban habitats would have to be the approach of the design rather than the current incrementalism of expanding capacity wherever the traffic visibly grows. Without such a change over the expected huge rise in intercity and long-distance traffic would become completely unmanageable,[20] as these already have around the major metros.

From the point of view of finance, the load flow aspects of road networks make for a lower traffic risk for a set of roads as compared to road segments being considered separately. If BOT and tolling have to be coexisting with annuities, then with the passage of time there would be a need to either create a market for tolls,[21] and/or allow for SPVs over various segments to merge given their negative incremental traffic correlation. Listed companies that hold many segments of highways exist in China where toll roads are many.[22] Making the same possible only after construction would only allow for leveraging developers' risk capital since the road once it completes construction and enters the annuity/toll phase can be offloaded on to markets, the latter if a market for tolls can be created. Of course if these possibilities are there even before construction (which would mean efficient accounting separation with strong audit of particular roads businesses from the point of view of the government), then financing costs could fall somewhat as well. In any case, the value of mergers after construction would allow for capital markets—especially of long tenure investors like pension and mutual funds to participate.[23]

7.6.2 Segments Not Commercialisable

Similarly in the case of gas pipelines, the market failure arising out of the natural monopoly aspect enhanced by load flow characteristics would imply that if segments of the network are privatized, then the risks emanating from load flow would necessitate that lenders (and developers) are protected from vast demand variation through take or pay contracts, which while it makes funding and construction by the private sector possible increases the cost of the service of transportation. Ideally, the entire

[20] Already the limitation of the current approach of by-passes, ring roads, (which all get quickly ribbonised and to become part of urban system) with regard to urban transportation, and radial (star) arrangements on highways, which come close to or intersect urban/rural habitats to bring about conflict between local and regional/long distance traffic takes away much public value in contrast to system design in almost any other country. The sacrifice of safety that the current approach entails is the reason for the almost 10–15 times higher loss of life due to road accidents that is there in India over the advanced countries, when correctly measured in terms of fatalities per vehicle km.

[21] See for instance Tilotia and Pawar (2004).

[22] Though most are in the public sector, the listing of such companies allows for secondary market participation. Cf. White (2010).

[23] See also Varma (2002).

network should be considered as a single one with open access and common carrier principles being built in to, with incentive regulation covering the transportation costs, to allow markets in gas to emerge. Only this can keep the costs down and pave the way for functional expansion of the overall gas business that included production as well with private capital.[24]

7.7 Foreign Capital in Infrastructure

One of the important themes in the literature and in popular discussions, with the re-emergence of private sector in infrastructure, is the hope and belief that there is a large role for foreign capital both direct and portfolio. The reality is that the scope is highly constrained because infrastructure services being non-tradable would not typically be able to generate the foreign exchange to service debt and equity that is designated in foreign currency. One could counter this by stating that significant infrastructure creation by the private and municipal sectors in the late nineteenth century—railways, tramways, canal systems and sewerage systems had been so financed. The differences between the situation then and today though need to be appreciated. Most of the infrastructure sectors which raised private capital (including foreign capital) were still in the competitive phase of their evolution as natural monopolies and were unregulated.[25]

That means they were able to operate like competitive firms with the ability to raise prices to cover exchange rate changes as much as other costs variation. Equally importantly since the Gold Standard ruled, the currency values could not deviate much from their sustainable values (at which the balance of payments is in equilibrium), so that the adjustment process of the exchange rate was much quicker and not of a situation of compounding disequilibrium which could last long in currency markets. In other words, borrowing in external markets then would automatically lower the currency value if the current account proved unsustainable with those additional capital inflows.

[24] Barua and Madhavan (2001).

[25] "Regulation" in the form of antitrust had just come into the railways in the USA. This was by no means price regulation but actually kept the competing "natural monopolies" from merging into a few dominant monopolies. For a discussion on the evolution of natural monopolies (industries with sub-additivity of costs) from competition to the textbook natural monopoly with pricing power, see Morris (2001a). See also Varma (2002).

7.7.1 Deviation from Uncovered Parity and Resulting Distortions

Today with fixed and dirty floats characterizing most exchange rate regimes, the implications of borrowing from abroad to take advantage of a seemingly lower overall cost of capital, may well mean that disequilibrium continues for long, with the pressure to get back increasing, which then manifests with a large fall in the currency to render the original perceived lower cost of borrowing infructuous. In other words, the uncovered parity condition when off in a significant way by as much as 200–400 basis points,[26] even for countries that are open to portfolio flows, suggests some seeming advantages to finance projects through international borrowings and capital flows. But this can be misleading[27] especially for long duration infrastructure projects, with fixed price services, and revenue being realized not in dollars, since the positive deviation from uncovered parity can suddenly reverse to turn deeply negative when the much lagged adjustment of same takes place.

7.7.2 Pension and Sovereign Funds

Yet there is the limited opportunity that arises out of foreign funds (of very long tenure pension and insurance funds for instance), from developed mature economies that face slower growth rates as compared to the emerging economy in question. To take advantage of the longer tenure of foreign funds, the local government would have to set in place adequate long-term cover and manage the exchange rate such as to adjust quickly to be as near as the uncovered parity condition. Even then, as agents who manage pension funds have sought significantly higher returns that what is possible for them in their own markets, the scope for such funds is limited. Sovereign wealth funds too are increasingly managed with incentives for high returns. As a result, the scope for foreign financing of infrastructure is limited as well.

[26] Aliber (1993) argues that multinationals (MNCs) could have an advantage in being able to take advantage of the uncovered parity being positive, even as portfolio capital is not able to close the gap. In other words, the so-called country risk" when used to denote this deviation from uncovered parity could be penetrated in part by MNCs.

[27] However, for MNCs in host countries from where exports take place (operating in areas with no market failure), the positive deviation from uncovered parity becomes an "advantage" allowing it to finance/take over local firms, using foreign sources of funds, even when these are otherwise on other real factors like technology, organization and management no inferior to the MNC.

7.7.3 ELG Economies

Export led growth economies, undervalue their currencies from the very start of their strategy and also have low real interest rate policies. This means that the deviation from uncovered parity is not as high as in other emerging economies, allowing for financing with low risks in infrastructure. But since there is no ex-ante revealed difference in the cost of local and foreign funds then, the uncovered parity condition (also sometimes called the fisher open) being nearly met, little flows would actually take place, and a certain functionality in the pattern of the sources of financing would emerge. Competitive entities with dollar revenue streams having more foreign capital inflows and non-competitive entities having no dollar revenue streams being almost exclusively funded from local sources. As such in these economies, much of the infrastructure would, as is should, get funded locally.[28]

7.7.4 Government to Government Credit

Government to government credit given on long tenure, and at low rates, may have a functionality though. Often such credit being linked to sourcing of equipment for the construction could raise the price of equipment above that of suppliers without such linked finance. This was certainly the case in the 2000s and earlier. As World Bank has created frameworks for bidding in such cases of international funding, which are fairer to the recipient countries than what they would otherwise have been, it has helped to create an opportunity for such credit to supplement the IDA window of the World Bank. Relative to the needs of a large economy like India in its current phase of transition, such credit would be very small but not negligible.

7.8 Indian PSBs and DFIs

Indian public sector banks (PSBs) pose a particular threat to enhancing private sector participation in infrastructure. Their inability to truly understand risks (or more correctly the organizational difficulties in using the correct approach) negates one element that could have been a watchdog for ensuring that developers do not take on unwarranted risks. And they could have also nudged procurement and PPP formats

[28] An additional consideration is the so-called real economy" advantage that MNCs have which arises out of imperfections in the technology and product markets, and in organizational structure and practice, Kindleberger (1969). When the advantage that MNCs have is of such kind and especially when technological, rather than arising due to the Fischer open (positive deviation from the uncovered parity), then the spillovers would naturally be large to benefit the host economies. Infrastructure sectors do not show large technological differences, which are also not appropriable. Hence, foreign direct investments too into infrastructure tend to be low if these are not to be dysfunctional.

to what is functionally desirable and in the interest of society. On the other hand, with a pure private banking sector, it is also unlikely that hidden rent opportunities in PPPs would get exposed either.

7.8.1 Reform of PSB Urgent

Hence, reform of the PSU banks is very much integral to the issue of private infrastructure development, especially in the enhanced use of PPPs for developing public infrastructure. As entities with their money in, and yet not having an objective of profit maximization under all circumstances (including partaking in rent generation), they could have played an important role in ensuring that rent opportunities are not there in PPPs and could have prevented developers from taking risks that are beyond their control. Yet their managers do not speak out against the inadequacies in government policy or in regulation, the frameworks for PPPs, all of which have a bearing on financing. Lacking autonomy, their senior managers do not have courage to contend with bad or incomplete infrastructural policy.

7.8.2 Policy Advisory Roles

It is interesting that when one FI, viz the IDFC had set up "policy advisory" sensing the need for the same if "good" projects were to be forthcoming, things really moved. The role played by the IDFC covering programme and organizational design of the NHDP, which was then adopted by the Ministry of Surface Transport, was crucial in the success of the both the NHDP and the PMGSY.[29] But soon enough, a variety of pressures emerged which forced the IDFC to withdraw from any such role. It also retreated from the developmental role even in the financial market, and today is regrettably, no more than a vanilla universal bank.

Other organizations like the ILFS and the IIFCL reached nowhere near the expected role of a DFI in a liberal financial sector. They lend largely from its own pockets to private infrastructure (without the leveraging of flow of funds from the market that they could have). Indeed they may have been lax enough to have contributed in a major way to the banking crisis. Approval by ILFS was akin to a green signal for all PSU banks to jump in without their own real assessment[30] The

[29]This happened under the leadership of Mr. Nasser Munjee, CEO of IDFC, when IDFC provided the staff functions for the High Powered Committee on Infrastructure, with the PMO under Mr. Sudheendra Kulkarni, Officer on Special Duty, putting its weight behind the proposed initiatives.

[30]One's own experience being on the board of a PSU bank during this period of lax lending was that it was almost impossible to argue against lending to infrastructure. If ILFS had cleared a particular infrastructure project, for the mangers of PSU banks, who behaved more like bureaucrats over long years of an abused interface between the government and the bank, there was no question of seriously re-examining the proposal. Even if glaring risks like in the case of a power project

tendency of PSU managers to never contest the views of government officials even when they were mistaken removes all hope that the public sector banks (without dilution of their shareholding to below 50%) would be able to reform themselves on the crucial function of credit assessment.

7.8.3 Lack of Autonomy Results in Failure of Accountability

For some of the better PSU banks, the problem was that they were "not allowed" to do correct credit assessment, despite reasonable expertise being available in-house. The bigger tragedy of PSU banking is not than managers did not know (they could have learnt), but that the expertise which is so obviously there in PSU banks is not effectively brought to bear. This is due to the lack of autonomy which makes the interface with government dysfunctional enough for banks to ignore prudence and be led by targets and other agenda brought in administratively by the government. The lack of autonomy[31] has allowed banks to, over a period, completely displace accountability to the primary task. The only "corrective" that can happen is to viciously punish managers who unluckily become the "fall' guys, as the crisis emerged and NPAs ballooned. This has today heightened the demoralization of the bank managers. It is only rational for them to dissociate from any lending at all. The probability, then, that those willing to act are motivated by other considerations increases. "Internal" adverse selection then runs rife!

The RBI's regulatory role in no way mitigates the situation either. Credit assessment ought to be holistic with a key role for private information and is hardly amenable to a set of requirements which are considered independent of each other. In itemizing regulation, it forced banks to adhere, to the letter of regulation and not the spirit. Similarly, regulating/controlling input and process measures, which was the penchant of both the RBI and the government, is the best recipe for losing accountability to the primary task. In other words, the RBI was "micro-regulating", despite the many sound measures and advice that it has brought on to the issue of management and governance of public sector banks.

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projecting revenues with no firm PPA but through sales in the market at assumed prices based on past prices for short-term deals, were pointed out, they could be easily overruled because "another PSU bank" had already taken the decision. RBI representatives would not typically be critical enough to look closely at endogenous risks being much more concerned about any ticks as laid out in the assessment procedure not being met.

[31]Government for example, carpet bombs the banks with office memos and Government Orders (some compulsory others advisory), and there could be as many as a few score over quarter, swamping the boards of the weaker banks (with very little countervailing power), so that response to these, as well as credit assessment much of which should have taken place lower down, uses up all the top management time. Most of these are internal and pertain to operations rather than strategy or policy, which leads to PSU banks being not able to maintain their boundaries—a necessary aspect of any "living" firm or system. Indeed, the bane of government in India is that it is singularly unable to distinguish strategy, plan and policy from operations.

7.8.4 Poor Organizations for the Primary Task

Resulting from the lack of autonomy, the PSU banks have not been able to create organizational structures and processes that are in keeping with the performance of their primary task. This of course keeps them from seizing the opportunity even when there are narrow windows of opportunity under the very rare benign and well-meaning minister and secretary who are able to differentiate the strategic and policy from the operational and organizational. This is of a course a general problem that all PSUs in India face, which is also the single most important factor that has denied effectiveness to PSUs[32] in leading the economic transformation of the country; a role that they have well played in the countries that starting later have been successful—most notably the east Asian Tigers and China, besides Japan in an earlier period.

There are many other design and policy aspects that act against public sector banking. Loan "melas" and such periodic loan forgiveness, and administratively directing banks to political and social goals (instead of stating them in policy terms) are well recognized as being perverse. However, the aspect of title to land being very weak and risky, in reducing the effectiveness of collateral-based lending is not recognized.[33] This hurts especially MSMEs. Similarly, the angularity between recovery laws and the lending portfolio of banks is only now beginning to be recognized.

7.8.5 Law and Recovery

Indian law modelled on the Anglo-Saxon banking practice where banks only lend short with the stock as security. But in India, banks actually lend long term as well, like the continental banks. However, in recovery the option to change the management is not considered, which in the Indian context would mean getting rid of the promoter and bringing in a new management. This option is very much part of the banking law in the continent, Japan and Korea, where term lending by banks is common. When lending long, this option being available to lenders is very important in the efficient direction and use of deposit resources that would be available to the banking system in a large measure. This lacuna is particularly limiting when lending to private infrastructure owing to the long tenure of the debt and the limitations in price adjustment that come with regulation.

The large amounts of capital that gets locked up in SLR assets (today about 22% of deposits) create the need for higher interest margins in lending, which has brought

[32] Sarabhai (1969), Morris (1991).

[33] The importance of a security of titles in land can go a long way to improve the lending by banks and FIs to especially MSMEs, since it would enhance the role of collateral-based funding. The need for a Torrens-based system which has the potential to overcome the current mess in titles is vital to the country but has got scant attention. See World Bank (2007). See also Mohanty (2010) for a survey of the various distortions in land allocation, regulation and use.

about a disintermediation. This of course hurts the MSMEs in manufacturing most since they have a comparative advantage in borrowing from banks.[34] The smaller infrastructure players too would be "unfairly" affected by this disintermediation.

7.9 Characteristics of Good Projects

7.9.1 Adequate Returns, Not Rents

The problem of bringing more private capital into infrastructure is much more that of the sector not having many good projects, and less than that of limitations in financial markets. The markets of course recognize "good" projects to be those which are profitable, even when some of the "profits" take the form of rents. But from a social and public point of view, "good" projects are not those that allow private developers to make abnormally high returns arising out of them taking high risks (that governments should mitigate), or because of rent opportunities that arise due to ill-designed PPPs and/or regulation. Such perversities would unnecessarily raise the direct and indirect cost of the services provided by the developer. The demand to that extent would then be far less than otherwise. But perhaps more importantly, the rents and super-normal profits inevitably attract the hostile attention of the public, opposition parties and other civil society organizations and media to take PPPs more than a step backward.

While financial markets and analysts may have incentives to not talk loudly of such rent creating opportunities, the government as the upholders of the larger social interest and especially of value to the public cannot but put its best foot forward in the design of infrastructure. Since government action ultimately is action by civil servants, capability of the senior civil servants is most vital. Hence, "good" projects are necessarily those that allow known returns ex-ante, while avoiding rents.

7.9.2 Legislation and Legal Frameworks

When PPPs are pushed through pure executive action, since a change of the executive is always possible in democracies, the framework for the award of contracts has to have justification in law and in value, if not through objective assessment, then at least through well laid out processes that lead to choice, including that of location, shortlisting and final award of the contract. In countries like India where programmes

[34] Cf. Morris (2001a).

of political parties are both fickle and populist[35]—in part arising out of the need to oppose—the risks due to change in governments are very high.

The risks can be reduced through laws that specifically provide for PPPs and private sector participation and the attendant requirements that go with it, which override other possible legal barriers. The hurry of politicians to get through with PPPs through executive action without waiting for the cumbersome legislative processes is usually a recipe for failure. And that gets reflected in the very high premiums for financing such projects, or in risk shifting behaviour. Here the role of the civil servants becomes important, since they are in a position to point to such risks and of the need to mitigate these.[36] Having laws and frameworks and independent institutions that have defined roles, in place mitigates this risk to an extent.

7.9.3 MCAs

There is general agreement that model concession agreements (MCAs) are important to take PPPs further. One argument in favour is the savings in time. Also that in following the MCA closely, the government promoting the project would have gone through a well-analysed and developed framework. After all there is no point in reinventing the wheel. There being many hidden risks the MCA provides a path where these have apparently been identified and addressed. An added benefit is that it provides a way to take forward PPPs to the civil servant who is otherwise harried to give the attention to the detail which is required for PPPs. Also in a situation of little or

[35]Pure populism without either a developmental or inclusion aspect is also partly the result of the state not having the capacity to strategies and pursue developmental goals. The lack of ability then makes politicians turn to the quickies that populist measures are.

[36]One of the major plus points of the NHDP was that it had its own legislative basis both in the NHDP Act and in the special provision for land acquisition that the NHAI could use. As the Congress came to power displacing the Vajpayee led NDA government under whose leadership the NHDP happened, the initial reaction of the Congress government was to critically examine the NHDP. But finding the same to be successful in creating public value and being well entrenched in law, the new government actually enhanced the investments! On the other hand, poorly crafted private investment arrangement for generation in the electricity sector under the IPP policy c. 1995, which allowed returns up to 32% (much of it in the form of rents), invited a severe backlash, from which a partial recovery could happen only after 10 years with much change and new policy in the form of the "Ultra Mega Power Policy" (Pandey et al., 2010). Similarly, the two metro airport privatisations which involved much rents that were hidden in the earlier format. This is because the bid criteria was the share of revenue when the revenue was ill defined. There were other issues as well (Pandey et al., 2010). These inter alia led to a period of retreat from privatization of other airports. And it is only now that the matter is back on the burner with an attempt to overcome the vast rent seeking opportunity created because of the bid criteria being the share of revenue, when revenue itself was ill defined. However, since public value was enhanced considerably by the professionalization of design and management that these privatisations brought about, there was no adverse public reaction as such, and the realization of the mistake is confined to official and academic circles. Also the intervention of the court to deny a part of the rents, much after the project was completed, took some part of the sting away. But the matter can still be brought on into the public domain if the same is seen to provide a political opportunity.

no organizational capability, and where the embedding of learning within government departments in low, which is very much the case with government departments in India, and where "mistakes" can invite punishment on the "fall guy" ex-post, civil servants are in a better position to push for PPPs within the ambit of the MCA. These are all valid, and MCAs are very important for countries like India that seek to provide much of their public infrastructure through private capital.[37]

7.9.4 Beyond MCAs

However, it is a mistake to believe that there are no significant or crucial differences between PPPs in the same sector and with the same objectives. Not only the differences due to geography, but those emanating from the nature of demand especially in the differences in willingness to pay, the current condition of the publicly owned network, differences in the nature of the organizational situation, all imply that with hardly any exception PPPs have special characteristics which need to be addressed, even if a good starting point is the MCA. In other words, the task of ex-ante subjecting the PPP (in the detail of all its agreements) to analysis (of risks and incentive compatibility) by putting oneself in the shoes of all stakeholders (developers, lender, consumers, ordinary citizens, the relevant public, governments—local, state and national, other authorities with the power to approve infrastructure, defence establishment, town planning authorities, cantonments, safety authorities, etc.), land owners and user of land, besides the interests that are likely to be adversely affected has necessarily to be gone through. Highways may be the sector, where MCA would encompass more of the risks as compared to other sectors where the specificities tend to be high. In the case of sewerage systems, ports, multimodal facilities, water systems, airports, etc., even with a standard approach, the specifics would almost always have to be deeply considered to anticipate the risks and potential points of dispute/misunderstanding as much as possible, even though we know that no contract can be completely specified.

7.9.5 Expert PPP Organization

A good answer especially in India is to have a neutral expert body of lawyers, economists, finance and market experts, besides those with sectoral knowledge, which could whet proposals sent to it on a voluntary basis. Such an organization should have independence and no executive or recommendatory powers and must

[37] The erstwhile Planning Commission under the initiative of Mr. Gajendra Haldea, member, created some excellent MCAs which were particularly effective for the road sector. However, that effort went away with the disbanding of the Planning Commission. It is unfortunate though that it then saw MCA and creation of an expert organisation here as alternatives rather than as excellent complements.

avoid any developmental role[38] Its reputation gets built on its expertise, although it is funded by government. Its purpose is really to point out the lurking risks and anomalies in a project, to the parties that approaches it. Over a period, whetting by the same organization would become a way by which sincere civil servants, lenders and developers (who seek genuine profits but not rents) could get their agreements and proposals double checked. The cost of such an organization would be very small vis-à-vis the social value it could render through PPPs and such modes of infrastructure development. Key to the success of such an organization is non-interference from the government and no influence of the private sector either. Having a budget that is not voted and having the right stakeholder structure are most important to the ability of such an organization to contribute to "good" PPPs.

Given the specific constraints and debilities that civil servants face in India,[39] the Indian system of decision-making, especially with regard to PPPs and infrastructure, can be highly problematic and could lead to situations of large risks and/or rent opportunities, or to inaction. Having recourse to an organization of specialists of the kind described above should result in a flood of "good" projects. This is especially so, since governance and organizational reform, (which involves both civil service reform and administrative reform in the Indian parlance) in the right direction, is hardly round the corner.

7.9.6 Administrative and Civil Service Reform

Similarly, enabling senior civil servants to have recourse to "owner's consultants"—who are unattached experts—could go far to develop a critical evaluation of the approach and strategy laid out by main stream consultants, who are who keep out of processes consultation that would typically follow the "framework or design" consultation. In other words, there is conflict of interest between the framework consultation and process consultation—the latter being large in size—which has the potential to distort the framework consultation recommendations.

[38] In the budget of 2014–15, government proposed an organization called 3PIndia with these roles but was unfortunately also saddled with a developmental role, which would negate the primary purpose of being an expert organization!

[39] Civil servants are not experts. The high value placed on "generalists", the frequent transfers and the disdain with which knowledge is considered all make for non-learning organisations. Also by design, there is very little embedment of knowledge other than of the procedural variety. The result is person dependence rather than system dependence. In most other LDCs through with poor governance, the reasons more often like in a politics that misdirects resources, or in an undertrained civil service, not in the kind of organizational failure that has become the hall mark of Indian administration.

7.10 Government's Roles

Recognizing the nature of the core market failures in particular sectors is paramount if they have to be addressed correctly. Thus while electricity has only the failure of being a natural monopoly, the city road sector is both a natural monopoly and suffers from appropriability problems due to lack of excludability as well. However, the sewerage sector is a natural monopoly but its excludability may not be of much meaning in a poor economy. This is because the very large positive externalities of use (actually the very large negative externalities of non-use even by a few) would keep the door open for avoidable infectious diseases which would hurt all. Therefore, it would be necessary to include everyone, and this implies subsidization as well.

7.10.1 Recognizing the Nature of Market Failure

With modern developments in contracting, measurement, data acquisition and analysis, it becomes possible to unbundle the electricity sector into generation, supply, ancillary services, transmission and the wires part of distribution of which only the latter two segments are natural monopolies since the show sub-additivity of costs. Today, we need only regulate these two to set free the other sectors. This means designed markets, the efficacy of which lies in the correctness of the design.[40] The financing options would, therefore, follow such desirable change in the industrial organization that leads to markets.

Similarly, sectors like city cleaning have only appropriability problems. Efficient regulation would mean taking advantage of market creation as well as use of contracting. The modes of intervention that are appropriate are indicated schematically in the Fig. 7.1. These are only the beginning. There are possibly other failures like experience good character of education and health that would necessitate some direct provision if the problem of poor ex-ante measures of quality has to be correctly addressed.

7.10.2 Electricity

Approaches to financing would have to recognize this optimal market structure and mode of intervention and be in tune with the same.

Thus, in an industry where generation has been marketised, market borrowings to finance investment to cover a large part of the capacity when generation is unregulated would imply that the generation company presells a large part of its capacity in long-term contracts, which could of course become financial contracts in a world where

[40] For example, Pandey and Morris (2009) lay out the framework for the design of electricity markets most appropriate to the needs of the country.

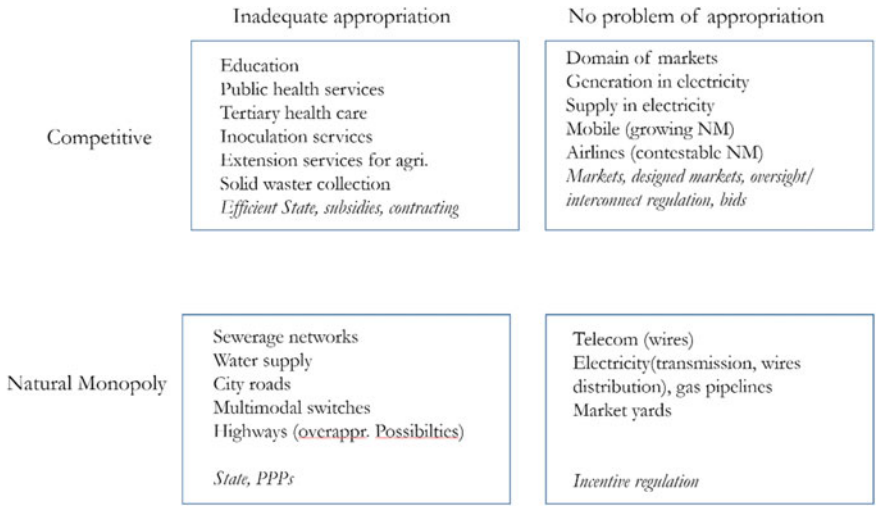

Fig. 7.1 The matrix of market failure and roles for the state

the delivery of power is based on day ahead markets, etc. Where the design of the markets necessarily involves the preselling of capacities prior to participation in the energy markets, the financing risks are clearer since demand imbalances manifest quicker and capacity creation is quickly signalled without large gaps. When the market bundles capacity and energy cost recovery into a single price bid, capacity addition may get bunched together to create periods of low and high prices, with the risks that these can put on an individual firm. The large generation capacity additions in India under Case I and II that took place in electricity without the deregulation of the sector in the right direction was problematic. With competition for the market (bidding under Case I and II) being unlinked to completion in the market (there being no substantial designed markets), generation was cast as PPPs, when it could have been competitive in operation as well.[41] But then the wires business in generation, and transmission remain natural monopolies, the former multiple but spatially separated, and the latter single to entire economy or large region, which then have to be regulated in an effective way—the current best practice would be incentive regulation. Else if the system is managed as a vertically integrated monopoly, then the regulation appropriate to the same would have to be in place.

7.10.3 Municipal Water and Sewerage

Similarly, in recognizing the vast social and public benefits of total inclusion in sewerage and water systems and the physical interaction of one with the other, bids

[41] See Pandey (2014).

would be for both sewerage and water together with strict penalties for non-coverage below nearly 100%. Although there is excludability, some people are too poor to pay and would be out of the network, and their inclusion is necessary to keep the value of the network high. The PPP structure and design would have to reflect this aspect, and viability gaps to be covered by the state would be in order. Also being natural monopolies, the tariff would have to be set, with increasing block to both allow for the judicious use of water and to have access for all. Access subsidization rather than use subsidization would be functional. With the tariffs fixed and incentive regulation chosen, it makes sense to have bids on the basis of the viability funds demanded, once performance levels are set. Since cost to serve tariffs may be higher than the initial willingness to pay (given the incredulity that people have with regard to the capability of the system to reform), a staged rise from tariffs that are no higher than the present to full cost recovery to all except the poor may be called for.

Volumetric metering and strict penalties against non-achievement of quality standards[42] and coverage would be called for. One necessary standard is that water supply has to be 24 * 7 since there is no way to ensure potability of water, or to control leakage with anything less than 24 * 7. Indeed, given the massive wastage of water, most PPPs if correctly structured should see humungous rise in social value. The risk reduction that is thereby possible with upfront clarity would crowd in private finance.

Similar sector/service-specific considerations are there in almost all areas of infrastructure. Major dysfunctionalities emerge if the tenets that follow from the schema in the figure are ignored. Thus, setting up of a regulated/unbundled industry like electricity which clearly has no appropriability problems as PPPs (as in the Case I and Case II or IIP models) are per se problematic, and their financing would reflect these risks. Besides these, there are of course many other sector-specific aspects which would need to be considered.

7.10.4 False Comfort of Cost Plus

Regulatory modes also influence the financing decisions. Thus in natural monopolies, when the regulation is cost plus, the "comfort of cost plus" reduces the cost of finance. However, this comfort comes with all the attendant failures and distortions brought about by cost plus regulation that greatly subtracts from consumer and social values. The somewhat higher cost of financing investments when the regulation is of the incentive type is more than compensated by the vast gains in social efficiency and the lack of massive distortions that cost plus brings. This is well known in the literature, but neither associations of developers, nor the financial institutions would be inclined to highlight this aspect. If government officials are unaware of the nuances of regulatory modes on the financing costs, then expensive errors are possible. The

[42]The standards too have to be realistic. For sewage disposal, a BOD of 10 ppm would be very expensive, while 30 which is very good would allow most cities have near 100% coverage via PPPs.

choice of cost plus which regulation which has slowly moved to "norms-based" regulation instead of having used incentive regulation directly is one of the reasons for the problems in the electricity sector.

7.10.5 Covering Vast Price Changes in Major Inputs

Similarly, if prices of significant inputs are expected to fluctuate much and can only be anticipated very weakly, then the private sector cannot be expected to bear the risks from these large movements in prices, since they intrinsically lack the capacity. They would have to be pass thru, but be based on prices in the markets which are thick. The regulation ought to recognize the need for such defined pass thru ex-ante. This, for example, would be case of generation bids invited through competition for the market (in the absence of competition in the market), where the fuel cost would have to be pass thru. It is only in the case where there are well-developed market for energy (competition in the market) where the pass thru arrangements need not be part of the ex-ante regulation, but result from the bid and market process that regulators can leave the cost of generation to the market.[43]

7.11 Brownfield Infrastructure

7.11.1 Completing Projects

The Ministry of Finance has been actively considering the potential of "brownfield investments". Essentially, there are two possible types of such projects. An asset that is probably not in adequate use, or in disuse which could be brought on stream with marginal capex and with opex to give high social value in such reworking. Examples would be highways not in good use because the surface is bad, or because in the interconnect was earlier ignored, city railway systems (Chennai's broad gauge old metro, Ring Railway in Delhi) which by marginal opex that is focused on access and interconnect could create social value. Past incomplete irrigation projects (earlier done with much cost and time overruns by the department) but now could be completed by an appropriate PPP, canal systems (which is to be completed) of irrigation projects where the dams are in place would also fit this category. Herein the value to incremental expenditure is very high, provided there is a break from the past in terms of the framework. The scope for such investments is high given the poor performance of public investments and of many mistakes made in the past that have prevented PPPs or public projects, from being able to create social and economic value. Of course,

[43]The core difficulties with both Cases I and II of the UMPP have been this. See Pandey (2014). Also being cast as PPPs with demand risk being completely taken off their backs, the policy has resulted in the ballooning of the capacity created to well above the realistic demands.

the challenge is to get the RFP right given the requirements and the true status of the asset, keeping central the social and public value that can be generated.

7.11.2 Operational Stage

Another class of brownfield projects would be projects that have gone past their construction and start of commercial operations and now face far lower level of risks. This would be the case in the operational phase of most road projects on annuities or tolls. They can be offloaded on to markets to free up entrepreneurial capital.[44] This would lead to enhancement of the space for private capital in infrastructure, and could push the development of long-term bond markets. Indexation of annuities and tolls to the interest rates would help to speed up the process.

7.11.3 Estimating Brownfield Investments

As on date (end 2018), the total stock of brownfield investments as from the PPI database is around USD 80 billion. This was some 29% of the total stock of investments in PPI projects in India.[45] The share of brownfield has been much higher in recent years especially since 2011 when the fiscal stimulus was pulled back and the country entered into a slow growth situation with very high real interest rates. Indian interest rates were out of line with global interest rates. They have begun to come down only since 2018. The large brownfield investments during this period we could think are exceptional. Thus, a share as high as 40–60% in brownfield investments would be unlikely going forward unless of course there is a specific desire to increase brownfield rather than greenfield investments. There is no reason why this should be the case, since greenfield which is also successful uses the private sector for the project phase as well. It is only when there is vast change in the interest differential or when the design and contracting practices do not keep the risks sufficiently low that the option of brownfield after construction while the state does the greenfield construction becomes the second best. However, when the brownfield arises by way of asset monetization by private parties who have already gone through the construction phase, then the pressure for the same would have arisen out of vastly different opportunity cost of capital between the brownfield investor and the original private developer who made greenfield investments. A look at the actual FDI projects in the road sector reveals that nearly all of them are brownfield investments from EPC projects that were earlier done by the government, after the construction period.

The potential for private participation (with divestiture and greenfield projects being the main form) is high in the water and sewerage systems and in solid waste

[44] Varma (2002, 2003).

[45] PPIAF Database.

treatment. However, the lack of value creating bidding formats, model concession agreements, and regulation has acted as barriers. It is unlikely that innovations in this regard are likely in these sectors. The Railways could witness some shedding of current rolling stock, rakes and even trains if pricing freedom is available to the brownfield investor making the investments. As such since the beginnings have been made we see an enhancement of private investments via the brownfield in this sector. Similar would be the case with regard to airports except that substantial upgradation would also have be part of the contract. It could go the whole way of divestiture with secondary brownfield investments arising later. The roads sector could withness increasing monetization through brownfield mode with the tolls /annuities being given over the investor.

The potential is very large since the toll rates are all very high being based on high interest rates upwards of 8.5% that was the feature over much of the 2000s and 2010s. With these tolls being borne by the users, the monetary value of roads originally built with EPC, would now be high via the brownfield when long-term rates have fallen quite significantly and are expected to fall even further, in the wake of low expected rates internationally. The government also being a hurry to greatly expand the road network, but with an imposed commitment to hold on to a tight fiscal deficit target would therefore increasingly go for brownfield investments which would enhance its revenue. Therefore, continued growth of brownfield investments in this sector is likely.

7.12 Conclusion

The approaches to financing infrastructure must arise out of the regulatory and design framework for private sector involvement, and these, when they are derived from optimal approaches to overcoming the many market failures that are possible, do result in better outcomes and lower overall cost of financing.

Having a commercially oriented banking sector is vital to the flow of funds to the infrastructure sector and to the exercise of due diligence in funding projects.

The role of DFIs in crafting instruments and approaches for overcoming the large interest rate (change) risks is very important.

The cost of covering interest rate risks over the entire concession period from the date of financial closure has to be internalized, and PPP formats must incorporate this provision. It would help to reduce adverse selection.

Contracts and PPPs have to improve if there have to be larger numbers of "good" infrastructure projects into which private capital can flow. "Good" projects are not those through which rents can be sought, but those where profits are adequate and private capital does not bear risks that it is ill equipped to bear.

In networks like pipelines, casting private projects out of individual segments of the network means that the risk of load flow would be enhanced inviting take or pay contracts and hence larger cost and lower social value. The better approach would be to have a few network players who are subject to incentive regulation who

act as common carriers to competitive businesses in gas production, storage and consumption. The financing requirements for the network would then fall.

The scope for use of foreign capital in infrastructure is limited. With limited technological and real advantages, there can only be the seeming "advantage" of a positive Fischer open (deviation from uncovered parity being positive). But investments that happen only to take advantage of this "capital cost advantage" opens the door to major exchange risks when debt inflows are contemplated.

The Indian public sector banks need to be reformed, and the mess has gone far enough. Nothing short of disinvestment would now work. The government cannot be relied upon to keep away from its dysfunctional interference. Such interference necessarily enables the banks to displace accountability.

Ultimately, it is the weakness within the government (non-learning organizations, lack of a systems approach, little ability to coordinate across many government departments, mind space of decision makers being too busy with firefighting, procedures and the mundane, and person centricity) that results in enhancing risks and in failure. Correction of the same would require civil service and administrative reform on lines that are yet to emerge.

Meanwhile setting up of an independent expert organization to whet PPPs (on a voluntary basis), allowing senior civil servants to have recourse to "owners consultants" even before formal consultants come in, could significantly increase the prospects for "good" PPPs.

Brownfield investments have risen sharply in recent years, and India is a major destination for brownfield investments in infrastructure. Their high shares reflect a growing unease with greenfield investments on the part of the international investors and the large Fischer open differential leading to opportunities to "arbitrage" the same through the conduit of direct investments. The large volume is also reflective of the fact that the government in recent times is keen on monetizing its assets especially in roads and other infrastructure where it earns high tolls based on earlier very high interest rates. As returns to capital have fallen the government by selling the assets (essentially the tolls and maintenance operations) to the foreign party, can raise funds to increase the pace of new construction. The issue of high tolls of course remains. Since much of the return to brownfield investments is not dollar designated, the foreign party faces the risk of long-term impairment of earnings in case the rupee sharply depreciates.

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Chapter 8
Land for Development: Market Versus Non-market Mechanisms

Ram Singh

8.1 Introduction

The land is an important factor in production for economic activities in the industrial and services sectors. Therefore the demand for land increases with economic growth. Demand for infrastructure and other public goods also increases with economic growth. The building of roads, railways, ports, airports, schools, and hospitals all require land. Consequently, as the economy grows, the demand for property increases from the private as well as the public sectors.

However, the supply of land as a factor of production is not fixed. Its availability critically depends on land use regulation. Nonetheless, in many cases, the demand for land by the private and the public sectors has to be met by transferring land from agriculture to the industrial and services sectors.

Traditionally, there have been two main mechanisms to transfer land from one economic activity to some other use. The first is the 'market mechanism.' The second mechanism of land transfer is through use of the *Eminent Domain* by the government agencies.[1] World over, eminent domain laws empower the state and its agencies to acquire private property for a public purpose. These laws permit compulsory acquisition or what is popularly called condemnation of a property by the government if the owner refuses to sell the property voluntarily.

The actual use of these mechanisms can have very different implications for the property rights of the landowners. This especially is the case with most of the

[1]The power of the state to forcibly take over private property is known with different names in different countries. For e.g., eminent domain in the US, Philippines; land acquisition in India; compulsory purchase in UK, New Zealand; resumption in Hong Kong; expropriation in France, Italy, Mexico, etc.; etc.

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less-developed economies where legal and political institutions aimed at preserving property rights are still fragile, and as such, property rights are insecure. The insecurity of property rights over land comes at a hefty price. It can divert resources from productive to appropriative or protective use. Moreover, insecurity of property rights can seriously undermine the incentives for productivity-enhancing investment in the land.

In this paper, we discuss the merits and demerits of the market mechanism and land acquisition law for transferring land from current to developmental purposes. We show that both mechanisms suffer from serious shortcomings. We argue that the land pooling mechanism is a better alternative to the traditional mechanisms of land transfer. The land pooling is more efficient as well as equitable, especially in Indian settings. Drawing upon the national and international experiences with the land pooling schemes, we demonstrate how suitably designed land pooling mechanisms can protect property rights, induce voluntary participation in land transfer to and encourage productive investment.

In Sect. 8.2, we discuss two types of land transfer mechanisms, namely, eminent domain and market mechanism (voluntary exchange). In Sect. 8.3, we examine the Indian experience with eminent domain. We show that the use of the eminent domain for property transfers suffers from three pressing problems: one, the compensation to property owners is less than full compensation; two, there is excessive litigation over compensation; three, the project choices by the government agencies are generally inefficient. In several cases, the project choice is not only inefficient but also socially wasteful. In the past, the decision-makers have used the power guided by ulterior motives. In Sect. 8.4, we discuss some pressing questions while exploring the limitations of eminent domain. In Sect. 8.5, we discuss various forms of land pooling mechanisms and show how the land pooling mechanism is superior to the other mechanisms in terms of efficiency and equity. In Sect. 8.6, we conclude.

8.2 Land Transfer Mechanisms

8.2.1 Land Markets

Primarily, there are two types of land transfer mechanisms, namely, the market mechanism and the eminent domain. Under the market mechanism, a buyer can buy land from a willing seller. Presumably, a voluntary transaction will go through only if both parties gain from it. Assuming that market transactions are voluntary, it follows that land market transactions will benefit both the buyer and the seller leading to a Pareto superior outcome.

Market mechanism also implies security of property rights, since their land cannot be taken away without their consent expressed in the form of acceptable price by the

property rights holder.[2] The security of property rights is conducive to productivity-enhancing investment. There is a large empirical literature showing that the protection of property rights is crucial for productive investment. See for example Besley (1995), Goldstein and Udry (2008) and Gonzalez (2007).

In contrast, insecurity of property rights over land comes at a hefty price. It can divert resources from productive to appropriative or protective use. De Soto (2000) along with economic historians North (1981), and Mokyr (1990) have cited overwhelming evidence to show this. These studies show the impact of insecure land rights on investment and productivity. Johnson et al. (2002) demonstrates the impact of insecure property rights on the investment decisions taken by manufacturing firms. These works weave a common and persuasive narrative. That is, secure property rights incentivise productive investment thus facilitating the creation of wealth.

However, there are several problems with the market mechanism. The first problem with the market mechanism is that not all Pareto improving transactions take place. The land market is vulnerable to multiple failures. The first cause of market failure is the asymmetry of information between the owner and the buyer. While asymmetric information is a source of market failure for many goods and services, the problem is acute for the land market. Many factors determine the value of land in addition to its area—for example, its location, proximity to other infrastructural and public amenities, quality of underground water, its susceptibility to flooding, and salvation, among many others. Consequently, no two land parcels are identical, and the owner of a plot can successfully hide many aspects of the property from the potential buyers. In this scenario, many potentially Pareto improving transactions fall prey to the asymmetric information.

In fact, unlike in the case of other goods, the land markets are prone to failure even in the presence of complete information. In other words, even if the buyer has all the information about the land, the market mechanism precludes many socially desirable transactions. At the heart of this problem is what is called the hold-up problem.

The hold-up problem arises in cases where the buyer needs several parcels of contiguous land and land purchases to happen in sequence. That is, the buyer approaches the sellers in the course to buy the required land. In such real-world contexts, the hold-up problem exhibits itself as the landowners exercise the market power by being the last to sell their property.

When land parcels are purchased in sequence, this gives sellers the bargaining power which drives up prices and makes land acquisition through the market infeasible. This causes governments to resort to the aforementioned legal alternatives.

Due to the sequential nature of the land purchase, by the time the buyer approaches the owners of the last parcels, the buyer has had already sunk the cost of acquiring the preceding plots of land. In other words, the landowners who are the last to sell their land exploit the fact that when negotiating with them, the buyer has already sunk

[2] In this paper, we will use the terms 'owner' and 'right holder' interchangeably. However, it should be noted that property rights do not necessarily mean ownership of the land. For the purpose of this paper, property rights can be taken as a bundle of rights over usage and control of the property including entitlements on income flows from the land.

the cost of acquiring the other plots of land. This gives the late sellers bargaining power and drives up prices of their parcels. The result is that land purchases through the market become very costly. Consequently, projects suffer from delays and cost overruns (Singh 2011). Besides, less than socially optimal levels of transactions take place. This problem becomes more pronounced as the number of parcels or the number of property rights holders over the given set of parcels goes up. For example, if tenants and landowners both have property rights over a given set of parcels, the problem of holdout becomes acuter to that extent.

Notable and very much present friction in a typical Indian rural market setting is the hold-up by the property owners. Potential sellers hold up from voluntary transactions due to their urge to draw out a disproportionately larger share of the surplus from the buyer. This further restricts the incidence of transactions in the Indian land market. Consequently, drawing from the earlier discussion of the hold-up problem, transactions in the land market become costlier.

The high transaction costs due to poor land records are also responsible for dormant land markets, especially in rural areas.[3] Retrieving land records becomes excruciatingly difficult and involved when data is laid out across various departments and has also not been kept up to date. In the past, poor or non-existent land records have led to the diversion of resources from productive to appropriative uses. That is, poor or non-existent land records created a situation where resources have been used for grabbing the land of others and/or defending their own land from others. Thus, appropriation is a rival, and socially wasteful, utilization of scarce resources, which not only causes economic underdevelopment but can actually make the situation a negative-sum game.

It is the presence of unusual market frictions like poor land records, inactive land market culture, and others, which explain the rather resting nature of the Indian rural land market.

The hold-up problem and the high transaction costs are the main economic justification behind the compulsory land acquisition by the government. Most legal jurisdictions allow government agencies to forcefully acquire land for public purposes. This legal power is bestowed on the government agencies by the legal doctrine called Eminent Domain.

8.2.2 Compulsory Land Acquisition

World over, eminent domain laws empower the state and its agencies to acquire private property for a public purpose. These laws permit compulsory acquisition or what is popularly called condemnation of a property by the government if the owner refuses to sell the property voluntarily. At the same time, the compulsory acquisition laws entitle the owner to compensation for forgoing the property. The compensation is to be paid by the acquiring-agency/condemnor at the time of acquisition.

[3] See Singh (2012).

As far as the amount of compensation is concerned, in the law of eminent domain, a precise formula leading to the damage award by way of deduction such as the differential method is missing. Instead, one finds a large number of definitions, which are often vague and have to be substantiated by jurisdiction.

The UK Compulsory Purchase Code (2002): "*… the right [of the owner] to be put, so far as money can do it, in the same position as if his land had not been taken from him. In other words, he gains a money payment not less than the loss imposed on him in the public interest, but on the other hand no greater*." US Constitution. Fifth Amendment (1791): "*…nor shall private property be taken for public use, without just compensation."* German Constitution: *"Such compensation shall be determined by establishing an equitable balance between the public interest and the interests of those affected."* Art. 14 (3) French Law: "*sur les expropriations pour cause d'utiZit publique*" provides for Market Value. Republic of Korea: "*just compensation*" (Art. 23, 3)UN resolution on the "New International Economic Order": "*just compensation*" (see Singh, 2004 Schäfer & Singh, 2018).

In effect, most legal orders entitle the acquisition affected owners to the "market value" of their property or some multiple of it.[4] It should be noted that the market value is less than the full compensation—if the market value were higher, the owner would have already sold the property on the market.[5]

In particular, the market value compensation is less than the full compensation under the civil liability is taken as the norm. What is worth noting is that civil liability, however, is for a wrongful act and therefore demands full compensation. Eminent Domain taking, on the other hand, is a legal act of the state in the public interest. Unlike a civil-liability settlement intending to compensate for the repercussions of an unlawful, tortious act, a constitutional taking is lawful and in the interests of the public. This means that the affected citizens may have to make some contribution to the pursuance of the common good for which the taking decision was made. This rationale for less than full compensation under eminent domain explains how less than full compensation can be more suitable than full compensation for taking decisions under eminent domain.

Indian law has seen significant changes related to the amount of compensation. The old Land Acquisition Act of 1984 entitled the affected owners to the "market value" of their property, on the date of Sect. 8.4 notification. According to the LAAR 2013s compensation provision, compensation is two times the market value in urban areas. In rural areas, the compensation can be up to 4 times the market value. In addition, the law provides for additional compensation in consideration of the compulsory nature of the acquisition. In India, this extra compensation is known as the *solatium.*

[4] Also see Sect. 8.3 to learn more.

[5] On merits and demerits of full compensation see Singh 2003 and Schäfer & Singh, 2018)

8.3 Eminent Domain and the Indian Experience

Market value is a counterfactual amount, as the property taken by the government is not traded through the market. So, there is discretion enjoyed by the government officials while assessing the market value. The compensation is determined with reference to the market value of the land at the date of the publication of the acquisition order, taking into account the value of superstructures (if any).

Depending on the jurisdiction or the context, the owner of the condemned property may or may not be allowed to negotiate the compensation amount with the condemner. However, under all jurisdictions, the owner has the right to litigate the compensation amount, if not satisfied with the compensation offered by the condemner. In India, litigation over compensation is rampant and is a nation-wide phenomenon (see Singh, 2012, 2013).

8.3.1 Actual Compensation is Less Than Market Value

In its various judgments, the Supreme Court has directed that the market value of the acquired property should be determined on the basis of what is called "circle rates" or "sale deeds" of a similar property, whichever is higher. However, in practice, the Land Acquisition Collectors (LACs) award compensation based on the circle rates, which vary from locality to locality. The circle rate of an area is popularly known by different names, such as the registry rate or the stamp duty rate. It is the minimum rate decided by the government authorities for the valuation of land for determination of duty/tax imposed at the time of registration of sale-deed of a property. When a sale deed of a property is registered, the stamp duty is imposed on the value of the property, as mentioned in the deed or its value based on the circle rate, whichever is higher. Generally, the sale-deed rates are above or equal to the circle rate of the property. In practice, the state governments revise the circle rates once in several years. As a result, these rates are generally well below the market value of the property in the area in question. See Fig. 8.1.

Under the LAA, while determining compensation, both the Land Acquisition Collector (LAC) as well as the courts are required to follow the same set of guidelines. These guiding rules are provided in the LAAR Act itself. However, the analysis undertaken has shown that there is a consistent difference between LAC provided compensation and court awards.

8.3.2 Excessive Litigation

While the Indian judiciary has not attempted to second guess the executive decisions regarding the acquisition of land, the courts have been lenient towards property

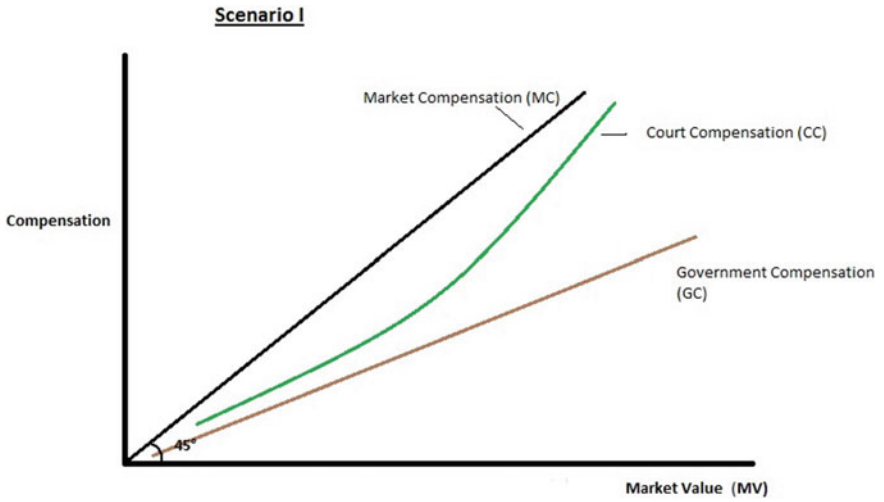

Fig. 8.1 Market value versus government compensation and judicial awards

owners on the question of compensation. The average court-awarded compensation is greater than the government awards. Consequently, many owners choose to litigate overcompensation.

Moreover, for any given property, the High Court (HC) award is different from the award of the Additional District Judge (ADJ). Given that the same set of guidelines is to be followed by the LAC, ADJ, and as well as the HC, the observed difference in awards is intriguing, which also results in excessive litigation. The relatively more financially well-off section of property owners benefits more from the litigation. The data presented below are drawn from Singh (2013), which is a project research report on this subject.

We use Tables 8.1, 8.2, and 8.3 to show and discuss the striking contrast in compensation rate between the compensation decided by LAC and the award determined by the ADJ court; the ADJ and HC awards; and the LAC-determined settlement and the HC award.

Table 8.1 shows the percentage increase in compensation by ADJ over that of LAC. In 2010, on average, the gap between the LAC awarded compensation, and the ADJ award was higher by more than 184 percentage points. In 2011, this difference

Table 8.1 Percentage increase in the compensation by ADJ over LAC

Cases adjudicated in 2010		Cases adjudicated in 2011	
Number of cases = 881		Number of cases = 523	
Mean	184.46	Mean	205.10
Standard deviation	399.58	Standard deviation	279.66
Min	0.00	Min	0.00
Max	8370.00	Max	2493.09

between the two further increased by 205.10 points. This stark on an average rise in the difference between the LAC compensation and the ADJ award in both years, 2010 and 2011, can explain the incentive to choose litigation over compensation for property owners.

On another note, the standard deviation, a measure expressing the degree of variation between the compensation rate provided by the LAC and the ADJ court award, is measured at 399.58 and 279.66 in 2010 and 2011, respectively. The high standard deviations in both years, 2010 and 2011, point to the significantly huge variation in the compensation and reward determined by the ADJ courts.

Table 8.2 shows that the average compensation provided by HC is higher than the ADJ awards. However, appealing before the HC against the ADJ court award is not a risk-free decision for the property owners. The HC may increase the compensation beyond the ADJ award, but it can also reduce the compensation below the ADJ provided compensation. Nonetheless, the HC provided compensation cannot be less than the LAC award.

Table 8.3, too, shows that the compensation awarded by courts through litigation is on average, significantly higher than that determined by LAC. According to Table 8.3, the percentage increase in compensation by HC over LAC was a whopping 265.6047 in 2010 and 363.0225 in 2011. In 2011, however, the standard deviation was measured at 1657.334—a seemingly enormous number. This could be explained by a possible outlier that is observable with a look at the maximum increase (36,810.26) in compensation of 2011.

To sum up, in the final analysis the litigation for compensation does not have a downside for the property owners. Unsurprisingly, all of the property owners under the study had opted for litigation by seeking a reference to the ADJ court. Our data provides both evidence of a strikingly substantial increase in the compensations by

Table 8.2 Percentage increase in the compensation by HC over ADJ

Cases adjudicated in 2010		Cases adjudicated in 2011	
Number of cases = 1085		Number of cases = 523	
Mean	32.54577	Mean	48.25835
Standard deviation	98.82402	Standard deviation	278.4299
Min	−40	Min	−48.1618
Max	1188.75	Max	5205.85

Table 8.3 Percentage increase in the compensation by HC over LAC

Cases adjudicated in 2010		Cases adjudicated in 2011	
Number of cases = 862		Number of cases = 517	
Mean	265.6047	Mean	363.0225
Standard deviation	442.4263	Standard deviation	1657.334
Min	0	Min	0
Max	8370	Max	36,810.26

courts over LAC and the consequent incentive for property owners to choose litigation over compensation.

Moreover, litigation favours the rich property owners over the relatively poor. The poor cannot afford to go all the way to the HC to get their due. Table 8.2 shows that the average compensation provided by HC is higher than the ADJ awards. However, appealing before the HC against the ADJ court award is not a risk-free decision for the property owners. Only the relatively rich property owners have resorted to litigation beyond the ADJ courts. Moreover, the rich own a relatively high-value property. The market is more active in high-value properties, especially the ones located near highways and urban areas, so it is easy to get comparable sales deeds for these properties. This, in turn, means that the rich get a bigger bang from the buck while investing in litigation efforts.

8.3.3 Excessive Acquisition

The Indian judiciary has been reluctant to second guess the executive decisions regarding the acquisition of land. This reluctance has made it easier for politically preferred but socially undesirable projects to get implemented. This indeed was the case under the old Land Acquisition Act, 1894.

The majority of the official land has been procured from everyday citizens in the wake of paying next to no remuneration. This endowment has both boosted and promoted both—the administration offices, and much of the time privately owned businesses—to gather huge supplies of unused land. For example, a report by the CAG on Special Economic Zones shows that as much as 31,886 ha, or 53% of the absolute land gained by the administration for these zones, stays unused—land which would otherwise have been put to more beneficial use by its unique proprietors. The states have famously obtained land for organizations' exercises, which can't even marginally be viewed as identified with any social government assistance reason. Some of such occurrences include getting land for setting up shoe-fabricating production lines, climate control system blower plants, lodgings, and pools. See Singh (2012) for a detailed account of misuse by the state and central government department of the eminent domain power.

Since the land is much cheaper when acquired under eminent domain, compared to its cost if purchased through market transactions. So, the private players and government departments might be tempted to over-acquire. This over-acquiring of land leads to land hoarding, discussed in the previous section. At the same time, it has not helped in reducing the problem of project delays (See Singh, 2011).

The area of land lying vacant with the Ministries of Railways and Defence, respectively, stands at 43,000 ha and 32,780 ha. This land is lying vacant without even any proposed use! Moreover, the 13 primary port trusts have 14,728 ha of land lying idle. (CAG report).

Though deeply startling, these numbers only show a flash of the epidemic of land hoarding. Not only do they factor out various departments of the Centre, but also,

and more notably, do not include the undue landholding by the States. What makes this whole scenario more miserable is that an enormous part of the area of unused land is the high-value property lying in top-tier regions in major cities.

Furthermore, this land hoarding has managed to create a phony shortage of land in various areas. This phony undersupply of land is one of the critical drivers triggering skyrocketing urban real estate prices. Inflated land prices lower competition as it increases the cost of commercial and development projects.

According to the Government Land Information System (GLIS), central ministries own about 20,00,000 ha of land. What is problematic is that a large proportion of government land lies unused. For instance, Ministries of Railways and Defence, Civil Aviation have lakhs of hectares of land lying vacant. The Indian Railways own the tag of the most prominent landowner in the country. According to CAG reports, the 13 primary port trusts have 14,728 ha of land lying idle. Moreover, changes in land-use post-acquisition are frequent. In response to an RTI filed by an India Today respondent, the Indian Railways said that it owned approximately 4.77 lakh hectare of land as of March 3, 2018.

As a result of the large sections of governments' land lying unused, the unlawful land infringement or land grabbing has gained momentum over the years. Individuals and groups not only encroach governments' land but also take part in illicit exchanges of the administrative land. According to the revenue department in the Odisha government, by June 2018, over 45,000 acres land has already been encroached either by groups or by individuals. The experience in other states is not very different.

8.4 The Inherent Vulnerability of Eminent Domain

The above discussion begs the following questions. Can higher compensation reduce litigation for compensation?; Can full compensation ensure that takings are in the public interest?; Can less than full compensation be justified on the grounds of efficiency?; Can Judicial Review of government decisions improve the use of land acquisition laws?

Can Higher Compensation Reduce Litigation? No, people will litigate as long as they gain from litigation. The key to reducing litigation is to remove the divergence between government awards and judicial orders. An exploratory inspection of various court judgments across the country insinuates the prevalence of court awards being higher than the LAC awards. In a few cases, the variation between the LAC award and the judiciary-awarded compensation is stunning. Hence, an increase in compensation by LAC may simply not be enough of an incentive to induce property owners not to choose litigation over compensation.

Consider an agricultural land of area 100 m^2. The circle-rate is, say, Rs. 1000/m^2. But there is a sale-deed of rate Rs. 1300/m^2. Under the old law, where the multiplier was 1.3, this meant the gains from litigation would be Rs. 39,000. This compensation translates into Rs. 300/m^2 times the area from litigation. Under the 2014 law, the multiplier and thus the compensation from litigation over compensation is even

higher. The compensation from litigation over compensation is four times higher than before. This means that the gains from litigation in the previous example, under the new law, would be Rs. 1,20,000! Property owners now have an even stronger incentive to litigate.

Can higher compensation improve the quality of taking decisions? No, preferences of the decision-makers – politicians and policymakers—are different from what is in the best interest of society. Contrary to popular belief, governments or politicians do not necessarily work towards maximizing the social welfare function. Governments, mostly run by politicians, are additionally driven by a different set of objectives, like gaining vote shares than solely focusing on social welfare. Empirical literature shows political considerations guide governments when it comes to using eminent domain for using private property. Many times, marginal communities are vulnerable to the government's target (see Levine-Schnur, 2017 for Israel and Palestine; Somin, 2015, Garnett, 2006, Boudreaux, 2005, for the USA; Singh, 2012 and 2013 for India).

Mandatory higher compensation can be seen as tightening the budget constraint of the government. Given current income, they are now required to pay higher compensation to property owners for any piece of land they say they need to acquire for *social welfare purposes.* We can show that, contrary to the popular view in the relevant literature, this tightening of government's budget constraint and the implicit assumption that their preferences diverge from what may be in the best interests of society can lead to more inefficient decisions. (Schäfer & Singh, 2018) The government decision is not solely guided by the associated costs. See Cohen (1990), Garnett (2006), Brennan and Boyd (2006), Levinson (2000), Fischel (2015). State Liability literature also corroborates this.

> Government does not internalize costs in the same way as a private firm. Government actors respond to political incentives; not financial ones-to votes; not dollars. Levinson (2000)
>
> We might better direct our efforts to design effective "political" markets instead of attempting to use economic signals to influence state and bureaucratic action. Cohen (1990)

For example, consider a city with three neighborhoods. Let us say that the government is considering these three projects to be implemented in the city: public park, access road, and golf course. Moreover, suppose the government can choose to implement any of the three projects at any one of the three locations. Suppose that for the city, the social ranking of projects is a public park, access road, a golf course, in descending order. In contrast, the government prefers a golf course over an access road and the access road over a public park. See Fig. 8.2.

Let us assume that the government can only implement any one of the three projects. In this case, even if they were *required* to pay full or higher compensation of the land acquired—they might move forward with implementing the project choice that they prefer the most, which in this case is the golf course. The financial illusion can explain this phenomenon the government may experience; in essence, they might perceive takings to be costless with a potential gain of voters. That means, without any additional political and other friction to induce them to choose a more efficient project, they are most probably going to go with the least preferred project by the city—a golf course.

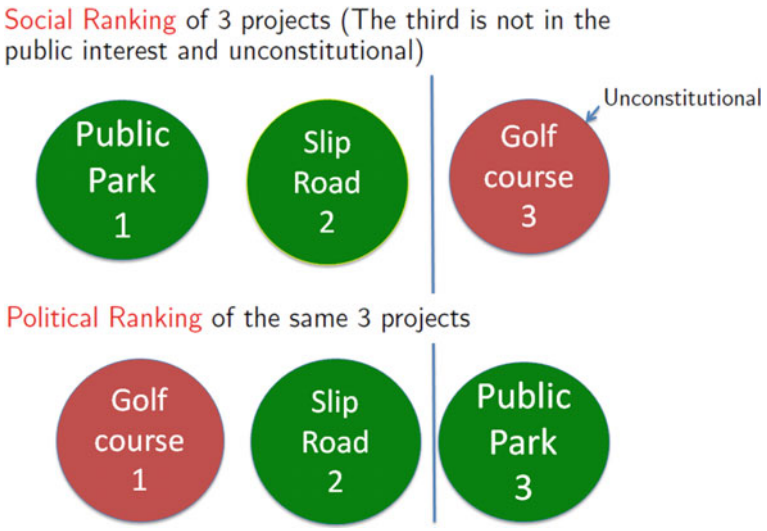

Fig. 8.2 Social versus political ranking of projects

Consider another case where the government can now implement two projects in the city. Even in this case, the government is going to go with the least two preferred projects by society.

The above discussion shows how the divergence in the preferences of the government and that of the society, may lead to scenarios where the choice of projects implemented is inefficient. This divergence in preferences, paired with the financial illusion that the government experiences concerning the associated cost of takings, explains how a higher compensation does not lead to more efficient taking decisions.

8.4.1 Can the Provision of Judicial Review Help?

Eminent Domain Law, including LAAR 2014 of India, requires a clear definition of *public purpose* in the constitutional law and the relevant cost and benefit analysis (SIA) of the project by the authorities. These provisions enable courts to check whether infringement of a right is 'proportional' to the project' benefits, or if the acquired land is actually the mildest infringement of property for the realization of the project. In several countries, courts still check whether a project is 'necessary' in view of the totality of social benefits as well as the related costs.

Under full compensation, the outcome cannot be efficient even with the provision of the judicial review. The kinds of projects taken up will be politically preferred but socially inefficient. In addition, investment choices will also be inefficient.

However, suppose less-than-full compensation is incorporated with the provision of restitution. In that case, the outcome is a cut above that under full compensation

on the subsequent three measures; namely, levels of productive investments by the property owners, use of the eminent domain power, and choice of project conditional on the use of eminent domain power. Using a formal model, Schäfer and Singh (2018) prove the following: "investment levels are more efficient, a taking happens only if it contributes to social welfare, and the choice of the project by the government is also better."

If these conditions are met, then investment choices are relatively efficient; all takings result in improved social welfare; the 'First Best' result cannot be achieved.

However, the judicial review needs to be credible to deliver the above outcomes. When the judicial review of the takings decisions cannot be guaranteed, the desired outcome cannot be achieved. In fact, less than full compensation without judicial review can only make things worse. As the land under eminent domain comes in cheap, the private players and government departments might get tempted to over acquire leading to land hoarding, as was discussed in the previous section.

8.5 Land Pooling Mechanism

Given the above-discussed problems with the Eminent Domain and the market mechanism, land pooling (or land readjustment (LR)) schemes emerge as a better alternative. The actual origin of the land pooling schemes is considered to be in Germany, where it was practiced in the late nineteenth century. The country has a well-established method for implementation and it has developed thousands of hectares of land through land pooling techniques since the 1980s (see Viitanen, 2002, p. 10). The land pooling schemes have drawn the attention of many Asian nations as they are more positive in approach and beneficial to the landowners.

Land pooling involves the legal consolidation of land parcels owned by individuals or groups of individuals by transfer of ownership rights to the land pooling agency. The agency later transfers parts of the land back to the owners, after undertaking the development activities. Development activities are projects of public purpose like schools, hospitals, roads, open spaces, and alike which fulfill the needs of the community while safeguarding natural resources.

The Land Pooling Scheme, by definition, is conducive enough to incorporate local participation and hence better in dealing with the objections raised by landowners with respect to compensation and land use under Eminent Domain.

Land Pooling can be cheaper than acquisition because there is an option of self-financing of a project via the increased value of land in the future, so it may not necessitate a monetary compensation at the time of initiation of the project if the participants are willing. Japan shifted to this model because of the increased frequency of run-ins with the hold-out problem, and increasing property prices. He also highlights that this policy might work only when the scale of projects is not large. A negative externality is that this does not necessarily address the problem of land inequality by making the redeveloped land with increased prices even more inaccessible to the poor.

The above benefits are borne out by the international experiences of the adoption of the land pooling schemes in various parts of the world. Land readjustment schemes have been adopted by a number of countries, the outcomes vary in all of them, with each facing a different set of problems.

8.5.1 International Experience

Experience in the Netherlands shows that the success of land-pooling is contingent on the strength of public institutions involved in the process (Needham, 2007). The citizens should have trust in the developing authority, which is pivotal in getting consent. The Netherlands example throws up a few caveats as well—While land-pooling is pitched as a self-financing mode of land acquisition, the Government needs capital while developing the project; therefore, it is important that the authority is financially solvent. In addition, the success of the land-pooling model was dependent on the economic factors in the country, as the increase in the value of the property is correlated with the economic climate.

In Kathmandu Valley, Nepal, the successful conversion of failed sites and services projects into successful land pooling schemes proves that the land pooling technique can be useful in addressing most of the deficiencies of sites and services. Due to the landowners' opposition, these projects were deadlocked for many years. Later, an agreement was reached to convert them into land pooling projects, and today, they have been completed. Despite the successful execution of many projects in the Valley, its demonstration effect is not as overwhelming as it should have been. The project highlights the downsides of the schemes. It shows that the land pooling projects can serve only the landowners of the project area. They do not ensure the access of plots to low- and middle-income families who do not own any piece of land in the city and are desperately looking for a plot. Landowners who already have houses outside the project area or who own housing plots in the project area might withhold their plots for speculative and strategic purposes in order to gain a higher value in the future. As a result, building development in the project influenced areas can be slow and plots can lie idle for many years (see Karki, 2004).

Hong Kong's experience presents an interesting case of vertical application of land pooling. With rising population density and vertical development of towns and cities, it is important to also look at vertical integration of property for development purposes. In this case, the connection with price fluctuations in the real estate market is important to predict the changes in the valuation of the property. Since this particularly applied to the housing market, developers in Hong Kong also had to provide extra monetary compensation to those owners who were unwilling to part with their homes, due to lack of alternative housing. This is bound to raise the costs associated with the projects and must be kept in mind while evaluating the benefits and costs.

According to the Land Use Planning report (Metternicht, 2017) by United Nations Convention to Combat Desertification (UNCCD), land use planning is defined as the systematic assessment of land and water potential, alternatives for land use, and

economic and social conditions in order to select and adopt the best land-use options. Its purpose is to select and put into practice those land uses that will best meet the needs of the people while safeguarding resources for the future.

Foresight Land Use Futures Project report (Newberry et al., 2010), the Government Office for Science, London, discusses climate change, demographic shifts, and changing societal preferences and attitudes as significant challenges on the alternative use of land for future use. Many development projects across the world have started recognizing the potential benefits of considering diverse areas such as ecosystem services, mitigating climate change, and well-being. However, rolling out new land policies to balance these competing pressures and demands is a significant challenge for the coming century.

The difficulties of implementing land use plans in settled areas stem from conflicts of interest within local communities, between government and local people, and, not least, the failure of professional planners and administrators to comprehend and respect these different goals. There have also been difficulties in getting several agencies to work together and, often, a lack of technical solutions to land use problems that are practicable, profitable, and easily-incorporated into existing systems.

However, there have been continuous efforts from time to time by different organizations and individuals all over the world to find out the best possible ways, guidelines, mathematical tools for land use planning by defining goals, identifying opportunities and constraints, integrating diverse strands of physical, socio-economic and environmental information to devise a range of land use options and to choose between them.

Due to the mechanisms designed by economists and technological advances, project developers are well equipped with professional expertise and of resources for both planning and implementation. Therefore, land use planning procedures have become sophisticated over time. Different methods and procedures have been adopted in different land-use planning depending on availability, accessibility, and affordability of the information and expertise.

Consider for instance the LUPLAN package, developed in Australia, is one such mathematical model that can hold individual characteristics of each planning area/mapping unit, provide attractiveness ratings for each potential land use, determine the most attractive land use for each mapping unit, and allocate land use on this basis. The output is in the form of percentages which express the extent to which individual land use plans achieve a given policy. Results can be reviewed, and weights assigned to different characteristics may be changed. Further runs of LUPLAN can be made until broadly acceptable results are achieved.

Another approach developed by the Canadian group of the University of Guelph and Agriculture Canada also starts with land mapping units and sets of policy objectives or land-use scenarios. Objectives are quantitatively specified as production targets. Scenarios define supply-side conditions, such as land availability, quality, and productivity. The relationships between production potential and needs can be expressed in terms of resource use feasibility, flexibility, and sensitivity. This procedure could also be used to assess the possible impact of soil erosion, acid rain, land drainage, and climatic change.

However, two continuing problems of local-level land planning have been witnessed in many contexts. Firstly, there has been an acute shortage of both professional expertise and of resources for both planning and implementation. Secondly, there has been a growing awareness of the need for people's participation in planning. (Dent & Goonewardene, 1993).

8.5.2 The Indian Experience

As discussed in the previous section, issues exist with land acquisition in India, which goes from pay to restoration and resettlement for people affected. An enormous part of India's population relies upon agriculture for livelihood. Therefore, resistance to giving up agricultural land can be understood. Additionally, states are regularly incapable to fund suitable compensation for land acquisition. Alongside these issues, various pending cases identifying with land disputes in the legal framework make land pooling a suitable alternative.

The idea was presented in India in 1915 as a Town Planning Scheme under the Bombay Town Planning Act in Maharashtra. It has been predominantly used in the state of Gujarat, Andhra Pradesh, Delhi, and Kerala. In recent years, Gujarat used land pooling to acquire land to build a 76-km long ring road in Ahmedabad and develop the Dholera Special Investment Region. Similarly, Andhra Pradesh has amassed land for the development of its new capital city of Amaravati. In 2018, the Delhi government approved land pooling to provide 17 lakh homes to a population of around 76 lakh residents in areas that have been earmarked by the Delhi Development Authority. But the policy implementation has not been immune to criticisms. Land pooling, although increases the value of land, raises questions on the social and environmental front. The scheme was criticised in Amravati because fertile land was also pooled and the state relied on law enforcement to curb resistance against the scheme. Delhi's policy does not address air and water quality issues.

In the absence of a national-level enabling legal environment, the use of LR in India varies from state to state. The town planning scheme implemented in Gujarat gives us three major insights (Mathur, 2013). First, the local governments in Gujarat reap substantial financial benefits from the sale of reserved land. They retain the reserved land for a considerable period of time, allowing them to benefit significantly from the increases in land prices. The ability to retain land is primarily a result of local governments not requiring land sale revenues to bear the up-front scheme costs. Second, Gujarat's LR process is largely equitable for landowners. Furthermore, the net demand does not need to be paid until the landowner is ready to realize the increased value of her land by applying for a land-use change or a building permit. Therefore, such designing of contracts enabled the Gujarat government to successfully undertake land readjustment and subsequently smooth project development.

8.6 Concluding Remarks

In this paper, we have discussed the merits and demerits of three mechanisms for land transfers for developmental activities. We have argued that both, eminent domain as well as the market mechanism, suffer from serious shortcomings. In contrast, the land pooling mechanism is a better alternative to the traditional mechanism of land transfer. We argue that land pooling is more efficient as well as equitable, especially in Indian settings. Due to the minimum displacement of land-owners and increased value of the returned land due to development activities, generally, there is less or no opposition by landowners. Moreover, this policy is self-financing since for development activities to begin, landowners have to pay upfront fees to the agency. This scheme is also inclusive in the sense that it provides transferable development rights to the landowners on the returned land.

However, for successful pooling of land, it is necessary that an adequate proportion of landowners voluntarily participate in this scheme. Therefore, it is necessary for the agency to mechanize contracts that involve voluntary participation by a sufficient number of landowners.

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Part IV
International Trade

Chapter 9
Looking at India's Engineering Exports: Stuck in the Middle of the Value Chain

Parthapratim Pal and S. S. Swathysree

9.1 Introduction: Overview of India's Engineering Goods Sector

Engineering goods sector is the largest segment of India's manufacturing sector and accounts for 3% of India's GDP. This sector forms the core of manufacturing, infrastructure and capital goods industries and hence considered as the crucial backbone of Indian economy. The engineering goods sector has strong backward and forward linkages with the major sectors of the economy, including sectors of strategic importance like aerospace, information technology, telecommunications, electronics, defence, renewable energy and nuclear energy. India's engineering sector is characterized by a strong presence of micro, small and medium enterprises (MSMEs), and it is a significant source of employment generation for the skilled and semi-skilled workforce of the economy. This sector employs approximately four million skilled and semi-skilled workers. Thus, the growth and job creation potential of this sector can facilitate India's structural transformation where surplus labour can be drawn out of agriculture and employed in a modern sector with higher productivity. It is expected that the direct and indirect contributions of engineering sector will become even more critical for the country in the years to come with the new initiatives of Indian government like "Make in India" and Atmanirbhar Bharat" focusing on the development of domestic manufacturing capabilities,

India's engineering sector is quite diverse in terms of capital, labour and technology. The diverse engineering sector can be broadly classified into two sectors: heavy engineering and light engineering. Heavy engineering sector with an approximate share of 80% in the sectoral output is the dominant subsector in the engineering goods sector. Heavy engineering sector includes transport equipment, capital goods

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and other machinery and light engineering sector comprises of low-technology products like casting, forging and highly sophisticated products like microprocessor-based process control equipment and diagnostic medical instruments.

Engineering exports constitutes around 25% of India's total merchandise exports. The share of the MSME sector in India's engineering exports is around 35–40%. India's total engineering exports in FY 2018–2019 was USD 81 billion and the compound annual growth of exports is around 7.6% during the last ten years. According to Engineering Exports Promotion Council of India (EEPC), the engineering sector is the largest net foreign exchange earner with respect to merchandise good. Over 35% of India's engineering exports go to developed countries, but the share of developing countries is also growing. The major engineering exports of India are iron and steel, motor vehicles/cars, electrical machinery and equipment, industrial machinery, auto components and parts, aluminium products, ships and boats.

Though the engineering sector is the largest net foreign exchange earner, the lack of competitiveness has been hurting the sector both in domestic and global markets. The strategy paper (Deloitte, 2019) has pointed out that only about 6% of India's engineering exports are high technology products. India's engineering sector has seen a surge in imports in recent years, and domestic players have lost market share both in domestic and global markets. Moreover, India's exports of engineering goods have become more import-dependent over the years. The share of engineering imports in India's total merchandise imports is approximately 20% and out of this China's share is 9%. Engineering goods constitute 63% of Indian imports from China. India has also seen a rise in import of intermediate goods from other Asian countries, particularly from China.

The increasing import dependence is the reflection of the underdevelopment of domestic technological capabilities. India's comparative advantage in this sector has traditionally come from its labour cost advantage; hence, the most of the production and exports are pegged towards the labour-intensive end of the value chain. Apart from some large players at the forefront of technology producing cutting-edge engineering goods, India's engineering sector is dominated by MSMEs who focus on low-value adding activities. Though these labour-intensive enterprises are critical for employment generation, their value addition and growth prospects are not very high. These firms lack advantages of economies of scale and access to resources required for capacity and technology upgradation. These challenges prevent them from investing in R&D, moving up in the value chain and competing successfully with large international players in global export markets. The technological backwardness of these firms is a significant cause for concern for India's engineering sector, particularly, in this Fourth Industrial Revolution Era. The digital transformation and automation of production processes pose a severe challenge to India's traditional comparative advantage in this sector. Thus, the government needs to take concerted policy measures to ensure them access to capital and channel investments for technology acquisition.

Though the government has raised import protection over the last few years, paradoxically these increase in tariff and non-tariff barriers have not been favourable

for the engineering goods sector as a whole. For instance, the government has recently imposed anti-dumping duty on steel imports from China, Vietnam and South Korea for five years as part of import restrictions. However, the consequent increase in domestic steel prices has left the engineering producers non-competitive in international markets. Thus, rather than generating a favourable condition for the domestic engineering sector, the rise in steel prices in the backdrop of imposition of anti-dumping duty has only benefitted large players in the steel industry.

One of the significant and long-standing issues faced by producers and exporters of engineering sector is the inverted duty structure, i.e. import duty on final products is lower than import duty on raw materials. Inverted duty structure is unfair to domestic manufacturers who are dependent on imported raw materials. For instance, reactors and plant machinery can be imported duty-free through free trade agreements, while key inputs face import duty in the range of 10–15%. Inverted duty structure also hinders domestic value addition. Indian government's Atmanirbhar Bharat Abhiyan initiative aims to develop a self-reliant manufacturing base, reduce import dependence and increase domestic value addition. However, there is a valid concern that instead of creating a level playing field, this initiative will lead to protection of intermediate goods and invert the duty structure further.

A promising opportunity for India's engineering sector in the aftermath of COVID-19 pandemic is the search of global manufacturers for an alternative supply base independent of China. The pandemic induced disruptions in the supply chain has drawn attention to the perils of overdependence on one country as a manufacturing base. Thus, global manufacturers are focusing initially for a China Plus one solution, i.e. while maintaining the supply base at China, they are looking for other destinations to try and test low-risk but high return activities. India can take advantage of this situation as India has skilled English speaking cheap labour force and a large and growing domestic market to offer. However, there is a concern that India may not be able to attract the firms looking to diversify given its low participation in global value chains and higher logistic costs compared to competing Asian counterparts like Vietnam, Bangladesh and Philippines. To emerge as an alternative reliable and competitive manufacturing supplier base, India needs to focus on increasing the scale of production, logistics and infrastructure, meeting international quality standards, skill upgradation, innovation and R&D, technology upgradation, domestic capability building and regulatory stability.

This paper looks at the changing pattern of exports of India's engineering goods sector and tries to identify subsectors and products with most export potential from this sector. This paper is organized in the following manner: Sect. 9.2 presents the annual trends in trade in engineering goods in India; Sect. 9.3 discusses the export competitiveness of India in engineering goods at HS 2-digit level. Section 9.4 analyses Indian engineering exports at a more disaggregated HS 4-digit level.

9.2 Annual Trends in Trade in Engineering Goods

Engineering exports and imports from India have shown an increasing but uneven trend over the last ten years. Engineering exports increased from 40.57 billion USD in 2008–2009 to reach a peak of around 81 billion USD in 2018–2019. However, in 2019–2020, it registered a 6.25% decline to reach 75.9 billion USD. Imports of engineering goods during this period has been consistently higher than the engineering goods exports. The annual trade numbers are shown in Fig. 9.1.

Table 9.1 presents the share of engineering exports and imports of India in its gross merchandise trade as well as in the total non-oil and petroleum exports and imports. The share of engineering goods exports in India's overall merchandise exports has risen steadily over the years. It reached a peak of 25.10% in 2017–2018 before declining to 24.54. Similarly, the share of engineering exports in non-oil and petroleum exports was at its peak in 2017–2018. Imports of engineering goods

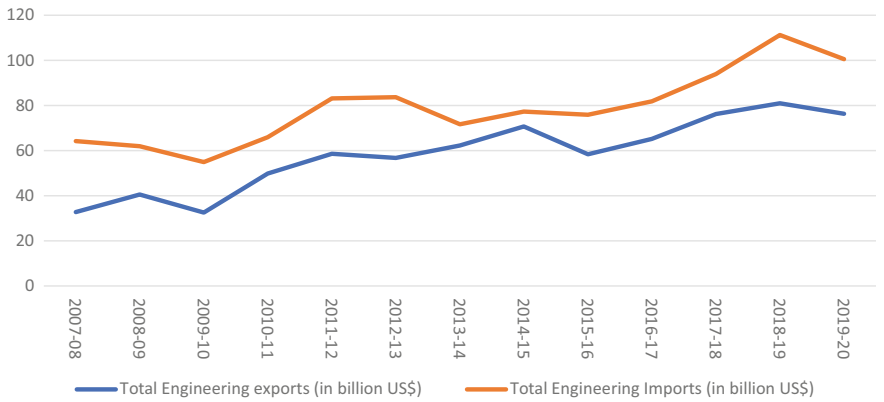

Fig. 9.1 India's engineering trade balance (in billion USD). *Source* Analysis of Engineering Exports and Imports, EEPC, various issues (Available at: https://www.eepcindia.org/publication/78/Engineering-Exports-Analysis)

Table 9.1 Share of engineering exports and imports in India's total exports and imports

	2014–2015	2015–2016	2016–2017	2017–2018	2018–2019
Engineering exports as a % of total exports	22.78	22.27	23.64	25.10	24.54
Engineering exports as a % of total non-oil exports	27.88	25.20	26.69	28.64	28.57
Engineering imports as a % of total imports	17.25	19.92	21.28	20.17	20.27
Engineering imports as a % of total non-oil imports	24.96	25.46	27.51	26.31	27.93

Source RBI Database on Indian Economy

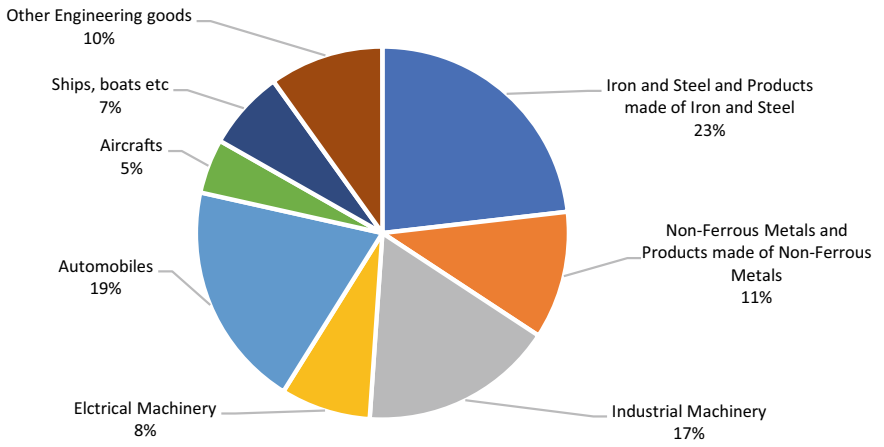

Fig. 9.2 Breakup of India's engineering exports (Average of 2011–2012 to 2019–2020). *Source* EEPC (see Fig. 9.1 for details)

as a percentage of total non-oil and petroleum import basket of India has registered a rising trend.

EEPC provides breakup of engineering exports in eight broad categories or panels. This breakup follows the HS chapters. The broad categories are iron and steel and products made of iron and steel, non-ferrous metals and products made of non-ferrous metals, industrial machinery, electrical machinery, automobiles, aircraft, ships, boats and other Engineering goods. The export data based on this breakup are available from 2011 to 12. Table 9.11 in the Annexure shows detailed data. A summary of this data is presented in Fig. 9.2.

Figure 9.2 shows that 'iron and steel and products made of iron and steel' is India's top export item in the engineering Sector. For the period 2011–2012 to 2019–2020, this panel account for around 23% of total engineering exports. The exports of 'non-ferrous metals and products made of non-ferrous metals' made up for another 11%. Overall, around 34% of India's engineering exports are made up of metals and products made of metals. 'Automobiles and automobile ancillaries' is a major source of exports and contributes to around 19–20% of total engineering exports. Electrical and industrial machinery together account for nearly 24% of engineering exports from India. As Table 9.2 shows 'electrical machinery' has exhibited the highest annual average growth rate among the different categories of engineering goods. The export growth rate of automobiles is also on the higher side.

India has seen a growing dependence of China for a range of raw materials, intermediate goods and capital goods. Table 9.3 depicts the rise and dominance of China in India's imports of intermediate goods and capital goods. The importance of China has grown since it joined WTO in 2001. Imports from China of intermediates like APIs, basic chemicals, and agro-intermediates, auto and electronic components and accessories, consumer durables, and capital goods have sharply risen over the years. A recent news report points out that 20% of the auto components and 70%

Table 9.2 Annual growth rate of the exports of engineering panels (in %)

	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017	2017–2018	2018–2019	2019–2020	AAGR
Iron and steel and products made of iron and steel	1.05	3.00	1.78	−28.15	24.81	23.51	−5.48	−4.27	2.03
Non-ferrous metals and products made of non-ferrous metals	1.14	6.73	33.48	−19.14	6.45	39.36	−17.24	−9.54	5.16
Industrial machinery	5.11	6.47	15.03	−6.14	1.50	15.91	15.50	−6.79	5.82
Electrical machinery	2.07	7.56	6.35	−3.54	23.94	41.34	25.56	6.46	13.72
Automobiles	13.26	5.10	11.88	−2.16	5.43	17.13	4.67	−7.28	6.00
Aircrafts	0.97	132.84	15.15	−39.41	−9.38	−33.02	−24.27	−16.80	3.26
Ships, boats, etc.	−52.68	−6.25	49.36	−42.01	40.78	−29.63	85.34	−19.93	3.12
Other engineering goods	6.29	7.26	7.05	0.04	7.19	16.54	13.24	−0.97	7.08
Total	−3.19	9.68	13.67	−16.94	10.99	16.81	6.23	−5.78	3.93

Source EEPC (see Fig. 9.1 for details)

Table 9.3 Imports of India-Capital goods and intermediate goods (in million USD)

	Imports of capital goods by India			Imports of intermediate goods by India		
Year	World	China	Share of China (%)	World	China	Share of China (%)
2001	8132.14	407.43	5.01	15,970.42	856.64	5.36
2005	28,395.19	4254.79	14.98	43,550.63	4045.68	9.29
2010	63,216.66	19,140.12	30.28	124,778.36	13,579.74	10.88
2011	75,454.31	24,033.04	31.85	160,256.26	18,690.61	11.66
2012	77,658.06	23,682.70	30.50	147,187.40	17,841.22	12.12
2013	74,208.10	24,449.09	32.95	133,434.97	17,262.39	12.94
2014	73,503.79	26,721.59	36.35	132,524.57	21,703.61	16.38
2015	79,384.60	30,539.17	38.47	134,469.02	20,947.58	15.58
2016	81,025.54	33,254.91	41.04	114,650.21	17,358.68	15.14
2017	94,409.28	40,588.15	42.99	146,645.09	19,732.56	13.46
2018	131,662.63	46,616.56	35.41	189,672.87	29,230.00	15.41

Source World Bank WITS database

of electronic components, 45% of consumer durables, 70% of APIs and 40% of leather goods are imported from China. A look at India's import composition of capital goods and intermediate goods for the year 2018 from the World Bank WITS database shows that China is the largest source of India's capital goods imports with a share of 35.4% in India's total imports of capital goods. Germany and USA are in the second and third positions, respectively, with 7.6 and 6.9% shares. Using the same data, we can see that for intermediate goods, China is again the top source with 15.41% share. Switzerland[1] and USA are in the second and third position with 10.5 and 8.5% share, respectively.[2] In intermediate goods, the share of China is misleadingly small because gold is classified as intermediate good and India is a huge importer of gold.

India has an overall trade deficit in the engineering sector (see Fig. 9.1). Table 9.3 shows that in the engineering sector also, India is heavily dependent on Chinese imports. Using the methodology adopted by Deloitte and EEPC in the strategy paper (Deloitte, 2019), we use HS 72–HS 94 to define the engineering goods sector. Table 9.4 shows the HS subsectors of the engineering goods sector where India's import dependence on China has been more than 10%. It is important to clarify here that this table does not show engineering sector's total dependence on Chinese imports as there can be other raw materials and intermediate goods which may come under HS codes which are outside of this group HS72–HS94.

[1]India's imports of intermediate goods from Switzerland is almost entirely made up of import of gold. Switzerland is the world's largest gold refiner country. Four of the world's biggest gold refineries are in Switzerland and it is estimated that two-thirds of the world's gold is refined in that country.

[2]World Bank WITS database

Table 9.4 Share of China in India's imports (average of 2018–2019 and 2019–2020), *HS Codes from the Engineering Sector where China's share is 10% or more in India's total imports*

Share of China in India's total imports	HS codes
More than 50%	HS-94, HS-92, HS-81
30–50%	HS-85, HS-83, HS-84, HS-86, HS-73
10–30%	HS-82, HS-87, HS-76, HS-90, HS-91, HS-72

Source Ministry of Commerce databank

Table 9.4 shows that Indian domestic manufacturers of engineering goods are facing increasing competition from Chinese goods in the domestic market. The increased imports from China could also possibly be displacing some domestic production. However, there is another side of the story too. Indian producers could be using technologically advanced imported capital goods, intermediate goods and cheaper raw materials in their production to stay competitive in international markets. Therefore, we classify India's engineering trade according to their position in the value chain using the Broad Economic Categories (BEC) classification.[3]

We employ the correspondence table between HS and BEC for this categorization. Since engineering goods can be classified into intermediate and final goods using BEC classification, we can gather a broad idea about the position of Indian engineering exports in the value chain. As can be seen from Fig. 9.3, imports of intermediate goods and capital goods are high and have risen rapidly. The trade balance for each of these product groups are shown in Fig. 9.4. This analysis tells us that within the engineering sector, India faces a huge trade deficit in both capital goods and intermediate goods. Capital goods play a critical role in driving manufacturing sector growth through its intersectoral linkages. They are also carriers of embodied technological change that augment productivity and technological capability in both the manufacturing and non-manufacturing sectors (Baark, 1991). As we have discussed elsewhere (Pal & Swathysree, 2019) high and growing imports of capital goods reflect lack of domestic technological capability and thus low ability to learn and innovate. Indian firms need to invest in research and development and promote technological upgradation to remain competitive in the domestic market and to become globally competitive.

The increased trade deficit in intermediate goods is a phenomenon cutting across all manufacturing sectors in India. The engineering goods sector is also not an exception. As can be seen from Fig. 9.3, intermediate goods account for more than 58% of total imports of the Engineering sector. However, it is also notable that both capital

[3]Broad Economic Categories (BEC) classification is an international product classification based on the end-use category of products. The major categories into which products are classified in BEC Revision 4 are food and beverages, industrial supplies, fuels and lubricants, capital goods and its parts and accessories, transport equipment (passenger cars, industrial and non-industrial and its parts and accessories), consumer goods and goods not elsewhere specified. It is plausible to aggregate these subcategories of BEC approximately into the three basic classes of products within the Systems of National Accounts (SNA) framework, namely capital goods, consumer goods and intermediate goods. (https://ec.europa.eu/eurostat/ramon/other_documents/bec/BEC_Rev_4.pdf).

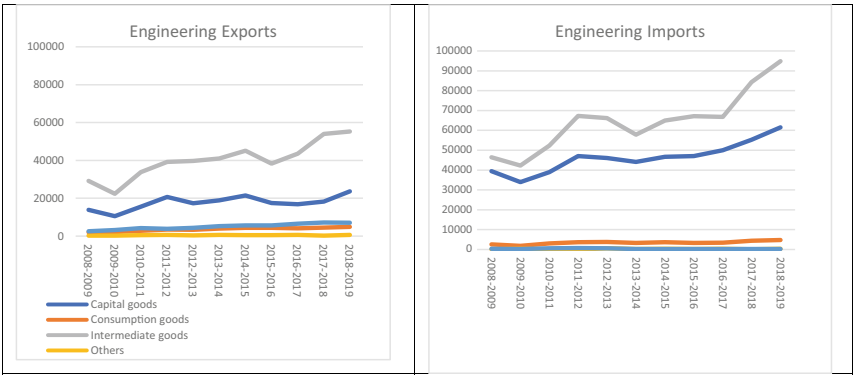

Fig. 9.3 India's engineering trade according to the UN BEC classification (in million USD). *Source* Authors' calculation using data from the Ministry of commerce database (https://commerce-app.gov.in/eidb/default.asp) and UN BEC classification

Fig. 9.4 Trade balance for different product groups (million USD). *Source* Authors' calculation using data from the Ministry of commerce database (https://commerce-app.gov.in/eidb/default.asp) and UN BEC classification

goods and intermediate goods are also the leading export items of India's engineering sector. In passenger cars, India has a positive trade balance (see Fig. 9.4), and this is largely due to a combination of heavy import duties on cars plus the advent of efficiency seeking foreign direct investments. Some domestic players are also big exporters in this segment.

India's engineering exports are driven mostly by intermediate goods and capital goods. Though in both these product groups, India runs a trade deficit. India also has decent exports of transport equipment and motor vehicles. These exports also showed a positive trend. This high two-way trade is an indicator that India is getting integrated into global supply chains. However, it is essential to understand which part

of the value chain Indian engineering industry is getting integrated. It is important because as the WDR (World Development Report, 2020, p. 3) says:

> The gains from GVC participation are not distributed equally across and within countries. Large corporations that outsource parts and tasks to developing countries have seen rising markups and profits, suggesting that a growing share of cost reductions from GVC participation are not being passed on to consumers. At the same time, markups for the producers in developing countries are declining. Such a contrast is evident, for example, in the markups of garment firms in the USA and India, respectively.

9.2.1 India's Top Export Markets for Engineering Goods

India's major export markets for engineering goods has not changed much over the last decade or so. The regional distribution of India's engineering exports shows that the developed countries remain the top export market of this sector. The countries in Europe and North America account for around 38–40% share in India's total engineering exports. The countries from Asia account for another 40% of total engineering exports (see Table 9.5).

On a country level, USA has remained the top export market for India's engineering over the past two decades. Around 15–16% of India's total engineering exports go to USA. UAE and EU countries are among the other important markets for India. Over the last few years, exports growth to some Asian countries like China and Vietnam has increased. Overall, the export market has not expanded much in

Table 9.5 Regional export composition of India's engineering exports

Region	2011–2012	2014–2015	2015–2016	2016–2017	2017–2018	2018–2019	2019–2020
EU	21.24	17.17	18.54	21.24	20.93	19.93	18.77
North America	13.59	14.56	15.76	15.32	17.92	18.90	19.89
ASEAN + 2	18.51	12.37	11.70	15.68	13.36	15.31	14.91
Middle East and West Asia	6.35	16.39	14.30	12.54	11.33	10.87	11.56
Africa	11.45	12.02	11.34	8.90	9.14	9.84	10.19
South Asia	6.11	9.79	10.33	9.35	9.44	10.18	8.94
NE Asia	9.88	7.68	7.87	8.23	9.59	7.13	7.73
South America	3.77	4.71	4.84	4.37	4.48	4.26	4.47
Others	8.02	3.98	4.37	3.21	2.85	2.60	2.28
CIS	1.08	1.34	0.95	1.15	0.95	0.98	1.27

Note ASEAN + 2 = ASEAN plus Australia and New Zealand

terms of geographic coverage. Top 25 export markets accounted for more than 75% of India's exports in 2019–2020. The same number was around 71.55 and 72.40%, respectively, for the years 2011–2012 and 2012–2013. A look at the top 25 export destinations over the years suggests that the list has mostly remained unchanged with one major exception. Since 2015–2016, Vietnam has joined as one of India's top and fastest growing destination for engineering exports. The growth of engineering exports to Vietnam is driven mainly by exports of industrial machinery, electrical machinery and iron and steel.

It is also worth highlighting here that the stability of India's export destinations imply that the slew of Free Trade Agreements signed by India does not seem to have a marked impact on India's top export markets for engineering goods. Most of the exports still go to the developed country markets like USA and EU with which India does not yet have any FTAs. On the other hand, India signed a high-profile FTA in goods with ASEAN which became operational in 2010. Despite the increased exports to Vietnam, the share of ASEAN has come down in India's exports of engineering goods. It is possible that trade networks and trade linkages play a very significant role in establishing markets in a foreign country and mere tariff preferences are not enough to change this significantly, at least in the short run.

9.3 Sectoral Revealed Comparative Advantage of the Engineering Sector of India

In this section, we look at the revealed comparative advantage (RCA) of India's engineering sector for the last five years. RCA indicator of one or higher shows a country's competitiveness in the international market.[4] Though a popular indicator in international trade, there are some limitations to this measure. Conceptually, RCA is higher than one if the share of a product in the country's export basket is higher than the share of that product in total exports by all countries. But RCA is an ex-post measure and it is more of a measure of relative export intensity of a country than actual competitiveness based on productivity differences. It also does not capture the information about the absolute global market size of that product. Therefore, a higher RCA in a product can indicate that a country is competitive in that product, but the global market for that particular product may be limited and hence limited potential for export expansion. Also, RCA indicator does not capture national measures which

[4]RCA index of country I for product j is often measured by the product's share in the country's exports in relation to its share in world trade:

$$RCA_{ij} = \left(x_{ij}/X_{it}\right) / \left(x_{wj}/X_{wt}\right)$$

where x_{ij} and x_{wj} are the values of country i's exports of product j and world exports of product j and where X_{it} and X_{wt} refer to the country's total exports and world total exports A value of less than unity implies that the country has a revealed comparative disadvantage in the product. Similarly, if the index exceeds unity, the country is said to have a revealed comparative advantage in the product.

can affect competitiveness such as tariffs, non-tariff measures, subsidies and others. However, RCA is a widely used measure in international trade literature owing to its intuitiveness to understand and ease to compute. Therefore, we use RCA but also supplement it with other indicators. We use RCA for multiple years to spot any changes in the pattern of competitiveness. The RCA indices for India's engineering sector at HS 2-digit level for the last five years is given in Table 9.6. We have used HS 2012 nomenclature here.

Table 9.6 shows mostly a consistent pattern. Among the 22 subsectors, India has remained consistently competitive in 6 subsectors. These are HS 72, 73, 76, 78, 79, (all metal and products of metals) and HS 89 (ships, boats and floating structures). India has lost competitiveness in HS 74 and HS 75 (both metals). There have not been any sectors in the last five years where India's subsectoral RCAs have moved from uncompetitive value (less than one) to more than one. Also, apart from HS

Table 9.6 Revealed comparative advantage of engineering subsectors of India

HS	RCA 2019	RCA 2018	RCA 2017	RCA 2016	RCA 2015
72	1.47	1.40	1.86	1.29	1.18
73	1.47	1.32	1.39	1.35	1.41
74	0.33	0.61	1.41	1.24	1.36
75	0.19	0.15	0.13	0.46	1.82
76	1.74	1.58	1.25	1.07	1.02
78	2.73	3.03	2.51	1.43	1.66
79	1.52	2.20	2.83	1.89	2.98
80	0.11	0.11	0.13	0.29	0.58
81	0.16	0.19	0.17	0.17	0.18
82	0.87	0.75	0.74	0.75	0.78
83	0.62	0.50	0.50	0.50	0.48
84	0.57	0.53	0.47	0.44	0.42
85	0.37	0.25	0.20	0.22	0.21
86	0.56	0.73	0.48	0.33	0.13
87	0.56	0.70	0.66	0.67	0.65
88	0.20	0.35	0.41	0.54	0.69
89	3.08	1.65	2.04	1.53	1.79
90	0.27	0.31	0.29	0.30	0.26
91	0.09	0.11	0.10	0.11	0.11
92	0.23	0.16	0.16	0.17	0.19
93	0.34	0.48	0.35	0.33	0.44
94	0.53	0.38	0.35	0.35	0.32

Source World Bank WITS Database, HS 72–83 are Metals and Metal products, HS 84 and HS 85 are machinery and mechanical appliances, HS 86–89 are transport equipments, HS 90–94 are miscellaneous engineering goods

82 (Tools, cutlery of base metal), no other subsectors show any sign of gaining competitiveness. In some of the other sectors, the RCA values are well below the threshold value. This includes, HS 84 and HS 85, which are the sectors where India has high import volumes and the government is now focusing on greater domestic reliance.

At HS 2-digit level, global demand and market size considerations should not be important. However, we have calculated the share of Indian exports in global exports for the engineering subsectors for the last four years (2016–2019). The results are given in Table 9.7. The table shows that there are no subsectors where India has an average market share of more than 5% in the global market for the period considered. There are three subsectors where India's share is between 4 and 5%. These are HS 78 (lead and articles thereof), HS 79 (zinc and articles thereof) and HS 89 (ships, boats and floating structures). However, even in these sectors, overall market share of India is not high enough to become a source of demand constraint.

Table 9.7 Share of India in global exports (in percentage)

HS code	2016	2017	2018	2019	Average share
72	2.17	3.17	2.41	3.27	2.76
73	2.30	2.39	2.30	3.34	2.58
74	2.11	2.42	1.06	0.75	1.59
75	0.77	0.22	0.25	0.42	0.42
76	1.81	2.15	2.72	3.92	2.65
78	*2.39*	*4.27*	*5.20*	*6.09*	*4.49*
79	*3.24*	*4.93*	*3.82*	*3.42*	*3.85*
80	0.50	0.22	0.19	0.26	0.29
81	0.29	0.30	0.32	0.36	0.32
82	1.29	1.28	1.31	1.99	1.47
83	0.86	0.87	0.87	1.40	1.00
84	0.78	0.83	0.93	1.28	0.96
85	0.43	0.36	0.45	0.85	0.52
86	0.56	0.84	1.27	1.29	0.99
87	1.14	1.15	1.22	1.26	1.19
88	0.95	0.75	0.65	0.49	0.71
89	2.65	3.59	2.97	7.03	4.06
90	0.53	0.52	0.54	0.69	0.57
91	0.23	0.17	0.19	0.22	0.20
92	0.29	0.27	0.29	0.54	0.35
93	0.56	0.61	0.84	0.78	0.70
94	0.60	0.61	0.65	1.20	0.77

Source World Bank WITS database

BEC classification[5] enables analysis of external trade statistics of a country in terms of trade in final and intermediate goods, and such analysis is crucial in the understanding of trade and competitiveness in the era of global value chains. Thus, to analyse the competitiveness and position of Indian engineering exports in the global value chain, we classify engineering exports of India into BEC categories using the correspondence table between HS 2007 and BEC Revision 4. In BEC classification, the subsector HS 89 mainly comes under transport equipment for industrial (HS 8901 and 8902) and non-industrial category (HS 8903), and capital goods (HS 8905).[6] When BEC categories are aggregated into basic classes of products within the SNA framework, the subsector HS 89 primarily falls into the capital goods category.[7] The other engineering subsectors (HS 72, 73, 76, 78, 79: metal and articles of metals) in which India is competitive primarily come under the industrial supply category in BEC and the corresponding category in the SNA framework is intermediate goods. Overall, it appears that India's sectoral competitiveness is mostly in resource-oriented intermediate goods sectors. The only exception is HS 89 (ships, boats and floating structures) and over the last few years, India has improved its RCA and market share in this subsector. It is the only engineering export of India which is at the higher end of the value chain.

9.4 Disaggregated Analysis of Exports of the Engineering Sector of India

In this section, we look at India's engineering exports at a more disaggregated level. For this, we look at HS 4-digit level data on exports. The objective of this section is to identify engineering exports which are present top performers. We also try to find the products that has the potential to become good export performers in the future. We use for our analysis, India's export data and the RCA indices at 4-digit level for the two latest years (2018 and 2019). At this level of disaggregation, global market size can become an important factor. Therefore, we use the RCA index in conjunction with the global market size for these products. We define global market size of a product as the total exports of that particular product by all countries. We use 2018

[5]Broad economic categories (BEC) classification is an international product classification based on the end-use category of products. The major categories into which products are classified in BEC Revision 4 are food and beverages, industrial supplies, fuels and lubricants, capital goods and its parts and accessories, transport equipment (passenger cars, industrial and non-industrial and its parts and accessories), consumer goods and goods not elsewhere specified. It is plausible to aggregate these subcategories of BEC approximately into the three basic classes of products within the Systems of National Accounts (SNA) framework, namely, capital goods, consumer goods and intermediate goods. (https://ec.europa.eu/eurostat/ramon/other_documents/bec/BEC_Rev_4.pdf).

[6]Excluding HS 8906 (goods nowhere else specified) and HS 8908 (industrial supply-primary) as per BEC classification.

[7]Excluding HS 8903 (consumption goods), HS 8906 (not classified) and HS 8908 (intermediate goods) in SNA framework.

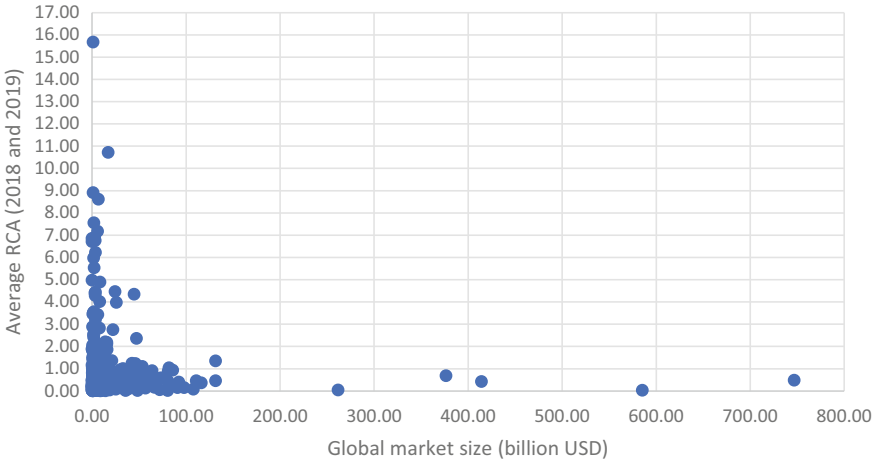

Fig. 9.5 Scatter plot of RCA and global market size of engineering exports from India. *Source* World Bank WITS database

and 2019 export data to find the global market size. We follow the same definition of engineering goods here as well, i.e. the products which falls under the HS codes of 72–94.

Figure 9.5 shows the scatter plot of India's RCA and the global market size for engineering goods. The RCA shown here is an average of RCA for the two years 2018 and 2019. It was found that the RCA indices for the last few years for India are highly correlated. For example, the correlation coefficient between the RCA indices for 2018 and 2019 is more than 0.9. Therefore, taking the average of two years' RCA values will give similar plots if we use RCA index of any one year. As mentioned before, the global market size for engineering goods is the average total export value for 2018 and 2019. These are expressed in billion US dollars. For this analysis, we use the World Bank WITS database.

The figure shows that there is a strong negative relationship between India's competitiveness and global market size. For products where there is a large international market, Indian exports do not have high RCA values. On the other hand, products where India has high RCA values, those tend to have smaller market size. For example, India has very high RCA (15.68) for the product HS 7614 (stranded wire, cables, plaited bands and the like, of aluminium, not electrically insulated). However, the total market size of the product is only around 1.15 billion USD. Conversely, HS 8703 (motor cars and other motor vehicles for transport of persons) has a global market of 747 billion USD but India's RCA is only 0.48.

Given this pattern, high RCA does not necessarily mean high exports or high export potential for a product. Therefore, we use RCA in conjunction with global market size and domestic exports for our analysis. We categorize the engineering goods in six different groups using certain filters. The idea is to classify the products

based on their present export performance and future export potential. For this, we used the following data:

a. RCA values for engineering goods exported by India (This value is the average RCA value for the latest two years 2018 and 2019). RCAs are taken at 4-digit HS level from the WITS database.
b. Global market size, i.e. the value of total exports of an engineering good by all countries and as mentioned this is the average values for the last two years (2018 and 2019). These are taken at HS 4-digit level from the WITS database. We have used two cutoffs for the global market size. The first cutoff of USD 10 billion roughly corresponds to HS 4-digit level products which constitute the top 1/3rd of global markets for engineering goods. The second cutoff of USD 5 billion is close to the median value, which is USD 4.4 billion.
c. India's domestic exports for the last two years. These are taken from the Ministry of Commerce database.
d. We also used the UN BEC classification to classify goods which categorize the goods according to their end-use category. This helps us understand the position of India's engineering exports in global value chain.

The filtering criteria used for creating the different categories are given in Table 9.8. A summary result is shown in Table 9.9. Detailed data is given in Annex Table 9.12.

Tier 1 and Tier 2 products are engineering goods (at HS4) where India is globally competitive, has good export presence and where the global market size is more than USD 10 billion at HS4 digit level. Tier 1 products are more important because domestic exports are higher for these products. Average domestic exports for Tier 1 products is around USD 2.1 billion. Tier 2 products are very similar but their present domestic export values are smaller. Average exports of Tier 2 products is around USD 571 million. Given the large global market size, and India's ability to exports in high volume, it can be said that the potential for export expansion are high for these products. Tier 1 and Tier 2 products make up for more than 30% of India's engineering exports. It is also notable that a large number of products in Tier 1 and Tier 2 are metals and products of metals. These are resource-intensive low-value added products. These products are highly susceptible to commodity price fluctuations and exchange rate movements.

Tier 3 products have smaller global markets. While average market size for Tier 1 and Tier 2 products are around USD 49 billion and USD 18 billion, respectively, the average global market size for Tier 3 products is USD 7 billion. While India is competitive in these products (RCA > 1), there is a possibility that it may face some demand constraints in these products.

The composition of Tier 1 and Tier 2 products show that around 70% of these exports are exports of intermediate goods. Exports of final goods is less than 10% in these categories (Table 9.9). For Tier 3 products, the share of intermediate goods is even higher than Tier 1 and Tier 2 products (82.9%). This is an important finding because it is generally said that exports of final goods are more desirable for a country because it leads to higher domestic value addition. But the international tariff regime

Table 9.8 Filtering criteria for classifying engineering exports

	Filters	Rationale
Tier 1	RCA > 1 and global market size > 10 billion annually and domestic exports > 1 billion annually	These products are major export items from India. India has export competitiveness and the world market is large
Tier 2	RCA > 1 and global market size > 10 billion annually and domestic exports between 200 million and 1 billion annually	India has export competitiveness and the world market is large. But domestic exports of these products are less than 'Tier 1' products
Tier 3	RCA > 1 and global market size between 5 and 10 billion annually And Domestic exports at least 100 million annually	India has competitiveness but global market is not large. Domestic exports are moderately high
Tier 4	RCA < 1 and global market size is more than 10 billion annually and domestic exports more than 1 billion annually	India is not competitive according to RCA but the domestic exports of these products is big. Global market is also large. India can strive to gain competitiveness in these products. This group has some of the products with largest global export markets in engineering goods
Tier 5	RCA > 1 global market size is less than 2 billion annually	India is presently competitive, but the global market size is small. Not very high export growth potential in these products
Tier 6	RCA more than 0.5 but less than 1 and global market more than 5 billion and domestic exports less than 1 billion annually	These products are not currently competitive according to RCA but there is big global market and India has sizeable exports

Table 9.9 Summary results

	Number of products	Share in domestic exports of Engineering goods (%)	Share of intermediate goods (%)	Share of capital goods (%)	Share of final goods (%)
Tier 1	11	25.72	69.30	21.60	9.13
Tier 2	10	6.33	70.13	21.26	8.61
Tier 3	10	5.10	82.92	5.28	11.80
Tier 4	9	25.19	44.63	15.94	39.42
Tier 5	30	1.73	49.03	25.90	25.07
Tier 6	43	19.36	43.81	50.33	5.86
Total	113	83.43			

Source WITS database and Ministry of Commerce database on Annual Trade of India

makes it difficult for developing countries to export final goods. This is done by tariff escalation where tariff rates are kept low for primary and intermediate goods but the tariff rates go up for the final goods. Also, in many cases, standards and Technical Barriers to Trade (TBT) are used to restrict imports of final goods. These policies make it a difficult challenge to move up the value chain. However, a country must strive to re-orient its exports and gradually shift its export basket from intermediate goods to more towards final goods.

Products under Tier 4 and Tier 6 are engineering exports where India is currently not competitive according to the RCA indicator. However, for these products, domestic export values are high (more than USD 1 billion annually). Therefore, India has export capability in these products. The low RCA values occur for these products because the global market size is big and India's share in global exports is low in these products. In fact, average global market for Tier 4 products is around USD 230 billion. This category of products includes highly exported items like motorcars, automobile components and electrical machineries. For Tier 4 products, India's export composition is also remarkably different. Around 39.4% of India's exports under the Tier 4 products are final goods. From policy perspective, Tier 4 products should receive priority as the global market is very large and the scope of domestic value addition is also high. This is possibly the sector where vertical and efficiency seeking foreign direct investment can add to India's export dynamism in the engineering goods sector.

Tier 6 products are very similar. There is big export market for these products. Tier 6 products include products like medical equipments, electrical and mechanical apparatus which have large export markets. According to RCA, India is currently not competitive in these products. But India has sizeable export volume for these products, though India's exports for Tier 6 products are lower than Tier 4 products. But like Tier 4 products, these products have immense potential and policy focus should be there for export promotion in both Tier 4 and Tier 6 products.

Products under Tier 5 are at the opposite end of the spectrum. These are products which are closer to the *Y*-axis as shown in Fig. 9.5. These are products where India is globally competitive (RCA > 1) but these products have small global export markets. Average global market size for these products is less than USD 1 billion. Given such small global market, high RCA does not necessarily imply high growth potential. There may be a case for Indian exporters who are in this category to diversify and explore alternative export markets.

Overall, our analysis suggests that India's engineering sector is a heterogenous sector with very different export dynamics for different type of products. Our findings suggest that exports of engineering goods are mostly driven by intermediate goods and capital goods. The type of products where India has a strong global market presence seems to be resource-intensive low-value added goods. These products are highly susceptible to commodity price fluctuations and exchange rate movements.

Our analysis also suggests that India's exports of final goods is extremely limited. There are very few final goods where India is globally competitive and where the global market is big (Table 9.10). However, among these products, HS 8703, HS 8711, HS 8704 and HS 8901 are some of the most prominent final goods exports

Table 9.10 India's exports of final goods in the engineering sector (Tier 1–6)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8703	746.85	0.48	Motor cars and other motor vehicles for transport of persons (excl of 8702) incl RCNG cars, etc	6.848	Tier 4	51	Passenger motor cars
8711	24.55	4.46	Motorcycles (including mopeds) and cycles fitted with an auxiliary motor, with or without side-cars	2.120	Tier 1	522	Transport equipment, industrial
8704	131.51	0.455	Motor vehicles for the transport of goods	1.097	Tier 4	521	Transport equipment, industrial
8901	60.70	0.695	Cruise ships, excursion boats, ferry-boats, cargo ships, barges and similar vessels for the transport of persons	1.026	Tier 4	521	Transport equipment, industrial
9403	73.58	0.59	Other furniture and parts thereof	0.852	Tier 6	61	Consumer goods not elsewhere specified, durable
7323	8.19	4.01	Table kitchen or other domestic articles and its parts of IRN/STL; IRN or STL wool; scourers or polishing pads, gloves an	0.543	Tier 3	62	Consumer goods not elsewhere specified, semi-durable
9404	13.66	1.985	Mattress supports; articles of bedding and similar furnishing (for example, mattresses, quilts, eiderdowns, cush	0.492	Tier 2	62	Consumer goods not elsewhere specified, semi-durable
8702	15.94	0.59	Public-transport type passenger motor vehicles	0.173	Tier 6	521	Transport equipment, industrial

(continued)

Table 9.10 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8605	1.67	5.975	Railway/tramway passenger coaches, luggage vans, post office coaches and other special Railway/tramway coaches, not self-propelled (excel items of 8)	0.171	Tier 5	521	Transport equipment, industrial
8215	1.87	1.885	Spoons, forks, ladles, skimmers, cake-servers, fish knives, butter-knives, sugar tongs and similar kitchen or tableware	0.055	Tier 5	62	Consumer goods not elsewhere specified, semi-durable
7418	0.61	2.875	Table, kitchen or other household articles and parts thereof, of copper; pot scourers and scouring or polishing p	0.031	Tier 5	62	Consumer goods not elsewhere specified, semi-durable
8713	1.15	1.235	Invalid carriages, W/N motorized/otherwise mechanically propelled	0.025	Tier 5	522	Transport equipment, non-industrial
8602	0.88	1.775	Other rail locomotives; locomotive tenders	0.022	Tier 5	521	Transport equipment, industrial
7319	0.22	1.865	Sewing, knitting needles, bodkins, crochet books, etc., and small articles for use in hand, of IRN/STL; safety pins and other pins	0.008	Tier 5	63	Consumer goods not elsewhere specified, non-durable
9208	0.09	1.16	Musical boxes, fairground organs, mechanical street organs, mechanical singing birds, musical saws and other	0.002	Tier 5	61	Consumer goods not elsewhere specified, durable

Source WITS database and Ministry of Commerce database on Annual Trade of India

from India. HS 8703 is motor cars and India export these to USA, Mexico, Latin America, West Asia and African countries. HS 8711 are motorcycles and India is exporting these mostly to developing countries and least developed countries. HS 8704 are transportation vehicles and HS 8901 are boats, ferries and barges. Apart from these and a few smaller export items, India's exports of final goods are very limited.

This problem is further exacerbated by government policies which tend to provide more protection for intermediate goods. India's engineering sector has some big oligopolistic players in sectors like steel, aluminium and copper. These big players have lobbying powers and manage to extract protection from the government. However, by providing protection to these intermediate goods, the government is creating an inverted duty structure which hampers the manufacturers of final goods. Protection from imports allow domestic players to increase price of intermediate goods. This affects the downstream industries negatively. Trade theory suggests that for increasing domestic value addition, there should be tariff escalation. That is, tariffs should go up with level of processing. However, by providing higher protection to the intermediate goods, the government is creating an inverted duty structure which may not be most conducive for domestic value addition. In sum, the presence of big and influential producers at the lower end of the value chain is distorting the incentive policies. Unless these are reversed, India may struggle to develop competitiveness in the higher value added segments of engineering goods.

Finally, to conclude, it should be highlighted that the engineering goods sector is at the cusp of a major technological overhaul, what Schwab (2016) terms as the Fourth Industrial Revolution. Advent of technological changes is expected to alter the production and trade relations in a major way in this sector. India's engineering sector and Indian policymakers must be prepared to deal with these massive transformative changes.

Annex

See Tables 9.11 and 9.12.

Table 9.11 Panel-wise exports of engineering goods (in million USD)

	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017	2017–2018	2018–2019	2019–2020	AAGR
Iron and steel and products made of iron and steel	15,319.75	15,480.37	15,945.08	16,229.03	11,661.13	14,554.69	17,976.07	16,990.50	16,265.30	2.03
Non-ferrous metals and products made of non-ferrous metals	5895.72	5962.83	6364.37	8495.23	6868.83	7311.82	10,189.89	8433.01	7628.73	5.16
Industrial machinery	8880.47	9334.27	9937.88	11,431.69	10,729.22	10,889.90	12,622.00	14,578.00	13,587.70	5.82
Electrical machinery	3396.73	3467.16	3729.32	3966.00	3825.80	4741.51	6701.83	8415.06	8958.81	13.72
Automobiles	9751.04	11,044.11	11,607.31	12,986.60	12,705.48	13,394.96	15,689.36	16,421.31	15,225.82	6.00
Aircraft	2275.16	2297.24	5348.82	6159.17	3731.84	3381.67	2264.99	1715.28	1427.19	3.26
Ships, boats, etc.	8077.85	3822.55	3583.69	5352.62	3104.12	4370.09	3075.18	5699.60	4563.90	3.12
Other engineering goods	5038.74	5355.85	5744.74	6149.59	6151.98	6594.56	7685.12	8702.77	8618.05	7.08
Total	58,635.46	56,764.38	62,261.21	70,769.93	58,778.40	65,239.20	76,204.44	80,955.53	76,275.50	3.93

Source Analysis of Engineering Exports and Imports, EEPC, various issues (Available at: https://www.eepcindia.org/publication/78/Engineering-Exports-Analysis)
AAGR = Average Annual Growth Rate

Table 9.12 Classification of engineering goods based on present export performance and future export potential: a detailed view

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
Tier 1							
7202	26.03	3.98	Ferro-alloys	1906.58	Tier 1	22	Industrial supplies not elsewhere specified, processed
7207	22.36	2.75	Semi-finished products of iron or non-alloy steel	1146.77	Tier 1	22	Industrial supplies not elsewhere specified, processed
7208	47.23	2.36	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot-rolled, not clad, plated or coated	2205.04	Tier 1	22	Industrial supplies not elsewhere specified, processed
7308	42.41	1.24	Structures (excel prefabricated buildings of HDG no. 9406) and parts, e.g. bridges roofs doors tubes, etc., used in structures of iron	1030.58	Tier 1	22	Industrial supplies not elsewhere specified, processed
7326	46.14	1.23	Other articles of iron or steel	1106.34	Tier 1	22	Industrial supplies not elsewhere specified, processed

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
7601	44.78	4.35	Unwrought aluminium	3967.10	Tier 1	22	Industrial supplies not elsewhere specified, processed
8411	131.57	1.35	Turbo-jets, turbo-propellers and other gas turbines	3542.33	Tier 1	53	Parts and accessories of transport equipment
8483	53.59	1.10	Transmission shafts and cranks; gears; ball screws; bearing housing another plain shaft bearings SPD changes including torque converters	1187.94	Tier 1	42	Parts and accessories of capital goods (except transport equipment)
8504	81.86	1.04	Electrical transformers, static converters (for example, rectifiers) and inductors	1719.99	Tier 1	41	Capital goods (except transport equipment
8711	24.55	4.46	Motorcycles (including mopeds) and cycles fitted with an auxiliary motor, with or without side-cars;	2119.67	Tier 1	522	Transport equipment, industrial
8905	17.30	10.71	Light-vessels, fire-floats, dredgers, floating other similar vessels where navigability is subsidiary to the mn function; floating docks; floating platforms	3295.31	Tier 1	41	Capital goods (except transport equipment

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
Tier 2							
7209	14.11	1.51	Flat rolled products of width > = 600 mm, cold rolled (cold-reduced), not clad, plated/coated	353.71	Tier 2	22	Industrial supplies not elsewhere specified, processed
7210	43.39	1.18	Flat-rolled products of iron/non-alloy steel of width >=600 mm, clad, plated/coated	895.39	Tier 2	22	Industrial supplies not elsewhere specified, processed
7306	21.23	1.36	Other tubes, pipes and hollow profiles (for example, open seam or welded, riveted or similarly closed), of iron or steel	545.01	Tier 2	22	Industrial supplies not elsewhere specified, processed
7307	15.91	2.18	Tube or pipe fittings (for example, couplings, elbow sleeves), of iron or steel	667.16	Tier 2	22	Industrial supplies not elsewhere specified, processed
7616	16.95	1.09	Other articles of aluminium	356.03	Tier 2	22	Industrial supplies not elsewhere specified, processed

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
7901	14.22	2.21	Unwrought zinc	552.79	Tier 2	22	Industrial supplies not elsewhere specified, processed
8474	14.63	1.87	Machinery for sorting, screening, separating, washing, crashing, etc., of mineral substances, in solid form mchns for shaping mineral fuel and forming mold	542.69	Tier 2	41	Capital goods (except transport equipment
8503	16.17	1.86	Parts suitable for use solely or principally with the machines of heading 8501 or 8502	673.27	Tier 2	41	Capital goods (except transport equipment
8714	15.81	2.11	Parts and accessors of vehicles of HDG 8711-8713	640.65	Tier 2	53	Parts and accessories of transport equipment
9404	13.66	1.99	Mattress supports; articles of bedding and similar furnishing (for example, mattresses, quilts, eiderdowns, cush	492.30	Tier 2	62	Consumer goods not elsewhere specified, semi-durable
Tier 3							

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
7222	5.92	7.165	Other bars and rods of stainless steel, angles, shapes and sections of stainless steel	816.765	Tier 3	22	Industrial supplies not elsewhere specified, processed
7305	8.04	2.82	Other tubes and pipes, (e.g. welded, riveted, etc) having circular cross section, the external diameter of which 406.4 mm, of iron/steel	465.53	Tier 3	22	Industrial supplies not elsewhere specified, processed
7312	5.81	1.02	Stranded wire, ropes, cables, plaited bands, slings and the like, of iron or steel, not electrically	111.995	Tier 3	22	Industrial supplies not elsewhere specified, processed
7325	6.66	8.61	Other cast articles of iron or steel	1118.44	Tier 3	22	Industrial supplies not elsewhere specified, processed
7801	6.13	3.425	Unwrought lead	378.27	Tier 3	22	Industrial supplies not elsewhere specified, processed
8205	5.90	1.07	Hand tools N.E.S. blow lamps; vices, clamps, other than accessors ports of mach-tools or water-jet cutting mach; anvils; portable for	116.045	Tier 3	41	Capital goods (except transport equipment

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
9028	7.23	1.06	Gas, liquified/electricity supply/production metres, incl calibrating metres therefore	126.935	Tier 3	41	Capital goods (except transport equipment
8535	8.00	1.17	Electrical apparatus for switching/protecting electrical circuits, etc. (e.g. switches, fuses, lightning arresters etc.) for a voltage exceeds 1000 v	187.225	Tier 3	42	Parts and accessories of capital goods (except transport equipment)
8545	8.45	4.885	Carbon electrodes, carbon brushes, lamp carbons, etc., other articles of graphite/other carbon, with/without metal of a kind used for electrical	739.59	Tier 3	42	Parts and accessories of capital goods (except transport equipment)
7323	8.19	4.01	Table kitchen or other domestic articles and its parts of iron/steel; iron or steel wool; scourers or polishing pads, gloves and	543.41	Tier 3	62	Consumer goods not elsewhere specified, semi-durable
Tier 4							
8703	746.85	0.48	Motor cars and other motor vehicles for transport of persons (excel of 8702) incl RCNG cars, etc.	6848.285	Tier 4	51	Passenger motor cars)

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8517	414.19	0.415	Electrical apparatus from line telephony/telegraphy, incl telephone sets with cordless handset carrier-current line system; videophone	3628.27	Tier 4	41	Capital goods (except transport equipment
8708	376.45	0.68	Parts and accessories of the motor vehicles of headings 8701 to 8705	5020.725	Tier 4	53	Parts and accessories of transport equipment
8704	131.51	0.455	Motor vehicles for the transport of goods	1096.605	Tier 4	521	Transport equipment, industrial
8544	110.96	0.455	Insulated (incl enamelled or anodised) wire, cable (incl co-axial cable) and other insulated electric conductor	1046.17	Tier 4	22	Industrial supplies not elsewhere specified, processed
8803	85.73	0.925	Parts of goods of HDG no. 8801 or 8802	1499.37	Tier 4	53	Parts and accessories of transport equipment
8481	81.22	0.88	Taps, cocks, valves and similar appliances for pipes, boiler shells, tanks, vats or the like, including pressure-reducing	1462.29	Tier 4	42	Parts and accessories of capital goods (except transport equipment)

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8409	64.06	0.9	Parts suitable for use solely or principally with the engines of heading 8407 or 8408	1128.495	Tier 4	53	Parts and accessories of transport equipment
8901	60.70	0.695	Cruise ships, excursion boats, ferry-boats, cargo ships, barges and similar vessels for the transport of persons	1026.38	Tier 4	521	Transport equipment, industrial
Tier 5							
9305	1.73	2.55	Parts and accessors of article of HDG 9301–9304	72.98	Tier 5	7	Goods nowhere else specified.
9307	0.05	6.71	Swords, cut lasses, bayonets, lances and similar arms and parts thereof and scabbards and sheaths thereof	5.90	Tier 5	7	Goods nowhere else specified.
7205	1.98	1.135	GRNL and powder of pig iron, SPGLSN, iron/steel	52.15	Tier 5	22	Industrial supplies not elsewhere specified, processed
7221	1.67	2.415	Bars and rods, hot-rolled, in irregularly wound coils, of stainless steel	77.00	Tier 5	22	Industrial supplies not elsewhere specified, processed

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
7303	1.05	8.91	Tubes, pipes and hollow profiles of cast iron	175.01	Tier 5	22	Industrial supplies not elsewhere specified, processed
7405	0.29	1.03	Master alloys of copper	5.42	Tier 5	22	Industrial supplies not elsewhere specified, processed
7415	0.95	1.54	Nails, tacks, drawing pins, staples (other than those of heading 8305) and similar articles of copper or of iron or steel	27.88	Tier 5	22	Industrial supplies not elsewhere specified, processed
7603	0.65	1.02	Aluminium powders and flakes	12.77	Tier 5	22	Industrial supplies not elsewhere specified, processed
7609	0.84	1.46	Aluminium tube or pipe fittings (for example, couplings, elbows, sleeves)	25.26	Tier 5	22	Industrial supplies not elsewhere specified, processed

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
7614	1.12	15.675	Stranded wire, cables, plaited bands and the like, of aluminium, not electrically insulated	319.63	Tier 5	22	Industrial supplies not elsewhere specified, processed
7904	0.12	4.975	Zinc bars, rods, profiles and wire	10.41	Tier 5	22	Industrial supplies not elsewhere specified, processed
8101	0.78	1.095	Tungsten (wolfram) and articles thereof, including waste and scrap	15.16	Tier 5	22	Industrial supplies not elsewhere specified, processed
8110	0.12	6.855	Antimony and articles thereof, including waste and scrap	15.48	Tier 5	22	Industrial supplies not elsewhere specified, processed
8305	0.67	2.05	Fittings for loose leaf binders/FILS LETR CLPSLETR CRNRS paper clips indexing tags and similar office articles staples in strips of bs	25.16	Tier 5	22	Industrial supplies not elsewhere specified, processed
8201	1.30	1.36	Hand tools like spades, shovels, hoes, forks axes and similar sewing tools sectors-any kind knives, hedge shears, etc., used in agr	31.91	Tier 5	41	Capital goods (except transport equipment

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8203	1.74	1.795	Files, rasps, pliers (including cutting pliers), pincers, tweezers, metal cutting shears, pipe-cutters, bolt croppers	59.09	Tier 5	41	Capital goods (except transport equipment
8404	1.39	3.52	Auxiliary plant, used with boilers of HDG no. 8402/8403(e.g. ECNMSRS, SUPR-HTRS, SOOT-RMVR, GAS-RCVR); CNDNSR FR STM/OTHR VPR POW	99.35	Tier 5	41	Capital goods (except transport equipment
8405	0.71	1.88	Producer/water gas generators, acetylene gas generators and similar water prcs generators, w/n with their purifiers	24.65	Tier 5	41	Capital goods (except transport equipment
8410	0.88	3.455	Hydraulic turbines, water wheels and regulators therefor	60.80	Tier 5	41	Capital goods (except transport equipment
8437	1.81	2	Machine for clang, string seed, grain/legumes vegetable; machinery for milling industry/from working of CRL/dried leguminous vegetables, excel farm-type m	69.62	Tier 5	41	Capital goods (except transport equipment)
8446	1.71	1.115	Weaving machines (looms)	35.70	Tier 5	41	Capital goods (except transport equipment
8468	0.88	1.445	Machinery and apparatus for soldering, brazing/welding, w/n cable of cutting, excel of HDG no. 8515; gas-operated surface tamping mchns an	24.43	Tier 5	41	Capital goods (except transport equipment

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
7316	0.17	1.875	Anchors, grapnels and parts thereof, of iron or steel	6.23	Tier 5	53	Parts and accessories of transport equipment
9208	0.09	1.16	Musical boxes, fairground organs, mechanical street organs, mechanical singing birds, musical saws and other	1.82	Tier 5	61	Consumer goods not elsewhere specified, durable
7418	0.61	2.875	Table, kitchen or other household articles and parts thereof, of copper; pot scourers and scouring or polishing p	31.23	Tier 5	62	Consumer goods not elsewhere specified, semi-durable
8215	1.87	1.885	Spoons, forks, ladles, skimmers, cake-servers, fish knives, butter-knives, sugar tongs and similar kitchen or tableware	55.15	Tier 5	62	Consumer goods not elsewhere specified, semi-durable
7319	0.22	1.865	Sewing, knitting needles, bodkins, crochet books, etc., and similar articles for use in hand, of iron/steel; safety pins and other pins	7.71	Tier 5	63	Consumer goods not elsewhere specified, non-durable
8602	0.88	1.775	Other rail locomotives; locomotive tenders	21.89	Tier 5	521	Transport equipment, industrial

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8605	1.67	5.975	Railway/tramway passenger coaches, luggage vans, post office coaches and other special railway/tramway coaches, not self-propelled (excel items of 8	171.02	Tier 5	521	Transport equipment, industrial
8713	1.15	1.235	Invalid carriages, w/n motorized/otherwise mechanically propelled	24.78	Tier 5	522	Transport equipment, non-industrial
Tier 6							
9018	116.13	0.36	Instruments and appliances used in medical, surgical, dental/veterinary science, incl scintigraphic apparatus electro-medical apparatus and sight-testing	905.055	Tier 6	41	Capital goods (except transport equipment
8536	92.42	0.39	Electricals apparatus for switching/protecting electrical circuits, etc., (e.g. switches relays, etc.) for a voltage not exceeding 1000 v	723.45	Tier 6	42	Parts and accessories of capital goods (except transport equipment)
8479	80.81	0.45	Mchns and mechanical appliances having individual functions, N.E.S.	799.15	Tier 6	41	Capital goods (except transport equipment
9403	73.58	0.59	Other furniture and parts thereof	852.235	Tier 6	61	Consumer goods not elsewhere specified, durable

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8414	65.35	0.66	Air/vacuum pumps, air/other gas compressors and fans; ventilating/recycling hoods incorporating a fan, w/n fitted with filters	842.045	Tier 6	41	Capital goods (except transport equipment
8421	64.28	0.54	Centrifuges, including centrifugal dryers; filtering or purifying machinery and apparatus, for liquids or gases	689.105	Tier 6	41	Capital goods (except transport equipment
8537	63.12	0.43	Boards panels, etc., equipped with two or more apparatus of HDG 8535/8536, incl those incorporating instruments/apparatus of CH 90	533.775	Tier 6	42	Parts and accessories of capital goods (except transport equipment)
8413	60.17	0.81	Pumps for liquids, whether or not fitted with a	958.315	Tier 6	41	Capital goods (except transport equipment
8701	55.54	0.82	Tractors (other than tractors of heading 8709)	870.35	Tier 6	41	Capital goods (except transport equipment
7403	53.24	0.55	Refined copper and copper alloys, unwrought	284.87	Tier 6	22	Industrial supplies not elsewhere specified, processed

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8431	52.41	0.72	Parts suitable for use solely/principally with the machinery of HDGS. nos. 8425 to 8430	763.555	Tier 6	42	Parts and accessories of capital goods (except transport equipment)
8501	48.11	0.56	Electric motors and generators (excel generating sets)	535.33	Tier 6	41	Capital goods (except transport equipment
8408	47.67	0.96	Compression-ignition internal combustion piston engines (diesel or semi-diesel engines)	919.295	Tier 6	53	Parts and accessories of transport equipment
8429	41.90	0.62	Self-propelled bulldozers, angledozers, graders levelers, scrapers, mechanical shovels, excavators, shovels loaders, tamping machines and road ro	484.67	Tier 6	41	Capital goods (except transport equipment
8419	38.51	0.81	Machinery, plant/laboratory equipment, w/n electrical heated, for heating, cooking, etc., excel machinery for domestic purposes; storage water heater, non-el	627.37	Tier 6	41	Capital goods (except transport equipment
7318	34.35	0.87	Screws, bolts, nuts, coachscrews, screw hooks rivets, cotters, cotter-pins, washers (incl spring washers) and similar articles of	578.24	Tier 6	22	Industrial supplies not elsewhere specified, processed

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8538	33.08	1.00	Parts suitable for use solely/principally with the apparatus of HDG no. 8535,8536/8537	642.855	Tier 6	42	Parts and accessories of capital goods (except transport equipment)
8482	30.32	0.96	Ball or roller bearings	565.865	Tier 6	42	Parts and accessories of capital goods (except transport equipment)
9001	28.51	0.75	Optical fibre and optical fiber bundles, etc.; sheets and plates of polarising material; LNSS; prisms, mirrors and other optical elements of any material	408.94	Tier 6	22	Industrial supplies not elsewhere specified, processed
7219	28.44	0.86	Flat-rolled products of stainless steel of width ≥ 600 mm	461.73	Tier 6	22	Industrial supplies not elsewhere specified, processed
8477	23.58	0.67	Machine for working rubber/plastics/for the manufacturer of products from these materials, N.E.S.	299.18	Tier 6	41	Capital goods (except transport equipment

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
9022	21.65	0.69	Other appliances of heading 9021 BTA/GMA radiations incl radiotherapy apparatus, X-ray tube and generators, high tension generators	291.565	Tier 6	41	Capital goods (except transport equipment
8412	21.30	0.62	Other engines and motors	272.845	Tier 6	41	Capital goods (except transport equipment
8207	20.96	0.62	Interchangeable tools for hand tools w/n power operated or for machine tool (e.g. for pressing stamping, etc.) dies for drilling/boring t	257.94	Tier 6	42	Parts and accessories of capital goods (except transport equipment)
7304	20.23	0.88	Tubes, pipes and hollow profiles, seamless of iron (other than cast iron) or steel	336.895	Tier 6	22	Industrial supplies not elsewhere specified, processed
8511	18.23	0.92	Electrical ignition/starting equipment for spark-ignition, etc., generators, etc., and cut outs of a kind used in conjunction with such engine	333.53	Tier 6	53	Parts and accessories of transport equipment
8502	18.00	0.98	Electric generating sets and rotary converters	366.955	Tier 6	41	Capital goods (except transport equipment)

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8702	15.94	0.59	Public-transport type passenger motor vehicles	172.825	Tier 6	521	Transport equipment, industrial
7214	15.09	0.68	Other bars and rods of iron or non-alloy steel, not further worked than forged, hot-rolled, hot-drawn	163.905	Tier 6	22	Industrial supplies not elsewhere specified, processed
8438	13.80	0.55	Machinery, N.E.S., for industrial preparation/manufacturer of food/drink, excel machinery for extraction/preparation of animal/fixed vegetable fats/oils	144.59	Tier 6	41	Capital goods (except transport equipment
8426	11.60	0.50	Derricks; cranes, incl cable cranes; mobile lifting frames, steel cars and works tracks fitted with a crane	110.43	Tier 6	41	Capital goods (except transport equipment
7213	11.10	0.78	Bars and rods, hot-rolled, in irregularly wound coils, of iron or non-alloy steel	157.755	Tier 6	22	Industrial supplies not elsewhere specified, processed
7607	10.24	0.52	Aluminium foil (w/n printed/backed with paper paperboard-plastics, etc.) of thickens (excel any backing) not exceeding 0.2 mm	103.245	Tier 6	22	Industrial supplies not elsewhere specified, processed

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8430	9.71	0.90	Other moving, grading, levelling, scraping, excavating, tamping, compacting, extracting or boring machinery, for earth, minerals or ores; piledrivers and pile; snow-plow	165.59	Tier 6	41	Capital goods (except transport equipment
9015	8.45	0.64	Surveying, hydrographic, oceanographic, hydrological, meteorological/geophysical instruments and appliances, excel compressor	118.79	Tier 6	41	Capital goods (except transport equipment
8451	7.97	0.51	Other parts of household laundry type mechanic and mchns for applying post to base fabric, etc; mchns for rolling, underlying, folding/cutting	75.315	Tier 6	41	Capital goods (except transport equipment
8432	7.83	0.71	Agricultural, horticultural/forestry machinery of soil preparation/cultivation; lawn/sports-ground rollers	109.68	Tier 6	41	Capital goods (except transport equipment
8487	7.40	0.89	Machines parts, not containing electrical connectors, insulators, coils, contacts or other electrical features, not spec	134.415	Tier 6	42	Parts and accessories of capital goods (except transport equipment)
8309	6.48	0.82	Stoppers, caps, etc., incl crown corks, screw caps, etc., capsules for bottles, threaded bungs, bung covers, seals and other packing accessors	103.31	Tier 6	22	Industrial supplies not elsewhere specified, processed

(continued)

Table 9.12 (continued)

Product code	Average global exports in billions	Average RCA	Description	Average exports from India in millions	Tier	BEC classification	BEC classification description
8484	6.38	0.90	Gaskets and similar joints of metal sheeting combined with other material; sets/assortment of gaskets and similar joints, put up in pouches, en	115.255	Tier 6	42	Parts and accessories of capital goods (except transport equipment)
8209	6.30	0.60	Plates stinks tips and like for tools, unmounted of cermets	72.625	Tier 6	42	Parts and accessories of capital goods (except transport equipment)
8425	5.82	0.50	Pulley tackle and hoists other than skip hoists	58.28	Tier 6	41	Capital goods (except transport equipment
7310	5.75	0.70	Tanks, drums, etc., and similar containers for materials (other than compressed/liquefied gas)-capacity $\leq$ 300 L not fitted with mechanical or t	77.18	Tier 6	41	Capital goods (except transport equipment

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Part V
Health and Education

Chapter 10
Towards Universal Health Coverage? Taking Stock of Two Decades of Health Reforms in India

T. K. Sundari Ravindran and Neena Elezebeth Philip

10.1 Introduction

Universal health coverage is defined as '*ensuring that all people have access to needed health services (including prevention, promotion, treatment, rehabilitation, and palliation) of sufficient quality to be effective while also ensuring that the use of these services does not expose the user the financial hardship* (WHO, 2020a).' As part of the 2030 Agenda for Sustainable Development, all countries have committed to trying to achieve universal health coverage (UHC) by 2030. While UHC is a desirable goal, it poses significant challenges for low- and middle-income countries on many fronts.

Over the past two decades, India has implemented a wide range of reforms in the health sector. The paper describes these major health reforms in India, with a focus on financing and private sector engagement and draws on existing evidence to argue that these have made limited contributions to access with financial risk protection for socially and economically marginalised groups. Drawing on the experiences of LMICs that have achieved near-universal health coverage, the paper concludes with listing much-needed reforms that are urgently needed for India to move anywhere close to UHC.

In this introductory section, the next two subsections, respectively, outline the concept of UHC and present data on where India stands in terms of progress towards

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UHC. Section two provides a brief introduction to the reforms introduced in India's health system over the past two decades and more and the extent to which these have contributed towards or diverged away from the UHC goal. Section three traces the actions taken by Thailand and Vietnam in making rapid progress towards UHC, followed by a brief discussion on the way forward for India if it is to achieve the UHC goal.

10.1.1 Universal Health Coverage

10.1.1.1 Definitions and Concepts

Universal health coverage (UHC) has emerged as one of the most discussed health system goals in the past few decades (WHO, 2005, 2010). According to the World Health Organization's Director-General, Dr. Margaret Chan, UHC is the single most powerful concept that public health had to offer (WHO, 2013). Achieving UHC is also an essential target of the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development (UN, 2015). On 23 September 2019, UN Member States adopted a high-level United Nations Political Declaration on UHC. The declaration expressed their commitment to invest in four major areas: financial risk protection, strengthening the health workforce and infrastructure, respectively, and reinforcing governance capacity to achieve UHC (WHO, 2020b).

UHC has two stated objectives. The first objective is that everyone should be able to access a full range of health services, which are of good quality. The emphasis is on all people getting the services they need. The second objective is to ensure protection from the financial risk associated with seeking health care. The need to pay for care at the point of use (whether through explicit policies on user fees or informal payments) may discourage people from using services and can cause financial hardship for those that do seek care (WHO, 2010).

UHC is conceived as consisting of three main dimensions, depicted as three axes of a cube (Fig. 10.1). The first dimension, represented by the x-axis of the cube, is *population coverage*, the proportion of the population who can access healthcare services with financial risk protection. The second dimension, represented by the y-axis, is *service coverage*, the range of services provided at subsidised or no costs at the point of receiving care. The third dimension, represented by the *z*-axis, is *financial risk protection*, which is the proportion of total expenditure towards services that are 'covered', i.e. need not be paid when receiving care. Moving towards UHC involves moving from the inner to the outer cube, by expanding along all three axes.

The three dimensions of the cube are interlinked. For example, when the population coverage is low, those who are not covered have to pay for services out-of-pocket (OOP), which would result in low financial risk protection (FRP). Even when all the population is covered, if the service coverage or the depth of the coverage is narrow, OOP will be high, leading to low FRP (WHO, 2010).

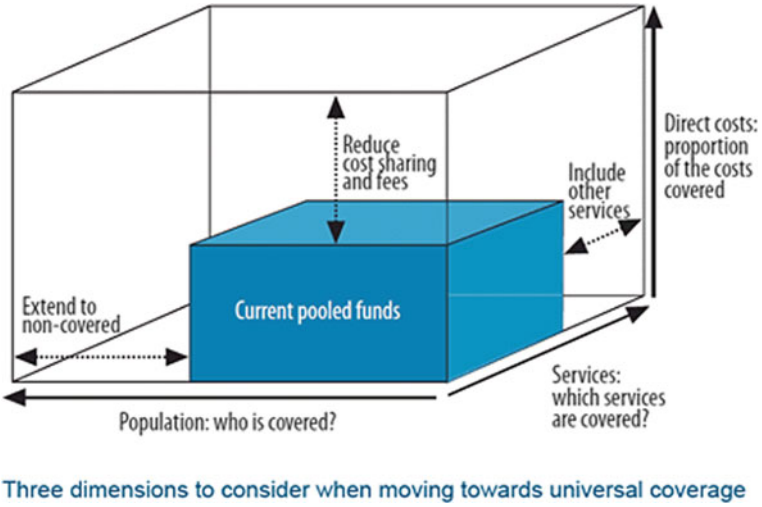

Fig. 10.1 Three-dimensional UHC cube. *Source* WHO (2010): p. 12

The values underlying the UHC cube are universality, comprehensiveness, and affordability, which indicate a concern with equity. Besides, efficiency and quality of services are essential to the achievement of UHC. Efficiency is '*a key intermediate policy objective*' for UHC (WHO, 2019a, b sundari), essential for making limited resources provide as best a population and services coverage as possible. Good quality services are critical to ensure that coverage is effective and achieves the intended health outcomes and implicit in the UHC goal (WHO, 2019a, b).

It is important to note that UHC is not an operational objective; instead, it may be viewed as an aspiration, a goal towards which to move. Again, UHC is not a specific scheme or project, such as a national insurance scheme in a country or a specific project to expand human resources in health. UHC is about the combination of all programmes and schemes that aim to improve access to quality health services and to increase financial protection. Schemes may contribute to the objectives of universal population coverage with a comprehensive package of services, without resulting in catastrophic health expenditure; or they may detract from them (Dkhimi, 2019).

Sen et al. (2018) highlight the fact that moving towards UHC is not merely a matter of moving from the inner to the outer cube. The path that was taken matters. At each point, important decisions are to be taken as to which population groups and services are to be included. These decisions are not merely technical, but political, and depend on who is sitting at the policy table and whose interests are given priority. Thus, moving towards UHC is, from the very beginning, a political process.

10.1.1.2 Indicators to Assess Progress Towards UHC

Three indicators are currently being used for the assessment of a country's progress to UHC. The first assesses *coverage of essential health services* and is a unitless index ranging between 0 and 100, 100 being the optimal value. The indicator is defined as the average coverage of fourteen tracer conditions (maternal and child health and family planning, and communicable and non-communicable diseases) and service capacity and access, including the density of health workforce and hospital beds (UNSD, 2020a). The global coverage of essential health services in 2019 was estimated to be 33–49%, while for LMICs, the coverage was lower, at 21–38% (WHO, 2019a, b).

The second and third indicators assess *financial risk protection*. One is the proportion of the population with large household expenditure on health as a share of total household expenditure or income, with 0 being the optimal value. Two thresholds are used to define 'large household expenditure on health': greater than 10% and greater than 25% of total household expenditure or income. It is computed as the population-weighted average number of people with large household expenditure on health as a share of total household expenditure or income (UNSD, 2020b). Globally, the shares of the world's population with catastrophic health expenditure in 2015 were 12.7% and 2.9% at 10% and 25% threshold levels, respectively (WHO, 2019a, b).

Another indicator of financial risk protection is the proportion of households impoverished by out-of-pocket expenditure on health. A household is counted as being impoverished by OOPE when its household consumption, excluding the OOPE, is below the poverty line, while its consumption, including the OOPE, is above the poverty line. The idea is that such a household was forced by the adverse health event to divert spending away from non-health budget items to such an extent that its spending on these items went from being above the poverty line to being below the poverty line. Two international poverty lines ($1.90 per day and $3.10 per day at 2011 PPP factors) are usually used for the computation (Wagstaff et al., 2018), and the optimal value is 0%. In 2015, globally, 1.23% and 1.4% of the population were impoverished using the $1.90 and $3.20 per day international poverty lines, respectively (WHO, 2019a, b).

10.1.1.3 Alternatives to OOPE: Financing Mechanisms that Facilitate Progress Towards UHC

Out-of-pocket payment for health, or payments made by the user of health services to the health service provider, at the time of receiving the treatment, are among the least desired mechanisms of paying for health care. The reason for this is that having to pay at the time of seeking health care makes access to services directly dependent on the ability to pay. Health reforms towards universal health coverage have, therefore, included bringing about a shift from OOPE to prepayment mechanisms such as government tax revenue and mandatory health insurance schemes.

OOPE may be incurred for several reasons. One is when all health services have user charges. However, high OOPE may also be incurred in settings where health care is financed through government tax revenue. OOPE is incurred in tax-financed health systems when governments make low investments, resulting in a narrow range of health services, available through a small number of unequally distributed health facilities. A large proportion of people in rural and remote areas have to seek health care from private providers, as do those who need services not provided in government facilities, incurring OOPE. OOPE is also incurred when drugs and diagnostics are to be paid for in government health facilities, or are not available, forcing people to seek them in the private sector. An unregulated private sector that charges for services and products according to the ability to pay, without guarantee of quality services, contributes to high OOPE. In order to protect poor and vulnerable households from further impoverishment owing to OOPE, health reforms also include social protection measures, including Publicly Funded Health Insurance Schemes (PFHIS) for poor households.

10.1.2 Progress Towards UHC in India: The Current Scenario

10.1.2.1 Performance in Terms of Coverage of Essential Health Services

We first examine India's coverage of essential health services against data for the SDG essential services coverage index and then look at national data from sources such as National Family Health Surveys and Central Bureau of Health Intelligence to understand differences across states and by economic status in coverage by essential health services and capacities for coverage, respectively.

India's index of population coverage for essential health services stood at 56 of a maximum possible of 100. The index was below the global average but slightly above the average for South Asian countries (Table 10.1). The index is constituted of tracer health needs related to maternal and child health and family planning, infectious diseases and non-communicable diseases, and service–capacity as indicated by ratios of hospital beds and skilled health professionals to population.

India scored lower than the global average on all sub-components of the service coverage index, barring coverage for NCDs. The performance on the service–capacity sub-component of the index and was far below the global value for this sub-component. India's health workers/1000 population (all physicians, nurses, and midwives) at 2.9 fall far short of the minimum benchmark of 4.45 for universal coverage by essential health services (WHO, 2016). While India does relatively well in terms of RMNCH coverage (as compared to other sub-components), performance in terms of coverage of HIV positive persons by antiretroviral therapy and effective treatment for tuberculosis has been lacklustre.

Table 10.1 India: UHC coverage by essential services, 2015

	Index of coverage by essential services (value)	Sub-components			
		Reproductive, maternal, neonata,l and child health (RMNCH)	Infectious diseases	Non-communicable diseases (NCDs)	Service–capacity
Global	64	75	54	63	71
South Asia	53	66	41	64	47
India	56	70	45	64	46
India: Data on key indicators included in the index (2015)					
% of family planning demand satisfied with modern contraceptives		72			
% of pregnant women with at least four antenatal visits		45			
% of children under 2 yrs. fully vaccinated (DPT3)		87			
% of children seeking appropriate medical help for child pneumonia[a]		77			
% receiving effective treatment for tuberculosis[b]		44			
% of HIV positive persons covered for antiretroviral therapy		44			
% households with at least basic sanitation		44			
% of persons above 18 yrs. not smoking tobacco within the last 30 days		88			
Hospital beds per 10,000 population		6.6			
Qualified Allopathic and AYUSH Physicians per 1000 population (2017)		1.17			
Qualified Nurses and midwives per 1000 population (2016–17)		1.74			

[a]latest available year, [b]estimates for treated—2014, estimates for detected—2015
Sources WHO and IBRD (2017), CBHI (2019) for data on physicians and nurses

The average service coverage statistics for the country, depicted in Table 10.1, masks vast inequalities by socio-economic status (Fig. 10.1) and across states (Fig. 10.2).[1] The steepest gap by wealth is for institutional delivery (Fig. 10.3).

Across states, again, there are large gaps in service coverage, even for RMNCH services. For example, the highest modern contraceptive prevalence rates are more than three times the lowest, while the highest prevalence of at least four antenatal

[1]Comparable data on service coverage by the state are only available for RMNCH indicators and are included here.

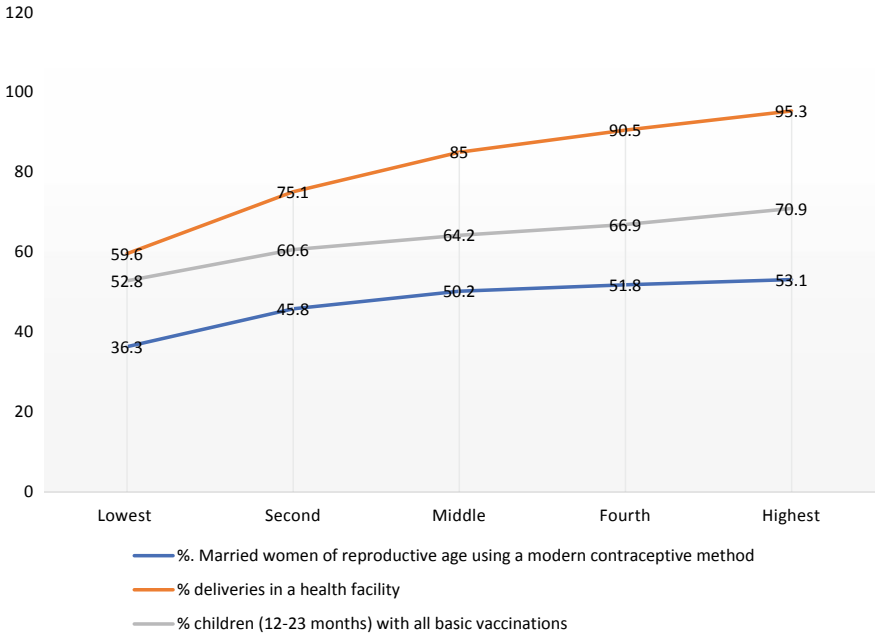

Fig. 10.2 India: Coverage of reproductive, maternal, and child health services by wealth index (2015–16). *Source:* IIPS and ICF (2017)

check-ups is more than six times the lowest rates. UHC would require these wide gaps to be bridged. This would require addressing the wide gaps in the capacity for service coverage, as shown by the health worker–population ratio.

Table 10.2 presents data on the health worker–population ratio across Indian states. Excluding auxiliary nurse midwives (ANMs) from the category of health workers, as of 2017, none of the Indian states met the benchmark of 445 physicians and nurses/midwives per 100,000 population. There were only four Indian states that meet the benchmark when ANMs are also included (CBHI, 2019). The situation in Jharkhand is especially dismal, with the health workers to population ratio falling below 10% of the benchmark, and seven other states falling 50% below the benchmark. There also appears to be a maldistribution of different categories of health workers. For example, states like Bihar, Jharkhand, Uttarakhand, and Uttar Pradesh have exceptionally low ratios of nurses and midwives per 100,000 population, which would pose major challenges to coverage by RMNCH services. Only five states have 100 or more qualified allopathic physicians per 100,000 population. The benchmark of 100 physicians per 100,000 population is met only through the inclusion of graduates of AYUSH systems of medicine, including naturopathy.

Estimates of health workers to population ratio given in Table 10.2 may be higher than the reality on the ground. A recent study of India's health workforce (Karan et al., 2019) found that health worker density based on data from various professional registries and associations of physicians and nurses (which CBHI uses) tended to

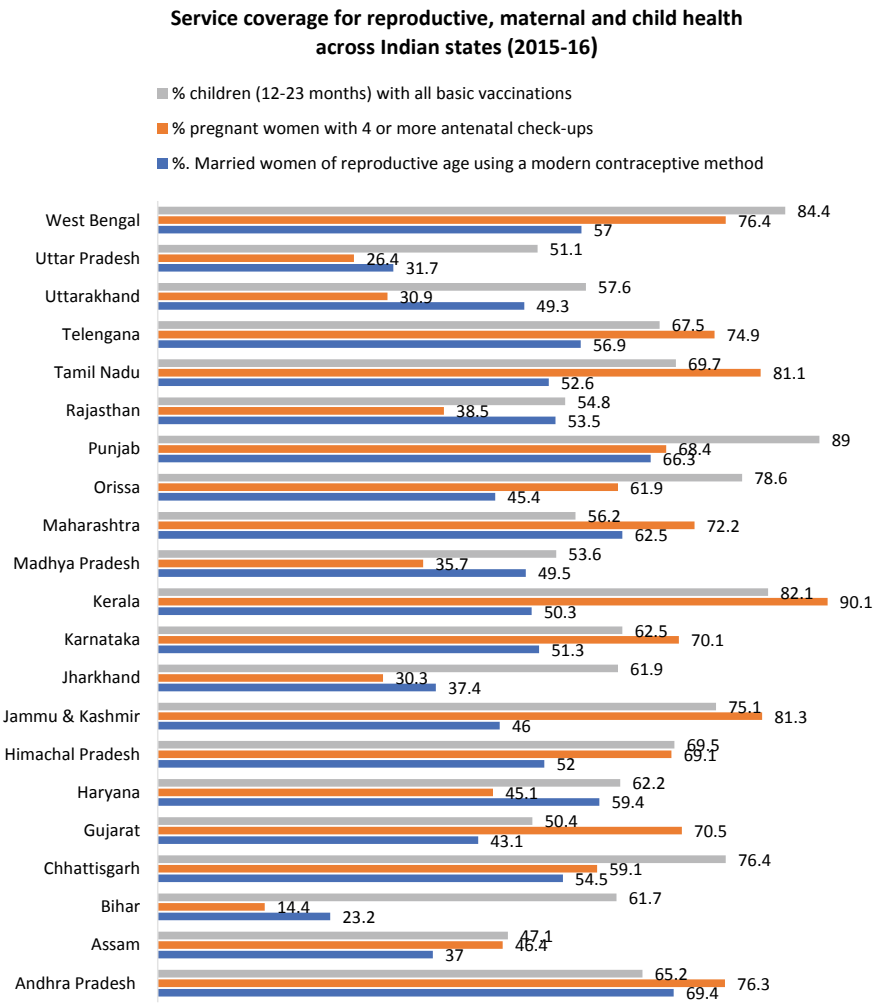

Fig. 10.3 Service coverage for reproductive, maternal, and child health across Indian states (2015–16). *Source* IIPS and ICF (2017)

be higher as compared to health worker density computed from NSSO data. They compute that as of January 2016, there were only 119 doctors (including AYUSH) and nurses and midwives (excluding ANMs) per 100,000 population with the requisite educational qualifications and 158 qualified health workers of all categories including dentists, pharmacists, physiotherapists, diagnostic and other technicians, just about half the health worker density calculated by us.

Table 10.2 Qualified health workers to population ratio across Indian states: 2016–18

	Allopathic physicians/100,000 population (2018)	AYUSH physicians/100,000 population (2017)	Registered nurses and midwives)/100,000 population (2016)	ANMs/100,000 population (2017)	Doctors, nurses and midwives/100,000 population	All health workers (including ANMs)/100,000 population
Andhra Pradesh and Telangana	92.4	37.6	123.6	211.9	253.6	465.5
Assam	55.1	5.0	64.6	51.8	124.7	176.5
Bihar	27.2	91.4	12.1	6.3	130.7	130.7
Chhattisgarh	24.6	15.7	37.3	36.5	77.6	114.1
Gujarat	83.8	62.6	57.5	143.1	203.8	346.9
Haryana	16.7	41.2	72.1	82.8	130.0	212.8
Himachal Pradesh	33.4	127.1	127.6	228.9	288.1	517.0
Jammu and Kashmir	88.2	36.0	n.a	n.a.	n.a.	–
Jharkhand	12.4	1.7	10.2	7.1	24.3	31.4
Karnataka	145.4	58.4	65.3	280.1	269.2	549.2
Kerala	134.4	94.2	69.1	593.1	297.7	890.9
Madhya Pradesh	37.1	65.2	38.4	115.4	140.7	256.1
Maharashtra	114.7	101.2	43.4	85.3	259.5	344.7
Orissa	39.7	25.9	109.5	133.1	175.0	308.1
Punjab	130.6	43.2	62.2	207.2	236.1	443.2
Rajasthan	44.4	19.2	111.1	204.7	174.8	379.5
Tamil Nadu	140.1	19.6	60.5	289.9	220.2	510.1
Uttarakhand	59.9	29.4	17.3	18.8	106.6	125.5

(continued)

Table 10.2 (continued)

	Allopathic physicians/100,000 population (2018)	AYUSH physicians/100,000 population (2017)	Registered nurses and midwives)/100,000 population (2016)	ANMs/100,000 population (2017)	Doctors, nurses and midwives/100,000 population	All health workers (including ANMs)/100,000 population
Uttar Pradesh	27.1	29.9	21.1	26.1	78.0	104.1
West Bengal	59.0	38.4	51.9	51.8	149.3	201.1
India	69.2	47.9	51.6	121.0	168.7	289.7

Source Computed using data from the National Health Profile 2019 and population estimates for 2018. The densities were calculated after deducting 20% from the number of registered health workers, as is done by the Medical Council of India to estimate the number of doctors available since many state councils have not updated their registries

10.1.2.2 Performance Concerning Financial Risk Protection

A significant proportion of the Indian population incurred catastrophic health expenditures (CHE) when seeking health care. This measure does not capture a large proportion who may have been unable to seek care because they could not afford to pay for it. India's indicators for financial risk protection were above the global averages and the averages for WHO's Southeast Asia Region as well as low- and middle-income countries (LMICs) (Table 10.3).

A study based on National Sample Survey data for 2014 reported a much higher incidence of CHE at the 10% threshold of 24.9%. There were huge variations across states in the incidence of CHE, ranging from 5.4% in Sikkim to 43.5% in Kerala (Pandey et al., 2018a) (Fig. 10.4).

India witnessed more than twofold (2.24) increase in the incidence of CHE during the two decades spanning 1993–2014 (Pandey et al., 2018b). The incidence of CHE increased from 11.1% in 1995–96 to 24.9% in 2014, based on computations using NSSO's health utilisation surveys. The poorer and more vulnerable groups were disproportionately affected. The incidence of CHE increased threefold among the poorest as compared to 1.74 times among the richest. The odds of incurring CHE were also higher among households with only persons above 60 years of age (aOR 3.26, 95% CI 2.76–3.84) as compared to households without elderly or children under five; among female-headed households (aOR 1.32, 95% CI 1.19–1.47) and among rural households (aOR 1.27, 95% CI 1.20–1.35) (Pandey et al., 2018b).

Table 10.3 Financial risk protection when seeking health care: India

	% of population incurring CHE (10% threshold)	% of population incurring CHE (25% threshold)	% of the population impoverished due to health spending (2011 PPP$ 1.90)	% of the population impoverished due to health spending (2011 PPP$ 3.20)
Global 2010	12	2.6	1.5	1.7
2015	12.7	2.9	1.2	1.4
WHO SE Asia Region 2010	12.8	2.8	3.0	3.4
2015	16.0	3.8	2.8	3.3
Low and middle income 2010 Countries (LMICs) 2015	11.8	2.5	2.4	2.8
	14.2	3.3	2.2	2.8
India 2011	17.3	3.9	4.16	4.61

Source WHO (2019a, b)

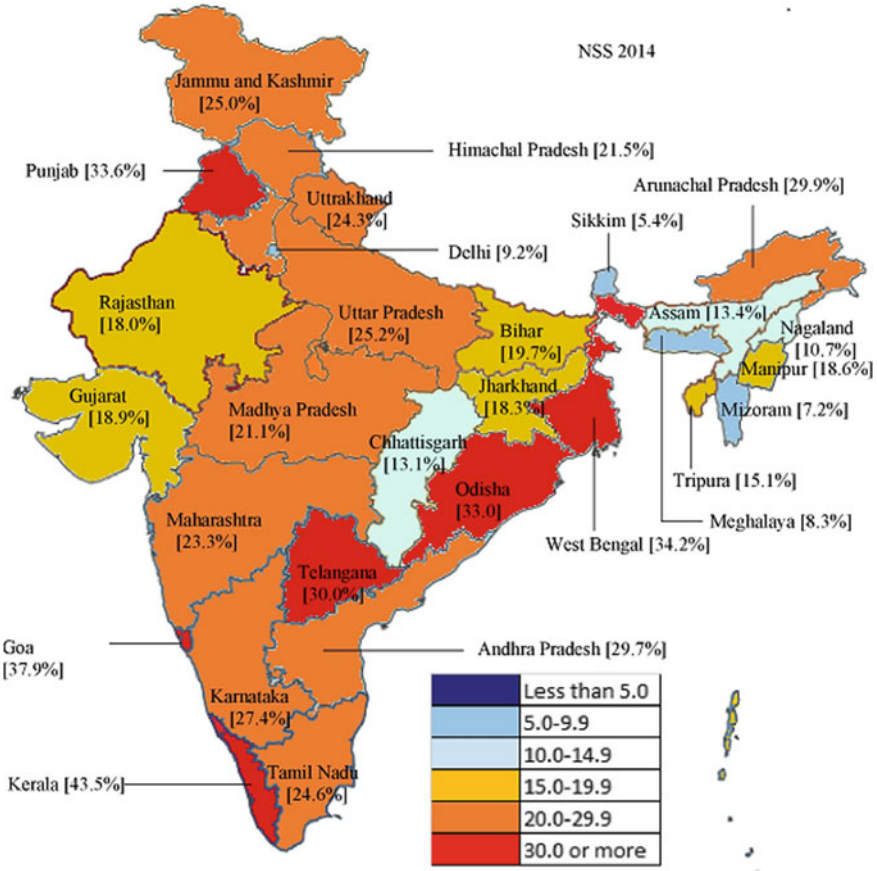

Fig. 10.4 India: Interstate variations in the incidence of catastrophic health expenditure, 2014. *Source* Pandey et al. (2018a)

10.1.2.3 Health Financing Mechanisms and Their Congruence with UHC Goals

One of the principal goals of UHC is financial risk protection, which means that no household would incur CHE or be impoverished as a consequence of spending on healthcare services. In order to progress towards this goal, countries have to move gradually away from out-of-pocket payments towards prepayment mechanisms that are predominantly publicly funded. Healthcare financing through government tax revenues and mandatory health insurance are most congruent with the goals of financial risk protection (McIntyre et al., 2013). What has been India's record in this regard?

Globally, India ranks among countries with the lowest levels of public spending both, as a proportion of the GDP, and in the amount spent per capita in current PPP

Table 10.4 India: National health accounts 2004–05 to 2015–16, selected years

	2015–16	2014–15	2013–14	2004–05
Total health expenditure (THE) as % GDP	3.8	3.9	4.0	4.2
Total per capita health spending in rupees (2004–05 constant prices)	3391.6	3156.8	3057.1	1201
Government health expenditure as % GDP	1.16	1.13	1.14	0.95
Government health expenditure as % THE	30.6	29.0	28.6	22.5
Out-of-pocket spending as % THE	60.6	62.6	64.2	69.4
Social security schemes as % THE	6.3	5.7	6.0	4.2
Private insurance spending as % THE	4.2	3.7	3.4	1.6
External funds as % THE	0.7	0.7	0.3	2.3

Source NHSRC (2018)

dollars. According to World Bank data for 2016, the global average for government spending on health as a proportion of GDP was 7.4%, and for China, Thailand, and Sri Lanka, 2.89, 2.9, and 1.68%. The comparable figure for India was 0.93%. The global average for per capita government spending on health in current US dollars for 2016 was 762.5, and for China, Thailand, and Sri Lanka, 231.1, 173.4, and 66.0, respectively. India's public spending at $16 was less than one-third that of Sri Lanka and one-tenth of Thailand and close to one-twentieth of China (World Bank, 2020).

Time trends based on National Health Accounts data for India show that government spending on health as a proportion of total health spending has increased by eight percentage points between 2004–05 and 2015–16. Out-of-pocket health spending declined as a proportion of total health spending—a move in the right direction, happening at a painfully slow pace. Mandatory insurance, social security schemes, and voluntary insurance currently play a marginal role in health financing (Table 10.4).

We, thus, see that India's health financing is not currently poised to provide significant financial risk protection, despite the very high and increasing levels of catastrophic health expenditure incurred by the population and especially by low-income groups.

10.2 Major Trajectories of Recent Health Reforms in India

10.2.1 Privatisation of the Health Sector

One of the major trajectories of health reforms adopted in India is the privatisation of the health sector. Privatisation may be defined as the adoption of deliberate policy measures and mechanisms by national governments as well as international financial

institutions and bilateral donors to expand the role of the for-profit private sector in healthcare delivery and of private financing for healthcare services received.

It may be noted that we are not talking about the public–private mix in India's health sector, but about measures adopted with the specific aim of expanding the private sector's role in health. India has, for a long time, had a mixed health sector, with public and private financing as well as service provision. Even at the time of independence, private practitioners of modern and Indian systems of medicine dominated service delivery (Baru 1993 as in Baru, 2006). It is widely acknowledged that stagnation in public spending on health throughout the 1970s and 1980s at a time, when demand for health services was rising, led to the growth of the private health sector in service delivery (Baru, 2006; Hooda, 2015; Chakravarthi et al., 2017). From the 1990s, the private health sector received policy support for expansion.

Privatisation of the health sector in India has taken several forms and mainly consists of (a) the provision of a number of concessions and incentives to encourage private (for-profit) investments and (b) entering into diverse public–private partnerships or PPPs (e.g., contracting out, voucher schemes, and social franchising).

Health insurance that permits the use of both public and private sectors for services also contributes to privatisation. There was also a brief experiment with the introduction of user fees in public sector health facilities, i.e. shift to private financing, during the mid to late 1990s and early 2000s. This was through the World Bank-funded Health Sector Development Projects in several Indian states. The experiment was soon discontinued because it resulted in a decline in the use of health services by low-income populations (Ravindran, 2010. User fees will soon make a comeback with PPPs for the construction of medical colleges and service provision at the secondary level currently (2020) being planned by the NITI Aayog (see p. 15).

10.2.1.1 Policy Measures to Facilitate the Growth of the Private Sector in Service Provision

A range of policy measures was implemented by the Government of India to encourage private investment in the health sector. For example, in 2000, 100% foreign direct investment in the hospital sector was permitted by the Reserve Bank of India. Private equity funding to promote healthcare infrastructure was also permitted. The Health Policy 2002 recommended private sector participation at the primary, secondary, and tertiary care levels and also suggested that suitable legislation be implemented to ensure minimum acceptable standards of quality. Hospitals and healthcare institutions were conferred 'Infrastructure' status in the budget of 2002–03, which made long-term capital and loans cheaper for the private health sector. The budget of 2003–04 gave industry status to hospitals and gave benefits to financial institutions for long-term loans to private hospitals. In 2005, the government amended the visa rules to encourage medical tourism. The Finance Act of 2008 allowed 100% tax exemption for five years for newly established hospitals with 100 beds or more located outside the eight urban agglomerations (Chanda, 2007; Hooda, 2015). Other measures included the exemption from import duty for rehabilitative

and assistive devices and the increase in depreciation rates for essential equipment from 25 to 40%, which allows considerable tax savings for private healthcare institutions. The National Health Policy of 2017 envisages a major role in service delivery for the private health sector, including 'strategic purchasing' of health services from the private for-profit and not-for-profit sectors and encouraging private investment in the health sector (GoI, 2017: 19).

There has also been a major push by international development agencies and multilateral financial institutions to encourage private sector growth in the health sector. In their study of the growth of private for-profit-hospitals, Chakravarthi et al. (2017) note the role played by the International Finance Corporation (IFC), a member of the World Bank Group, and CDC Group, the development finance institution of the UK in promoting the growth of the for-profit private health sector in India. The IFC has made equity investments in, or given loans, to several private health companies in India, including Apollo Health Enterprises, Max Healthcare, Rockland Hospitals, and Fortis Health care, to name only a few. The CDC group has made direct investments in the expansion to many Tier II and III cities of the Rainbow Hospital, a maternity and paediatric healthcare business based initially in Andhra Pradesh. It has also made investments in several funds that have invested in healthcare companies in India (Chakravarthi et al., 2017).

10.2.1.2 The Growing Role of the for-Profit Private Health Sector and Implications for UHC

Deliberate policy measures to expand the role of the private sector in health, together with increasing demand for health care, have resulted in the rapid growth of the share of private health facilities and beds, especially since 1991. Between 1971–80 and 2001–10, the number of private health enterprises increased 15-fold, from 39,749 to 630,088 (67th Round of NSS). For-profit enterprises dominate the private health sector and constituted 98.4% of all health enterprises in 2010–11 (67th Round of NSS). The nature of the private health sector has changed from one dominated by individual practitioners and small-scale clinics and nursing homes to an organised industry attracting huge investments and characterised by oligopolisation (Chakravarthi et al., 2017).

The dominance of an oligopolistic private health sector in service delivery is leading to significant increases in the cost of health care. In 1986–87, hospitalisation in a private health facility costs 2.3 times and 3.1 times more as compared to public facilities in rural and urban areas, respectively. In 2017–18, the corresponding ratios were 6.4 and 8.0, respectively (Table 10.5).

Thus, the growth of the share in service provision of the for-profit private sector in India and the increase in the cost of health care spurred by it appear to be responsible for the high incidence of catastrophic health expenditure in India. Private health facilities equipped with qualified human resources are concentrated in the economically more prosperous states and in urban areas, where effective demand is higher than

Table 10.5 Cost per hospitalisation per case in public and private hospitals (Indian Rs. Current prices)

Years/NSS rounds		Public	Private	Ratio of private to public
42nd 1986–87	Rural	1120	2566	2.3
	Urban	1348	4221	3.1
52nd 1995–96	Rural	3307	5091	1.5
	Urban	3470	6234	1.8
60th 2004–05	Rural	3238	7408	2.3
	Urban	3877	11,553	3.0
71st 2014	Total	6120	25,850	4.2
75th 2017–18	Rural	4290	27,347	6.4
	Urban	4837	38,822	8.0

Source Hooda 2015 Table 8, p. 19, updated with figures for the 75th Round of NSS

in rural areas. They provide curative services, for which there is higher demand as compared to preventive and promotive services.

10.2.1.3 Public–Private Partnerships in Health (PPPS)

Public–private partnerships (PPPs) in health are seen as an important strategy for harnessing the considerable human and financial resources available with the private sector towards achieving national health goals, including UHC.

PPPs in India have mainly taken the form of contracting, and to a much smaller extent, social franchising. Early examples of partnerships were with the non-profit private sector and consisted of grants-in-aid for the provision of family planning, abortion, and HIV-related services. There were also examples of primary healthcare services being contracted out to NGOs in the states of Maharashtra and Tamil Nadu (Purohit, 2001).

Public–private partnerships (PPPs) with the for-profit private sector seem to have made their appearance in health policy during the 1990s and early 2000s. The various state-level Health Systems Development Projects funded by the World Bank actively promoted PPPs. C*ontracting out* of non-clinical services in hospitals—e.g. laundry, cleaning services, drivers, dietary services—was a feature of state-level HSR projects in all the seven[2] World Bank-funded State Health Systems Development Projects (The World Bank, 1994, 1996, 1998a, 1998b, 2000). In Maharashtra, a joint venture company, including the government and the private commercial sector, was launched to set up a super-specialty hospital (Muraleedharan et al., 2002).

Under the NRHM in 2005, PPPs were adopted as a useful strategy for meeting the massive requirement for resources, workforce and management capacity. A wide

[2]In the states of Andhra Pradesh, Karnataka, Maharashtra, Orissa, Punjab, Tamil Nadu, Uttar Pradesh

range of PPP arrangements was entered into between state governments and private companies and included contracts for provision of MRI and CT scan services in public hospitals (Andhra Pradesh and Rajasthan); provision of drugs (Rajasthan); voucher schemes for the provision of maternal and child health and family planning services in private clinics, and so on (Venkataraman and Bjorkman, 2009). *The Chiranjeevi Yojana* in Gujarat, in which the government entered into contracts with private obstetricians and gynaecologists for the provision of free delivery care to women from low-income households, is perhaps the best-known and much-discussed example of PPPs in India. The *Chiranjeevi Yojana* was launched in five northern districts of Gujarat in January 2006 and then expanded to the rest of the state between December 2006 and January 2007.

PPPs have reappeared as a strategy in the National Health Policy 2017, to meet the gap in financial and human resources in health. The latest move in this regard is the plan by *NITI Aayog* to enter into PPPs with the for-profit private sector to set up and maintain medical colleges. These private entities will have the license and authority to provide health services through the district hospitals for a minimum of sixty years as per the terms and conditions set in the model agreement (Niti Aayog, 2019).

The USAID and DFID are important players promoting and supporting private provider networks and *social franchises* in reproductive health in the states of Bihar, Jharkhand, Rajasthan, Uttar Pradesh, and Uttarakhand. Some of the well-known franchises include *Janani*, The Merrygold Network, and the Sky Network.

10.2.1.4 The Role of PPPs in Expanding Population and Service Coverage and Providing Financial Protection

There are few robust evaluations of the PPPs in India, except for the *Chiranjeevi Yojana,* and the Merrygold and Sky social franchising networks. We therefore also draw on systematic reviews of contracting arrangements and social franchising schemes for health. The overall picture that emerges is that PPPs make no significant population-level impact either on expanding coverage to those who were not hitherto covered or increasing the range of services available. They often did not reach the most impoverished populations and could even increase the average OOPE. Thus, PPPs may contribute little to progress towards UHC and may not represent the best use of the limited resources available for investing in health services.

The *Chiranjeevi Yojana* in Gujarat, India, to increase uptake of maternal health care and institutional deliveries was hailed as a success in its initial years. However, later evaluations have identified several limitations. During 2005–2010, five years into the programme, the scheme had not contributed significantly to the probability of an increase in institutional deliveries (2.42 percentage points; 95% CI: −5.90 to 10.74). The probability of suffering a maternal health complication had also not changed significantly under the scheme. Spending on delivery had also not changed significantly for users of the scheme (Mohanan et al., 2014). Another evaluation found that the scheme had failed to achieve adequate uptake among the poorest

women. Women from scheduled tribes or poor were three times more likely to be not using the scheme. Lack of official documentation that proved eligibility was an important reason for non-use by eligible women. Women who utilised the CY programme overall paid more than women who delivered in the free public facilities (Yasobant et al., 2016). The reasons for high OOPE are hypothesised to be the long distances travelled to the CY facility and the inability of many contracted providers to deliver Comprehensive Emergency Obstetric Care (CEmOC), forcing patients to seek care from faraway facilities, including city-based private hospitals (Yasobant et al., 2016).

The *Mamata*-Friendly Hospital Initiative in Delhi and the *Janani Sahayogi Yojana* in Madhya Pradesh were two other schemes modelled after the Chiranjeevi Yojana. Evaluations of both schemes found that most of the private providers enroled in the scheme were located in urban centres because there were few qualified providers in rural areas. Thus, the schemes did not increase access for the under-served populations. Patients also reported incurring high OOPE, for the same reasons as cited in the case of the *Chiranjeevi Yojana* (Ravindran, 2011).

As for PPPs to run public hospitals currently in the pipeline as per NITI Aayog, there are no evaluations of previous experiences from India. However, case studies of two PPPs in Sweden and Lesotho, respectively, suggest that NITI Aayog's proposed plan may be risky and involve a major loss to the public exchequer. In Sweden, the government entered into a 30-year PPP arrangement in 2010 with the Swedish Hospital Partners (SHP) to build and manage the Nya Karolinska Solna (NKS) Hospital. The government intended to ensure that the project was completed on time and within the budget and maintained and run cost effectively. The completion of the project took more years than planned, and the cost to the government doubled. NKS hospital is now known as 'the most expensive hospital in the world'. The Queen Mamohato Memorial Hospital in Lesotho was set up by the government in partnership with the Tsepong Consortium in 2008. The contract period was 18 years. IFC of the World Bank Group was the transaction advisor for the PPP. According to the terms of the contract, Tsepong provided services to the required performance standards and was paid an annual service payment. If there were more patients served than the agreed threshold, then the government had to pay a higher amount. The costs escalated for many reasons, including a higher number of patients beyond the agreed threshold, and is an albatross weighing down Lesotho's entire healthcare system. A study commissioned by IFC in 2013 reported that the PPP costs the government 41% of its health budget and 2–3 times the cost of the old hospital (Eurodad, 2018).

Three evaluation studies are available for social franchising schemes—two of the Sky social franchising network (Tougher et al., 2018; Penn-Kekana et al., 2018), and one that examined the equity impact of Merrygold and Sky networks (Haemmerli et al., 2018). The *Matrika* social franchise of the Sky network in Uttar Pradesh, India, is a network of private providers and facilities aiming to increase coverage and quality of maternal, newborn, and reproductive health services. Three years into the programme, there was no significant increase in the proportion of institutional

deliveries, or in the 14 indices of maternal, newborn, and reproductive health care[3] that were assessed (Tougher et al., 2018). A process evaluation of the same scheme found that the scheme had low coverage, was not well-known among the intended target groups, and had weak referral linkages between facilities providing antenatal care and delivery services. The quality of care was also reported to be unsatisfactory across the board (Penn-Kekana et al., 2018). A majority of franchise users belonged to the higher socio-economic groups within the low-to-lower-middle income settings, and only 10–20% were from the lowest two socio-economic status quintiles. The poorest women could not afford to pay even the modest fee-for-services charged by the franchises. Another limitation was that the most impoverished areas did not have health facilities that could be included in the franchising networks (Haemmerli et al., 2018). These findings regarding social franchises hold across the world. An examination of the 2015 Compendium of 70 social franchises for maternal, newborn, and reproductive health spread across 40 countries (Viswanathan and Seefield, 2016) shows that social franchises have, in general, not added much to the range of health services but have focussed mostly on contraceptive and safe motherhood services. Nor have they increased service–delivery points in rural and hard-to-reach areas since many are 'fractional' franchises, set up in clinics that were already operational. They tended to cater to relatively better-off clients, findings on quality improvement in the franchised clinics were equivocal, and no improvements in desired health outcomes could be established (Ravindran and Fonn, 2011).

10.2.2 Publicly Financed Health Insurance Schemes for Low-Income Populations

Policymakers in India view publicly financed health insurance schemes for low-income populations as a primary strategy for achieving UHC, as evidenced in the announcement by the Health Minister of India in relation to the ambitious *Ayushman Bharat* Scheme launched in 2018 (GoI Press Information Bureau, 2019). The *Ayushman Bharat* Scheme includes the *Pradhan Mantri Jan Arogya Yojana* (AB-PMJAY) or National Health Protection Scheme funded by the Government of India and state governments. The scheme aims to cover 100 million poor and vulnerable households (500 million beneficiaries) with a benefits package of INR 0.5 million per household per year for secondary and tertiary care hospitalisation in public and empanelled private health facilities. The AB-PMJAY subsumes *Rashtriya Swasthya Bima Yojana* (RSBY), the erstwhile nationwide PFHIS implemented during the previous decade, and many of the state government-sponsored PFHIS. As of January

[3]These included antenatal care use, content of antenatal care, knowledge and preparedness for pregnancy and birth, use of delivery care, adoption of recommended delivery-care practices, reduction in harmful or ineffective delivery-care practices and over-used practices, respectful care, financial consequences, post-partum care, content of newborn care, neonatal health, breastfeeding, and family planning.

2020, all but four states of India—Delhi, Orissa, West Bengal, and Telangana—are implementing the scheme.

What is the evidence on the extent to which PFHIS for low-income populations contributes to UHC? While it is early days yet to assess the UHC impact of PMJAY, there are numerous studies of the PFHIS implemented by the national and state governments during the decade of 2008–2018. We synthesise the findings from these studies in this section.

10.2.2.1 The First Decade of PFHIS in India (2007–2018)

In 2008, following the example of other LMICs, India introduced a nationwide scheme called *Rashtriya Swasthya Bima Yojana* (RSBY), initially with the Labour Ministry. It was subsequently transferred in 2015 to the Ministry of Health and Family Welfare (MOHFW). In the final edition of the RSBY scheme, states had the freedom to adapt and modify the scheme to suit their needs. Governments implemented RSBY in 23 different states during the decade of 2008–2018. Besides, nine state government sponsored voluntary health insurance schemes were introduced at various points in time, starting in 2003 through 2017. These included the Andhra Pradesh's *Rajiv Arogyasri* (2007), Comprehensive Health Insurance Scheme (CHIS) of Kerala (2008), Karnataka's *Yeshasvini* Co-operative Farmers Health Care Scheme (2003) and *Vajpayee Arogyashri* Scheme (2009), Himachal Pradesh's RSBY-plus Scheme, Tamil Nadu's Chief Minister's Comprehensive Health Insurance Scheme (CMCHIS), and Rajiv Gandhi Jeevandayee Arogya Yojana (RGJAY) in Maharashtra (2012). The last to join the fray were Uttarakhand (2015) and Chhattisgarh (2017), with the Mukhyamantri Swasthya Bima Yojana (MSBY). The scheme in Chhattisgarh was a top-up of the RSBY and covered all households not covered by RSBY (Prinja et al., 2017).

All the schemes targeted poor households. While different states used different criteria to identify the poor, the identification was usually based on a poverty threshold used by the government of India or state governments. All who fell below the threshold were classified as poor or below poverty line (BPL), regardless of the depth of their poverty and deprivation. Although all schemes covered only the costs of hospitalisation of households and aimed to provide financial risk protection, some were reimbursement schemes, and others were assurance and insurance schemes (Duggal, 2018; Philip et al., 2016; Prinja et al., 2017).

We synthesise below the current evidence on the contribution of PFHIS in India to expanding population and service coverage and providing financial risk protection, especially to low-income and other vulnerable population groups.

10.2.2.2 Population Coverage

The RSBY programme was implemented in 520 districts (83.2% of all the districts) in India in 23 states across India. Many studies have given different figures for

population coverage. A recent study by Karan et al. (2017) showed that approximately 36 million families were enroled in the RSBY or almost 60% of all poor families in the implemented districts. However, this represented only about 15% of the 250 million poor families in the country, targeted by the RSBY (Karan et al., 2017). Previous assessment studies on RSBY have reported coverage ranging from 27% to 47% of the eligible households during 2011–2015 (Vellakkal, 2013; Nandi et al., 2013; Virk and Atun, 2015). As per the RSBY website, around 37.7 million BPL families were enroled in the RSBY scheme nationwide in 2018 (RSBY, 2018). As of December 2020, the AB-PMJAY scheme had issued more than 12.7 crore e-cards all over India (Government of India, 2020).

Studies indicate wide variations in population coverage across states and districts. District- level coverage of RSBY was as high as 90% in some districts of Punjab and as low as 40% in some districts of Orissa. A study conducted in Maharashtra in 2013 found that the ever-enrolment rate of RSBY among BPL households was only 22%. The study also found that only 12% of the eligible households were currently enroled, and not all of them were seen to possess a valid RSBY card (Thakur, 2014). Another study found drastic variations in enrolment patterns across villages within the same district: in about 3% of the selected villages, all (100%) BPL households were enroled, whereas in 10% of the villages, no eligible families were enroled (Sun, 2011).

One of the reasons for variations in population coverage and low enrolment rates in some pockets or demographic groups was differences in the level of awareness about the schemes (Philip et al., 2016, Reddy et al., 2011, Sun, 2011). While most people were aware that BPL status was the eligibility criterion and that only five members per household could be enroled, far fewer proportions knew about diseases/conditions covered under the insurance schemes and about transport allowances (Prinja et al., 2017).

Other studies have pointed out discrimination in enrolment due to the discrepancies in BPL data. The health ministry used BPL data from censuses conducted by state governments to identify households eligible for the scheme. There are several problems with the BPL lists, as indicated by numerous studies. Due to these errors, many poor households are left out, and many non-poor households are on the list (Karan et al., 2017; Philip et al., 2016; Sun, 2011). Other studies have found that there is low enrolment in poor districts within a state (Narayana, 2010; Rathi et al., 2012; Sun, 2011). Two studies from Kerala also found that CHIS failed to insure the poorer households within the below poverty line category (Philip et al., 2016; Vellakkal, 2013).

10.2.2.3 Service Coverage

Studies on utilisation of PFHIS have measured service coverage as the number of hospitalisations per 1000 persons in a year among RSBY enrolees. Service coverage of RSBY varied across districts and states. According to a 2010 study, the average hospitalisation rate per 1000 persons in a year varied from 4 in Punjab to 25 in

Gujarat. The highest hospitalisation rate of 196.41 was reported in the Dang district of Gujarat, whereas the lowest was reported in the Jalandhar district of Punjab with one hospitalisation (Narayana, 2010). Other studies have reported slightly different rates (Reddy et al., 2011).

Studies indicate several barriers to utilisation, despite being enroled in the RSBY. First, many enroled households did not have information on which health facilities were empanelled (Kumar, 2010, Nandi et al., 2012). Utilisation rates were associated with caste status of the insured person, with less advantaged castes having the lowest utilisation rates, presumably owing to lack of information about how and where to use the scheme (Prinja et al., 2017). Secondly, in many districts, there were very few empanelled hospitals. In other instances, empanelled health facilities refused or delayed treatment to enrolees. A study found that the use of the RSBY scheme by enrolees depended on the number of people in the same village who had already utilised the benefits and the number of hospitals empanelled under the scheme in the area (Kumar, 2010; Palacios et al., 2011; Narayana, 2010). Quality of care in the empanelled hospitals may also contribute to utilisation, as indicated by the finding that the utilisation rate was concentrated in a select few empanelled hospitals in the district (Palacios et al., 2011; Narayana, 2010).

To assess the true magnitude of service coverage, it would be necessary to assess the actual proportion of eligible conditions covered by the PFHIS in the households enroled. A prospective community-based study in Kerala and Tamil Nadu of 600 low-income urban households in each state found that even when households were enroled in the PFHIS, only a fraction of the hospitalisation episodes in these households were covered by the insurance scheme. In Kerala, 368 of 414 insured households experienced at least one episode of hospitalisation during nine months covered by the study. Of these, only 44 households or 12% had all episodes of hospitalisation for all members covered by the scheme. A little over 30% had some hospitalisation episodes of some members covered, while 57.6% of insured households had to pay out-of-pocket for all the episodes of hospitalisation. In Tamil Nadu, only 9.4% of the 138 households (of 600), which had at least one member hospitalised were fully covered by the CMCHIS, 8.7% were partially covered, and 81.9% had none of the hospitalisation episodes covered. Most reasons for the poor service coverage were similar to those discussed earlier—lack of information on empanelled hospitals and on health conditions eligible for coverage, distance and ease of use, and refusal and delays in the empanelled hospitals. However, an important reason was the low level of financial coverage of Rs. 30,000. Any household with more than one episode of hospitalisation had to incur OOPE (Philips, 2018).

'Service coverage' may also be defined beyond utilisation for conditions 'covered' by the scheme by enrollees. From the perspective of UHC, the outcome of interest is the proportion of health needs covered by any scheme, so that the OOPE on healthcare incurred is minimal. The study by Philips (2018) examined service coverage in this way. It found that in Kerala, 410 of 414 insured households (99%) had health needs requiring outpatient or in-atient care. However, only 44 households received complete coverage, because the scheme covered only inpatient care up to a total cost of Rs. 30,000 (Philips, 2018). The fact that all PFHIS in India covers only secondary and

tertiary inpatient care, in a scenario where chronic morbidities are on the rise may mean that they leave a significant proportion of health needs uncovered, resulting in poor financial risk protection.

10.2.2.4 Financial Risk Protection

All PFHIS have emerged intending to provide financial risk protection to poor households during catastrophic health shocks. A systematic review on the financial risk protection provided by RSBY and other state-run insurance schemes found that out of the 13 studies assessing financial risk protection, a majority of studies (69%) reported no reduction in OOP expenditure among enroled households after implementation of health insurance schemes. Out of the five studies which measured the impact of RSBY, two studies reported a reduction in OOP expenses. However, no study showed any decrease in the incidence of catastrophic health expenditure. On the other hand, studies that measured catastrophic health expenditure as a measure of financial risk protection showed an increase in the incidence of catastrophic health expenditure headcount (Philip et al., 2016; Prinja et al., 2017).

Findings on CHE from the NSS surveys, discussed in section one, confirm the above. During the decade when PFHIS were implemented, there has been no reduction in CHE or the proportion impoverished as a consequence of OOPE in health.

10.2.2.5 Prognosis for AB-PMJAY

The evidence on PFHIS in India shows that they have failed to expand population or service coverage or to provide financial risk protection. In what ways is the AB-PMJAY different, to succeed where the previous schemes failed?

There have been important changes in the design of the AB-PMJAY as compared to earlier schemes. One, coverage is extended beyond the BPL population to other vulnerable and marginalised households identified through the Socio-Economic and Caste Census (SECC). Second, there is no upper limit on the number of members to be enroled per household, which had, in the past, led to the exclusion of the least powerful household members. Third, the financial coverage has been increased substantially, from Rs. 30,000 to Rs. 500,000, a 16-fold increase. Fourth, membership in the scheme is portable across Indian states.

But other problems remain. There is poor availability and skewed distribution of public and private hospitals and qualified healthcare providers; non-coverage of ambulatory care and cost of medicines; and lack of information among enrolees on empanelled hospitals and eligible conditions. However, perhaps the biggest problems of all will continue to be the challenges in engaging with an unregulated and power private health sector and the low levels of public investment in healthcare.

The Clinical Establishment Act, 2010, has been implemented only in ten states and union territories, with little impact on regulating the private health sector. Other states have diverse regulatory policies, and little is known about their effectiveness. Health facilities are not legally obliged to adopt Standard Treatment Guidelines, and Protocols and accountability mechanisms are weak. In the absence of regulation, the AB-PMJAY may encounter escalating costs of treatment for no significant improvement in health outcomes (Keshri and Gupta, 2019).

Studies of the performance of AB-PMJAY during 2018–19 carried out by the National Health Authority show significant inequalities in access to and utilisation of the scheme. For example, states with the highest needs—in terms of the proportion of people living below the poverty line and disease burden—had enroled fewer beneficiaries and had much lower utilisation rates for AB-PMJAY than the better-off states (NHA, 2019a). The 115 'aspirational districts', which are economically the least developed, had fewer hospitals empanelled, lower claim volumes and lower average claim sizes (NHA, 2019b). While private hospitals accounted for 61% of all claims by volume and 66% of all claims by value, they accounted for 82% and 81%, respectively, of all claims above Rs 100,000 (NHA, 2019c).

The budgetary allocations for AB-PMJAY in the past years have been a minuscule fraction of estimated needs. The amounts allocated in the three budgets (2018–19, 2019–20, and 2020–21) are Rs. 3200 crores, Rs 6400 crores, and Rs. 6400, crores, respectively. Revised estimates for AB-PMJAY for 2019–20 were only Rs. 3200 crores, half the original allocation (Kaur, 2020). Keshri and Gupta (2019) point out that even if only 5% of the 100 million beneficiary families claimed 20% of Rs. 500,000 which they are entitled to, the estimated expenses would be Rs. 50,000 crore per annum, without accounting for the running cost of the scheme.

Unless these unresolved problems are addressed, the AB-PMJAY does not appear to hold promise for ushering India towards UHC.

10.3 The Way Forward

In this section, we first describe the steps taken to make rapid strides towards UHC by two Asian countries—Thailand and Vietnam. While we have much to learn from Thailand, which has fared well on all counts—population and service coverage and financial risk protection, as well as in improvements in health status, it has a much higher level of per capita GDP than India. We, therefore, decided to include the example of Vietnam, since it is closer to India in terms of economic development but has done comparatively far better than India in progressing towards UHC goals. In the concluding subsection, we draw on the lessons from these countries and elsewhere, to outline the path India will have to take to move close to UHC.

10.3.1 The Experiences of Thailand[4] and Vietnam in Health Reforms Congruent with UHC Goals

Table 10.6 presents basic economic, demographic, and health data for India, Thailand, and Vietnam, to set the context within which to understand the health reform experiences of the respective countries.

It may be seen from the table that Thailand and Vietnam fare much better than India in terms of health status indicators and UHC indicators of coverage and financial risk protection. However, in terms of the availability of health workers, there is not a big difference across the three countries. The critical difference is in the extent of health spending. Current health expenditure in India is only half that in Vietnam and close to one-quarter that in Thailand. Government health spending in India is only about 25% of current health expenditure, as compared to 78% in Thailand and 47% in Vietnam. India's public spending on health as a % of GDP is only about a third of that in the other two countries, although India's GDP growth rate is higher than that of Thailand and comparable to that of Vietnam.

10.3.1.1 Thailand

What has been Thailand's strategy towards achieving near-universal health coverage? According to Tangcharoensathien (2018), Thailand has adopted a long-term, sustained two-pronged strategy since the 1970s. On the one hand, infrastructure and human resources were strengthened, and considerable investment went into expanding the availability of health services. Simultaneously, efforts were made to reduce out-of-pocket expenditure and to provide financial risk protection to all, in an incremental manner. A robust regulatory system enabled the provision of a comprehensive benefits package cost effectively.

Increasing availability to enable population coverage

In the initial phase, the district health system was strengthened in terms of increasing the number and equitable distribution of health facilities and the health workforce. The government decided to freeze the budget for urban hospitals for five years and invested it in strengthening the district and primary health system. By 1990, every district had a hospital with 30–150 beds covering 30–50,000 population, and by 2000, every subdistrict had a health centre covering 3000–5000 population. The health centre was staffed with 3–5 nurses and several paramedics (Tangcharoensathien, 2018).

In 1972, the government introduced compulsory rural service for all newly graduating doctors, nurses, dentists, and pharmacists. The period of compulsory service was 2–3 years. In the subsequent years, policies were introduced to increase the numbers of health professionals from rural areas and to deploy them in the towns or

[4]The description of Thailand's UHCReforms is based on a presentation by Viroj Tangcharoensathien in a seminar in Trivandrum, on 9 September 2018.

Table 10.6 India, Thailand, and Vietnam: Economic, demographic, and health indicators

Indicator	India	Thailand	Vietnam
Fiscal space			
GDP per capita in current US$ in 2018	2010	7273.6	2566.6
GDP per capita growth (annual %) in 2018	5.7	3.8	6.0
Tax revenue (% of GDP) in 2017/2018	11.2	15.0	n.a.
Demography			
Population in millions (2018)	1352.6	69.4	95.5
Population growth (annual %) 2018	1.1	0.3	1.0
Health expenditure			
Current health expenditure per capita in current US $ in 2016	62.72	221.92	122.84
Current health expenditure (% GDP) in 2016	3.66	3.71	5.66
Domestic government health expenditure per capita in current US$ in 2016	15.95	173.40	58.27
Domestic government health expenditure (% GDP) in 2016	1.16	2.9	2.7
Health status and service coverage			
Under-five mortality rate (per 1000 live births) in 2016	37	9	21
Maternal mortality ratio (per 100,000 live births) in 2017—WHO/UNICEF modelled estimates	145	37	43
Births attended by skilled health staff (%) in 2016	81	99	94 (2014)
Antenatal care (4+ visits)	45	93	74
Health service availability			
Hospital beds per 10,000 population in 2015	0.7	2.1	2.6
Physicians per 100,000 population in 2015	80	80	80
Nurses and midwives per 100,000 population in 2015	210	300	140
UHC indicators			
Service coverage index (out of 100) in 2017	57.3	79.8	75.0
Catastrophic Health Expenditure (latest years) – 10% threshold – 25% threshold	17.3 3.9	2.2 0.4	9.4 1.9
Impoverishment due to CHE (international poverty lines, latest years) – $1.90 – $3.20	4.16 4.61	0.0 0.01	0.25 1.16

Sources World Bank Data from data.worldbank.org for all indicators except the UHC indicators, which are from WHO (2019a, b)

districts where they hailed from. These policies helped to recruit and retain health professionals in rural areas. Health professionals working in remote and difficult areas, those who did not engage in private practice, and those who stayed in services were rewarded with financial incentives and non-financial incentives such as housing, opportunities for higher education, and career advancement (Tangcharoensathien, 2018).

Strengthening of the district health system shifted the burden of outpatient care from secondary hospitals to rural health centres. In 1977, only 30% of the outpatients used rural health centres, 24% used district hospitals, and 46% used regional hospitals. By 2010, the pattern had shifted to 54% using rural health centres, 33.4% using district hospitals, and 12.6% using regional hospitals. This also meant a more efficient use of financial and human resources (Tangcharoensathien, 2018).

Expanding financial risk-protection

Thailand has three major pooling mechanisms for health financing. The first is the Civil Servants' Medical Benefits Scheme (CSMBS), covering civil servants and their dependents, financed by tax revenue, started in 1980. The second is the mandatory Social Health Insurance Scheme (SHI) started in 1990, for other formal sector employees, with tripartite contributions from the employees, employers, and the government. The third is the Universal Coverage Scheme (UCS), which started in 2002, and covers everyone not covered by the first two schemes. UCS is also tax-funded (Tangcharoensathien, 2018).

Thailand had experimented with targeted voluntary non-contributory schemes for low-income groups since 1975, and with voluntary contributory schemes for the informal sector since 1983. The decision to discard these voluntary and targeted schemes in favour of a universal scheme came about because of the realisation that targeted schemes failed to cover a substantial proportion of those outside the formal employed sector—30% in 2001 (McIntyre et al., 2013).

Providing a Comprehensive Benefits Package

Since its introduction in 2002, the benefits package of UCS has increased substantially to include some high-cost procedures and treatments, including renal replacement therapy, liver and heart transplantation, and ARV for the treatment of HIV.

All new additions are subjected to rigorous health technology assessment, and together with measures such as the National List of Essential Medicines (NLEM), it helps in cost containment and rational and efficient use of resources (Tangcharoensathien, 2018).

10.3.1.2 Vietnam

In 1986, the government of Vietnam adopted 'Doi-moi', a policy of 'renovation', which marked the beginning of its transition to a market economy with many effects

on the health sector. In 1992, the government promulgated the National Health Insurance *Decree*. Two types of schemes were introduced: compulsory insurance for all current salaried and retired workers in the public sector, and all current workers of private enterprises with more than ten employees; and voluntary health insurance for all the others: students, farmers, family members of those enroled in compulsory schemes (WHO, 1996). Between 1992 and 2009, the country made several modifications to the health insurance schemes. It also introduced several measures to provide financial risk protection for those not employed in the formal sector, such as a user fee exemption for the poor and extending voluntary insurance coverage to various vulnerable population groups. As of 2007, there was the mandatory Social Health Insurance scheme, which covered formal sector employees through a system of payroll deduction, and voluntary health insurance for those not formally employed. Also, the poor were covered by the Health Care Funds for the Poor (HCFP), and children under six years of age were provided free care, paid by the government through tax revenue (Ekman et al., 2008). In 2009, the Government of Vietnam (GoV) passed the Law on Social Health Insurance to create a national Social Health Insurance (SHI) program, making SHI the primary mechanism for achieving UC. In 2014, Vietnam revised its Health Insurance Law, replacing voluntary membership in contributory schemes for those outside the formal sector to mandatory membership. The revised law also replaced individual membership with family membership. Today, National Health Insurance is the main health financing mechanism in Vietnam, with the mandate to cover the entire population. While formal sector employees contribute, those in the informal sector pay a subsidised premium while the government pays the premiums for the poor. The shift to the single consolidated pool of revenue has helped in improving financial risk protection, as seen in Table 10.6. As of 2015, 72% of the population was reported to be covered by the National Health Insurance (WHO, 2015).

Many other reforms are underway to strengthen the availability of services. Between 2002 and 2010, policy measures increased the density of human resources, with a more rapid increase in rural and remote areas of both physician and nurse/midwife density (Somanaathan et al., 2014). Regulatory mechanisms and measures for cost containment for pharmaceutical products are also being strengthened (WHO, 2015).

10.3.2 The Way Forward for India

The examples of Thailand and Vietnam and of other countries that have been successful in progressing towards UHC suggest a number of definite dos and do nots for countries intending to achieve UHC.

- The political will and commitment to consistently make substantial public investments in health care is the starting point for the journey towards universal health coverage.
- Coverage of the population with an adequate number of health facilities with an optimal mix of health workers is the foundation on which the journey towards UHC is premised. Strengthening coverage of primary health care is imperative.
- Bold and innovative policies that are sustained over a long period, such as compulsory rural service for all levels of healthcare providers combined with incentives such as posting in home district and fair transfer policies, rewards for staying on in government service and not engaging in private practice, are needed to train and retain a skilled health workforce.
- Tax-based financing supplemented by a single mandatory insurance scheme for the formal sector collected into a single pool of revenue offers the most feasible route to UHC in settings with a large informal sector.
- Targeted social protection schemes and voluntary contributory schemes for the informal sector do not succeed in expanding population coverage to universality. They also result in the fragmentation of funding pools, limiting the scope for risk pooling and cross-subsidisation.
- The ability to offer a comprehensive benefits package is contingent on efficient management of the health system, cost containment measures in the procurement of drugs and supplies, stringent health technology assessments before the adoption of new technologies and procedures, among others.
- There is no evidence as yet to suggest that engagement of an unregulated and powerful private health sector helps in moving towards UHC.

Most of these lessons are well-known and have been widely written about. There is, however, no sign that India's UHC policies are taking cognisance of the evidence. In the most recent budget, announced on 1 February 2020, the allocation in real terms has decreased by 4.3%. A paltry allocation of Rs. 1600 crores was made for setting up the HWCs, the same amount as the last year's budget. Less than 15% of the 1.5 lakh HWCs have as yet been built, with only two more years to go before the deadline, and most of this year's allocation may be required to pay the recurring costs of these existing HWCs. The allocation for the AB-PMJAY has, as already seen, been grossly inadequate since the inception of the programme (JSA, 2020). There is a poor understanding of a large number of diverse challenges related to different cadres of the health workforce, leave alone efforts to address these. We have barely begun the discussion on financing reforms to consolidate the multiple and fragmented funding pools or on the best ways of engaging with a heterogeneous private health sector.

The intention of this paper is not to portray a picture of gloom and hopelessness. If it encouraged readers to take a hard look at reality and begin to address the challenges, it would have achieved its purpose.

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Chapter 11
Changing Landscape of Professional Higher Education in India: What Do We Know and What Do Recent Data Tell Us?

Pradeep Kumar Choudhury and Amit Kumar

11.1 Introduction

Higher education (HE) plays a critical role in creating a better world. It contributes to economic development with the production of specialised human capital and plays an equally important role in improving human well-being with the supply of socially conscious, civilised and enlightened citizens. It facilitates social progress and works as a driver of inclusive growth (Tilak, 2018). Further, in a competitive global knowledge economy, there is an increasing demand for skilled human resources with creative minds and the higher education system contributes significantly to fulfilling these goals. It is being argued that countries with a larger proportion of graduates participating in labour market have higher total factor productivity and extra capacity to adopt technology and innovation (Altbach, 2013; Bloom et al., 2014; Rahman & Unnikrishnan, 2015; Whalley & Zhao, 2013; World Bank, 2017). Furthermore, the changes that are taking place in the production of knowledge in the twenty-first century demand for more higher education graduates. They contribute significantly to the growth and expansion of the knowledge business and are increasingly critical to the world economy. Overall, higher education contributes significantly to national development, and it is well recognised globally.

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Owing to the significant contribution of HE to social and economic development, demand for higher education continues to grow rapidly around the globe (Altbach & Levy, 2005; Buckner, 2017; Marginson, 2016; Trow, 2007; Varghese, 2015). Marginson (2016) found that while global population multiplied by 1.93 from 1970 to 2013, number of tertiary students in the world multiplied by 6.12 during the same period. A large chunk of secondary graduates aspire to access higher education to acquire a new set of skills that are required to get meaningful employment in the job market. The world average in the gross enrolment ratio (GER) in HE has gone up from 13.62% to 38.04% between 1990 and 2018 (World Bank, 2020). Similar to the global trend, there is a growing aspiration of younger Indians to access higher education. India has become one of the largest higher education systems globally, with around 1.41 million faculties and 37.4 million students enrolled in 993 universities and 39,931 affiliated colleges (MHRD, 2018–19). The GER, as estimated by the MHRD based on data collected from institutions of higher education through the *All-India Survey of Higher Education*, has gone up close to seventy times–0.4% in 1950–51 to 26.3% in 2018–19 (MHRD, 2019; UGC, 2015). The National Education Policy (NEP) 2020 targets to achieve a GER of 50% in higher education by 2035. India aims to create a knowledge society by providing access to quality higher education to majority of the Indians that would help to address the new realities of the twenty-first century. Thus, like many other developing countries, HE sector in India has undergone a massive expansion in terms of institutions and student enrolments in the past three decades.

Interestingly, the rapid growth in HE in post-1990s was largely due to the promotion of private participation. Though every region experienced significant growth of private higher education institutions (HEIs) in the post-liberalisation period, it made up more than 60% of all the new institutions for many countries (Buckner, 2017: 299). The expansion of higher education in India is accompanied by a fast-growing private sector in the post-1990s (Tilak, 2018). There was no private university in the country in 1990–91, which has increased to 385 in 2018–19. Similarly, private colleges have gone up by six times (from 6627 to 39,931) during these three decades of post-liberalisation. Concurrently, student enrolment in private HEIs rose from a meagre 16.7 million (2010–11) to 24.8 million in 2018–19, demonstrating an increase of more than 67% during the last decade. Currently, private sector holds more than two-third of all HEIs that cater to 66.4% of overall enrolments in HE (AISHE Annual Report 2018–19, 2019). As expected, the private sector participation in professional higher education (PHE) disciplines like engineering, medicine law, management, pharmacy, catering technology, town planning, etc. is significantly higher than the courses offered in humanities and social science disciplines. For instance, in 2018–19, the share of private institutions is more than 90% of the total UG level engineering institutions in the country with an enrolment share of 87% (AICTE, 2020). Similarly, in the last three decades (1990 to 2020), the number of private medical colleges increased by 540%, whereas the number of government-run medical colleges grew up only by 174% with an overall growth of 279%. The share of private sector in total number of medical colleges increased from 3.6% in 1950 to 48.3% in 2020. In this period, the enrolment share has gone up from 1.4 to 47% (Choudhury, 2016a;

Medical Council of India, 2020). Thus, the growth of professional higher education in India has been driven largely by developments in the private sector that leads the HE sector in the country towards a 'new massification'. The unprecedented boom in the market-driven courses in professional higher education has experienced a new economic and institutional discourse in this area.

While the expansion of professional higher education sector has helped the country to reach a stage of massification (which is to be celebrated), it is equally important to examine the changing trend and pattern it follows in its growth. Despite massive expansion of PHE in the country, very few studies have explored the major issues this sector has been facing for a long period. Particularly, availability of studies examining the changing student composition in access to PHE is extremely limited. Likewise, even with several policy changes that emphasise on privatisation of PHE in India, the contours of this remain understudied. How has the neo-liberal turn of the early 1990s shaped the PHE sector in India? What the recent data evident? Also, in the context of an increasing presence of the private sector and shrinking public funding, it is dangerous to ignore the role households currently play in demanding PHE in India. This calls for examining the inequalities in household investment in PHE in India. In total, absence of new and updated research on professional higher education in the context of India is quite visible, and therefore, this study giving a critical descriptive account on the status and prospects of PHE in India will be of immense interest to academia as well as administrators and policymakers.

Based essentially on secondary database, this study focuses on four important issues (a) changing trend and pattern of the growth of professional higher education, (b) inequalities in access to professional higher education, (c) socioeconomic and institutional barriers in access to PHE and (d) household financing of PHE. The paper provides a more complete and up-to-date assessment of PHE in India and aims to identify and explore the major issues and new challenges faced by this sector in recent times. The discussion on the changing landscape of PHE in India would certainly provide a comprehensive picture of the sector, which may inspire others to carry out further research in this area. It must, however, be stated that the analysis is limited with the availability of secondary data in several indicators on higher and professional education in India.

The rest of the paper proceeds as follows: Sect. 11.2 discusses the major data sources used in the study. Section 11.3 examines the changing trend and pattern of the growth of professional higher education in terms of institutions and enrolment, particularly highlighting the upsurge of this sector in the last decade, both at national and regional levels. Section 11.4 maps out the trend, pattern and socioeconomic disparities in access to PHE in India using National Sample Survey (NSS) unit-level data. Section 11.5 estimates the predicted probability of accessing PHE by the students using probit model. Next section discusses inequality in household spending on PHE by socioeconomic and institutional factors. Finally, a critical comment is offered on the recent reforms being attempted in professional higher education in the country as part of the conclusion.

11.2 Note on Data and Methodology

The paper uses disaggregated unit-level data available in the latest three education rounds of the National Sample Survey Organisation (NSSO)—the 75th round conducted in July 2017 to June 2018, the 71st round conducted in January-June 2014 and the 64th round conducted in July 2007–June 2008. The 64th round *(Participation and Expenditure in Education*) covered a sample of 100,581 households (63,318 rural households and 37,263 urban households), the 71st round *(Education in India)* includes a sample of 65,926 households (36,479 rural households and 29,447 urban households), and the 75th round *(Household Social Consumption: Education)* includes a sample of 113,757 households (64,519 rural households and 49,238 urban households) from all over India. Unlike the more 'general' or 'normal' rounds, the focus of these three rounds of data was to collect information on four important issues related to education, in addition to many other household-level characteristics in detail: (a) participation in education, (b) family expenditure, often referred to as private expenditure, incurred by households on education, (c) incentives provided by the government and (d) the extent of educational wastage in terms of dropout and discontinuation along with causes of the same. The surveys also give information on number of adults who have acquired higher education (or completed level of higher education).

In this study, we have restricted our sample to the students who are currently attending four professional courses (engineering, management, medicine and law) in higher education in India. Sample size for those pursuing professional courses is coming out to be 15,568 for 2017–18, 5878 for 2014–15 and 625 for 2007–08. It accounts for 48.5%, 34% and 11.8% of the total sample size for university graduates in respective years. Of the total sample in 2017–18, around 79% were enrolled in government institutions, whereas remaining 21% were studying in private ones. Engineering students constituted the highest share (72%), followed by Medicine (14.3%), Management (10%) and Law (3.7%). Similar proportions of samples with a few variations are taken in 2007–08 and 2014–15. The NSSO data analysis is supplemented by the information collected from the annual reports of the All India Survey of Higher Education (AISHE) in this study.

The analysis covers four major discussions. First, the changing trend and pattern of growth of professional higher education (in terms of institutional expansion and student enrolment) in India are analysed, both at national and regional levels. Second, inequalities in access to professional higher education are discussed. This reveals the trend and pattern in the socioeconomic disparities in access to PHE and its interface with institution type. Third, using the unit-level data of 2017–18, the predicted probabilities of attending professional higher education are analysed for persons aged 18–23 years using probit models. The dependent variable for the probit estimation is a dummy variable and takes value 1 for the persons in the age group of 18–23 and are currently attending PHE and 0 if they (of the age group 18–23) are currently

not attending PHE. The analysis considers several individual, household and institutional factors as explanatory variables.[1] To examine the heterogeneity in the predicted probabilities of attending professional higher education, the probit regression is separately made by gender, household location, consumption quintiles and institution type. Fourth, inequalities in household spending on professional higher education are analysed using 2017–18 NSSO data. The variations in the household spending on professional higher education are shown by gender, caste, location (rural-urban), consumption expenditure quintile, course type and type of institution; separately for fee and non-fee items. However, as the NSS data are based on sample surveys and observations become fewer as one moves to smaller and smaller sub-groups, some of the results need to be interpreted with caution.

11.3 Growth Trend of Professional Higher Education in India

Professional higher education in India has experienced substantial growth in terms of number of institutions and student enrolments during last five decades, more so in recent years. The number of professional higher education institutions (PHEIs) increased from a meagre 374 (1970–71) to 4,722 in 2018–19, i.e. the growth of 12.6 times in the last 50 years (see Fig. 11.1). More importantly, the last decade has observed significant growth of PHEIs in India—3214 (3077 colleges and 137 universities) in 2011–12 to 4722 (4479 colleges and 243 universities) in 2018–19, registering a 147% increase. Likewise, student enrolment in professional courses has gone up from 39.6 lakhs to 71 lakhs (an increase of 179%) during the last decade.

There exist wide course wise variations in the growth of PHE institutions and enrolments during the last decade. Engineering marks the highest enrolment of 40.3

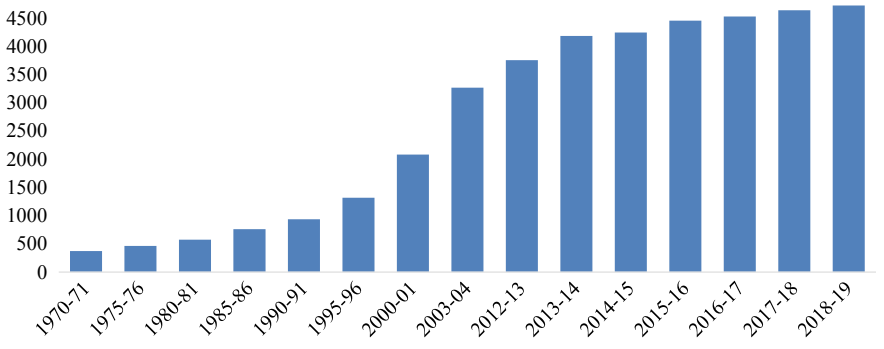

Fig. 11.1 Growth of number of professional HEIs in India. *Sources* Compiled by the authors from Selected Educational Statistics, MHRD and AISHE reports, MHRD (various years)

[1] Detail on the explanatory variables used in the probit model is discussed in Table 11.9 in appendix.

lakh students accounting for more than half of the total enrolments in PHE and 12.4% of enrolments in overall HE in 2018–19 (see Table 11.1). The number of engineering colleges has experienced unprecedented growth since 2000s, primarily due to private investments—a major departure from earlier periods (Choudhury, 2016b). There were only 1788 degree-level engineering institutions in 2011–12 with an enrolment of 2.9 million students, which has increased to 2373 institutions with more than 4 million students in 2018–19. However, quite interestingly, a decline in engineering enrolment is observed after 2014–15 that shows the recent trend of declining demand for this discipline due to quality concerns of engineering graduates and its linkage with the labour market. It is noticed that several private engineering colleges in the country are not getting enough students for admission, and therefore, on the verge of closing them. This has led to a severe crisis in engineering education in the country, and this issue could be considered as another distinct research area to explore. Among the four PHE disciplines, lowest enrolment of 4.2 lakh students is observed across law courses in 2018–19. In the last decade, the highest growth in the number of professional HEIs is registered in medicine discipline (190%), followed by law (184%), engineering (133%) and management (127%), with the overall growth rate of 147% in PHEIs. However, during this period, medicine discipline has recorded the highest increase in enrolment of students (316%), followed by Law (280%). The growth of student enrolment in four courses of PHE (medical, law, engineering and management) is 179%.

The massive expansion of PHE in India, both in terms of institutions and enrolment, is mainly due to the increased private sector participation. In 2018–19, private institutions were 90% of the total UG level engineering institutions in the country, with an enrolment share of 87% (AICTE, 2020). Similarly, the share of private sector in the total number of medical colleges increased from 3.6% in 1950 to 48.3% in 2020 (Medical Council of India, 2020). It is interesting to note that while a large number of private engineering institutions have come up to minimise the demand–supply gap, it is not the case in the discipline of medicine. Relatively less intervention of private sector in medical education (compared to engineering education) may be attributed to the cost difference in establishing these two types of institutions and also the strict regulatory structure of the Medical Council of India (MCI). It is well understood that the setting up of a medical college involves huge capital investment and heavy recurring expenditures as compared to establishing an engineering college. However, in a failed engineering education market, private investors are looking medicine as a potential alternative discipline to capture the higher education sector and also to make profits. In this context, a study to understand the investment strategies of private players in higher education would provide better insights into the growth story of professional higher education in India.

Student enrolment in PHE as a share of overall HE enrolment has increased from 21.4 to 21.80% in the last decade. However, it is important to note that though there is a small increase in the share (0.4%) between 2010–11 and 2018–19, it is declining after 2013–14. In 2013–14, the share was 23.89, which has reduced to 2.8% in 2018–19 (see Fig. 11.2). The share of student enrolment in different PHE courses to overall enrolment in HE reveals some interesting points. For instance, while the share of law

Table 11.1 Discipline-wise growth of institutions and enrolments in PHE

	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
Institutions									
Engineering	NA	1788	2191	2329	2303	2351	2327	2354	2373
Medical	NA	549	651	758	782	891	950	1025	1046
Management	NA	544	562	670	669	687	679	667	691
Law	NA	333	349	426	490	524	571	592	612
Total PHE	NA	3214	3753	4183	4244	4453	4527	4638	4722
Higher education	–	23,845	28,012	30,053	35,212	36,466	37,716	38,964	39,172
PHE share to HE	–	13.5	13.4	13.9	12.1	12.2	12	11.9	12.1
Enrolments (in Lakh)									
Engineering	24.5	29.2	36.7	43.2	45.2	45.1	43.8	42.1	40.3
Medical	4.3	6.0	6.9	8.2	9.3	10.3	11.2	12.4	13.6
Management	9.2	9.3	9.8	10.5	11.1	11.2	11.5	12.2	12.9
Law	1.5	1.8	2.1	2.7	3.3	3.5	3.8	4.0	4.2
Total PHE	39.6	46.4	55.4	64.6	68.8	70.1	70.2	70.8	71.0
Higher education	185	195	232	270	304	312	322	325	326
PHE share to HE	21.4	23.8	23.9	23.9	22.6	22.5	21.8	21.8	21.8

Source Compiled by the authors from AISHE reports, MHRD (various years)
Note Figures for under-graduation and post-graduation level of HE only

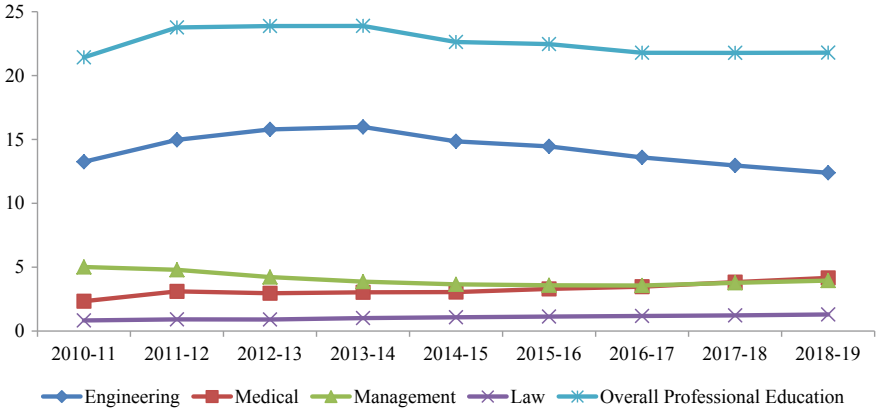

Fig. 11.2 PHE enrolments as a percentage of overall HE enrolments. *Source* Compiled by the authors from AISHE reports, MHRD (various years)

enrolment increased marginally (from 0.8 to 1.3%), medical enrolments registered a growth of almost 178%, i.e. its share increased from 2.3 to 4.2% during the period. A reverse trend is observed in engineering and management disciplines where the enrolment shares have declined in the last decade. In 2010–11, share of enrolments in management to overall HE enrolments was 5%, which dropped to 3.9% in 2018–19. In engineering education, a marginal increase in enrolment share was observed until 2013–14 (15.9%); however, it started declining afterwards and became 12.4% in 2018–19.

A similar pattern is observed in enrolment share of different disciplines to total PHE enrolment. Engineering enrolments hold the highest share in PHE enrolment; whereas law accounts for the least share throughout 2010–11 to 2018–19 (see Fig. 11.3). However, share of engineering enrolments has been steadily declining from 61.8% (2010–11) to 56.8% in 2018–19, after reaching the highest share of 66.9% in 2013–14. Likewise, share of enrolment in management declined from 23.4% in 2010–11 to 18.2% in 2018–19. Therefore, there is a decline in the demand for engineering and management courses in the last decade, and the students' preference has shifted towards law and medicine. The share of student enrolment has gone up from 3.9 to 5.9% in law and 10.9 to 19.2% in medicine during the same period. The engineering boom, however, ended in a problem of plenty. As reported in several print media, many private engineering colleges are being shutdown (converted to supermarkets, private schools, gymnasiums) in recent years in the states like Uttar Pradesh, Haryana, AP, Telangana due to low enrolment and many are on the verge of closing admission; and in 2018–19, 105 engineering colleges were closed (AICTE, 2020). What led to this situation? Which are the colleges that are getting fewer admissions in engineering education? How is the demand for different courses within engineering education is changing? What are the policy responses to this? These are some of the critical questions that need further research and would certainly contribute to the debate on changing landscape of PHE in India.

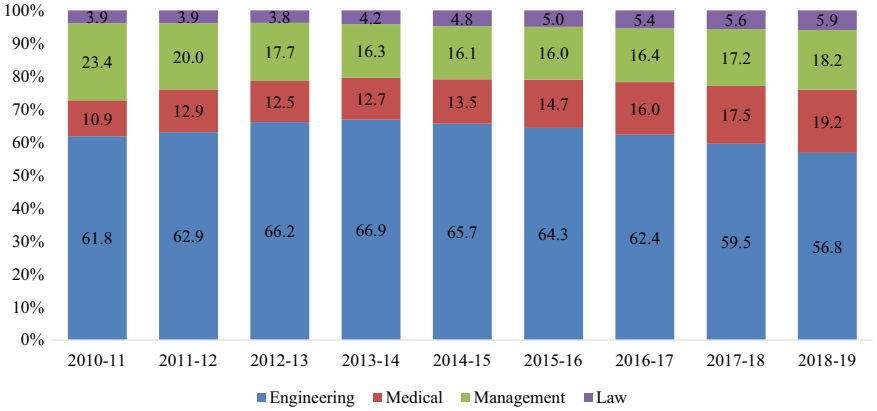

Fig. 11.3 Discipline-wise share of enrolment in PHE. *Source* Compiled by the authors from AISHE reports, MHRD (various years)

Interestingly, we notice regional inequality in the growth of professional higher education in India. Regional imbalances in the growth of PHE sector (in terms of both institution and enrolment) continue to be a major issue even though it was seriously noted in the National Policy on Education in 1986. In 2018–19, southern region (Andhra Pradesh (including Telangana), Karnataka, Kerala, Tamil Nadu and Puducherry) with 21% of India's total population, alone has almost 40% of India's professional HEIs (see Fig. 11.4). In contrast, ten states and two union territories from the eastern and northern regions (Bihar, Jharkhand, Odisha, West Bengal, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttarakhand, Uttar Pradesh, Delhi and Chandigarh), accounting for 45.3% of India's population, have only about 28% of the total professional HEIs. Similarly, only about 2% of the professional institutions (73 in number) are located in the eight north-eastern states—including Assam,

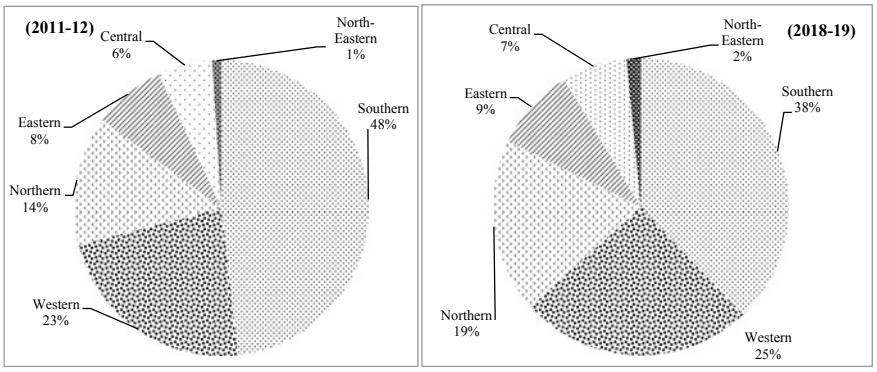

Fig. 11.4 Regional distribution of professional HEIs in India. *Source* Compiled by the authors from AISHE reports, MHRD (various years)

Manipur, Meghalaya, Sikkim and Tripura—constituting 3.76% of total population in India. However, a comparative picture on this between 2011–12 and 2018–19 clearly shows a declining share of institutions in southern region, i.e. from 48% in 2011–12 to 38% in 2018–19. Consequently, the shares of the rest of the regions have increased during the same period—highest by eight northern states, i.e, five percentage points. The decline in the share of PHE in southern region is mainly due to the shutting-down of several private engineering colleges. It is noticed that a large number of private engineering colleges in the region are either closed or run the risk of being closed soon due to the low enrolment. For instance, in the 2019–20 academic year, AICTE has approved 22 degree-level private engineering colleges for progressive closure[2] in the southern region. This figure was 24 in the academic year 2018–19.

In 2018–19, out of total 4722 professional HEIs, southern region holds the highest number of professional HEIs (1781) i.e. 66 universities and 1715 colleges (see Table 11.2). Similarly, four western states have the second-highest professional HEIs, i.e. 1196 including 51 universities and 1145 colleges. In contrast, north-eastern states have the least amount of institutions, i.e. 13 universities and 60 professional colleges. A recent spurt in number of professional HEIs is visible when looked at the numbers during the last decade. In 2011–12, there were 3214 professional HEIs in India, with a similar distribution wherein southern region holds the highest share, followed by western and, in contrast, north-eastern region at the bottom. However, the growth rate varies widely among different regions. Despite having the least number of institutions, north-eastern region has recorded the highest growth of 228% in the number of institutions between 2011–12 and 2018–19. The Compounded Annual Growth Rate (CAGR) of PHEIs for this region during the same period was registered to be 4.7%. While the number of universities (offering professional courses) in north-eastern region rose from 7 to 13 during 2011–12 to 2018–19, colleges rose from 25 to 60 during the same period. The northern region has recorded the second-highest growth with an increase of 197% during the same period. Interestingly, the least growth rate was registered by the region with highest number of institutions, i.e. southern region, i.e. 115%, with a CAGR of 0.8%. While the number of universities in southern region rose from 40 to 66 during 2011–12 to 2018–19, colleges rose from 1504 to 1715 during the same period. The number of professional HEIs as a percentage of overall HEIs has decreased from 13.5% to 12.1% during 2011–12 to 2018–19, and this share was highest (14%) in 2013–14. Though the decrease in the share is marginal, the variations among different regions are observed to be significant. For instance, while north-eastern and central regions register an increase of 2.4% and 1.9%, respectively, other regions register a decrease in the same–northern region with the highest decrease of 3%.

Professional HEIs as a percentage of overall HEIs varies widely across different states. For instance, in some of the states/union territories such as Delhi, Chandigarh, Tamil Nadu, Kerala and Punjab, the share of professional HEIs is higher than the national average of 12.1%. However, in several other major states like Uttar Pradesh,

[2]Progressive closure means institute cannot admit the students for the first year during the academic year for which progressive closure is granted; however, the existing students will continue.

Table 11.2 Region-wise growth of professional HEIs and their share to overall HEIs

	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	Growth rate	CAGR
Southern	1544 (15.3)	1660 (16.3)	1685 (17.1)	1655 (14.7)	1706 (14.8)	1729 (14.5)	1735 (14.4)	1781 (14.7)	115.3	0.8
Western	729 (13.3)	863 (11.7)	1035 (13.2)	1009 (11.4)	1067 (11.8)	1109 (12.3)	1158 (12.2)	1196 (12.3)	164.1	2.79
Northern	452 (12.0)	582 (11.6)	689 (11.3)	798 (9.5)	866 (9.6)	877 (9.0)	895 (8.9)	891 (9.0)	197.1	3.84
Eastern	253 (12.2)	321 (12.8)	379 (13.0)	381 (12.5)	400 (12.6)	403 (12.1)	411 (11.5)	425 (11.5)	168	2.92
Central	192 (10.3)	268 (12.1)	319 (12.4)	329 (11.9)	338 (12.0)	333 (11.9)	351 (12.2)	335 (12.2)	174.5	3.14
North-eastern	32 (6.9)	45 (8.1)	63 (9.6)	59 (8.4)	64 (9.0)	62 (8.5)	66 (8.8)	73 (9.3)	228.1	4.69
All India	3214 (13.5)	3753 (13.4)	4183 (13.9)	4244 (12.1)	4453 (12.2)	4527 (12.0)	4638 (11.9)	4722 (12.1)	146.9	2.16

Source Compiled by the authors from AISHE reports, MHRD (various years)
Note see Table 11.8 in Appendix for state-wise details

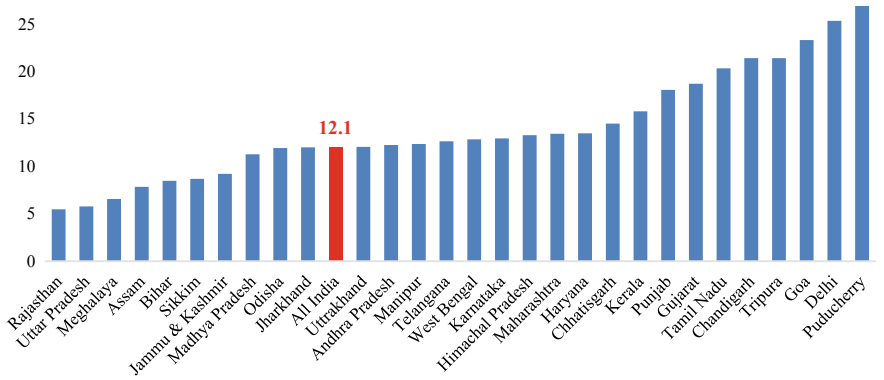

Fig. 11.5 Share of professional HEIs to overall HEIs in India (2018–19). *Source* Compiled by the authors from AISHE reports, MHRD

Bihar, Rajasthan and Odisha, the share is below the all-India average (see Fig. 11.5). Puducherry tops the list with the share being 26.9%, whereas Rajasthan is in the bottom as only 5.5% of the total HEIs in the state are offering professional courses in 2018–19. In 2011–12, Andhra Pradesh had the highest number of professional HEIs, i.e. 573 institutions (nine universities and 564 colleges), followed by Tamil Nadu with 439 institutions (15 universities and 424 colleges), and both of these states are from southern region (see Table 11.7 in appendix). However, in 2018–19, Maharashtra is on the top with 592 institutions (17 universities and 575 colleges), followed by Tamil Nadu with 513 institutions (16 universities and 497 colleges). It is important to note here that the only state that registered a decrease in the number of institutions is Andhra Pradesh. The reason lies in the formation of Telangana state in 2014, which led to a divide in the number of PHEIs in the state. As revealed from the data, majority of the economically better-off states (with per-capita Net State Domestic Product higher than the national average) hold a higher share of professional HEIs than their counterparts, i.e. states with low per-capita NSDP. Therefore, at the macro-level, a direct relationship exists between economic condition and participation in PHE in India, and more discussion on this is done in latter part of the paper using household-level information from NSSO. Nevertheless, to unravel the state-specific dynamics in the growth of PHE, there is a need to examine the policy interventions of the states on professional higher education, and this is beyond the scope of this paper.

11.4 Who All Are Accessing Professional Higher Education in India?

A major concern that is often highlighted in the studies and policy debates is unequal access to and participation in higher education among different socioeconomic groups of population in India. Several scholars (e.g. Azam & Blom, 2009; Basant & Sen, 2010, 2014; Chakrabarti, 2009; Chanana, 1993, 2016; Dhesi, 2000; Ghuman et al., 2009; Hasan & Mehta, 2006; Khan & Sabharwal, 2012; Raju, 2008; Srinivasan, 2010; Srivastava & Sinha, 2008; Sundaram, 2006, 2009; Tilak, 2015; Tilak & Choudhury, 2019; Thorat, 2016; Wankhede, 2016) have analysed the variations in participation and attendance in higher education across different social groups (caste and religion), gender, location of the households, and between poor and rich. There are visible disparities between regions, widening inequalities between poor and non-poor and between social groups; and this is viewed as a growing social concern. The groups that lag behind include women, scheduled castes, scheduled tribes, other backward classes, Muslims, and the poor from all groups, particularly from rural areas (Thorat, 2016: 33). The enrolment rates of these groups continue to be low, compared with their counterparts. For example, in 2018–19, as against the overall GER of 26.3%, it is 23% for scheduled castes and 17.2% for scheduled tribes. Similarly, the GER is 26.3% among men and 26.4% among women, showing, of course, no big difference between men and women. Between different states/union territories, the ratio ranges from 5.5% in Daman & Diu and 50.6% in Chandigarh; among the major states, it varies between 13.6% in Bihar and 49% in Tamil Nadu (MHRD, 2019). Therefore, access to higher education in India has been and continues to be unequal, which produces several other socioeconomic inequalities in the country. More clearly, a vicious circle is clear: the barriers to access to higher education among low-income students widen the income inequality, which in turn widens the inequality in access to higher education (Tilak & Choudhury, 2019). Though several studies have examined the inequality in access to HE by socioeconomic groups, specific discussion on professional higher education is sparse. Therefore, it is important to examine how far students from marginalised sections of society can access professional higher education, which is expensive than the humanities and social science courses. We look at the problem of unequal access to professional higher education by gender, social groups (caste and religion), region (rural-urban) and between poor and rich, in the backdrop of institution type (government, private-aided, and private-unaided).

Did the expansion of PHE sector lead to the widening of access of HE among underrepresented groups and regions or has it widened inequalities? Who are the winners and losers in the process of this expansion? How inequality in access varies by institution type? Whether inequalitiesinhigher educationhave increased or declined over time? Using three education rounds data of NSSO (64th, 71st and 75th), an attempt is made in this section to analyse the existing pattern of inequality in access to PHE in India. By considering various groups with reference to institution type (government, private-aided, private-unaided), the present study attempts to deepen the understanding of the inequalities in participation in professional higher education

in India. It reveals the heterogeneity in access to quality professional higher education in India, as it is widely evident that students attending government institutions get quality education than their private counterparts.

There has been a phenomenal growth in the number of female students enrolled in Indian higher education since independence. Currently, women constitute 48.6% of total enrolments in higher education in 2018–19 (MHRD, 2019). However, gender inequality persists in rural areas, among scheduled and non-scheduled population, and even among the poor and even rich families (Tilak & Choudhury, 2019). This received attention of some scholars in recent years, who have studied gender inequality in higher education across social groups, location of the household, discipline of study, type of institution etc. (e.g. Ghuman et al., 2009; Raju, 2008; Rao, 2007; Srivastava & Sinha, 2008). Women in rural areas have remained doubly deprived; being women and living in rural areas (Raju, 2008). The status of women belonging to different disadvantaged social groups such as scheduled castes and scheduled tribes in higher education appeared to be worse than that of those belonging to forward castes. For example, the GER for scheduled tribe women is 16.5% compared to the overall GER among women of 26.4% (MHRD, 2019). Similarly, the participation of Muslim females in higher education was 6% as compared to 9% for Hindu females, 13% for Sikh females and 16% for Christian females in 2005 (Srivastava & Sinha, 2008; Thorat, 2008).

Gender-wise enrolment in different types of professional HEIs in India provides some useful insights. Evidently, a decrease in women's participation in PHE is observed in India during 2007–08 to 2017–18. Of the total students enrolled in PHE, only 36.2% were reported to be females in 2007–08 and this share further declined to 35% in 2017–18 (see Table 11.3). In the last decade, there is significant progress in the female enrolment in HE; however, their preference is still skewed towards humanities and social science courses. For instance, in 2018–19, women's share in overall HE enrolment is 48.6%, while it is 29.3% in engineering (MHRD, 2019). Also, within four PHE courses included in this study, females are better represented in medicine, law and management than engineering. The gender inequality in the enrolment of STEM (Science, technology, engineering and mathematics) courses has been and continues to be a major issue worldwide and more so in India (Chatterjee & Ramu, 2018; Justman & Méndez, 2018; Malhotra, 2018; UNESCO, 2017; Wang & Degol, 2017). This issue is understudied in India and needs urgent attention in both academia and policy space. There is a notable decrease in female enrolment in government institutions, i.e. from 60.9% to 37.6% during 2007–08 to 2017–18; while this share for male students has gone up from 39 to 62.4% during the same period (see Fig. 11.6).

As caste is a very important phenomenon in India, many studies have focused their attention on inequalities in higher education between by social groups—caste and religion (Basant & Sen, 2010, 2014; Biswas et al., 2010; Chanana, 1993; Dubey, 2008; Hasan & Mehta, 2006; Kaul, 1993; Rao, 2007; Srivastava & Sinha, 2008; Sundaram, 2009; Thorat, 2008; Tilak & Choudhury, 2019). As many of these studies found, the participation of two disadvantaged caste groups, namely scheduled castes (SCs) and scheduled tribes (STs), in higher education has improved over time, but

Table 11.3 Access to PHE by socioeconomic groups and institution type

	Gender		Caste			Religion			Residence		Quintile		Total
	Male	Female	SC/ST	OBC	General	Hindu	Muslim	Other	Rural	Urban	Poorest	Richest	
2017–18													
Govt	62.4	37.6	14.7	35.2	50.0	83.3	10.6	6.1	25.5	74.5	6.1	53.9	18.3
PA	66.1	33.9	15.9	44.9	39.1	87.1	6.1	6.7	25.4	74.6	6.5	51.1	28.9
PUA	65.3	34.7	12.9	46.4	40.7	85.2	8.9	5.9	28.1	71.9	3.7	50.5	52.8
Total	65.0	35.0	14.1	43.9	41.9	85.4	8.4	6.2	26.8	73.2	4.9	51.3	100
2014–15													
Govt	66.3	33.8	16.9	44.6	38.5	83.4	9.7	6.9	34.0	66.0	7.6	39.6	17.1
PA	69.7	30.3	12.0	40.2	47.8	83.2	9.9	6.9	31.1	68.9	5.6	43.2	24.1
PUA	64.9	35.1	10.7	46.8	42.5	84.8	7.0	8.2	34.3	65.7	4.3	50.6	58.8
Total	66.3	33.7	12.1	44.8	43.1	84.2	8.2	7.7	33.5	66.5	5.2	46.9	100
2007–08													
Govt	39.1	60.9	3.7	38.8	57.5	86.9	5.2	8.0	15.2	84.8	2.6	60.1	25.5
PA	81.7	18.3	10.6	50.3	39.1	94.1	3.6	2.4	53.1	47.0	3.6	64.8	34.9
PUA	63.9	36.1	5.3	26.5	68.2	84.3	5.0	10.7	20.8	79.2	1.4	59.9	39.6
Total	63.8	36.2	6.8	38.0	55.3	88.4	4.5	7.1	30.6	69.4	2.5	61.6	100

Source Compiled by the authors from NSSO 64th, 71st and 75th round unit-level data

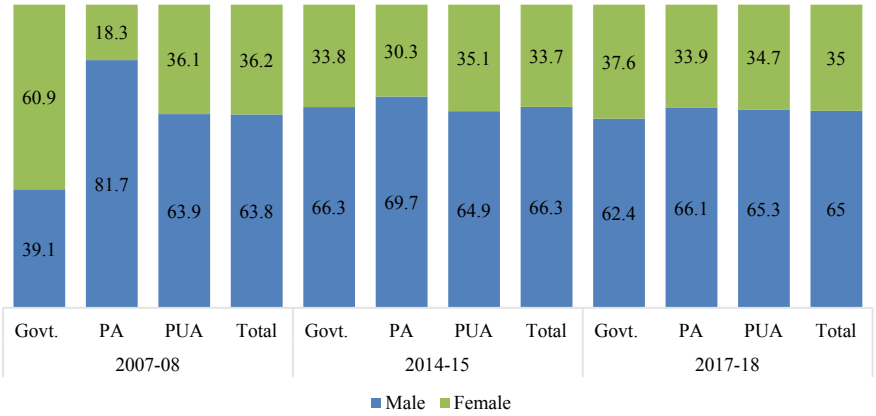

Fig. 11.6 Student distribution in PHE by gender and institution type. *Source* Compiled by the authors from NSSO 64th, 71st and 75th round unit-level data

still, a significant gap exists. The other backward classes have higher participation rates than scheduled castes and scheduled tribes, but lower than that of general category students (Azam & Blom, 2009). Wankhede (2016) has argued that the social backwardness of these groups results in social sufferings and economic exploitation with a high degree of dependence on upper castes, which further leads towards educational backwardness. Ghuman et al. (2009) found, based on a primary survey in rural Punjab found that as high as three-fourth of total students from a rural background studying in different professional education programmes belonged to forward castes, leaving only one-fourth of total space for the socially disadvantaged sections of the society. However, evidence on the discipline-wise distribution of students from different social groups is meagre in India, as majority of the works focus on overall higher education, and therefore, the present study contributes to the literature.

In the last decade (between 2007–08 and 2017–18), the enrolment of SCs and STs has gone up substantially, though it is far below their forward caste counterparts. In 2007–08, attendance of SC/ST students in PHE was 6.8%, which increased considerably to 14.1% in 2017–18 (see Table 11.3). As expected, their enrolment share in government PHEIs has increased from a meagre 3.7% in 2007–08 to 14.7% in 2017–18. This growth in SC/ST enrolments in PHE may be attributed to the well recognition of the benefits of HE by the society, and also to some extent, the changing policies in the education sector to enrol students from socially disadvantaged groups. Though SCs/STs have made a significant improvement in accessing PHE between 2007–08 and 2017–18, they are still not at par with general and OBCs. In 2017–18, enrolment of forward caste students in PHE was around thrice (2.97 times) the students from SCs and STs—41.9% vis-à-vis 14.1%. Therefore, even after seven and half decades of independence, equitable access to educational opportunities in general and professional higher education in particular has remained a major challenge in India. Surprisingly, there is a sharp decline in the enrolment share for forward caste in

professional HE during the last decade—from 55.3% in 2007–08 to 41.9% in 207–18, and this is mainly due to the decline of their enrolment in private-unaided institutions during the period, i.e. from 68.2% to 40.7% (more than 40% decline). As the overall enrolment of general category students has increased in recent years, it would be interesting to examine who all are the forward caste students being shifted from PHE and in which disciplines of HE they are enrolled. Have they shifted to humanities and social science courses? Are they enrolled in newly emerged interdisciplinary courses offered in several HEIs in India? Are they accessing HE abroad?

Differences exist in student enrolments by different religious groups such as Hinduism, Islam, Christianity, Sikhism, and Jainism. According to AISHE (2018–19), representation of Muslim students in Indian higher education is 5.2%, whereas 2.3% students are from other minority communities. Similar proportions are observed for PHE wherein the highest enrolment is among Hindu religion followed by Christian, Sikh and Jain. Students of Muslim religion are least represented in professional courses. Inequalities in enrolment share among different religious groups in PHE are extreme. In 2007–08, Hindus alone dominated the overall enrolment by a very high margin of 88.4%, followed by others[3] (7.1%) and Muslims (4.5%). Though there are shifts in the enrolment share among these groups across different types of institutions, they are observed to be marginal. In 2017–18, the proportion was almost same with Hindus marking the highest enrolment (85.4%) followed by Muslims (8.4%) and others (6.2%). According to Census (2011), the respective population shares are 80.5% (Hindu), 13.4% (Muslims) and 6.1% for other religions including Christians, Sikhs, Buddhists and Jains. Thus, Muslim students are less represented in higher education as compared to their population share in India. The marginalisation and exclusion of Muslims in the sociocultural, political and economic spheres of India is often linked with their lower access to higher education, and particularly in technical and professional HE, as it helps them in meaningful employment in the labour market.

Access to higher education differs considerably between the students residing in rural and urban areas. Regional (rural–urban) disparities in higher education arise due to natural clustering of HEIs in and around metropolitan and urban areas (Agarwal, 2009; Sinha, 2008). Students from rural areas do not have many options to choose, which affects their participation in higher education. On the other hand, people from urban areas have moderate access to a variety of educational institutions, and hence, they seem to be able to access education according to their choice. Furthermore, it is not only the availability of opportunity that matters to participate in higher education, several socioeconomic factors of the households are also important. The participation rate of people in urban areas in higher education is three times higher than that of the rural population in 2004–05 (Raju, 2008). In urban areas, 35 per cent of the relevant age group population attended higher education institutions, compared to 19%in 2013–14 (Tilak & Choudhury, 2019). The students from rural areas still form only 30% of the total enrolments in higher education in India in 2018–19 (MHRD, 2019). Describing socioeconomic profile of the students entering into higher education,

[3] 'Others' include Christian, Sikh, Jain, Buddhist, Zoroastrian and other religions.

Hasan and Mehta (2006), based on 55th round of National Sample Survey, reported that out of the total students enrolled in colleges, as high as 63% were from urban areas and the rest 37% are from rural areas.

Spatial disparities in PHE enrolments in India are prominent. In 2017–18, close to three-fourth of the students enrolled in PHE (73.2%) are from urban regions, and the rest 26.8% are from rural areas (see Fig. 11.7). In 2007–08, these figures were 69.4% and 30.6%, respectively, for urban and rural areas. In the last decade, the regional disparity in access to PHE (difference between urban and rural enrolment) in India has gone up. This gap was 38.8% in 2007–08, which has increased to 46.4% in 2017–18. In 2017–18, relatively more students from rural areas were enrolled in an engineering discipline (28%) as compared to law (25.2%), management (24.2%), and medicine (23.4%). The higher enrolment of rural students in engineering courses may be due to better access to engineering colleges, particularly private ones. Interestingly, student enrolment in PHE from rural areas has increased from around 15% to 25.5% (more than two times increase) between 2007–08 and 2017–18, and more or less a similar trend is observed for private-unaided HEIs. However, there is a significant decline in students' enrolment share in private-aided PHE institutions in this period, i.e. from 53.1% to 25.4%. This may reflect that the cost of professional courses offered by private HEIs in India is increasing steadily, which may not be affordable to rural households. However, this needs further scrutiny.

Among the recent studies, Basant and Sen (2014), Tilak (2015), Thorat (2016), Wankhede (2016), Borooah (2018), Deshpande (2018), Kundu (2018), Sinha (2018), Thorat and Khan (2018), Tilak and Choudhury (2019) have examined several dimensions of inequalities in higher education (gender, caste, religion, region) and concluded that inequalities between the rich and the poor are the highest, and moreover, they are increasing even with the expansion of higher education sector in India. Using 64th and 71st NSSO rounds data, Tilak and Choudhury (2019) find that the inequality in access to higher education has increased substantially by households'

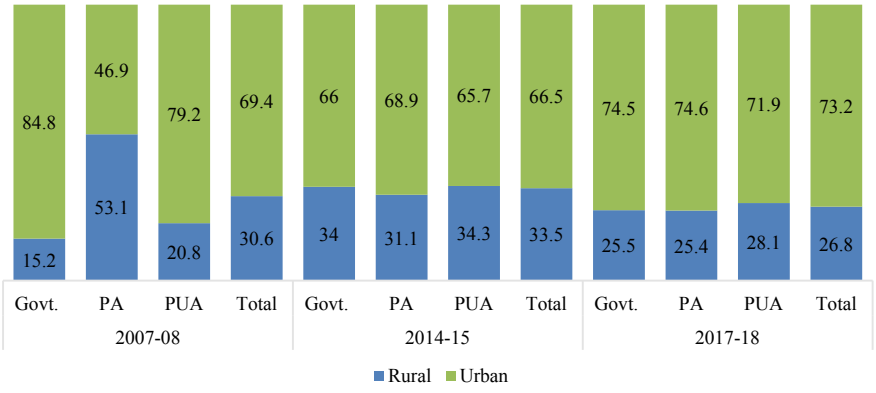

Fig. 11.7 Student distribution in PHE by location and institution type. *Source* Compiled by the authors from NSSO 64th, 71st and 75th round unit-level data

economic status in the last seven years, between 2007–08 and 2013–14. In 2007–08, the difference in the gross attendance ratio between the poorest and richest families was 29.5% points, and this gap has gone up to 43.5% points in 2013–14. However, a survey of literature points out that although a few studies have mentioned that economic status of the household is a major barrier to access higher education, academic interest to examine it in detail has been relatively limited. In this study, monthly per-capita consumption expenditure of the household is used as a proxy for their economic status, as NSSO does not collect data on household or individual income. Data on average monthly per-capita consumption expenditure of the households is collected and provided by NSSO and is extensively used by researchers as well as policymakers while measuring the economic status of households.

The findings of our study also show a clear impact of family's capacity to pay on participation in professional higher education in India. Enrolment of students in PHE increases for each successive consumption quintile in 2017–18—4.9% for the bottom quintile (Q1) to 51.3% for the top quintile (Q5)—revealing a huge rich-poor gap in access to PHE (see Fig. 11.8). However, in the last decade (between 2007–08 and 2017–18), there is a reduction in income-based inequality in access to PHE. In 2007–08, 2.5% of students from poorest households (Q1) were accessing PHE while it was 61.6% for the richest households (Q5)—a gap of 59.1%. More students from bottom quintile access government HEIs than private ones, obviously because of non-affordability of high tuition fees charged by private PHEIs.

Overall, gender and inter-sectoral inequalities in PHE enrolment share have widened over the years. Though there are promising improvements in gap between scheduled and non-scheduled populations, they are still far behind forward caste students. Similarly, inequalities between the rich and the poor are highly striking, but still, some improvement is recorded during the last decade. The inequality in access to PHE between government and private institutions reveals some interesting

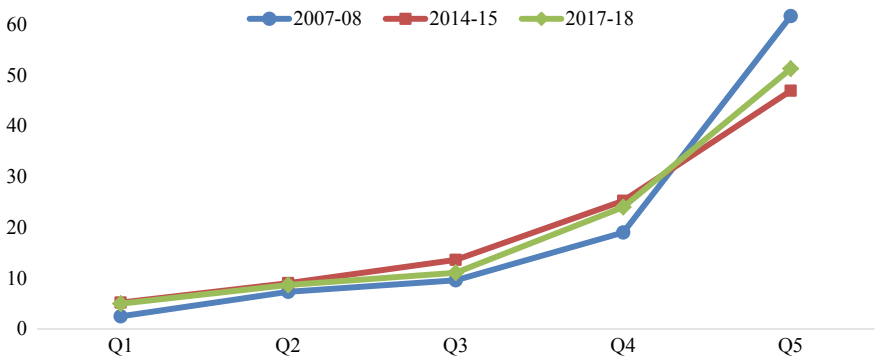

Fig. 11.8 Share of student enrolment in PHE by consumption quintile. *Source* Compiled by the authors from NSSO 64th, 71st and 75th round unit-level data

points. For example, in the last decade, there is a substantial decrease in female enrolments in government institutions. Unlike, more students from rural areas have enrolled in government institutions than private-aided and unaided institutions.

11.5 Barriers to Participation in Professional Higher Education: Probit Estimates

Students from different socioeconomic settings face several problems in accessing professional higher education in India. The problems are more in rural areas, among women, scheduled castes and scheduled tribes, and the poor. This section attempts to estimate the probability of people belonging to different social and economic groups attending professional higher education.

The predicted probabilities of attending professional higher education are analysed for persons aged 18–23 years using probit model. The dependent variable for the probit estimation is:

PHE_ATTENDANCE = 1, if the person in the age group of 18–23 is currently attending professional higher education;

= 0, otherwise, i.e. if the person (of the age group 18–23) is currently not attending professional higher education

The analysis considers gender, caste, household consumption expenditure, household size, location (rural/urban) and institution type as explanatory variables. To examine the heterogeneity in the predicted probabilities of attending professional higher education, the regression estimates are made separately for gender (male and female), region (rural and urban), expenditure quintiles (poor and rich) and institution type (government and private). Houhsoeld size is also considered as a control variable. The variables chosen for the logit model, their notation and definitions are given in Table 11.9 in Appendix.

Looking at the results of Eq. 1.1 (probit estimation for overall sample), we find that the chances of attending professional higher education are significantly higher for men as compared to women. Being female decreases the chances of accessing PHE by 12.6% than their male counterparts (see Table 11.4). This supports the findings of several other studies conducted on Indian higher education (Dubey, 2008; Raju, 2008; Srivastava & Sinha, 2008; Sundaram, 2006, 2009; Tilak & Choudhury, 2019). The gender gap in access to PHE enlarges when it comes to attending a private institution. Specifically, males have a 16% more chance of attending professional courses in private institutions than their female counterparts. Hence, gender plays a crucial role in household decision to send their children for PHE. The findings suggest that caste plays a significant role in determining the predicted probability of attending PHE. Compared to SC/STs, OBCs and forward caste students are 5% and 4.3% more likely to attend PHE, respectively. Though results hold true across major population divide, caste identity plays a greater role among those belonging to urban and high-income families.

Table 11.4 Predicted probabilities of attending professional higher education India (2017–18): Probit estimates

(Marginal Effect/standard error)	Equation 1 Overall	Equation 2 Male	Equation 3 Female	Equation 4 Rural	Equation 5 Urban	Equation 6 Poor	Equation 7 Rich	Equation 8 Govt	Equation 9 Private
Gender	0.125***	–	–	0.130***	0.122***	0.072***	0.125***	0.067***	0.159***
	(0.005)	–	–	(0.007)	(0.007)	(0.012)	(0.010)	(0.007)	(0.007)
Caste_*OBC*	0.050***	0.058***	0.039***	0.032***	0.071***	0.017	0.072***	0.029***	0.062***
	(0.007)	(0.009)	(0.010)	(0.009)	(0.010)	(0.014)	(0.016)	(0.009)	(0.009)
Caste_general	0.043***	0.056***	0.027***	0.012	0.069***	0.039**	0.068***	0.040***	0.045***
	(0.007)	(0.009)	(0.010)	(0.010)	(0.010)	(0.017)	(0.015)	(0.009)	(0.010)
Location	0.042***	0.028***	0.060***	–	–	0.076***	0.071***	0.031***	0.049***
	(0.006)	(0.008)	(0.008)	–	–	(0.013)	(0.015)	(0.008)	(0.008)
Hh_cons_exp (Q2)	0.025***	0.037***	0.010***	0.038***	– 0.022	–	–	0.012	0.033**
	(0.009)	(0.013)	(0.014)	(0.010)	(0.018)	–	–	(0.010)	(0.014)
Q3	0.104***	0.128***	0.071***	0.116***	0.053***	–	–	0.066***	0.123***
	(0.010)	(0.013)	(0.014)	(0.011)	(0.018)	–	–	(0.011)	(0.014)
Q4	0.151***	0.192***	0.099***	0.163***	0.109***	–	–	0.108***	0.172***
	(0.009)	(0.013)	(0.013)	(0.011)	(0.016)	–	–	(0.011)	(0.013)
Q5	0.258***	0.288***	0.217***	0.232***	0.229***	–	–	0.218***	0.279***
	(0.010)	(0.014)	(0.015)	(0.017)	(0.016)	–	–	(0.014)	(0.014)

(continued)

Table 11.4 (continued)

(Marginal Effect/standard error)	Equation 1 Overall	Equation 2 Male	Equation 3 Female	Equation 4 Rural	Equation 5 Urban	Equation 6 Poor	Equation 7 Rich	Equation 8 Govt	Equation 9 Private
Family_size	−0.018*** (0.001)	−0.015*** (0.002)	−0.021*** (0.002)	−0.021*** (0.002)	−0.015*** (0.002)	−0.015*** (0.003)	−0.021*** (0.003)	−0.013*** (0.002)	−0.020*** (0.002)
Type_institution	0.254*** (0.005)	0.286*** (0.006)	0.211*** (0.007)	0.240*** (0.007)	0.262*** (0.007)	0.193*** (0.012)	0.259*** (0.010)	– –	– –
Constant	−1.45*** (0.041)	−1.20*** (0.049)	−1.23*** (0.066)	−1.43*** (0.061)	−1.25*** (0.063)	−1.40*** (0.097)	−0.676*** (0.067)	−1.41*** (0.073)	−0.677*** (0.050)
Pseudolikelihood	−18,210.7	−10,790.1	−7390.5	−7005.3	−11,175.2	−1508.2	−5836.1	−5184.8	−13,006.4
Pseudo R Square	0.140	0.137	0.114	0.136	0.118	0.109	0.069	0.082	0.075
Observations	32,009	18,273	13,736	13,543	18,466	3,655	9,120	11,708	20,301

Notes Standard errors in parentheses; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Rural SC/ST students have a 7.1% and 6.9% less chance of attending professional education than OBCs and forward caste students, respectively. Moreover, their chance of attending professional courses in private institutions is further less. This is apparent, as majority of SC/ST students come from lower or middle-class families who are not able to afford expensive courses offered in PHE.

Households' location (rural/urban) is statistically significant in determining the probability of attending PHE in India. The value of marginal effect associated with variable '*location*'reveals that individuals residing in urban areas have a 4.2% higher chance of attending PHE than those from rural areas. This corroborates with the available literature concluding the dominance of urban areas in accessing higher education (Hasan & Mehta, 2006; Raju, 2008; Srivastava & Sinha, 2008) and more availability of HEIs in urban areas (Varghese, 2015). While the magnitude of this likeliness further increases in case of females (6%) and those attending private institutions (4.9) as compared to male students (2.8%) and those attending government institutions (3.1%).

Economic status of household has a significant impact on the decision to send a child for professional education. An increase in the level of household consumption (ranging from bottom to top quintile) increases the probability of a child attending PHE. Estimates reveal that chances of attending PHE increase with an upward shift in the consumption quintile. Students belonging to rich families (Q5) have a 25.8% more chance of attending professional courses than those from poor families (Q1). As expected, the impact of economic status is comparably high among males and those attending professional courses in private institutions. Specifically, male students from rich families have 28.8% more such chances than poor male students. Similarly, rich students are 27.9% more likely to opt for private institutions than their poor counterparts. Due to continuous increase in education costs, poor students face difficulty accessing higher education, particularly professional courses which are costlier. Several studies in developing country contexts have established a positive and statistically significant association between household consumption expenditure and the probability of attending higher education (Azam & Blom, 2009; Chakrabarti, 2009; Tilak, 2015; Borooah, 2018; Tilak & Choudhury, 2019). While higher economic status significantly increases the likeliness of attending professional courses, household size is reported to be negatively associated with it. Not surprisingly, having an additional sibling decreases the chance of accessing PHE for other children by 1.8%, with more or less same magnitude among other socioeconomic factors. This corroborates with the fact that a bigger family size will result in leaving fewer resources for education (Qian & Smyth, 2010; Huy, 2012; Bayar & Ilhan, 2016).

Apart from individual characteristics and household attributes, another major factor that affects the probability of participation in PHE is type of institution i.e. government or private.[4] Students choosing private institutions for higher studies are 25.4% more likely to choose professional courses, with a greater magnitude for males (28.6%) and rich households (25.9%). This reflects upon the paying capacity of the households as those opting for high-charging private institutions may opt for

[4]Private institutions include both private-aided and un-aided higher education institutions.

costly professional courses as well. The other interpretation for this may be the larger offering of professional courses (engineering, medicine, law, management etc.) by private HEIs than publicly funded colleges and universities.

11.6 Household Spending on Professional Higher Education in India

This section examines the variations in the household expenditure on professional higher education by socioeconomic groups. It is argued that the quality of professional higher education accessed by the students of different family backgrounds varies substantially, and this is largely due to the differences in their spending on higher education. Even if some poor households send their wards to courses like engineering, medicine, management, and law, they spend significantly less on it, as compared to the non-poor households, which might affect quality, continuation, and performance of students in the studies. Therefore, it is quite important to look at the variations in the household expenditure on PHE, in addition to examining the inequality in accessing it. Though there are few available studies on the inequality in household expenditure on higher education in India (Panchamukhi, 1990; Tilak, 2002; Azam & Kingdon, 2013; Duraisamy & Duraisamy, 2016; Tilak & Choudhury, 2019; Chandrasekhar et al., 2019), there is hardly any such work for PHE sector.

The annual average household expenditure on PHE in India is reported to be around ₹71.4 thousand that accounts for 37% of the total annual household consumption expenditure in 2017–18. Out of the total household spending on PHE, ₹55.8 thousand is incurred on fee (tuition fee, exam fee, library fee and other fees) and ₹18.1 thousand on non-fee items such as expenditure on food, accommodation, textbooks, transport, private tuition, mobile, internet and others (see Table 11.5). Fees accounted for 27.5% and non-fee spending constituted 9.4% of annual household consumption expenditure. Share of fee spending to total household spending on PHE

Table 11.5 Annual per-student household spending on PHE (2017–18)

Items of expenditure	Per-student spending	% of total spending	% to annual household consumption expenditure
Fee	55,864	74.5	27.5
Books and uniform	6061	8.1	3.0
Transport	6488	8.6	3.2
Private tuition	2838	3.8	1.4
Other items	3781	5.0	1.9
Total non-fee	18,102	25.5	9.4
Total spending (Fee + Non-Fee)	71,366	100.0	37.0

Source Compiled by the authors from NSSO 75th round unit-level data

is around three-fourth (74.5%) while it is 25.5% on non-fee items. The households have spent a considerably higher amount towards fee than non-fee items, i.e. three times. This is largely due to higher fees charged in professional courses such as engineering, management, medicine and law (particularly in private institutions). Despite this, it is quite interesting to note that households also spent a significant share of their total spending on PHE, i.e. 25.5% towards non-fee items. Spending on 'books, stationery and uniform' and transportation take a major share (69.3%) of non-fee spending followed by 15.7% on private tuition and the rest 20.9% on other items. Within PHE, the highest expenditure was incurred by medical students (₹85.9 thousand) followed by engineering (₹70.5 thousand), management (₹68.5 thousand), and least by the law students (₹39.3 thousand)—making medical the costliest professional discipline (see Fig. 11.9). While fee in a medical course was 2.6 times that of the law course, interestingly, non-fee spending was more among law students (compared to medical students). It is apparent that the tuition fee charged for medical courses are much higher than other professional courses (especially in private institutions), which results in differences in household expenditure. Students of different professional courses spend more or less the same on non-fee items like hostel charges, transport, books, etc.

Household spending on PHE varies widely by institution type due to their different fee structures (see Fig. 11.10). Students enrolled in private-unaided institutions spent around 1.7 times more than those studying in government ones—₹78.4 thousand and ₹45.5 thousand, respectively. The considerable gap in overall spending is largely due to huge fee differences between the two types of institutions, which is relatively high in professional courses such as engineering, management, medicine and law; particularly in private institutions. Fee charged by private-unaided professional HEIs was around twice the government institutions.

Household spending on PHE varies by different socioeconomic and institutional factors. Findings reveal a pro-male bias in PHE spending, wherein households spent ₹71.7 thousand on sons, slightly more than daughters, i.e. ₹70.7 thousand (see Table 11.6). Gender bias in favour of men in household spending on education has been documented in many studies conducted in different regions of India (Azam &

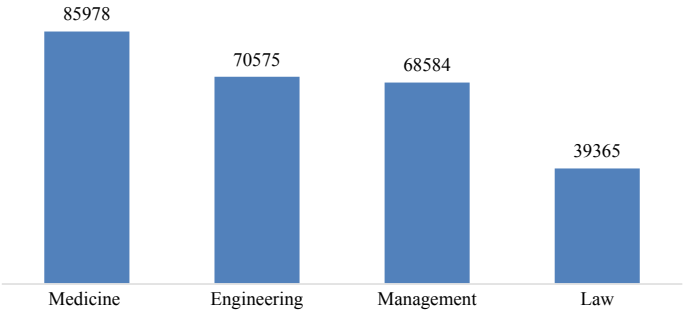

Fig. 11.9 Household spending on professional higher education by discipline. *Source* Compiled by the authors from NSSO 75th round unit-level data

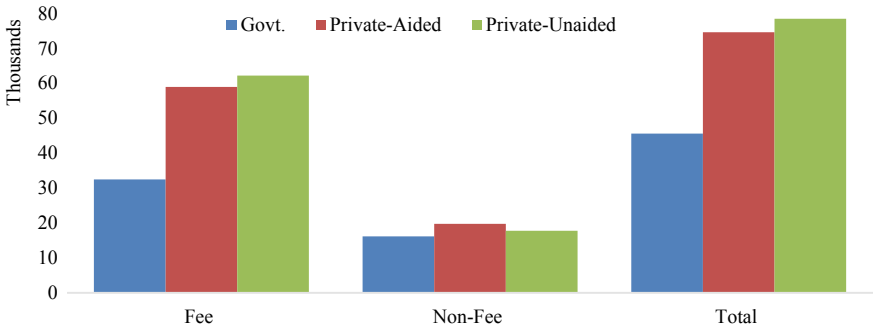

Fig. 11.10 Household spending on professional higher education by institution type. *Source* Compiled by the authors from NSSO 75th round unit-level data

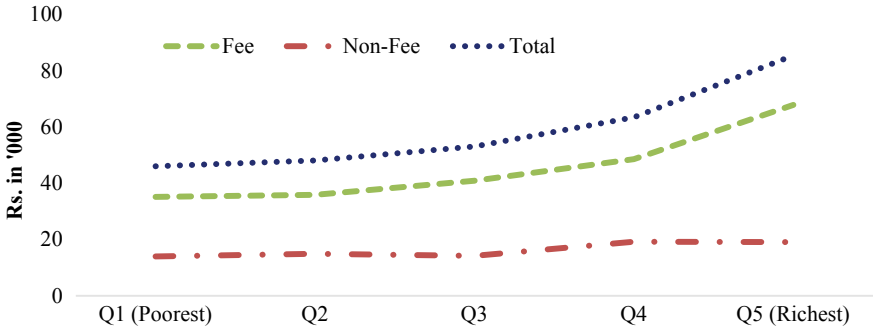

Fig. 11.11 Household spending on professional higher education by expenditure quintiles. *Source* Compiled by the authors from NSSO 75th round unit-level data

Kingdon, 2013; Chaudhuri & Roy, 2006; Kingdon, 2005; Panchamukhi, 1990; Saha, 2013). In a recent study, Duraisamy and Duraisamy (2016) show that parents spend 11% more on son's education than daughters. Contrary to the established literature, non-fee spending on females is more than their male counterparts—₹19.6 thousand for female students and ₹17.3 thousand for males. This can be attributed to the mass availability of professional HEIs or awareness among parents regarding returns to girls' education. Further, a significant rural-urban disparity exists in spending on professional education in India, particularly on fees. Urban households spent 1.4 times more on PHE of their children than their rural counterparts. This inter-regional gap in spending was found to be slightly more in case of fees (1.5 times) than non-fee items (1.2 times)—mainly due to the huge gap in fees charged by professional HEIs in these two sectors. Variations in PHE spending are also prevalent across social groups. General students incurred the highest expenditure (₹81.6 thousand), followed by OBCs (₹66.7 thousand) and as expected, SCs/STs spent the lowest, i.e. ₹55.2 thousand. Students from forward caste spend around 50% more (gap of ₹26.3 thousand) than SC/ST students. This difference is largely due to the difference in the

Table 11.6 Household spending on PHE by socioeconomic and institutional factors (2017–18)

Category		Fee	Non-fee	Total	% to annual household consumption expenditure
Location	Rural	41,221	15,978	54,446	39.4
	Urban	61,229	18,897	77,565	34.2
Gender	Male	56,160	17,301	71,700	35.3
	Female	55,312	19,624	70,745	34.8
Caste	SC/ST	41,961	15,794	55,279	32.3
	OBC	52,258	15,484	66,747	38.0
	General	64,256	20,249	81,602	33.7
Type of institution	Govt	32,460	16,180	45,580	22.5
	Private-aided	58,925	19,763	74,579	36.7
	Private-unaided	62,164	17,786	78,428	38.6
Type of discipline	Medicine	69,857	16,343	85,978	42.4
	Engineering	54,823	18,107	70,575	34.8
	Law	26,566	17,891	39,365	19.4
	Management	54,557	20,201	68,584	33.8
HH consumption expenditure quintile	Q1 (Poorest)	35,185	13,996	46,078	67.2
	Q2	35,890	14,955	48,103	45.2
	Q3	40,916	14,203	53,089	38.9
	Q4	48,576	19,245	63,459	36.1
	Q5 (Richest)	67,857	19,120	85,439	32.9
	Total	55,864	18,102	71,366	35.2

Source Compiled by the authors from NSSO 75th round unit-level data

spending on fees paid by students. This might be because students from marginalised sections (including SCs and STs) are provided with fee waivers in PHEIs (particularly by public HEIs) of the country.

Evidently, the average spending on professional education is higher for each successive expenditure quintile in 2017–18 (see Fig. 11.11). It is the lowest for the poorest households (₹46,078) and highest for the richest households (₹85,439). The top quintile households (quintile 5) spend close to two times more on PHE than the bottom quintile (quintile 1). A similar expenditure pattern is observed for fee and non-fee items wherein the households belonging highest consumption expenditure quintile spent around 1.9 times and 1.4 times more than their lowest quintile counterparts. Households belonging to lowest quintile (Q1) spent a significant part (67.2%) of their annual household consumption expenditure, whereas the corresponding figure was only 32.9% for highest quintile. This indicates that poor households are spending a significant share of their annual consumption expenditure towards PHE of their children. This is largely due to the massive expansion of the private HEIs in the country

that has led to an increase in family investment in higher education, and more so for the students accessing professional courses such as engineering, medicine, management and law.

11.7 Concluding Remarks

Using the unit-level data from three education rounds of NSSO—64th (2007–08), 71st (2014–15) and 75th Round (2017–18)—supplemented by the data available with AISHE, this paper analysed the changing landscape of PHE in India. It primarily focused on four major issues (a) changing trend and pattern of the growth of professional higher education, (b) inequalities in access to professional higher education, (c) socioeconomic and institutional barriers in access to PHE and (d) household financing of PHE. We find that PHE sector has registered a 147% increase in number of institutions and a 152% increase in student enrolments between 2011–12 and 2018–19, and interestingly, this is due to the increasing presence of private sector. In the last decade, the highest growth in the number of professional HEIs is registered in medicine discipline (190%), followed by law (184%), engineering (133%) and management (127%); with an overall growth rate of 147% in PHEIs. Among the students accessing PHE, more than half (57%) are enrolled in engineering discipline and rest are in medicine (19%), management (18%) and law (6%). We also noticed huge regional variations in the growth of PHE in India in the last decade. In 2018–19, the southern region—Andhra Pradesh (including Telangana), Karnataka, Kerala, Tamil Nadu and Puducherry—with 21% of India's total population, alone has almost 40% of India's professional HEIs. In contrast, ten states and two union territories from the eastern and northern regions, accounting for 45.3% of India's population, have only about 28% of the total professional HEIs. Similarly, only about 2% of the professional institutions (73 in number) are located in the eight north-eastern states, constituting 3.76% of India's total population. However, a comparative picture on this between 2011–12 and 2018–19 clearly shows a declining share of institutions in southern region, i.e. from 48% in 2011–12 to 38% in 2018–19.

Findings also suggest that students belonging to lower socioeconomic settings are not only underrepresented in PHE but also spend considerably less on it than their counterparts. Evidently, a decrease in the share of women's participation in PHE is observed in India during 2007–08 to 2017–18. Of the total students enrolled in PHE, only 36.2% were reported to be females in 2007–08 and this share further declined

to 35% in 2017–18. Interestingly, in the last decade (between 2007–08 and 2017–18), the enrolment of SCs and STs has gone up substantially, though it is still far below their forward caste counterparts. The rural-urban inequality in access to PHE in India is found to be very high. In 2017–18, close to three-fourth of the students enrolled in PHE (73.2%) are from urban regions, and the rest 26.8% are from rural areas. In 2007–08, these figures were 69.4% and 30.6%, respectively, for urban and rural areas. The inter-sectoral gap, which was 38.8 percentage points in 2007–08, has increased substantially to 46.8 percentage points by 2017–18. Further, results show a clear impact of income on PHE participation in India as it goes on increasing for each successive consumption quintile. From the bottom quintile (Q1) to top quintile (Q5), enrolment share ranges from 4.9% to 51.3% in 2017–18—revealing a huge rich-poor gap in access to PHE. The corresponding range was 2.5% to 61.6% in 2007–08, which indicates a reduction in income-based inequality in PHE access during the last decade.

The probit estimates show that the chances of attending professional higher education are significantly higher for men than women. Being female decreases the chances of accessing PHE by 12.6% than their male counterparts, and this gap further enlarges when it comes to attending a private institution (males have a 16% more chance of attending professional courses in private institutions). Similarly, a clear hierarchy in probability of attending PHE is visible among social groups. Compared to SC/STs, OBCs and forward caste students are 5% and 4.3% more likely to attend PHE respectively, with a greater impact on those belonging to urban areas and rich families. Households' location (rural/urban) is statistically significant in determining the probability of attending PHE. Individuals residing in rural areas have 4.2% higher chances of attending PHE as compared to those from urban areas. Further, the chances of attending PHE increase with an upward shift in the consumption quintile. Students belonging to rich families (quintile 5) have a 25.8% more chance of attending professional courses than those from poor families (quintile 1).

The paper, giving a critical descriptive account on the status and prospects of PHE in India will be of immense interest to academia as well as administrators and policymakers. Recent debates on professional higher education in India have raised several interesting policy concerns (including the issues raised in the recent National Education Policy 2020), and this empirical study facilitates a more informed discourse on this. While increased private participation has opened up possibilities of better access to professional higher education, it has widened the inequality in access to PHE in the country. Findings indicate that some forms of inequalities are

more pronounced than others, and therefore, there is a need to address these distinct forms of inequalities with policy changes. The paper thus provides a rationale for institutional level interventions to address these inequalities. It is felt that, there is an urgent need to increase public spending on PHE in India, particularly for the interest of most vulnerable and marginalised students.

This study has largely considered the demand-side factors to understand the barriers to access PHE India and does not include supply-side variables due to the limitations of the NSSO data used in this study. Therefore, in further research, the focus might be expanded to include supply-side determinants of access to professional higher education, which may reveal the picture better. Further research might focus on looking at the growth, participation and household spending on some specific costly disciplines such as engineering, medicine and management. Another area for further enquiry should be to link the pattern of household spending on professional education with access to student loans, which is considered as an alternative to costly higher education in the policy space. Nevertheless, this article makes a significant contribution to higher education sector as there are limited studies on PHE in India, particularly using the latest available data.

Appendix

See Appendix Tables 11.7, 11.8, 11.9 and 11.10.

Table 11.7 State-wise growth of professional HEIs in India

	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	Growth rate (2011–12 to 2018–19)
Southern	*1544*	*1660*	*1685*	*1655*	*1706*	*1729*	*1735*	*1781*	*15.3*
AP	573	288	269	286	298	303	309	314	−45.2
Karnataka	400	423	479	432	432	449	467	474	18.5
Kerala	112	123	144	162	186	197	199	206	83.9
Tamil Nadu	439	472	514	496	507	511	514	513	16.9
Puducherry	20	19	24	20	21	21	21	21	5.0
Telangana	NA	335	255	259	262	248	225	253	−24.5*
Western	*729*	*863*	*1035*	*1009*	*1067*	*1109*	*1158*	*1196*	*64.1*
Goa	9	12	12	14	13	13	14	14	55.6
Gujarat	270	321	356	354	391	398	419	428	58.5
Maharashtra	323	388	523	480	497	528	567	592	83.3
Rajasthan	127	142	144	161	166	170	158	162	27.6
Northern	*452*	*582*	*689*	*798*	*866*	*877*	*895*	*891*	*97.1*
Chandigarh	3	5	5	6	6	7	4	6	100.0
Delhi	38	45	47	46	47	50	54	52	36.8
Haryana	83	114	134	139	144	152	138	140	68.7
HP	33	36	38	38	39	41	44	48	45.5
J & K	9	15	22	22	26	25	29	28	211.1
Punjab	107	138	155	172	180	178	188	188	75.7
Uttarakhand	36	42	41	45	49	48	59	52	44.4
Uttar Pradesh	143	187	247	330	375	376	379	377	163.6

(continued)

Table 11.7 (continued)

	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	Growth rate (2011–12 to 2018–19)
Eastern	*253*	*321*	*379*	*381*	*400*	*403*	*411*	*425*	*68.0*
Bihar	38	50	56	58	65	65	69	74	94.7
Jharkhand	14	25	29	33	36	38	40	40	185.7
Odisha	65	85	126	128	132	126	123	129	98.5
West Bengal	136	161	168	162	167	174	179	182	33.8
Central	*192*	*268*	*319*	*329*	*338*	*333*	*351*	*335*	*74.5*
Chhattisgarh	61	70	82	88	89	95	110	114	86.9
Madhya Pradesh	131	198	237	241	249	238	241	221	68.7
North-eastern	*32*	*45*	*63*	*59*	*64*	*62*	*66*	*73*	*128.1*
Assam	14	24	35	36	39	37	41	43	207.1
Manipur	5	6	8	8	9	8	7	12	140.0
Meghalaya	3	3	3	3	3	3	4	4	33.3
Sikkim	2	4	4	2	1	2	2	2	0.0
Tripura	8	8	13	10	12	12	12	12	50.0
All India	*3214*	*3753*	*4183*	*4244*	*4453*	*4527*	*4638*	*4722*	*46.9*

Source Compiled by the authors from AISHE reports, MHRD (various years)
Note *For Telangana, the growth rate is calculated for 2012–13 to 2018–19

Table 11.8 Share of professional HEIs to total HEIs in India

	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
Southern	*15.3*	*16.3*	*17.1*	*14.7*	*14.8*	*14.5*	*14.4*	*14.7*
Andhra Pradesh	14.8	13.6	15.9	12.9	12.2	11.7	11.9	12.3
Karnataka	13.4	14.1	15.4	13.0	13.0	12.9	13.0	13.0
Kerala	13.8	14.5	16.6	14.4	15.0	15.4	15.2	15.8
Tamil Nadu	18.9	19.7	20.8	19.8	21.1	21.1	20.3	20.3
Puducherry	25.6	25.3	30.8	24.7	25.9	26.6	26.6	26.9
Telangana	0.0	18.8	15.8	12.8	12.8	12.2	11.5	12.7
Western	*13.3*	*11.7*	*13.2*	*11.4*	*11.8*	*12.3*	*12.2*	*12.3*
Goa	18.8	23.5	22.6	24.1	22.8	22.8	23.7	23.3
Gujarat	15.9	17.7	19.0	17.7	19.0	18.5	18.7	18.7
Maharashtra	12.6	9.1	11.6	10.5	11.1	12.8	13.0	13.4
Rajasthan	11.0	11.5	10.2	7.1	6.7	6.2	5.6	5.5
Northern	*12.0*	*11.6*	*11.3*	*9.5*	*9.6*	*9.0*	*8.9*	*9.0*
Chandigarh	12.0	18.5	18.5	21.4	21.4	25.0	14.3	21.4
Delhi	20.3	23.7	25.1	24.0	24.4	24.9	26.6	25.4
Haryana	15.9	17.8	17.4	16.2	15.8	15.1	14.0	13.5
Himachal Pradesh	12.0	12.5	13.3	12.8	12.0	11.7	12.5	13.3
Jammu & Kashmir	4.4	6.4	7.4	7.1	8.3	8.1	9.4	9.2
Punjab	29.7	28.3	21.5	18.5	18.3	17.3	17.9	18.1
Uttarakhand	15.9	16.8	15.4	13.1	13.6	12.7	13.5	12.1
Uttar Pradesh	7.3	6.4	7.0	6.1	6.3	5.8	5.7	5.8
Eastern	*12.2*	*12.8*	*13.0*	*12.5*	*12.6*	*12.1*	*11.5*	*11.5*
Bihar	6.7	8.4	9.2	8.9	9.6	9.4	8.7	8.5
Jharkhand	12.4	13.0	12.8	13.4	12.2	11.9	12.3	12.0
Odisha	12.5	10.8	11.7	11.9	12.1	11.7	11.6	11.9
West Bengal	15.5	17.2	16.8	15.2	15.0	14.0	12.9	12.9
Central	*10.3*	*12.1*	*12.4*	*11.9*	*12.0*	*11.9*	*12.2*	*12.2*
Chhattisgarh	10.3	11.5	12.2	12.5	12.3	12.8	14.4	14.5
Madhya Pradesh	10.2	12.3	12.4	11.7	11.9	11.6	11.5	11.3
North-Eastern	*6.9*	*8.1*	*9.6*	*8.4*	*9.0*	*8.5*	*8.8*	*9.3*
Assam	4.7	6.6	7.7	7.3	7.9	7.2	7.9	7.8

(continued)

Table 11.8 (continued)

	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
Manipur	7.5	7.8	9.4	9.3	10.3	9.9	7.8	12.4
Meghalaya	6.7	6.1	6.0	5.4	5.2	5.0	6.7	6.6
Sikkim	12.5	22.2	22.2	9.5	4.8	8.3	8.3	8.7
Tripura	19.5	17.0	26.5	20.0	22.6	21.4	21.8	21.4
All India	*13.5*	*13.4*	*13.9*	*12.1*	*12.2*	*12.0*	*11.9*	*12.1*

Source Compiled by the authors from AISHE reports, MHRD (various years)

Table 11.9 Notation and definition of the variables in the probit model

Notation of variable	Name of variable	Definition
Attending_PE (Dependent Variable)	Currently attending professional higher education	= 1, if the student is currently attending professional higher education course = 0, if the student is currently attending other higher education course
Individual characteristics		
Gender	Sex of the students (dummy variable)	= 1, if the student is male = 0, if the student is female
Caste	Caste of students	= 1, if the student belongs to SC or ST (Ref) = 2, if the student belongs to OBC = 3, if the student belongs to forward caste
Household Characteristics		
Hh_cons_quintile	Household constuption quintile	= 1, if household lies in Quintile 1 (Poorest—Ref.) = 2, if household lies in Quintile 2 = 3, if household lies in Quintile 3 = 4, if household lies in Quintile 4 = 5, if household lies in Quintile 5 (Richest)
Family_size	Size of the Family	Total number of brothers and sisters in the family

(continued)

Table 11.9 (continued)

Notation of variable	Name of variable	Definition
Location	Location of the household (dummy variable)	= 1, if the household living in an urban area = 0, if the household living in a rural area
Institutional Factors		
Type_ inst	Type of institution (dummy variable)	= 1, if the student is enrolled in private institutions = 0, if the student is enrolled in government institutions

Table 11.10 Summary statistics of the variables used in the probit model

Variable	NOB	Mean	SD	Min	Max
Gender	32,122	0.575	0.494	0	1
Caste	32,123	2.116	0.738	1	3
Location	32,123	0.446	0.497	0	1
Hh_cons_quintile	32,123	2.969	1.425	1	5
Family_size	32,123	4.796	2.214	1	28
Type_inst	32,010	0.540	0.498	0	1

Note The number of observations (NOB) is 32,123 except for some variables with missing information. Weighted means and standard deviations (SD) are reported, which were corrected for the differences in sampling probabilities

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Part VI
Labour and Employment

Chapter 12
Has Labour Rigidity Slowed Down Employment Growth in Indian Manufacturing?

Jayan Jose Thomas

12.1 Introduction

A striking feature of the Indian economy has been the relatively small contribution made by the manufacturing sector to the country's gross domestic product (GDP) and, more importantly, to employment. In 2017, manufacturing accounted for only 15.1%of India's GDP, compared to 29.3% in China.[1] In 2011–12, India's manufacturing sector provided employment to 61.3 million, which was only 13% of the country's total workforce of 472.5 million.[2]

The slow expansion of manufacturing employment in India has often been attributed to the alleged rigidity in the country's labour market. It is argued, in general media and policy discussions, that labour regulations in India reduce the flexibility for capitalists to hire and fire workers as they choose, discouraging them to invest in industry in the country. At the same time, *Economic Survey 2019–20* is optimistic that India will be able to create 40 million well-paid jobs in manufacturing by 2025. For achieving this, the *Survey* recommends an 'Assemble in India' strategy, with a focus on labour-intensive industries and export markets. It argues that India will be able to replicate China's success in being a hub for the final assembly of a range of 'network products', including computers, and electronic and telecommunication

[1]Data obtained from the World Bank's *World Development Indicators.* Available at https://data.worldbank.org/indicator.

[2]According to data from the National Sample Survey Organization (NSSO) on Employment and Unemployment.

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equipment, production of which occurs across global value chains coordinated by a few multinational enterprises (MNEs).

This paper contests the widely cited argument that labour regulations and labour market rigidities have been the main reason behind the slow growth of manufacturing employment in India. It argues that, on the contrary, the absence of a well-articulated industrial policy has been a major stumbling block to expanding manufacturing employment in the country. The paper is based on evidence gathered from secondary data sources and also from field studies carried out by the author in various industrial centres across India.

In India, manufacturing consists of the organized and unorganized (or registered and unregistered) sectors. The organized manufacturing sector is almost identical with the factory sector. The factory sector comprises factories that employ more than 10 workers and operate with the aid of electric power (as well as factories that employ more than 20 workers without the aid of electric power). Annual Survey of Industries (ASI) is the main source of data on the factory sector, and according to ASI, the factory sector employed 15 million workers in India in 2017–18 (and 13.3 million workers in 2011–12).

According to the recent Periodic Labour Force Survey (which is based on a sample survey of households), manufacturing employment (organized and unorganized combined) in India in 2017–18 was only 60.2 million, which was 12.8% of the country's total workforce in that year. At the same time, close to 80% of all manufacturing workers in India are outside the factory sector, engaged in small, informal (or unregistered) enterprises.[3] It is notable that despite its low share in employment, the organized sector contributed 67.6% of India's total manufacturing GDP in 2010–11 (GOI, 2016).

According to the National Sample Survey Organization's (NSSO) household survey on Employment and Unemployment in 2011–12, the size of India's manufacturing workforce was estimated to be 61.3 million. In fact, the size of India's manufacturing workforce had declined by close to one million between 2011–12 and 2017–18 (from 61.3 million to 60.2 million) (see Fig. 12.1).

12.2 Cheap Wages or Role of State? Building Comparative Advantages in Industrialization

There has been a long-standing debate on the extent to which interventions by state or governments, especially in the building of technological and institutional capabilities, contribute to the process of industrialization. As is well known, state intervention in industrialization had been extensive in the case of the former Soviet Union, China

[3]It needs to be highlighted, however, that NSSO's employment survey is a survey of households while ASI is a survey of enterprises. This difference in the nature of the two surveys is a limitation while making an estimate of employment in the unorganized manufacturing sector using a combination of data from the NSSO and ASI.

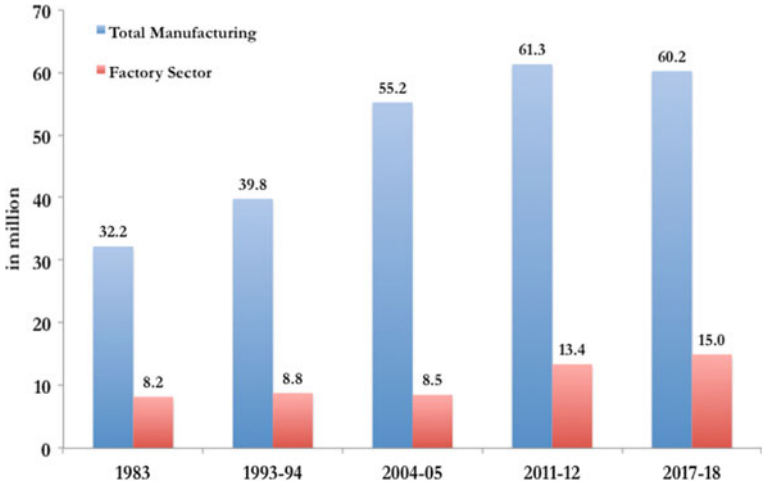

Fig. 12.1 Employment in the factory sector and manufacturing in India, in million umbers

during its Maoist phase, and India during the planning years. In each of these industrializations, the public sector played a dominant role, even while the operations of private firms had been subject to significant controls by the state. These experiments produced mixed results with respect to achieving industrialization and economic growth.

According to many commentators, state intervention played a crucial role in the miraculous successes of the East Asian economies too, such as of South Korea and Taiwan (Amsden, 1989; Chang, 2007). Remarkably, in these countries, the role of state intervention was not in the setting up of public sector units. On the other hand, the 'leading hand of the state' had been instrumental in identifying potential areas of growth, as well as in guiding, promoting and disciplining the private players (such as the chaebols in South Korea) (Amsden, 1989).

Nevertheless, neoclassical economists and 'Washington institutions' such as the International Monetary Fund (IMF) and the World Bank have been arguing for only a limited role for the government in industrial and economic development. They contend that the 'invisible hand of the market', in itself, will bring in economic development, and that the government only needs to ensure that conditions exist for the free operations of the markets. Pointing to many instances of government failures (such as the inefficiency in public sector units in some countries), the IMF and the World Bank oversaw 'structural reforms' in several developing countries from the 1980s onwards. These reforms resulted in a retreat of the state from industrial and economic development.

However, a number of economists have challenged the neoclassical narrative on how industrialization could be driven by market forces alone. Alice Amsden (1989) pointed out that the East Asian countries achieved their successes not by sticking to only those industries in which they had comparative advantages (such

as labour intensive industries). On the contrary, they (South Korea, for instance) made bold forays into diverse and challenging areas such as ship building and steel making. This they managed to achieve because the governments in these countries offered assistance, especially in the form of subsidies, to the deserving firms. In other words, Amsden (1989) argued that late-industrializing countries such as South Korea achieved success by 'getting relative prices wrong' (for instance, with subsidized credit, capital was being made cheap in a capital-scare country)—not by 'getting relative prices right' as the neoclassical economists contend (Amsden, 1989).

In the case of the advanced economies of today, including Britain and the United States, Ha Joon Chang (2002) pointed out that the state intervened to nurture industries in these countries too, during their phases of industrialization. Therefore, when institutions such as the IMF deny developing countries the opportunities for industrialization with state support, they are, in fact, 'kicking away the ladder' for climbing the steps for development (Chang, 2002, 2007).

The voices favouring state intervention in industrialization have been growing louder during the recent years. First, there is now greater recognition of the fact that economic growth is delayed not just by government failures, but often more severely due to market failures, especially with the eruption of financial crises in many parts of the world. Secondly, the spectre of deindustrialization is emerging as a threat to employment growth not just in the developed world but also in developing countries. According to Rodrik (2015), deindustrialization refers to a situation in which countries '[run] out of industrialization opportunities sooner and at much lower levels of income compared to the experience of early industrializers'. Rodrik (2015) attributes this to globalization and labour saving technological progress in manufacturing.

Given such a context, there is now much greater appreciation of the role of industrial policy in aiding industrialization. Mazzucato (2011) has highlighted the critical contributions made by the 'entrepreneurial state' towards achieving economic growth. She argues that state has been a leading agent—and not just a facilitator—in achieving innovative breakthroughs, including in the case of the Internet, the computer industry and the pharma-biotech industry. The IMF in a recent paper seems to have finally admitted the role of what it describes as 'Technology and Innovation Policy' in fueling economic growth. This paper points out how the East Asian miracle economies followed the 'moonshot' approach to development: the leading hand of the state directing domestic firms in these countries into technologically sophisticated industries (Cherif & Hasanov, 2019).

The role of state in financing industrial development is important too, as Gerschenkron (1962) had showed how development banks played a vital role in the industrialization of Germany. Development financial institutions (DFIs) have been critical for providing long-term finance for manufacturing growth in several countries including Germany, Japan, South Korea, Brazil and India. Commercial banks suffer from a problem of maturity mismatch when it comes to lending for long-term investment, dependent as they are on short-term borrowings from depositors. While

the decline of DFIs in India since the 2000s has hampered the country's industrial growth, the setting up of China Development Bank in 1994 has really given boost to that country's industrialization drive during the recent years (Nayyar, 2018).

12.3 State and Industrialization in India

As is well known, India had launched an ambitious programme of industrialization led by the state and the public sector during the 1950s, which had indeed been a model for other developing countries too. Industrialization in India during the 1950s through the 1970s had been characterized by large investments by the public sector in key, strategic areas, as well as by extensive control of the state over the activities of the private sector through the licensing regime.

Industrial development that occurred in India during the phase of planning had been unsuccessful in generating adequately large manufacturing employment, particularly considering the vastness of the country's labour reserves. India's Second Five-Year Plan model emphasized the building of a capital goods sector, comprising machines that produce other machines. According to the plan model, greater allocation of investment to the capital goods sector would result in faster growth of savings, investment and output in the long run.

Investment into capital- and technology-intensive sectors during the planning years (including into areas such as space science and atomic energy) laid the foundations for India's diversified economic base. At the same time, however, the employment generating potential of the capital goods sector had been limited. Given such a context, it was believed (perhaps a little too naively) that handicrafts and the production of consumer goods in the small-scale sector would alleviate the problem of unemployment in the country.

Nevertheless, Indian planning did very little to remove the hurdles to the growth of agriculture and small-scale industries. India's record during the post-independence period in implementing land reforms and ensuring primary education for all has been rather unimpressive. As a result, the benefits from state-led development have so far reached only a minority of Indians. The slow growth of rural incomes and the persistence of high income inequalities have dampened the growth of industrial demand in the country, especially for mass-consumption goods (such as apparels or processed food).

India's economic development shifted from being state-led to increasingly market-driven from the 1980s onwards. The licensing requirements for private sector investments began to be liberalized from the 1980s itself. India inaugurated far reaching market-oriented economic reforms in 1991. With the 1991 reforms, the Indian economy has become increasingly open for foreign trade and investment. Quantitative restrictions (QRs) on imports had been virtually removed by the early 2000s, and tariffs on most goods have been reduced drastically over the following years. The norms on foreign direct investment (FDI) have been liberalized. The reservation of certain sectors for the small-scale sector had been abolished in 1991. At the same

time, with the reforms in the banking sector, credit received by micro and small industries as well small agricultural cultivators has been on a decline.

Public investment in India has been declining sharply from the 1990s onwards. In fact, the capability of the state to undertake public expenditures has been undermined by its commitment to maintain fiscal discipline. With the opening of the capital account, increasingly from the 2000s, the Indian economy has been coming under the influence of highly volatile, short-term capital inflows. Given India's heavy dependence on the imports of oil (and in recent years electronic goods), the country's current account has been in a deficit, increasing the vulnerabilities on the external front.

It may be noted that the withdrawal of the state from industrial development in India after the 1990s has implied not only a marked deceleration in public investment, but also the state's abdication from the sphere of industrial policy. This has been a crucial difference between the Indian and the East Asian industrialization experiences. In fact, during the post-1991 years, State governments (in particular) in India have had very little autonomy with respect to investments and policies related to industrial growth. Given the imbalances in the nature of Centre-State fiscal relations in India, State governments do not have large enough financial resources at their command to make impactful interventions in the industrial sector. They are often compelled to compete with each other in attracting domestic private and foreign investments by extending tax and other concessions to the private industrialists.

12.4 Growth of Indian Manufacturing Over the Decades

According to estimates based on NSSO surveys, India's manufacturing employment was 32.2 million in 1983, 39.8 million in 1993–94, 55.2 million in 2004–05 and 61.3 million in 2011–12 (see Table 12.1 and Fig. 12.1). The size of the manufacturing

Table 12.1 Employment in the factory sector and manufacturing in India, in million numbers and as % of total employment in the country

Years	Employment in million numbers			Manufacturing employment as % of total employment
	Factory sector	Manufacturing, total	Total employment (all sectors)	
1983	8.2	32.2	303.4	10.6
1993–94	8.8	39.8	374.4	10.6
2004–05	8.5	55.2	457.8	12.2
2011–12	13.4	61.3	472.5	13.0
2017–18	15.0	60.2	471.5	12.8

Notes and sources Author's estimations based on various rounds of surveys conducted by the NSSO, PLFS (for manufacturing and total employment) and ASI (for factory sector employment)

workforce relative to the country's total workforce remained steady at 10.6% between 1983–84 and 1993–94, but rose to 12.1% by 2004–05 and to 13% by 2011–12 (see Table 12.1).

Despite the growth in the size of the overall manufacturing workforce, there had been hardly any significant change in the size of India's factory sector during the 1980s and 1990s. According to the Annual Survey of Industries, factory sector employment in India was 8.2 million in 1983, 8.8 million in 1993–94 and 8.5 million in 2004-05. Factory sector employment as a share of total manufacturing employment in India declined from 25.5% in 1983 to 15.4% in 2004–05 (see Table 12.1 and Fig. 12.1). The factory-based production of cotton and jute textiles suffered steep declines during the 1980s, with thousands of mill workers losing jobs in Mumbai, Kolkata, Ahmedabad and other industrial centres.

The introduction of economic reforms in 1991–92 was followed by a surge in industrial investments in India. Almost all factory-sector industries experienced acceleration in the growth of output and employment during the period from 1991–92 to 1995–96, and the star performers had been minerals and metals, machinery, automobiles, and chemicals and petrochemicals. However, the growth of output in India's organized manufacturing sector decelerated between 1996–97 and 2001–02, with several industries recording negative or very low rates of growth. Factory sector manufacturing employment increased sharply, by 1.5 million, during the first half of the 1990s, and declined subsequently, by 1.1 million, during the second half of the 1990s (see Fig. 12.2 and Table 12.2).

Fig. 12.2 Log of gross value added and employment in 100,000 numbers, India's Factory Sector: 1991–92 to 2016–17. *Source* Annual Survey of Industries, various issues

Table 12.2 Employment in the factory sector in India, industry-wise, numbers in 1000s

Industries	Increment to employment						Employment in 2016–17
	1973–74 to 1980–81 (7 years)	1980–81 to 1991–92 (11 years)	1991–92 to 1995–96 (4 years)	1995–96 to 2004–05 (9 years)	2004–05 to 2011–12 (7 years)	2011–12 to 2016–17 (5 years)	
Food products, beverages, tobacco products (10, 11, 12)	740	−35	207	1	406	100	2322
Textiles, garments, leather goods, footwear (13, 14, 15)	231	−160	377	6	821	404	3090
Wood products, furniture, jewellery, toys, precision devices (16, 31, 32)	10	4	67	50	105	121	515
Chemicals, petroleum, rubber and plastic products (19, 20, 21, 22)	227	188	264	48	729	427	2325
Minerals, metals, metal products (23, 24, 25)	229	164	217	−108	1275	79	2775
Machinery, equipment, instruments (26, 27, 28)	153	139	181	−230	649	91	1543
Motor vehicles, transport equipment (29, 30)	96	61	143	−170	558	223	1304
All manufacturing (10:32)	1713	378	1524	−471	4675	1435	14,289
Average annual increment to employment, all manufacturing,	245	34	381	−52	668	287	

Given the above-referred context, India's industrial growth during the 1980s through the first half of the 2000s has been described as 'jobless'. That is, despite the relatively fast growth of factory sector output, the growth of factory sector employment in the country had been stagnant during this period (see Fig. 12.2). Some scholars have argued that labour regulations have reduced the flexibility in India's labour market and thereby slowed down the growth of factory employment in the country.

It is notable that despite the stagnancy in the growth of factory employment, total manufacturing employment in India (according to NSSO's household surveys) increased by 23 million (from 32.2 million to 55.2 million) between 1983 and 2004–05 (see Table 12.1). This suggests that the expansion of manufacturing employment in India during the period from the early 1980s to the middle of the 2000s occurred largely in micro and small units in the unorganized sector.

12.5 Manufacturing Employment During a Phase of Fast Growth: 2004–05 to 2011–12

The growth of employment and output of organized manufacturing sector (as well as of overall GDP) in the country registered an impressive revival during the early 2000s. Factory sector employment in India increased from 8.5 million in 2004–05 to 13.4 million in 2011–12—thus an increase of 4.9 million new jobs over this seven-year period (see Fig. 12.2 and Table 12.2). That was remarkable compared to the near 'jobless' growth that characterized this sector for the two-and-a-half decades since the 1980s.

The record of employment growth in the unorganized manufacturing sector, however, presents an altogether different picture. Between 2004–05 and 2011–12, NSSO data shows that overall manufacturing employment in India increased from 55.2 million to 61.3 million—thus an increase of only 5.1 million new jobs. At the same time, as we have already seen, organized manufacturing employment had registered a sharp increase during this very period (4.7 million new jobs between 2004–05 to 2011–12). Thus, between 2004–05 and 2011–12, the growth of employment in the manufacturing sector (organized and unorganized sectors combined) decelerated, despite a revival in employment growth in the organized manufacturing sector. Clearly, this points to a sharp downward fall in the growth of employment in India's unorganized manufacturing from the mid-2000s onwards.

Between 1983 and 2004-05, employment in the relatively 'modern' industries—chemicals, petroleum, rubber and plastic products, minerals, metals, metal products, machinery, equipment, instruments, motor vehicles and transport equipment—increased by approximately 6.3 million (according to NSSO surveys). During this period, the net increase in factory employment in the same set of industries was only 0.9 million (see Table 12.2). This suggests that for every new job in the factory

sector, approximately six jobs had been generated in the unregistered sector in the above-referred set of industries during the years from 1983 to 2004–05.

The period between 2004–05 and 2011–12, however, presents a completely different picture. The net increase in factory employment during this period (according to ASI data) in the modern industries referred above was 3.2 million (thus, a much better record compared to the corresponding increase of only 0.9 million between 1983 and 2004–05). At the same time, the NSSO household surveys suggest that the net increase in overall employment in these industries during the 2004–12 period was also 3.2 million. This implies that there had been hardly any net increase in employment in the unregistered sector in a wide range of industries, including chemicals, plastic products, minerals, metals, metal products, machinery and equipment, and motor vehicles.

It is important to note that even within the factory sector, a substantial share of the incremental employment created after the 2000s has been in the relatively large factories. Rakshit (2019) shows that factories that employ 200 or more workers accounted for 61% of the total factory employment in India in 2014–15, up from 54% only in 2000–01. In fact, 43% of the incremental employment during the 2000–2015 period occurred in factories employing 500 or more workers (Rakshit, 2019).

12.6 Growth of Manufacturing Employment After 2011–12

The growth of overall GDP and of manufacturing incomes in India had been at extremely fast rates (annual growth rates of above 8% for both) during the years from 2003–04 to 2007–08. However, the worldwide economic crisis, which became pronounced by 2008, affected Indian industry too, especially the export-oriented sectors including garments and engineering. The expansionary monetary and fiscal policies initiated in India to tide over the economic slowdown, which included greater lending by banks, helped to overcome the crisis to some extent.

Nevertheless, the Indian economy has been facing greater difficulties after 2011–12. First, there has been a slowdown in investment rates in the Indian economy. Gross capital formation as a proportion of the country's GDP was 39.5% in 2012–13 but declined to 33.5% by 2016–17. India's exports have slowed down in growth too, with a decline in the global demand conditions. India's current account deficit had dipped to very levels by 2012–13 (touching 5%of GDP in that year). The change in the base year for GDP estimations from 2011–12 onwards makes it difficult to compare the rates of growth before and after that year. However, certain points are worth noting. There has been a clear deceleration in the growth of agricultural incomes and rural demand in India after 2011–12 (compared to the years between 2003–04 and 2011–12). The construction sector, which had been the most important source of employment in the country during the period from 2004 to 2012, experienced a noticeable slowdown in the growth of incomes after 2012–13.

According to ASI data, the growth of value added and employment in India's factory sector decelerated markedly from 2011–12 onwards, relative to the growth

during the 2004–11 period. The growth of value added had revived somewhat during the 2014–16 period, but slowed down again in 2016–17. The slowdown in employment growth after 2011–12 in industries such as machinery, minerals and metal products is of particular concern (see Fig. 12.2 and Table 12.2).

As is well known, demonetization of high value currency notes in November 2016 and the introduction of goods and services tax (GST) in July 2017 have been landmark events with very serious implications for the economy and labour markets. Small units in the informal sector have been adversely affected by these policies. When informal sector units have been compelled to become part of the formal sector in the wake of demonetization and GST, many of them may have possibly perished, causing severe loss of employment.

The employment situation in India has now reached a tipping point. An expansion of the country's working-age population, on the one hand, and the structural shift of the workforce away from agriculture, on the other, implies that new jobs will have to be generated in the non-agricultural sectors at a relatively fast rate. We have estimated that the *potential* workforce in India in industry and services grew at the rate of 14.7 million a year during the 2004–12 period. At the same time, the actual rate at which employment was created in industry and services in the country during the above-referred period was only 6.5 million year—or at less than half of the potential rate (Thomas, 2015).

The focus of government initiatives such as the 'Make in India' programme or of policy discussions in the country in general has been about removing hurdles to and thereby promoting investments by the big firms, both foreign and domestic corporate. However, it is less known that the crisis of manufacturing employment in India has affected the micro and small firms much more than the big firms.

Between 2004–05 and 2017–18, overall manufacturing employment in India increased from 55.2 million to 60.2 million—thus an increase of only 5.0 million new jobs. At the same time, employment in the factory sector (or organized manufacturing) alone increased by 6.5 million (from 8.5 million to 15 million) during this period (see Fig. 12.1). Thus, between 2004–05 and 2017–18, the net increase in employment in the manufacturing sector (organized and unorganized sectors combined) was less than the net increase in employment in the organized manufacturing sector alone (Thomas, 2019a; also see Jha, 2019). Within the factory sector, research by Angarika Rakshit of IIT Delhi shows 43% of the incremental employment during the 2000–2015 period occurred in factories employing 500 or more workers.

The above evidence points to a sharp downward fall in the growth of employment in small and unorganized manufacturing firms in India from the mid-2000s onwards. This has been confirmed by evidence gathered by this author during visits (done over several years) to some of the major industrial cities in the country, including Coimbatore, Rajkot, Vadodara and Surat. Industries in these cities, which include electrical machinery, pumps, automobile ancillaries and textile machinery, have been characterized by relations between firms of varying sizes and at various levels in the value chain. At the base of this, industrial ecosystem are a vast network of micro and small enterprises, which are suppliers of parts or components to the larger

units. Typically, the micro units carry out one or more machining operations (using lathe, drilling or milling machines) required in the production of a particular part or component (this is popularly called 'job work').

12.7 Labour Rigidity Argument: Losing Relevance?

The 'jobless' growth—stagnant growth of employment despite a relatively fast growth of value added—in India's factory sector between the 1980s and early 2000s has been the subject of a scholarly debate. Some economists have argued that the slow growth of factory employment in India during the 1980s and in later decades has been mainly on account of the rigidity in the country's labour market. This rigidity has been attributed to the introduction of certain labour regulations in the country during the late 1970s, which, it is argued, made it difficult for the employers to retrench workers (Besley & Burgess, 2004; Fallon & Lucas, 1993). At the same time, some other scholars have questioned the argument that India's labour market is rigid, and even pointed to some problems in the methodologies used in studies that attributed jobless growth to labour regulations (Bhattacharjea, 2009; see also the review in Thomas, 2018a).

There are enough grounds now to contest the labour rigidity argument, particularly in the context of the rising share of informal employment even within the formal segment of Indian manufacturing. Between 1999–2000 and 2014–15, directly employed workers accounted for only 33.5% of the incremental employment in India's factory sector, while the rest were contract workers or other employees who are outside the purview of the labour laws. Annavajhula and Pratap (2012) find that contract workers are employed in almost every aspect of production operation and they form 70–80% of all workers in Maruti Suzuki's plants in Gurgaon and Manesar.

In recent years, trade union activism has declined in India, and labour's bargaining strengths relative to capital has been substantially reduced. In India's factory sector, as a share of gross value added, profits increased sharply from 19.0% in 2000–01 to 53.8% in 2007–08, whereas workers' wages declined from 15.5% to 9.2% during the same period. Although profits as a share of gross value added declined afterwards (to 39.5% in 2014–15), this decline was more due to the rise in interest charges and salaries for supervisors and managers (see Fig. 12.3). Experiences from various industries show that employers find different ways to circumvent the existing labour regulations, while the authorities adopt a lax attitude towards implementing them (Dutta, 2016). In a field study of women garment workers in Bangalore, Johny (2018) writes about the strategies adopted by the employers to avoid payment of gratuity benefits to workers (including persuading workers to terminate their current contract and re-join the same factory within a week or so on a new contract) (also see Thomas & Johny, 2018) (Table 12.3).

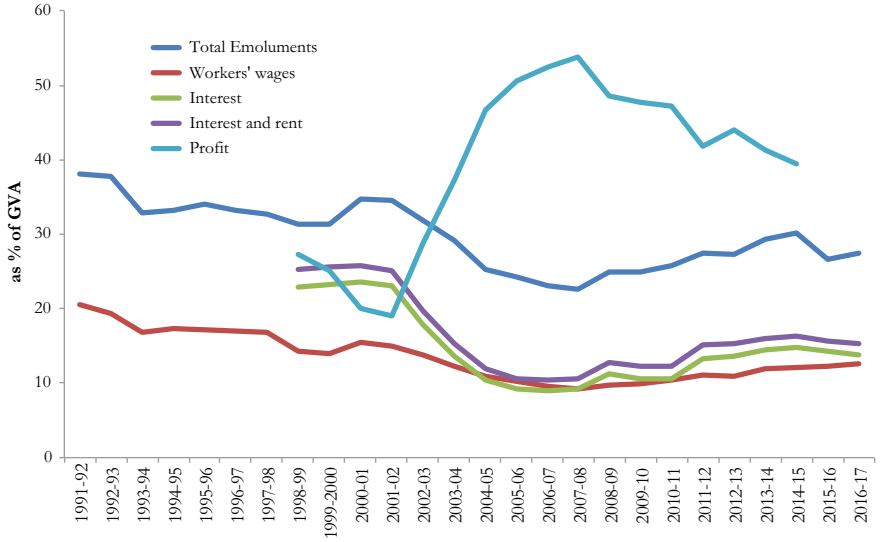

Fig. 12.3 Expenditures on labour and capital as % of gross value added, India's factory sector, 1991–92 to 2016–17. *Source* Estimates based on Annual Survey of Industries

Table 12.3 Distribution of employment in India's factory sector, by categories, 1999–2000 to 2014–15, as % of all persons employed

Category	1999–2000	2014–15	Incremental employment, 1999–2000 to 2014–15
All persons employed	100	100	100
1. Workers	76.8	77.5	78.4
1.1 Directly employed	61.7	50.1	33.5
Men	50.9	40.1	24.7
Women	10.8	10	8.8
1.2 Employed through contractors	15.2	27.4	44.9
2. Employees other than workers	23.2	22	20.3
2.1 Supervisory and managerial staff	10	9.8	9.5

Source Annual Survey of Industries

12.8 Investment and Industrial Growth

In India, the growth of the industrial sector has been closely linked to trends in investment. Gross capital formation (GCF) as a proportion of GDP in India was 19.2% in 1980–81, rose to 23.0% in 1992–93, but following a stagnation in investment after the mid-1990s, this ratio was still at 24.3% in 2000–01 (all estimations at 2004–05 base). In fact, there has been a sharp fall in public investment in the Indian economy

since the 1990s. Gross fixed capital formation (GFCF) in public sector as a proportion of India's GDP peaked at 12.2% in 1986–87, but subsequently declined to 6.6% by 2002–03. Private corporate sector GFCF too was on a decline in the country from the middle of the 1990s.[4]

There has been a significant revival in investment and industrial growth in India since the early 2000s onwards. GCF as a proportion of GDP rose impressively to 38% in 2007–08. This revival had been led by private corporate sector investments, which were financed largely by a notable rise in corporate profits and savings. However, after 2007–08, the private corporate sector GFCF has registered a decline in India. According to national income estimates with 2011–12 as the base year, GCF as a proportion of GDP in India was 39% in 2012–13 but fell to 33.3% only by 2016–17.[5]

It is important to note that as per the data compiled by the World Bank, investment rates in India had reached the levels achieved by China by 2017. However, the Chinese and the Indian rates began to diverge after that. By 2011, while GCF as a proportion of GDP was 39.6% for India, this rate had risen to 47.7% for China (see Fig. 12.4). In the aftermath of the global financial crisis, while the state in China responded with massive investments in infrastructure and new technologies, the Indian economy suffered due to stagnation in both public and private corporate investments.

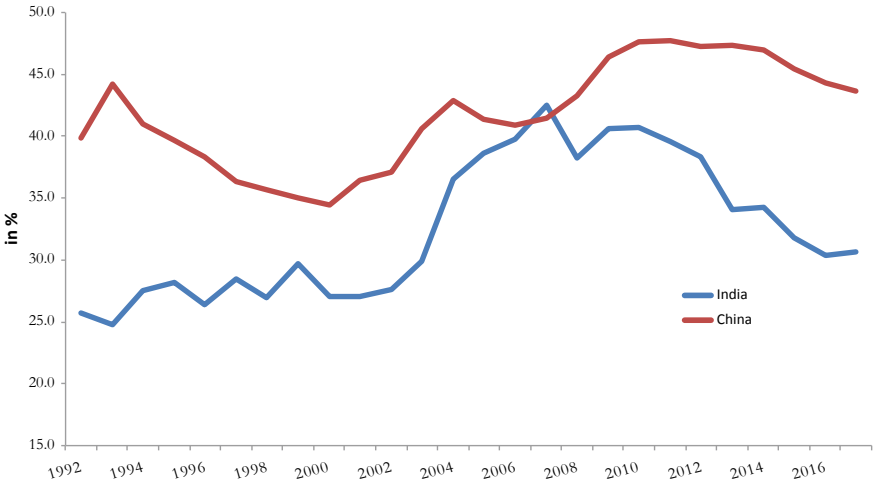

Fig. 12.4 Gross capital formation as % gross domestic product, India and China: 1992 to 2017
Source World Development Indicators

[4]Data obtained from National Accounts Statistics, Ministry of Statistics and Programme Implementation, Government of India, available at https://www.mospi.gov.in/13-national-accounts-statistics.

[5]Data obtained from National Accounts Statistics, Ministry of Statistics and Programme Implementation, Government of India, available at https://www.mospi.gov.in/13-national-accounts-statistics Gross Capital Formation as % gross domestic product, India and China: 1992 to 2017.

12.9 Infrastructure Challenges

In India, the growth of the infrastructure sectors such as electricity, roads and ports has failed to catch up with the overall pace of economic growth. This has resulted in severe supply-side bottlenecks, adversely affecting the growth of the country's manufacturing sector. The constraints in the infrastructure sector raise the costs of Indian firms, especially the micro, small and medium units, and reduce the competitiveness of their products both in the domestic and export markets.

Estimates by the Ministry of Power show that the energy availability in India during 2011–12 was 857.9 billion units (or kilowatt hour), which was 8.5% less than the energy requirement for that year. Power demand–supply shortages had been reported from every region of India and from a majority of Indian States in 2011–12 (CEA, 2012, Annex II). By 2017–18, energy availability in India increased to 1203.6 billion units, and the deficit in energy availability was reduced to 0.7%. The decline in deficit does not, however, confirm that the power situation has improved in the country. The reduction in deficit could partly be a consequence of the slowdown in energy demand (which grew at an annual rate of only 3.2% between 2013–14 and 2017–18), arising from a slow growth of demand from the industrial sector.[6]

It needs to be noted here that the power generation capacity in China was 2.4 times the power generation capacity in India in 2000, and 4.1 times the Indian figure in 2008. By 2017, electricity generation in China (in GWh) increased to 4.7 times the corresponding Indian level.[7] Public sector power utilities under the control of the Central or the State governments accounted for more than 80% of the total energy generation capacity in India even in 2011–12 (and 53.9% in 2019).[8] It is clear that investments by the public sector in power generation are crucial, especially given the long gestation nature of power projects.

Allcott et al. (2016) show that in India, electricity shortages have had a significant negative effect on the growth of output and revenues of manufacturing firms. They further show that the growth retarding impacts of power shortages have been more severe on small industrial units, which cannot afford to install generators. Our field research in Coimbatore in Tamil Nadu confirms that power shortages have been the most serious constraint to growth in this industrial town between 2007 and 2014. For instance, in January 2012, industrial units in Coimbatore suffered from six hours of power cuts on a daily basis, and as a result, several units were operating at 50% or even less of their actual production capacities. The owner of a leading pump manufacturer in Coimbatore recounted the schedule of power cuts affecting his factory in January 2012: 10 am to 12 noon, 4 pm to 6 pm, 7.30 pm to 8.15 pm, and 9.45 pm to 10.30 pm.[9]

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[6] https://powermin.nic.in/en/content/power-sector-glance-all-india.

[7] Data obtained from World Development Indicators, World Bank.

[8] Information from the Ministry of Power, Government of India reported in http:// www.indiastat.com.

[9] Based on the author's field research on Coimbatore's industrial sector from 2008 onwards. See also Thomas (2009).

There are other forms of infrastructure bottlenecks that affect the growth of small industrial units. Consider, for instance, the case of agro- and food-processing industries. The prospects for the growth of such industries, especially in relatively small-scale units, are indeed very high in India. These industries will be beneficial for the farmers and will also help provide cheap food for the general public. However, a major hurdle for the growth of such industries is the absence of the necessary infrastructure. Even facilities for storage and transport of fruits, vegetables and other agro-based products from the farm to the market (cold storages, for instance) are extremely poor in most parts of the country.

12.10 Banking and Credit

India used to have a relatively strong institutional mechanism for long-term financing of industrial development, but this began to weaken from the 2000s onwards (Nayyar, 2018). The development finance institutions (DFIs) in India included term-lending institutions such as ICICI and IDBI; State financial corporations and state industrial development corporations; and institutions such as LIC and Unit Trust of India (UTI), which mobilized savings from households. Lending by DFIs as a proportion of gross fixed capital formation by the private sector in the country climbed to 75% by 2000–01 (Nayyar, 2018).

However, from the 2000s onwards, development banks in India as well as in many other countries began offering 'universal banking services', diluting their core strengths in long-term lending. On the other hand, from the mid-2000s onwards, commercial banks in India increased their lending to large-scale industries, including units notably in the power and telecom sectors (Nagaraj, 2013). Long-term lending by commercial banks to large-scale industries eventually led to the ballooning of their non-performing assets (NPAs).

During the pre-1990 years, targeting of bank credit to agriculture and small-scale industry was an important aspect of India's banking policies. The availability of subsidized credit made sizeable contributions to the growth of small-scale industries, such as, for instance, the garment industry in Tiruppur (Chari, 2000). However, the shares of agriculture and industry in the total allocation of credit by scheduled commercial banks in India declined from the 1990s onwards. As a proportion of non-food gross bank credit, advances to small-scale industries (SSIs) fell from 15.1% in 1990–91 to 6.5% in 2005–06, 5.7% in 2010–11 and only 4.9% in 2017–18 (see Fig. 12.5). The number of loan accounts of the SSI sector in commercial banks had declined from 219 million in 1992 to 93 million in 2005. On the other hand, the share of personal loans and professional services in total outstanding bank credit in India increased from 9.4% in 1990–91 to 27% in 2005–06, and was 22.8% in 2017–18 (RBI, 2006: 132–9; also see Fig. 12.5).

It is important to note that with the crisis due to NPA and other problems affecting the banking sector, credit disbursed by the commercial banks to the industrial sector has declined sharply from 2014 to 15 onwards. The year-on-year growth of bank

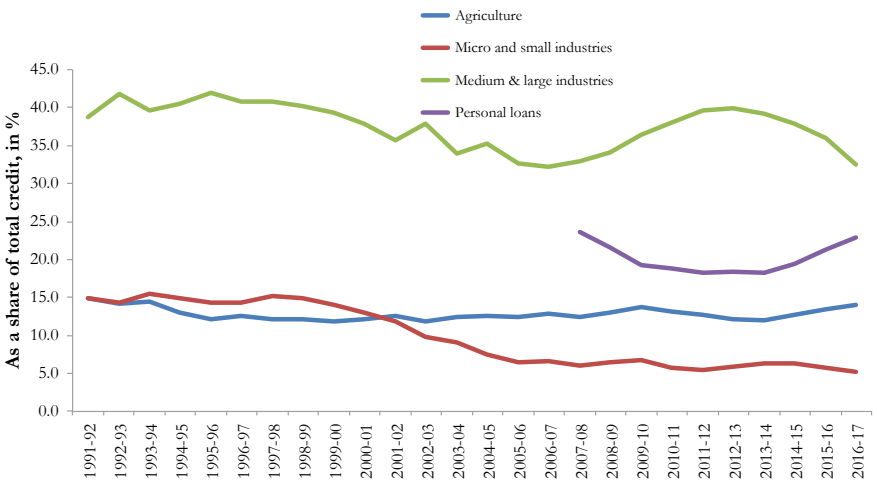

Fig. 12.5 Shares of industry and agriculture in outstanding non-food gross bank credit in India, 1991–92 to 2016-17 in %. *Source* Reserve Bank of India

credit received by micro, small and medium industries had been negative during 2015–16 and 2016–17, and only marginal (only 0.5%) in 2017–18. In comparison, year-on-year growth of personal loans disbursed by scheduled commercial banks was above 15% in each of these years (data from Reserve Bank of India).

Several owners of small and medium firms we spoke to highlighted the problem of relatively high interest rates. They say while they have to pay interest rates of 10–11% in India, Chinese firms receive loans at much lower interest rates (say 4%).[10] The high interest rates on working capital loans in particular are a heavy burden for the entrepreneurs. Typically, working capital requirements are relatively high during periods of recession, when firms are more likely to be burdened with the non-payment of dues from their customers (other firms, which may also be feeling the pains due to the recession). On the contrary, however, banks are reluctant to provide loans to firms during periods of recession (because they fear that the firms may default on the loans). Also if a firm delays its repayment of loan (which is more likely during a recession) by more than a certain period, banks begin to charge penal interest rates.[11]

At the same time, micro enterprises (mostly in the unregistered sector) receive very little credit from banks and other institutional sources. Typically owners of micro enterprises depend on their own personal or family savings for investment in machinery.

[10]Based on the author's field research in Coimbatore, Peenya (Bangalore), and Kollam (Kerala) (all during 2017–2018).

[11]Based on the author's field research at various industrial towns, including Coimbatore, Rajkot (2015–2016), and Kollam (2018).

12.11 Trade Liberalization and Rising Import Intensity of Manufacturing

India has reduced the tariffs on the import of several manufactured goods into the country from the 2000s onwards. The weighed average of import tariffs in India on capital goods declined from 94.8% in 1991–92 to 28.7% in 1995–96, 23.1% in 2001–02, 9.5% in 2005–06 and to 5.6% in 2009–10. The tariff reductions have adversely affected the prospects of India's manufacturing firms, which are, as noted above, already disadvantaged by many supply-side constraints. Some of the industries that recorded fast rates of growth of imports into India from the 2000s onwards include: machine tools, electrical and non-electrical machinery, electronic and computer goods and transport equipment (see Fig. 12.6).

In the case of the electronics industry, India, has been liberalizing duties from the middle of the 1990s onwards, initially as part of its World Trade Organization (WTO) requirements and later as a result of the Free Trade Agreements (FTAs) that India and some of the East Asian countries entered into. Given such an environment, domestic manufacturers of electronic components could not develop the technological capabilities needed to survive in this fast changing industry. Despite being a major market for mobile phones, India is today a large importer of telecommunication products (Francis, 2018).

Industrial growth that is increasingly based on imported components reduces the growth opportunities for the domestic industry and depresses the possible linkages

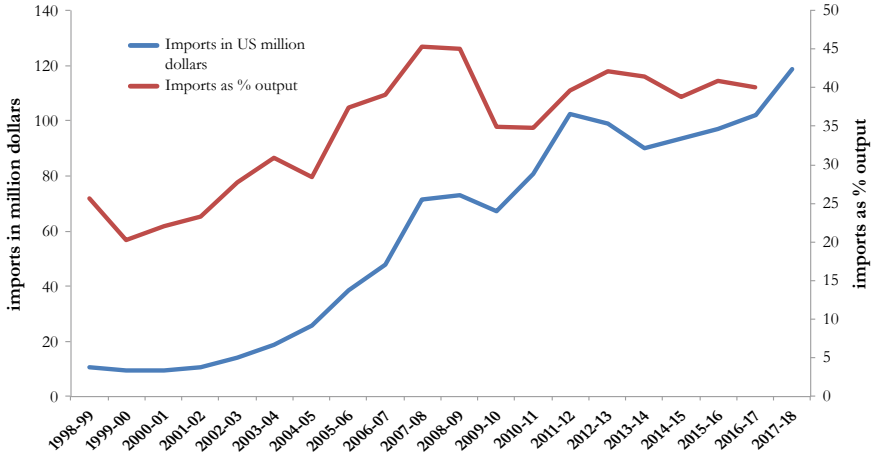

Fig. 12.6 Imports of machinery, electronic goods and transport equipment into India, 1998–99 to 2017–18: in million dollars and as a share of domestic production of these products in India. *Note* Based on data on imports and output of the following goods: machine tools; machinery except electrical and electronic; electrical machinery except electronic; electronic goods; computer goods; transport equipment; and project goods. *Source* Import data as reported in the Handbook of Statistics on Indian Economy, Reserve Bank of India; Output data from Annual Survey of Industries

between the large and the small-scale sectors. Typically, a substantial part of the production of ancillaries and components for machinery and transport-equipment industries in India has been in the small-scale or the unorganized sector. With the rise in the import of components, such opportunities for production in the small-scale sector have been reduced.

12.12 Exchange Rate Fluctuations

The gradual liberalization of India's capital account from the 2000s onwards and the resultant increase in the inflows of foreign portfolio investments (FPI) into the country have created problems for the country's manufacturing sector. The volatility in FPI flows has led to wide fluctuations in exchange rates and also in the prices of several commodities (such as steel and cotton) (see Fig. 12.7). It may be noted that unlike India, China has had strict controls on foreign capital movements across its borders to filter out volatile, short-term capital flows, which are often harmful to the economy. In the context of Brazil, Nassif et al. (2018) show how long-term industrial and technological policies have been weakened due to their incompatibility with short-term macroeconomic policies.

The Rupee-Dollar exchange rate appreciated sharply between May 2007 and April 2008, resulting in a steep decline in the revenues and employment of export-oriented industries such as textiles, garments, leather and engineering in India. At the same time, there have also been equally sharp depreciations of the Indian Rupee, such as during the second half of 2008 and again during the period from May 2011 to

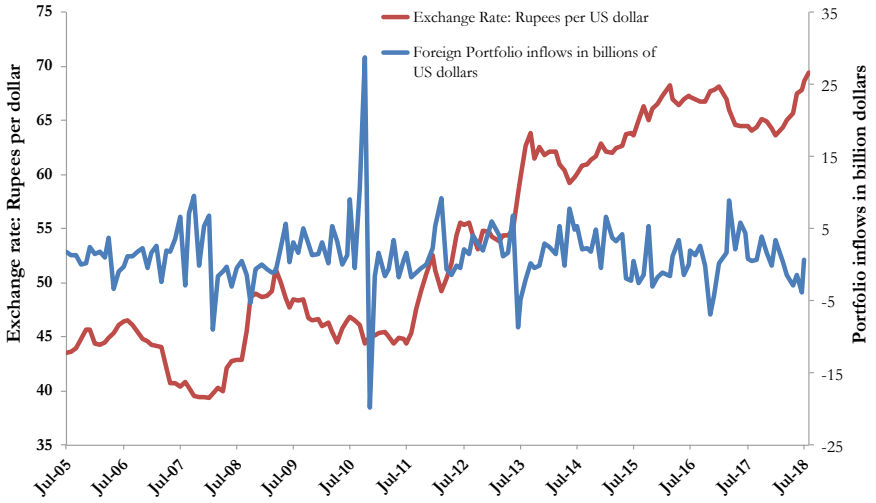

Fig. 12.7 Rupee-Dollar exchange rate and inflows of Foreign Portfolio Investment into India, July 2005 to August 2018. *Source* Reserve Bank of India

August 2013 (see Fig. 12.7). During these periods of currency depreciation, imports of machinery and raw material become costlier. Also, many Indian firms, which have availed of foreign-currency loans, incur heavy losses when they are required to repay their loans in the depreciated rupee.

12.13 Industrial Policies for Regional Development

In India, industrial policies should reflect the priorities and requirements for industrial development across various regions. There are variations across States with respect to demographic structures, which also have important implications for their labour markets. In 2011, population in the age group of 0 to 14 years as a share of total population was 23.4% only in Kerala and 40.1% in Bihar (according to data from the Census of India). Within India, the largest additions of working-age population over the coming years are going to come from some of the poorest regions, including States such as Uttar Pradesh and Bihar. At the same time, States such as Kerala and Tamil Nadu will see their population ageing.

Kerala has already started facing a severe shortage of unskilled workers, whereas, at the same time, educated workers from this State have been seeking employment opportunities elsewhere. According to an estimate by the State government, 1.4 million Keralites were working in various professions outside the country in 2011. At the same time, a rising stream of migrant workers from other States, including Bihar, West Bengal and Odisha, meets the large demand for unskilled labour in Kerala. According to an estimate in 2011, migrant labourers in Kerala from other Indian States numbered approximately 2.5 million, which was close to 20% of the State's total workforce (12.7 million) at that time.

Given such a context, the Approach Paper for the Thirteenth Five-Year Plan for Kerala (for the period from 2017 to 2022) had suggested that the future industrial development of Kerala should focus on industries that build on the advantages of a skilled workforce. Kerala aims to make a mark in sectors such as biotechnology, life sciences, pharmaceuticals (thus furthering Kerala's expertise and advantages in the area of healthcare), electronics hardware and knowledge industries in general.

Kerala is indeed making steady progress in some of these areas (a Life Sciences Park is being set up in Thiruvananthapuram). However, a relative shortage of financial resources is a big hurdle for the State in setting up research centres and other institutions that are crucial for the nurturing of knowledge industries. Central government public sector enterprises (PSEs) and research and educational institutions funded by the Central Government have a relatively small presence in the State (In 2013–14, Kerala's share in total investment by Central government PSEs was only 1.9%, much less than Kerala's share in India's population, which was 2.8% in 2011).

12.14 Services V/S Manufacturing

India's recent economic growth has been led by the services sector. The relatively fast growth of the services sector, especially of sectors such as information technology (IT) and financial services, has, in fact, created some disadvantages for the manufacturing sector in India. Most importantly, services sector growth has pushed up the cost of land and also for skilled labour in the country. Entrepreneurs we talked to in different parts of the country (Gujarat, Kerala, Tamil Nadu and Karnataka) have cited availability and cost of land as a key concern for them.[12] For instance, in Peenya industrial estate in Bangalore, the cost of one acre of land would be higher than Rs. 10 crores, according to some estimates in 2017. Therefore, for an entrepreneur, cost of land would become a heavy drain on her financial resources even before she begins production.

Many engineers and other skilled professionals find the services sector more attractive (with respect to salaries and working conditions) compared to manufacturing. Manufacturing firms find it difficult to offer salaries comparable to those offered in sectors such as the IT or financial services. Owners of manufacturing firms complain that even less skilled workers prefer to work in shopping malls or retail services rather than in factories.

12.15 Small Firms V/S Big Firms

In India, public sector units have facilitated the growth of the small firms around them, typically as suppliers of inputs or as players in some stage of the value chain. For example, a number of industrial units in Peenya have been engaged in the aircraft industry, to a large extent due to the linkages built in this industrial area by Hindustan Aeronautics Limited (HAL), Bangalore. Similarly Bharat Heavy Electricals Limited (BHEL) in Tiruchirappalli and Indian Petrochemicals Limited (IPCL) in Vadodara in 1969 had helped the emergence of clusters of small industrial units in these cities.[13]

However, in recent years, leaders of small-industry associations point out that they receive very little assistance from the bigger private firms, especially foreign-owned firms. For instance, small firms engaged in the power equipment industry note that MNCs in this sector (such as Hitachi or ABB) prefer to work with other foreign firms (as suppliers), and not with the small-scale Indian firms. They also point to how a major Indian private company in the power sector imported most of the machinery it needed while setting up its new plant, in the process denying smaller Indian firms the opportunity to benefit from such a large demand.[14]

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[12] Based on the author's field research in Coimbatore, Rajkot and Vadodara (2015–2016), Peenya, Bangalore (2017) and various industrial locations in Kerala.

[13] Based on the author's field research in Vadodara (2015–2016), Peenya, Bangalore (2017), and Tiruchirappalli, Tamil Nadu (2018).

[14] Based on the author's field research in Vadodara (2015–2016) and Peenya, Bangalore (2017).

A major complaint of micro and small industries is that the charges they receive from the bigger firms for turning, milling or other machining operations (what are commonly referred to as 'job works') have hardly improved over the years. In fact, with the emergence of CNC machines, the bigger firms have to depend less on the small firms for machining and other operations. Delay in payments from their buyers (which are typically bigger firms) is another major problem faced by the smaller firms. This increases the working capital needs of the small firms (especially because they will have to make ready payments for purchasingtheir inputs).[15]

12.16 Foreign Investment and the 'Make in India Initiative'

To promote the growth of manufacturing in India, the Union government, led by the National Democratic Alliance (NDA), has launched a 'Make in India' initiative. Previously, the United Progressive Alliance (UPA) government had rolled out the National Manufacturing Policy with the same objective. The thrust of both these initiatives has been to attract private investments, especially foreign investment, with the government acting as a facilitator for private investors. In recent years, rules relating to FDI have been liberalized to a great extent, with more and more sectors being put under the 'automatic route' for approval.

International experience suggests that FDI will contribute to development only if it brings in technologies and managerial capabilities, and not just capital, to the host nation. If the objective of the foreign investors is only to gain a better access to the markets in the host nation, they could end up weakening, rather than strengthening, the domestic firms.

Given such a context, there are concerns on the nature of FDI flows into India during the recent years. Rao and Dhar (2018) show that about half of the total reported FDI inflows into India between 2004 and 2014 were not 'realistic'—these were investments made either by financial investors or by national investors investing in the domestic economy through the FDI route. They further show that the share of manufacturing in total FDI flows into India declined from 47.8% during the period October 2012—September 2014 to only 30.3% during the period October 2014–March 2017 (Rao & Dhar, 2018, p. 116). Further, an increasingly larger share of FDI flows into India is not in the form of 'greenfield' investments, but achieved through the acquisition of shares of domestic firms (Nagaraj, 2017).

Since 2011–12, investments in the country by domestic private firms have been on a low key. The possible reasons include the slowdown in demand at home and abroad, unutilized capacities of these firms, and their high levels of indebtedness. Given such circumstances, the expansion in public expenditures will be a critical component of any effort to promote economic growth and development in India.

[15]Based on the author's field research in Coimbatore, Rajkot (2015–2016) and Tiruchirappalli (2018).

12.17 Guiding Technological Development

Technological changes in the manufacturing sector have been increasingly labour saving, and this brings in a new dimension to the challenge of employment creation.[16] New technologies such as of electric vehicles or of renewable energy sources will absorb much less labour than their earlier generation of technologies (compared to diesel- or petrol-engine vehicles, electric vehicles require much fewer components). Further, India is highly dependent on imports in the case of many new technologies (for instance, in the case of electric vehicles, India is dependent on the import of lithium batteries).

Given such a context, it is important to invest in the creation of new technologies. India requires technological advances that generate new economic opportunities and absorb—not displace—labour. Consider, for instance, advances in biotechnology that may find new commercial applications for our agricultural products, or electric vehicles and renewable energy solutions that depend less on imported material (Thomas, 2018b). Nevertheless, India's spending on research and development has been rather inadequate. Nagaraj (2017) reports that in 2011, R&D spending as a proportion of GDP was only 0.8% for India, compared to 1.8% for China. In fact, China is gradually shifting its economic base from low-wage industries, and is now emerging as a global leader in several new technologies, including artificial intelligence and renewable energy.

It needs to be noted that innovations and technological interventions are needed in the case of traditional and labour-intensive industries as well. Consider the case of the textile industry, which employs 9.3 million workers in India, out of which 84% are outside the factory sector (in 2011–12) (Thomas & Johny, 2018). Many of these workers are attached to handlooms or other traditional forms of production, with extremely low levels of productivity. For instance, in a major centre for handloom weaving in Kannur district of Kerala, a worker is able to weave only 5 to 6 m of cloth in a day (and earn only around Rs. 350–400 a day). On the other hand, in a newly set up high-tech weaving factory in the same district, a worker can oversee the production of upto 450 m of cloth in a day.[17] It is clear that in handlooms and other traditional sectors, both technological and organizational innovations are needed to increase productivity, improve wages, and at the same time, avoid job losses.

[16] For instance, as of now, the Rourkela plant of a major public sector steel company employs around 12,000 workers and produces 4.5 million tonnes of steel annually. Company sources suggest that, during the early 1990s, this plant had employed around 30,000 workers, although its production capacity then had approximately been only one-third of the current level. Based on the author's field research in Rourkela (2018).

[17] Based on the author's field research in Kannur, Kerala (2019).

12.18 Concluding Remarks

Given the growing size of the working-age population of India, the employment-challenge for India is possibly bigger than that faced by any other country (except China) in the world. At the same time, a large population also offers a sizeable market, which can be turned into a significant advantage for the domestic manufacturers. In the Indian context, however, the low levels of rural incomes and the high degree of inequality are constraints to realizing the potential of the domestic market. In rural India, in 2011–12, the richest decile of households accounted for 55.7% of the total consumption expenditure on durable goods (according to NSSO's surveys on household consumption expenditures). Small-scale industries in the unregistered sector, which cater to the demand from the poorer sections of the population, have been trapped in a cycle of poor quality of production, out-dated technologies and low levels of profitability.

India should envisage an industrial growth that is driven more by the domestic market, which will benefit from an improvement in the wages and incomes of its rural and urban informal workers. In any case, the prospects for a growth strategy led by exports are rather bleak, given the continuing crisis in the global economy, the growing tide of protectionism in the developed world and the competition from other labour surplus countries such as Bangladesh. Once the domestic market is seen as the anchor for its future growth, Indian industry will realize that it is not in its interests to squeeze labour more. On the contrary, rising wages and labour incomes could provide the basis for a revival of mass demand, and fuel the growth of a range of industries including food, clothing and consumer durables.

India's policy makers should realize that planning and industrial policies are not incompatible with markets and globalization. In fact, the need for industrial policies are ever greater now given the uncertainties associated with technological changes and the turbulences in the global economy. At the same time, there are huge investment needs for the country today in the areas of irrigation, electricity, rural and urban infrastructure, as well as in many areas of basic research. With greater investment and well-directed industrial policies, India should try to revive its manufacturing sector, tapping fully the potential of its vast home market and also of its young workers and entrepreneurs.

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Part VII
Gender

Chapter 13
Sex Selection, Family Building Strategies and the Political Economy of Gender

Mary E. John

13.1 Introduction

This chapter aims to contribute to an understanding of gender in contemporary India through the lens of the phenomenon of sex selection. I will be using the term sex selection here to refer to the ways in which new reproductive technologies make it possible to "choose" the sex of the child one wishes to have. In the Indian context such technologies have been highly gender biased, that is, they are most used and most discussed in the context of son preference and daughter aversion.

It was in 1990 that the noted economist Amartya Sen shocked the world with his front page article in the *New York Review of Books* "More than One hundred Women are Missing" (Sen, 1990). For many, including demographers who are dedicated to the study of populations, this was news. It was far more common to hear of a surplus of females when compared to males in the statistics of populations. Other things being equal, nature in fact has favoured the female over the male when it comes to humans in terms of their chances for survival. Excess male infant and child mortality has been the norm in almost all parts of the world, as males appear to be biologically speaking the "weaker" sex (attributed to the vulnerabilities associated with the XY chromosome compared to the more complete XX chromosome in women), and women outlive men in old age at the other end of the life cycle. Add the frequency of wars that disproportionately kill men, and we have a global situation in which surplus women has been a far more common characteristic of populations. The fact that the sex ratio at birth (SRB) is around 950 girls to 1000 boys (the Indian measure) or approximately 105 boys to 100 girls (the world measure) is due to excess male births, where nature so to say compensates for their relative vulnerability in survival.

I will be suggesting that the phenomenon of sex selection in India represents a new moment in the political economy of gender, and I will be spelling out what I believe

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are the most salient characteristics and challenges that it throws up. In order to do that, however, some historical context setting is required. First of all, it is not Amartya Sen who discovered the phenomenon of missing women, though he was the first to provide a global estimation regarding its size, with China and India contributing the most. His analysis was also important for pointing out that this was not just about poverty but needed to be understood as a consequence of modern developmental processes.

"Missing women" were in fact already discovered by British colonial officials in the course of the nineteenth century in regions such as Rajputana and Punjab. What had been put down entirely to seclusion and women's invisibility in public life received a new face with open admissions of practices of female infanticide. Historical scholarship has given us excellent analyses of the phenomenon, with Barbara Miller providing pithy quotations from the colonial archive. "Pride and purse" were the official explanations as to why a Rajput father in less than comfortable circumstances would have a baby daughter killed upon birth: Not being able to afford the dowry for her marriage would bring shame and ignominy upon the family (Miller, 1981:56). Veena Talwar Oldenburg's book length study (Oldenburg, 2002) offered a fresh perspective that went beyond existing explanations by seeing female infanticide as bearing a relationship to British rule: Her point is that the household economies of various peasant castes in the Punjab were adversely affected by British revenue policies which in turn transformed more favourable practices regarding women's bride-wealth and property rights into burdensome forms of dowry, thus, spurring practices like female infanticide. Others like Ravinder Kaur have pointed out that not all the practices of upwardly mobile status seeking peasant castes could be blamed upon the British (Kaur, 2007). Be that as it may, it could be said that through field accounts and in the preparation of the first Censuses from 1881 onwards, "missing women" via female infanticide and related practices have left an archive for taking stock of the historical skew in the number of women compared to men in several castes in colonial India.

The second moment in an Indian history of "missing women" also predates Amartya Sen. It was demographers like Pravin Visaria and subsequently Asok Mitra in the late 1960s and 1970s who noted long term secular declines in the sex ratio in the Indian population going by Census figures (Mitra 2000, 1978; Visaria, 1971). This was a puzzle, especially since these declines *increased* in the decadal Censuses after independence. All India census statistics in 1901 had 961 women to 1000 men, which fell to 946 in 1951, 941 in 1961 and 930 in 1971. How could the life chances of females compared to males be worsening with development and after the break with colonial rule? These worries were picked up by the Committee of the Status of Women in India in their famous *Towards Equality* Report prepared for the United Nations Year of Women in 1975 (Sharma & Sujaya, 2012 1974). The Committee used these adverse figures, along with evidence of declining trends in employment and the tiny numbers of women legislators and parliamentarians in the state assemblies and the Lok Sabha (which ranged from 5 to 10%), to ask the shocking question: Were women in post-independence India turning into a minority? The work of Asok Mitra is particularly noteworthy in this context for his detailed explorations into the

conundrum thrown up by sex ratio patterns. As I have noted elsewhere, "Mitra called upon the social science community to probe everything from the effects of recurrent famines and epidemics, migration patterns, food availability and consumption patterns, mortality differentials across the entire life cycle from infancy to maternal deaths and ageing, disparities in medical treatment, and, finally, the effects of labour and employment among women, both rural and urban" (John, 2014: 5).

The 1970s and 1980s became known for economic analyses of gender disparities within the household, which brought forth a new focus—not so much missing women as the endangered "girl child". It was also in the late 1970s and early 1980s that women's organisations accidentally discovered a report from the All India Institute of Medical Sciences (AIIMS). This report was a study of the results of testing a newly imported technology for the determination of foetal abnormalities, namely amniocentesis. The study report (which supplied the test to about 11,000 pregnant women in Delhi in 1978) mentioned in passing that the vast majority of these women enquired about the sex of their foetus and went in for abortions when informed that they were female. This became the springboard for major campaigns and legal reform to ban the use of such technologies for sex determination testing. (It is another matter that, as disability activists were to point out much later, testing for "abnormalities" which might well result in abortions was not problematised by the women's movement at that time.) In 1994, the Prevention of Pre-Natal Diagnostics Act (PNDT) was passed which was modified to include pre-conception technologies in 2003. From a restricted genetic test of amniotic fluid, ultrasound technologies were annexed to become the most widespread method of sex determination, soon followed by other more sophisticated methods using assisted reproductive techniques at the stage of conception itself. (For a good account of the relationships between changing technologies and the limits of the law see Jaising et al., 2007).

This brings me to the stage where we are now in thinking about the relationship between missing women and the practice of sex selection in contemporary India. As the discussion so far should make evident, the significance of a gender imbalance or a skewed sex ratio in India was present well before medically mediated sex determination technologies entered the scene. Moreover, to guard against a possible misunderstanding, it is not as though other routes leading to excess female mortality have now ceased to be significant. Whether they had any actual effects in practice, older beliefs among mainly rural women, including taking potions from local practitioners, performing rituals of various kinds, all in order to ensure that a pregnancy lead to the birth of a boy, still have a place. Female infanticide itself had not disappeared with modernity—it was rediscovered in the 1980s in rural districts in central and northern India, and, more unexpectedly, among specific dominant castes in Tamil Nadu, though the deliberate killing of a baby girl may have largely disappeared in the twenty-first century. But there is no getting away from ongoing and diffuse forms of gender discrimination—from lack of nutrition and care, to medical needs—which continue to have fatal consequences from infancy onwards. John Bongaarts and Christophe Guilmoto have undertaken a careful analysis of demographic data across different countries, with a special focus on China and India, to tease out two broad

reasons for gender imbalances in populations, based on the kinds of data available (Bongaarts & Guilmoto, 2015).

Table 13.1 gives Bongaarts and Guilmoto's calculations of missing women taken overall. They compare the two nations China and India that have the largest missing numbers by virtue of their population size with other countries and the rest of the world. Notice that countries with absolutely no such histories (Nigeria and Indonesia) are now showing small skews of their own. These are composite numbers, being the product of pre-natal sex selection and post-natal excess female mortality. Broadly speaking, gender biased sex selection began around 1980 when the technology first became available and has been increasing since then. Excess female mortality due to a host of forms of gender discrimination reached a peak around 2000 in countries like India and have since declined. The plausible explanation is that unwanted daughters are increasingly not being born via sex selection, along with the extremely significant factor of recent reductions in fertility rates. Micro-level studies such as that by Sharada Srinivasan in Tamil Nadu broadly confirm this trend (Srinivasan, 2012). According to Srinivasan, forms of neglect leading to excess female infant and child mortality rates were more prevalent in parts of Tamil Nadu up till the 1980s and from the 1990s shifted effectively to the pre-birth elimination of female foetuses via medical technologies.

Bongaarts and Guilmoto have estimated that India in 2020 would have a total of 45.8 million missing women, where the annual additions computed over the last 5 year period for 2020 are 0.36 million excess deaths and 0.59 million missing births. *Interestingly, in their calculations, India is the only country where currently sex selection accounts for a larger proportion of missing women than post-natal gender discrimination, including China.*

Table 13.1 New estimates of the number and per cent of missing females in selected populations, 1970–2010

	Numbers missing (in millions)					Percent missing	
	1970	1980	1990	2000	2010	1970	2010
World	61.0	72.2	87.6	105.9	125.6	3.3	3.7
China	27.2	31.8	39.2	49.5	62.3	6.9	9.5
India	21.8	27.1	33.2	38.9	43.3	8.2	7.4
Pakistan	3.5	3.7	4.0	4.4	4.4	12.5	5.2
Bangladesh	2.3	2.9	4.0	4.2	2.4	7.2	3.2
Nigeria	0.2	0.6	1.1	1.4	1.9	0.6	2.5
Indonesia	0.0	0.0	0.0	0.1	1.7	0.0	1.5
Rest of the world	6.1	6.1	6.2	7.4	9.6	0.5	0.5

Bongaarts & Guilmoto (2015)

13.2 What Does the Era of Sex Selection Inaugurate?

When women's organisations first encountered pregnant mothers thronging to clinics that openly advertised sex determination testing in major cities like Bombay, Delhi and Amritsar in the 1980s and were then successful in getting the PNDT Act passed, activists recall feeling that the problem was now solved. But the practice by no means subsided and in fact expanded through the wide prevalence of ultrasound testing that had become a part of general antenatal care. Census data of 1991 and especially 2001 was another wake up call. In 1991, the overall sex ratio for India fell to an all time low of 927 women to 1000 men, with the child sex ratio (0–6 years) dropping from 962 in 1981 to 926 in 1991. In 2001, the CSR fell below that of the overall sex ratio—so while general sex ratios rose to 933, the CSR fell to 927. (As of 2011, it has fallen further to 918 while the overall sex ratio stands at 943). In 2001, certain states like Punjab (CSR 798), Haryana (CSR 819) and Himachal Pradesh (CSR 896) posted the biggest declines. These were all taken as clear indications of the rise in sex selection, even while the life expectancy for women overall was improving.

In a joint study, *Planning Families, Planning Gender* undertaken in the wake of the 2001 Census data results (where field work was conducted between 2003 and 2006 in select districts of Rajasthan, Madhya Pradesh, Himachal Pradesh, Haryana and Punjab), Ravinder Kaur, Rajni Palriwala, Saraswati Raju, Alpana Sagar and I conducted research in towns and villages in districts which had the lowest CSRs (John et al., 2008). In some field sites—notably in Dholpur (Rajasthan) and Morena (Madhya Pradesh)—even our micro-level study of 1200 households per district picked up strong evidence of the post-natal neglect of girls, especially in impoverished households, though in the poorest among them excess male child mortality was just as evident. The better off sites, in urban Kangra (Himachal Pradesh), Fatehgar Saheb (Punjab) and Rohtak (Haryana), were dominated by the availability of ultrasound clinics ready to undertake sex determination, which were hubs for the rural hinterland as well. The presence of the law had not prevented the practice from continuing, and most families had no idea about the PC PNDT Act. Indeed, some of our respondents contrasted the "sin" of killing off girl babies in the past with medically mediated sex selective abortions as a positive practice.

There are several aspects to sex selection in India, some of which may be shared with countries like China and Korea, while others are more distinctive to our context. The first of these that is common has to do with declines in fertility. In China, the extent of the rise of missing girls has been directly seen to be a fallout of its one child policy that was strictly implemented in the 1970s as part of the state's reform measures. However, what should be noted is that it was rural China that was most adversely affected, in a context where sons were seen to be vital to their farm economies. Moreover, a one child policy presents the starkest of choices. India, on the other hand, for all its fears around "population explosion", including intense pressures from international agencies and western powers, could not possibly take the China route. India has adopted a two child norm, more recently laced with restrictions in some states for government employees and legislators who have more than two

children, though at the national level the population policy has so far been one of disincentives and incentives. At the same time, there is much that is surprising and not well understood about recent declining trends in fertility in India. It is one thing to hold up the "Kerala model" where having a small family went hand in hand with state led education and health benefits, building on prior histories of social reform across several communities and castes (Devika, 2008). But already in the case of Tamil Nadu significant drops in fertility levels from the 1980s among poor families with little education did not fit the usual parameters and correlations. In north-west India, with older traditions of gender imbalances going back to colonial times, signs of the "small family" have been more recent.

In the study, *Planning Families Planning Gender* just mentioned, fertility patterns varied most notably by age of the mother and by location. The mean number of ever born children was at its lowest of 1.6 among mothers 29 years or less in the Punjab and Himachal sites and highest at 5.2 in Rajasthan and 4.0 in Madhya Pradesh among mothers in the 30–39 age group. However, what came through quite clearly was that with only insignificant exceptions (where mothers said that children come as "god wills"), families were now more consciously and deliberately "planning" both the size and the sex composition of their families. The core of this family building strategy was around the desired number of sons—just one son emerged as a new preference in both the urban and rural Punjab sites, while Haryana respondents spoke of two sons and a daughter. In urban sites across all locations, it was more common to hear of one son and a daughter, and it is here that the small family norm has been most fully internalised.

As several scholars have attested, it is under conditions of fertility decline that the question of planning gender, i.e. family building strategies around the sex composition of one's children, becomes most sharply posed (Das Gupta & Mari Bhat, 1998; Guilmoto, 2012; Mari Bhat & Francis Zavier, 2001). In our study, it was amply evident that the higher the level of development in a site or the standard of living of a family, the more conscious and deliberate was this family building strategy. It is here that matters become quite complex. Gender discrimination can be quite easily aligned with poverty, that is to say, with conditions of hardship and vulnerability where girls and women are the worst sufferers. This is especially evident in families that have more daughters than are wanted, more often than not families who are waiting to have the desired number of sons. In the John et al. (2008) study, to give an example, a family in a Rohtak village with five daughters allowed two of them to die. This was not even considered a problem, whether for the family or the village, almost as though it were "good riddance". At the same time, we have seen historically, that practices like female infanticide were not simply a problem among the most poor. The examples from the colonial archive revealed Rajput families and upwardly mobile Jat peasants who were the guilty parties. In the contemporary period, Satish Agnihotri has used the term "prosperity effect" to name the differential impact of increases in income on the life chances of girls and boys (Agnihotri, 2000). While in a very poor household male mortality outweighed or equalled female mortality, as the situation began to improve it was boys who no longer died, and thus had a comparative social

advantage that compensated for their biological vulnerabilities, whereas the opposite was the case with girls.

Studying sex selection on the ground is not easy to do, given that this is a practice that has been banned and carries legal penalties. Most of the time inferences are drawn about its prevalence through macro data, whether it be adverse child sex ratios or sex ratios at birth. The study sites in John et al. (2008) stretched from those with long histories of adverse sex ratios (like Haryana and Punjab), districts of Rajasthan and Madhya Pradesh associated with female infanticide and low levels of development, and districts of Himachal Pradesh with no such prior histories at all, and where medically mediated sex selection was a new phenomenon. In one case in Kangra town, a respondent spoke freely and readily about having undergone multiple abortions after her daughter was born to finally get the son her in-laws wanted. When we interviewed her she had the photograph of her eldest daughter on the mantlepiece as proof of how much she cared and of how proud she was of her achievements—the daughter had just started an engineering degree. Others were more circumspect. Moreover, there is no standard script as to where the pressure may be coming from. In some cases, it was in fact the natal family that decided to go ahead with the abortion when the first ultrasound revealed a female foetus. Sex determination tests and abortions cost money, moreover, and this too has to be negotiated by a pregnant mother in a state of dependency. In situations where a mother wishes to operate in a more clandestine fashion, she might go ahead "on her own" with assistance from others outside the immediate family as proof of her loyalty to the family she had married into, pre-empting the demands of a mother-in-law.

The study sites in John et al. (2008) were primarily large towns and nearby villages, with a mix of families by standard of living and caste. As already mentioned, locations ranged from poorer to better off districts in north-west India. What they all share is the predominance of a dependency on agriculture and allied activities whose cities and towns are expanding to accommodate recent migrants from the surrounding rural areas who seek better options for themselves and their children. These turned out to be sites where sex selection was prevalent to varying degrees, as a strategy to match the size and sex composition of children with their hopes for a better future. This future required just one son in Punjab (among a small proportion of landowning Jat Sikhs and more so among town dwellers), and two sons in Haryana (which was widely stated in the rural sites and among poorer families in Rohtak city). Unlike in the past, girls were no longer considered as essential to family and kinship practices, even though in urban areas an upwardly mobile family would want to have one boy and one girl (and in that order).

Analysing the effects of development on family building strategies and its consequences for gender turned out to be particularly elusive. From one generation to the next, many positive indicators were clearly in evidence. Gender gaps in schooling had not only narrowed, but in some of the economically better off sites, girls were studying further than boys. This micro-level evidence can be confirmed with secondary data on schooling and higher education in states like Haryana, Punjab and Himachal Pradesh. Ages at marriage were increasing when comparing mothers and daughters. Interviews with mothers indicated how much hope was placed on a daughter,

coupled with the desire to stretch resources to maximise her opportunities. Decisions to migrate to towns were not only spurred by the patriarchal desire to enhance returns on sons but also to give daughters chances that their mothers never had. How do we square this with obvious signs of son preference and daughter aversion and the growing resort to sex selection?

The strength of our analysis lay in tackling these kinds of paradoxes and complexities. We argued that the new family with smaller numbers of children (including, it should not be forgotten, much fewer sons than before) was being most obviously enabled through the resort to sex selection technologies, especially when the first child was a girl. Sex selection enabled non-poor families to close the gap between desired and revealed preferences. At the same time, it would be far too short sighted to simply reduce the question of sex selection to the availability of the required medical technologies and the capacity to pay—after all, the Southern states of India have the most widespread availability of various pre-natal technologies, but this has not made them leaders in sex selection.

This is where contextual questions pertaining to forms of development are critical. One of the challenges here is to gain a handle on the changing prosperity of regions like Haryana and Punjab, as the legacy of the Green Revolution has been receding and the promise of better urban futures has been quite unevenly realised. Our study captured the consequences of such uneven development within families in their planning for children. How would this help us understand better that the worst sex ratio imbalances were associated with higher levels of education and increases in age at marriage?

Our broad answer was to see the imbalance itself not simply as the vestige of an old tradition but as the unintended consequences of modernity itself. As we put, these

> unintended consequences of contemporary social processes when combined with parental fears of the unattached sexuality of adult daughters in a context of a highly competitive and differentiated marriage market, are compounding the sense of burden represented by the birth of a daughter. She now requires many more years at home with higher investments in nutrition, health and education. Parental responsibility continues to rest on ensuring a 'good' marriage, which takes her away from them, even though this does not necessarily represent the end of their responsibilities. Sons, on the other hand, embody a range of ritual and economic roles. If the current climate of economic volatility and masculine anomie makes them often fall short of expectations, nonetheless, at least one is essential for the future of the family. It is this conjuncture that is producing the falling sex ratio (John et al., 2008: 86).

13.3 Frames of Analysis

These are the ways in which a very specific practice thought of as internal to a family and often as a mere extension of tradition through technological means needs to be better understood. Given the problem that sex imbalances are seen to pose to societies and the daunting nature of their consequences, there has been a huge literature on the subject that continues unabated. (For reviews see Guilmoto, 2012; John, 2014).

In the course of my own review of this literature, I found that certain approaches tended to predominate.

The first type I would call the "cultural" approach. When it comes to gender relations in countries like India, tradition and culture are usually the first ports of call when it comes to providing explanations for the extent and depth of the discrimination that women and girls face in mainstream Hindu society. Culture as tradition can mean various things: it can mean the religious sanction accorded to the inferior status of women, visible in Brahmanical and even Buddhist texts in ancient India. Uma Chakravarti has deployed the notion of Brahmanical patriarchy to describe the structures that can be discerned in ancient Brahmanic texts in relation to women (Chakravarti, 1993). Caste and gender come together to ensure the greatest strictures on upper caste women and the differential control over the labour and sexuality of women lower in the caste hierarchy. Sons are necessary to perpetuate the lineage and norms of purity and chastity circumscribe the lives of upper caste women to ensure the proper reproduction of the family line. In contemporary times, such a culture has undoubtedly upgraded itself. Lower castes are increasingly seen to imitate upper caste customs. Ages at marriage have been slowly rising and while arranged marriages are the widespread norm to this very day, the idea of the consent of the girl to the decisions made by family elders and relatives is gaining acceptance. Depending on their class and caste location, marriage credentials such as a good education are vital for securing the right match, while maintaining the norms of caste endogamy and village exogamy. It is these cultural ingredients that are seen to be at the basis of the resort to sex selection, to ensure the birth of sons and the avoidance of unwanted daughters. Such accounts are correct in so far as they go. However, they tend to be rather static in scope and are usually contextless.

The second type I would call the "violence" approach. While the emphasis on culture owes much to anthropological frames of analysis, recognising the role of violence has come from feminist practice and the theorising of the women's movement. In the late 1970s and 1980s, it was women's organisations in India who not only agitated against rape and set in motion new legal reform, but discovered that reports of burn "accidents" in the household of a newly wedded couple in cities like Delhi were not accidents at all but cases of murder or more rarely suicide of the daughter-in-law. Forms of violence have over the years come to be seen to circumscribe the lives of women in India. In a significant essay, Kumkum Sangari has claimed that even though the heightened prevalence of sex selection cannot be understood outside a host of factors, it is the special role of violence that needs to be foregrounded. Women's lives can be plotted along what she calls a "continuum" of violence—when she is pregnant, as a discriminated daughter, and as an oppressed daughter-in-law. Violence is the "connective tissue" between the familial and the public domain in her analysis (Sangari, 2012). In a very suggestive phrase, sex selective abortions become a form of pre-emptive violence, undertaken by women, under coercion or more actively, in order to prevent the future fate of the unwanted daughter. While I do think that violence has given us new perspectives in our struggles, too much is lost if it turns into a frame of analysis in this mode. I am not convinced that experiences of violence are the principal cause for daughter aversion, such that a mother does not bring her

pregnancy to term, aided by medical practitioners. Moreover, there is no direct correlation between, for instance, domestic violence and sex selection—the state of Kerala has had very high rates of domestic violence according to National Crimes Records Bureau data without having a negative sex ratio. There is a different sense in which increased male violence has been popularly thought to be one of the direct consequences in societies which have a gender imbalance, when men are unable to find wives through conventional marriage routes. Ravinder Kaur et al. have undertaken a macro analysis of the relationships between adult sex ratios and crimes against women across 18 Indian states. Crime rates turn out in fact to be best explained by factors other than the sex ratio. The assumption that the greater the shortage of women the more violent the men does not hold (Kaur et al., 2016).

This brings me to my preferred frame of analysis, which I do not see as being in contradiction to ideas of culture or experiences of violence. I have been struggling to find the appropriate way to designate this approach and the best that I can offer is what I would call the political economy of gender and its relations to sex selection and family building strategies. The approach of political economy calls for a whole discussion of its own which I am unable to offer here. The core idea is to connect work and labour, including the public world of employment and the fantasy of a good "job" as families migrate from their villages, with people's desires for the right kind of family in a specific developmental context. One of the spheres where this is particularly under researched in the Indian context is urban India, and more specifically, India's towns and non-metropolitan cities. Most studies of sex selection, including recent ones, have had a rural focus (Goli & Arokiasamy, 2011; Larsen & Kaur, 2013; Srinivasan, 2012) even though, as I said at the beginning, the phenomenon in India has been urban-led, and urban sex ratios are still worse than rural ones in many states. (This makes for a contrast with countries like China and Korea where sex selection was most widespread in rural areas.)

13.4 Daughter Only Families in Urban India

In my most recent research conducted between 2017 and 2018, I focussed on urban sites in two States—Haryana, the state which after Census 2011 had the lowest child sex ratio in the country, and Maharashtra, a state with a more uneven history in relation to sex selection (John, 2018). The aim was to develop linkages between patterns of economic development in such sites and the practice of sex selection, through the views of women respondents. Census 2011 had thrown up new twists in the unfolding saga of gender biased child sex ratios. The overall CSR for India fell from 927 in 2001 to 918 in 2011—being an average across different states and changing trends. Some of the worst states in north-west India appeared to be peaking or plateauing while a slower decline was perceptible in many other states. This was the background for choosing urban sites in Haryana and Maharashtra to examine family patterns, marriage, education and work for mothers, fathers and their children, in families where children had been born on or after 1990. These were families who

had settled in the towns chosen to improve their lives and those of their children, both working class and middle class. Most of their narratives were laced with the limitations of these urban spaces—while schools might have been satisfactory for some, already with higher education among the better off the lack of opportunities were in evidence. But the greatest lacuna, especially, but not only, for women and their daughters, was in the sphere of work and job opportunities.

It is a commonly shared perception that better education is the solution to gender discrimination and to sex selection. Already in the prior study (John et al., 2008), no simple links could be drawn between the higher education of their mothers and sex selection, and, if anything, it was the more educated that displayed the worse sex ratios. Schemes like Beti Bachao Beti Padhao, launched by the central government with much fanfare in states like Haryana in 2014 to stem the tide of sex selection, show very little understanding of the role of education. In the study (John, 2018), where field work was conducted in 2016–2017, the education of daughters was deeply structured by the constraints of class and caste. The most important finding was that for both mothers and daughters, while levels of education had the strongest relationship to marriage prospects, the weakest link was with work. Mothers certainly welcomed the idea of their daughters finding jobs, but much of what they could say remained vague and for good reason. There was no way of being able to depend on getting a job, especially for girls, however many degrees they might have collected, which only reinforced the fact that marriage remained the main source of economic and social security for daughters. Moreover, a considerable source of anxiety in marriage negotiations and prospects was the boy. It was remarkable to hear in both Haryana and Maharashtra that one of the first qualities of a good match was that the groom be "without addictions". Not to be duped by false claims of jobs and property by prospective in laws was another big problem.

This is the background for considering the family building strategies and sex composition of the families in the 2018 urban-based study, conducted well over a decade after the 2008 study. By this time and in these locations, it was amply evident that the small family is not only preferred but more or less realised. The modal number of children ranged from 2 (in middle class urban wards) to 3 in poorer wards. More to the point, larger families were invariably families with more girls, with clear indications that these were "extra and unwanted", awaiting the birth of a son.

Along with the realisation of the small family, this study made it quite clear how widespread the desire for a boy and a girl had now become. Families with one boy and one girl were the largest proportion among family types and more so in better off localities. This brought home a new level to the whole question of son preference and daughter aversion. To put it most directly, what the era of sex selection and the small family was throwing up was a somewhat different challenge—namely the avoidance of being a girl only family.

In the range of possibilities—girl and boy, two boys, two boys and a girl, two girls and so on—while having a second son after the first was quite tolerable, ideally a boy and a girl were the most preferred. Certainly, extra sons were not wanted, given all the difficulties in settling them economically in the current economy with

its increasingly elusive and precarious forms of employment. The big challenge was what to do when one or more girls had already been born and another was on its way.

How much intervention were families engaging in to prevent further girls from being born? Compared to the prior study, sex selection had become more clandestine and expensive. Respondents were in much more denial about the practice, and spoke more freely of "others"—relatives and neighbours—who resorted to such methods. Even so, very few families appeared to openly accept being a daughter only family. In the urban sites, families had a hard time imagining a secure future for themselves and for their daughters if there was no son. No assurance could be placed on daughters alone for the security and happiness of parents when patrilineal marriage was still the norm. At the same time, such was the complex nature of gender in the contemporary political economy of urban development that no weight could be placed on sons staying with their parents, or even caring for them in old age. In several accounts, moreover, it was not so much that parents needed a son. Rather, in times of so much economic volatility and uncertainty a girl needed a brother. It was crucial to maintain positive ties with natal kin, and brothers were critical in times of hardship. That was also why no one said that daughters should ask for their share by way of inheritance—to do so was to only invite a break in filial ties.

The political economy of the family in the era of sex selection is something of a strange beast. On the surface more and more families wish to have one son and one daughter, a picture of gender egalitarianism. But this hides much more than it reveals. More than ever before gender is a complex phenomenon where the structures of gender discrimination find their clearest expression in the avoidance of the girl only family, rather than in the avoidance of the girl per se. In a context where local economies are fuelling desires for a better life but able to offer too little, the desire for a son is offset in a discourse of sons who are unable to fulfil expectations. Daughters must be settled through good marriages which calls for corresponding investments in their education, along with a more positive discourse around daughters, who might do more for them than any son in later years. The ongoing resort to sex selection that goes hand in with the slogan "one boy and one girl" must be understood in this light. This also heightens the challenge for a genuinely more egalitarian future. Only those policies that make the world right for girl only families to not just be acceptable but to thrive will mark a whole new moment in the history of gender in contemporary India.

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Chapter 14
When South Meets North: Interrogating Agency and Marital Mobility in Kerala-Haryana Marriages

Paro Mishra

14.1 Introduction

Recent wave in migration scholarship, using a gendered perspective, has critiqued how in migration studies, questions of labor mobility often takes precedence over mobility associated with marriage and family formation (Palriwala & Uberoi, 2008; Piper & Lee, 2016; Piper & Mina, 2003). Consequently, the past two decades have witnessed rising scholarly attention towards the phenomenon of marriage migration in cross-border/transnational contexts which is highly diverse in terms of its reasons, magnitude, origins and destinations, communities and distances involved (Constable, 2003, 2005; Faier, 2011; Fan & Youqin, 1998; Freeman, 2005; Williams, 2010; Yang & Lu, 2010).[1] However, in the Indian context, marriage migration has already been explored in great detail as part of kinship studies.

As we know, migration of women at the time of marriage to their husband's home is a customary kinship practice in many parts of the Indian subcontinent. Fulford (2013) notes that marriage migration in India is the largest permanent migration in the world. For scholars engaged in kinship studies, movement of married women has always been at the center stage of social anthropology in India. Early strand of this literature focused on the themes of village/territorial exogamy (Furer-Haimendorf, 1976; Gough, 1959; Lewis, 1958; Mencher, 1962; Srinivas, 1965), marriage distance (Agarwal, 1994; Hershman, 1981; Palriwala, 1991; Plunkett, 1973) and marriage direction (Lewis, 1958; Marriott, 1955). These were largely a part of the broader

[1]This rising tide of contemporary transnational marriage migration has largely been attributed to globalization, increased communication and contact resulting in diminished spatial and temporal boundaries, and the emergence of a global imagination (Constable, 2003; Jones, 2004).

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concern in social anthropology with structural rules and principles guiding marriage. Later anthropological studies, influenced by the feminist turn in the 1970s, explored the impact of patrilocal marriage migration and marriage distance on women in terms of natal kin access in marital distress (Dyson & Moore, 1983; Jeffery & Jeffery, 1996; Jeffery et al., 1988), property, particularly land, inheritance (Agarwal, 1994; Palriwala & Uberoi, 2008; Sharma, 1980) and fertility decisions (Jeffery & Jeffery, 1996). In all these studies however, marriage migration has been analyzed for the so called normative/conventional arranged marriages which follow rules of caste endogamy, hypergamy, clan and territorial exogamy and involve dowry as the predominant form of marriage payment. Just as in the rest of the world, marriage migration in India too is diversifying in its form, content and direction and there is thus an urgent need to interrogate newer patterns of marriage migration and what they entail for the people involved.

One such newer form of marriage related mobility in India, which is the focus of this paper, is a response to so called "bride-shortages", especially in rural areas of northern and north-western India.[2] In states like Punjab, Harayana, Rajsthan and Uttar Pradesh, son-preference, rapid fertility decline and sex-selection through new reproductive technologies have created a demographic shortage of females (Arokiaswamy, 2004; Miller, 2001). As such, many males in the marriageable age-groups, unable to find spouses locally, are transcending conventional norms of match-making and bringing in cultural 'strangers' as spouses from distant eastern, southern and north-eastern parts of the country and from countries like Nepal and Bangladesh (Kaur, 2004; Chaudhry & Mohan, 2011; Mishra, 2013). These unions, referred to as cross-region marriages or long-distance marriages, result in marriage migration of women across thousands of kilometers into completely distinct socio-cultural regions.

Bride shortages and marriage migration, however, are not just common to India but also experienced by several other Asian countries. They are largely an outcome of combination of two factors: imbalanced sex-ratios and changing gender relations in these countries. Many receiving countries of cross-border marriage migration in Asia—China, South Korea and India—have skewed sex ratios at birth and scholars have attributed cross-border marriage migration to this demographic shortage of women (Fan & Youqin, 1998; Jones, 2004; Kaur, 2004, 2012; Yang & Lu, 2010). In addition to sex-ratio imbalance, changing gender relations in sending and receiving countries are also changing patterns of marriage migration. Single women's rising preference for non/late marriage in South-east and East Asia (Jones, 2004) and their migration to cities for employment as men in farming communities remain 'tied' to the land (Davin, 2008; Faier, 2011; Yang & Lu, 2010) are important factors creating local bride shortages and driving men to import brides from elsewhere.

In most of this literature an often stressed theme is that of hypergamy and upward social mobility that women achieve through transnational marriage migration. Marriage migration in this perspective is viewed as economically motivated with women ardently pursuing global hypergamy in a quest to marry men in richer

[2]Some rural communities in South India are also reported experiencing bride-shortages and newer forms of marriage migration (Srinivasan, 2017).

and advantageous locations (Lee, 1998). Following Bourdieu (1977, p. 70), while it is true that "in all societies, marriage provides an important arena for the achievement and consolidation of upward social mobility, and for enhancing a family's social capital", scholars have increasingly complicated assumptions of hypergamy in cross-border marriages. Recent studies have shown how in many cases, cross-border marriages may translate into spatial mobility but coupled with downward social mobility (Belanger, 2011; Freeman, 2005).

Situated against this backdrop, this paper analyzes social mobility among marriage migrants in a specific network of cross-region marriages in India, those between Haryanavi men and Kerala brides, referred to sometimes in south Indian media as Haryana *Kalyanams* (marriages).The case of Kerala brides in Haryana becomes a special test case in comparison to brides from other sending regions because of the starkly different representation of Kerala brides in comparison to brides from other parts of India—Bengal, Bihar, Orissa and North-eastern part of the country, where the former are portrayed as active agents making informed choices while the latter as being 'coerced' into these unions. This paper critiques these two divergent amplified views on cross-region brides from Kerala and elsewhere and delves in the particularities of experience of social mobility and agency of Kerala brides in Haryana. This paper is organized in to six sections. The second section provides an overview of the field site, methodology and data. The third section offers a critique of two divergent media narratives on Kerala brides and cross-region brides from other parts of the country. The fourth section discusses four case studies of Kerala brides to bring out the diversity in their experiences of Kerala–Haryana Marriages. The fifth section rounds up the discussion on mobility, agency and power geometry in cross-region marriages and the final section offers concluding remarks.

14.2 A Note on Field Site, Methodology and Data

This findings presented in this paper draw on a larger research project focused on understanding the phenomenon of cross-region marriage migration into Haryana, a north Indian state, between August 2012–December 2013 with follow ups in 2014, 2017 and 2019. The initial study was conducted in 5 villages of 2 districts of Haryana—Sonipat and Hisar (see Fig. 14.1).

The state of Haryana was chosen for its history of long-standing demographic imbalance and marriage squeeze (Arokiaswamy, 2004; Bhatt & Halli, 1999) (see Table 14.1) and sufficient popular (Agal, 2006; Dhaliwal, 2003) and scholarly evidence (Ahlawat, 2009; Kaur, 2004, 2008) of cross-region marriages in this state.

The study districts and villages were chosen to make the sample heterogeneous in terms of cohorts of incoming brides and the castes into which they are marrying in Haryana (see Mishra, 2013, 2016 for details).The methodology and tools used involved ethnographic observation, intensive fieldwork and detailed interviews to arrive at a "thick description" (Geertz, 1973) of the "lived experience" of cross-region marriages. Semi-structured interviews with cross-region brides, their

Fig. 14.1 (Left) Map of India illustrating Haryana; (Right) study districts (marked in red) in Haryana (*Source* Census of India, 2011)

husbands, marital family members, local brides, neighbours and village elderly were conducted. Most of the interviews were conducted in the natural setting of the home of the respondents, barring a few that were conducted in public spaces like local tea-shops, village panchayat (council) premises, streets and by-lanes. The interviews ranged from 45 min to one and a half hour with multiple follow ups. The respondents consented to being interviewed based on an examination of the purpose of the

Table 14.1 Overall sex ratio for Haryana since 1901

State/District	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001	2011
Haryana	115.3	119.8	118.5	118.5	115.1	114.8	115.2	115.3	114.9	115.6	116.1	113.8

Source https://ncw.nic.in/pdfReports/Gender_Profile_Haryana.pdf

research. While they were eager to share their 'stories', they did not want to be a part of any media story. The interviews were accompanied by detailed note taking which was later translated and transcribed by the authors. The use of dictaphone was avoided to put the respondents at ease. The identity of all the respondents has been safeguarded with the use of pseudonyms. The interviews were analysed using grounded theory method. This paper makes use of the narrative approach (Brettel, 2003; Riesmann, 2000) which does not assume objectivity but privileges positionality of the respondent.

Along with ethnographic fieldwork, this research has also drawn from content analysis of Indian and international English language print media on cross-region unions published between early 2000s and 2019 and three activist/NGO reports on the subject (Kant & Pandey, 2003; Kukreja & Kumar, 2013; Singh, n.d.). In analysing these sources I restricted myself to an examination of the way cross-region unions were represented and how this representation comes to embody issues of relationships, choice and agency.

In initial 5 villages, 47 cross-regional brides were found, 43 were from distant Indian states like Bihar (8), West Bengal and Kerala (7 each), Assam (6), Jharkhand and Uttar Pradesh (5 each), and Tripura, Chhattisgarh, Maharashtra, Uttrakhand and Madhya Pradesh (1 each) and 4 brides were from Nepal.[3] In addition to the 7 Kerala cross-region brides from this sample, follow up fieldwork in one more village in Hisar in 2019 yielded additional 9 cases of Kerala brides. In all, this paper is based on case studies of 16 Kerala brides married to Haryanavi men. All Kerala brides were found in Hisar district which is largely due to established marriage networks, path dependence and chain migration. For comparison purposes, data pertaining to other cross-region brides is also utilised in this paper.

The 16 Kerala brides hailed from 3 districts—Kannur (9), Palakkad (4) and Thrissur (3). At the time of the study all brides were living in their marital homes with their husbands or in joint families, however, subsequently one couple relocated to Kerala. The average size of natal family for the brides was 5.3 while for the grooms was 4.6 which means that the brides came from relatively larger families. 5 brides came from families that owned some agricultural landholdings while others largely depended on non-farm labour, petty employment and small businesses for their livelihood. In contrast, 8 Haryanavi Grooms owned land ranging between 2 and 5 acres and were full time farmers. Others worked as agricultural labourers (2), factory workers (1), construction worker (1), cab driver (1), truck driver (1), confectioner (1) and small business owners (1). The age of Kerala brides ranged between 28 and 41 years while that of men ranged between 32 and 48 years.

On an average Kerala brides were better educated than Haryanvi men as can be seen from the Table 14.2.

[3]The porous borders of India with Nepal and Bangladesh have also facilitated cross-border marriage migration of women from these countries into India. Ibrahim (2018) has documented presence of Bangladeshi brides in Kutch, Gujarat. Kaur (2012) and Blanchet (2008) have studied Bangladeshi brides married to men in Uttar Pradesh.

Table 14.2 Distribution of brides and grooms according to the level of education

Level of education	Kerala brides	Haryanvi grooms
Illiterate	0	0
Up to primary level	1	3
Upper primary	3	6
High school (class X)	5	6
Intermediate (class XII)	4	1
Under graduate	1	0
Any vocational training	2	0
Total	16	16

All the groom and Kerala brides were Hindus but had diverse caste backgrounds (see Table 14.3a, b). Caste background of 1 bride could not be ascertained.

As mentioned earlier, unlike conventional marriages, caste endogamy is not a concern in cross-region marriages. A high degree of intermarriage across broad categories (Scheduled Caste, Backward Castes and Others) is visible when we examine

Table 14.3 **a** Caste distribution of Kerala brides, **b** caste distribution of Haryanavi grooms

a

Category	Caste	Number of brides
Scheduled castes	Pulaya	2
	Malayan	1
Backward castes	Thiyya	5
	Irruva	3
	Gatti	1
	Ahir	1
	Visvakarma	1
Others	Nair	1
Total		15

b

Category	Caste	Number of grooms
Scheduled castes	Valmiki/Harijan	1
	Khatik	1
	Sainsi	1
Backward castes	Saini	2
	Kumhar	2
	Sunar	1
Others	Jat	6
	Chauhan	2
Total		16

Table 14.4 Caste composition of couples

	Scheduled castes	Backward castes	Others
Scheduled caste	1	1	1
Backward caste	2	2	7
Others	0	1	0

the caste composition of couples in Haryana Kalyanams. Table 14.4 illustrates that 9 out of 16 brides were married hypergamously and thus experienced upward caste mobility. In 3 cases Kerala brides experienced caste hypogamy.

14.3 Two Contrasting Media Narratives: Trafficking Versus Strategizing

When this research started in 2011, there was scanty academic literature on the subject of cross-region marriages. Except for a few journal articles (Kaur 2004, 2008) which linked the emergence of cross-region marriages in north India to the phenomenon of local sex-ratio imbalance, there were no other academic studies available. The only other source of information on these cross-cultural marriages were newspaper articles and media reports. This research thus began with a close examination of these reports and commentaries, both Indian and international. One thing that stood out starkly was that the popular media viewed these unions as cases of bride trafficking and commercial trade in women. Central to their story line were characters of "poor, vulnerable young women" who were "kidnapped" or "duped on the pretext of employment" by "traffickers" who "sold" them to "sexually-starved", "violent", "overage" men who "exploited" these women for "sexual and reproductive labour". Palriwala and Uberoi (2008) note in the context of transnational marriages that much of the popular discourse is

> predicated on the assumption that the introduction of material calculations or commercial operations in to the process of spouse-selection self-evidently impunges the authenticity of marital relationships. It is taken as transforming marriage from a domestic arrangement in the domain of kinship to a form of human "trafficking" (2008, p. 35).

These media descriptions of cross-region marriages as trafficking were replicated in later activist reports (Singh, n.d.). However, a careful examination of these accounts revealed that they were only alluding to cross-region brides from Bihar, Bengal, Odisha, Assam and Bangladesh. In the case of Kerala brides married to Haryanavi grooms, the popular narrative was very different.

In media reports on Kerala–Haryana marriages words like 'trafficking', 'bride-buying' are conspicuous in their absence. Instead of commonly used stereotypes like '*paros*', '*molkis*' (bought for a price) or '*jugaad*' (makeshifter) used to convey the commodification of cross-region brides from other parts of the country, Kerala women in media reports are referred to as 'brides' and 'wives' signaling their

married status. Similarly, the men were referred to as 'grooms', 'husbands' and not as 'buyers', 'exploiters'. A cursory look at the headlines shows how Kerala–Haryana marriages are being portayed as (happy, successful) marriages and not cases of trafficking: 'Young women in Kerala discover wedded bliss in the hinterland of Haryana' (Binduraj, 2012); 'How brides from Kerala are transforming society in dusty towns of Haryana (Narang, 2015); 'Cross-cultural Marriages: Far away from Kerala, they live happily in Haryana' (Singh, 2014). The reports detail how Kerala women, who are from a 'progressive state', have 'voluntarily agreed' (Narang, 2015) to marry into 'dusty, crowded, patriarchal Jat hinterland' of Haryana (Binduraj, 2012) leaving behind 'lush greenery' of Kerala (Narang, 2015).These descriptions, while signaling the spatial hypogamy experienced by marrriage migrants, also illustrates active agency and choice excercised by Kerala women in opting for these unconventional marriages. These choices are further explained as emanating from structural constraints of poverty, inability to pay dowry and horoscope matching troubles. In contrast to these depictions, the newspaper reports on marriages of women from other distant states presents a very different narrative as can be seen from the following headlines: 'The price of being a woman: Slavery in modern India' (Huggler, 2006); Brides purchased and exploited in Haryana (Dheer, 2019); 'Haryana's slave brides: For trafficked women, a life lived on margins' (Firstpost, n.d.).

Kerala brides' assumed agency is in sharp contrast to the 'coercion' and 'victimhood' attributed to women from other parts of India who are viewed as 'trafficked' women. In an early paper on the phenomenon of cross-region marriages Kaur (2004) had insisted on the need to be attentive to differences between categories of bride-price marriages, trafficking, bride-buying and how cross-region marriages do not fall into any of these categories. It is important to mention here that while trafficking for marriage does take place, it constitutes a very small percentage of total number of cross-region marriages. This has now been fairly well established by both in-depth micro ethnographic studies (Chaudhry & Mohan, 2011; Kaur, 2012; Mishra, 2013) and macro level surveys (Kukreja, 2018).

The shortcomings of this dual narrative started surfacing more in detailed interviews with cross-region brides. Brides, both from Kerala and elsewhere, shared a lot of similarity in their reasons for marrying faraway, process of mediation mediators involved and post marital experiences. The comparative table below summarizes who were the mediators involved in cross-region marriages for both Kerala brides and others (Table 14.5).

The data presented here shows that the process of mediation for both Kerala and other brides was largely through existing cross-region brides followed by marriage mediation through couples who were married cross-regionally. Similar observation around chain migration has also been noted by Davin (2008) in her work on long-distance marriage migration in China where she argues that:

> Like other forms of migration, marriage migration generates 'migration chains'. Marriage migration from one area to another can snowball as successive cohorts of brides arrange matches for their husbands' kin or other villagers with women from their natal homes (2008: 69).

Table 14.5 Mediators involved in Kerala–Haryana and other cross-region marriages

Mediator	Kerala brides	Other cross-region brides
Existing cross-region bride	10	22
Cross-region couple	5	8
Altruistic female broker	0	6
Migrant male labourer	0	1
Father-in-law of a cross-region bride	1	0
Trafficker (relative of cross-region brides)	0	3
Total	16	40

This has also been noted by several scholars working on cross-region marriage migration in India (Chaudhry & Mohan, 2011; Mishra, 2013; Srinivasan & Rajan, 2018; Kukreja, 2018). Despite existence of this alternate evidence, the two contrasting narratives on Kerala brides and other cross-region brides have proliferated over time and they leave no room for heterogeneity of experiences, strategies, motivations and situational contexts in which these marriages were negotiated and the way they are lived. A question that emerges in this context is why and how Kerala women come to be regarded as 'saviours' of the countryside in Haryana? One of the reasons put forward is that Kerala brides are more 'empowered' as they come from a region of gender-friendly cultural regimes and better development indicators in comparison to Haryana. Thus they are in control of their marital destiny and become 'agents of change' and transformation in rigidly patriarchal Haryanvi society (Narang, 2015; Singh, 2014). But is the narrative really this simple? This, I argue, is only a partial representation of a more complex social reality.

Existing literature on women's marriage migration and mobility has argued that marriage remains one of the most socially acceptable means of achieving mobility for women (Palriwala & Uberoi, 2008). Women marry hypergamously and thus manage to maneuver agency and achieve upward mobility, not only for themselves but also for their families left behind (Brennan, 2004). In this perspective mobility and agency are intrinsically tied to the aspect of movement. However, this has been complicated in Massey's (1994) analysis of the concept of the "power geometry", which, although developed in the context of movement across transnational spaces, is an important conceptual lens to penetrate questions of movement, mobility and agency across a range of spaces. Massey argues that questions of agency should not simply be interrogated from the vantage point of 'who moves' and 'who doesn't', but engages with differential positioning of groups and individuals within the transnational space constituted of flows and movements. In this framework 'who moves' is as important as 'who controls the mobility of others'. As Massey explains,

> [Some individuals] initiate flows and movements, others don't; some are more on the receiving-end of it than others…[There are] groups who are really in a sense in charge of time-space compression, who can really use it and turn it to their advantage[…]But there are also groups who are doing a lot of physical moving, but who are not 'in charge' of the process in the same way at all (1994, p. 149)

The Kerala brides (as other cross-regional brides) covered in my study are not "in charge of" their mobility but are rather dependent on others like north Indian men, the matchmakers/go-betweens and their own families to achieve the movement and mobility they desire. In one way or the other, they all stand to gain from the movement and productive and reproductive labour of the migrant brides. However, despite their disadvantaged positioning in the local market marriage—due to reasons like poverty, inability to meet dowry demands, being socially overage, or not 'good-looking'—Kerala brides have made use of the limited opportunities available to them to fulfill their desires with respect to marriage and family formation. In what follows I draw upon four case studies to focus on the marital experiences of Kerala brides and bring out the fluidity and multidirectionality of "lived" experiences of Kerala brides in Haryana. These case studies make us rethink the possible varied meanings of post marital mobility for women and how these meanings are bound up with the particularities of contexts within which this movement and mobility is taking place.

14.4 Case Studies

Of the multiple stories and narratives I collected, these 4 brief case studies of Kerala brides partially represent an array marital experiences. Given the wide diversity of marital experiences and outcomes, it is impossible to generalize about the character and quality of Haryana–Kerala marriages. However, these case studies reflect the range of ways in which Kerala brides and Haryanvi men met and married, the rich possibilities and bitter disappointments they faced in their post marital life, the paradoxes of mobility (Freeman, 2005) they experienced in the process, and the degree of (or lack of) agency they could exercise in negotiating their position within this arrangement.

Neerja

Neerja from Kannur district of Kerala was married for 6 years at the time of my fieldwork to Dharamendra, a jat, who worked as a school cab driver. For a large family of 4 sisters and 1 brother and limited earnings, Neerja said that getting married in Kerala was more difficult than "plucking stars from the sky" as marriages there involve huge dowry and gold exchange. When Dharmendra's proposal was brought by another cross-region bride Kalyani, Neerja said yes to it and within a month she got married. Looking back at her married life, Neerja shared that back then she did not realize that there was something lacking about men who went to Kerala to find brides. She said that either they were "landless or jobless, had no education, were poor or addicts. Why else would they go all the way from here to Kerala?" She shared

how naïve she was to conclude from Kalyani's appearance that all was well with her life in Kerala.

Neither Neerja's upbringing nor her expectations had prepared her for the tough physical labour involved in animal husbandry work which she was expected to do after her marriage as a cultural imperative to serve her in-laws and husband. She found it hard to reconcile how an "educated" women like her (she had completed her intermediate level of schooling) could be made to follow regressive (*pichde*) customs like veiling (*purdah)*, not talking to males, and prevented from taking up employment. She shared that she suffered a lot in the first few years and would not want other women to come here. Like Neerja, many other cross-region brides I met found their life in rural Haryana to be dull, boring and backward in comparison to their own natal regions and were shocked to discover the daunting nature of everyday rural life and the numerous constraints that shaped their social and economic realities.

Critical of the cultural practices in Haryana, Neerja was trying hard at the time of my fieldwork to convince her husband to move back to Kerala. In a light-hearted moment, she had once remarked in front of Dharmendra, how "he loved his cattle and land more than her" (*Isne mere te jaada prem apne daangar aur jameen te sae*) and will not leave them at any cost. However, when I revisited the field after seven months the couple had already relocated to Kerala. While Neerja was more agential in escaping the daunting and 'backward' life of rural Haryana, it is important to note that this agency was itself contingent on and mediated by the resources and support her husband offered. 3 more brides in my study shared how they wanted to move back to Kerala but had to give up sensing the lack of interest on their husband's part. For most cross-region brides their vulnerability was exacerbated by unsupportive husbands and demanding marital families.

Ananta

Ananta was married to Sadhu, a Jat by caste. Ananta was a Thiyya (OBC) by caste. Married for 10 years, Ananta used to work as a nurse before her marriage and earn a decent salary. After the birth of two children, Ananta thought of resuming her nursing job however, she was denied permission to do so by her husband. She was told, "our women do not work outside the home". When Ananta tried to reason with her husband by saying that Jat women do work in the fields, he answered that the women work on their own families' land and this work was different. He later explained to her that the nursing profession is not deemed respectful and that their entire *kunba* (extended family) and *biradari* (community) would make fun of his family for allowing their daughter-in-law to do so. After much persuasion, Ananta succeeded in getting permission to work as an *aanganwadi* helper, where she had to prepare meals for the children.

Anthropological literature on caste has documented how certain castes that dealt with the bodily and other wastes were looked upon as "polluting" and "defiling" (Dube, 2001; Ghurye, 1991). The nursing profession is also considered to be polluting, as caring for the sick brings one into contact with their body substances. Married to a man from the dominant Jat caste, Ananta was not allowed to engage in nursing and thus found her caste mobility impeding her opportunities for economic

mobility. Patriarchal norms, combined with caste prescriptions prevented Ananta from making full use of her earning capacity as a nurse at the local Public Health Centre (PHC) and she had to settle for a meager wage of Rs. 1000 per month instead. Ananta confided that she wanted to help her natal family monetarily through earnings but can no longer do so.

Denial of request to join the workforce was also reported by other Kerala brides. The pressure to keep a wife at home and out of workforce is exacerbated by the fear that cross-region brides might run away. Throughout my stay in rural Haryana, few stories of cross-region brides who "ran away" from their marital homes regularly surfaced in casual conversations. My respondents in the field site always referred to a "nearby village", "another place" where the incident happened without being specific about the details. Although, I did not come across any household from where cross-region brides ran away, such stories were definitely a part of people's imagination and hence became an important reason to control them. Ironically for women, this rigid control on their spatial movement and sharp dichotomization of work and domesticity was one of the most common sources of dissatisfaction as they felt that such dichotomization curtailed their opportunities for socio-economic mobility.

Monika

Monika had faced several refusals for marriage in Kerala because of her family's inability to pay dowry. At the age of 30 she got married to Karambeer in Haryana through another cross-region couples whom Karambeer's mother had approached to find a match for him. Karambeer was himself marginalized in the local marriage market due to unemployment. Although his family owned some land, it was to be eventually shared with 2 other brothers—both of whom were unmarried and one also suffered from hearing and speaking impairment. The entire wedding expense of around 60,000 rupees was borne by Karambeer's mother. When Monika arrived in her marital home, her mother-in-law expected her to enter polyandrous relationships with her two unmarried brothers-in-law. Coming from a culture where fraternal polyandry is unheard of, Monika rejected this. Her denial was also supported her husband. However, the pressure continued to grow and the couple finally left the joint family to settle in a nearby town. The relations between the couple and the marital family are strained and Karambeer's mother feels betrayed that her son sided with his wife than his mother. Even after having a daughter-in-law she is still burdened with household responsibilities.

Although north Indian men and Kerala brides may have found a solution to the difficulties of getting married, they had not bargained for the problems of adjustment that these unconventional unions may pose. Surreptitious practice of fraternal polyandry has been documented for north India region (Chowdhry, 2007; Hershman, 1981). Although Monika exercised agency by refusing being forced to sleep with her brothers-in-law she faced further uncertainties after leaving her marital home. With

no house and source of regular income it was difficult for the couple to make ends meet and they struggled for a few years before achieving some stability.

Reema

Reema, aged 29 has been married for 7 years to Rambir, aged 46. She had seen his picture before marriage but said that he looked "much younger" in the picture than in reality. The couple now has a 5 year old son. This is Rambir's second marriage and he has a daughter and son from his first wife who left them several years ago due to his alcoholism. Despite trying hard to adapt herself to local norms, Reema still cannot speak Haryanavi language fluently and fails to get the correct accent and pronunciation. As such has been mocked on several occasions by her marital family members including her husband. Her mother and sister-in-law openly ridicule her and do not like to take her anywhere with them as they feel embarrassed when she talks. Her husband also joins them on multiple occasions in making fun of her. She expressed dissatisfaction for her husband and shared that in all these years she has not developed any feelings for him as he is older and has never stood up for her, even when she is taking care of his children from the first wife. On several occasions he has also raised his hand when he comes home drunk after work. She says, she feels "trapped" in this relationship but there is nothing she can do as she cannot go back to her family.

It cannot be denied that the gender power balance in cross-region marriages (as in normative marriages), is more in favour of the men and the marital families of cross-region brides and thus can be misused sometimes. The vulnerability of cross-region brides in such circumstances is aggravated because natal support cannot be mobilized easily in situations of distress due to long marriage distance. The 'slave mentality' (McKay, 2003) of husbands and the affinal families may relegate cross-region brides to the status of personal maids who were thought of as 'purchased' and constantly humiliated and ill-treated.

14.5 Mobility, Agency and Power Geometry

The ethnographic vignettes presented here highlight that though most Kerala brides enter into these marriages voluntarily, sensing their disadvantaged position in local marriage market, they are quite unprepared for the challenges these marriages might raise for them. While the mediators provide background information on families and grooms, the lack of in-depth knowledge about north Indian gender regime, its patriarchal make up, marital families expectations and husbands' nature puts cross-region brides in a very vulnerable position. Although they may not be "change makers" in the way the media presents them to be some of they do strategize to make situations better for them and bargain within their marital families, as Neerja, who convinced her husband to move back to Kerala, or Monika, who resisted being forced into polyandry did. However, it is important to remember here that in both these cases, the Kerala brides were able to make these choices because their husbands were supportive of

the decisions they were making. Women's agency and choice in these cases was not absolute but constrained and highly dependent on the nature of relationships they shared with their husbands and marital family members. This bargaining power may not be available to women in abusive marital relationships as in Reema's case whose husband indulged in domestic violence. The power geometry thus made their husband's more in charge of how their exercise of agency and experience of mobility may turn out to be.

Whether or not Kerala–Haryana marriages translated into upward mobility for the brides remains a difficult question to answer. Most Kerala brides married men who were of a higher caste than them. Some also married men who were landed and thus economically better than their natal families. This may be interpreted as an indicator of upward mobility. However, mobility itself can be mapped on various levels and context sensitive considerations of mobility are important to counter the assumptions of upward or downward mobility Kerala brides in Haryana. Thus most of the Haryanavi men were also less educated than the Kerala brides; few were older in age and some also with children from previous marriages. Upward mobility on some indicators was complicated by downward social mobility on others. As Piper and Lee (2016, p. 10) remind us that

> Marriage migration may appear to be a secure way of achieving a less precarious life legally, socially and economically, but the men who marry such women are often characterized by socio-economic qualities deemed undesirable by local women in the destination regions. For example, they may be working class, disabled or have other ailments or problems such as gambling or drinking.

Getting married to such men may not translate into upward mobility for migrant brides. Additionally, while on the one hand, these marriages did allow Kerala brides to fulfill their desires for marriage, family formation and children, on the other hand, they also brought bitter disappointments to them. Kerala brides found their sense of "independence" and "freedom" severely restricted by the difficult life of a rural agrarian economy with hard physical labour of farm and animal husbandry in addition to household work. Unlike other cross-regional brides, they were very vocal and critical of the Haryanavi cultural practices which they regarded as "backward". They believed they were in no way better off than before by marrying into Haryana where regressive gender norms, unrealistic expectations of marital family members andtheir surveillance riddenlives prevented them from entering labour force as Ananta's case shows. This further heightened their dependence on the marital kin and husband. However, despite this most of the brides were making an effort to fit-in and focused their energies on getting accustomed to the new ways of life. Those who could not were at the receiving end of mockery and ridicule as 'outsiders'.

14.6 Conclusion

The case studies discussed in this paper complicate any straightforward assumptions of mobility and agency in cross-region marriages and emphasize the need

to analyze webs of power within which Kerala brides operate. These narratives of subjectivity, resistance, coercion and choice destabilize dominant media perceptions of Kerala cross-region brides as hyper agents who are completely in charge of their marital destinies. Flaws and limitations of the one-dimensional representation of Kerala brides in popular discourse are brought to fore through these textured set of experiences which highlight how varied and fluid the lived experience of these marriages can be. While some Kerala brides are motivated to pursue upward mobilities and productively contribute to both the sending and receiving societies, they are often vulnerable and face several economic, social and cultural constraints. They constantly found themselves grappling with harsh patriarchal norms and rigid gender prescriptions which often came in conflict with or curtail their personal desire for freedom, agency and mobility.

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Chapter 15
Gender and Development: Back to Basics Continued Relevance of Marcal's Who Cooked Adam Smith's Dinner

Padmini Swaminathan

15.1 Introduction

Feminists (Cornwall & Rivas, 2015) have forcefully argued that the language of "gender equality" and "women's empowerment" has been so fully embraced by one and all that they (the terms) have been eviscerated of conceptual and political bite; and hence, the question that these feminists pose is, what could be other or new frames for bringing about a transformative approach? According to these critics, development narratives of gender equality presume a set of hierarchical and oppositional relationships between women and men in which women are positioned as structurally inferior.

> By eliding 'gender relations' with 'heterosexual relationships', by presuming an imbalance of power within these relationships in favour of men, by transmuting that power imbalance to infuse society as a whole, and by simplifying power relations in the form of a zero-sum game 'women' end up as the 'poor and marginalised' and 'men' continue to be the problem… Men play a part only as perpetrators, never as themselves on the receiving end of violence, the structural violence of poverty or indeed the institutionalised violence of conflict. (ibid.: 404)

In a similar manner, the authors contend that, the concept of empowerment has been reduced to provide women with access to different kinds of resources (microfinance, being a prime example) and to measurable outcomes, with the relational dimensions of empowerment falling out of the frame. "Representations of empowered women, such as, women running their own businesses, speaking up in public, sending their daughters to school… tend to be completely devoid of any images of the men in their lives. Where relationships come into view, they are generally of groups of women working together in imagined harmony. Men and boys are relegated to an entirely separate field of engagement" (ibid.: 407).

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Taking the Discipline of Economics as base, this paper demonstrates how and why macro-economic policies centrally anchored in the Discipline of conventional Economics cannot accommodate gender concerns; thereafter, it provides a brief overview of the shifts in "gender and development" literature emphasising in particular the contribution of feminist economists. Feminists' continued efforts to move towards transformation of society to achieve gender equity finds articulation in the manner in which the Sustainable Development Goals of Agenda 2030 have been formulated. We discuss briefly this movement from MDGs to SDGs highlighting the specific contribution of feminist economists. Next, using the Telangana Social Development Report, 2018, which study was undertaken against the backdrop of the adoption by the country (and endorsed by the Telangana state) of Agenda 2030, the paper not only demonstrates what a "gender" reading of secondary data can reveal but also the fact that the findings of the report are in sync with the concerns raised by feminists over the various Sustainable Development Goals and Targets of Agenda 2030. The paper ends by supporting the framework that Cornwall and Rivas (2015) have laid out for a transformative agenda using three of the concepts that underpin the human rights framework, namely accountability, inclusion and non-discrimination.

15.2 Reading Who Cooked Adam Smith's Dinner? A Story About Women and Economics

> In the same way there is a 'second sex', there is a 'second economy'. The work that is traditionally carried out by men is what counts. It defines the economic world view. Women's work is 'the other'. Everything that he doesn't do but that he is dependent on so he can do what he does… Adam Smith only succeeded in answering half of the fundamental questions of economics. He didn't get his dinner only because the tradesmen served their own self-interests through trade. Adam Smith got his dinner because his mother made sure it was on the table every evening… We don't know why Adam Smith's mother took care of her son. We just know that she did. (Marcal, 2015: 8)

In tracing the story of Smith's "Economic man" using Daniel Defoe's 1719 novel about Robinson Crusoe, Marcel demonstrates how economists' obsession with the concepts of self-interest and invisible hand created an economy that could "transform our egoism and greed into harmony and balance… (Further), even though the word 'economy' comes from the Greek oikos which means home, economists have long been uninterested in what exactly happens at home" (ibid.: 14).

Over time and across Disciplines, even as feminists' engagement and outpouring of literature around themes of care, dependency, gender discrimination in payment of wages, allotment of tasks, etc., have taken a life of their own, it is yet significant to point out how since Adam Smith's time, insularity from issues of care, dependency and self-sacrifice characterises the Discipline of Economics with the unfortunate result that adding women to the economic model was premised on women being like men. Marcel expresses this point simply yet forcefully:

> Economic man can stand for reason and freedom precisely because someone else stands for the opposite. The world can be said to be driven by self-interest because there's another world that is driven by something else. And these two worlds must be kept apart… If you want to be part of the story of economics you have to be like economic man… Somebody has to be emotion, so he can be reason… Somebody has to be dependent so he can be independent. Somebody has to be tender, so he can conquer the world. Somebody has to be self-sacrificing so he can be selfish. (ibid.: 18–19)

On the one hand, conceptual and operational difficulties in valuation and measurement of "work" that goes into homemaking and care has been touted as reasons for not including housework in GDP estimates. On the other hand, instead of making efforts to overcome these problems and/or learning from the few economies (Canada, for instance) that have made such efforts, the tendency among most economists has been to dismiss housework as inconsequential to GDP calculations. Worse, in mainstream economic models, the homemaker is unproductive, not working, economically inactive. Further, mainstream economists find nothing offensive in joking about how GDP increases when a man employs a housekeeper and how the same GDP decreases when the man marries his housekeeper. As Marcel puts it: "In addition to the joke saying a *lot about the perception of gender roles among economists*, it also shows how the *same kind of work* can be counted or not counted as part of the GDP" (emphasis ours) (ibid.: 27).

The rigid conceptualisation of "economic man" has meant that woman has entered the job market without the man having entered the home to the same extent such that, the constant allusion to "work–life" balance has not only resulted in maintaining the divide between the private and the public spheres but has worked to the detriment of the woman, "who is judged on her ability to keep the home and family in order in a way that men are not". Given this scenario, work–life conflicts become women's issues and responsibility. Solutions to such conflicts are not sought in fundamentally changing our ideas about the boundaries between work and family life; instead, when women report being more stressed and feeling more short of time than men, what is blamed is feminism: "the fact that women are having a hard time being like economic man is taken as proof that women don't belong to the public sphere".

In critiquing the Discipline of Economics through the trope of the Economic Man as handed down to us by Adam Smith and made more sophisticated by later economists through mathematical models, Marcel demonstrates how theories of economics have been able to maintain the façade that economic outcomes are gender neutral. The poverty of economics lies in its inability to factor in the different structural positions that men and women occupy in any economy, which, in turn, lead to differential outcomes for men and women even if the policies are the same.

And that brings us to the title of Marcel's book, Who Cooked Adam's Dinner? In the Epilogue to the book, Marcel provides a brief bio of Margaret Douglas, Adam Smith's mother, upon whom the entire responsibility of bringing up Adam Smith fell, since the latter's father passed away six months before his birth. Margaret Douglas became a widow at the young age of twenty-eight; at the age of two, while Adam Smith inherited his father's estate, his mother was entitled to only one-third of the

inheritance which made her dependent on her son till her death at the age of eighty-four. What Marcel underlines through these details are the following: despite Adam Smith acknowledging how dependent he was on his mother and a female cousin for tending to his household, "in his economic theories, however, there is no trace of these insights… *the discipline and lineage of thought that Adam Smith originated omitted something fundamental when Adam Smith forgot about his mother"* (emphasis added) (ibid.: 85).

More significant, Marcel emphasises that, despite feminism having explicitly pointed out that "Margaret Douglas is the missing piece of the puzzle" (ibid.: 85), the Discipline of Economics since the time of Adam Smith continues to centre-stage Smith's "economic man"; not surprisingly therefore, economic policies based on the tenets of this Discipline have systematically been able to rationalise the devaluation of domestic work, performed largely by women all over the globe. The invisibility of the range of domestic work is succinctly captured as follows by Marcel:

> Economic Man… has neither a childhood nor a context. He grows out of the ground like a mushroom. And when all people are assumed to be like him, a large part of the economy becomes impossible to see. (ibid.: 28)

Over time, and largely because of women's movements all across the globe, severally and jointly, the project of economic development was forced to contend with many of the issues raised by women. Women's questioning of the gendered nature of development was instrumental in giving rise to "Gender and Development" (G&D) as an academic Discipline, as policy, and as activism (locally and globally); G&D carried forward several of the themes that the Discipline of Economics failed or refused to grapple with, because of these themes association with "Body, Emotion, Dependency and Vulnerability" (ibid.: 76)—aspects of existence traditionally attributed to the woman. In the following section we take a critical look at what has changed, if at all, since Gender and Development was mainstreamed, internationally and nationally.

Section 2

In 1987, ***Gender and Society*** journal carried several papers that began with a seminal piece on "Doing Gender" by West and Zimmerman. Among other things, the article offered a critical assessment of then existing perspectives on sex and gender, even as it introduced important distinctions among the terms sex, sex category and gender (ibid.: 125–51). In 1995, in the same journal, West and Fenstermaker published "Doing Difference" to make up for an earlier neglect of race and class, and, "to extend our analysis to consider explicitly the relationships among gender, race and class, and to reconceptualise 'difference' as an ongoing interactional accomplishment" (ibid.:9).

In 2009, ***Gender and Society*** revisited the theme in the form of a symposium that, in a sense, took stock of how "Doing Gender" had been conceptualised and operationalised over the intervening period. Among the several contributions to this discussion, we highlight Barbara Risman's observations for the sharpness with which it captures the sanitised manner in which "Doing Gender" has been operationalised.

To quote Risman: "First, the concept has been so integrated into the sociological lexicon that the implicit feminist critique embedded within it sometimes disappears entirely. Second, the feminist use of doing gender has become so diffuse that we have created a tautology: whatever groups of boys and girls, or men and women, do are a kind of gender" (ibid.:81).

Needless to add, much of the discussion on "doing/undoing/redoing" gender and as documented in the pages of ***Gender and Society*** referred to above is in the context of Western societies. It is our contention that, while the framework within which the "doing of gender" is discussed remains relevant across time and space, what is conspicuous by its absence in the above discussion (whether in 1987 or 2009) is the context and level of "development" of a country—political, economic and social—a phenomena that cannot be ignored and which still foregrounds much of the discussion on gender, and, about gender, in societies such as India. And so, the question that we pose in this Section is:

How did the feminist agenda of gendering development turn into gendered development?

Ruth Pearson's seminal essay on The Rise and Rise of Gender and Development (2005) provides a brilliant overview of the gender journey, intellectual, and otherwise, which journey, at one level, has resulted in mainstreaming gender in academia and in policy, but, the same journey, at another level, has mainstreamed gender in an instrumental fashion. Globally, according to Pearson, gender and development had its origins in the plans for economic restructuring and growth that were formulated in the second half of the twentieth century; thereafter the agenda itself was widened. By end of twentieth century, G&D had moved firmly into the mainstream; all bilateral and multilateral agencies, big international NGOs (such as Oxfam, Care International, Save the Children, to name a few) were required to have policies, dedicated staffing and units to address gender issues. In addition to specialised courses and programmes on G&D, academic development studies programmes included modules on G&D within their programmes while students were encouraged to bring women's perspectives and gender issues into the general analysis of development theories and strategies (ibid.: 168–169).

While feminists have insisted that mainstreaming gender ipso facto implies transformation of society such that the achievement of gender equity becomes the norm through elimination of bias and disadvantages that any gender faces in society, the operation on the ground of the agenda of gender mainstreaming has avoided confronting directly the structures that produce and entrench gender inequity. Suffice here to mention how across countries, across international, national and local organisations, the effort has never been to change structures but, instead, invest in social services that could free women to work more effectively in the market economy. Including among and within the world's best practices countries (the European welfare states and Sweden, for example), feminists (Hobson & Fahlen, 2009), using time budget studies, point out that, even as women's hours of unpaid work have decreased, there is very little change in the amount of men's unpaid work in the home. Part of the reason for reduction in the number of hours devoted by European

and Swedish women to domestic tasks lies in their ability to hire female migrant labour.

Other scholars (Echtelt et al., 2009) have engaged with the theme of the organisation of the workplace. Their research demonstrates how these changes (variously designated as post-Fordist, post-modern or high-performance organisations), characterised by greater flexibility ostensibly to increase autonomy levels of the workforce and better integration of work and home, have in practice, made these new workplaces "even more a man's world than more traditional organisations" (ibid.: 189). Elaborating on these new work arrangements, the authors document how the institution of project-teams charged with fulfilling targets within specified deadlines have shifted responsibility onto the workers. One indicator used by the authors to measure the outcome of new work organisations on work–family issues is ***overtime work***. In explaining the rationale for the use of overtime work as indicator, the authors state, "(T)raditionally, men have undertaken more overtime than women, reflecting the gendered division of labour. If post-Fordist work makes a difference—for better or for worse—it will show up in the amount and division of overtime men and women perform" (ibid.: 194).

Based on their research conducted in the Netherlands, Echtelt et al. (2009) make an important observation, namely that the shift from clock time to task time leads to ***unpaid overtime*** (emphasis ours) (ibid.: 94). Differentiating unpaid from paid overtime, the authors argue that:

> Paid overtime is mainly restricted to those jobs where the employer can control the pace of work and this is less in the autonomous and flexible post-Fordist settings… the characteristics of the post-Fordist workplace shifts the focus of the employee to bringing a task to a good and timely end and demonstrating commitment by prioritising work over everything else… This implies that the post-Fordist workplace may indeed extend to the kitchen table… Whether this will bring the desired equality may be considered doubtful. (ibid.: 194–196)

In other words, what the authors emphasise is that while overall women might work less overtime than men because of the disproportionately shared burden of housework, post-Fordist work arrangements has significantly increased **unpaid overtime** for both men and women. The continued non-responsibility of organisations for the social lives of employees in new work arrangements, coupled with the fact that disproportionately larger numbers of women continue to shoulder the responsibility of housework implies that the project of transformation of society through mainstreaming of gender remains elusive even for the best of societies.

15.3 From MDGs to SDGs: Have We Moved Closer to Achieving Gender Equity?

The Declaration of the Millennium Development Goals (MDGs), adopted with much fanfare in 2000 and which Goals were to be achieved by 2015, explicitly mentioned gender equality. Issue no. 1 of 2016 of the journal, ***Gender and Development***, carries

a set of articles that provide a critical assessment of how far the goal of gender equality in particular has been achieved, in what respects the 2030 Agenda for Sustainable Development (SDGs) are a departure and improvement over the MDGs, and what is realistically possible to expect given larger global and local scenarios.

Goal 3 of the MDGs aimed at "Promoting gender equity and empowerment of women" along with eradicating extreme poverty and hunger, achieving universal primary education, reducing child mortality, improving maternal health, among others. Scholars (Stuart & Woodroffe, 2016) have pointed out that, of the several goals and targets of the MDGs, only gender parity in primary, secondary and tertiary education had been achieved; even here, the achieved target was enrolment, not completion rates, with larger proportion of girls dropping out for various reasons than boys. Needless to add, the achievement of the goals showed significant differences between countries and regions.

An important observation made by several authors in the Gender and Development journal issue mentioned above is that the MDGs were evolved with minimal input from the many social groups whose participation in implementation was critical, but whose support for the goals and targets were often lacking. The women's rights and feminist movements in company with other social justice movements drew attention to the fact that the MDG targets were mostly technical and quantitative in nature, and this inevitably led to cosmetic improvements, instead of addressing the root causes of gender inequality and discrimination (see for example, Fukuda-Parr, 2016). The MDG evaluation also showed the lack of understanding of the inter-linkages between the MDG goals in terms of both causes and solutions, and lack of recognition that all MDG goals had gender dimensions, which were not taken into account by donors and implementers. One example pointed out by many scholars is the multiple dimensions of poverty, not just based on lower levels of salaries and income for women, but on a combination of obstacles from gender-based discrimination, gender-based violence, and insecurity, to unpaid burden of care and domestic work, and legal and customary barriers regarding access and control over resources, which were not taken into account in the simplified measurements and solutions designed for reaching the MDGs.

On the other hand, these same authors in the above journal point out that the gender equality goal in Agenda 2030, like, many other goals was the subject of widespread consultations, position papers, etc. (see Ponte & Enrique, 2016 for more details). Further, the explicit goal relating to gender (Goal 5: Achieve Gender Equality and Empower all Women and Girls) is complemented by others thereby demonstrating the inter-linkages between goals as well as the need to address these goals ***simultaneously*** for the larger goal of gender equality to be achieved. Thus, for example, complementing the target on "paying attention to unpaid domestic and care work" is a target for achieving universal and equitable access to safe and affordable drinking water under Goal 6, which recognises, at least on paper, the need to invest in basic infrastructure for reduction of time and energy spent on unpaid domestic and care work (see Razavi, 2016: 30). In fact, according to the feminists who were at the forefront of the drafting of Agenda 2030, one of the more contentious and hard-won targets in the 2030 Agenda was the inclusion of gender inequalities in the division of

"unpaid care and domestic work"—an aspect of gender inequality that is hard-wired into the way families and households provide for and nurture their members. To say that care is provided on an unpaid basis does not mean that it carries no costs. In fact, women bear the bulk of the costs entailed in its provision in terms of foregone opportunities to (a) engage in paid work, (b) enrol in education/training, or, (c) simply to have more time for leisure or self-care. So, while care giving is essential for all societies and economies, it is clearly unfair that one gender provides the lion's share while the other gets a "free ride".

How is the SDG target on "unpaid work" formulated and worded? "Recognise and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and family *as nationally appropriate*" (emphasis ours). Analysing the wording of this target, feminists (Razavi, 2016, in particular) have pointed out that the attempt here is to avoid using the term "redistribution" but settle for a more voluntaristic sounding term implying the need for more equal-sharing—"shared responsibility".

> This is further watered down with the proviso as 'nationally appropriate'… in the current formulation of the target what gets more attention is 'recognise and value': the inherent danger here being that 'recognise and value' will get reduced solely to counting unpaid work in statistical terms (through time-use surveys) and valuing it in monetary terms (by creating 'satellite accounts'). While these are important instruments of measurement and valuation, it would be unfortunate if action under this target stopped there and did not address critical policy issues. (Razavi, 2016: 31.

What passes for "economic development" and what kinds of macro-economic policies, monetary and fiscal are needed to ensure that economic growth generates decent jobs and livelihoods has not been adequately dealt with in the 2030 Agenda, according to its critics. The need for monetary and fiscal policies to go beyond containing inflation and broad-basing tax base to address other and more crucial aspects of the economy such as employment and decent wages has been flagged by several feminist economists (Koehler, 2016: 54; Razavi, 2016: 33). The significance of this omission lies in the fact that, in most countries of the developing world, exports based on price competitiveness deploy disproportionately large numbers of women on low wages. As indicated by Razavi (2016),

> the emphasis on external markets leads both producers and policy makers to see wages as a cost rather than a source of potential demand thereby generating all sorts of strategies to reduce unit wage cost. In such a scenario, the emphasis on export-oriented strategies sits uncomfortably with the important nudge given in 2030 Agenda to wage policies to reduce inequality. The latter would suggest the need for a policy framework that promotes strategic industries that can afford to pay higher wages and the pursuit of full employment through demand-side strategies. (ibid.: 34)

What is interesting or rather dismaying is that, the lack of attention to how resources for provision of various essential services (such as health, child care, piped water, fuel) are to be generated and expended to reduce dependence on households (read women in these households) remains unspecified in Agenda 2030. We

are back to raising the question of how the burden of household and care work is to be addressed, whose responsibility is it and what are the implications of its non-resolution.

15.4 The Telangana Social Development Report 2018: A Regional Story of Gender, Access and Well-Being

Closer home, against the backdrop of the Government of India's acceptance of the SDGs followed by its endorsement by various state governments, the Council for Social Development, Hyderabad, in its **Telangana Social Development Report, 2018**, (henceforth TSDR, 2018) specifically explored gender differentials in social development using official secondary data disaggregated at unit level across district, location and social class for the state of Telangana. Here, we provide a glimpse of the picture that has emerged when data were analysed using crucial social and economic parameters such as education, employment and violence among others.

We begin with **education**. To enable policy makers to arrive at informed decisions to address gender gaps in education, TSDR, 2018, pinpointed at what levels of education differences among the genders have cropped up, among which social categories these gaps are acute, in which particular districts of the state and among which religious groups, these differences, if any, persist, despite attempts by the state to close such gaps through its various education-related welfare policies. The following are some of the several observations made by the Report:

- while the gender gap in overall education was in favour of female students both in rural and urban areas, it was quite the opposite in the case of higher education. Thus, the Report stated, it was essential to explore, why, despite being able to attend school up to higher secondary level, females were not able to pursue higher education. The latter has implications for job opportunities for females in occupations that require higher levels of education and/or professional skills;
- a larger proportion of girls walk to school. This statistic when seen in tandem with the fact that, the further the location of an educational institution, the greater the chances of females discontinuing education, required examining whether public provision of transport could mitigate the incidence of girls dropping out from educational institutions particularly at higher levels which require them to travel some distance;
- that in 2014 Telangana still had 10% males and 18% females who were never enrolled in an educational institution was a matter of grave concern. The gender gap among "never enrolled" was about 7 percentage points for the state as a whole, with the gap being phenomenally high in rural areas when compared to urban areas. Further, data analysed in the report showed enormous variations across districts. "Being engaged in domestic duties" was the single important reason for non-enrolment of girls, while "being engaged in economic activities"

constituted the prime reason for non-enrolment of boys. Cleary, interventions to get everyone in school so that no one was left behind needed customised policies.

It is important to note that TSDR, 2018, findings on gender differentials in education echo several of the concerns raised by feminist scholars (Esquivel, 2016; Koehler, 2016) who have critically examined the SDGs from a gender perspective. **SDG Goal 4 on Education** has a target, (4.1) on school completion rather than merely emphasising enrolment rates. The questions raised by these scholars are similar to those documented in TSDR, 2018. These include: does dropping out of school before completion have to do with gender-related factors, such as: distance between educational institutions and students' homes; threat of gender-based violence on the way to school arising from lack of provision for travel to school; lack of sanitary facilities for menstruating girls; disproportionate burden of unpaid care work? What is clear is the need for gathering evidence on gender-related factors inhibiting continuation of schooling to enable formulation of appropriate policies required for achieving target 4.1, namely completion of schooling.

Educational levels of worker population: An important exercise conducted by TSDR, 2018, was the exploration of levels of literacy among worker population to address the question: does gender matter? According to the Report, between the sexes, relatively more males in general and male workers in particular were literate and better off educationally than females in general and female workers in particular. The greater proportion of illiterate women in the workforce along with a greater proportion of literate women being captured as "non-workers" was a conundrum highlighted by the report for empirical investigation towards appropriate policy.

In the light of the above findings, the implementation of SD Goal 5 that calls for, among other things, **economic empowerment of women**, requires that governments have to simultaneously address the issue of illiteracy among women workers even as it needs to comprehend why educated women are not in the labour/work force. Scholars have pointed out that while Goal 5 makes a link between access to technology and empowerment of women, there is no discussion of how women, and especially illiterate women, could be put in a position to claim access to technology. A positive aspect of the SDG agenda pointed out is that target 5.4 emphasises the need to address the theme of unpaid care and domestic work through the provision of public services, appropriate infrastructure, social protection policies, and promotion of shared responsibility within the household and the family but with the rider that this promotion of shared responsibility should be as "nationally appropriate" (Koehler, 2016: 57).

Female work participation rates and nature of employment: The secular decline in female labour force participation rate (FLFPR) in India has become a cause of concern for researchers and policy makers alike. Scholars have attempted to explain this phenomenon in various ways: through minute examination of secondary data as well as through field-based studies. A significant aspect that the TSDR 2018 attempted to explore was the reason for the sharper decline in female labour force participation in Telangana when compared to all-India, even if, overall, Telangana

had a much better score of female participation vis-a-vis all-India. Examination of data revealed the interplay of several complex factors such as changing agricultural scenario leading to decline in demand for female labour; absence of support for conduct of domestic duties; non-availability of work close to place of residence—factors that reiterated the gendered nature of the sexual division of labour in our society. An important contribution of TSDR 2018 was its demonstration that a significant proportion of women who were "not in the labour force" but have returned themselves as "engaged in domestic activities" were willing to participate if work was provided in, or, in the vicinity of their household. Thus, data suggests that women have desire to participate in labour market but that they are engaged in domestic activities not always by choice.

At one level, we have a sizeable proportion of females returned as attending household and domestic duties; at another level, a majority of those returned as workers were employed as unpaid family worker. In terms of the distribution of workers across occupations, TSDR 2018 found that on an average majority of the workers, especially the females, were employed in two specific occupations: namely, crop growers and elementary activities including agriculture, fishery and related activities. These occupations are of poor quality and informal in nature as: (a) these require only "primary and below" levels of education; (b) no probability of getting a written job contract; (c) no choice of availing paid leave; (d) no privilege of enjoying social security benefits. Thus, in bringing a qualitative lens to quantitative data, TSDR 2018 was able to demonstrate that there was disproportionate representation of one gender in those activities that were poorly paid and characterised by low skill requirements thereby contributing to widening gender gap.

This vexatious issue of widening gender gap is sought to be addressed through removal of barriers to women's entry into the labour market. However, feminists have pointed out that mere removal of barriers and/or even equalising access will not suffice unless the issues of paid/unpaid work, occupational segregation, gender wage gaps are not simultaneously tackled. Thus, even though, Agenda 2030 speaks of bringing in "equality of opportunity in employment", feminists have cautioned against reading too much into this provision, since it is not reinforced by making governments commit to changes in macro-economic policies (Esquivel, 2016).

Violence is a development issue: Rarely do Social/Human Development Reports discuss the theme of violence against women. TSDR, 2018 however does. Apart from being the first of its kind, the contribution of TSDR 2018 lies in its exploration of the relationship, if any, between indicators of development (such as literacy and sex ratios, among others), and, crimes against women. The question therefore posed in the Report was: do rising literacy levels consequent to economic development translate into better indicators of well-being for women and girl children in particular? Has India's and Telangana's economic growth been able to mitigate the "hostile environment" in which its population resides? TSDR 2018 also examined the institutional architecture and mechanisms put in place to address crimes committed against women. The chapter finds that "despite a dense and intersecting network of civil and criminal legislative protections for women against violence in the home and in

the public domain", and despite rising levels of literacy across gender and location, not only have crimes against women in Telangana increased, but women's presence in institutions that are crucial to address such crimes, namely, police, judiciary and legislative bodies, is abysmally low.

Realising the crucial importance of a crime-free environment for gender equality, the SDGs had specifically articulated the following: *Make cities and human settlements inclusive, safe, resilient and sustainable (SDG Goal 11); and, Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels (SDG Goal 16)*. While feminists have welcomed the articulation of these goals, they have expressed their dismay at the fact that "none of the targets included under this "peace and governance" goal called for specific measures to ensure women's equal participation in governance institutions and peace processes" (Goetz & Jenkins, 2016:128). The latter had also stressed the need to increase the numbers of women in public authority pointing out how "the strikingly low numbers of women in positions of public authority has long been seen as both a consequence of gender discrimination—which inhibits the growth and limits the influence of constituencies advancing gender equality—and an obstacle to overcoming it" (ibid.: 129).

The discussion in TSDR 2018 demonstrates concretely the consequences of poor representation of women in governance institutions; implicitly, it also points to the need for accountability, "the obligation of those in authority to take responsibility for their actions, to answer for them by explaining and justifying them to those affected, and to be subject to some form of enforceable sanction if their conduct or explanation is found wanting" (Razavi, 2016: 38).

15.5 What is the Transformative Agenda that Some Feminists Seek to Reclaim and How?

Right at the beginning, we have alluded to the contribution by Cornwall and Rivas (2015) where they have mentioned the need for bringing about a transformative approach. These authors emphasise the aspect of re-framing a transformative agenda through three of the concepts that underpin the human rights framework, namely accountability, inclusion and non-discrimination.

Accountability, and including within it the concepts of obligation and answerability, according to the authors, has much to offer gender discourse. Talking in terms of "holding to account" rather than merely "involving or engaging" men offers a frame that goes beyond gentle invitations to join in harder talks about patriarchy, privilege and power. The concept and practice of "inclusion" enables making men and boys also the objects of attention: making their exclusionary practices visible and unacceptable. The practice of non-discrimination "goes beyond carving up the world into two classes of people: the victims and perpetrators. It is about holding up the mirror to each and every one of us to force us to examine the extent to which we

harbour assumptions, myths, stereotypes and limiting beliefs that prevent us from treating everyone with dignity and respect. As such, it can provide us with a tool for identifying laws, behaviour and institutions in which one class of people are treated differently to others and the material, psychological, symbolic or structural violence that results from such acts of discrimination" (ibid.: 410).

Agenda 2030 document includes within it the rhetoric of "accountability, stakeholder participation, social dialogue and global governance" (Esquivel, 2016). In a critical examination of this rhetoric, Esquivel (2016) illustrates how targets set for different goals do not provide details of analogous accountability mechanisms. Thus, for example, while target 17.17 talks of public–private sector partnerships for development, it makes no mention of how these partnerships will be made transparent and accountable to be able their gauge their effectiveness in addressing the goals for which the partnership was entered into, in the first place. The author is even more critical when discussing Agenda 2030s goal of "empowering all women and girls". To quote Esquivel (2016) in some detail:

> Although genuine empowerment always involves changing unequal power relations, donors and investors tend to favour an apolitical use of the term, in which power relations may actually remain wholly or virtually untouched. When used in this way, the notion of empowerment risks becoming a signifier of righteousness – part of the process of mystification of dominant group interests. In other words, it becomes empowerment without power (emphasis as in original). (ibid.: 14)

It would be in order here to conclude with Marcel's observations. According to her, only half of the feminist revolution has happened. "We have added women and stirred. The next step is to realise what a massive shift this has been… wave economic man off from the platform and then build an economy and a society with room for a greater spectrum of what it means to be a human" (ibid.: 88).

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Chapter 16
Women, the Planned Economy, and the Anticipation of Utopia

V. Geetha

For over a century and more we have grappled with multiple inequalities: from within various anti-caste movements and ideologies that emerged in colonial India, anti-colonial and socialist struggles, and women's movements. In the event, we have straddled disciplines and genres, as we sought to understand how sexuality, labour, family, caste, land, property, and religion are simultaneously conjoined and misaligned and in diverse ways.

I would like to examine one of our earliest efforts at comprehending these inequalities: a document titled, Women's Role in the Planned Economy (WRPE), published on the eve of Indian Independence. It had been commissioned by the National Planning Committee appointed in 1938 by the national movement and began its work in 1939. A special subcommittee was set up to this end, and it defined its concerns in these particular ways: "(a) the family life and organisation, and woman's employment in the house, and the change therein in recent years; (b) marriage and succession and the laws governing these (c) the conditions of industrial employment of women and the protection of working women in mines, factories, plantations, workshops and cottage industries as well as in domestic employment and retail trade (d) social customs and institutions which preclude women from taking her full share in India's planned economy (e) the types and methods of appropriate education to play her due role in household work, in the profession and in social and national services; and (f) any other questions connected therewith" (Women's Role in the Planned Economy, Vora & Co. Publishers Ltd, Bombay, 1947, p. 17).

The completed report made two important claims: it noted that its endeavour was novel; and that while planning was undoubtedly an expression of a scientific, rational progressive attitude towards economic life, when it came to women's lives, human aspects counted in a rather fundamental sense (ibid, p. 29). The report had been prepared keeping this in mind. Secondly, the recommendations outlined in the report

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were made on the understanding that a woman's life was not a cheap imitation of a man's life. Neither was a woman to be viewed as a being who, with babe in arms, wearily followed a man, "striding forward to conquer new worlds": "The picture which we now envisage is that of man and woman, comrades of the road, going forward together, the child joyously shared by both" (ibid, p. 33).

This brisk clarity notwithstanding the report insisted that planning would keep in mind women's role as guardian and trustees of future generations, for a woman was, after all, "a mother of the race" (ibid, p. 39). That is, it made clear it was not asking for an abandonment of the duties of motherhood, but wanted the planned society to ensure that the conditions in which women lived and worked were fair and just and enabled their growth as persons, in every sense of the word, without doing violence to their role as mothers.

This tension in the report between women's role as mothers, and women as economic and social beings, however, was more rhetorical than substantial. It conveyed a dutiful sense of what was expected of women, but in a political and discursive sense the report argued for an extension of women's individuality and autonomy. Thus, it insisted: "Planning, as we understand it, is fundamentally a coordinated effort to raise the National Standard of Life to a higher level. This may partly be done by economic changes; but it requires a sound social structure where the individual is the unit and is assured of his or her fundamental rights" (ibid, p. 28).

Given this, that the social structure as much as the economic structure ought to be transformed, the report comprised two parts: the first part dealt with the economic lives of women and how the ills they suffered in this context needed to be addressed while the second part dealt with matters of law, caste, marriage, widowhood …. Importantly, the first part did not lose sight of all that women endured on account of their familial and social status, and which shaped their work worlds as well. Concerns over childcare (the insistence on the provision of creches), harassment at the work place, the rights that are to be bestowed on children, irrespective of their "legal" status—that is, whether they were born out of wedlock or not—also find their place in this section (ibid, pp. 42–44). The attitude towards the unwed mother is startlingly empathetic, and interestingly, she was not to be discriminated against, and if anything, the man also ought to be brought to a sense of his responsibilities, the report made clear (ibid, pp. 184–185). It was as if the labour of motherhood was being granted its due! The radical potential of this move though is compromised somewhat by the alarmingly eugenicist understanding of social motherhood—that those with "defects" of a kind that would impair reproduction not be allowed to marry or reproduce (ibid, p. 40)!

In the second part, we have economic concerns shadowing social ones, predictably, in discussions to do with prostitution: reflections over what prostitutes might expect to do, once they were coaxed out of their professions, thus, lead onto a discussion of the economics that defined their lives and how they might transit to other forms of livelihood.

While arguments with regard to desirable transformations in the social structure were in keeping with what nationalist women had demanded for a long time—legal reform, with an emphasis on monogamy, right to divorce, equal property rights for

women—the ones to do with women as economic beings appear to bear the influence of a socialist understanding of women's labour, place in the family, and what they deserved by way of equality and dignity in the workplace.

Thus, women's right to work was defined as one that went beyond affirming one's right to "the mere chance of earning a livelihood" and as something to do with the full utilization of a woman's abilities (ibid, p. 45). This latter was seldom realized, and for various reasons, the report noted. For instance, the work that labouring women did—and here the report indexed a range of occupations of "a non-formal nature", including petty vending, home-based production—was seldom visible as such or valued. For one, women's labour in these contexts was viewed in "corporate terms"; that is, it was subsumed in family labours such (ibid, p. 51). This was particularly true of agricultural labour, and this meant that women had "no right on collective gains". Family labour, the report observed, also meant drawing on the unacknowledged work of widows and deserted women in the household (ibid, p. 103). The so-called non-formal sector was viewed as central to social reproduction, with a lot of home-based work having to do with food processing and allied work.

The report also referenced caste-based labour, pointing to how women from certain servile communities were expected to follow and minister to upper-caste women, especially young brides to whose household they were originally attached (ibid, pp. 107–09). Prostitution was also understood in social and religious terms, as sexual labour imposed upon certain castes and communities (ibid, pp. 187–189).

As for the middle classes, the report argued, they appeared to exhibit a half-hearted attitude towards employment. It was clear that communities that do not mind women working or being seen in public while still part of the labouring classes put a moratorium on such work when they aspire towards upward mobility. To work against the grain of such an understanding, it was important to value all forms of labour, besides updating education and offering modern training to all women (ibid, p. 51).

The report placed a value on housework, and since women perform this all important labour, it was argued that she ought to have her due share in the collective income of the family: husbands, it was suggested, ought to pay for their spouses' social insurance from their earnings, and wives were to have shares in their spouses' property (ibid, pp. 103–105). The link between unpaid housework and a general devaluation of women's work was also referenced in the report: because of this, it was noted, women's work was viewed as subsidiary. Further, it was assumed that women were subsidized by what men earn and therefore deserving of a lower wage (ibid, pp. 55–56).

Since women's labour was not granted the recognition it deserved, trade unions too did not appear to think of ways and means to work with them. For one, of course, women were a dispersed labour force, and secondly they were, themselves, not clear as to the social value of women's labour. Thus, if workers were to be laid off, women workers were sent home first, and sometimes trade unions appear to have endorsed such measures (ibid, pp. 114–118). More generally, the report outlined all that trade unions ought to attend to: women's maternity benefit (eventually to be made part of a general social insurance scheme) and an enhanced wage; equal pay for equal

work; provisions for creches, health schemes, housing, and nursery schools; ensure that there were female health inspectors, as well as an educated woman as welfare officer; and most important, the report asked for a replacement of jobbers with a Central Labour Board that would coordinate labour supply for industry (ibid, p. 54).

Interestingly, the economic concerns outlined in the report are not all that different from those featured in subsequent reports, be it the 1974 report prepared by the Committee on the Status of Women or the Shramshakthi report on women in the non-formal sector, released in 1988. What is absent in all reports, though, is the way in which caste and occupational status are linked in diverse ways across the country, especially where women's work is concerned. While all three reports gesture towards this, none really provides an analytical framework that would help us understand the complex articulation of labour, gender, caste, and occupations. The WRPE invokes caste when it addresses the question of a moribund social system and when it argues that the caste order militates against sexual and conjugal freedom, including freedom of choice with respect to marriage. Yet, even as the report agrees that caste must go, it does not really spend time analysing the system as both a system of production, labour control, and of regulated social reproduction.

The 1974 report recognizes immense variation in women's economic lives, grants that social, economic, and religious identities often coalesce to create the peculiar conditions in which women work and live, but does not actually "name" caste (Towards Equality, Report of the Committee on the Status of Women, Report, Ministry of Education and Social Welfare, Department of Social Welfare, Government of India, New Delhi, 1974, pp. 37–83). Shramshakthi is wonderfully detailed, and even as it notes caste and community origins of workers and the ways in which caste status and identity shape labour, yet it does not adopt an adequate analytical argument to comprehend the ways in which labour, poverty gender, and caste are articulated in the economy of the informal sector.

The one report that actually sought to do this was the Kaka Kalelkar report (Report of the Backward Classes Commission, Government of India Press, Shimla, 1955) on the backward classes, which had a separate section on women, and attempted to read their lives through the prisms of both labour and social roles; and in the event, suggested a mix of ameliorative measures, including technical and vocational education, along with provisions for higher education, especially in the field of medicine and the Home Sciences (pp. 31–33). Importantly, the report identified the problem of "backwardness" with the economy and labouring lives of rural India and, in that sense, referenced the labour question as equally central as caste and property in land, when it came to addressing backwardness (pp. 55–80).

Interestingly, none of the reports that were commissioned to throw light on this or that aspect of inequality in the Indian context appeared to have referenced each other. If we are to consider the 1974 report as a case in point: before its time, there was the Kaka Kalelkar report, as well as the L. Elayaperumal Committee report on Untouchability (Report of the Committee on Untouchability, Economic and Educational Development of the Scheduled Castes and connected documents, Department of Social Welfare, 1969) and both referenced women's realities. But they are not referred to or considered germane to their purpose by the writers of the 1974 report.

The Mandal Commission report was released thereafter. Its findings and recommendations, however, have not attracted feminist attention, and so feminist appraisal of the 1974 report has mirrored the curious yet founded inability to discuss caste in relation to women's lives, and not asked questions of its content that would lead to a better appreciation of what it sought to do, and what its constitutive limits were.

On the other hand, what these reports achieved are not to be put aside on account of their sins of omission. That is hardly the point of this argument, and here I shall restrict my remarks to the WRPE report. Its utopianism continues to startle us after all these years, and it seems a good and useful point of departure to begin new conversations to do with women's social and economic lives. It is useful, therefore, to identify the constituent details of this utopianism. While utopian energy permeates the entire report as such, it is particularly charged and present in the dissenting note appended by Kapila Khandwala (WRPE, pp. 22–243). An astonishing piece of writing, its salient observations might be summarized thus.

A woman has to be recognized in her own person, and not in relation to family, kin or community. Her individual rights are, therefore, inalienable. To recognize woman's equality then means that one works against the grain of all that militates against it and thwarts its fruition. The planning committee, therefore, must undertake a thorough critique of the family system and all that it stands for and seeks to undermine its existence. Rather than value family as blood kinship, it must rethink it as a form of associated living by choice. It follows then that women must have the right to partners of their choice and importantly the right to divorce, simply on the grounds of incompatibility or a desire to part ways (in short the dissenting note advocates what we today call non-fault divorce). Further unmarried mothers ought not to lose civic rights. Rights of all workers, including of prostitutes, ought to be respected.

Childcare, care of the elderly, in short all of care work ought to be removed from the provenance of the family and vested in the state. Women workers ought to be compulsorily unionized; additionally, they should represent themselves in the workplace, in workers' councils as much as in political forums. Women ought to have a right to not only all forms of employment but all forms of public office as well. While property rights are important in a normative sense, given the current situation of women's dependence, ultimately all forms of property ought to go, much as the family ought to be transcended.

The dissenting note echoes the spirit of the utopian projects of the nineteenth century: in the early days of capitalism and the beginning of the destruction of the craft guilds, women workers in Britain and on the continent were amongst the first to grasp the significance of the dawn of an age of avarice and possession. They stood with all those utopians—Saint-Simon, Fourier, Robert Owen—and demanded not only a reorganization of manufacture but of the sphere of reproduction as well, calling for a socialization of housework and parenthood. Common kitchens, laundries, communal childcare, and more open conjugal and romantic arrangements were discussed in these circles and continued to inform socialist commonsense, as the workers' movement grew in strength (Sheila Rowabotham, Dear Dr. Marx: A Letter from a Socialist Feminist, Socialist Register, Volume 34: 1998; https://socialistregister.com/index.php/srv/article/view/5698/2594; accessed on 16 November 2019).

This anticipation of Utopia, particularly in the dissenting note but also elsewhere in the document, is intriguing. For one it sits oddly with the rational and scientific temper of planning. Secondly, it insists on rethinking the good and rational society not only in pragmatic terms, but in terms of an expansive vision, of a future that cannot perhaps be had in the here and now, but which, nevertheless, must inform all calculated efforts at social transformation.

In this context, it is interesting that when asked in his 92nd year (1972) of the sort of changes that he wished to see in the years to come, E. V. Ramasamy Periyar, anti-caste thinker and political leader from Madras chuckled and remarked that he would like women to be free of domestic and conjugal relationships, and that it might be a good idea, therefore, to declare marriage a criminal offence! He added that if women were educated and had access to work, they were bound to think of their lives and themselves differently. And if some of them wished to be mothers, they need not be burdened by marriage, but then childcare ought to become the charge of the state. Marriage, motherhood, and family, he indicated, were so constitutive of women's existence that they could not perceive a life outside of these spheres, if they remained yoked to them (Ve. Anaimuthu [Ed.], PeriyarE.Ve.RaSinthanaigal, Volume 6, Part 2, Periyar E. V. Ramasamy-Nagammai Kalvi Aasraichi Arrakkatalai, Chennai, 2009, pp. 4407–4408).

Periyar's movement was invested in practical gains for the non-Brahmins and Dalits and women, and seldom did it give into free fantasy as to what the world of tomorrow might look like. Yet, with regard to the women's question, Periyar took radical positions on almost all matters, from marriage to contraception to citizenship. And this radicalism was tinged with millenarian fervour. It was as if the reimagining of gendered lives and arrangements was choicelessly utopic.

It seems to me that the critique of family and the need for its supersession, however familiar it might seem to those honed in socialist thought, ought to be claimed for another critical purpose: to advance an analysis and argument to do with caste, gender, labour, and the economy. To be sure, feminist economists have worked on the household, on issues to do with subsistence economies, food provisioning, the relatively low caloric intake of girls, maternal mortality rates, the economic burden borne by the girl child, as she drops out of school and a myriad other related issues linked to the sphere of reproduction. Motherhood and the family have been subjects of debate as well.

However in our public thinking on economic policies, we seldom reference the intimate as well as the economic aspects of family or kin networks; neither do we position caste and religious identities and experiences as germane to women's economic life, and if we do, then these are separated out in a section on Dalit or Muslim women. More generally, caste and religion continue to remain "superstructural" in our thought. Also, it is only with the campaigns and struggles against sexual harassment at the work place have we even begun to consider how sexuality structures work spaces as well. While we have attempted to link sexuality and economics in discussions of sex work, the onus in those debates too has been the destigmatization of sexual labour, and a struggle with the legal definitions of trafficking, sexual

content, and related matters. The manner in which the terrains of sexuality, work, caste, and religion interact has seldom held our critical attention.

This remarkable 1940s document presents us with an alternative approach to thinking through the social, sexual, and economic lives of women, including the importance of adopting caste as a primary analytical category. In this sense, it might well be a good and useful point of departure for reflecting on a history of ideas that has shaped economic thought, and to carry forward that history into the present, where it stands to be both inherited and challenged. If we are to consider the WRPE document a useful piece of feminist heritage, then its limits, tensions, and great creative sprawl demand a re-reading and reclaiming.

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