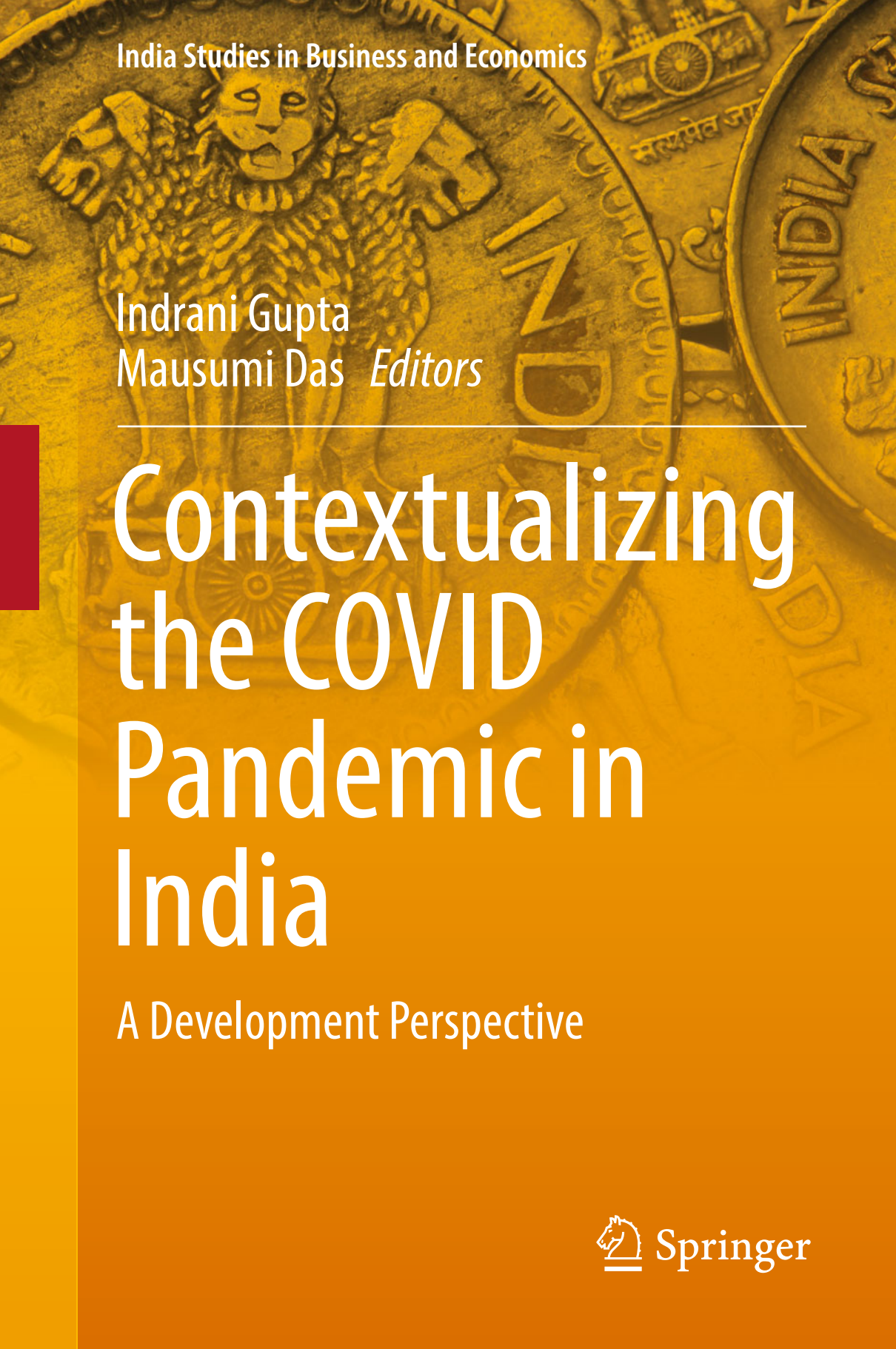
India Studies in Business and Economics
Indrani Gupta
Mausumi Das Editors
Contextualizing the COVID Pandemic in India
A Development Perspective
Springer

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Editors

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Foreword

The COVID-19 pandemic that crept up on us, silently, at the end of 2019, and soon became a visible, global pandemic, and was declared as such by the World Health Organization in March 2020, is one of the most traumatic health events of humanity in recent history. It is the largest pandemic since the Great Influenza Epidemic of 1918–20, popularly known as the Spanish Flu. The COVID-19 pandemic's arrival and rapid escalation, with more than 6.9 million lives lost (the number is still rising as I write), in our modern world with so much scientific expertise, is a humbling experience. It happened as we were beginning to believe that such episodes are part of history. Caught by surprise, we are now struggling to understand the science of the virus, how it appears and spreads, and how it can be contained.

In the long history of humanity, there have been many epidemics, and some much larger, in many dimensions, than the current one. What is special this time and may have no parallel in the past is the manner in which we responded to it and its resultant impact on the economy. Despite the many initial uncertainties and doubts, we have responded to the pandemic with huge collective measures, at the level of national governments, and even global, inter-governmental organizations, such as top-down orders and nudges to stop non-essential work, travel bans, school closures, and halting of ships from docking and off-loading goods and people.

All this kept the incidence of infection and COVID-19 mortality lower than what may have happened otherwise, but it also meant that the pandemic had a disproportionate effect on the world's economy, international trade, and labor markets. The global GDP declined 3.3% in 2020, with some countries, like India, witnessing much larger declines in GDP. Unemployment shot up worldwide, and there is talk now of this having permanent effects on labor markets in the form of the Great Resignation, leading to disruptions in seemingly unrelated markets and sectoral shortages of work and supply-chain disruptions.

For this very reason, strange though it may seem, the pandemic provides us with an opportunity, of a kind we never had before, to understand the interface between economics and large-scale medical upheavals. This being the age of big data we have information at a level and of dimensions we never had before. What effect does a pandemic have on the economy, international trade, labor market, and the level of

inequality? What kinds of policies can we use to respond to them when they happen? And what precautions can we take to insulate ourselves in advance, even before a pandemic hits? The data and our enhanced scientific ability allow us to take on these big questions.

These are precisely the kinds of questions that this book is concerned with. The book, edited by Indrani Gupta and Mausumi Das, is an important and timely contribution to the interface between health and medicine, on the one hand, and economics and policymaking, on the other. The book is written from the perspective of the Indian experience. The chapters, authored by prominent economists with different specializations, dissect India's experience with the pandemic, over the last 3 years, and try to enhance our understanding of how to respond, in terms of economic policy, to such a crisis in future.

Given the size of India (by all estimates, India's population overtook that of China's earlier this year) and given that India is an emerging economy that mirrors challenges faced in many parts of the world, the book should be of wide interest, especially in developing and emerging economies in the Americas, Africa, and Asia.

The economic impact of the pandemic in India was large. As pointed out in the book, India's economy was witnessing a slowdown even before the pandemic. This, coupled with the very poorly organized lockdown, dealt a disproportionate negative shock to the Indian economy. India's GDP shrank by a staggering 5.8% in 2020–21, and unemployment, and especially youth unemployment, spiked.

On the plus side, India has long had a successful vaccination program and was quick to respond with widespread vaccination in response to the new virus. It also has a large pharmaceutical sector that began researching and producing vaccines. All this makes India's experience varied and of wide interest.

The book ranges over a vast array of topics, from the overall macroeconomic impact and fiscal and monetary response, the effect on the financial sector, and nationwide vaccination drives, to more microeconomic matters like the effect on labor markets, gender-specific impacts, the disruption of education and effect on learning, the connection between under and over nutrition and health risk, and the role of trust in the effectiveness of government intervention. We learn, for instance, that there were big differences in the drop in employment across different groups. The largest employment declines were suffered by Scheduled Caste or Dalit men, followed by Scheduled Tribes. Upper-caste men suffered the least.

Many of the lessons discussed in the book have big long-run implications. Take, for instance, education. The long closure of schools has inevitably done big damage to the acquisition of human capital, and this will likely widen the chasm between the rich and the poor. The switch to online education may have been fine for the children of the rich and the middle classes, with their computers, laptops, and iPads at home. But for the vast numbers of poor and low-income families, this meant, plain and simple, a halt to education for more than 1 year. We know that, in some of the poorer states, up to 80% of the teachers did not have access to the technology needed for long-distance teaching. As noted in this book, in some of the poorer states in India, less than 10% of schools have internet facilities. All this will no doubt impact the

acquisition of human capital for a large segment of India's population and impair their ability to earn when they become adults.

On the other hand, the pandemic turned out to be a period of learning-by-doing in terms of technology. We have all learned to give and attend lectures and classes and participate in meetings via Zoom and other digital devices. Technology usually takes a lot of time to permeate through society. Thanks to the COVID-19 pandemic, we have been forced to master in record time a lot of new digital technology that was available but was not being used. This will have a big impact on the trajectory of the global economy and growth.

An important contribution of this collection is that it addresses some important underlying issues that at first sight look rather abstract and far-removed from our daily concerns, but an understanding of these is likely to have long-term benefits. I am referring here to matters that go beyond mainstream economics, such as social identities, for instance, pertaining to caste and religion, social norms, and the role of trust. Trust, as an invisible driver of economic efficiency and growth has been written about extensively. However, the role of trust in policymaking and in the relation between government and the citizenry has received much less attention. As the chapter on vaccination hesitancy documents, there are great variations in hesitancy about vaccination among the people across India and much of it relates to the level of trust in medical professionals. The description of a theoretical model, later in the book on the role of trust in making government more effective, helps the book shed light on the role of institutions in making policy more effective.

My hope is the book will not just help us understand better the challenges faced by the economy during this pandemic, but spur economists and epidemiologists to explore new ideas, and take on new research in the field of health and economics.

Kaushik Basu
Cornell University
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Indrani Gupta is Professor and Head of the Health Policy Research Unit (HPRU) of the Institute of Economic Growth (IEG). She received her PhD in Economics from the University of Maryland, USA. Prof Gupta's work experience has been diverse, including teaching and academic institutes, the World Bank and the Government of India. Her areas of interest cover a wide range of topics in the area of health economics and policy, and include demand for health and health care, health financing and coverage, poverty and health, costing and cost-effectiveness and economics of diseases.

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Chapter 1
Impact of Covid-19 on Macroeconomic Developments: Recession, Recovery and Assessment

Manoj Panda

Abstract This chapter examines the macroeconomic developments covering the recession and recovery in India during Covid-19. It begins with a brief introduction of the global environment since the outbreak of Covid-19 and the spread of the pandemic during March 2020 to March 2023. It discusses the closure of production units following the lockdown and the government's policy response to ameliorate the adverse effects. It examines the macroeconomic developments during fiscal 2020–21, the year of recession when GDP witnessed an absolute fall by 5.7%. It documents the impact of recession on sectoral value added, unemployment, consumption, investment, fiscal and trade parameters during the recession. It also briefly describes the movements of these variables during 2021–22, the year of recovery and 2022–23, the year of global conflict. Next, the chapter makes an assessment of the policy measures and the likely impact of recession on different income groups and incidence of poverty. It hints at reorienting certain macroeconomic and human development policies to equip the economy and the people to meet a pandemic like situation in future.

Keywords COVID-19 · GDP · Recession · Recovery · Inflation · Unemployment

Thanks are due to Mahendra Dev, A. Ganesh-Kumar, Amrita Ghatak and Ashima Goyal for conversation on some of the points. The author alone is responsible for the views and errors, if any.

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1.1 Introduction

1.1.1 Global Environment

It is now a little more than three years since the outbreak of Covid-19 that was declared as a pandemic by the World Health Organization in March 2020. With more than 763 million reported cases and 6.8 million deaths globally by early April 2023, the pandemic has turned out to be one of the deadliest events in human history. Most of the countries enforced lockdowns of varying length and intensity prohibiting movement of people and closing down production units for months. The worldwide health crisis caused by the virus induced the deepest global recession since the end of World War II and the global economy witnessed an absolute contraction of 3.3% in the year 2020.[1] Fortunately, the scientific community succeeded in developing vaccines towards the end of 2020. Although the virus is still spreading in April 2023, the effect has become milder in a large part of the world due to vaccination of a sizeable proportion of the population and development of natural immunity in human bodies. The year 2021 saw economic activities resuming gradually and global GDP recovered with a growth of 6.0% in 2021.

In the beginning of 2022, there was optimism about a strong prospect for high global growth at 5.8%. Possibility of inflation due to accommodative stand during Covid was expected to be fought by tightening monetary conditions. The Soviet–Ukraine war in Europe, however, soon changed the scenario to lower growth and higher inflation compared to those expected earlier. The global supply disruptions for commodities compounded by sanctions against Russia led to fuel and food shortages. A high inflation rate not seen for four decades was fought with continuous raising of interest rates by the Federal Reserve System in the United States causing capital flight to home country. In a globalized financial system, several other major economies were left with no choice but to follow the high interest rate regime of the US. Failure of Silicon Valley Bank, a medium sized bank in the US and loss of confidence in Credit Suisse, a major global investment bank, created turmoil in the financial market, though regulators controlled the crisis swiftly in both cases. These developments had adverse effects on global economic growth and the IMF brought down its global growth estimate to 3.4% growth for 2022 and predicts 2.8% in 2023. Global inflation was high at 8.7% in 2022 and is likely to be 7.0% in 2023 as against 4.7% in 2021. World trade volume grew by 5.1% in 2022 and is expected to rise by 2.4% in 2023. Re-emergence of Covid in the first quarter of 2023 in several major economies has added to the uncertain environment.

Against this backdrop, this chapter examines the macroeconomic developments covering the recession and recovery in India during the Covid years and the challenges ahead to better equip India to meet emergency situations such as Covid and international conflict. Section 1.2 briefly traces the spread of the virus in India during

[1] The global numbers here are from International Monetary Fund's World Economic Outlook, October, 2022 and April, 2023.

March 2020 to March 2023. Section 1.3 examines the macroeconomic developments during the recession in the financial year 2020–21, recovery in 2021–22 and global conflict in 2022–23. The focus of discussion of this chapter is the year 2020–21 when the major impacts of Covid were felt. The years of recovery and the conflict are covered in brief. Section 1.4 deals with an assessment and future challenges. Finally, Sect. 1.5 concludes.

1.2 The Spread of COVID-19 in India

Covid-19 was detected in India in the last week of January 2020 and started spreading rapidly towards mid-March 2020. The daily new cases of infection depicted in Fig. 1.1 below clearly indicate three major waves of varying intensity lasting for a few months each over a period of 3 years since March 2020. The daily cases peaked at over 41,000 in May 2021 during the second wave followed by another peak at 34,000 in January 2022. Total cumulative reported cases in India have been 44.7 million compared to the global total of 761.4 million by March 2023. Of the total affected, 98.8% recovered and the reported fatality rate of 1.2% is a bit above the global average of 0.9%.[2] The 7-day rolling average of affected cases has varied between 100 and 1500 during December 2022 and March 2023 and the prevalence of the virus has possibly taken an endemic form. More than half a million lives have been lost due to the virus. Large section of surviving lives faced unprecedented difficulties and challenges.

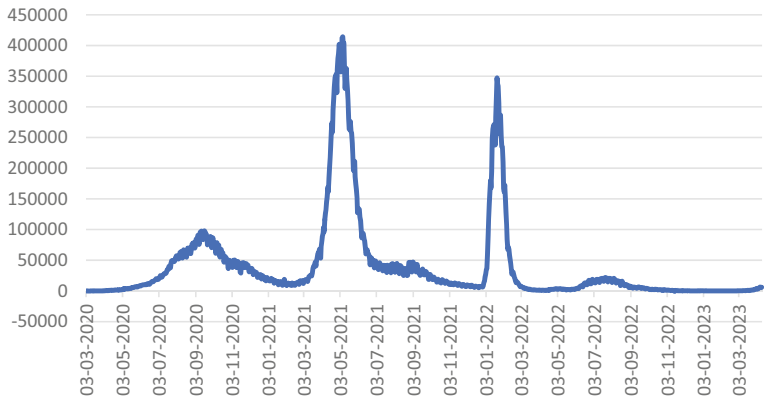

Fig. 1.1 Daily Covid cases in India. *Source* Author's graph based on WHO database

[2] According to an estimate made by WHO, excess mortality during the Covid period was at least 3.3 million as against 1.8 million reported Covid mortality in 2020. It indicates total number of deaths during the pandemic compared to those expected under normal conditions and thus includes deaths directly due to the virus and indirectly due to disruptions in essential health services, travel restrictions, reduced affordability etc. (https://www.who.int/data/stories/the-true-death-toll-of-covid-19-estimating-global-excess-mortality).

In order to contain the rapid spread, a nation-wide lockdown was announced in India during March 25 to May 31 in 2020 which involved closure of all workplaces except permitted essential services and agricultural activities. The lockdown was strict in the beginning but gradual relaxation later led to reopening of economic activities in a phased manner, though local restrictions in select containment zones continued. In the initial weeks of the strict lockdown, migrant workers started returning to their homes due to lack of job and limited income support by the employers. In the absence of normal transport facilities, some inter-state migrants walked hundreds of miles to reach their homes in other states. The size of this reverse migration was beyond expectation by the administration which responded late for making adequate arrangements.

Different variants of the virus evolved due to mutation, which spread at varying speeds. Both infection and death rates were larger during the second wave in March–June 2021 raising concerns regarding shortage in medicines and oxygen supply. A health crisis of this nature and scale had not been seen in living memory. There was no nation-wide lockdown during the second wave, but state and local governments declared containment zones depending on the extent of infection in various localities. Industrial and commercial enterprises were also prepared to deal with local lockdowns by the time the second wave arrived. As a result, the second wave was not as damaging to the economy as the first one.

This deadly wave was successfully tackled within a few months. The Central and the state governments had to manage a huge task in which they did not have earlier experience. It was a learning exercise even for the health care workers who risked their lives. The densely populated urban slums were a major challenge to prevent rapid rise in infections.

The scientific community soon succeeded in developing vaccines to fight the disease. In the first week of January 2021, the Indian drug regulating agency permitted the emergency use of two vaccines: Covishield[3] and Covaxin[4] produced by two Indian companies. Government of India decided to supply the vaccines free of cost to priority groups such as those engaged in health care and other essential services, and senior citizens. After about 3 months, all adults were eligible to take the vaccine and open market sale at regulated price was permitted. The internet-driven Aadhar identity cards supplied to citizens were a big help in monitoring the vaccination process. There was possibly some avoidable delay in Indian policy decision on the availability of the vaccines compared to some other countries in its peer group. Finally, the vaccination process turned out to be a successful and affordable one. By March 2023, as many as 220 crore vaccines have been administered either as a first or second dose according to government statistics. This was no small achievement in a country of 140 crore population with most of the population living in rural areas. Vaccination generally

[3] The Oxford–AstraZeneca developed Covishield vaccine was produced by the Serum Institute of India (SII) that is credited with production of the world's largest number of doses of different vaccines used in 170 countries.

[4] Covaxin was indigenously developed by an Indian firm Bharat Biotech in collaboration with the Indian Council of Medical Research and the National Institute of Virology.

prevented the disease and, in some cases where it did not prevent the infection, it limited the intensity of the disease. People also developed some kind of natural immunity over time. As restrictions were gradually removed, economic and social activities resumed in a limited manner after the first wave and became more or less normal in many spheres by mid-2022 except for a few touch-intensive non-essential activities.

1.3 Macroeconomic Impact

During the lockdown and local restrictions, the lifestyle as well as workstyle of people got distinctly changed due to confinement at home involving only limited permissible mobility. All economic activities came to a standstill during April–May of 2020 except for some essential services like health care, food supply, water, electricity, banks and law and order. Almost the entire information technology related sectors provided facilities for work from home (WFH) to employees. Other sectors like government and private offices, schools and other educational institutions followed WFH quickly. Several retail shops and restaurants adopted delivery at home mode during the restrictions and many continued even after the restrictions were removed. Online purchases saw many-fold expansion in urban and rural areas.

The society as well as the economy were hard hit posing challenges to both lives and livelihoods. As elsewhere, Indian policy makers too had to make a difficult choice on the trade-off between lockdown and livelihood. Absence of lockdown increased the risk of virus infection, associated health costs, and risk of fatality, while sacrifice of livelihood meant severe economic costs for different sections which in turn might include higher morbidity and mortality. After the experience of the strict lockdown for over two months till May 2020, Government of India revealed its preference on life versus livelihood trade-offs by gradually relaxing the lockdown and shifting from nation-wide lockdown to local confinement zones in the hotspots. Apart from encouraging economic activities, the gradual exposure helped in building up of natural immunity of the people.

The major macroeconomic impact of the pandemic could be traced by examining the linkages of the key macroeconomic variables as depicted in Fig. 1.2. The lockdown due to the pandemic led to closure of the production units except for essential services. It meant workers losing their jobs or working at a lower remuneration in many sectors and got reflected in fall in income of households providing labour or capital services. Fall in income led to reduced consumption demand which in turn led to reduction in capacity utilization and investment outlay. Prices of goods and services were the result of interaction of supply (domestic production and imports) and demand (consumption, investment and exports).

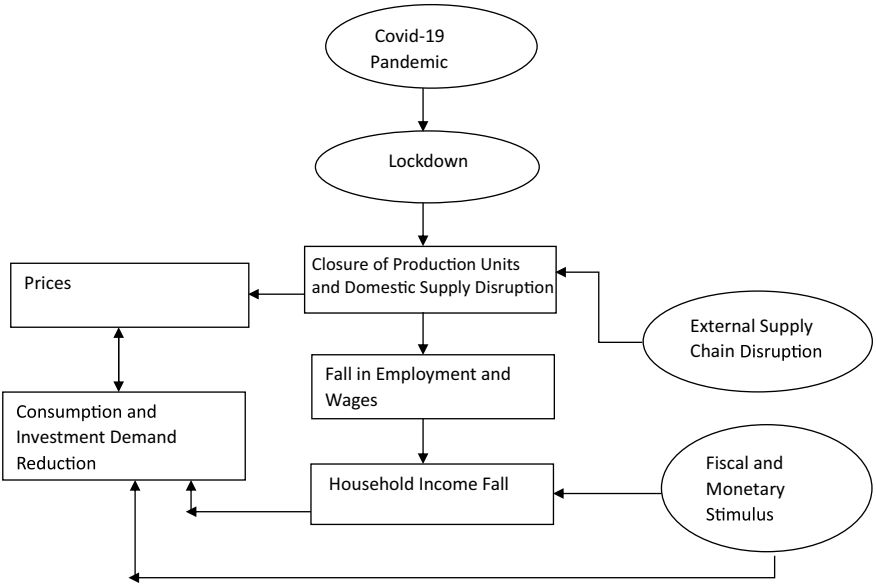

Fig. 1.2 Flow Diagram indicating major effects of lockdown

1.3.1 Recession

Prior to the pandemic, the Indian economy was already in a slow-down mode for a few years due to sluggish investment and exports (Fig. 1.3). Under this situation, the health emergency due to Covid and the consequent strict lockdown had grave adverse effects on the economy. India recorded a contraction in GDP by −5.7% in the 2020–21 fiscal year.[5] There were substantial variations in GDP growth from one quarter to another directly related to the intensity of the lockdown across quarters. GDP contraction was severe by −24.4% (year-on-year) in Q1 2020–21 and moderated to −7.4% in the following quarter. Economic growth reverted to a positive zone in the second half of 2020–21 with 0.5% in Q3 and 1.6% in Q4. Obviously, the stricter the lockdown was, the worse was the GDP impact. India turned out to be one of the worst cases in terms of GDP loss in the quarter of April–June 2020.[6] By cross country comparison, apart from India, Argentina, Italy and United Kingdom experienced large contractions in GDP due to stringent lockdowns during this period, though China and Turkey stood out as exceptions to this rule.

[5] Fiscal year 2020–21 refers to April 2020–March 2021 in India and so on.

[6] See, for example, Report on Currency and Finance (RBI, 2022).

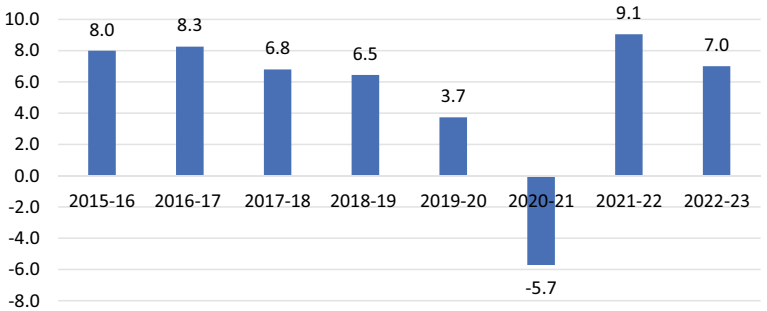

Fig. 1.3 Real GDP Growth Rate in India since 2015–16. *Note* 2nd revised estimate for 2020–21; 1st revised estimate for 2021–22 and 2nd advanced estimate for 2022–23. *Source* Author's graph based on data from the National Statistical Office

1.3.2 Policy Measures

As elsewhere, several measures were adopted in India by the Cetral and State governments and the Reserve Bank of India (RBI) to provide support to different vulnerable sections of people and save the economy from collapsing. Soon after the imposition of the lockdown, the Central government announced a Rs. 1.7 trillion (0.85% of GDP) package in the last week of March 2020 to provide safety net for the poor and the unorganized workers who were likely to be the most affected due to the lockdown. The RBI ensured liquidity by reducing policy rates and cash reserve requirements considerably. As the pandemic persisted, the package of measures was progressively widened in the following months. In May 2020, the Finance Minister announced a package referred to as *Atmanirbhar Bharat*[7] or Self-reliant India. It was more comprehensive on both fiscal and monetary measures and contained elements of even economic reforms. Some key features of the measures are[8]:

1. A safety net programme called the Pradhan Mantri Garib Kalyan Yojana (the Prime Minister's Plan for Welfare of the Poor) was to help the poor with food and some money in their hands for meeting other basic needs. It included, among other things, (a) free distribution of 5 kg wheat or rice and 1 kg of pulses every month to 80 crore ration card holders in addition to their entitlements under National Food Security Act (NFSA)[9] to draw ration at subsidized rate, (b) some monetary benefits to old age pensioners and widows, (c) extension of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) to include migrant

[7] During the pandemic, the phrase *Atmanirbhar* has been used in a wider sense of referring to policies to offset the economic impact of Covid by food distribution, production and distribution of vaccines and personal protection equipment (PPE) for health care workers. It was also used at times for new initiatives in areas like industry, education and defence.

[8] Dev and Sengupta (2022) describe the policy measures in greater details.

[9] NFSA was enacted in 2013 with a target to cover 62% of India's population. In 2020, 80 crore ration card holders constituted 58% of total population.

workers with additional allocation of Rs. 922 billion, (d) liberal insurance for health workers, and (e) budgetary allocation for certain relief to informal sector workers.

2. A second set of measures was meant for helping certain economic activities and contained (a) credit guarantee for collateral-free bank loans of Rs 3 trillion to micro, small, and medium enterprises (MSMEs), (b) government investment of Rs. 100 billion in funds that in turn would invest Rs. 500 billion in equity capital of MSMEs, (c) micro food enterprises needing technical upgradation to attain food standards, (d) development of fishing harbours, cold chain and market infrastructure, (e) improvement of infrastructure for cattle feed, fishing harbours, cold chain, and markets; (f) bearing part of the provident fund cost of MSME employees, and (g) a partial credit guarantee for non-banking financial companies where the government would bear the first 20% of loss. Budgetary allocations were also made to support several schemes related to agriculture and allied sectors such as agricultural and husbandry infrastructure, fishermen development, animal disease control plan, herbal cultivation, beekeeping, and supply chain for fruits and vegetables.
3. A reform package was also announced involving amendments to essential commodities act to enable better price realization by producers and promote competition in the agricultural market. The farming community in Northern India apprehended that government would eventually withdraw from procurement of food grains at minimum support price being implemented through Agricultural Produce Market Committee and went on protest for several months. Finally, the agricultural market reform measure was not implemented.
4. The Government further enhanced support measures during the second wave for safety net to vulnerable sections of the population and for reviving various economic activities to help growth and generate employment. Though the nature of relief measures were similar to earlier period, the overall package of Rs. 6.3 trillion was larger than that announced earlier.
5. The state governments on their part were responsible for ensuring food distribution, transferring cash to the vulnerable groups, providing medical services to the covid patients, building up of additional health infrastructure and supplying essential goods in the market. They also topped up the relief package as per the need of the states and took decisions on local containment zones.
6. In addition to the fiscal measures, the Reserve Bank of India (RBI) announced monetary policy measures to preserve financial stability. These measures included reduction in repo rate, reverse repo rate, and cash reserve ratio in order to inject liquidity in the system. RBI also deferred payment of interest on working capital and permitted banks to decide on moratorium on payment of instalments on loans. These monetary measures amounting to about 8% of GDP provided relief to stressed business and individuals during the lockdown.

1.3.3 Sectoral Growth

Turning to sectoral breakdown of GDP growth, two sectors that witnessed positive growth in 2020–21 are (i) agriculture and allied 3.3%, (ii) finance, real estate and professional services 2.2% (Table 1.1). Agriculture and banks were treated as essential services and large segments of professional services related to information technology could work from home or anywhere. Sectors most adversely affected were trade, hotels, transport and communication at −20%. Growth dropped considerably in two labour intensive sectors: textiles, apparel and leather products by −18.4%, and construction by −7.3%. Contact intensive sectors like tourism were hard hit and did not fully recover even by the end of 2022.

1.3.4 State-Wise Variations

Fall in income was regionally widespread. Percentage change in real gross state domestic product (GSDP) for major states[10] in India in 2020–21 depicted in Fig. 1.4 shows that most of the state economies contracted by 4%–6% in 2020–21. The southern state of Kerala and western state of Maharashtra experienced the highest fall in income at −9.2% and −7.6% respectively. As may be seen from the figure, three major states—West Bengal, Tamil Nadu and Andhra Pradesh—succeeded in preventing a fall in their state income and recorded marginally positive growth. Factors accounting for inter-state variations included incidence of infection, strictness of movement restrictions, extent of work from home facilities and share of exempted sectors in GSDP.

1.3.5 Unemployment

Returning to the national level, the lockdown and uncertainty created by the Covid resulted in rise in the unemployment rate. Quarterly urban unemployment rate depicted in Fig. 1.5 shows that unemployment rate rose to a record 21% for both males and females during the quarter from April to June 2020. It started falling thereafter but rose again during the second wave by 3–4 percentage points. It remained high for almost two years. The livelihood problem was thus acute for a large segment of labour force participants. However, PLFS annual unemployment data available for both rural and urban areas in Table 1.2 do not indicate such a rise primarily because most people cannot afford to remain unemployed for 'most part of the year'.

[10] These major states account for 98% of the total income.

Table 1.1 Sectoral real growth in gross value added

	Sector	Annual growth rate (%)				
		2018–19	2019–20	2020–21	2021–22 (1st revised estimate)	2022–23 (2nd advanced estimate)
1	Agriculture, forestry, and fishing	2.1	5.5	3.3	3.5	3.3
2	Mining And Quarrying	−0.8	−1.5	−8.6	7.1	3.4
3	Manufacturing	5.4	−2.9	−0.6	11.1	0.6
3.1	Food products, beverages and tobacco	20.7	−4.1	3.7	n.a	n.a
3.2	Textiles, apparel and leather products	6.8	−2.1	−18.4	n.a	n.a
3.3	Metal products	2.1	−0.9	1.8	n.a	n.a
3.4	Machinery and equipment	8.9	−4.5	−6.3	n.a	n.a
3.5	Other manufactured goods	0.2	−2.5	7.2	n.a	n.a
4	electricity, gas and water supply	7.9	2.2	−3.6	9.9	9.2
5	Construction	6.5	1.2	−7.3	14.8	9.1
6	Trade, hotel, transport and communication	7.2	5.9	−20.2	13.8	14.2
7	Financial, real estate and professional service	7.0	6.7	2.2	4.7	6.9
8	Public administration, defence and other services	7.5	6.3	−5.5	9.7	7.1
9	Gross value added (at basic prices)	5.8	3.8	−4.8	8.8	6.6
	Gross domestic product (GDP)	6.4	3.7	−6.6	9.1	7.0

Source National Statistical Office, 2022: National Accounts Statistics (https://mospi.gov.in/publication/national-accounts-statistics-2022) and NSO, 2023: Second Advance Estimate for 2023–24; n.a. indicates not available (as of March 2023)

1.3.6 Consumption and Investment

The income and employment loss led to contraction in absolute terms in all components of domestic final demand—private consumption, government consumption, and investment in 2020–21 (Fig. 1.6). Government consumption contraction was the least by less than half a percent. Overall private consumption fell by more than 5%,

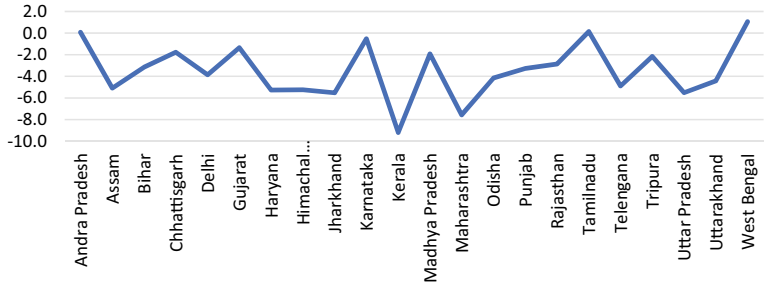

Fig. 1.4 Growth in Gross State Domestic Product in Major Indian States in 2020–21 (%). *Source* Reserve Bank of India

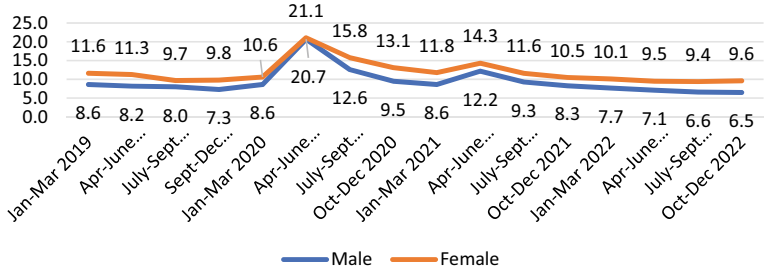

Fig. 1.5 Unemployment rate: urban 2019–2022 (for 15 years and above; current weekly status). *Source* Author's graph based on data from Periodic Labour Force Survey (PLFS) Quarterly Bulletin (MoSPI)

Table 1.2 Unemployment rate for 15 years and above

	Male	Female	Person
2017–18	6.1	5.6	6.0
2018–19	6.0	5.1	5.8
2019–20	5.0	4.2	4.8
2020–21	4.5	3.5	4.2
2021–22	4.4	3.3	4.1

Source PLFS Annual Report 2021–22

though the low-income groups were protected to some extent by free food distribution. Gross investment contracted by above 8% due to closure of construction activities and uncertainty in demand. Gradual revival of sales in housing market was aided by low interest rates, discounts and lower stamp duty.[11]

While real private consumption expenditure dropped, household savings rose. Financial savings of households increased by one-third from Rs. 24 lakh crore to 32 lakh crore in the form of currency, bank deposits and insurance. Precautionary motive

[11] See, RBI annual Report 2020–21 for more details.

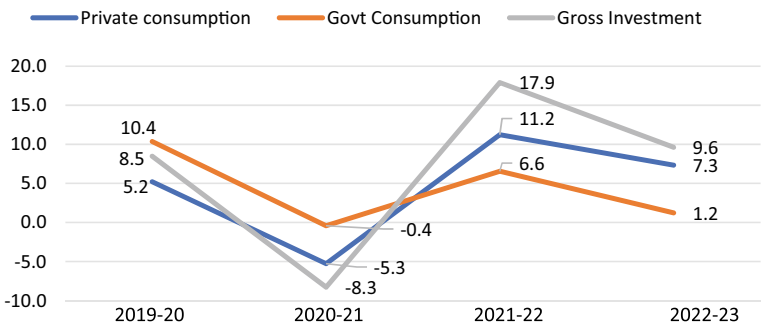

Fig. 1.6 Annual real growth in consumption and investment (%). *Source* Author's graph based on data from National Statistical Office Feb 2023

to hold liquidity for job uncertainty and possibility of sudden health-related expenditure dominated household behaviour during the pandemic. A section of population that did not experience income loss had reduced opportunity to incur discretionary expenditure. Government capital expenditure, which fell in the first half of 2020–21, rose substantially in the second half.

1.3.7 Foreign Trade

In the external sector, merchandise exports fell to USD 292 billion in 2020–21 from 313 billion in 2019–20 (Fig. 1.7). A sharper fall in imports compared to exports had a positive effect on narrowing down the trade deficit in 2020–21. Merchandise trade activities were directly affected by restrictions imposed in the home country as well as those in partner countries. Service exports, especially those related to information technology, have shown resilience and have been a source of support for the overall balance of payments. But travel and transportation restrictions resulted in a fall of exports and imports of other services. Loss of jobs for Indians working abroad in host countries, particularly in Gulf countries, affected inward remittance income during the pandemic.

1.3.8 Fiscal Parameters

On the fiscal front, government revenue receipts as a proportion of GDP of the Central government as well as consolidated governments of Centre and States fell implying revenue contracted to a larger extent than GDP. Total expenditure by the Central government rose by 4.3% of GDP to reach 17.7% in 2020–21 and total disbursement of Centre and states together rose by 5.1% of GDP. This got reflected in a rise in

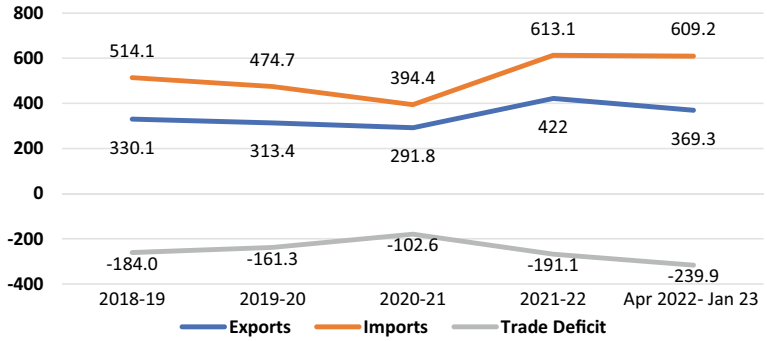

Fig. 1.7 Merchandise exports and imports (USD billion). Economic Survey and Press Information Bureau (for 2022–23)

fiscal deficit of the Central government by 4.5% to touch 9.2%, while consolidated deficit was as high as 13.1% of GDP.

1.3.9 Inflation

CPI inflation for the year 2020–21 was 6.2% driven by food as well as non-food prices due to several factors such as panic purchase during lockdown, supply disruptions, transport cost, and non-availability of labour prevailing from time to time. The month-to-month variation in prices was large in both upward and downward directions (Fig. 1.8). The average prices remained above 6% for several months after the breakout of the Covid, came down below 6% after November 2020, and started rising again after October 2021. There were even distress sales for certain items like poultry and products for a few months due to rumours in social media of association with the virus. The RBI reduced the policy repo rate from 5.15 to 3.35% during March and May 2020 to contain the financial distress of citizens and enterprises which provided stability in the monetary system. The cash reserve ratio, which had remained unchanged for 8 years, was lowered by 1 percentage point to inject liquidity.

1.3.10 Recovery in 2021–22

The containment of the virus supported by fiscal and monetary policies helped in the recovery of the aggregate economy in FY 2021–22. Growth in aggregate economic activities as measured by the GDP turned out to be 9.1% (Fig. 1.3) which meant that GDP more than recovered the pre-pandemic level in 2019–20. Agriculture and allied sectors recorded a 3.5% growth in 2021–22 and food grains production reached

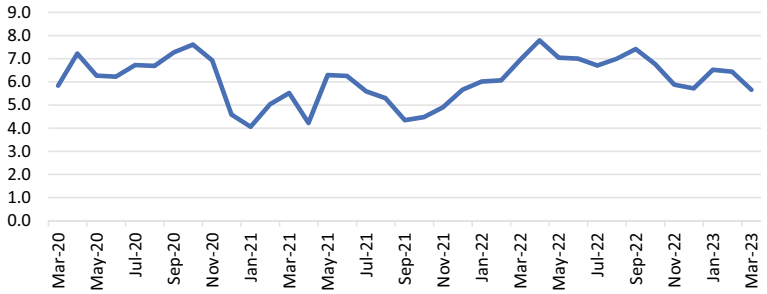

Fig. 1.8 Consumer price inflation (rural and urban combined)

a record 315 million tons. Manufacturing value added grew by 11.1% growth in 2021–22 after 2 years of negative growth (Table 1.1). Other sectors which led the recovery are construction (14.8%) and trade, hotel, transport and communication (13.8%). Normalcy did not fully return to the contact-intensive sectors like tourism and discretionary consumption spending revived slowly. Available GSDP data for major states shows that several states like Andhra Pradesh, Bihar, Madhya Pradesh, Odisha, Rajasthan, and Telangana recorded double-digit growth in 2021–22.[12]

Gross investment grew by 17.9% in 2021–22 after experiencing negative growth in the previous year (Fig. 1.6). Exports picked up to USD 422 billion in 2021–22 from USD 292 billion in 2020–21 (Fig. 1.7). Imports, however, grew by a larger amount from 394 to 613 billion, thus nearly doubling the trade gap. The governments attempted to restore fiscal balance slowly. An additional revenue receipt of 2.7% of GDP and expenditure reduction of 0.6% contributed to fiscal deficit reduction from 13.1% of GDP in 2020–21 to 10.3% in 2021–22 for Centre and states together (Table 1.4).

CPI inflation was 5.5% for the year as a whole in 2021–22. In the last quarter, it exceeded the upper bound of 6% assigned to the Monetary Policy Committee (MPC). But, in order to revive growth, the MPC maintained the status quo on the policy repo rate as well as an accommodative stance.

1.3.11 Global Conflict 2022–23

According to virologists, a virus normally takes an endemic form after about 3 years and Covid too was thought to be tending towards that stage by many experts in public forums. However, its recurrence tendency in late 2022 and early 2023 in some countries again caused concerns leading to lockdowns, especially in China, and reminded us that the virus might remain a mild disruptor for some more time. But the global growth scenario saw new problems triggered by the Russia–Ukraine war in 2022. Both the pandemic and the war compounded the problems in global

[12] RBI (2022): Handbook of Statistics on Economies of States.

Table 1.4 Fiscal parameters of central government and consolidated government (% of GDP)

Items	2018–19	2019–20	2020–21	2021–22	2022–23 (provisional)	2023–24 (BE)
Central government						
Revenue receipts	8.2	8.4	8.3	9.2	8.5	8.7
Tax revenue (net of states' share)	7.0	6.8	7.2	7.7	7.5	7.7
Total expenditure	12.3	13.4	17.7	16.0	15.3	14.9
Revenue expenditure	10.6	11.7	15.6	13.5	12.4	11.6
Capital expenditure	1.6	1.7	2.2	2.5	2.9	3.3
Fiscal deficit	3.4	4.7	9.2	6.7	6.4	5.9
Central and state governments						
Revenue receipts	20.0	19.2	18.6	20.7	21.3	n.a
Tax receipts	17.3	16.1	16.1	17.0	17.6	n.a
Non-tax receipts	2.7	3.1	2.5	3.7	3.7	n.a
Capital receipts	6.5	9.4	13.7	9.7	9.5	n.a
Total disbursements	26.6	27.0	32.1	31.5	31.0	n.a
Gross fiscal deficit	5.8	7.2	13.1	10.3	9.4	n.a

Economic Survey 2022–23 and Budget 2023–24. Combined state data for 2023–24 are not yet available

supply chain during the year. Rise in fuel and food prices due to trade disruptions caused concerns about the cost of living in many parts of the world. Several developed economies persistently experienced high inflation rates after about 4 decades of low inflation regime. International organizations monitoring global growth scenarios are pessimistic about global growth for the next two years, 2023 and 2024.

Advanced official estimate[13] for India is hopeful that GDP is likely to grow at 7.0% in 2022–23 (Fig. 1.3). Other agencies like IMF, World Bank and RBI predict the GDP to grow between 5.9% and 6.8% for the year as a whole. This meant that GDP is expected to expand in 2022–23 at around the pre-Covid trend despite the disruptions. The war seems to have affected the Indian economy with a lag since growth in second half of the financial year is estimated to be 4.5% i.e., less than half of 9.4% in the first half of 2022–23.

Agricultural sector is likely to grow at 3.3%. Manufacturing sector has suffered considerably in 2022–23 and its growth is estimated to come down to just 0.6% from a double-digit figure in the previous year (Table 1.1). Trade, hotel, transport and communication are estimated to accelerate further and construction is also likely to

[13] Second Advanced Estimate for 2023–24 by the National Statistical Office released in February 2023.

witness a high growth rate. The deceleration in GDP growth in 2022–23 is likely to affect both consumption as well as investment (Fig. 1.6).

The fiscal situation is likely to improve further during 2022–23 with fiscal deficit of Centre and states improving by about 1 percentage point to remain at 9.4% of GDP (Table 1.4). During the first 10 months of 2022–23, imports bill has nearly touched the yearly figure of the previous year while exports are 13% below (Fig. 1.7). These trends are likely to further widen the trade gap for the year as a whole.

India has also been affected by global inflation in 2022. Inflation as measured by CPI started rising from October 2021 onwards and stayed consistently above 6% during January 2022 to October 2022 (Fig. 1.8) prompting RBI to trigger tight monetary policy measures. Although the global conflict has created major challenges for the Indian economy on the trade, investment, and price fronts slowing down the post-covid recovery process, India is counted among the fasted growing economies during 2022–23.

1.4 Assessment and Challenges

It is by now well recognized that the Indian economy has performed better than most other comparable economies. A quick recovery of GDP from its deepest fall in 7 decades strengthens the faith in the long-term resilience of the economy to meet inevitable shocks from time to time. The total fiscal and monetary support as a percentage of GDP was almost similar to the global average of 15%.[14] The total government expenditure as well as fiscal deficit for Centre and States together rose to 32.9% of GDP in 2020–21 from 27.0% in 2019–20 and correspondingly fiscal deficit increased to 13.3% in 2020–21 compared to 7.2% in the previous year. These numbers indicate that the fiscal support provided in India during the pandemic was relatively small at about 6% of GDP due to limited fiscal space. Using a fiscal multiplier value[15] of 1.2, the expansionary fiscal policy of 6% of GDP would have neutralized about 7.2% of adverse GDP impact. In other words, GDP contraction due to the pandemic could have been about 13% without the fiscal support instead of actual drop of 5.7%.

In retrospect, it looks like the revival of growth as soon as possible was a primary consideration for the government in its Covid management. The emphasis on infrastructure related capital expenditure in budgetary allocation was an appropriate instrument for this purpose. Investment expenditure has got a larger multiplier effect and is

[14] RBI Annual Report 2020–21.

[15] Various simulation exercises using CGE models indicate that the Keynesian fiscal multiplier varies between 0.7 and 1.5 depending on the environment and instrument used (Kumar & Panda, 2009). Since government used various income generating means such as food distribution, employment generation, direct transfer, and infrastructure investment during Covid pandemic, an average fiscal multiplier of 1.2 may be used. It will be interesting to carry out a detailed study on the GDP impact of the stimulus instruments used in India with relevant closure for the specific environment of 2020–21.

consistent with the growth priority (Panda, 2020). Apart from creating employment, it also induces private investment playing a complementary role. India remained a relatively attractive destination for capital flows influencing the stock market prices.

RBI's unprecedented monetary measures provided a lifeline to the economy and prevented disruptions in the monetary and financial system. India adopted a flexible inflation targeting (FIT) regime in 2016 that stipulated the objective of monetary policy as "primarily to maintain price stability, while keeping in mind the objective of growth". The mandated CPI inflation rate is within the range of $(4 \pm 2)\%$. The introduction of the FIT regime did make monetary policy transparent and credible to the economic agents and decision makers. The RBI responded very well in liquidity management during the Covid period in 2020 and 2021. But, our understanding of monetary operations would improve if we know the extent to which RBI's policy rate decisions helped growth by arresting further decline.

The accommodative monetary policy got reversed in 2022 as a result of high inflation by upward revision of policy interest rates in several rounds. Monetary policy rate hike typically impacts growth with a lag of 3–4 quarters. Again, a question arises regarding the extent of growth being sacrificed to achieve lower inflation. The literature speaks of the concept of the sacrifice ratio that refers to the percentage of cumulative GDP loss that an economy bears for each percentage point reduction in trend inflation. Only a few studies have attempted to estimate the sacrifice ratio on the Indian data and they differ hugely varying between 0.5 to 6.7 contingent on the state of economy, time period considered and method used.[16] Our understanding of evidence-based trade-offs between growth and price stability must improve to help the society and policy makers strike the right balance.

In the current environment, Indian economy is expected to grow at about 6.5% in FY 2023–24. We can expect a further acceleration of GDP to an average growth rate of 7% with restoration of global environment.[17] In the context of Covid, a question naturally arises: if India will overcome the GDP shock of 2020–21 in the medium run, say by 2030–31. The recovery process was such that GDP level in 2021–22 was about 11% lower compared to a pre-Covid long term trend of 7%. A recovery of this order over 7–8 years is unlikely to happen unless the Indian economy grows at 8.5% or more.

Government's Make in India initiative aimed at boosting the manufacturing sector with certain incentives in selected industries of strategic nature. It had also provided large tax incentives to the investors a year before the pandemic. While the manufacturing sector did perform well in 2021–22, its performance in 2022–23 has been very poor. The incentives do not seem to have helped in reducing large fluctuating behaviour of the sector observed over the years. Survival in a competitive world must be at the core of any medium run supporting scheme.

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[16] An early attempt by RBI (2002) placed the sacrifice ratio at +2.0; other estimates are: Kapur and Patra (2003) between 0.5 and 4.7 depending on alternative measures of inflation, specifications and time period, Dholakia (2014) between 1.7 and 2.1 for disinflation period and 2.8 for inflation period, Mitra and Sanyal (2015) got 2.8 for expansionary phase and 2.3 for contractionary phase, Goyal and Goyal (2019) obtained 6.7 during 2011–17.

[17] CRISIL (2023) estimates GDP growth of 6.8% during FY24 to FY28.

Digital India initiative focuses on creating digital infrastructure, delivering services digitally and promoting the digital literacy. The pandemic forced unprecedented changes in the pattern of employment and income generation process in some sectors where work from home became the norm and continued even after normal economic activities resumed. Some technology related start-ups became billion-dollar companies in a short period making use of the opportunities to innovate services using information technology such as financial transactions, food delivery, entertainment and online class rooms. A section of urban population, particularly the youth, got employed in this emerging system.

1.4.1 Distribution

On the distributional front, the natural question is: did thelow-income groups suffer more during the pandemic compared to others? Large number of urban workers in the MSMEs, which account for most non-agricultural employment and a good proportion of exports, lost their jobs during the lockdown. The sudden declaration of a strict lockdown forced workers to return home initially without transport facilities. Had about one week's advance notice been given, migrant labourers would have returned home in an organised manner. When the lockdown was relaxed or lifted, several MSMEs found it difficult to reopen due to financial problems. Some migrant labourers, who had returned to their villages, were scared of resuming work in the urban areas.

A large section of domestic help, mostly women accounting for about 9% of the women workforce, could not hold on to their work during the lockdown. In a sample survey of domestic workspaces in Ahmedabad and Kolkata, Ghatak and Sarkar (2023) state that only 23% of the domestic workers could get compensation for absence from work during the national lockdown. They mention that many employers helped in terms of paid leave and items like mask, sanitizer and soap in the beginning of the lockdown but as the duration continued beyond a month, employers gradually stopped paying the wages. Several housing societies and even employers put additional entry requirements on domestic workers in addition to those put by the public authorities.

The government's policy to expand help to the poor, however, turned out to be of great help to households at the bottom end of the pyramid. Subsidized distribution of food through the public distribution system (PDS) has been an important element of India's food security policy for the low-income groups for several decades. The National Food Security Act (NFSA) made food distribution a legal entitlement in 2013 and stipulated public provision of 5 kg of food grains per person per month[18] to about 62% of the population at a very subsidized price. After the outbreak of the pandemic, free distribution of essential food items in addition to their entitlements

[18] The very poor were entitled to 35 kg of grains per month per household.

under NFSA considerably ensured food security of poor households in both urban and rural areas. This helped to avoid the possibility of a large-scale hunger problem.

Government procures food grains from the market at minimum support price to build up stocks and distributes grains from the stocks under PDS. Market intervention for procurement has come under criticism by several researchers on efficiency grounds since grain stocks have been in excess of requirement year after year. Government stocks of grains rose by 4 MT even during the pandemic year 2020–21 despite increased distribution. Attempt to improve competition in food grains market was given up due to farmers' protest in northern India. The procurement programme needs review to improve efficiency keeping in mind the food security objective through the PDS mechanism.

Evaluation studies using telephonic survey data have pointed out that about 80% of households having PDS ration cards did receive the food grains distributed by the government (Dreze & Somanchi, 2021). Further, an enhanced outlay of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) helped to maintain some minimum earnings for manual workers. Employment under MGNREGS reached a peak with 45.9 million persons[19] in June 2020. Afridi et al. (2021) point out that the capacity of the local government at the village level 'to quickly translate funds into jobs' played a critical role in job creation.

People and health experts did not know the nature of the unprecedented health crisis and its spread. Lockdown and health measures were taken in the beginning anticipating the maximum possible risk. As the disease spread and experience gained during the initial months, responses on balancing 'life and livelihood' got calibrated.

1.4.2 Poverty

India houses the maximum number of poor people in the world, but the incidence of poverty was falling over the years driven by growth in per capita income and consumption. Dasgupta et al. (2021) found an increase in the head count ratio of poverty by 3 and 2 percentage points in rural and urban areas respectively due to Covid, implying a setback to the declining trend. Yet, based on the yardstick of $1.9 a day poverty line, India might be able to achieve the income poverty target set by the United Nation's Social Development Goals (SDG1) by 2030. It is, however, somewhat lower than the Indian Government's accepted poverty line recommended by the Tendulkar Committee (Planning Commission, 2009), and considerably lower than the poverty lines suggested by the Rangarajan Committee (Planning Commission, 2014) which is more relevant for a low middle income country. Based on the official poverty lines, the SDG1 target cannot be met by 2030 without strengthening the pro-poor policies.

[19] Economic Survey 2021–22, p. 371.

1.4.3 Dealing with Another Pandemic like Situation

We may now turn to certain medium to long term issues which might better equip India to deal with another pandemic or similar emergency situations. Level of per capita income is one major, though not exclusive, indicator of the capability of society to cope with a health emergency or a lockdown condition. Apart from enhancing capability of individuals, a higher per capita income also increases government's revenue and its ability to spend on public health services. India's GDP recorded an average growth rate of about 7% in the post reform period 1992–2019 to reach USD 3.2 trillion recently. Given its population of 1.42 billion, the per capita GDP is only $2300 or about a fifth of the world average. Many analysts feel that India can attempt for a GDP growth path of 7–8% for about 2–3 decades. This seems feasible taking into consideration its investment rate, labour force and its distribution by working age and skill, productivity, and technology adoption.

Several multinational companies are locating their production units in India to cater to Indian and global demand. Post Covid, India is being looked upon as an alternative to China for their production centres by some leading global players such as Apple. Many Indian industries are also competing well at the global level providing goods and services at attractive prices. India emerged as one of the leading players in outsourcing of information technology enabled services during the last three decades. Its internet and mobile network has penetrated into villages and many, though not all, students in villages had access to online teaching during the pandemic. Online financial services have also spread rapidly during the last 5–7 years. Given these conditions, India should endeavour towards a maximum feasible growth path so that growth setbacks due to a pandemic or an international conflict can be overcome quickly.

Covid has provided an opportunity to invest in improving the quality of health and education services for strengthening human capital and in turn productivity of labour force. Since economic growth and human development are interlinked, the increase in health expenditure during Covid should be continued with emphasis on primary and secondary health services to achieve the health-related SDG goals. Learning abilities of children, particularly in low-income groups, have fallen during Covid due to online classes and its improvement needs special attention.

India decided not to join certain regional free trade agreements on strategic grounds. But it has signed about a dozen free trade agreements separately including those with Australia and United Arab Emirates in 2022 and one with United Kingdom seems to be in an advanced stage. It needs to be pursued more aggressively, along with arrangements with several major players in global trade to enable producers in India to take competitive advantage of emerging trade scenarios. Since the government has been advocating for an efficient and competitive economy with a global presence, it should desist from using *Atmanirbhar Bharat* argument for import substitution. Any moderate protection given to certain industries should have performance conditionalities attached with an exit clause after about 5 years. The government's

emphasis on infrastructure development even during Covid, for highways and railways connecting major industrial centres to users and ports, indicates its commitment at helping reduction in transportation cost and improving competitiveness.

Infrastructure development to build up cold storage and quick transportation of perishable agricultural goods is already getting policy attention and needs to be continued. Attempts to reform Agricultural Produce Market Committee (APMC) rules during the Covid period was aborted due to farmers' protest in the North–West part of the country. A fresh look is needed for promoting competition in agricultural sector with initiatives by the state governments considering regional diversities.

1.5 Conclusions

The global community faced an extraordinary situation in the wake of the Covid-19 pandemic. India's approach to manage the pandemic was broadly similar to other countries. The choice between lockdown and livelihood during the Covid waves was a difficult one for policy makers and it is going to attract the attention of scholars for deeper analysis in the coming years. The relaxations made after a brief period of strict lockdown were balancing acts between life and livelihood. Democracy and associated institutions certainly helped to understand the ground realities better for policy adaptations.

India was fortunate to develop and produce vaccines within the country. The rapid spread of the pandemic was checked with the administration of the vaccines to a sizeable section of population by the end of 2021. GDP contraction of 5.7% in 2020–21 was recovered with 9.1% growth in 2021–22. The Central and State Governments attempted to protect the vulnerable sections of society even as they focussed on infrastructure development and growth sustainability. The Central Bank maintained the lifeline of the economy through liquidity injection and safeguarded the financial stability. The conflict arising from Russia–Ukraine war in 2022 disrupted the global supply chain leading to slow down of the global economy. The international environment will possibly remain very uncertain in the near future. The gloomy global economic scenario of 2022 is likely to persist in 2023 and 2024.

India needs to learn lessons from the pandemic and equip itself for any future health or other emergency situation. A major factor determining capability is the level of per capita income and there should be no relaxation of our resolve to attain the maximum feasible growth in an efficient and sustainable manner. Even as it does so, the pandemic has taught us to further strengthen our efforts to improve human development through investment in health and education. Growth and human development are interlinked and one feeds the other. India will hopefully succeed in managing the post pandemic evolving future.

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Chapter 2
Primary Health Care and Resilience of Health Systems

Indrani Gupta

Abstract There is now a considerable volume of literature that points to the primacy of primary health care in dealing with pandemics and epidemics. The paper discusses the centrality of primary health care in pandemic preparedness by giving the example of India. It starts by attempting to understand the debate around excess deaths during the COVID-19 pandemic and the possible reasons for this to make the point that it is possible that India saw a greater impact of the pandemic than is officially believed. It elaborates on the current gaps in the existing primary care from four angles: health financing, the capacity of the primary health care system which includes infrastructure and personnel, performance in terms of health outcomes, and equity in terms of access, affordability, and availability of primary care. In this context, the paper looks at the extent of prioritization of the health sector in the three years after COVID-19 started by looking at budget allocations. It concludes that unless the health sector is urgently prioritized in government spending, it is unlikely that the state of primary care will improve anytime soon, with a concomitant impact not only on health outcomes and equity during normal times, but aggravated impact from future pandemics and epidemics.

Keywords Primary care · COVID-19 · Resilience · Health financing

2.1 Introduction

The COVID-19 pandemic has caught many countries unprepared and led many others—especially among the low and middle-income countries (LMICs)—to react in real-time to fix their health systems to cope with the urgent requirements of drugs, medical products, personnel and health facilities. There is evidence that existing health inequalities have deepened further (Riley & Mensah, 2021; Tan, 2021; Wilkins et al., 2021) and progress towards Universal Health Coverage (UHC) has slowed

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down. This implies serious setbacks to the Sustainable Development Goals (SDG) goals, especially for the LMICs.

The attainment of most of the SDG health goals is critically dependent on sound primary health care. The Global Conference on Primary Health Care held in Astana, Kazakhstan, in October 2018, and the subsequent Astana declaration signed by a majority of countries, reaffirmed the importance of achieving Health for All through strengthening Primary Health Care (WHO, 2019). The Alma-Ata declaration defined primary health care as "essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination" (WHO, 1978). The declaration also states that Primary Health Care is the first level of contact of individuals, the family and community "with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process".

Thus, while it has been argued that primary health care is not primary care, primary health care is implemented largely through primary care services. Thus, the servicing of primary health care is done through promotive, preventive, curative, and rehabilitative services, and also includes health education, maternal and child health care and immunization (Hone et al., 2018). Comprehensive care with a strong referral system and strong primary care is essential for robust primary health care.

A 2014 report from WHO and other organizations highlighted the success factors for women's and children's health in 10 fast-track countries (PMNCH et al., 2014). These countries were those that got the basics in place with a multi-sector and multi-partner approach, catalytic strategies incorporating proven interventions and sound guiding principles.

The basics can be what WHO defines as a well-functioning health system with trained health workers, a well-maintained infrastructure, and a reliable supply of medicines and technologies. Such a system is backed by adequate funding, strong health plans and evidence-based policies. Also, the system should "have the capacity to control and address global public health threats such as epidemic diseases and other severe events" (WHO, n.d.). The six building blocks of the health system are service delivery, health workforce, health information systems, access to essential medicines, financing and leadership/governance. These building blocks—when strengthened—would automatically move a country's health system towards resilience by helping it to reach its health sector goals of greater access, coverage, quality and safety (WHO, n.d.).

Needless to say, the most visible impact of strengthening these six pillars would be seen on a country's primary health care system. There is now a considerable volume of literature that points to the primacy of primary health care in dealing with pandemics and epidemics. A rapid review (Desborough et al., 2021) of lessons from previous infectious disease epidemics for primary care and their relevance to COVID-19 indicated the primacy of primary health care systems and public health, and the need to strengthen primary health care systems and related workforce. Another review

of best practices in LMICs (Peiris et al., 2021) indicated that successful primary health care strengthening initiatives were those that could implement substantial reforms across all four strategic functions—political commitment and leadership, governance and policy, funding and allocation of resources, and engagement of communities and other stakeholders. However, the strategic reforms must be accompanied by operational reforms in areas such as workforce, infrastructure, drugs and health products, technology and payment systems. The study finds that service delivery models that promote integrated services, workforce strengthening and use of digital technologies show the strongest evidence of improvements in the health goals of access, coverage and quality. A recent scoping review indicated that COVID-19 resulted in significant challenges in responding effectively in countries where primary health care capacity was "less robust or variable across states and districts" (Edelman et al., 2021).

Overall, there is agreement that investments in primary health care can make health systems resilient and help in responding better to catastrophes like COVID-19. A report from the Organization for Economic Co-operation and Development (OECD) presents evidence of how strong primary health care helped health systems to adapt during the COVID-19 pandemic with a resultant reduction in mortality rates through greater prevention, lower program rates by managing cases at the lower tiers of the health system, helping vulnerable populations through improved and equitable access, providing continuity of care via proper referral systems, and giving community support (Scarpetta et al., 2021).

Most countries were unprepared when the pandemic started, but the extent of unpreparedness differed across countries depending on the robustness of their health systems and especially that of primary health care. While much has been written about pandemic preparedness, relatively less has been discussed about the role of primary health care in addressing the pandemic challenges, especially for LMIC countries like India.

This paper starts by reviewing the existing literature and debates on excess mortality from COVID-19 in India and goes on to expand on the possible reasons for this. It puts forward evidence on the state of primary care and public health in India, its possible impact on the extent of damage from the pandemic, and examines whether post-pandemic, India has been able to course-correct and prepare itself better for any future such catastrophe.

2.2 Excess Mortality Due to COVID-19 in India: Evidence and Debate

Official estimates of deaths per million put India in the group of countries with very low mortality from COVID-19. According to official statistics, as on 24 November 2022, the cumulative deaths from COVID-19 were 530,601 or 1.19% of those who were infected with the coronavirus. Cumulative confirmed COVID-19 deaths per

million people in India is one of the lowest in the world. However, during the pandemic, non-COVID-19 care and program also went down globally due to the stringent lockdowns imposed in most countries. Thus, the all-cause excess mortality during the COVID-19 period has been a cause for concern for some researchers. The excess mortality is the difference between the observed all-cause mortality during the pandemic and the expected all-cause mortality had the pandemic not happened (Mukherjee, 2022).

The main challenge in understanding the COVID-19 pandemic in India lies in its mortality numbers. The excess mortality during COVID-19 period has been a global phenomenon, including in India. The WHO estimated that India had 4.74 million excess deaths, which is 10 times the official estimate at that time, a figure that has been strongly refuted by the Indian government on grounds of faulty methodology (PIB Delhi, 2022a, 2022b). The Economist provides an analytical model with a machine learning algorithm and a number of covariates to estimate excess mortality estimates for 187 countries. According to their estimate, there may have been 4.8 million excess deaths in India for the two years, 2020–2021. There are a few other estimates for India as well (Banaji & Gupta, 2022; Deshmukh et al., 2021; Leffler et al., 2022), and all seem to point towards a significant underestimate of the all-cause mortality numbers put out by the government during the COVID-19 period. A recent study based on extensive analysis of data from an independent survey suggests that India's cumulative COVID-19 deaths by September 2021 could have been six to seven times higher than the official estimates (Jha et al., 2022). Similarly, other studies have concluded independently that it is possible that only one out of seven or eight deaths have been recorded as COVID-19 deaths in the country (Guilmoto, 2022).

While the government continues to maintain that its own estimates are valid, the various estimates arrived at by scientists and experts seem based on sound methods, indicating the possibility that India actually could have been one of the biggest contributors of excess deaths in its region (Nahmias & Shayani, 2022). Other studies have also documented misreporting of COVID death data in India (Natashekara, 2022). The problem lies in India's death statistics, which are significantly under-reported, making it entirely plausible that COVID as well as non-COVID deaths have, in fact, been significantly undercounted.

A study analyzed the completeness of the registration of deaths in the Indian Civil Registration System (CRS) from 2005 to 2015 at the state level, and concluded that while there have been significant improvements, there is overall still a gap and significant state-level variations with poor availability of reporting by age and sex (Kumar et al., 2019). Others indicate that data on medically certified causes of death are not very useful due to the low hospital reporting (Rao & Gupta, 2020) and only about 22% of all deaths are medically certified in India. It has been pointed out that in rural areas deaths do occur outside of hospitals leading to further underestimation (Chatterjee, 2020). Researchers have analyzed the National Family Health Survey (NFHS) data on registration and child mortality, and data from the Sample Registration System (SRS) and CRS to conclude that India's SRS likely underestimates mortality, and may be missing sampling older as well as younger populations (Banaji

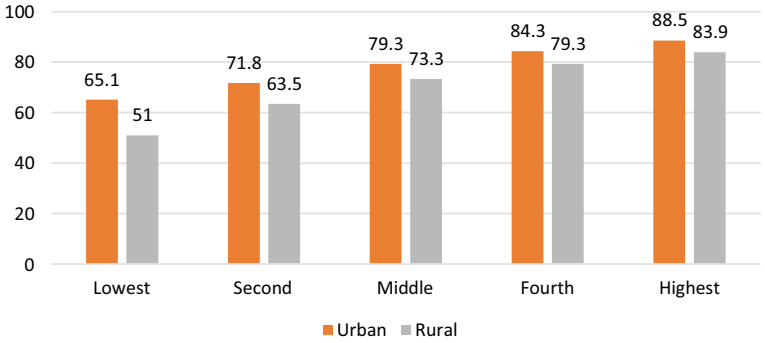

Fig. 2.1 Death registration by wealth quintile Deaths during the 3 years preceding the survey, deaths registered with civil authority 2019–20 (%), NFHS-5

et al., 2022). Also, there is a likelihood that death registration was interrupted during the pandemic leading to undercounting of deaths.

Data from NFHS-5 indicates that there is an income gradient in death registration; registration improves substantially with increases in wealth quintile, as Fig. 2.1 indicates. Also, there is a rural–urban difference in death registrations. Overall, only 51 and 65% of deaths are registered for the poorest in the sample. There is also a gender divide: male and female registration across all quintiles (not shown here) were 75% and 66% respectively, indicating a higher possibility of undercounting female deaths. Further, some states like Bihar, Jharkhand and UP have extremely low death registration rates at 36.4, 39.9 and 47.7% respectively.

Presumably, these numbers went down even further during the lockdown with the lower treatment-seeking behavior during the pandemic period, which could have impacted the reported death figures during this period.

Though not fully, both the questions—why so many deaths might have occurred and why these were not counted—can partly be answered with the above evidence. Could India have counted better and avoided the excess mortality to a certain extent? A functional civil registration and vital statistics system is of critical importance as a surveillance mechanism, and the lack of it also points to an inability to connect public health and primary health care to a sound surveillance system. Further, India's response to the pandemic was to adopt a hospital-based approach rather than a primary care-based one. Some have argued that a primary-care alternative would have served the country better (Sudhir & Mor, 2020), also because tertiary care facilities were found severely constrained. There is enough evidence now that India faced a severe shortage of hospitals, hospital beds, medical personnel and basic medical equipment like protective gear during the pandemic, especially during the first year of the deadly delta virus (Lodha & Kabra, 2021; Verma et al., 2020). Also, the impact of the severe lockdown disrupted other routine services like immunization, antenatal visits, supply of drugs, information, education and communication (IEC) activities and community-based screening for other diseases (Singh et al., 2021; Vyas et al., 2021). Restricted out-patient services (OPD) and program services, and diversion

of resources from non-COVID to COVID care would have led to a neglect of other illnesses, with routine primary care in many countries disrupted (Matenge et al., 2022).

The question is if India had adopted a primary care approach to deal with COVID, would that have helped reduce excess mortality to some extent, as happened in many other countries? That in turn raises another question: could it have adopted a primary-care-based approach? How prepared was its primary health care system to deal with a pandemic of this magnitude that disrupted existing services for non-COVID care as well? The idea of preparedness pertains to the pre-pandemic stage, and, therefore, it is most relevant to see the state of primary care just before the pandemic struck, and analyze whether the tertiary-care approach was an option or a compulsion, and if India's primary care was geared adequately to deal with the pandemic.

2.3 Primary Health Care in India

Despite the many global and country initiatives on primary care, there seems to be a paucity of robust and available data on primary care indicators globally. The Primary Health Care Performance Initiative (PHCPI) collects data on 38 core indicators, and is helpful in analyzing the comparative situation in countries (PHCPI, n.d.). However, data is missing for many countries—including India—across a number of indicators, especially for parameters like spending on primary care. Nonetheless, the PHCPI's Vital Signs Profiles include financing, capacity, performance and equity, and are a good set of parameters to assess the state of primary health care in a country, using country-level data.

We use each of these core indicators for the country as a whole but also give examples of differences across key states. Most of the state examples are from Tamil Nadu (TN), which is one of the top-performing states in the country in terms of health outcomes, and Uttar Pradesh (UP) which is an Empowered Action Group (EAG) state and is given special focus on a number of fronts to reduce the overall vulnerability of the state.

2.3.1 Financing of Primary Care

While data on total health financing across states in India is available quite readily, financing distributed across different types of care is much more difficult to assess due to lack of data. A study (Gupta et al., 2020) of the composition of total government health finances in 2015–16 for five states—Bihar, Himachal Pradesh, Tamil Nadu, West Bengal and Uttar Pradesh—indicates that the expenditure on primary care among these states was highest for Bihar at 60% and lowest for West Bengal at 41%. Both Tamil Nadu and Uttar Pradesh spent a similar amount—slightly more than 50%—on primary care out of the total government health spending. More recently,

the National Health Accounts (NHA) 2018–19 estimates indicate that about 47% of current health expenditure in the country is spent on primary care. In Table 2.1, we present some core financing indicators and an estimate of what India must be spending on primary care.

The table indicates that less than INR 900 per capita is spent on primary care by the government, despite almost half of the total expenditure being on primary health care. This is due to the very low overall spending on health by the government. A study analyzed trends and outcomes in primary health care expenditures in LMICs from 2000 to 2017 and estimated India's spending to be around USD 30, but this is inclusive of out-of-pocket expenditure and private care (Schneider et al., 2021). Total expenditure on primary care is almost equally shared by public and private sectors in India. Thus, in 2018–19, the total per capita spending on primary care in India would be around USD 20. This is consistent with other findings: for example, a recent study of 36 LMICs from 2011 to 2016 found significant variation across countries in primary health care spending, with the average expenditure ranging from USD 15 to 60 per capita, and from 31 to 88% of current health expenditure (Maele et al., 2019).

OECD countries spend about 13% of their total health spending on primary health care services that includes prevention, general care, dental care and home-based care (OECD & European Union, 2020). However, their total health spending is much higher than India's, making their primary care spending quite reasonable.

The low spending on primary care is coupled with significant variation in spending across states: for example, even though both Tamil Nadu and Uttar Pradesh spend more than 50% on primary care, the total health expenditure envelope differs markedly; thus, per capita spending is INR 1090 in Tamil Nadu and INR 480 in Uttar Pradesh (Gupta et al., 2020). With such low levels of spending, it is reasonable to expect that a variety of critical expenditures either are not undertaken or undertaken at sub-optimal levels. The components are expenditures on preventive care, the entire family planning program of the country, expenditures on all lower tiers of health care like sub-centers, primary health centers, outpatient curative care at ambulatory centers including diagnostic and pharmaceutical expenditures, medical goods purchased by households, rehabilitative care etc. (NHSRC, 2022).

Table 2.1 Public financing of health and primary health care, 2018–19

National health accounts	
1. Total Health Expenditure (THE) in GDP (%)	3.2
2. Government health expenditure in GDP (%)	1.3
3. Government expenditure in THE (%)	41
4. Per capita government expenditure (INR)	1815
5. Share of primary health care in government THE (%)	47
6. Per capita expenditure on primary health care from (4) and (5) above (INR)	INR 853
7. Per capita government expenditure on primary health care (US$) ($1 = INR 82.73)	$10.3

In the next sections, we see some results of this inadequate spending on primary care in the country.

2.3.2 *Capacity of Primary Health Care: Infrastructure, Personnel and Drugs*

The latest Rural Health Statistics for 2019–20 (MoHFW, 2022a) bring out the state of health facilities in India. Figure 2.2 presents the shortages in the three lowest tiers of health facilities: sub-centers (SC), Primary Health Centers (PHC) and Urban Primary Health Centers (UPHC). SCs are the first points of contact between patients and the health care system, and together with PHCs form the backbone of preventive and primary care.

Overall, there is a shortage of 24%, 29% and 44% in SCs, PHCs and UPHCs respectively in the country, with the EAG states contributing significantly to the total shortage.

Similar statistics on missing health personnel for SCs and PHCs are presented in Fig. 2.3 and show the serious gaps in critical personnel—technicians, pharmacists, auxiliary nurse midwife (ANM), health assistants—with only doctors and nurses in adequate supply. As before, EAG states contribute significantly to the missing numbers.

Besides buildings and personnel, the infrastructure facilities available at these various government centers also seem to be sparse, and vary significantly across states. For the country as a whole, 10% and 13% of the SCs work without regular water supply and regular electricity respectively. Table 2.2 on Primary Health Centers indicates that states like Tamil Nadu do much better than EAG states like Bihar and UP in these indicators. For efficiency, these facilities are clearly essential.

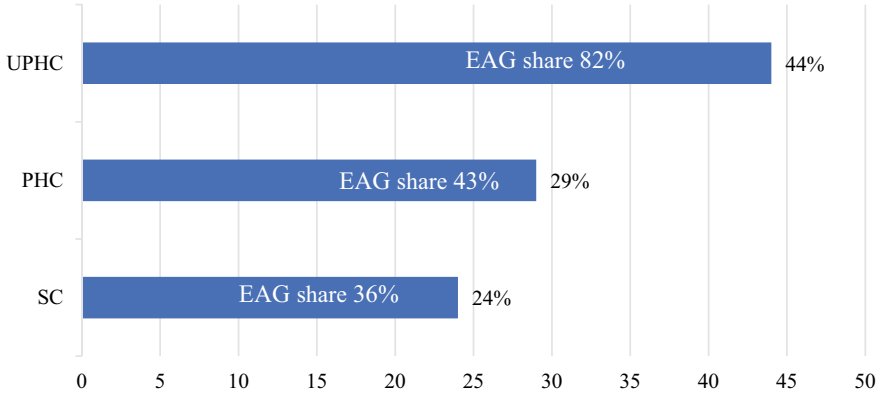

Fig. 2.2 Shortfall in health facilities, 2021 (%) Rural Health Statistics. *Note* EAG states here includes Assam

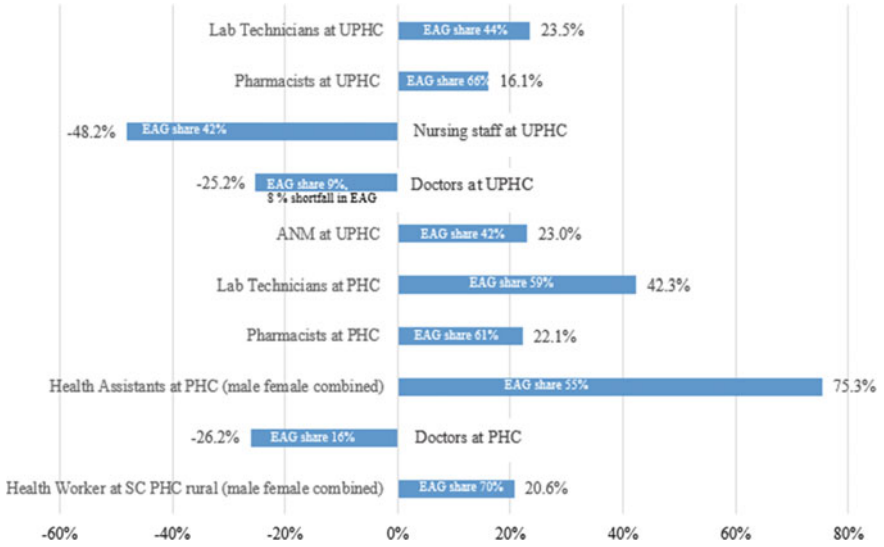

Fig. 2.3 Shortfall in personnel, 2021 (%) Rural Health Statistics

Table 2.2 Infrastructure facilities at Primary Health Centers, 2021 (percentages)

State	Without electric supply	Without regular water supply	Without all-weatherable motorable roads	Without telephone	Without computer
India	4.8	6.7	8.3	38.2	29.2
Bihar	31.1	31.1	23.8	72.4	24.3
Uttar Pradesh	5.6	5.2	16.5	77.4	76.1
Tamil Nadu	0.6	0.8	6.0	13.3	6.7

A functional referral system forms the backbone of a resilient health system that caters to people's needs for different kinds of services. If a primary health care system works well, there is less pressure on the higher tiers of the health system. This was evidenced during the COVID-19 pandemic when many required tertiary care urgently. While no data is available, it is entirely possible that due to the lack of primary care or care available at the community levels, health outcomes worsened for many, and people were forced to look for tertiary care facilities. The Community Health Centers (CHC) were designed to provide specialized medical care via a team of health personnel, like surgeons, obstetricians and gynecologists, physicians and pediatricians and act primarily as a referral center for the neighboring PHCs for patients requiring specialized health care services. However, the CHCs are hardly functional with severe shortages of personnel as shown in Fig. 4a, b; majority of the posts are vacant and the shortfalls compared to required personnel are mostly over 80%.

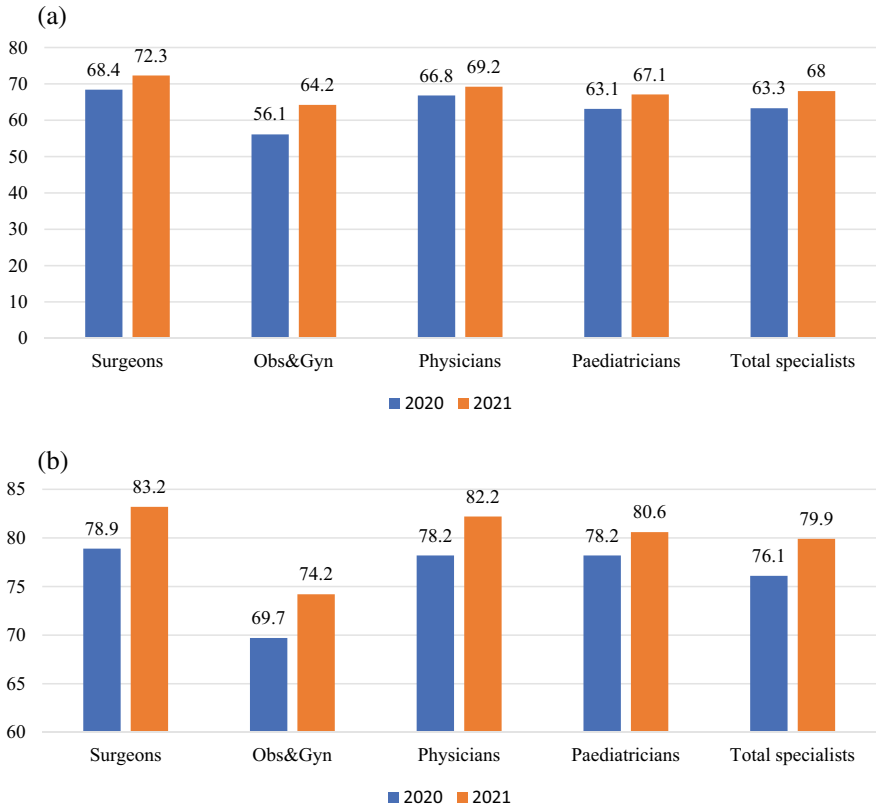

Fig. 2.4 **a** Vacancy positions of specialists at CHCs. **b** Shortfalls of specialists at CHCs

As for district hospitals, a study based on an assessment of district hospitals found that on an average, only 27% of the hospitals met the Indian Public Health Standards norms for positioned doctors, 12% for staff nurses and 56% for paramedical staff respectively (Sarwal et al., 2021).

The brief analysis above indicates that when the pandemic struck the country, the health sector was far from resilient to withstand the onslaught of a catastrophe of this magnitude, especially at the lowest rung of the health system.

An important component of health care comprises drugs. A recent cross-sectional study (Ambade et al., 2022) finds that medicines accounted for 29.1% of inpatient and 60.3% of outpatient out-of-pocket expenditures respectively. Also, other non-medical costs like travel, stay, food etc. accounted for 24% and 15% of inpatient and outpatient expenditures respectively. While there are other views that household surveys like the NSS may overstate the share of medicines in OOPE (Prinja et al., 2022), the latest NHA (NHSRC, 2022) indicates a significant share of pharmacies (23%) in current health expenditure based on provider classification, and about 27% of current health expenditure on diagnostics and medicines based on healthcare functions. The last

aggregate pertains only to expenditure emanating from outpatient contact or over the counter purchase, and excludes medicines that are part of in-patient care. Seen in conjunction with the high share of households in current health expenditure (54%), increasing burden of chronic diseases and a high share of private providers in both inpatient (55%) and out-patient care (66%) as per the 75th round of the NSS (NSSO, 2019), the high share of drugs and medicines in household health expenditure is entirely logical. During the pandemic, there was evidence that some key medicines like anti-malarial drugs were in significant short supply (Godman et al., 2020). The shortage of drugs in the beginning of the pandemic has partly been due to dependence of India on countries like China for active pharmaceutical ingredients (Dapke et al., 2021). Even during non-COVID times, the inability of the health system to provide free or subsidized medicines despite some key initiatives like *Jan Aushadhi Kendras* (Sareen et al., 2022) has prompted the launch of the revamped *Pradhan Mantri Bharatiya Jan Aushadhi Kendras*. It remains to be seen whether this initiative will bring down substantially the cost of drugs borne by households, and help in reducing out-of-pocket spending.

2.3.3 Performance: Primary Care Indicators

The first indicator of the overall performance of a health sector comprise disease outcomes, which in turn depend on the ability of the health system to provide access, service coverage and quality care. We take a few indicators under each of these.

Figure 2.5 presents data from the Global Burden of Disease study on disease burden by cause in India between 1990 and 2019.

There has been a decline in the share of communicable, maternal, neonatal and nutritional diseases and an increase in the share of non-communicable diseases (NCDs) over the years. While primary health care is increasingly becoming an important input in the prevention of NCDs, communicable diseases and maternal/child health are generally covered mostly under primary health care. Within this group of conditions, Fig. 2.6 indicates that neonatal conditions, malaria and other tropical diseases, respiratory infections and tuberculosis (TB) remain significant.

The latest National Sample Survey data on health (75th round) also indicates that infectious diseases remain a major reason for seeking treatment. Figure 7a, b present the shares of disease groups in OPD and IPD care, and show that about one-third of all diseases are in the infectious disease group.

The Alma Ata Declaration emphasizes safe water, sanitation and hygiene (WASH) as integral to public health, and the UN SDGs include separate goals for water and sanitation. The high share of diarrheal diseases and other water and sanitation related diseases in India can be explained by the continuous unfavorable WASH situation in the country. As Fig. 2.8 indicates, the mortality rate attributable to unsafe water, sanitation and hygiene in 2019 was very high for India, making it in the group of countries at the bottom for this indicator.

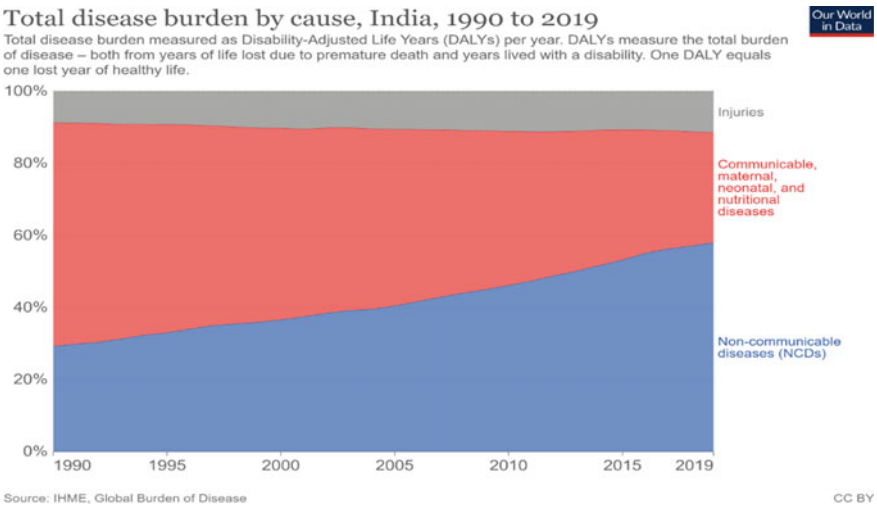

Fig. 2.5 Disease burden by cause

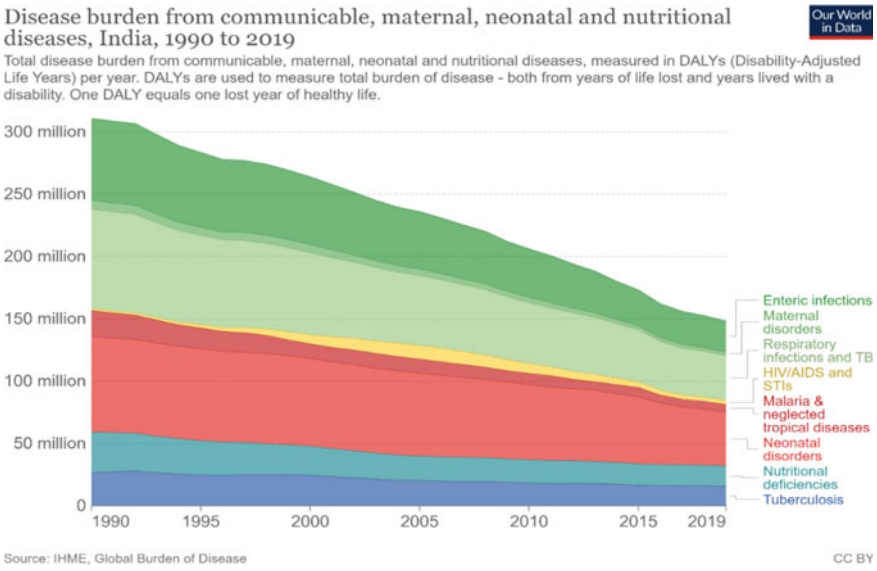

Fig. 2.6 Disease burden from communicable, maternal, neonatal and nutritional diseases, 1990–2019

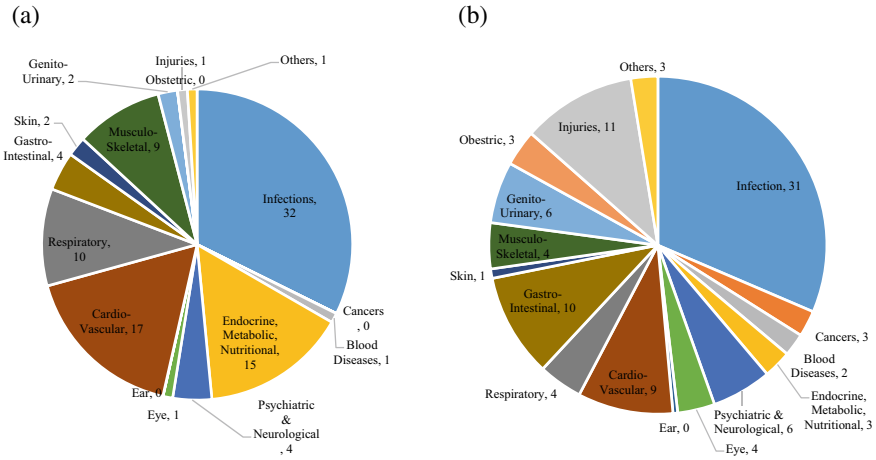

Fig. 2.7 **a** Share of disease groups in OPD care (%). **b** Share of disease groups in IPD care (%)

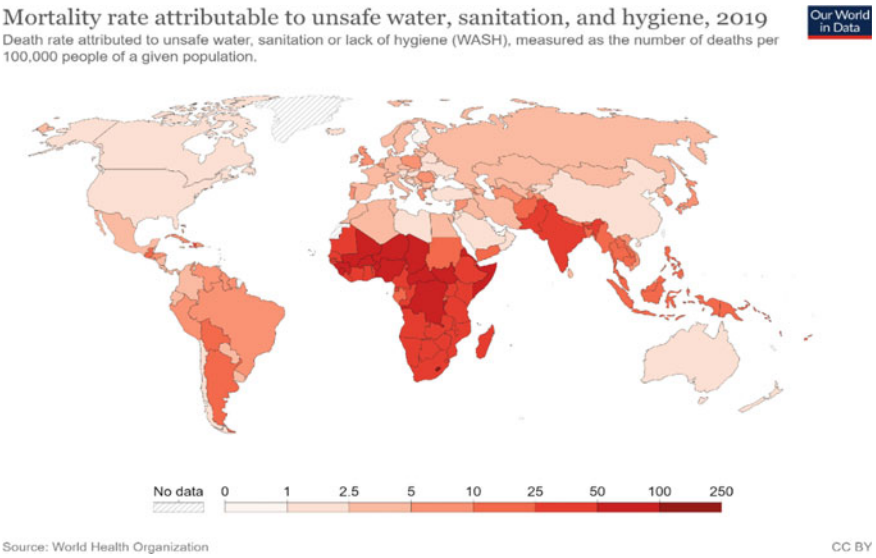

Fig. 2.8 Mortality rate attributable to water, sanitation and hygiene, 2019

A robust primary health care system would result in improvements in key health outcomes, and maternal and child health is critically dependent on a well-functioning primary health care system. This area has also been a key focus area of government health policy. Some results from the latest National Family Health Survey, round 5 (NFHS-5) are presented later in Table 2.3.

Table 2.3 Accessibility and availability of primary care services, NFHS-5

Indicators	India	Tamil Nadu	Uttar Pradesh
Current use of family planning, any modern method	56.5	65.5	44.5
Health workers ever talked to female non-users about family planning	23.9	28.5	25.1
Institutional births in public facility (out of total institutional births)	61.9	66.9	57.7
Children 12–23 months fully vaccinated, based on either vaccination card or mother's recall	76.4	89.2	69.6
Child with diarrhea in 2 weeks preceding survey received ORS	60.6	53.8	50.7
Child with diarrhea taken to a health facility/provider	68.9	60.2	69.9
Children with fever or symptoms of ARI in 2 weeks preceding survey taken to a health facility/provider	69	67.4	63.0
Ever undergone screening for cervical cancer	1.9	9.8	1.5
Ever undergone screening for breast cancer	0.9	5.6	0.4
Women with comprehensive knowledge of HIV/AIDS	21.6	23.6	13.1

In Fig. 2.9 we show three basic indicators: Neonatal Mortality Rate, Infant Mortality Rate and Under-5 Mortality Rate, for India as well as TN and UP. We also present the numbers for Thailand (UNICEF, n.d.) to enable comparison with a country in our region which has made great strides in improving their health sector performance.

While the numbers have been improving over the years, it will probably take a long while to reach the levels of Thailand. Also, TN and UP have starkly different rates indicating disparities across states.

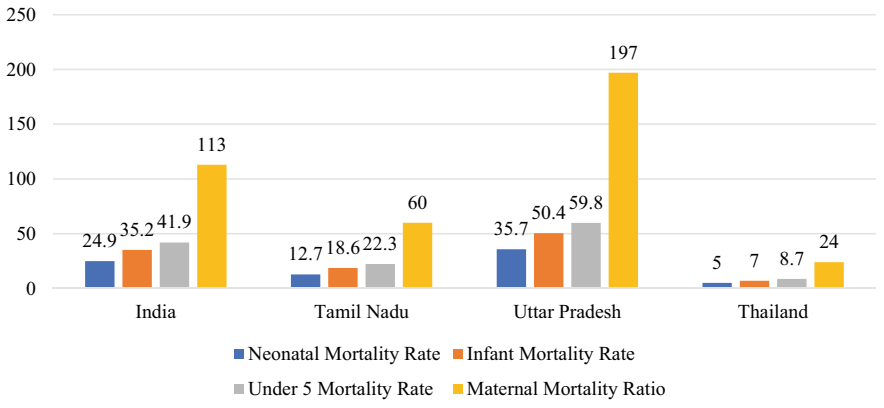

Fig. 2.9 Key indicators of mother and child health. *Source* NFHS-5, UNICEF

While these are outcome indicators, some key access indicators are useful to look at as well. Access could be to preventive and promotive services as well as to curative services at the level of primary health care.

The family planning program of the government remains a key program under the National Health Mission (NHM). The goal is to stabilize population but also to promote reproductive health, and reduce maternal, infant and child mortality and morbidity. Table 2.3 presents selected indicators for India, TN and UP. Additional indicators on screening of key NCDs are also given, since these are in principle available at primary care facilities.

Data given in Table 2.3 indicates that the family planning program has not been fully successful; for example, less than 60% of women interviewed used any modern methods. As for health workers talking to female non-users about family planning—a service one would assume would now be standard practice—the number is only 24% for India. While vaccination coverage has improved, it is still not 100%, and 24% of children are not fully vaccinated, which is a large size of the total target population in absolute terms. Similarly, there is a lot of scope for improving the treatment of diarrhea and acute respiratory infections (ARIs) among children.

NCDs have been increasing sharply in the country, and preventive check-ups have been a part of policy discussions in the recent years. The Health and Wellness Centers (HWCs) under the Ayushman Bharat program were to offer comprehensive integrated care with an added emphasis on NCDs. The NFHS-5 figures indicate rudimentary uptake of these services, though more recent data might show improvements.

Finally, there is still very poor knowledge about HIV, despite the National AIDS Control Program being a major focus of the government in the last more than two decades.

As in the case of health outcomes, the states show disparate results, though not uniformly.

2.3.4 Equity in Outcome, Access, Affordability and Availability of Primary Care

Equity in outcomes, access and affordability remains a key concern in India. While some evidence of inter-state inequities in health outcomes and access have been presented above, in Fig. 2.10 we show outcomes across wealth quintiles for Neonatal and Under-5 Mortality Rates, and establish the point that lower quintiles have worse health outcomes.

The reasons can be gleaned from some of the findings from NFHS-5, which shows there is a clear and sharp income gradient to access services.

Skilled birth attendance: 79% and 97% in the lowest and highest wealth quintile respectively.

Percentage receiving antenatal care from a skilled provider: 72.2% for the lowest quintile and 93.7% for the top quintile.

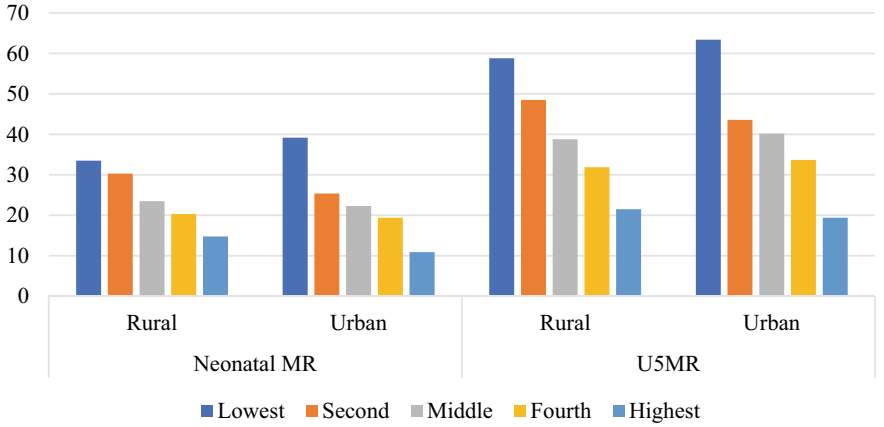

Fig. 2.10 Neonatal and under-5 mortality rates, by wealth quintile, NFHS-5

Percentage of all pregnancies to women aged 15–49 in the five years preceding the survey for which an ultrasound test was done: 57.3% for the lowest and 91.8% for the highest quintile.
Percentage of deliveries in a health facility: 76.2% for the lowest and 97.4 for the highest quintile.
No post-natal checkup: 26.3% of the lowest quintile compared to 7.9% of the highest quintile.

As for inequities in affordability, there is plenty of evidence now that even for primary care, individuals pay out-of-pocket and the impact falls disproportionately on poorer households. The NSS data indicates that 66% visited private facilities for non-hospitalization treatment compared to 30% that visited public facilities. Studies have found that despite programs like *Janani Suraksha Yojana*, households face hardship in financing for deliveries in India, and women from poorer quintiles face a greater disadvantage and catastrophic spending continues for institutional deliveries (Goli et al., 2021; Yadav et al., 2021).

The NSS 75th round data indicates that even among the poorest quintile, 12% and 30% in rural and urban areas respectively, go to private hospitals for childbirth, indicating possible access issues in public hospitals. Even for TB, there is evidence that due to the significant presence of private sector in provision of TB services, there has been an increase in household expenditure, and catastrophic expenditure is evident in poor households while accessing program services (Prasad et al., 2021). These numbers are indicative of a primary health care system that is still grappling with issues around accessibility and availability of health care for economically vulnerable populations.

2.4 Health Priorities During COVID-19

These various pieces of evidence point to the fact that when COVID struck, India already had an impaired capacity to deal with its magnitude due to a less-than functional primary health care system, but a general lack of preparedness across all tiers of the health system. Given that there are major gaps in infrastructure, personnel and other complementary inputs, the first and foremost requirement in a post-COVID situation would be to bolster and fill the existing gaps in personnel and infrastructure; evidence exists to show that healthcare capacity is inversely related to health indicators like case fatality rates (Khan et al., 2020) and countries that spend more on health infrastructure tackled the pandemic better (Oshinubi et al., 2021).

While India did damage control in real-time by increasing testing facilities, COVID beds, and selected equipment, was it able to actually initiate the work on filling the gaps in key health sector parameters? Clearly, to put in place missing personnel and infrastructure would require a huge jump in funding. Was India able to increase the allocations to health once the pandemic started? There have been three budgets released post-COVID by the union government, in 2021–22, 2022–23 and 2023–24. We take a brief look at these three budgets in Table 2.4 to assess whether the pandemic prompted a change in health allocations and prioritization.

If we look at the revised estimates (RE) of 2021–22 and compare them with the BE of 2022–23, we see a very modest—almost negligible—increase of 0.1% in allocations to the DoHFW. The Department of Health Research got about 4% increase, however. Between 2022–23 and 2023–24 there was a modest increase in BE allocations of 3.4% with DoHFW receiving a 3.8% increase. It remains to be seen whether the RE would be the same or lower.

A positive feature in the budget immediately after the pandemic was that the government launched the India COVID-19 Emergency Response & Health Systems Preparedness Package in two phases, Phase-I (PIB Delhi, 2020) and Phase-II (PIB

Table 2.4 Budget allocations to health, 2021–22, 2022–23, 2023–24, Rupees Crores

Ministry/ Department	2020–21 Actuals	2021–22 RE	2022–23 BE	2023–24 BE	RE 2021–22 to BE 2022–23 growth	BE 2022–23 to BE 2023–24 growth
Department of Health and Family Welfare	77569	82921	83000	86175	0.1	3.8
Department of Health Research	3125	3080	3201	2980	3.9	−6.9
Total—Ministry of Health and Family Welfare (MoHFW)	80694	86001	86201	89155	0.2	3.4

Source Demand for Grants, Ministry of Health and Family Welfare

Delhi, 2021a) for INR 15,000 crores and INR 23,123 crores respectively. This was in addition to the allocations for vaccination. Under these heads, several health systems strengthening items like diagnostics, procurement, hospital strengthening etc. were included, which would have certainly helped improve some core elements of the health system. The second phase of funding also had a state share of around INR 8123 crores. The National Health Mission—India's flagship and largest program run as a centrally sponsored scheme for the health sector—got about 7% increase in its allocations compared to the previous year's revised estimates, but the allocations remained substantially below the projected demand (Center for Policy Research, 2022). There are a few other programs and schemes that would have impacted the health sector like the *Pradhan Mantri Atmanirbhar Swasth Bharat Yojana*, which had the objective of strengthening capacities of primary, secondary, and tertiary health systems. However, in the last budget of 2023–24, there were no major announcements except mention of tackling sickle cell anemia. Nursing colleges and multidisciplinary courses for medical devices also found mention. PM-Ayushman Bharat Health Infrastructure Mission or PMABHIM has been an important part of the 2022–23 budget (PIB Delhi, 2021c), but in the last budget BE to BE allocations have declined by 34%, though the share of states in this program has increased somewhat.

A program that directly impacts the state of primary care involves the Health and Wellness Centers (HWC)—an initiative under Prime Minister's Ayushman Bharat program—which has been seen as vital for strengthening primary care. HWCs have been envisaged to deliver Comprehensive Primary Health Care, with a broad range of services that go beyond maternal and child health care to include care for non-communicable diseases, palliative and rehabilitative care, oral, eye, ENT care, mental health and first-level care for emergencies and trauma, including free essential drugs and diagnostic services. The objective was to transform the 1,50,000 Sub-Health Centers (SHCs) and Primary Health Centers (PHCs) into HWCs by December 2022. As per government data, a total of 1,20,112 HWCs were functional in the country as on 30th June 2022 (MoHFW, 2022b).

If fully operational and functional, HWCs can actually change the way primary care is delivered in the country. However, there remain operational challenges for full scale-up of the HWCs. While the costs for running may seem modest, that is because only a few changes have so far been implemented, out of the full list of parameters visualized for HWCs (Gupta et al., 2022). While the HWC initiative is laudable, it needs much enhanced funding with concomitant increases in funding for personnel, infrastructure and training; in fact, the post-pandemic budgets have not seen much increase in the HWC allocations. Evidence indicates that unless states strengthen the existing physical infrastructure including regular supply of medicines and consumables and other critical parameters like referral mechanisms, the initiative is unlikely to bring the expected results (Brar et al., 2022). Therefore, the allocations on HWCs should be seen in conjunction with other allocations in the health ministry's line items. In conjunction with the HWC initiative, new innovative and evidence-based programs might need funding as well. For example, during the COVID-19 pandemic, community health workers were seen to fill the gap of missing personnel,

and there are examples of rapid training of these workers to help in prevention and treatment (Singh & Singh, 2022).

With the aim of strengthening the health infrastructure, the Fifteenth Finance Commission recommended grants to local bodies of around INR 70,000 crores to strengthen the existing health infrastructure at the level of primary care (PIB Delhi, 2021b). This is an important initiative, and can empower the local bodies to undertake required health spending at the local levels. In addition, the Ayushman Bharat Digital Mission (ABDM) was launched and in the latest budget National Digital Health Mission has received a 71% BE to BE increase, to develop and support the integrated digital health infrastructure of the country, with the aim of bridging the gap among various stakeholders for the smooth functioning of the health sector.

These myriad new initiatives launched in the last few years do have the potential of changing the health sector landscape, especially at the primary care level. However, the financing of the health sector as a whole remains a major concern. The multiplicity of schemes and programs with different sources of funding seems somewhat complex, preventing a proper analysis of health financing. For example, the HWC and other key initiatives are being additionally supported through the National Investment Fund, and the *Pradhan Mantri Swasthya Suraksha Nidhi* (PMSSN), which is a single non-lapsable reserve fund for health started from the proceeds of Health and Education cess (Reddy, 2022). Also of concern is the steady decline in the share of the National Health Mission over the years; the main programmatic components include Health System Strengthening, Reproductive-Maternal-Neonatal-Child and Adolescent health and non-communicable diseases. NHM, in fact, directly impacts on how the primary care system runs in the country, and this should have seen a robust increase in allocation. The NHM together with the HWC initiative have the potential to take India's primary care to a higher level, only if there is a quantum jump in funding for these programs.

The budget of the Department of Health and Family Welfare indicates that overall, the finances have not been augmented significantly either out of the total expenditure of the central government, or in GDP. The share of DoHFW in estimated GDP (PIB Delhi, 2022b; World Bank, 2022) was around 0.4% in 2020–21. The DoHFW budget estimates for 2022–23 and 2023–24 in projected GDP are also estimated to be very similar. Similarly, the share of DoHFW in total expenditure of government of India was 2.2% in 2020–21, and is estimated to be lower at about 2% using the 2023–24 budget estimates.

2.5 Conclusion and Looking Ahead

Primary health care will remain the cornerstone of an effective response to deal with pandemics and epidemics. While India has moved in the right direction in terms of thinking about primary care and infrastructure, a lot remains to be done. Most of the initiatives taken in the recent past are laudable, but not adequate. Effective primary health care would require a more holistic approach with major financial

backing. For example, a very important but often overlooked area is the role of community-centric primary care. It has been argued that trained community-level workers can play an important role in providing primary health care, even outside of health facilities (Perry, 2018). This has been suggested for many diseases in India like TB. For example, the TB control program came under tremendous pressure during COVID with a substantial decline in TB detection rates. It has been suggested that infrastructure and manpower at primary care level can effectively deal with a pandemic such as COVID and TB (Yadav et al., 2022). The fact that the private sector has a higher share in TB treatment indicates the inability of the public sector to deliver efficient services. The role of community services is critical even for the basic public health surveillance system. Utilization of services by individuals and disease notification remain separate making the surveillance system patchy (Blanchard et al., 2021). A comprehensive primary care system is one that includes a robust surveillance system as well.

The various activities, interventions and programs launched by the government to deal with the pandemic have been important to deal with the effects of an unprepared health system. However, such an approach—if continued—will distract from the main business of the health sector. Strengthening each of the pillars of a health system requires going beyond a piecemeal approach, with sustainable and continuous backing of additional funds for each of the major focus areas under each of the broad pillars, without having to cut down on ongoing and necessary activities within the health sector. Primary care financing cannot be discussed separately from total health financing. The disappointing post-COVID budgets continue to indicate an approach that relies on a programs-approach rather than a unified exercise of health system strengthening. In any case, the latter can happen only if a quantum jump is made in government spending on health, at least to the recommended 2.5% of GDP as envisaged in the recent health policy document. Without that jump, neither primary health care nor other parts of the health system can be made robust enough to withstand the shocks of a catastrophe like COVID-19.

While the pandemic has affected the economy and resulted in the contraction of activities, India has been fortunate to have avoided major economic downturns. With the economy picking up and revenues increasing, there is fiscal space for additional financing for the health sector, which is an urgent requirement to avoid not only the excess burden of deaths and illness from a similar catastrophe, but for a more equitable and just health system in the country.

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Chapter 3
Lives, Livelihoods and Government Support in the Wake of the Covid-19 Pandemic in Rural Bihar

Gaurav Datt, Swati Dutta, and Sunil Kumar Mishra

Abstract By collecting primary data through phone interviews during October 2020 through January 2021, from a sample of more than 1600 households in seven districts of rural Bihar, this study documents the living experience of these households during and following the first wave of the Covid-19 pandemic since March 2020. It focuses on the impacts of the pandemic on different sources of livelihood; select impacts on health, nutrition and education; and the extent of government support received by households. Detailed evidence from the study paints a picture of pervasive and severe impacts where virtually no household or source of livelihood was spared, though with some differentiation by social group and income class. The evidence also points to the meagre level of government support received by households. Many received only a fraction of the promised support at a time when existing safety nets were also compromised to a lesser or greater extent.

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Keywords Pandemic · Livelihoods · Bihar · Lockdowns · Migrant labour · Safety nets

3.1 The Covid-19 Context in India and This Study

The final death toll in India from the Covid-19 pandemic may never be known. Estimates by the World Health Organization put the excess deaths in India over the two year period from January 2020 to December 2021 at 4.74 million (Msemburi et al., 2022). This is almost one-third of the 14.9 million global excess deaths associated with Covid-19, much higher than the 18% share of India in the global population. The estimate of excess mortality in India is also nearly ten times the official count of Covid-19 deaths of 0.48 million. In terms of the sheer loss of lives, the scale of the human calamity has been colossal. Besides the tragic loss of human lives, there was also the large toll on people's livelihoods that were severely disrupted by the pandemic either directly by disease and death among family members or indirectly by the shutdown of large parts of the economy for shorter or longer periods in a bid to contain the spread of the virus. As memory recedes with each celebratory news of the incipient economic recovery, it is important to document what we are recovering from. In the absence of relevant evidence and data from the official statistical agencies, this task of documenting the pandemic's impact on people's livelihoods was spearheaded by a number of microstudies that undertook their own primary data collection.[1] Our study on rural Bihar is part of that effort.

The backdrop to our study is India going in for an aggressive suppression strategy with a series of national lockdowns beginning in late March 2020. The lockdowns however also caused an economic shutdown with a decimation of work, livelihoods and incomes for large sections of the population. With no vaccine in sight till well into 2021, the economic costs of the pandemic had been mounting throughout 2020. While the well-off had more staying power, this raised grave concerns about how the poor and those with meagre livelihoods even in normal times could cope and survive the lockdown period and beyond. These challenges were all the more severe in poor states like Bihar on which this study focuses.

In particular, the study focuses on the experience of rural households in Bihar during and following the first wave of the Covid-19 pandemic. The focus on the first wave was a direct result of the timing of the study which collected data over the months of October 2020 through January 2021. The study aimed to generate rapid survey-based information to assess both the differentiated economic impact of the pandemic as well as support received by rural households in Bihar. While the Covid-19 case load from the first wave was concentrated in urban areas, the suppression

[1] A catalogue of 92 such COVID impact surveys (at the time of writing) has been compiled by the Centre for Sustainable Employment at Azim Premji University (https://cse.azimpremjiuniversity.edu.in/covid19-analysis-of-impact-and-relief-measures/#other_surveys). For a review of the larger multi-state COVID surveys from a food security perspective, see Drèze and Somanchi (2021).

measures have potentially deep though under-investigated economic impacts on rural households through a range of channels. Rural livelihoods are intimately connected to the urban economy through a number of inter-sectoral linkages, not the least through migrant workers from rural areas who have been in an especially precarious situation following the lockdowns. An understanding of the differentiated nature of impacts through different channels is thus important in this context.

The ultimate consequences of the livelihood impacts for households also depend on their access to relief and support measures by the government. While a range of relief measures catering to pandemic-affected populations were announced by the government, little is known about actual delivery on the ground, especially in environments characterized by limited and varied implementation capacity, such as in Bihar. Hence, the importance of generating information on the ground reality of both the economic impact and the efficacy (relative to need) of various support measures.

3.2 The Scope of Data Collection in Rural Bihar

Primary data was collected through mobile phone-based interviews for a final sample of 1613 rural households (with 9,317 household members) between October 2020 and January 2021 in 12 villages across seven districts of Bihar. The seven study districts shown in Fig. 3.1 are well spread out across different regions of Bihar. The study sample is an updated version of an earlier (2016–17) sample developed by the Institute for Human Development (India) as part of its Bihar Research Programme to be broadly representative of the state as a whole in socio-economic terms.

There were two main parts to the survey. The first part on the impact on livelihoods gathered information on how employment and earnings of households were affected

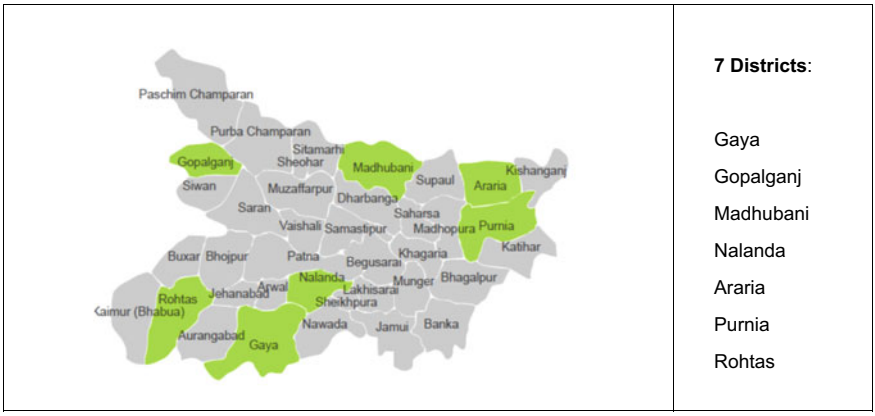

Fig. 3.1 The seven study districts of Bihar

across six main categories of work or livelihood activities (broadly following the National Sample Survey (NSS) classification of employment categories). The six categories are:

(i) Self-employed in agriculture
(ii) Self-employed in animal husbandry
(iii) Self-employed in non-agriculture
(iv) Regular wage/salaried worker
(v) Casual labour in agriculture and non-agriculture (other than migrant labour)
(vi) Migrant labour.

The last category distinguishes migrant workers working outside the village, who are known to be particularly important for rural Bihar, where about half of the rural households have at least one migrant worker. We also collected information on select health, nutrition and education impacts of the pandemic.

The second part on support received gathered information on the extent to which various elements of the support package announced by the government have been actually reaching the households since the lockdown. This includes: (a) the announced additional free allowance of rice/wheat and pulses (and whether this is truly additional to households' receipt of their regular public distribution system (PDS) ration); (b) direct transfers into women's Jan Dhan accounts; (c) free provision of cooking gas cylinders; (d) additional payments to old-age, widow and disabled pensioners; (e) additional support from the state/local government. This information focuses on documenting the efficacy of actual delivery with a view to identifying which channels of providing support to affected populations worked better or worse than others.[2]

3.3 Profile of Study Households and Livelihoods Prior to the Pandemic

Table 3.1 shows the distribution of the sample households by village and social group. A large proportion of households (26%) belong to the SC/ST category, followed by slightly less than one-fourth of households in the upper caste category (Brahmin, Kayastha, Bhumihar and Rajput). About 19% belong to OBC-1 category[3] while 15% are OBC-2 and 17% of households are Muslim.

The average study household had 5.7 members, with 2.2 children below 18 years of age, 0.3 elderly members above 65 years, and 3.3 members in the working age group of 18–65 years (Table 3.2).

Figure 3.2 shows the distribution of households by the main source of income. It is striking that migrant labour is the main source of income for over 50% of households.

[2] For further details on sample selection, sampling weights, survey instruments and organization of fieldwork, see Datt, Dutta and Mishra (2021).

[3] OBC-1 category households are those in the "creamy" layer of other backward caste households.

Table 3.1 Study households by village and social group (number of households)

District	Village name	SC-ST	OBC-1	OBC-2	Upper Caste	Muslim	Total
Gaya	Alalpur Bishanpur	13	17	12	28	0	70
	Rupaspur Salempur	30	12	17	16	1	76
Gopalganj	Paharpur Dayal	0	0	34	9	0	43
	Dewan Parsa	28	24	3	31	19	105
Madhubani	Mahisam	78	62	32	79	102	353
	Khangaon	40	60	9	60	5	174
Nalanda	Chandkura	67	13	34	4	0	118
	Mohiuddinpur	22	6	0	5	0	33
Araria	Jitwarpur	24	173	26	105	16	344
Purnia	Belabadan	38	21	22	0	28	109
Rohtas	Samauti Buzurg	45	21	17	21	7	111
	Amarhi	17	7	39	14	0	77
	Total	402	416	245	372	178	1,613

Note SC: Scheduled Castes; ST: Scheduled Tribes; OBC-1: Other Backward Castes-Category 1; Other Backward Castes-Category 2

Table 3.2 Average household size and composition

	Male	Female	Total
Children (0–17 years)	1.1	1.1	2.2
Working age adults (18–65 years)	1.7	1.6	3.3
Elderly (above 65 years)	0.2	0.1	0.3
Total household members	3.0	2.7	5.7

Note All calculations use sample weights

The second largest category is casual labour which is the main income source for about one-fifth of households. Self-employment in agriculture is the main income source for about 14% of households, while self-employment in non-agriculture activities accounts for about 8% of households as the main source. The dependence on regular wage/salaried work is quite limited, with about 7% of households reporting it as their main source of income. Finally, self-employment in animal husbandry is rarely the main source of income; it is so for only 0.2% of all households.

However, most households engage in multiple income-generating activities. Apart from the main income source for the household, the survey asked if any household members were engaged in different categories of work.

Table 3.3 shows the participation rates for these categories of work. As seen from the Table, migrant labour is the most common category of work, with 55% of households reporting at least one migrant worker. Animal husbandry is also very

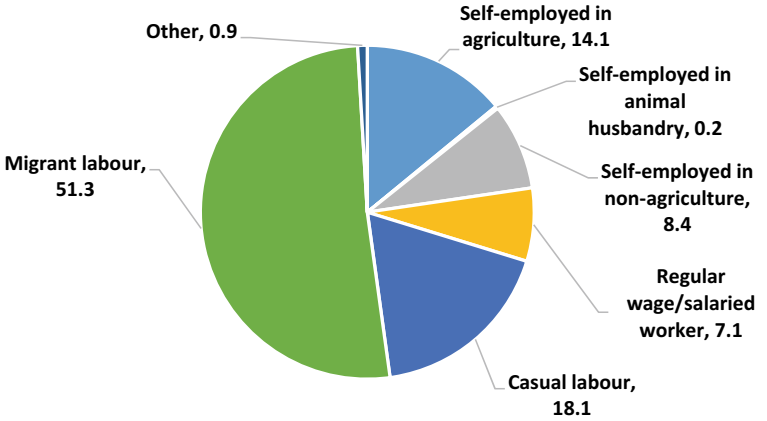

Fig. 3.2 Distribution of households by main income source (%). Note: All calculations use sample weights

common with a 54% participation rate. However, despite this high participation rate, as noted above, it is rarely the main source of income as noted above.

Two other important categories of work are self-employment in agriculture (with a participation rate of 39%) and casual labour (with 36% participation). Self-employment in non-agricultural activities and regular wage/salaried work is relatively less important with participation rates of 11 and 7.5% respectively.

Table 3.3 Participation in different categories of livelihood activities

Type of livelihood activity	Participation rate (% of households with at least one member participating in…)					
	All households	SC-ST	OBC-1	OBC-2	Upper Caste	Muslim
Self-employed in agriculture	38.9	19.3	32.1	64.3	58.6	26.9
Self-employed in animal husbandry	54.0	60.9	52.5	65.8	40.2	53.4
Self-employed in non-agriculture	11.0	3.8	14.0	21.7	10.8	9.2
Regular wage/ salaried work	7.5	5.9	5.7	7.6	8.8	10.5
Casual labour	35.7	67.6	52.5	21.6	4.2	24.0
Migrant labour	55.4	56.2	52.3	41.3	54.0	72.1
Any livelihood activity	99.1	99.7	99.0	99.4	98.8	98.8
Average number of livelihood activities	2.0	2.1	2.1	2.2	1.8	2.0

Note All calculations use sample weights

There is considerable occupational diversity across social groups. Ignoring animal husbandry as it is rarely the main source of income, the two most common activities for the SC-ST group are casual labour (participation rate of 68%) and migrant labour (56%). For the OBC-1 group too, their two most common activities are casual labour (53%) and migrant labour (52%). For the OBC-2, it is self-employment in agriculture (64%) and migrant labour (41%). The same two are also the most important for the Upper Caste group—self-employment in agriculture (59%) and migrant labour (54%). For Muslims, migrant labour is by far the most important activity (with a participation rate of 72%) followed by self-employment in agriculture (27%). Despite this diversity, it is notable that migrant labour is one of the two most common sources of livelihood for all social groups.

Given the limited scope of the phone-based survey, it was not possible to collect detailed information on household incomes. The survey did however include a single question on monthly household income from all sources (including remittance income) during the year preceding the Covid-19 pandemic. This income question did not ask for an exact value of income, but asked respondents to select one of the seven size categories for their monthly household income, ranging from below Rs. 5,000 to more than Rs. 30,000. We aggregated some of the smaller categories to identify four broad income groups[4]:

(i) Lowest income group (monthly household income of <Rs. 5,000)
(ii) Low income group (monthly household income of Rs. 5,000–Rs. 10,000)
(iii) Middle income group (monthly household income of Rs. 10,000–Rs. 20,000)
(iv) Top income group (monthly household income of >Rs. 20,000).

Figure 3.3 shows the distribution of study households by income groups. As seen in the Figure, the shares of the lowest, low, middle and top income groups in the total number of households are 13, 50, 28 and 9% respectively. Note that even the top income group has relatively modest income levels.

3.4 Impacts on Different Sources of Livelihood

This section presents our main findings on how the different sources of livelihood for households in rural Bihar were impacted by the Covid-19 pandemic. Impact was assessed by comparing a household's pre-Covid status with their situation since Covid. Unless otherwise specified, the reference period for studying the impact is April-September 2020, the six-month period following the first national lockdown announced by the Prime Minister that began on March 24.[5] In the following discussion, the reference period of April-September 2020 is noted as "since Covid" or

[4] As we did not ask for the level of household incomes, we were unable to classify households in terms of per capita income.

[5] There were four successive lockdowns between March 24 and May 31, 2020.

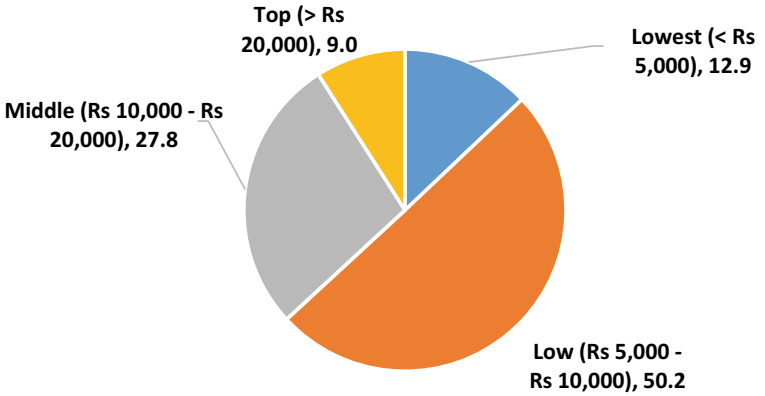

Fig. 3.3 Distribution of households by income group (%). *Note* All calculations use sample weights

"during Covid". For some of the questions, the reference period is up to the date of interview with the household.

The pandemic affected each source of livelihood over this period in several different ways. For instance, livelihood from self-employment was affected by harvesting operations and sale of the *rabi* crop, farming operations and cropped area for the *kharif* crop, and reduced availability or higher cost of inputs. Non-agricultural self-employment was affected through loss of income through business closure and difficulties in business operations due to supply chain problems and lack of demand. Regular wage/salaried employment was affected by loss of jobs for many of those employed in the private sector. Casual labour activities were affected by curtailed wage employment and reduced wages in some cases. Livelihood from migrant labour was severely affected by the sudden stoppage of work in destination areas, the resulting widespread return migration and the lack of alternative employment opportunities in or around the native villages. And both casual and migrant labour livelihoods were affected by the limited operation of public works under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA).

A detailed account of each of these diverse channels through which pandemic-induced disruptions impacted each livelihood source for the study households is beyond the scope of this chapter, but is available in Datt et al. (2021). Here, we limit the discussion to the main findings on the overall impact on a particular livelihood source that could have occurred through any one or more of these channels. Our focus, in particular, is on differential impact across different types of households distinguished by (i) their primary source of livelihood or income, (ii) their social (caste/religion) group, and (iii) their income level. This is preceded by a brief summary of the overall impacts on the population as a whole.

3.4.1 Summary of Overall Impact on Livelihoods

Table 3.4 presents a summary of household-level impacts of Covid-19 on each of the main sources of livelihood. Several features of the overall livelihood impacts are notable.

The first and perhaps the most notable feature of the impact of Covid-19 is its pervasiveness. The livelihood of virtually every rural household was affected by the pandemic in some way; thus, altogether 94% of all households were affected.

The pervasiveness of impact across individual sources of livelihood was however highly varied. Thus, for instance, the impact on regular wage/salaried employment affected only 1% of all households, while 52% of all households reported being affected through the impact on migrant labour. The effect on migrant labour indeed represented by far the most pervasive form of livelihood impact for these rural households in Bihar. The second most pervasive form of impact was on casual labour which affected 36% of all households, followed by self-employment in agriculture which affected 29% of all households.

The variation in how widely the impact on a particular source of livelihood affected households reflects in part the varying extent to which households rely on different sources of livelihood. Thus, at one end, only 7.5% of all households participated in regular wage/salaried employment, while at the other end, 55% participated in migrant labour through one or more migrant workers. In light of this, it is also instructive to look at the percentage of affected households among those participating in a particular source of livelihood. As seen in the last column of Table 3.4, there is also a large variation in impacts conditional on participation. Thus, the conditional impact was 100% for casual labour and 94% for migrant labour. Participation in self-employment in (non-horticultural) agriculture and non-agriculture was also highly likely to be impacted (76 and 85% of participating households).

Table 3.4 Overall impacts across different sources of livelihood

	% of households		% of affected among those participating
Source of livelihood	participating in	affected by Covid	
Self-employed in agriculture	38.9	29.5	75.7
Self-employed in animal husbandry	54.0	9.0	16.6
Self-employed in non-agriculture	11.0	9.4	85.3
Regular wage/salaried worker	7.5	1.1	14.5
Casual labour	35.7	35.7	100.0
Migrant worker	55.4	52.3	94.4
Any source	99.1	93.6	94.4

Note All calculations use sample weights

It is however notable that the conditional impacts were low for self-employment in animal husbandry and for regular wage/salaried employment. These sources of livelihood thus offered a measure of protection against the impact of Covid. Especially, in the case of regular wage/salaried employment, if a household was fortunate to have a worker in such employment, it stood a much better chance of weathering the livelihood impact of the pandemic.

Given that we do not have information on the initial composition of household income by livelihood source as well as the diverse nature of the impact for each source, it is not possible to quantify the overall impact in monetary terms. However, since we do have information on what the households report as their main source of income, we can use this information to classify households into the following categories of increasing severity of impact, namely, households with:

(i) No impact on any income source
(ii) Impact on subsidiary sources of income only
(iii) Impact on the main source of income only, but not on subsidiary sources of income
(iv) Impact on both the main and some subsidiary income sources
(v) Impact on all sources of income.

Note that the last category of "impact on all sources of income" by definition also implies impact on the main source. It also includes impact on single source households.

Table 3.5 shows this measure of the intensity of the livelihood impact. It is notable that the impact is limited to subsidiary income sources only for about 5% of households. For nine out of ten households, the pandemic impact involves the main source of income. For about 45% of households, *all* income sources were affected. For about 20% of households, the impact involved both main and subsidiary sources of income, while for 24% of households, it was limited to just the main income source. The evidence thus further reinforces the significance of livelihood impacts for the study households insofar as these were not limited to just the minor sources of income, and in close to half the cases they extend to all income sources.

Also, note that this measure of intensity of livelihood impact accords well with the fraction of livelihood sources impacted. For the "no impact" and "impact on all sources of income" categories, this fraction is by definition 0 and 1 respectively. For the intermediate categories, it increases from 0.42 for "impact on subsidiary sources only", to 0.47 for "impact on main source", to 0.65 for "impact on main and some subsidiary sources". It is noteworthy that the average fraction of income sources impacted for all households is 71%.

Table 3.5 A measure of the intensity of livelihood impact

Intensity of impact	% of all households	Average fraction of participating livelihood sources impacted
No impact	6.4	0
Impact on subsidiary income sources only	4.9	0.42
Impact on the main source of income only	23.7	0.47
Impact on both the main and some subsidiary income sources	19.7	0.65
Impact on all sources of income	45.4	1
Total	100	0.71

Note All calculations use sample weights

3.4.2 Impact by Social Group

The pervasiveness of pandemic impact is also seen across social groups. There is some indication that the percentage of households affected (experiencing any livelihood impact) was marginally higher among SC-ST and OBC-1 groups (at 95–97%) than among the Upper Castes and Muslims (at 91–92%), but the difference is not substantial (Table 3.6).

There is however greater variation across social groups by the type of impact (Table 3.7). For instance, for SC-ST groups, the two most important sources of impact are those on livelihood as casual labour (68% of SC-ST households) and migrant work (54% of SC-ST households), while relatively fewer of these households were affected through self-employment activities. The most important type of impact for Muslim households was through migrant work (over 70% of Muslim households report this impact), though impact through casual labour was relatively less important (24% of Muslim households). By comparison, the effect on self-employment in agriculture was the most common type of impact for OBC-2 and Upper Caste households (54%

Table 3.6 Overall impacts by social group

Social group	% share in total number of households	% of households affected by Covid (any impact)
SC-ST	26	96.7
OBC-1	19	94.7
OBC-2	15	93.1
Upper Caste	23	91.1
Muslim	17	91.7
Total	100	93.6

Note All calculations use sample weights

and 50% of these households respectively). These variations in the types of impact largely reflect the underlying variations in the occupational distribution across social groups.

Table 3.8 shows the intensity of impact by social group, where intensity is measured as in Sect. 5.1 above, ranging from no impact, to the impact involving subsidiary, main or all sources of income. There is some indication here that the impacts were more severe for SC-ST households, as they have the lowest proportion of less than 7% of households with either no impact or impacts limited to subsidiary income sources only. This proportion is about 16% for Upper Caste households, though also about 13–14% for OBC-2 and Muslim households.

Table 3.7 Type of impact by social group

Type of impact on livelihood	SC-ST	OBC-1	OBC-2	Upper Caste	Muslim	All households
Self-employed in agriculture	11.4	20.8	53.8	49.9	16.9	29.5
Self-employed in animal husbandry	11.3	12.8	14.9	4.3	2.2	9.0
Self-employed in non-agriculture	3.0	11.3	19.0	9.1	8.7	9.4
Regular wage/ salaried worker	0.6	0.8	1.1	1.5	1.6	1.1
Casual labour	67.6	52.5	21.6	4.2	24.0	35.7
Migrant worker	54.4	50.4	38.3	47.2	70.8	52.3
Any source	96.7	94.7	93.1	91.1	91.7	93.6

Note All calculations use sample weights

Table 3.8 Intensity of livelihood impact by social group

Intensity of impact	SC-ST	OBC-1	OBC-2	Upper Caste	Muslim	All households
No impact	3.3	5.3	6.9	8.9	8.3	6.4
Subsidiary income sources only	3.3	4.5	5.2	7.0	4.5	4.9
Main source of income only	22.7	17.3	24.1	23.5	32.1	23.7
Main and subsidiary income sources	26.8	21.8	22.3	10.4	17.0	19.7
All sources of income	43.9	51.2	41.5	50.3	38.2	45.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note All calculations use sample weights

3.4.3 Impact by Income Class

Pandemic impact on livelihood is also pervasive across all income groups. Amongst the four income groups we distinguish for our data, there is no clear pattern in the proportion of households experiencing any livelihood impact. About 89% of the lowest income group are impacted as against 82% of the top group, while proportion of the low and the middle income group who are impacted is higher at 94–97% (Table 3.9).

Similar to the social groups, there is greater variation across income groups in the type of impact rather than the incidence of any impact. For instance, the proportion of households experiencing adverse impact through casual labour activities is highest at about 50% for the lowest income group, declines to 40%, 29% and 12% for the low, middle and top income groups respectively (Table 3.10). By contrast, the proportion of households adversely impacted through self-employment in agriculture increases with income level, from 19% for the lowest income group to 28%, 34% and 36% respectively for the low, middle and top income groups. Impact through migrant work seems to be common among all income groups; it is highest at 62% of households in the middle income group, while it is close to half the households in all the other income groups.

Table 3.11 shows the intensity of impact by income groups, which is suggestive of the impacts being more severe for the lower income groups than the top income group. For instance, no or only subsidiary income impact was limited to 6–11% of households in the lowest/low income groups, while this proportion was 36% of households in the top income group. Similarly, about 46–49% of households in the lowest, low and middle income groups reported impacts on *all* sources of income, relative to 34% of households in the top income group. While this is only a rough measure of intensity, it nonetheless points to a degree of regressivity in the livelihood impacts of the pandemic.

Table 3.9 Overall impacts by income group

Income group	% share in total number of households	% of households affected by Covid (any impact)
Lowest (<Rs 5,000)	13	89.4
Low (Rs 5,000–Rs 10,000)	50	96.5
Middle (Rs 10,000–Rs 20,000)	28	94.2
Top (>Rs 20,000)	9	82.0
Total	100	93.6

Note All calculations use sample weights

Table 3.10 Type of impacts by income group

Type of impact on livelihood	Lowest (<Rs 5,000)	Low (Rs 5,000–Rs 10,000)	Middle (Rs 10,000–Rs 20,000)	Top (>Rs 20,000)	All households
Self-employed in agriculture	19.3	28.2	34.2	36.4	29.5
Self-employed in animal husbandry	15.2	8.0	8.6	7.0	9.0
Self-employed in non-agriculture	2.8	8.9	13.0	10.4	9.4
Regular wage/ salaried worker	0.0	0.8	1.8	2.3	1.1
Casual labour	49.8	40.4	28.5	11.7	35.7
Migrant worker	49.3	48.8	61.7	47.2	52.3
Any source	89.4	96.5	94.2	82.0	93.6

Note All calculations use sample weights

Table 3.11 Intensity of livelihood impacts by income group

Intensity of impact	Lowest (<Rs 5,000)	Low (Rs 5,000–Rs 10,000)	Middle (Rs 10,000–Rs 20,000)	Top (>Rs 20,000)	All households
No impact	10.6	3.5	5.8	18.0	6.4
Subsidiary income sources only	0.4	2.7	6.8	17.7	4.9
Main source of income only	24.2	29.6	15.7	14.3	23.7
Main and subsidiary income sources	16.3	18.8	24.1	16.3	19.7
All sources of income	48.5	45.5	47.6	33.8	45.4
Total	100.0	100.0	100.0	100.0	100.0

Note All calculations use sample weights

3.5 Select Impacts on Health, Nutrition and Education

Our survey also inquired into a limited range of Covid-19 impacts on health, nutrition and education, the findings for which are presented below.

3.5.1 Health

The survey did not directly ask about Covid-19 infection among household members since at the time of the survey reported cases in rural areas were very low and there was very limited testing for Covid-19 especially in rural areas. The survey however did inquire into whether households faced problems in accessing treatment for health conditions other than Covid since the pandemic. Table 3.12 reports the findings.

About 12% of households reported facing other health problems since Covid that would have needed a visit to a doctor, clinic or hospital. Among these households, large fractions reported a range of difficulties in accessing treatment. The most common difficulty was the lack of transport to get to the medical facility, reported by 88% of households with health problems. Nearby facility being closed or not having adequate medical staff or supplies was also widely reported, by 42 and 47% of households with health problems. More than a quarter also reported long waits before receiving medical attention and 22% found the treatment unaffordably costly. Perhaps more strikingly, more than three-fourths of households with health problems also pointed to the risk of Covid-19 or other infection at the medical facility.

Covid-19 also disrupted the provision and access to child and maternal care services. The survey estimates show that about 28% of households with children below 24 months missed their children's immunization since Covid, while 41% of households with pregnant or lactating women reported being unable to avail of the ante and post-natal check-ups since Covid (Table 3.13). In addition, only 7% of households with pregnant/lactating women reported that they mostly received their Take Home Rations from Anganwadi centres. About 10% were not enrolled in the

Table 3.12 Difficulty in accessing treatment for other health conditions since Covid

	% of all households
Any household member facing health problems other than Covid that would have needed visit to a doctor/clinic/hospital (public or private)	11.7
Of these: % of households who faced the following difficulty in accessing treatment:	
Nearby medical facility closed	41.7
Nearby medical facility does not have adequate supplies or medical staff	46.5
Medical facility full, sent away	7.4
Refused treatment at medical facility	19.7
No transport available to get to the medical facility	87.5
Long wait before medical attention received	27.6
Cannot afford treatment, too costly	21.8
Risk of Covid-19 or other infection at medical facility	76.0

Note All calculations use sample weights

Table 3.13 Difficulty in accessing child immunization and maternal care since Covid

Children below 24 months:	
% of households with children below 24 months	16.7
Of these, the fraction who missed immunization since Covid	28%
Pregnant/lactating women:	
% of households with pregnant/lactating women	7.3
Of these, the fraction who were unable to get the ANC/PNC check-ups since Covid	41%
Of these, the distribution of households by receipt of Take Home Ration from Anganwadi centre since Covid:	
… not enrolled in Anganwadi centre	10%
… did not receive	33%
… received rarely or sometimes	49%
… mostly received	7%

Note All calculations use sample weights

Anganwadi centre, while 33% did not receive the Take Home Ration and about half received it only rarely or sometimes.

3.5.2 Nutrition and Education

About two-thirds of all households had school-going children. Among these households, about 63% reported their school-going children receiving midday meals at school prior to Covid (Table 3.14). This partly reflects the fact that while the midday meal programme operates in government schools, about 15% of households sent some or all of their children to private schools. Some households may also have older kids beyond the upper-primary level not covered by the midday meal program.

With the closure of schools since Covid, among households where children were earlier getting midday meals, about 16% did not receive any alternative food supplements from the government. A large fraction did receive supplements, but only about 4% received them on a regular basis; the rest (80%) received them on an occasional basis (only sometimes or rarely). Similarly, the provision of food supplements for 0–6-year-old children through the Anganwadi centres was also disrupted. About 30% of households had children in that age group. Among such households, only 2% received food supplements from the Anganwadi centre on a regular basis and about 5% received cash instead of the take-home ration. Of the rest, 19% were not enrolled in the Anganwadi centre, 25% did not receive anything and close to half received supplements only sometimes or rarely.

The survey also inquired into the response to school closures in terms of any home-based learning (Table 3.15). Of all households with school-going children, about two-thirds reported at least some home-based learning, mostly through some

Table 3.14 Disruption of midday meals at school and food supplements for children since Covid

% of households with **school-going children**	66.2
Of these, % of households where children had midday meals at school, pre-Covid	62.8
Of these, distribution of households by children's receipt of some alternative food supplement from government after school closure:	
Did not receive	16.2%
Rarely	12.9%
Sometimes	67.1%
Mostly	3.8%
% of households with **0–6 year old children**	30.0
Of these, distribution of households by children's receipt of food supplement (including Take Home Ration) from Anganwadi centre since Covid:	
Not enrolled in Anganwadi centre	19.4%
Not received	25.0%
Rarely	10.8%
Sometimes	38.0%
Mostly	2.2%
Received cash transfer instead of ration	4.7

Note All calculations use sample weights

teaching by family members or others. We do not have further information on the extent or quality of this teaching. However, only 7% of households with school-going children reported any online learning. This proportion was much lower, at under 2%, for households with children in government schools. Clearly, online teaching was not a viable alternative for children from these rural households in Bihar.

Table 3.15 Disruption of education since Covid and home-based learning

	All schools	Only government schools
% of households with **school-going children**	66.2	56.2
Of these, % of households reporting any home-based learning after school closure:		
Online learning	7.1	1.6
Taught by family members	44.2	40.5
Taught by others (including private tutoring)	42.2	39.6
Any home-based learning	66.3	63.0

Note Of all households with school-going children, 85% send all their children to government schools only, 11% send all their children to private schools only, and 4% send some to private and others to government schools. All calculations use sample weights

3.6 Access to Government Assistance

This section presents findings on the extent of public assistance received by households since the pandemic. Following the first lockdown, the government announced a series of measures to support households during the crisis. However, there is only limited evidence on how far this support was delivered on the ground and actually received by households. In the following, we present our findings in relation to the key support measures.

3.6.1 Free Additional Food Ration

One of the announced relief measures was the Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY). This provided for free additional ration of 5 kg of wheat or rice per person and one kg of pulses per household per month to all ration cardholders under the Public Distribution System (PDS). This was over and above their regular entitlement under the National Food Security Act. The measure was initially announced for the three months of April, May and June 2020, but was later extended for another five months through to November. Table 3.16 presents evidence on this for our sample households in rural Bihar.

It turns out that about 18% of all households did not have a ration card and hence were automatically excluded as they did not meet the eligibility criteria for this relief measure. Among households with ration cards, a small proportion (under 2%) did not receive any free grain or pulses. For rice or wheat, only about one-fifth of cardholding households received the announced amount of 5 kg or more. Most (78% of cardholding households) received less. For pulses, only about 7% of the cardholding households received the stipulated 1 kg or more, and more than 90% received less. Among households with ration cards, the median amount of rice or wheat received was 3.75 kg (per person listed on the card per month) while the median amount of pulses received was 750 gm (per household per month). Thus, the typical household received about three-fourths of the announced amount of free ration.

However, the provision of free ration seems to have come at the expense of the regular rations through the PDS. As seen in Table 3.17, only 51% of the cardholding households reported receiving their full normal PDS ration since Covid. The proportion receiving the full PDS ration was even lower, at 46%, for households who received at least 5 kg of free rice/wheat or at least 1 kg of free pulses. Thus, the evidence indicates that the provision of free ration was not necessarily additional to the regular PDS ration, and may have at least partially displaced the latter.

Table 3.16 Free grains or pulses received by households

Free rice/wheat received	% of all households	% of households with ration card	Amount received (kg per month per person listed on the ration card)	
			Median	Mean
No ration card	18.4			
With ration card				
Received nothing	1.5	1.8	0.00	0.00
Received less than 5 kg	63.6	78.0	3.75	3.55
Received 5 kg or more	16.5	20.2	6.25	6.36
Total	100.0	100.0	3.75	4.05
Free pulses received	% of all households	% of households with ration card	Amount received (kg per month per household with ration card)	
			Median	Mean
No ration card	18.4			
With ration card				
Received nothing	1.5	1.8	0.00	0.00
Received less than 1 kg	74.1	90.8	0.63	0.59
Received 1 kg or more	6.1	7.4	1.00	1.09
Total	100.0	100.0	0.75	0.62

Note All calculations use sample weights

Table 3.17 Displacement of normal PDS ration

	% of households receiving their FULL PDS ration
Cardholding households who:	
Did not receive their FULL free PMGKAY ration	52.7
Received their FULL free PMGKAY ration*	46.4
All cardholding households	51.4

Note * Households who received at least 5 kg of rice/wheat (per listed person per month) or at least 1 kg of pulses (per household per month). All calculations use sample weights

3.6.2 Free Cooking Gas Cylinders

Another measure announced as part of the Covid relief package was the provision of free Liquefied Petroleum Gas (LPG) cylinders for three months for the beneficiaries of the Pradhan Mantri Ujjawala Yojana (PMUY). Table 3.18 presents the evidence

Table 3.18 Provision of free LPG cylinders

	% of all households	% of eligible households
Not eligible under the PM Ujjawala Yojana	52.4	
Eligible, received … free LPG cylinders since April 2020		
None	19.2	40.4
1	13.0	27.2
2	2.8	5.9
3	10.6	22.3
4	2.0	4.2

Note All calculations use sample weights

pertaining to this measure. As seen in the Table, the majority of households (52%) were not eligible for this benefit. Another about one-fifth (19%) though eligible did not receive any free LPG cylinders since April 2020. Thus, only about 28% of households received this benefit, with about 13% receiving one LPG cylinder since April 2020 and the remaining 15% receiving more than one cylinder. Put differently, about 40% of the eligible beneficiaries received any LPG cylinder, and nearly three-quarters of the eligible beneficiaries received less than three cylinders as intended by the announced relief measure.

3.6.3 Cash Transfer into women's Jan Dhan Accounts

This relief measure is related to a cash transfer of Rs. 500 per month, for 3 months, to the Jan Dhan bank accounts held by women. Table 3.19 reports the relevant evidence for our study households.

It turns out that 31% of households did not have Jan Dhan accounts in the names of women. Of those that did, while 69% received the announced total amount of Rs. 1500, the remaining 31% received less than Rs. 1500. About 22% received a single instalment of Rs. 500 instead of three such instalments. Among all households that received the cash transfer, the average transfer per Jan Dhan account was Rs. 1226 over the 3-month period. This amounts to a transfer of just Rs. 13 per recipient household per day, which together with just under one-third of the households receiving nothing, testifies to the meagreness of this support.

3.6.4 Pension Receipts

Another support measure announced by the Government of India related to an ex-gratia payment of Rs. 1000 to poor senior citizens, widows and disabled persons.

Table 3.19 Cash transfers to women's Jan Dhan accounts

	% of households
No women Jan Dhan account	30.9
	% of households with women Jan Dhan accounts
Transfer received per Jan Dhan account (Rs.)	
0	1.3
500	22.2
750	0.5
1000	6.4
1250	0.5
1500	68.6
2250	0.2
3000	0.2
Average transfer per Jan Dhan account (Rs.)	1226
Average transfer per recipient household per day (Rs.)	13

Note All calculations use sample weights

This was over and above the existing pensions for these groups, which in any case have been long criticized for their paltry entitlements. Table 3.20 reports the evidence on old-age, widow and disability pensions received by the study households over the six-month period from April to September 2020.

As seen from the Table, the household coverage of these pensions is limited. Only about one-fifth of all households received old-age pensions for this period, though the coverage of old-age pensions in Bihar is meant to be universal since 2019 (at Rs. 400 per month). The coverage of widow and disability pensions is far more minimal at 4 and under 2% of all households.

Besides limited coverage, the pension amounts received are small not only in absolute terms but also relative to entitlements. For instance, the median amount

Table 3.20 Old-age, widow and disability pensions received during April-September 2020

	% of households receiving the pension	Amount per recipient household per month (Rs.)				
Type of pension		P25	Median	Mean	P75	Median/Entitlement
Widow	4.3	200	333	340	500	0.71
Old-age	19.5	200	367	359	400	0.65
Disability	1.4	200	300	314	400	0.53
Any pension	24.7	200	367	359	400	

Note All calculations use sample weights

per recipient household per month was Rs. 367 for old-age pensions, Rs. 333 for widow pensions, and Rs. 300 for disability pensions. However, including the special ex-gratia payment of Rs. 1000, the entitlements per month for this six-month period should have been Rs. 467 per month for widow pensions and Rs. 567 per month for old-age and disability pensions.[6] Monthly receipts for more than three-fourths of recipients of old-age and disability pension recipients, and more than three-fifths of widow pension recipients fell short of these entitlements by 29–47%.

3.7 In Closing

The aim of this study was to document ground-level evidence on the impact of the Covid-19 pandemic on the livelihoods of rural households in Bihar and the level of government support they received to cope with this impact. The picture that emerges from the detailed evidence the study was able to document is one of pervasive and severe impacts on rural livelihoods in the state. The study primarily relates to impacts over the first 8–10 months of the pandemic since April 2020. This is a period when Covid-19 infections were concentrated in urban areas of the country. The evidence shows that it nonetheless exacted a large toll on rural livelihoods too, mainly due to the widespread disruption of economic activities and the many links between the urban and rural economies. In the case of Bihar, this was exacerbated by the dominant link through migrant workers on whose earnings as much as half of the rural households in Bihar critically depend. The livelihood impacts the study documents are likely to have pushed many into poverty and those already poor into a more severe state of deprivation, with the evidence also suggestive of higher intensity of impact among less privileged socio-economic groups.

In contrast to the scale of the livelihood impact, the evidence testifies to the meagre level of government support received by the rural population of Bihar. Many households received only a fraction of the promised support at a time when the existing safety nets were also compromised to a lesser or greater extent. However, the promised support itself was meagre relative to the impacts. The need and case for greater support to affected households for them to find a pathway to a reasonable recovery is obvious. This case is only strengthened by the experience of the more devastating second wave of the pandemic since March 2021 that heavily afflicted the rural areas too.

In particular, the study also documents how the pandemic has highlighted the complete lack of social protection for migrant workers who are the backbone of key sectors of the economy including construction, manufacturing and agriculture, and who are critical to the welfare of large number rural households who rely on remittances sent by them. The lack of portability of certain safety nets such as subsidized

[6] Calculated over the six-month period at Rs. 300 per month for widow pensions and Rs. 400 per month for old-age and disability pensions. This entitlement also assumes that there is only one eligible member for a particular type of pension if the household reports receiving that pension.

food through the Public Distribution System, and the absence of social insurance mechanisms such as MGNREGA in urban areas stand out as key areas for future social policy reform.

This study also underscores the importance of continued and rapid data gathering to monitor the evolving impacts of the pandemic and engineer timely support to those in need. It also underscores the need to develop flexible support mechanisms that can spring into action based on some observable triggers that an institutionalized data gathering process can regularly monitor.

Finally, while this study has obvious and immediate relevance for Bihar, it highlights issues of broader relevance beyond this immediate context. Together with other studies of a similar nature, it adds to the corpus of ground-level evidence on the multifaceted impact of the pandemic, not only as a matter of historical documentation but also as a record of who is impacted, and how that should inform mitigation, support and recovery efforts for those impacted.

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Chapter 4
The Impact of the Pandemic on Social Vulnerabilities in India

Archana Dang, Mausumi Das, and Indrani Gupta

Abstract This research looks at the economic well-being of households across social categories in India before and during the COVID-19 pandemic. Nearly all households saw significant spending reductions during the pandemic, resulting in a leftward shift in the distribution of monthly per capita household expenditure (MPCHE) in 2020 compared to that in 2017. We document that even prior to the epidemic, the percentage change in the MPCHE slowed down, leaving the Indian economy more vulnerable. This slowdown was more pronounced particularly among urban families, who had seen a drop in spending prior to the pandemic. The economic shock that came in the wake of the COVID-19 pandemic further compounded this problem. Indeed in 2020, the MPCHE fell by 27% in urban households and 20% in rural households, while poverty rose by 19 and 14 percentage points in urban and rural households, respectively. In this paper, we focus on the urban households, which were disproportionately impacted by the pandemic, and evaluate the impact by two social groups—caste and religion. Our findings show that the socially disadvantaged groups, who were already at the bottom of the economic ladder in the pre-pandemic period, have been significantly impacted. SC/STs, Muslims, and Hindu-SC/STs had the highest increase in poverty rates as compared to Hindu-UCs, Sikhs, and Christians. Our results indicate that the pandemic has deepened already-existing economic disparities between socio-economic groups.

Keywords COVID · Poverty · Caste · Religion · Vulnerability

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4.1 Introduction

The COVID pandemic has had a huge negative impact on the global economy. However, the degree of the pandemic shock has been varied across countries, depending on their pre-pandemic macroeconomic trends. The Indian economy was already frail due to the slowdown prior to the COVID-induced epidemic, making it more susceptible to an adverse economic shock (Ramakumar & Kanitkar, 2021; Subramanian & Felman, 2019). In this backdrop, the Indian government implemented one of the harshest national lockdowns beginning March 24, 2020, to contain the spread of COVID-19. Given the nature of the disease, the lockdown—and the consequent halting of economic activities—were probably unavoidable in principle, but some have argued that it could have been less harsh and implemented in a phased manner to soften the impact (Bhattacharyya, 2020; Menezes, 2020; Ray & Subramanian, 2020). These policies precipitated an economic crisis, which was the greatest economic shock in the country in recent history.

While the COVID-19 virus can—in principle—infect anyone irrespective of her socio-economic status and lead to economic losses via reduced economic activity and job losses, evidence from the United States and the United Kingdom showed that racial and ethnic minority groups had a disproportionate number of COVID-19 infections, hospitalizations, and deaths (Moore et al., 2020; Adhikari et al., 2020; Owen et al., 2020; Dobin & Dobin, 2020). Furthermore, not only have there been unequal health impacts, but there have also been unequal economic repercussions, i.e., socially vulnerable groups have been affected more than others, exacerbating already-existing disparities in economic inequality.

The scenario in India is also not very different. Although the data on fatality due to COVID in India is not available by social group categories of caste and religion—making it difficult to ascertain which groups were at higher risk of mortality—there is little evidence to suggest that the economic (such as on employment, income) impact of the epidemic has been uniform across social classes. Moreover, the pre-COVID economic slowdown and the unbalanced nature of the growth process had already created fissures within the society, which are likely to have impacted the coping mechanisms of the weaker sections of the population. Yet, there has not been any systematic study that explores the differential impact of COVID across different sections of the population from a pre- and post-COVID perspective.

In this paper, we attempt to fill this gap. The study has two objectives: (a) to investigate the economic well-being of households/individuals utilizing monthly per capita household expenditure (MPCHE), percentage change in MPCHE, and poverty rates in pre-COVID years (2017, 2018, and 2019) and COVID years (2020), to assess the effects before and during the pandemic year; and (b) to examine these economic indicators before COVID and during COVID by two social categories—caste and religion. We utilize the nationally representative dataset Consumer Pyramid Household Survey (CPHS) for our analysis.

There exist quite a few studies that document the contemporaneous impact of the pandemic shock on the poverty and employment situation in India. Kesar et al. (2021)

and Abraham et al. (2021) were among the first to investigate and demonstrate that urban workers were struck more heavily at least during the first year of COVID.[1] According to an early analysis by Kochhar (2021), around 75 million people in India were expected to become impoverished as a result of the COVID issue, accounting for more than half of the global increase in poverty. Furthermore, a few studies using CPHS (the only dataset available during the pandemic) show an increase in poverty rates in India; for example, the State of Working India (2021) found a 15-percentage point increase in poverty in rural areas and a 20-percentage point increase in poverty in urban areas in 2020. Similarly, Dhingra and Ghatak (2021) report a 14 and 18 percentage point increase in poverty (year on year from August 2019 to August 2020) in rural and urban areas respectively, using the same dataset. Gupta et al. (2021) and Jha and Lahoti (2022) similarly show a sharp increase in poverty during the first lockdown, after which poverty rates dropped but did not revert to pre-pandemic levels.

Evidence from India demonstrates that job losses have disproportionately impacted the disadvantaged groups. According to Deshpande and Ramachandran (2020), Scheduled Caste (SCs) and Other Backward Classes (OBCs) were respectively 14% and 6.8% more likely to lose their jobs during the lockdown compared to Upper Caste (UC). Moreover, only UC men were able to recover after the lockdown, as opposed to men and women from other castes (Deshpande, 2022). Furthermore, the fall in employment was greatest for employees with less education (Abraham et al., 2021; Deshpande, 2022). Less-educated members had a higher chance of finding work while being unemployed (Abraham et al., 2021), but Deshpande (2022) found that recovery for illiterate men was slow. Finally, women were more likely than men to lose their jobs during the lockdown, while males recovered faster following the lockdown (Abraham et al., 2021; Deshpande, 2022).

Our study complements this existing literature in two distinct ways: (a) we undertake before and during COVID analyses to examine if the pre-COVID disparities played any role in explaining the differences observed after the pandemic started; (b) we analyze household well-being by focusing on changes in household monthly consumption expenditure across social groups.

4.2 Data

The study utilizes the Consumer Pyramid Household Survey (CPHS) conducted by the Center for Monitoring Indian Economy (CMIE) for the analysis. CPHS is a representative longitudinal survey of over 150,000 households, covering almost all the states. It collects information on various indicators such as household demographics, income, expenses, employment status, ownership of assets, access to basic

[1] Using CPHS data, Kesar et al. (2021) and Abraham et al. (2021) estimated workers who were who were in the workforce prior to the lockdown (in February), but reported being either unemployed, or out of the labour force, or not having worked for even a single day during the lockdown.

amenities, etc. Each year the data is collected in waves; January–April, May–August, and September–December. The first wave was administered during January–April 2014; more than 20 waves have been executed since then. Every household is interviewed once in four months, i.e., thrice a year. Within each wave, each household is slotted in a specific month, and every household is interviewed precisely four months after their last interview. So, for example, if a household is interviewed in February, that particular household will be re-interviewed in June and then in October in a calendar year.

We use data from waves beginning January–April 2017 (Wave 10) to September–December 2020 (Wave 21) for the analysis. Although households are visited once every four months, information on income and consumption expenditure (both in rupees) are obtained for the four months preceding the interview month, enabling a monthly time series of these variables for each household. The expenditure data includes information on food, education, health, clothing and footwear, cosmetics, recreation, power, and fuel. These categories are further subdivided into more refined categories. For example, the expenditure on food includes pulses, whole grains, edible oils, ghee, vegetables, fruits, etc.

There is evidence that households tend to report their income/expenditure for the previous four months based on their current circumstances (Wadhwa, 2019), making the most recent available information a more useful variable due to bias in previous months' reporting. Accordingly, we also use one-month recall expenditure data in our analysis. For example, for a household interviewed in February, we rely on their January expenditure data. As a result, for each calendar year, each household will have three data points. For our analysis, we use a three-month average to calculate each household's monthly per capita consumption expenditure (the sum of food and non-food expenditures) for each calendar year. We denote this variable as monthly per capita household expenditure (MPCHE). All expenditure data is converted to 2012 prices using the Consumer Price Index (CPI), 2012 base. Poverty status is determined for each individual based on household's average monthly per capita consumption expenditure (as described above) using the Rangarajan committee poverty line.[2] Finally, we utilize 2017, 2018 and 2019 as pre-COVID years and 2020 as the COVID year.

4.3 A Comparison of Economic Indicators in COVID Year with Pre-COVID Years

We utilize the percentage change in household's monthly per capita (MPCHE) spending across pre-COVID and COVID years. We measure poverty rates by estimating the number of individuals below absolute poverty line.

[2] The Rangarajan committee poverty line for rural is Rs 972 and urban is Rs 1410 in 2011–12 prices but we use CPI 2012 to convert these poverty lines in 2012 terms.

To get a perspective on the pattern of household consumption expenditure in the years preceding the COVID shock and during COVID, we first examine the overall distribution of monthly per capita spending across rural and urban households. Figure 4.1 depicts the distribution of monthly per capita spending of households for the pre-COVID years of 2017, 2018, and 2019 as well as 2020, the COVID year for both rural (Panel A, Fig. 4.1) and urban areas (Panel B, Fig. 4.1). The kernel density plots and dash lines of the same color correspond to the distribution of MPCHE and average MPCHE for a given year.

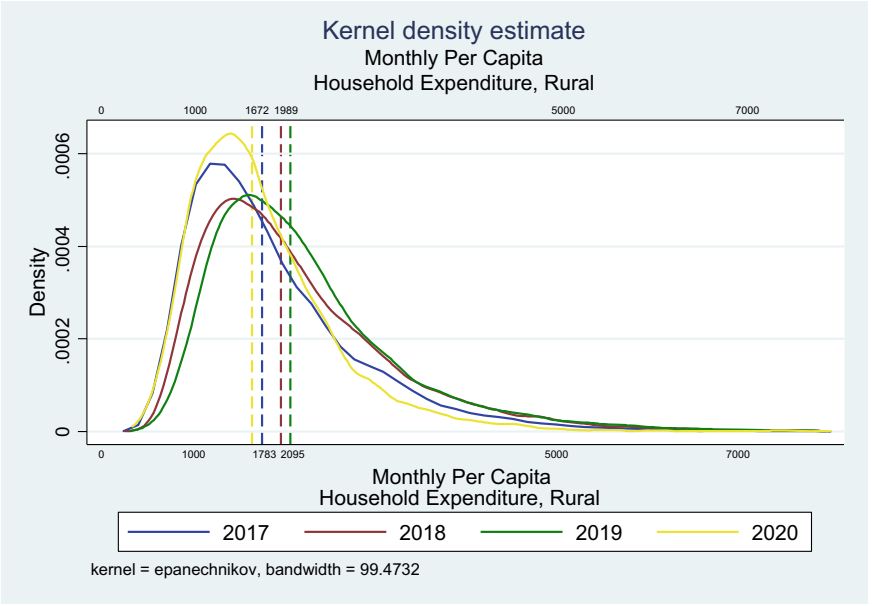
As shown in Fig. 4.1, in pre-COVID years 2017, 2018, and 2019, the average MPCHE in urban regions was Rs 2684, Rs 3028, and Rs 3013, respectively, whereas the equivalent figures in rural areas were Rs 1783, Rs 1989, and Rs 2095. During the COVID period, i.e., 2020, the mean MPCHE decreased to Rs 2193 in urban areas and Rs 1672 in rural areas, both of which were lower than the 2017 average. Furthermore, the fall in average expenditure is more substantial in urban than in rural regions.

Figure 4.1 shows that the MPCHE distribution for the COVID year has moved significantly to the left, and the Kolmogorov–Smirnov test rejects the null hypothesis of equality of MPCHE distributions across 2020 and 2019, 2020 and 2018, and 2020 and 2017. This is true for both urban and rural households. These findings indicate that the economic well-being of households in 2020 was lower than three years ago.

The altering pattern of household consumption expenditure becomes more clearly visible when we compare year to year changes. Figure 4.2 depicts the percentage change in MPCHE from one year to the next by type of residence and year. It shows that household expenditure rose by 12% and 13% on average in rural and urban areas respectively in 2018 from 2017. However, when comparing 2019 to 2018, the change in expenditure was positive for rural households; the growth was less than the previous year, with spending increasing by just 5% (Fig. 4.2). On the other hand, in urban areas, spending was actually lower in 2019 compared to 2018. These numbers indicate that the Indian economy slowed even before COVID struck the world. Furthermore, urban regions were hit worse than rural ones, as spending fell in 2019 compared to 2018. This finding is similar to the findings of Subramanian and Felman (2019), Jaffrelot (2020), and Dev and Sengupta (2020), who found that India was experiencing a slowdown before 2020.

As expected, and illustrated in Fig. 4.2, household spending fell during the pandemic year, with a negative percentage change in expenditure. Rural expenditure declined by 20% on average, whereas urban expenditure fell by 27% (Fig. 4.2). Furthermore, at least in the first year of COVID, the estimates above demonstrate that urban (relative to rural) households were hit harder as they experienced a more significant decline. Two factors possibly contributed to this regional disparity. First, the concentration of population and that of economic activities in the urban areas meant, they were impacted more due to COVID-19 infections than rural areas during the first year of the pandemic (Gupta et al., 2022; Pandey et al., 2022). Secondly, household consumption in the urban areas had already stagnated in 2018–19; therefore, the economic shock associated with pandemic acted as a dual blow, leaving very little room for drawing down saving from the previous year to smooth consumption.

Panel A



Panel B

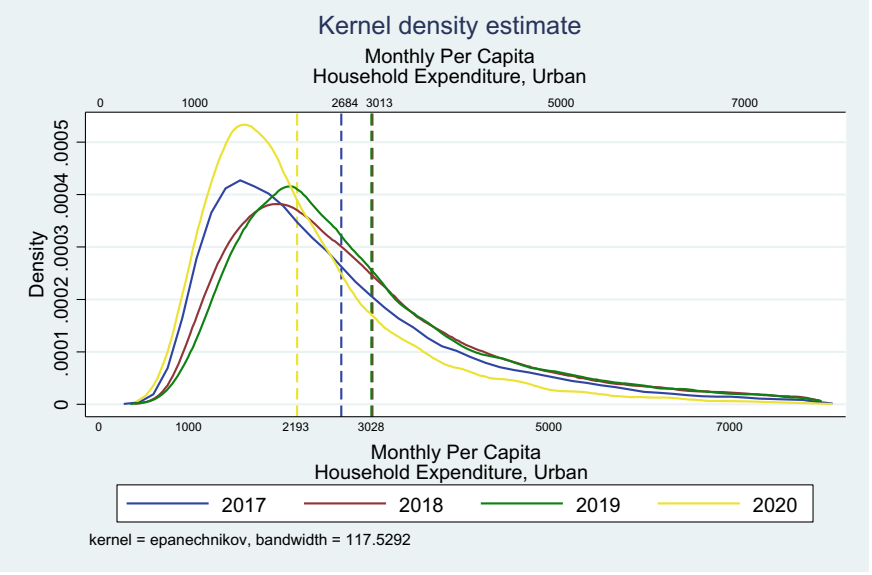


Fig. 4.1 Probability density function and average monthly per capita expenditure of households by year. *Source* Estimated using unit record data of the Consumer Pyramid Household Survey (CPHS). *Notes* Monthly per capita household expenditure is in 2012 prices

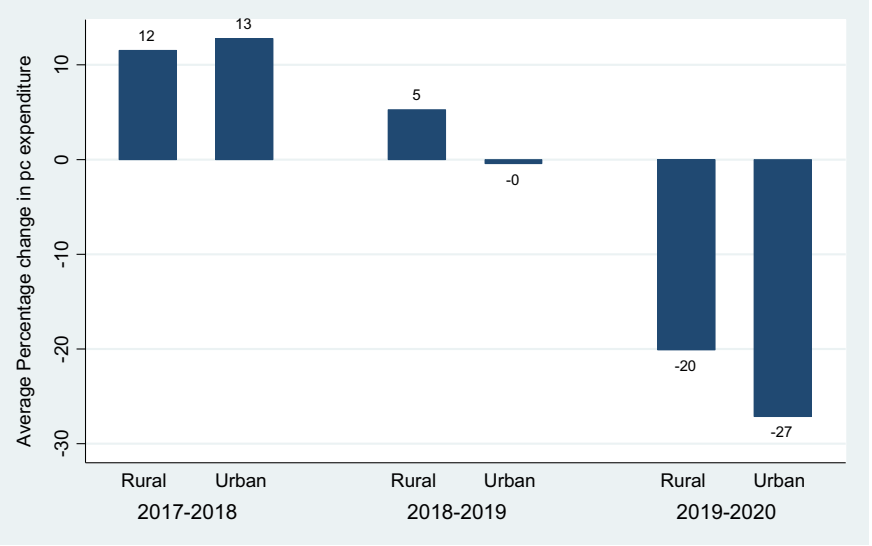


Fig. 4.2 Percentage change in monthly per capita household expenditure by type of residence and year. *Source* Estimates computed using unit record data of the Consumer Pyramid Household Survey (CPHS). *Notes* Monthly per capita household expenditure is in 2012 prices

Our findings lend support to previous research indicating urban regions were disproportionately affected by the economic slowdown due to pandemic (Abraham et al., 2021; Kesar et al., 2021).

Reduction in households' consumption expenditure also makes them more susceptible to poverty. We now turn to a comparative study of the poverty rates in rural and urban areas over the period 2017–2020.

In terms of poverty rates, Fig. 4.3 shows that approximately 25–27% of rural and urban individuals were below the poverty line in 2017, immediately following demonetisation, whereas poverty rates declined to 16–17% in both rural and urban areas in 2018. In the following year, 2019, it declined further to 11% in rural regions and 14% in urban areas. Poverty rates in rural and urban regions grew by 13 and 19 percentage points respectively, in the COVID year 2020. These figures are consistent with the State of Working India (2021) and Dhingra and Ghatak (2021) findings which use the same dataset.

Our analysis so far has depicted a broad aggregative picture of the regional disparities in average consumption expenditure of households in the pre-COVID years, which were exacerbated at the onset of the pandemic. But there were within-region disparities too: disparities that showed up along various socio-economic dimensions. In order to identify the impact of COVID on the most vulnerable sections of the society, therefore, we go beyond these average numbers and look across different social categories. Since our findings above and other studies (Abraham et al., 2021;

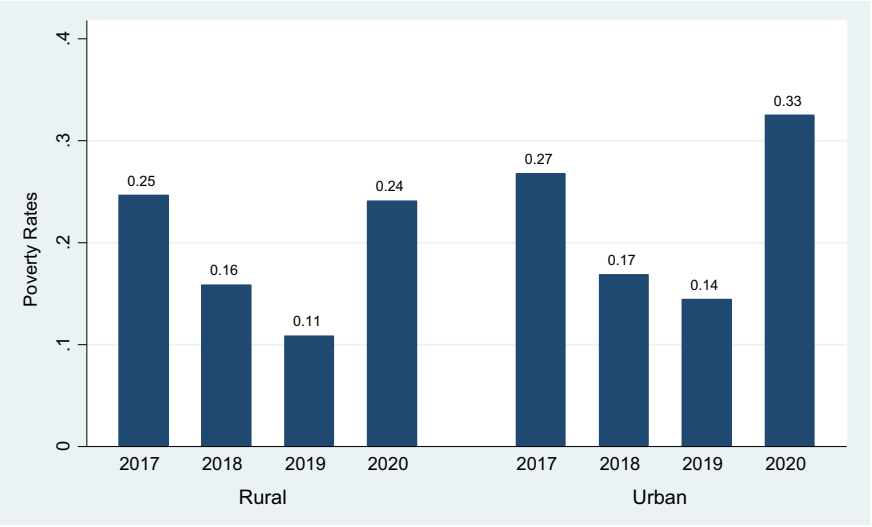


Fig. 4.3 Poverty ratios as a percentage of individuals by type of residence and year. *Source* Estimated using unit record data of the Consumer Pyramid Household Survey (CPHS) using monthly per capita expenditure is in 2012 terms

Kesar et al., 2021) demonstrate that urban households were more impacted in the first year of COVID, we limit our subsequent analysis to only urban households.

4.4 Understanding Heterogeneity of Economic Indicators by Social Categories

Numerous studies reveal that caste and religion groups differ in outcomes such as education, occupation, consumption expenditure, salaries, and asset ownership. Despite significant growth in income for all Indians, poverty is concentrated among SCs/STs and other minority groups such as OBCs and Muslims (Borooah, 2010; Desai et al., 2010). As a result, members in these groups, whether individuals or households, are more likely to be exposed to adverse shocks such as COVID. In this section, therefore, we examine how the per capita expenditure has changed for different social groups in the pre-COVID years and the additional impact on account of COVID on these groups.

For the analysis, we use three broad caste categories: Scheduled Caste (SC)/ Scheduled Tribes (ST), Other Backward Classes (OBC) and Upper Caste (UCs). Similarly, we use Muslims, Hindus, and others (mostly comprising Sikhs and Christian households since the proportions of Buddhist and Jain households were low).

4.4.1 Per Capita Expenditure by Caste and Religion

As seen in Fig. 4.4, the economic dominance of the UCs over other social categories, in particular the SCs and STs, has remained unaltered in the period 2017–2020, despite the COVID shock. Indeed, for all the four years under study, UCs are at the top of the ladder in terms of level of per capita expenditure, followed by OBCs and SC/STs, who are at the bottom. During the COVID year, all groups saw a dramatic drop in their expenditure levels. For example, it fell by Rs 952 for UCs, while it fell by Rs 728 and Rs 625 for SC/STs and OBCs, respectively (see Table 4.1). In absolute terms, the expenditure fall was greater for UCs than for the disadvantaged groups, but in relative terms, the percentage change in expenditure was not substantially different, with SC/STs and UCs household spending falling by 28–27% and OBCs households spending falling by 25% (see Table 4.1).

Carrying out a similar analysis across different religious groups, we find that the Hindu majority is no longer economically the most dominant group. Indeed, as Fig. 4.5 illustrates, households that identify themselves to other-religion (such as Sikhs, Christians, and so on) are the most prosperous, followed by the Hindus. However, the Muslims have remained at the bottom rung of the ladder for all the four periods of our study. During the COVID shock, the average monthly spending declined for all categories: absolute spending declined by Rs 1011 for other-religion households, Rs 718 and Rs 619 for Hindu and Muslim households, respectively (see

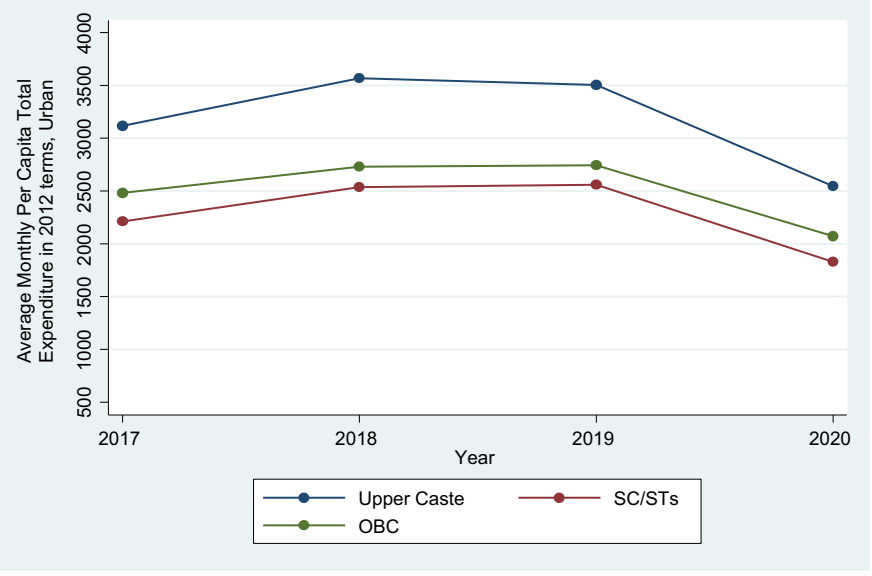


Fig. 4.4 Monthly per capita expenditure of urban households by year and caste categories. *Source* Estimated using unit record data of the Consumer Pyramid Household Survey (CPHS). *Notes* Monthly per capita household expenditure is in 2012 prices

Table 4.1 Absolute and percentage change in monthly per capita expenditure of urban households between 2019 (pre-COVID year) and 2020 (during COVID) by caste and religion (in INR)

Caste	Absolute change	Percentage change (%)	Caste and religion	Absolute change	Percentage change (%)
Upper castes	−959	−27	Hindu–upper castes	−876	−24
OBCs	−728	−28	Hindu-OBCs	−603	−22
SC/STs	−675	−25	Hindu-SC/STs	−604	−24
Religion			Muslims	−548	−23
Hindus	−718	−24	Other-religion	−1019	−25
Muslims	−619	−25			
Other-religion	−1011	−25			

Source Estimates computed using unit record data of the Consumer Pyramid Household Survey (CPHS)
Notes Monthly per capita household expenditure is in 2012 prices

Table 4.1). However, as Table 4.1 indicates, the variability in percentage terms is not very different; it decreased by 24–25% across religion categories.

In order to get a relative perspective between the social and religious categories, we now combine across categories. Accordingly, in Fig. 4.6, we identify households

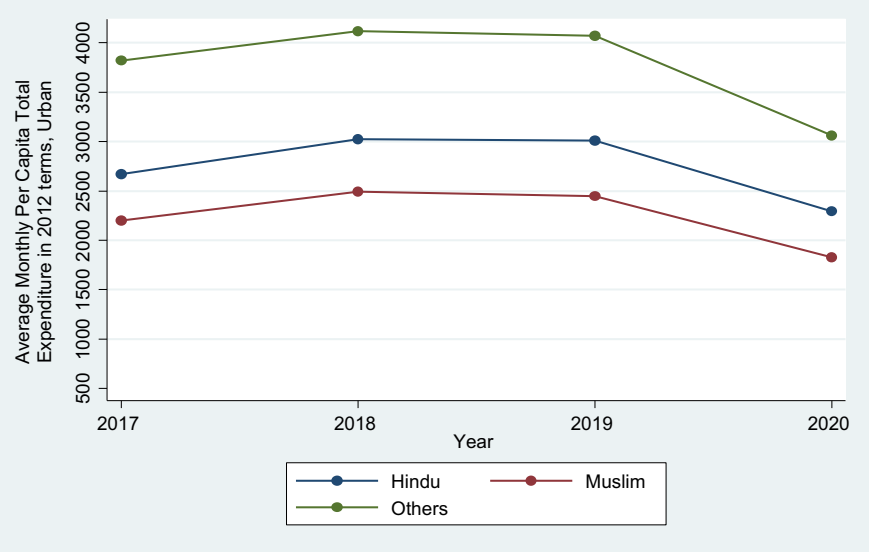


Fig. 4.5 Monthly per capita expenditure of urban households by year and religious categories. *Source* Estimated using unit record data of the Consumer Pyramid Household Survey (CPHS). *Notes* Monthly per capita household expenditure is in 2012 prices

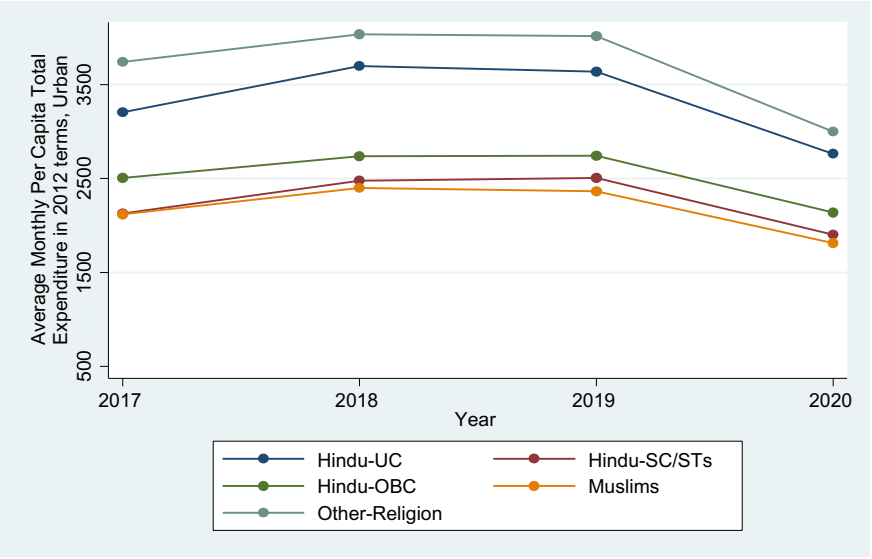


Fig. 4.6 Monthly per capita expenditure of urban households by year and caste and religious categories. *Source* Estimated using unit record data of the Consumer Pyramid Household Survey (CPHS). *Notes* Monthly per capita household expenditure is in 2012 prices

based on caste categories within religious communities. We find that other-religion households have the highest expenditure levels, followed by Hindu-UC and Hindu-OBCs, while Hindu-SC/STs and Muslims are among the lowest on the ladder and have comparable spending levels. During COVID, expenditure levels fell sharply across the board, with other-religion households experiencing the greatest absolute drop. However, when we consider their previous expenditure levels, i.e., when we consider percentage change in expenditure, all socio-religious categories experience a similar drop in expenditure ranging from 22% by Hindu OBCs to 25% by other-religion.

4.4.2 Poverty Rates by Caste and Religion

As mentioned previously, it is a well-documented fact that the levels of poverty are higher among underprivileged groups such as SC/STs, Muslims etc. As shown in Fig. 4.7, SC/STs show the highest poverty incidence in urban areas in both pre- and during-COVID periods. The OBCs follow next, and the UCs have the lowest incidence.

During the COVID year, poverty increased dramatically for all groups, as indicated in Table 4.2, with SC/STs experiencing a 24-percentage point rise, followed by OBCs experiencing a 21-percentage point increase, and UC seeing an 18-percentage point

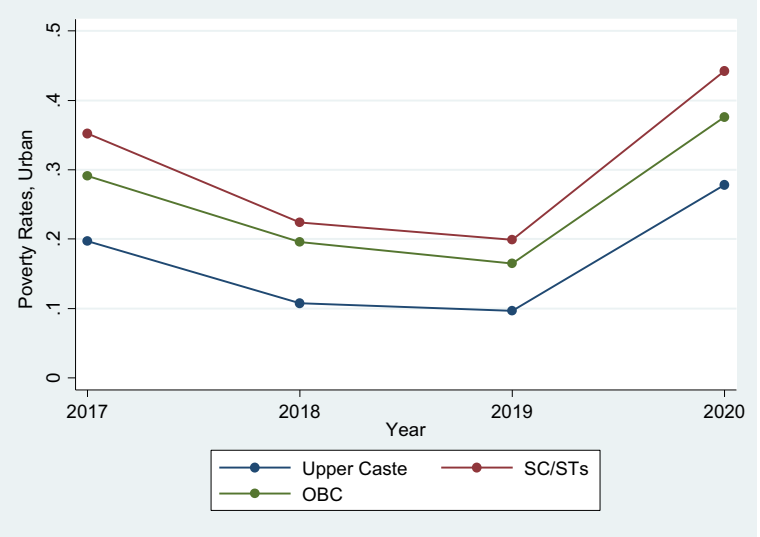


Fig. 4.7 Poverty rates of urban India by year and caste categories. *Source* Estimated using unit record data of the Consumer Pyramid Household Survey (CPHS). *Notes* Monthly per capita household expenditure is in 2012 prices

increase. There wasn't much variation in the percentage change in spending (see Table 4.1), but when it comes to impoverishment, we see variation across social groups, with the most vulnerable social group facing the most impoverishment.

When we look at poverty incidence by religious group (Fig. 4.8), we see that there are variations in prevalence across religious groups, even in urban India. The highest incidence is recorded for Muslims across all years, with Hindus coming in second, followed by other-religion communities, primarily Christians and Sikhs.

Table 4.2 Change in poverty rates between 2019 (pre-COVID year) and 2020 (during COVID) by caste and religion

Caste	Percentage point	Caste and religion	Percentage point
Upper castes	18	Hindu–upper castes	16
OBCs	21	Hindu-OBCs	24
SC/STs	24	Hindu-SC/STs	23
Religion		Muslims	26
Hindus	22	Other-religion	9
Muslims	26		
Other-religion	9		

Source Estimated using unit record data of the Consumer Pyramid Household Survey (CPHS)
Notes Monthly per capita household expenditure is in 2012 prices

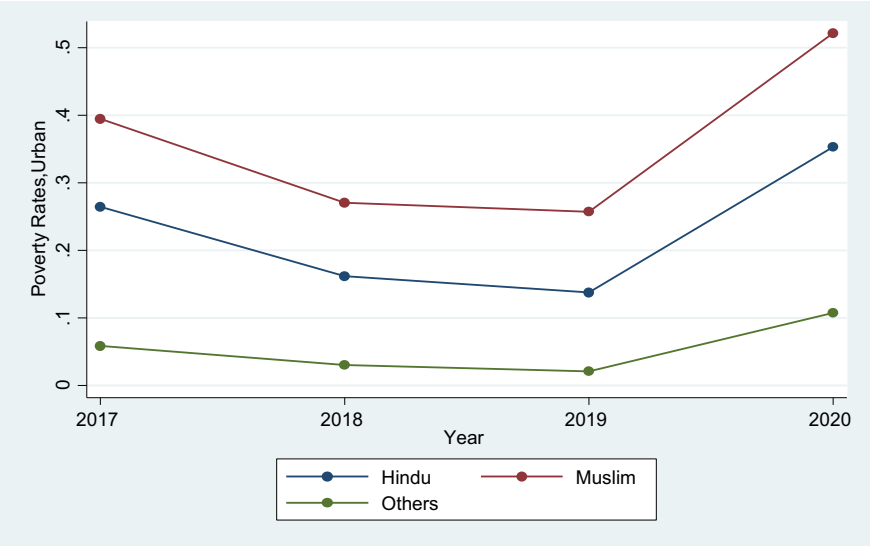


Fig. 4.8 Poverty rates of urban India by year and religious categories. *Source* Estimated using unit record data of the Consumer Pyramid Household Survey (CPHS). *Notes* Monthly per capita household expenditure is in 2012 prices

The prevalence of education among Christians has aided them, although Sikhs have enjoyed economic growth first due to farming and dairying (Thorat, 2010).

The most vulnerable group, Muslims, experienced the largest increase in poverty during COVID, with poverty increasing by 26 percentage points, while Hindus saw an increase of 22 percentage points (see Table 4.2). Poverty increased by 9 percentage points among the wealthiest religious communities, namely Christians and Sikhs but was much less sharp rise than the other-religious communities.

When we further disaggregate caste within Hindus, and compare them with Muslims and other-religion groups, we observe that Muslims have the greatest poverty rates, followed by Hindu-SC/STs (Fig. 4.9). Hindu OBCs had the third highest poverty rate, with Hindu-UCs having the second lowest and the other-religion community having the lowest.

We witness a dramatic spike in the poverty rates of the most vulnerable, with Muslims experiencing a 26-percentage point increase in poverty rates during the COVID year, followed by Hindu-OBCs and Hindu-SC/STs experiencing a 23–24 percentage point increase in the head count ratio (see Table 4.2). In the COVID year, the poverty incidence among Hindu-UCs and other-religious groups increased by 16 and 9 percentage points, respectively.

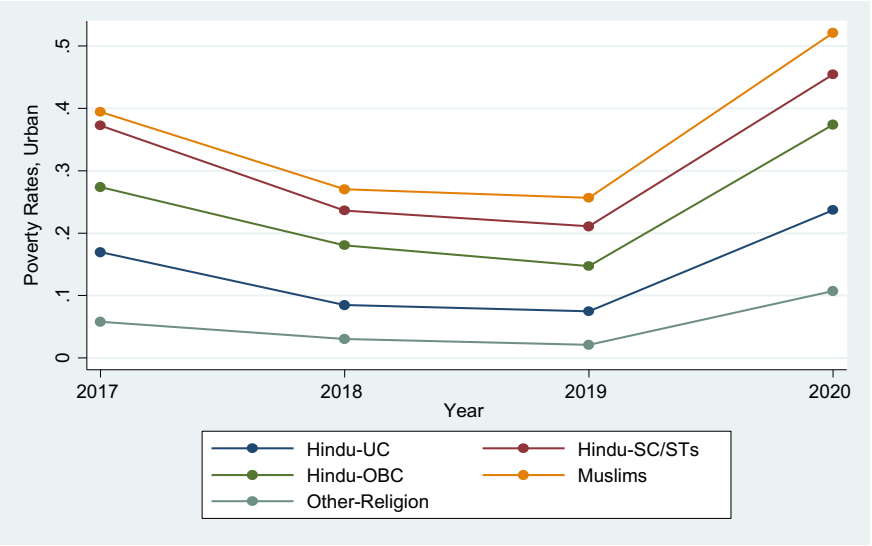


Fig. 4.9 Poverty rates of urban India by year, caste and religious categories. *Source* Estimated using unit record data of the Consumer Pyramid Household Survey (CPHS). *Notes* Monthly per capita household expenditure is in 2012 prices

4.5 Conclusion

Concerns have been raised regarding the pandemic's influence on the economy. This study examines the material well-being of households/individuals prior to and during COVID years, utilizing monthly per capita expenditure of households and estimates of poverty rates using a nationally representative dataset. According to the evidence, the distribution of monthly per capita expenditure of households in 2020 has moved significantly to the left compared to the distribution in 2017. Households' per capita expenditure fell by 27% on average in 2020 compared to 2019. Furthermore, the Indian economy was already weak prior to the epidemic, as evidenced by the drop in percentage change in expenditure shortly before the outbreak, which is consistent with other studies. Poverty rates increased by 14 percentage points in rural areas and 19 percentage points in urban areas respectively. Our findings show that both rural and urban households were impacted, but urban households were impacted more, at least in the first year of COVID, which is consistent with the literature.

The economic cost of COVID has not been distributed evenly across social groups. We show that the drop in the percentage change in expenditure is nearly identical across social classes, but those at the bottom of the distribution, i.e., the already disadvantaged socio-economic groups, were affected the hardest in terms of impoverishment. According to our findings, SC/STs, Muslims, and Hindu SC/STs were at the bottom of the ladder. Although the fall in per capita expenditure for these categories

was about 24–25%—which was closer to the overall decline in per capita expenditure—this decline drove the disadvantaged below the poverty line, and poverty rates for these groups climbed dramatically. For example, poverty increased by 22 percentage points among SC/STs, by 26 percentage points among Muslims, and by 23 percentage points among Hindu-SC/STs when compared to Hindu-UC, among them poverty increased by 16 percentage points and by 9 percentage points among other-religious communities (mostly Sikhs and Christians).

We conclude that the pandemic has been economically more damaging for the socially disadvantaged groups, who historically have a significantly lower ability to cope with the economic impact. The pandemic has, therefore, further aggravated the already-existing imbalance in the society and inserted another layer of disadvantage for the most vulnerable populations comprising disadvantaged castes (such as SC/STs) and Muslims. Paying greater attention to these groups in poverty alleviation policies would help narrow the inequality gaps faster.

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Chapter 5
COVID-19 and Education in India: A New Education Crisis in the Making

Jandhyala B. G. Tilak

Abstract This article briefly reviews the devastating impact of the COVID-19 on the education sector in India. Focusing on school education, it also critically examines how effective online learning, the only major way adopted during the pandemic, has been in the delivery of education and whether it is a reliable alternative method of teaching and learning in India. It also briefly outlines a few important strategies required for the recovery of loss incurred and to face emerging challenges in education in India.

Keywords COVID-19 · Online learning · Teachers · Inequalities · Fees · Private schools

5.1 The Global Pandemic and the Emergency Response

The sudden outbreak of the Corona virus disease, popularly known as COVID-19, a highly infectious disease caused by the SARS-CoV-2 virus, sent shockwaves across the whole world, killing hundreds and thousands of people, and devastating every country and affecting every sector. Few places could escape from its malignant breath. By August 2023, i.e., in about three years and a half about 7.7 billion people have been infected with the virus worldwide and 7 million died (WHO COVID-19 Dashboard). The numbers are equally frightening in India: 4.5 crore have been infected and 5.3 lakh deceased. The numbers of both infections and deaths are still rising, though at much reduced rates of growth.

The emergency response of the governments to the sudden emergence of the unprecedented crisis has been somewhat uniform: the desperate closure of all the

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activities in the entire country. The sudden pandemic forced nations to lockdown their countries in all respects—schools were shut; workplaces were closed; markets were sealed; international as well as domestic travel was banned; even mobility of people outside their homes was prohibited. Only essential activities like medical and sanitation, services like power and water supply, and sale/purchase of basic essentials of food items and pharmaceuticals were allowed, that too with several conditions attached. People were predominantly confined to their homes. This continued for several months, before attempts were made, to slowly and partially, but not very successfully, relax restrictions on selected sectors. Finally after several months all restrictions have been lifted.

But soon some countries were to re-adopt some of the restrictions. Many countries are not yet free from the COVID restrictions. Work from home has become the norm in many countries, except in the case of essential services where the physical presence of the employees is considered absolutely necessary.

Among the many sectors, education is an important one that has been inflicted with serious radical ruptures, resulting in an education emergency, and it is feared that the effects of the lockdown might last too long—longer than those on many other sectors of the economy. The effects on other sectors have also caused further rippling effects on the education sector. But COVID-19's overall impact on education is going to be long-lasting. Of all, schools were the first to be closed, and the last to be reopened, having hampered severely all three main activities in education, that is, admissions, teaching–learning and examinations. Higher education and research have also been seriously disrupted (Tilak & Kumar, 2022). As an immediate response to the unprecedented health crisis created by the pandemic, the education sector first adopted the drastic measure of closing schools, colleges and universities all across the nation. China, which reported the first case in the world in December 2019, closed its schools in February 2020, India in March 2020 and many other countries followed. The closure lasted for several months. With the closure of schools, according to the estimates by the UN by mid-April 2020, 94% of learners—1.58 billion children and youth, and 63 million teachers worldwide were affected by the pandemic. These figures covered all levels of education, from pre-primary to higher education in as many as 200 countries. The closure of schools was the most drastic measure in education, as there has been no activity of any kind relating to teaching and learning at all; in many countries there was virtually a loss of at least one and a half years, possibly two successive academic years of students. The loss in learning at the school level is believed to be unsurmountable in the near future; and in case of higher education, it is feared that public universities, say in India, could be damaged 'beyond repair' in the fallout from the COVID-19 catastrophe (Lau, 2021).

After recouping from the initial shock, many countries began looking for emergency alternative systems to limit damage and have been forced to adopt the second-best, or actually the only, alternative, that was a wide range of distance learning methods, the most prominent one being online learning. While African countries have relied more on television and radio than other methods, online and television have been more extensively used in Asian countries. The use of online platforms was of the same high level in primary, lower secondary and higher secondary and

even higher levels of education. This was seen as at least partially arresting the steep regression in learning that was taking place everywhere. With this, similar to 'work from home', 'study at/from home' and 'teach from home' have become the norm. Classes were held through video conferencing, using Zoom, Google Classroom, Google Meet, Crisco Webex, Microsoft Teams, Jitsi Meet, Google Hangouts and other similar platforms, and assignments were given to students via the internet, through WhatsApp or email, while YouTube and Skype were also used. Interactions between guardians, teachers, students and parents took place, if at all they took place, in WhatsApp groups.

But access to the internet is not universal. According to UNICEF and ITU (2020), as many as 2.2 billion children and young people were unconnected; they were deprived of digital technologies and services that have proved to be so essential during the pandemic. While 47% of households globally were not connected to the internet, the share of students with no internet access at home varied from 15% in Western Europe and North America to as high as 80% in sub-Saharan Africa. Closing the digital divide requires significant quantum of resources in almost every country.

During the third stage, i.e., after complete closure of schools in the first stage, and initiation of experimenting with online learning in the second stage, many countries began partially opening schools—in some parts of the countries and for students in some grades, some only in higher education. In some countries, they have opened only to conduct practical laboratory work; in some cases, only to conduct examinations; in a few others, only to process admissions. Some schools have adopted blended teaching methods—online activities partly supported by small amounts of in-person interactions. Offline activities were still not encouraged as they required strict adherence to new norms, involving masks, social distance, frequent hand washing, sanitizers and so on, which were costly and measures like social distancing were extremely difficult to enforce in schools given children's behaviour. It also required additional infrastructure and additional teachers. Class-size was an important parameter for reopening schools, which posed a serious challenge in developing countries like India where it is normally high. As a partial solution to infrastructure in terms of classrooms and teachers, shifts in school systems were adopted; students of only a few grades—higher grades—were required to go to schools; students were grouped and they were required to come to schools only on alternative days in a week. Schools were opened in some countries sporadically. In fact, plans to reopen schools and get children into physical classrooms have suffered a major setback in many countries with the upsurge of COVID-19 cases again during the second and the third waves. The situation recovered slowly and schools in many countries were opened. Yet the global health crisis is not over. Though the WHO announced in September 2022 that the end of the COVID-19 pandemic is in sight, the situation was not yet normal: there was a sudden upsurge of the pandemic in China; the death rate has been relatively flat and not yet at its lowest level in the United States, and it has not disappeared in many other countries. Some countries have experienced cycles of restrictions, relaxations and restrictions. The WHO suggested continued testing, treatment and vaccinations, integration of effective treatment for COVID-19 into primary healthcare systems, and caution in making relaxations in safety measures. Finally, the WHO declared

on 23 May 2023 with a 'great hope' the end to COVID-19 as a public emergency, at the same time stressing that it does not mean the disease is no longer a global threat. New variants are still emerging requiring continued surveillance in all countries.

5.2 Indian Experience

India has also experienced the same trends: the shattering first wave of the pandemic in 2020, the ferocious second wave in the first half of 2021, a fierce third wave in the second half of 2021, and at last a situation of slow recovery. The experience during the second phase has been worse. The helpless patients and their relatives who could not get beds in the hospitals, the relatives of the sick patients who were running from pillar to post for oxygen cylinders, the corpses waiting in line at the crematoria for long hours, and some bodies floating in rivers, fires and smoke from 24 × 7 funeral pyres, and the crowds at the vaccination centers were all experiences of helplessness that is strange to modern India.

In education 320 million students were attending schools and higher education institutions before the onset of the pandemic. All were affected as national lockdown was declared due to the pandemic. During the first wave, at the school level 1.5 million schools were completely closed for almost a full year, impacting 247 million children enrolled in elementary and secondary schools in India, according to UNICEF (2021) estimates. Procedures and plans for admissions and evaluations were also disrupted; conventional methods were replaced by rapid tests, and quick evaluation and assessment methods; year-end examinations were either postponed repeatedly or cancelled for the second consecutive year; they were substituted in some cases by (internal) assessments which were also not necessarily conducted systematically at regular intervals. In a few cases, online testing was done in place of final examinations, particularly in the case of board examinations at the end of grades X and XII. For the lower grades, most students were 'automatically' promoted.

Yet, even during the waning phases of both the first and second waves and also the third wave, schools have remained shut, while many economic activities were revived, travels resumed, and shops, restaurants, bars, cinema halls and malls were opened, albeit at supposedly less than normal capacity. Though there was a demand from several quarters for opening schools, the decision to keep school children at home served a purpose: to conciliate the nervous parents, to reduce the risk of virus transmission, and to allow administration and schools more time to fill the gaps in their infrastructural arrangements and prepare solid grounds for a well-organised online and offline instruction (ORF, 2021), based on sound pedagogical principles, best practices and earlier research evidence. It appeared that the last one, namely the filling of the gaps in infrastructural arrangements and preparation of solid grounds for well-organised online and hybrid instruction, has not happened much so far. It is only much later as increasing medical research showed that severe illness due to COVID-19 was uncommon among children, that schools were gradually opened, but amidst parents' continued fears.

5.3 Emergency Response: Online Learning

After the first phase of a complete lockdown, like many other countries, India also has taken up online teaching as an essential activity to minimize the loss in education to some extent by providing opportunities at least for partial learning. The old traditional media of distance education—radio and television have also been used, but on a very limited scale. The online method of education covering all aspects of education essentially admissions, teaching, learning and evaluation has become the single most dominant, if not the only, activity taking place in education in India. The Government of India has taken some important initiatives, including launching of *Digital India* initiatives in developing and spreading digital infrastructure in the country (MeitY, 2019). It has arranged online portals and educational channels through direct-to-home television and radios so that students can continue learning. It also has made available several apps and app-based resources. Web-based and app-based resources containing video lectures, e-worksheets, e-textbooks e-assessments, e-Pathshala/Learning on the Go, and platforms like e-Vidya (consisting of DIKSHA and NISHTHA), have been developed and made available for school students. The National Repository of Open Educational Resources has been made accessible to students. However, no information was available on how many students were actually using these resources during the pandemic. Some schools used several supplementary methods to improve the effectiveness of online learning, such as social media, radio, email, telephones and even the postal system.

Online teaching and learning is revolutionary in many ways as it has the potential to take education to remote corners of the big country. The pandemic has compelled schools to enthusiastically or reluctantly adopt digital technology in all possible manners. While some schools have serious reservations on the access and efficiency of online learning, which was triggered by the pandemic, others are highly optimistic, viewing it as an important opportunity to digitize Indian education on a large-scale, a reform which according to them exposes learners to innovative content and digital formats, is long overdue. But when remote teaching is the *only* mode of imparting education during anytime like the present pandemic, many problems arise given the larger picture: inequalities sharpen, and are visible more strikingly as has been experienced. While online learning is being practiced in both school education and institutions of higher education, and both show a few major strengths and a few critical weaknesses of this format, we concentrate here on school education.

Despite some well-intended efforts to reduce learning losses, the emerging evidence shows that there are three major effects of school closures and/or online teaching/learning as reported in the media: losses in literacy and learning, widening of inequalities, particularly the lopsided digital expansion, and the loss of food, nutrition and overall health and wellbeing of children and their families. These short-term effects have long-term repercussions.

How far have been the Indian school system and people prepared for extensive nation-wide online teaching and learning?

It is indeed a difficult to transition from the offline classroom to the online classroom given the numbers involved and considerations for quality and equity, apart from other challenges which are indeed multi-faceted. The pandemic has exposed the many inadequacies of our education system. Teachers, administrators and students were unprepared for online education; they were not ready for this abrupt, major transition from face-to-face learning to virtual learning. Many may have smart phones and computers, but are not necessarily familiar on how to use them for online teaching/learning. Teachers are traditionally proficient in teaching using a blackboard, chalks and books all in a physical classroom setting, but their relative expertise in the use of technology and digital teaching is practically nil; they may not even be well-versed with creating digital content for school children. There might be very few who were good at it. They might do their best, but their abilities/training may be limited in teaching fundamental concepts to young children via online, which they can do relatively easily in face-to-face classrooms.

In many cases, online classes were held by sharing videos on WhatsApp groups. At higher secondary level, given the number of subjects, there could be as many as 30–40 WhatsApp groups for each class; managing such a magnitude might be very difficult for the teachers. The teachers might be aware that the way they were doing is certainly not the way ideal teaching/learning should happen. It appears that because of not being able to face the challenge, and feeling frustrated with the experience of engaging ineffectively with their students, quite a few teachers have left their teaching jobs.

Given large class-sizes, teachers were also constrained in efficiently managing 30–40 students in virtual classrooms, as students might get disconnected without being noticed by the teacher. They faced problems in teaching as well as in the evaluation of students' performances under online methods with the new technology. Added to this were the technical difficulties that the teachers faced which included a lack of technical infrastructure, limited awareness of online teaching platforms and security concerns, and a not very conducive atmosphere in their homes from where online teaching was mostly done. For example, about 67% of teachers in Chhattisgarh and 80% in Uttar Pradesh did not even have the required devices at their disposal (OXFAM, 2020). Teachers might feel compelled to make several compromises and function in improvised conditions. The teachers' problems, including a lack of technical knowledge and the inability to properly integrate courses with technology, all dampened an effective engagement with children in online teaching. The mask environment was indeed a struggle for the teachers as well as the students.

Apart from the teacher's lack of familiarity with an online format there are the infrastructural issues. First, internet accessibility. According to UDISE data 2019–20, a mere 22% of schools across the country on an average have internet access, while government institutions fared much worse at 11%. The second constraint was access to functional computers: the national average was 37% with only 28.5% of government schools having such computers (Table 5.1). Beyond these averages, there

were a range of deficits that different states suffer from, reflecting deep asymmetries: a meagre 6.5% of schools in Odisha, 8.5% in Bihar, 10% in West Bengal and 13.6% in Uttar Pradesh have internet facilities, compared to 87.8% of schools in Kerala and 85.7% of schools in Delhi.

It is clear that schools were not well prepared, and teachers were not sufficiently experienced in the use of digital technology, as hardly one-third of schools have functional computers, and only one-fifth have internet facilities. Government schools are at a higher disadvantage than government-aided private schools and private unaided schools. In short, by the time of the outbreak of COVID-19, Indian schools had only a limited exposure to a hands-on experience with digital technology.

Now let's move to households. Electricity is a basic requirement to use digital devices. In a 2017–18 survey, the Ministry of Rural Development found that only 47% of Indian households received more than 12 hours of electricity a day; and more than 36% of schools in India functioned with no electricity at all (Modi & Postaria, 2020). Availability of electricity in a school does not necessarily mean that all classrooms in the school have an uninterrupted supply of electricity at least for the entire duration of the school hours.

The situation regarding access to digital devices has been further unsatisfactory as shown in Table 5.2. According to NSSO (2020), merely 4.4% of rural households and 23.4% urban households have a computer (desktop or laptop, notebook, palmtop, tablet, iPad, smartphone, or any similar device) in 2017–18; while 14.9% of rural households and 42% of urban households have access to internet; in rural areas among persons of 5 years and above, only 9.9% were able to operate a computer and 13% were able to use the internet. Among the children of the primary and upper primary age-group (5–14), only 9.1% were able to use computers; and 8.8% were able to use the internet, while only 7% have actually used the internet (in the 30 days preceding the survey) either at home, school or outside.

These figures are national averages. The situation was worse if you look at the state-by-state picture: only 1.3% of rural households in Jharkhand and 1.5% in

Table 5.1 Electricity, computers and Internet in schools in India, 2019–20 (*% of schools having facilities*)

	Electricity	Computer	Functional computer	Internet
All schools	83.4	38.5	37.1	22.3
Government schools	81.5	30.0	28.6	11.6
Government aided private schools	85.9	63.0	61.8	42.2
Private unaided schools	90.4	59.9	58.5	50.2
Other schools	73.0	29.7	26.9	21.4

Source MoE (2021): Unified District Information System for Education Plus (UDISE+) 2019–20. Ministry of Education, Government of India. https://www.education.gov.in/sites/upload_files/mhrd/files/statistics-new/udise_201920.pdf

Table 5.2 How many households have access to basic ICT facilities in India? 2017–18 (%)

	Computer	Internet
(a) Have a facility		
Rural	4.4	14.9
Urban	23.4	42.0
Rural + urban	10.7	23.8
(b) Have ability to use a facility (among aged: 5+)		
Rural	9.9	13.0 (10.8)
Urban	32.4	37.1 (33.8)
Rural + urban	16.5	20.1 (17.6)
(c) Have ability to use a facility (among aged: 15–29)		
Rural	23.7	30.4 (25.3)
Urban	56.0	63.2 (57.5)
Rural + urban	33.6	40.4 (35.0)

Figures in ( ) are percentages of population who actually used the facility
Source NSSO (2020)

Andhra Pradesh have a computer. Even in urban Andhra Pradesh, only 11.6% households have such a facility. However, marginally higher proportions of households have access to the internet: 15–16% of households in Bihar, Chhattisgarh, Andhra Pradesh, Madhya Pradesh and West Bengal have access to the internet. Those who have the ability to operate computers and/or use the internet also constitute small numbers in many states (Table 5.3).

According to a survey of students conducted by the ActionAid (2021), majority of students (58% of the students surveyed) preferred smartphone, laptop (36%), tablet (5%) and desktop (less than 1%). Many might not be actually having any of them. About two-thirds of the respondents of a pre-election survey in the country conducted in 2019, did not own a smart phone, and 78% did not have a mobile phone (CSDS, 2019). Mobile data pack has been the source of internet for 82% of the respondents of the survey by ActionAid (2021). According to a majority of the respondents (62%), WhatsApp was the best way to communicate with teachers and students on class updates.

Having a smart phone in a household does not necessarily mean that the child—and every child—has access to it for her/his online education. Similarly access to the internet does not necessarily mean that a household actually has internet at home or that it is of a high-speed connectivity. As the NSSO report (71st Round) reveals in 2014 while 27% of households (at least one member of the household) has access to the internet, less than half of them (47%) have their own device at home. While 51% of rural households in Kerala have access to the internet, only 23% have access at home; the difference is even starker for states like Andhra Pradesh where 30% of rural households have access to the internet, but only 2% have access at home. In states like West Bengal and Bihar, only 7–8% of rural households have any access to

Table 5.3 Percentage of households with computer and Internet facility in different states, 2017–18

	Percentage of households having a facility						Percentage of persons (5+) with ability to use Internet		
	Rural		Urban		All				
	Computer	Internet facility	Computer	Internet facility	Computer	Internet facility	Rural	Urban	All
Andhra Pradesh	1.5	10.4	11.6	29.5	4.8	16.6	12.0	28.5	17.1
Assam	3.7	12.1	30.8	46.9	7.5	17.0	13.8	39.1	16.6
Bihar	2.7	12.5	20.0	38.6	4.6	15.4	10.2	28.3	12.1
Chhattisgarh	3.2	10.6	22.0	34.6	6.9	15.2	9.0	30.3	12.9
Delhi	–	–	34.7	55.8	34.9	55.7	–	51.1	50.5
Gujarat	4.4	21.1	20.1	49.1	11.2	33.2	15.6	40.1	25.1
Haryana	5.9	37.1	29.5	55.4	14.7	43.9	24.2	44.5	30.9
Himachal Pradesh	10.5	48.6	28.3	70.6	12.9	51.5	30.8	57.3	33.5
Jammu & Kashmir	3.5	28.7	16.0	57.7	6.6	35.8	17.3	37.8	21.8
Jharkhand	1.3	11.9	15.6	40.2	4.4	18.0	8.1	30.2	12.4
Karnataka	2.0	8.3	22.9	33.5	10.7	18.8	12.1	37.6	21.4
Kerala	20.1	46.9	27.5	56.4	23.5	51.3	41.0	47.5	43.9
Madhya Pradesh	2.3	9.7	17.2	35.4	6.1	16.3	8.0	30.6	13.5
Maharashtra	3.3	18.5	27.4	52.0	14.3	33.7	16.9	44.1	28.8
Odisha	1.8	5.8	17.2	31.2	4.3	10.0	7.4	29.3	10.9
Punjab	9.4	39.4	26.7	57.1	16.2	46.4	28.5	46.8	35.0
Rajasthan	6.4	18.5	26.6	49.9	11.7	26.7	11.6	35.1	17.1
Tamil Nadu	11.6	14.4	24.7	24.8	18.1	19.6	20.2	34.9	27.1
Telangana	1.6	9.9	17.6	41.9	9.1	24.9	12.1	40.0	25.0
Uttarakhand	7.0	35.2	32.5	64.3	14.3	43.5	29.4	53.0	35.6
Uttar Pradesh	4.0	11.6	22.3	41.0	8.2	18.4	8.8	28.9	13.0
West Bengal	3.3	7.9	23.0	36.0	9.4	16.5	8.6	30.3	14.9
All-India	*4.4*	*14.9*	*23.4*	*42.0*	*10.7*	*23.8*	*13.0*	*37.1*	*20.1*

Source NSSO (2020, pp. 246, 250)

the internet; and the proportion that has access at home is a minuscule number. Even in urban areas the picture was not better: only 18% of urban households in Bihar and 21% in West Bengal could access the web at home.

Rural households in general and the households of bottom expenditure quintiles in rural areas in particular are severely deprived of digital infrastructure: just about 1.6% of the bottom quintile in rural areas have a computer. The ownership

of technical devices is even more worrisome, especially in the case of children in rural areas. When even an educationally advanced state like Kerala launched the First Bell Distance Learning Programme—a centralized online programme, as an interim arrangement for regular students of grades I–XII in June 2020 through a government-owned channel, accessible through YouTube and others, 2.6 million students were found not having access to essential digital learning tools. The information technology revolution has not penetrated into rural areas. In a survey of 15 states conducted in August 2021 (The School Team, 2021), it has been found that hardly 8% of primary and upper primary school children in rural areas and 23% in urban areas have access to online education. In fact, the irregular supply of electricity, non-availability of technical infrastructure, and irregular and frequently interrupted internet connectivity are issues not just restricted to rural areas; even in the metros in India these were recurring problems. Broadband penetration is simply not adequate in most parts of the country. The net result was: hardly 8.1% of children in government schools, and 17.7% in rural private schools have attended online classes; 18.3% in rural government schools and 20.7% in private schools could access video recordings (ASER Centre, 2021). The situation seemed to continue to be the same as the pandemic progressed, as in August 2021 a meagre 8% children in rural areas and 24% urban children have been found to be studying online regularly; the corresponding figure was 4% among children of the Scheduled castes/tribes regularly or otherwise. 37% of rural children and 19% of urban children were reported to be not studying at all (The School Team, 2021).

All this evidence on how accessible the online learning/teaching has been, how proficient the students and teachers have been in using the online devices, and in short how much has been the level of readiness of the education community to adopt online methods, comes as an eye-opener, if not as a shocker, to the nation which has been recognised as "one among the top two countries globally on many key dimensions of digital adoption" (McKinsey Global Institute, 2019, p. 2) (though the observation was made mainly in the context of business activities).

5.4 Is Online Learning a Reliable Alternative?

Apart from the practical constraints described above, the use of online programmes, particularly exclusively online ones, will have serious adverse effects, some of which have been well highlighted by earlier researchers. First, the nature and definition of 'education', 'school', and college/university gets completely changed. School for the young children meant a 10 × 12 inch digital screen, if not a 2 × 4 inch mobile phone screen. Similarly, the relationship between a student–teacher-school was completely redefined, as all were confined to a small electronic device, ignoring the conventional wisdom that "the centre of any educational process is the human relationship between a student and a teacher" (International Commission on Futures of Education, 2020, p. 20). The safe and warm relationship has been seriously undermined in the new models. Second, the socialization of children, which has been considered for

centuries as an important function of education, gets lost as online programmes do not allow individual in-person contact. The social skills that physical school campuses automatically promote are essential for the holistic growth and development of children. Children learn a lot from engaging with peers. As it is widely understood, "a student's overall psycho-social development takes place in the school". The overall development consists of social and challenging environments, engagement, communication, group work, value education, and play and relaxation time with peers. They learn and grow through the cycle of fun, play, art, music, sports and knowledge (ActionAid, 2021). Even at higher levels of education, 'learning to live together,' an important pillar highlighted by the Delors Commission (1996), is possible only in the physical brick and mortar campuses of universities and colleges and not in virtual campuses. Thus, one of the most important limitations of remote learning methods is the lack of personal interaction between teacher and students and among students, which is essential for learning. So the very learning is truncated in remote learning systems, alienating one from another. Children may at best be good in handling and interacting through laptops/iPads, smart phones and so on, but not necessarily in many other essential life-skills and actually nil in socialization. In the whole process, children may get demotivated, feel insecure, and finally altogether lose interest in education, and later in going to schools when they are reopen. This will be too costly for society.

Third, as Kasturirangan observed, 'playfulness, creativity and many other aspects can never be transferred through online learning' (*Times of India*, 2020). Joyful learning becomes an alien concept. Underscoring the importance of human interface for good communication and for inspiring young minds, C. N. R. Rao observed, online education cannot inspire young minds, and can actually be 'disastrous for children' (*Firstpost*, 2020). As per increasing evidence, there has been a negative impact of online learning on learning by children, as meaningful and structured learning could not take place. As Ashok Mody (2023, p. 404) observed, digitally delivered content can indeed worsen learning outcomes. It has been found to be alienating students from learning. In short, on-line learning is neither sustainable nor desirable, particularly at the school level and at higher level it can serve as a good supplementary method.

Fourth, the system, as it is practiced, transfers substantial responsibilities of children's education from teachers and schools to parents and homes; and the latter are not well equipped to perform the task. Majority of the students might require help, guidance and supervision by their parents or others at home during the online classes. But in a survey by Save the Children (2020), 37% children in India reported that there was no one to help them at home. Only a few educated and economically well-off families were able to provide necessary support to their children in their on-line learning activities. They also feel constrained as the adults might be working from home for their employers. A vast majority of children suffer from lack of both—a lack of proper learning environment at home, and parental support, resulting in the widening of inequalities in education. For example, OXFAM (2020) found that 82% parents in India faced challenges in supporting their children to access digital education during the COVID crisis: adequate signals and internet speed were the biggest

issues. Parents with more than one school-going child might find the problem even more grave. The provision of necessary gadgets and access to digital facilities to children at home with network having access to unlimited data, which a major proportion of households in India cannot afford, is a basic prerequisite for such online learning. As a result, overall attendance rates were low, and much learning has not taken place in these classes.

In addition, there are added issues at home that hinder online learning. The physical indoor space at home was limited in many households for effective online learning. Household work, interruptions by younger siblings, other external distractions, including necessary household chores during the classes were common. 80% of the children were reported to be facing some obstacle or other at home (Save the Children, 2020). For both students and their parents it was a harrowing time. A home environment, however good it may be, will not be equivalent to a school environment for learning even if the latter is of mediocre quality. The school as a physical space is not only superior in all respects, but is simply indispensable.

Online education is a poor substitute to a formal school system. From the point of view of students, certainly it is not as effective as learning in physical classroom (Mukhopadhyay & Chomal, 2020); and teachers know fully well that the remote learning cannot mirror the school-based learning. It could at best be considered during the COVID period like contexts, as an emergency measure like the permission for emergency use of vaccines, relevant during times of emergency only, as they were not subject to standard rigorous pre-testing modalities. During normal times, online teaching may serve well as a supplementary method that too mainly in higher education, and to some extent in higher secondary education, but certainly not in primary or elementary or lower secondary education; it cannot and should not replace traditional methods at any level of education. The long-tested conventional method of schooling is irreplaceable. This holds true not only for a developing economy such as India, but also for advanced countries for several reasons. Unequal access to digital technology is a problem everywhere; and hence large-scale innovations in teaching through technology may not be feasible. It has to be accepted that online education cannot be a desirable effective option for all children even during such periods of crisis.

Another important fallout of the closure of the schools is the loss of the school-lunch or midday meal which was severely disrupted. Though a few states arranged the supply of uncooked food items to students/parents on the school campuses, this has not adequately provided good nutrition to children which is necessary for them to study and learn; the supply of uncooked items was also not possible during a complete lockdown. Overall, according to an OXFAM survey in five states, only 54% of children received dry rations during the pandemic; 8% received cooked food and 4%, money.

On the whole, of all the negative impacts of the massive disconnect with the school, it is the very loss of learning that is generally feared to be the heaviest and is feared to have accumulated exponentially. During the pandemic, just 29% of rural and 53% of urban school children were studying regularly off or online; as many as 75% of the parents in India have reported that their children's learning—reading

and writing—abilities have declined during the online education (The School Team, 2021). According to a study by the Azim Premji University (2021), the learning loss in language was as high as 82% in primary education in India, and 92% in mathematics, the loss being higher in higher grades. A more recent survey of schools in rural north Bihar conducted by *Jan Jagaran Shakti Sansthan* (JJSS, 2023) reported that "a majority of teachers feel that most children in classes 1–5 had forgotten how to read and write by the time schools reopened after the COVID crisis got over." Globally the present value of total learning loss in monetary terms has been estimated to be about US $10 trillion (World Bank, 2020). According to OECD (Schleicher, 2020, p. 4) the loss amounts to as high as 69% in a typical country's Gross Domestic Product (GDP); and it is also estimated that this will reduce the GDP by 1.5% for the remainder of the century. The loss is not confined to just a few developing countries where the problem can be much more serious than in advanced countries. For example, a study by the Brookings Institution (Kufheld et al., 2020) found that test scores in US schools have declined between 2019 (before COVID-19) and 2020 (after the closure of schools and/or introduction of online). According to Donnelly et al. (2021), even in Europe's highest-income countries the pandemic has given rise to big learning losses and a sharp rise in inequality. A study by Haeck and Lefebvre (2020) has found that the learning deficit created by the pandemic, can increase the gap in test scores by more than 30% globally between different socioeconomic groups. Since the losses in learning are not uniformly felt by all, learning loss, which is feared to be the longest-lasting legacy of the pandemic, itself will create further inequalities in education. That the children will drift further apart in their education, leading to widening of inequalities is widely feared, including in Austria, Germany and Switzerland (Huber, 2021). The problem is likely to be more acute in countries like India with at least one generation of students getting badly affected. It has now been globally realised that mental, physical and cognitive development of children has been severely shaken. The overall situation in India is summed up in Table 5.4, which throws light on different practices adopted for emergency learning and the extent of loss in learning, besides on the problems of access. In addition to underscoring the overall low levels of learning, it also unveils the high degree of rural–urban inequalities in the same.

The whole situation involving almost exclusive reliance on online learning has helped the private sector develop new forms of coaching. Several ed-tech start-ups, some called 'Academies' and 'Unacademies' have come up in a short time such as Byju, Vedantu, Shaw Academy, Khan Academy, Udemy, My Private Tutor, EduWizard, Vibrant Academy, Gradeup Great Learning, Toppr, COURSERA, Board Infinity and Whitehat Jr. Many offer online coaching and programmes in education and skill development to students from grade I to the higher education levels. They began redefining and reducing concepts of teaching and learning.

A few of them have, however, been functioning for the last few years. They promise to offer a wide variety of services online: video lectures, teaching classes, skilling, and coaching for competitive examinations conducted by the Union Public Service Commission for entry into civil services, banks, railways, etc., the Joint

Table 5.4 Elementary education in India during lockdown, 2021

	Rural	Urban
Percentage of school children who		
Are studying online regularly	8	24
Among scheduled castes/tribes	15	4
Are not studying at all nowadays	37	19
Are unable to read more than a few words	48	42
Have a smart phone	12	11
Have connectivity problems	65	57
Find online classes difficult to follow	43	46
Percentage of parents who feel that their		
Child has adequate online access	8	23
Children's reading abilities have declined	75	76
Among scheduled castes/tribes	66	83
Grades I–V	79	78
Grades VI–VIII	70	72
Percentage of children studying		
Through online classes/videos	8	25
Through watching television	0.1	3
Through private tuitions	14	24
At home with family help	12	15
At home without family help	15	19
With friends in others' houses	3	2

Source The School Team (2021)

Entrance Examination for admission in engineering studies, and National Eligibility-cum-Entrance Test for admission into medical and related fields providing model questions, solutions, concepts, practice tests and so on. In addition, some of them offer upskilling in digital competencies like areas like data sciences, analytics, artificial intelligence, machine learning, cloud computing, cyber security and digital business. Some also offer career guidance to students and newly-joined professionals. Others have developed tie-ups with schools to offer online classes. Many institutions have tied up with these different so-called 'edtech' platforms to offer extra-education or coaching and skill-oriented programmes. Several ed-techs find it a highly lucrative business, with some offering free access to students and teachers mostly only initially for a limited trial period. For example, the annual revenue of Great Learning, a start-up, has risen by 150% to Rs 325 crores in about a year. In all, according to some estimates, there are as many as 92 such start-ups but, 'these old and new players have made India's ed-tech landscape so crowded that quality has taken a beating' (Bhattacharya, 2021). While many of these start-ups have come up during the pandemic crisis, it is likely they will continue with some mergers and consolidation and thrive, even afterwards, exploiting gullible parents and students. After all, there

is a huge market value: the online tutoring is currently valued at US $3.5 million, growing at a compound rate of growth of 30% (Roy, 2020). But it needs to be underlined that in the long run "public education cannot be dependent on digital platforms provided by private companies" (International Commission on Futures of Education, 2020, p. 17).

The online teaching has been adopted by both government and private schools, but the latter ones have pursued it quite aggressively, requiring young students to spend 5–6 hours or more in front of digital screens which is generally regarded as unhealthy for young children, causing serious strain on optical nerves, familiarly known as 'computer vision syndrome' and delay in development of intellectual faculties among the children. The Ministry of Education, Government of India, for example, has suggested that the maximum screen time for a student should be three hours total, split into four-five sessions, interspersed with good breaks. But the greedy and over-ambitious private schools didn't bother about such guidelines, as they wish to continue charging high levels of fees which they felt that parents would be willing to pay only if their children are engaged for longer hours, even if it is on online. In fact, there was no rationale for charging high fees for virtual classes as schools saved a lot on maintenance of school infrastructure and several other overheads. Instead, schools feared a loss in fee revenues that used to be generated by making surpluses on several heads like bus charges, canteen services, laboratory charges, excursions and even school uniforms; and still they have raised their fees. Some schools have even made uniforms sold by schools compulsory for online classes—different uniforms for different sessions such as regular classes, physical training, yoga, dance, and music. As reported by OXFAM (2020), in Odisha, Bihar, Jharkhand, Chhattisgarh and Uttar Pradesh where the survey was conducted, 39% of the parents were charged hiked fees and 15% were charged for uniforms despite the physical closure of schools and state guidelines restricting fee hikes. Many private schools also conducted online classes for kindergarten/pre-primary children of 3–5 years. Besides, the private schools also feared increased dropouts or withdrawal of children because of COVID and online teaching, impacting their finances and teacher employment. The fears were not unfounded. For example, 2.82 lakh children in Gujarat, some 2.4 lakh in Delhi, more than 2 lakh in Haryana, 1.85 lakh in Punjab, 1.29 lakh in Madhya Pradesh and 1.25 lakh children in Telangana enrolled in private schools have switched to government schools in 2021–22 (*India Today* Web desk, 8 October 2021). According to the survey of the School Team (2021), in the country as a whole, as high as 26% of children migrated from private to government schools. Few new admissions seemed to have taken place in many private schools as COVID-hit families find it hard to afford them now. Some schools, particularly 'low budget' private schools have been closed.

On the whole, despite several harmful features of online education, it has grown rapidly in India and is still growing mainly due to economic payoffs the business of online education yields. According to IBEF (2021), India has become the second largest market for e-learning after the US, with an estimated market value of US$ 1.96 billion in 2021, which is forecasted to reach about US$ 11.6 billion by 2026.

5.5 Strategies for Uncertain Future

Today, ravaged by the COVID-19, the whole school system is facing one of its most serious challenges. Governments are able to control COVID-19 and some countries like India could even experience "remarkable resilience and economic resurgence (Viswanath, 2023), but the education crisis it caused may not be over so soon. In fact, some (Li & Lalani, 2020) fear that the pandemic has changed education forever. The long-term effects are still unknown and difficult to foresee, as they will take time to manifest. However, some have predicted quite a few problems: the recovery of losses incurred in literacy and learning will be extremely difficult: teaching can be accelerated but learning by young children cannot be so hastened as they might not be able to catch up. Therefore, the loss of even one year of schooling may mean a 'just a completely wasted cohort' (Duflo, 2021) as the learning trajectory got drastically derailed. One cannot shove huge amounts of curriculum down the throats of young children. But some states have extended hours of teaching and reduced number of holidays, after schools were reopened. If too much is thrust on the children, they may even breakdown. With heavy syllabi, coupled with rat-race, mad competition and peer/parental pressures, students particularly at higher secondary level are known to be experiencing a high degree of emotional distress. Certainly additional teaching hours or extra classes would be too taxing for the children. It should be realised that children need time to assimilate what they read and are taught. It is not only learning losses in school curriculum, but also the losses in socialisation and related skills among the children have to be addressed.

Second, the experience with prolonged school closures and online learning, with isolation and confinement to homes, and self-isolation in case of those who were inflicted with the virus, seems to have a negative effect on the mind, body and behaviour and overall wellbeing of students. The subsequent effects on the academic growth, social life and mental health of children, including anxiety and depression levels of older children, may indeed be very serious. The students might imbibe their online behavior, characterised by impatience, aggression, restlessness, inattention, clinging, distraction, hesitation to ask questions, and introversion, etc., and new learning styles, to such a level that they might find it difficult to readopt to 'normal' behaviour on the physical campus. Having been caged within the four walls of a home for 24 h every day, for months with no outdoor sports and other physical activities, certainly the behavior of students, their wellbeing and mental health would pose serious problems.

According to a joint statement by the UNICEF and UNESCO (2021), "schools should be the last to close and first to reopen." But it has happened the other way. Schools in India were closed first, in all for more than 600 days. The long deprivation of school experience for more than one and half year has caused irreparable loss among the young children at primary level, and also for the children in grades X to XII, who face severe pressures of public examinations.

As Human Rights Watch (2021) observed, school closures were not a temporary interference with the education of a large section of marginal groups, but the abrupt

end of it. There are a large number of dropouts, and their willingness to return to schools has been doubtful. According to OXFAM (2020), teachers feared that 30% students in India might not return to schools at all when they reopen. In a survey in Tamil Nadu and Puducherry, such children in the age group of 15–18 years—who were in schools when the schools closed due to the pandemic and would never go back to schools—comprised two-third of the total children surveyed (Educo, 2021). Save the Children (2020) has predicted that as an under-estimate about 10 million children worldwide would drop out of schools. According to UNESCO this figure would be at least 24 million children and youth. A large section of students are forced to go to labour market as the schools were closed. They might not come back. Child labor seemed to have been increased due to the closure of schools on one hand and loss of parental employment and earnings on the other. For example, in Tamil Nadu the number of child laborers has more than doubled during the lockdown, according to a survey of the Campaign against Child Labour (Narayani, 2021). Globally child labour had been gradually declining during the past two decades. But the COVID-19 pandemic threatened and reversed the trend. According to ILO and UNICEF (2020), the number of people in extreme poverty might rise by 40–60 million (in 2020). As one percent point rise in poverty leads to at least a 0.7% point increase in child poverty, one can understand the magnitude of increase in child labour and corresponding dropouts from schools. Further, in case of girls, it has been pointed out that increasing number of early marriages and early pregnancies have an adverse effect on the probability of their rejoining education. Thus, there would be huge dropouts and a significant fall in new admissions as well. Motivating the young children to get back to schools is indeed a big challenge that the schools would face.

All this stresses the need to holistically plan for imaginary interventions in education. One can at least identify three inter-related major areas for policy action that can help recover losses to some extent, and lay strong foundations for the future.

First, it may have to be acknowledged that the transition that has taken place from physical classroom settings to remote education system is not sustainable. Extensive training needs to be provided to teachers and administrators in the use of digital technology and other alternative methods to use remote teaching as supplementary methods in normal times and to depend upon them heavily during times of crisis in the future. This is in addition to strengthening training in traditional pedagogy and other areas. Digital literacy turns out to be a basic need. All this requires a revamping of the system of teacher education in the country, as envisaged in the *National Education Policy 2020* (Government of India, 2020). The goal should be to ensure that every school has highly competent trained and qualified teachers in required numbers. This might help to some extent in the recovery of the loss incurred in learning, but it will be quite challenging. Simultaneously, measures should be evolved to de-adict children from mobiles and digital tools, to make children come back to physical school campuses and enjoy classroom teaching and learning. The learning experience of students has to be enhanced by mitigating the serious psycho-socio distress caused by the outbreak of the COVID-19 and follow-up actions—the lockdown and online home learning—that consciously integrate psychological, emotional and health issues with an appropriate education response. Such measures have to be based

on child psychology, behaviour and health so that the children overcome the trauma they have experienced, and the problems of readjustment to school environment they face when they get back to schools are minimised. Imaginative and innovative 'second chance' and 'remedial catch-up' learning strategies and differentiated instructional interventions have to be developed, along with tailored and sustained support systems, including for emotional support and guidance to the students and teachers. Further, there may be a need for modifying the curricula in all levels of education.

Second, there is a huge need for heavy investment in education not only in the training of teachers and administrators, but also in strengthening school infrastructure, basic and modern, including the necessities that have arisen in this crisis like digital devices, software, safety and cleaning mechanisms. The pandemic has made us realise how big the digital divide has been, and how important it is to bridge it. There is a need to ensure almost universal availability of reliable, and stable digital connectivity and free and open source technologies and software. Systems also need to be developed in such a way that households and communities across the whole nation have increased level of access to digital devices, and parents acquire basic skills and become familiar with their use, so that they can provide basic support to children at home when needed. Provision of digital infrastructure in schools and communities requires a huge amount of resources: the current market size for digital classrooms in India is estimated at US$ 1billion, out of which the market for private schools is estimated at US$ 266 million and that of government schools is approximately US$ 740 million (Roy, 2020). As the National Education Policy (Government of India, 2020, p. 58) has recognised, "the benefits of online/digital education cannot be leveraged unless the digital divide is eliminated through concerted efforts." Hence the needed investments have to be made. This might help in absorbing, to some extent, future shocks of the kind we have experienced. Further, safety measures, hygienic environment, health facilities etc., require additional infrastructure, and teachers, in addition to extra support in the form of technical and non-technical manpower including health workers. Moreover, families may need to be compensated for the loss of their economic lives, and for the loss of midday meals and for meeting nutritional needs of children, if one is serious about bringing back the system to normalcy.

Huge investments are necessary to meet increasing needs to improve quality, and more importantly, to reduce the stark gaps between rural and urban regions in access to quality education by all sections of society. While developing digital infrastructure and online education, care has to be taken that online education does not substitute the long-tested conventional education of the brick and mortar classrooms. It has to be planned only to supplement and support conventional classroom teaching and learning. So the likely option seems to be developing strong hybrid models, blending both modes of education, though teaching simultaneously on online and offline may be very challenging for the teachers. In the blended model the online models should not be given a dominating place, and the traditional mode should not end up in sidelines. Rather it needs to be the other way: the conventional model should be given a primary place and the other supportive. It has to be ensured that digital technology

does not cause a new crisis in education. All this requires substantial upscaling of the public budgets for education.

Finally, above all, in all this, it needs to be recognized that it is the public school system that plays a crucial role. As the International Commission on the Futures of Education (2020, p. 9) stated, "The current crisis is reminding us how crucial public education is in societies, communities, and in individual lives." After all, it is the best equalizer in society. Heavily concentrated efforts focusing on rejuvenating the public education system are needed without relying on the private sector. As conventional wisdom goes, 'It is manifest that education should be one and the same for all, and that should be public, not private' (Aristotle, quoted in Everson, 2000, p. 15).

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Chapter 6
The Penalty of Being Young: India's Workers During the Pandemic

Rosa Abraham and Mrinalini Jha

Abstract With the evolution of Covid-19 since its emergence in 2020, the pandemic has had multiple economic effects—effects which manifest as immediate shocks—but also as scarring effects having long-term repercussions. Certain demographics may be more exposed or vulnerable to these long- and short-term impacts. This chapter focuses on young workers who entered the Indian labor market for the first time during the pandemic. Using all-India CMIE-CPHS data, we track a panel of both the young workers, and the young entrants to examine this. Our findings reveal that even though there is only a marginal difference in the likelihoods of finding employment when comparing between the pandemic and the pre-pandemic entrants, the pandemic entrants face a greater disadvantage in the intensive margin in terms of the type of employment. There was a rise (drop) in the more precarious forms of employment like daily wage (permanent salaried) for the pandemic entrants as compared to their pre-pandemic counterparts. Further, they suffer disproportionately in terms of the associated earnings from this employment. The pandemic entrants made 60% lower monthly income than the pre-pandemic entrants in 2019. Even by 2022, the temporary salaried workers among the pandemic entrants continued to make 4% lower income as compared to the starting income of their pre-pandemic counterparts.

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6.1 Introduction

The Covid-19 pandemic had far reaching effects extending beyond its immediate health repercussions. The disruption in economic activities, restrictions in mobility, and the contraction of the global economy in the months thereafter meant that this was not a short-term disruption and likely had long-run implications for workers across the globe. In particular, as many have pointed out, the pandemic exacerbated existing inequalities in the labour market with marginalized communities and groups suffering disproportionately. In this chapter, we focus on one of these groups, i.e. young workers.

In a global survey of youth (18–29 year olds) conducted by the International Labour Organisation (ILO) across 112 countries, 17% reported having lost their jobs. Nearly a quarter reported a reduction in working hours while about 42% reported a reduction in their income (ILO, 2022a). Country-specific studies also indicated young workers being disproportionately affected. In the United States, for instance, while 16–29 year olds accounted for only a quarter of the workforce, nearly a third of the rise in unemployment rate between February and April of 2020 were attributed to them. Additionally, the rise was much higher among Black and Hispanic youth (Alba & Aaronson, 2020). In countries in Latin America too, the youth were worst impacted compared to older workers. However, they were able to return to employment faster than older workers. However, most of this recovery was into informal employment and occupations that were more favorable towards young workers (gig and platform work (ILO, 2022b)). Similarly, in Asia and Pacific, unemployment rates increased in Australia, Indonesia, Japan, Malaysia, and Vietnam, as well as in Hong Kong and China with youth unemployment rates predicted to double by 2021(ADB & ILO, 2020).

In India, the issue of youth unemployment had already been a major policy challenge. Between 2011–12 and 2018–19, youth (18–30 years) unemployment rate had increased from about 6% to nearly 15%. If youth were categorized further by their level of education, unemployment rate was even higher among educated youth. Graduates reported an increase in unemployment rate from about 21% to 32% during the same period (Basole et al., 2021). It was in this context that a crisis like Covid-19 hit. Preliminary evidence found that nearly 60% of older workers did not face any job loss during the economic lockdown while the corresponding share among younger workers was only 30%. Moreover, younger workers were also less likely to return to work after a job loss (Basole et al., 2021).

In this context, the second section of this chapter uses the most recent all-India household survey data to see how young workers have fared vis-a-vis older workers. We track individuals who were employed pre-pandemic and examine what happened to them during the lockdown period (in 2020) and then two years subsequently (in 2022). This allows us to understand both the immediate impact as well as the relatively long term persistence of job loss during the lockdown. We compare the impact and persistence between young and old workers to understand if and how

young workers are differently affected in terms of job loss, transitions from jobs, as well as persistence of job loss compared to older workers.

Besides the immediate and more obvious impact of the lockdown on young workers, there is also a 'scarring' effect that youth are particularly vulnerable to as new entrants into the labour market. Kahn (2010), for instance, found that youngsters graduating during a recession are in lower-level occupations with lower wages and persistent negative impacts. Similarly, Schwandt and von Wachter (2020) found that youngsters entering the labour market for the first time in 2020 potentially stood to forfeit earnings to the extent of $400 billion over the next ten years of their working lives, a penalty of graduating into a bad economy. It is likely that in India too, in a labour market that was already plagued by high youth unemployment, young entrants to the labour market during these bleak years may also be particularly disadvantaged in comparison to workers who had entered during normal years. In the third section, we specifically track the young, erstwhile students, who would have entered the labour market in 2020. In doing so, we examine if there are any 'scarring' effects owing to entering the labour market during an economic downturn. The fourth section concludes.

6.2 The Costs of Being a Young Worker

The Center for Monitoring Indian Economy's (CMIE) Consumer Pyramids Household Survey (CPHS) provides a unique high frequency panel dataset that allows us to track individuals over multiple times in the year, across several years. The CMIE interviews households three times a year collecting information about the demographics of all household members including their employment status, type of employment, industry, and occupation. More importantly, during the economic lockdown, CMIE (temporarily) transitioned from a field-based survey to a phone survey, effectively being one of the only large scale surveys of individuals during the economic lockdowns of 2020.

Since we are particularly interested in how workers were impacted and recovered after the economic lockdown, we leverage CMIE-CPHS panel dataset of workers. The first economic lockdown, one of the most stringent in the world (Mathieu et al., 2020), was imposed in India starting March 24th, 2020. It was extended multiple times, and for most of the next two months, the country was in a near-full lockdown. Economic activities contracted severely as mobility was restricted and the economy effectively shut down. Although the national lockdown was only announced by March-end, from early March onwards, mobility had begun to be severely restricted as captured by the stringency index (Fig. 6.1).

The severe restrictions clearly had economic impacts as is evident from Fig. 6.2.

Figure 6.2 gives the overall picture of the manifestation of the pandemic in the country vis-a-vis the different phases of the pandemic by overlaying reported number of Covid-19 cases (left axis) against various measures of mobility restrictions as measured by Google mobility index (right axis).

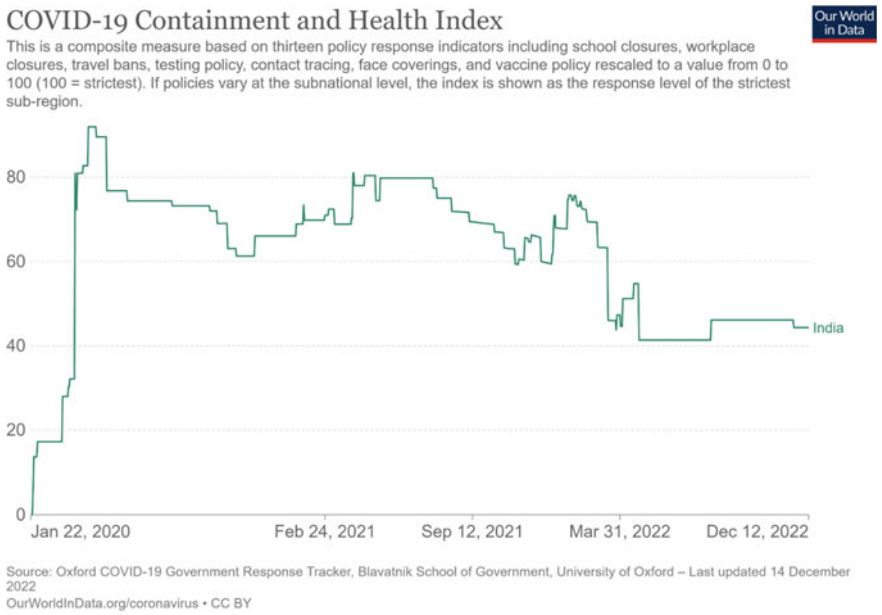

Fig. 6.1 Stringency index for India

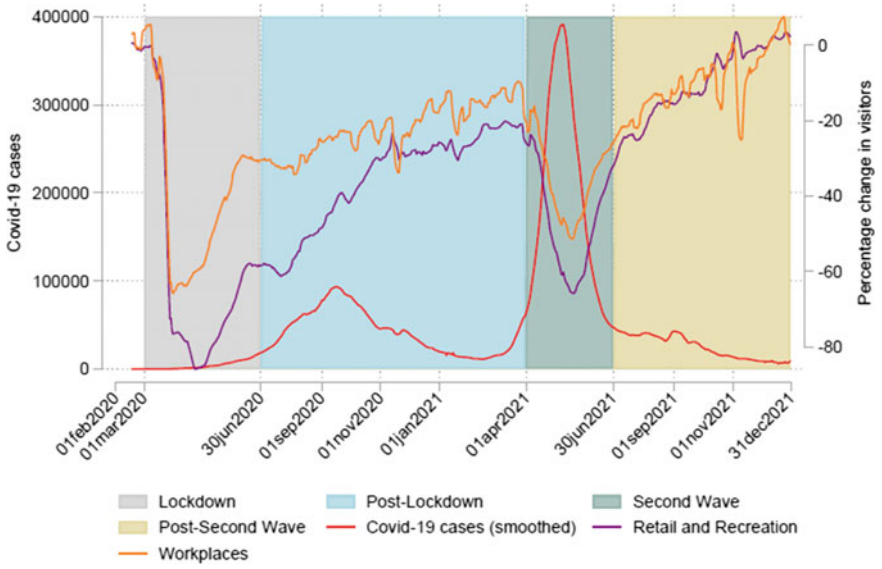

Fig. 6.2 Pandemic phases, infection, and mobility rates. *Source* Jha and Lahoti (2022)

Table 6.1 Employment trajectories

Jan–Apr 2019	Jan–Apr 2020	Jan–Apr 2022	Trajectory
Employed	OOWF	OOWF	No recovery
Employed	Employed	OOWF	Delayed job loss
Employed	OOWF	Employed	Recovery
Employed	Employed	Employed	No effect

Note OOWF refers to out of the workforce

To understand the economic impact of these months, we identify the months of March and April 2020 as 'impact' months. Using these as anchors, we construct a panel identifying the same individual pre-pandemic, exactly one year ago in March–April 2019. This is the baseline on the basis of which we benchmark impact. Similarly, to uncover the long run recovery after the impact, we track these same individuals two years after the impact, i.e. in the months of March and April 2022. Finally, since we are interested in the labour market impact, we restrict the analysis to pre-Covid workers. Therefore, we essentially track pre-lockdown workers during the lockdown months, and two years thereafter, to see what was the impact and their long run recovery in labour market outcomes.

By restricting the analysis to only workers, for every individual, we are able to identify four possible trajectories. Table 6.1 describes these trajectories.

An individual may have been completely unaffected in terms of labour market outcomes during and after the lockdown. This is the '*No effect*' trajectory. On the other hand, a worker may have lost employment during the lockdown period and not have been able to return to work which we refer to as the '*No recovery*' trajectory. They may also have been able to hold on to their jobs during the lockdown but subsequently lost employment two years later—'*Delayed job loss*'. Finally, an individual having lost work during the lockdown may have subsequently returned to work by the beginning of 2022, constituting the '*Recovery*' trajectory.

6.2.1 Employment Costs

In general, nearly 80% of the pre-pandemic workforce were unaffected and followed a 'no effect' trajectory. They did not lose work during the first four months of 2020, and remained employed two years later. A marginal share, approximately 7%, faced a 'no recovery' trajectory. However, this overall number hides large variations across different groups. Women and young workers were particularly affected as were less educated workers, as has been explored elsewhere (although using a slightly different trajectory panel) (Abraham et al., 2022; Basole et al., 2021; Deshpande, 2020). Since we are particularly interested in the impact on young workers, we explore the trajectories of young workers vis-a-vis older workers.

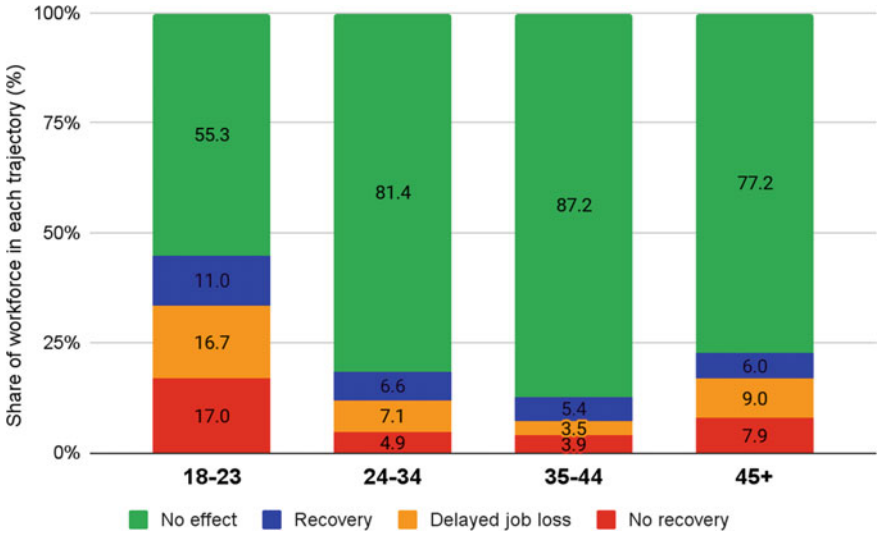

Fig. 6.3 Employment trajectories by age group. *Source* Authors' calculations using CMIE-CPHS

We broadly categorize the workforce into four age categories with the youngest at 18–23 year-olds, and the oldest being individuals 45 years and above. Figure 6.3 provides the distribution of trajectories by each age group.

Examining the share of individuals who were unaffected by the lockdown, it is evident that middle-aged workers were the least affected with nearly 80–90% of these workers not losing employment during or the years after the lockdown. In contrast, the worst off were the youngest of workers, and to a lesser extent, the oldest workers. Only 55% of young workers were unaffected. Instead, about 17% of young workers had no recovery from a job lost during the lockdown period. Combined with those who suffered a delayed job loss (16.7%), workers who were unemployed by the beginning of 2022, accounted for about 34% of young workers. For the middle aged group individuals, the corresponding share was only between 12% and 8%. Clearly, younger workers were far more likely to lose their jobs and not return to work compared to older workers. This is not surprising since young workers have less experience and firms find it less costly to fire these workers compared to more experienced (older) workers. Further, young workers often have fewer networks and social capital in the labour and consequently find it harder to return to the labour market after having lost jobs (ILO, 2020; ILO, 2022a).

To what extent does the trajectory differ within different kinds of young workers? Similar to other studies, we find a disproportionately larger impact on young women compared to young men. Nearly 41% of young women workers followed a no recovery trajectory compared to only 16% of young men. Similarly, about 57% of young men were unaffected by job loss, while for women, this was only 23%.

When young workers are categorized by their level of education, interestingly, we can see that it is the more educated young workers who are more likely to suffer from

job loss and not recover (Fig. 6.4). As education levels increase, there is a clear trend with a decline in the share of workers following a no-effect trajectory and an increase in the share having a no recovery trajectory. About a quarter of young workers who had education above graduate level had a no recovery trajectory, compared to only 10% of less educated workers. This curious pattern may be explained by aspects from the demand and supply side. On the demand side, it is likely that the kind of jobs that were more likely to recover or could be recovered into, were also the ones that were more likely pursued by less educated individuals. These include self-employment and casual wage work which are characterized by an ease of entry (in terms of required education levels, capital investment) as well as ease of exit. Salaried work, on the other hand, is less easy to return to having lost employment, and hence does not have the ease of entry associated with casual and self-employment. Indeed, we find that among permanent salaried workers, nearly a quarter experienced a no-recovery trajectory, compared to only 12% of daily wage workers. Since salaried work is likely to be more pursued by higher educated individuals, this could explain why higher educated workers witnessed a more muted recovery.

On the supply side, the less recovery among higher educated workers could be explained by the fact that these kinds of workers were more likely to come from richer households and hence could 'afford' to remain unemployed or return to education. Indeed, this conjecture is confirmed in that the households that experienced a recovery were in fact the poorest households, while individuals who faced no recovery were more likely to come from the richest households (based on pre-pandemic average household income level).

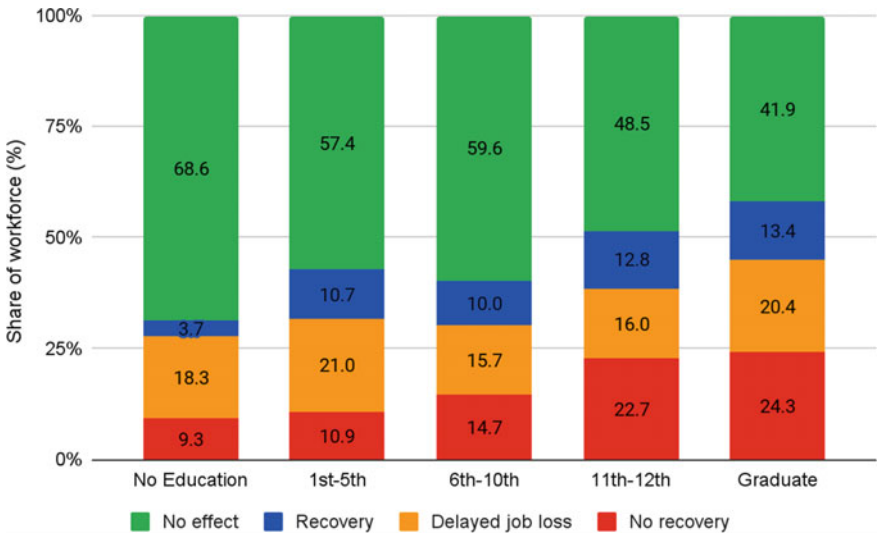

Fig. 6.4 Employment trajectories of young (18–23) workers, by education level. *Note* Authors' calculations using CMIE-CPHS

It is also the case that for many older workers who are likely to be the main earner in their family, it is imperative to return to work. Therefore, they are more likely to resort to fallback employment or less paid precarious work. Young workers, on the other hand, have the 'luxury', in a sense, of not having to work. In fact, in times of economic downturn, many workers often return to education/training in an effort to acquire more skills while jobs are in shortage. We compare the transitions to different employment arrangements as well as out of the workforce entirely using the transition matrix below (Fig. 6.5).

The transition matrix indicates what employment arrangements people have moved into over the two years. So, the 48% in the first cell under daily wage workers indicates that 48% of 2019 daily wage workers remained as daily wage workers. Another 15% moved out of the labour force while a marginal 3% and 5% moved into temporary and permanent salaried employment. Darker shades represent larger shares. For older workers, across all employment arrangements, we see a large movement into self-employment. So about 30–25% of salaried workers had moved into self-employment. In contrast, for younger workers, we see very little transition to other forms of employment, but rather between 30%–40% of young workers, irrespective of employment arrangement had left their jobs entirely, as can be seen in

		Employment arrangement in 2019			
	Older workers	**Daily wage worker**	**Permanent salaried**	**Temporary salaried**	**Self employed**
Employment arrangement in 2022	Daily wage worker	48	6	16	11
	OOLF	15	13	15	12
	Permanent salaried	3	50	11	6
	Temporary salaried	5	7	31	3
	Self-employed	30	25	26	68
	Total	*100*	*100*	*100*	*100*
	Younger workers				
Employment arrangement in 2022	Daily wage worker	47	4	16	12
	OOLF	30	42	34	39
	Permanent salaried	1	34	4	2
	Temporary salaried	9	12	31	8
	Self-employed	13	8	15	40
	Total	*100*	*100*	*100*	*100*

Fig. 6.5 Employment transitions across employment types and out of the labour force. *Note* OOLF stands for out of labour force. Darker shades represent larger shares. Authors' calculations using CMIE-CPHS

		Employment arrangement in 2019			
	Older workers	**Daily wage worker**	**Permanent salaried**	**Temporary salaried**	**Self-employed**
Employment arrangement in 2022	Daily wage worker	57	7	19	13
	Permanent salaried	3	57	13	6
	Temporary salaried	5	8	37	4
	Self-employed	35	28	31	77
	Total	*100*	*100*	*100*	*100*
	Younger workers				
Employment arrangement in 2022	Daily wage worker	67	7	24	19
	Permanent salaried	1	58	6	3
	Temporary salaried	14	21	47	13
	Self-employed	19	14	23	65
	Total	*100*	*100*	*100*	*100*

Fig. 6.6 Intra-workforce transitions. *Note* Authors' calculations using CMIE-CPHS

the high share of OOLF categories for all employment types. Since the large exit out of the labour force obscures intra-workforce transitions, we restrict the analysis to individuals who remained employed between the two periods (Fig. 6.6).

Comparing intra-workforce movements, we find that there is more stickiness, as represented by the diagonal elements, for younger workers in daily wage work and temporary salaried work compared to older workers. The permanent salaried workers have similar levels of stickiness, whether young or old. Older workers in self-employment are more likely to continue as self-employed compared to younger workers. Further, older workers see far more transitions into self-employment, unlike younger workers. Therefore, analogous to the case of men compared to women, as found by Abraham et al. (2022), here too, we find that younger workers seem to have a disadvantage in finding fallback employment and are more likely to withdraw from work entirely.

Not surprisingly, the majority of the young workers who left the workforce are now reporting themselves as students. However, the data does not allow us to identify whether they are indeed enrolled in education or not. About 85% of the displaced young workers were now students, compared to only 13% of displaced older workers. Even two years after the most stringent economic lockdown and the inevitable contraction of the economy, many of these erstwhile workers have not been able to return to work. This also has important policy implications. India already has a problem of educated unemployed. As more and more individuals have withdrawn to pursue education/skilling, this problem will only be exacerbated unless

targeted policy interventions are in place to bring them back to appropriate jobs in the workforce.

6.2.2 Earnings Costs

For those workers who managed to retain their jobs, what has been the income implications of the lockdown in its immediate aftermath, and two years thereafter? Here too, have young workers suffered a larger loss of earnings compared to older workers? CMIE-CPHS allows us to track monthly earnings of workers.[1] We compare the average monthly earnings of workers across different employment arrangements, pre and post the lockdown. Note that average earnings here is limited to those who remained employed in both periods. Given the intra-workforce flux that we saw earlier, it is likely that a salaried worker in 2019 may no longer be salaried, but rather may be self-employed or a casual wage worker. Nevertheless, a comparison of the average earnings between the two periods can provide an understanding of relative change in earnings between younger and older workers (Fig. 6.7).

We can see that, in keeping with the traditional Mincerian wage and experience predictions, average earnings for older workers are always higher than that of younger workers (Mincer, 1958). And, not surprisingly, permanent salaried workers earn the highest at approximately Rs. 30,000 per month, followed by temporary workers, self-employed and daily wage workers. Between 2019 and 2022, there has been a secular increase in earnings for all employment types, except self-employed, for both young and older workers. Therefore, although younger workers have suffered disproportionately at the extensive margin of employment loss, in the intensive margin of earnings, they have fared similar to their older counterparts.

6.3 The Costs of Being a Young Entrant

In order to understand the implications of entering the labour market during this economic turmoil, we track a subgroup of the youth who are identified as the young entrants who would have entered the labour market in 2020, i.e. the year of the pandemic.[2] We identify this cohort as individuals between the age of 18 and 23 who report themselves as students and were out of the labour force in 2019.[3] These are

[1] Earnings information is collected for each member of the household. Earnings includes wages from salaried work and casual daily wage work. For self-employed earnings, income information is collected at the household level. We attribute this to each individual member by dividing the total household earnings from business/self-employment by the number of self-employed individuals in the household.

[2] Close to 90% of our sample consists of individuals who are high-school graduates and above.

[3] Individuals between 18 and 23 reporting themselves as students and out of the labour force interviewed in the first wave of 2019 (Jan'19–Apr'19).

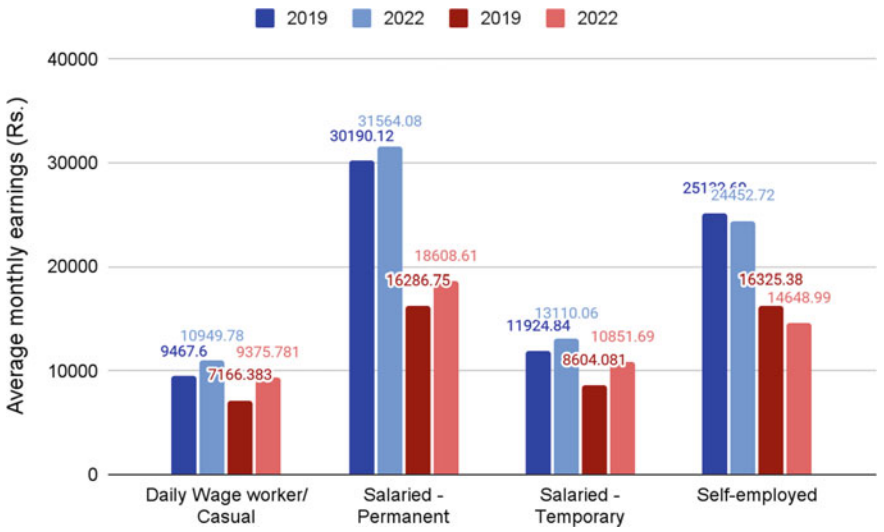

Fig. 6.7 Average monthly earnings by type of employment arrangement for older and younger workers, pre and post lockdown. *Note* The blue bars represent older workers, red bars represent younger workers. Earnings are restricted to those who are employed and report a non-zero income. Earnings are in real terms, in 2000 prices. Authors' calculations using CMIE-CPHS

individuals likely to enter the labour market in the coming year. We follow them till 2022[4] and document their employment trajectories along with their corresponding incomes. Our working sample thus consists of a balanced panel of individuals who were students, out of the labour force, and between 18 and 23 years of age in 2019. Employment and income outcomes of these pandemic entrants are then compared with those who entered the labour market in 'normal' times or the baseline. To do this we again create a balanced panel of individuals who were students, out of the labour force, and in the 18–23 age bracket in 2018. We track the employment and income outcomes of this cohort, who are likely to enter the market in 2019—a normal, pre-pandemic year.

In the analysis we are thus tracking two cohorts—(i) the pandemic cohort are tracked in 2020 and in 2022, (ii) the pre-pandemic cohort are tracked in 2019. The two cohorts (pandemic cohort; and normal year, pre-pandemic cohort) are not likely to be different in characteristics—the only significant difference between them being the year they entered the market. Comparing the outcomes for these two cohorts thus gives us the difference on account of their entering the labour market in the year of the pandemic. In doing so, we examine if there are any penalties or 'scarring' effects owing to entering the labour market during an economic crisis. Since we have data for only two years for the pandemic cohort, we cannot comment on the long-term

[4] The last period for which we have their data at the time of writing.

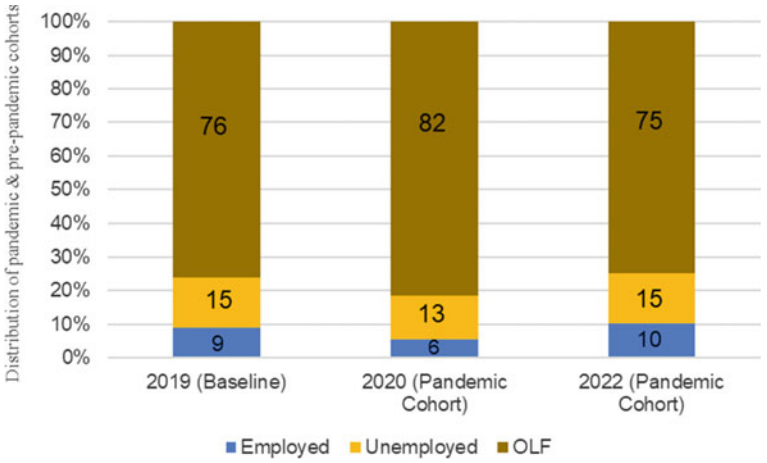

Fig. 6.8 Distribution of the baseline/pre-pandemic cohort and the pandemic cohort. *Source* Authors' calculations using CMIE-CPHS

impact yet, rather we use the employment and income information for this cohort in two years (2020 and 2022) to gauge the impact and recovery vis-a-via the baseline.[5]

6.3.1 Employment Outcomes of the Pandemic Cohort

There are 27,636 individuals who form a part of the balanced panel of the pandemic cohort, i.e., individuals who were interviewed in all three years (2019, 2020, and 2022), belong to the age bracket of 18–23, and report themselves as students and out of the labour force in 2019. Of these labour market entrants, 6% were able to find employment in 2020, 13% remained unemployed, and 82% continued to remain out of the labour force (Fig. 6.8).

We compare the above individuals against a similar panel of 'young' workers who entered the labour market during a 'normal' year. The balanced panel for this baseline group consists of 33,230 individuals. They reported to be students, out of the labour force, and in the 18–23 age bracket in 2018, forming the non-pandemic cohort of 2018. Of them, 9% were able to secure employment, 15% were unemployed, and 76% remained out of the labour force in the year 2019. The labour force thus shrank by 5% in the pandemic year on account of the young entrants, as compared to the normal pre-pandemic year. Even after two years of having entered the labour market, only 10% of the young entrants of the pandemic cohort were able to find employment.

In addition to the question of how many were able to find employment, it is also important to look at the kinds of employment that they were able to secure, and how it

[5] The income and employment status of those who entered the market in 2019.

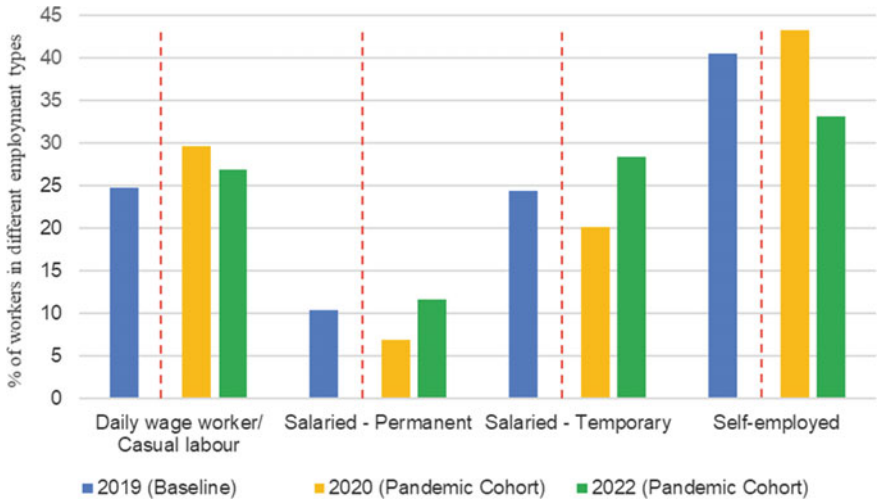

Fig. 6.9 Type of employment secured by labour market entrants in 2019, and those entering in 2020 tracked in 2022. *Source* Authors' calculations using CMIE-CPHS

compares vis-a-vis their predecessors, or the labour market entrants during a normal year.

Figure 6.9 gives us the distribution of the nature of employment that the labour market entrants were able to secure. The baseline (2019) gives the nature of employment for workers who were students in 2018 and entered the workforce in 2019. This is compared with the labour market entrants of 2020 who in turn are tracked over two years—2020 and 2022. We compare the first year of entrance in the market for both cohorts, i.e., 2019 for the baseline cohort, and 2020 for the pandemic cohort, to understand the differential impact of entering the market in the year of the pandemic. Further, the employment distribution for the pandemic cohort in 2022 is used to understand how much of the difference persists.

There was a drop in the percentage of individuals who were able to get into the most secure form of employment—permanent salaried. While 10% of the baseline cohort was able to get a permanent salaried job on entering the labour market, the corresponding number for the pandemic cohort was only 7%. A greater proportion of the pandemic cohort got absorbed in daily wage work, and self-employment—the more precarious kinds of employment—in comparison to the baseline cohort. The pandemic cohort however makes some recovery in about two years time. By 2022 the proportion of workers in permanent salaried jobs went up to 12% and the self-employed fell to 33%, though the proportion of daily wage workers and those in temporary salaried jobs continued to remain higher than the respective proportions in the pre-pandemic cohort. So, even though there is only a marginal difference in the extensive margin of finding employment between the pandemic and the pre-pandemic cohort, the pandemic cohort faces a greater disadvantage in the intensive margin of the type of employment.

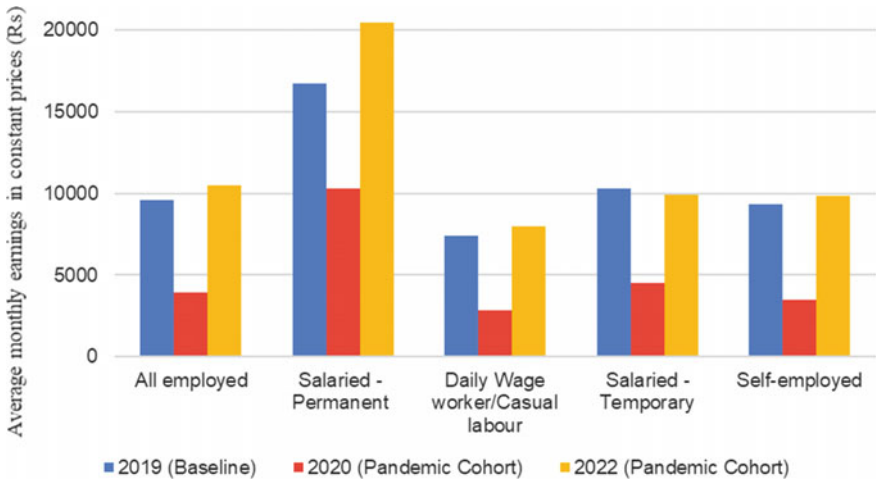

Fig. 6.10 Average monthly earnings of pandemic and baseline cohort, by employment type. *Source* Authors' calculations using CMIE-CPHS

6.3.2 Earnings of the Pandemic Cohort

While there is a difference in the nature of employment secured by the pandemic cohort and that secured by the baseline pre-pandemic year cohort—with the pandemic cohort performing poorly both in terms of the size of the total workforce as well as the share of those getting the more secure salaried jobs—there is also an associated income story which too is likely to differ between these two cohorts.

We go deeper to examine the intensive margin of income loss for the labour market entrants of the pandemic cohort who are able to secure employment. The average real monthly income of the employed labour market entrants in 2020 was Rs. 3,946.[6] In contrast, the employed labour market entrants in 2019 were earning Rs. 9,588 on an average. The pandemic cohort was thus making around 60% lower monthly income than the baseline year, pre-pandemic cohort. The income difference varied depending on the nature of employment (Fig. 6.10). The difference in incomes for the daily wage workers and the self-employed of the pandemic cohort vis-a-vis the respective pre-pandemic cohort was the highest at 62%, i.e., the daily wage workers and the self-employed of the pandemic cohort were earning 62% lower monthly income on average as compared to their pre-pandemic counterparts. The difference was the least for the permanent salaried workers of the pandemic cohort, who were earning 38% lower income than their pre-pandemic cohort.

Even after gaining a two-year experience in the market, the pandemic cohort of employed workers was able to make only around 9% higher income as compared to the *starting* income of the pre-pandemic cohort. By 2022 the permanent salaried workers of the pandemic cohort were making 22% higher income than the starting

[6] In 2019 prices.

income of the permanent salaried workers of the pre-pandemic cohort, while the temporary salaried workers of the pandemic cohort continued to make 4% lower income even after two years as compared to the starting income of their pre-pandemic counterpart. Increment in earnings of the daily wage workers and the self-employed after two years of working was only around 5–7% higher than the starting salary of the respective workers in the baseline pre-pandemic year cohort.

Comparing the young entrants of the labour market in the pandemic year with those in the pre-pandemic year, we find that the penalty in terms of finding a job is marginal in the extensive margin of not getting employment. However, there is a significant difference in the intensive margin of the kind of employment one is able to secure, and the intensive margin of the earnings. So the pandemic entrants faced a penalty at the extensive margin of securing employment, which was relatively less than the penalty they suffered at the intensive margin in terms of the kind of employment, and the associated earnings from this employment.

6.4 Conclusion

The Indian economy is going through its potentially most productive period where the youth bulge can be turned into a demographic dividend. However, on the downside, if the economy is not able to provide satisfactory employment and income earning opportunities to this mass, it can turn into a 'demographic bomb' (Lin, 2012).

The analysis in this chapter explores the economic fate of two kinds of youth—the young who were already working on the eve of the pandemic (young *workers*); and the young, erstwhile students, who entered the labour market in the year of the pandemic (young *entrants*).

On comparing the effect of the pandemic on the young workers vis-a-vis the older workers, we find that the younger workers have suffered disproportionately more in terms of losing employment during the pandemic. In terms of their earnings however, for the young who were able to retain their employment, they fared similar to their older counterparts. The penalty for the young workers thus was primarily in terms of their ability to retain their employment.

In contrast, when we focus on the young entrants during the pandemic, we find that vis-a-vis their predecessors they were only marginally worse-off in securing employment.[7] However in terms of both the kind of employment they were able to secure, and their earnings from those employment, the young entrants of the pandemic were at a greater disadvantage than the pre-pandemic cohort. A greater proportion of the young entrants of the pandemic cohort got absorbed in the more precarious kinds of employment, and a smaller segment was able to secure permanent salaried employment. Further, the starting earnings of these entrants took a large hit vis-a-vis the pre-pandemic cohort.

[7] The young entrants in the pre-pandemic year of 2019.

It is also pertinent to note that we continue to live in deeply uncertain and volatile times with the infection rates on the rise even as we write this chapter. Our analysis suggests that the young are at a greater disadvantage—whether they are already a part of the labour market or a fresh entrant. We will be able to get a complete picture of the actual penalty only after some more years when the economy has moved past the continuing damages of the pandemic, and the employment and income trajectory of the workers has stabilized. But till then it is imperative that we take measures to provide productive employment and decent pay to our youth to exploit the golden period of the economy's youth bulge. Poor employment opportunities and a lack of decent income avenues at the beginning of one's career is likely to have scarring effects on the workers for their entire labour market life-cycle. In the face of this unprecedented crisis, safeguarding the economic outcomes of our youth is thus critical to exploit the economy's demographic dividend, aside from its intrinsic social-ethical merits.

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Chapter 7
Social Protection Policies and Women's Employment During COVID-19

Nikita Sangwan and Swati Sharma

Abstract India imposed one of the strictest lockdowns to contain COVID-19, this brought all non-essential economic activities to a standstill. This was an unprecedented economic and health shock that affected the entire population, but the worst affected were the informal migrant workers who lived hand to mouth. Millions of them fled back to their native places seeking refuge from the economic uncertainties created by the sudden lockdown. However, this reverse migration resulted in an increased burden on rural economies in multiple ways. This chapter discusses the role played by rural social protection policies, particularly the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and the Garib Kalyan Rojgar Abhiyaan (GKRA), in easing the burden on the labor market, with a focus on the provisions of these schemes on female labor force participation.

Keywords Covid-19 · Rural labor market · Gender · Reverse migration · NREGA · GKRA

JEL classification J08 · J16 · J68 · O15

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7.1 Introduction

COVID-19 highlighted vulnerabilities faced by women—globally and nationally, as documented by the immediate studies following the pandemic. Women experienced an increase in their unemployment probabilities and a fall in re-employment chances along with the higher burden of unpaid care work (Deshpande, 2020; Abraham et al., 2021). Further, (Agarwal, 2021) lists the direct and indirect ways COVID-19 could multiply the hardships faced by women due to pre-existing gender inequalities and social norms. Thus, ensuing gender disparity and vulnerability have the potential to magnify the already poor labor force participation of Indian women.

India witnessed one of the strictest nationwide lockdowns in March 2020 leading to mass "reverse migration"—individuals who had come to urban areas in search of economic activities journeyed back home.[1] According to government estimates, approximately 10.4 million workers went back to their native villages (GoI, 2020), increasing the burden on the already stressed rural economies. Women being the residual workers and men enjoying the first hold over employment opportunities may result in gendered effects on the rural labor markets. Thus, in this chapter, we discuss the implications of reverse migration on women's employment in rural India. Rural women who were already showing declined participation in paid economic activities now faced intense competition from returning workers and increased household members to be taken care of.

We look at the social protection schemes like MGNREGA and GKRA (discussed in detail later) that could serve as a fallback option in the wake of economic uncertainty. While both rural men and women faced higher competition with reverse migration, the common understanding dictates that the loss could be more pronounced for rural women. With a scarcity of earning opportunities and a higher burden of household responsibilities, the male breadwinner norm at the household level may get reinforced more intensely. It may get revoked too, for instance—in case of the sudden death of the earning member due to COVID-19. In such multiple scenarios, women may want to exploit the mandated provision that guarantees 1/3rd of work generated under MGNREGA. Thus, we focus on fallback options and their implications on women's employment amidst the pandemic, which was a huge shock to the demand and supply of labor.

Several studies note massive expansion under MGNREGA during the pandemic on account of increased demand for work (Afridi et al., 2022a). Since MGNREGA is a demand-driven, self-selection-based program it is of no surprise that this program was the 'go-to' option in the absence of alternative economic opportunities. However, (Narayanan & Saha, 2022) points out that this expansion was not proportionate and overall the program provided just 13.5 days per rural household. The limitation of their analysis is the exclusion of the pandemic-specific employment generation program—GKRA (Garib Kalyan Rojgar Abhiyan) which was similar to

[1] Figure 7.1 shows the timeline across various stages of the lockdown. Towards march end, almost all economic activities came to a halt, with a few exceptions of necessary services like the sale and purchase of household non-durable goods, medical, and defense.

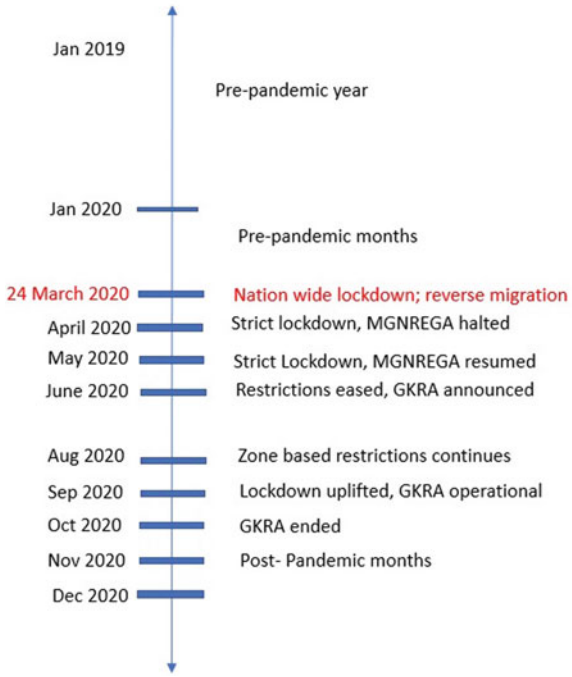


Fig. 7.1 Timeline during first wave of COVID-19. *Source* Based on varied newspaper articles

MGNREGA in design and implementation. However, unlike MGNREGA, GKRA had no mandated provision and thus, its implications for FLP could be different. Keeping in line with the central theme of our study, we explore women's participation in MGNREGA in GKRA's presence.

Through our analysis, we add to the bigger debate regarding women's participation in paid economic activity and measures to retain and enhance their labor force participation. COVID-19 shock shows that any crisis having adverse labor market implications is likely to aggravate the extant problem of low and stagnant labor force participation rates (LFPR) of women in developing countries. Our paper confirms this in the context of the rural labor market and further shows that this may play out even in the historically feminized sector (such as MGNREGA). For instance, women's share in MGNREGA person-days fell by 0.5% in post pandemic period as compared to the pre-pandemic period. However, the mandated 1/3rd provisioning in MGNREGA bounded the fall in women's employment to some extent whereas GKRA with no special provisioning share show no such result. Thus, we advocate the need for special/targeted policies to mitigate women's vulnerabilities and thereby overall loss in the household's welfare.

7.2 Fall Back Options in Rural India During Pandemic

7.2.1 Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and Women

The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) launched in 2005, is a pan-rural India demand-based employment generation program. Under this act, each rural household has the right to manual work for 100 days (all adults per household in total) on publicly funded projects (usually for rural development).[2] It has been lauded as one of the largest antipoverty programs (safety net) and empirical evidence shows it to be particularly attractive to rural women. Studies underscore the role of MGNREGA in enhancing female labor force participation. Women find some of its features like- a guarantee of work near home, equal pay promise to men and women, and one-third reservation for women, quite desirable as they help in overcoming barriers to participation in paid economic activity (e.g.: preference for guaranteed work identified by Dhingra and Machin (2020), mobility restrictions identified by Afridi et al. (2020, 2022b).

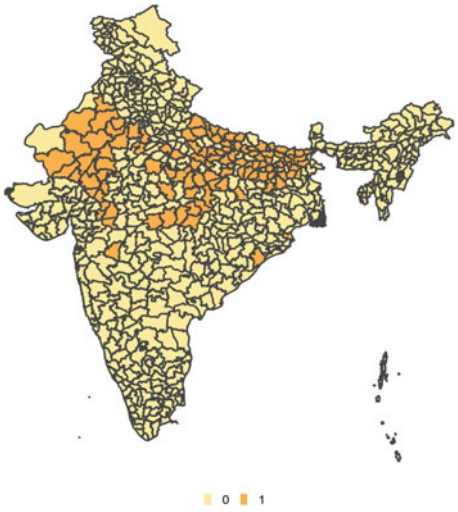
We look at the disequilibrium created by the pandemic. The dependence on MGNREGA increased—more people demanded work under the scheme as other employment opportunities dried up, especially due to the mass reverse migration to rural India from urban India. For instance, nearly 133 million people demanded work in 2020–21—a 43% increase compared to the previous year. Up to 110 million people worked in the program in 2020–21, compared to an average of 78 million in four years to 2019–20. While the government increased the MGNREGA budget by INR 400,000 million for 2020–21 to address increased demand, it was considerably less than the estimated required allocation.[3]

7.3 Garib Kalyan Rojgar Abhiyaan (GKRA)

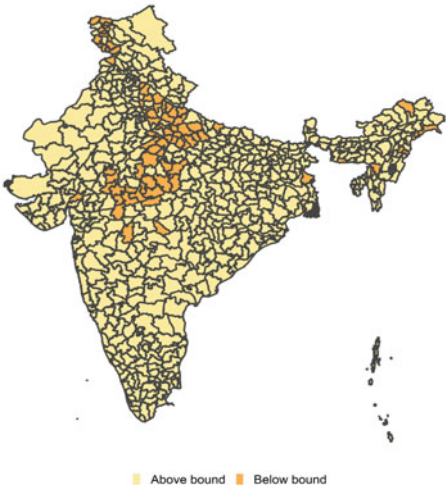
Another employment scheme—GKRA (Garib Kalyan Rojgar Abhiyaan), was launched with an aim to provide social protection to the "*returning migrants and similarly affected rural population*" in June 2020 by the Government of India. The GKRA was introduced in 116 selected districts across 6 states of Bihar, Jharkhand, Odisha, Rajasthan, Madhya Pradesh, and Uttar Pradesh. Districts with 25,000 and more returnee migrant workers in these 6 states were selected with a focus on 25 works to be coordinated by 12 different departments/ministries with a resource envelope

[2] Source: https://www.newsclick.in/female-labor-force-in-India-declining.

[3] Source: https://www.indiaspend.com/governance/migrant-workers-no-reliable-data-or-policy-737499.



(a) GKRA Districts



(b) Mandated women's share

Fig. 7.2 Distribution of GKRA and women's share in MGNREGA. *Source* NREGA Public Data Portal (2019–2020), Census (2011) and GKRA Portal

of INR 500 billion. Panel a, Fig. 7.2 shows the distribution of the districts selected under the scheme.[4,5]

[4] Source: https://rural.nic.in/press-release/garib-kalyan-rojgar-abhiyan.

[5] Reverse migration started as soon as the nationwide lockdown was announced in March 2020 and therefore announcement of GKRA in June is unlikely to affect this phenomenon (https://www.indiaspend.com/governance/ migrant-workers-no-reliable-data-or-policy-737499).

There was a significant overlap between activities under MGNREGA and GKRA with 13 (17) out of 25 activities falling under MGNREGA (Ministry of Rural Development). Moreover, one of the objectives of GKRA was to "*saturate villages with public infrastructure and assets*", similar to MG-NREGA (GoI, 2021). The wages for these activities came from the allocated INR 500 billion. Thus, GKRA worked under the capacity of existing schemes and may either complement or substitute their benefits.[6] By design, the program catered to about two-thirds of returning migrants in the allotted districts and there was no special provision for women under GKRA.[7].

7.3.1 Rural Women Labor Force Participation

One must note that there was an intense competition not only in quantity but skill level as well. The returnee migrants were relatively more skilled which may further limit employment opportunities for women. To some extent, the provision of 1/3rd of jobs for women may act as a cushion for rural women's employment status. Since the pre-pandemic average share of women (49% in 2019) is above the reservation, women may lose employment when the rationing of jobs becomes more intense. It is quite remarkable that the proportion of women participating in MGNREGA is more than double India's overall FLFP. Over the years, women's share in MGNREGA has surpassed the mandated provision in the majority of districts across India. Panel b, Fig. 7.2 shows the distribution of districts by 33% bound in the year 2019 (pre-pandemic) with most of these districts located in North India. It is based on the classification described in Sangwan and Sharma (2022) based on 2019 women's share in MGNREGA to break the sample into districts that are (i) *above bound*—districts with women's share above 33%, (ii) *below bound*—districts with women's share below 33%.

Our analysis focuses on checking whether MGNREGA preserved its proven legacy of safeguarding women's employment in the face of higher competition from men. Additionally, we examine the complementary role of the GKRA scheme in achieving this objective, even though GKRA did not have any specific provision for women.

7.4 Role of Special Provisions for Women

Similar to contemporary studies, we find an increased dependence on NREGA during the pandemic year. Figure 7.3 shows an upward trend in the number of person-days generated under MGNREGA by GKRA status. The intensity of the generation of

[6] For details of work/activities under GKRA refer to Table 7.1, Appendix A.

[7] https://www.insightsonindia.com/social-justice/welfare-schemes/schemes-under-ministry-of-rural-development/garib-kalyan-rojgar-abhiyaan-launched/

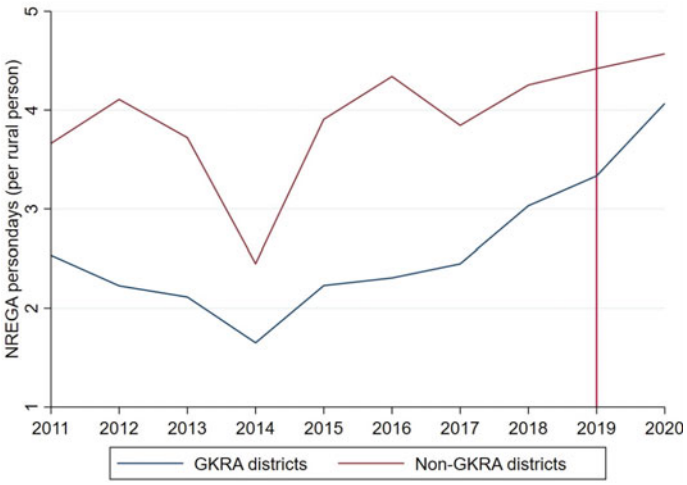


Fig. 7.3 Employment generation in rural India under MGNREGA (per rural inhabitant). *Source* NREGS Public Data Portal (2011–2020) and GKRA Portal

person-days went up during the pandemic in all the districts as reflected in the higher slope post 2019. However, the figure depicts that Non-GKRA districts have relatively higher person-days generated per rural inhabitant in the pre as well as the post pandemic periods indicating historically lower reliance on MGNREGA in districts with GKRA that continues post pandemic. Interestingly, reliance on MGNREGA was not uniform and was more pronounced in the GKRA districts compared to the non-GKRA districts as reflected by the steepness of the curve. As reverse migration increased the pressure on the rural labor markets, alternative work opportunities contracted or became more competitive, one would expect a shift to the social protection program as a fallback option. And, as the stress of reverse migration was larger for GKRA districts we are seeing a greater increase in these districts relative to Non-GKRA districts.

Since men and women might be impacted differently by labor market shocks, MGNREGA person-days may also be gendered. Figure 7.4 breaks Fig. 7.3 by gender. GKRA districts are also the ones with the lowest women's person-days throughout the timeline considered. It follows a parallel path with respect to the men's person-days graph and always lies below it. When we look at person-days generation by gender in Non-GKRA districts, we observe no clear pattern, in fact, women's person-days surpass men's person-days multiple times. In particular, from 2017 onwards women's person-days are always more than men's person-days. However, post pandemic both curves hint at a slight decline in person-days, unlike GKRA district's curves that show a steep increase.

We move from an absolute measure to a relative measure to examine the trends in more detail in Fig. 7.5. Despite the larger number of absolute MGNREGA person-days in Non-GKRA districts, the share of women is larger in the GKRA districts

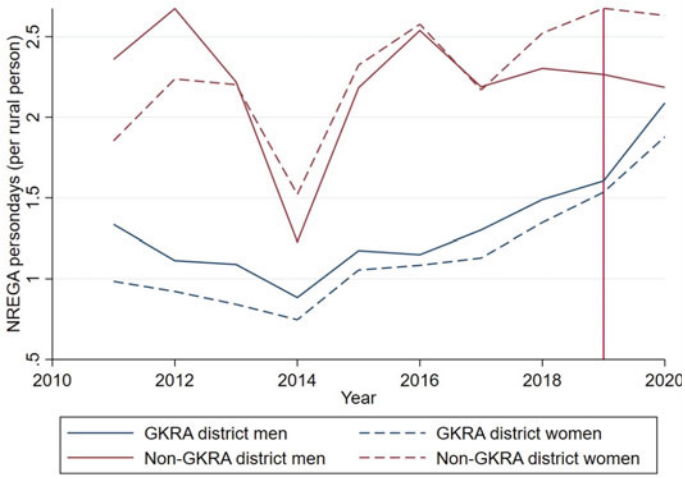


Fig. 7.4 Employment generation by gender in rural India under MGNREGA (per rural inhabitant). *Source* NREGS Public Data Portal (2011–2020) and GKRA Portal

(Fig. 7.5). Notably, the overall share of women in MGNREGA is more than 50%, well above the mandated bound of 33.33%, in both pre and post-COVID-19. While women's share in GKRA districts lies above non-GKRA districts but falls at a faster rate and starts to converge towards non-GKRA districts by the end of 2020. These trends in GKRA and non-GKRA are on expected lines as GKRA districts face greater competition from the relatively higher share of returning migrants. It is concerning that the convergence seems to be coming from the fall in women's share- while both types of districts are witnessing a decline, GKRA districts' fall is more rapid.

However, these are suggestive trends and do not control for a host of district and time trends that might be driving these patterns. A more rigorous analysis is carried out by Sangwan and Sharma (2022) that we discuss in detail here to support our discussion and conclusion. Using a first difference technique with districts fixed effects, authors find an increased dependence on MGNREGA during the pandemic. The number of person-days per person went up by a quarter of a day (6%) during the pandemic year (Panel (a), Fig. 7.6).[8] The magnitude is larger in districts that are below the mandated provision—almost half a day (14%) but is not statistically different from above bound districts (5%). In panels (b) and (c), we report the estimated coefficients for men and women, respectively. For both the sexes, the dependence on MGNREGA increased but the magnitude of this increase is larger for men relative to women as depicted in Fig. 7.6.

To examine the women's situation more closely, we study the changes in women's share during Covid-19. The share of women in MGNREGA person-days fell from

[8] The estimated coefficient is 0.26 and the mean persondays is 4.34. To calculate the change in percentage terms, we divide the estimated coefficient by the mean value, i.e., $0.26/4.34 = 0.06 = 6\%$. We follow a similar method to interpret coefficients throughout the discussion.

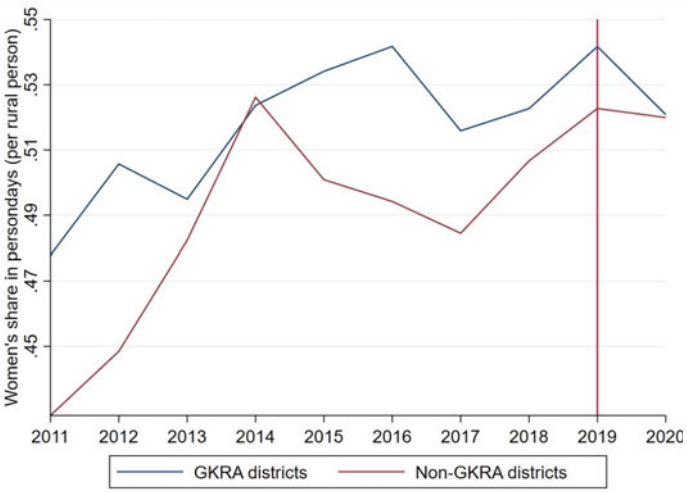


Fig. 7.5 Women's share in employment generation in rural India under MGNREGA (per rural inhabitant). *Source* NREGS Public Data Portal (2011–2020) and GKRA Portal

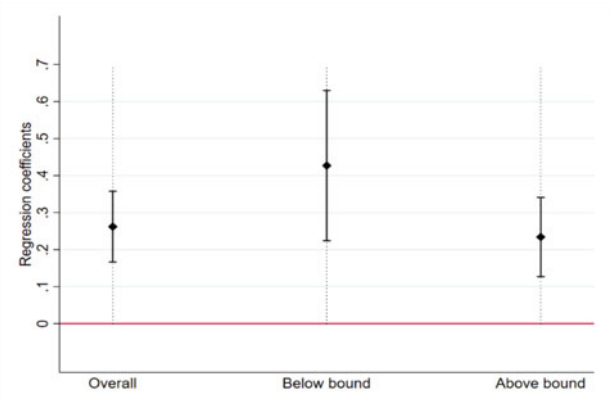
its pre-pandemic level by 0.5% as shown by Panel (a.) of Fig. 7.7. Interestingly, there exists a significant heterogeneity in the districts below and above the mandated bound. Districts where the reservation had not been reached and jobs could be claimed under MGNREGA using special provisions, saw an increase in the share of women. On the other hand, districts that had already reached the mandated provision saw a contraction in the share of women. As a result, the share of women in below bound districts went up by 2.6% while those above bound fell by 0.8%.

Since the GKRA status is correlated to greater competition from the returning migrants, we look at the difference in the share of women in NREGA by the GKRA status in Panels (b) and (c) of Fig. 7.7. It is in the GKRA districts where the competition from returning migrants would be relatively higher and thereby may substitute away women if there are no special provisions to protect their livelihoods. On expected lines, the heterogeneity in the share of women by the bound is driven by GKRA districts with no change for non-GKRA districts.

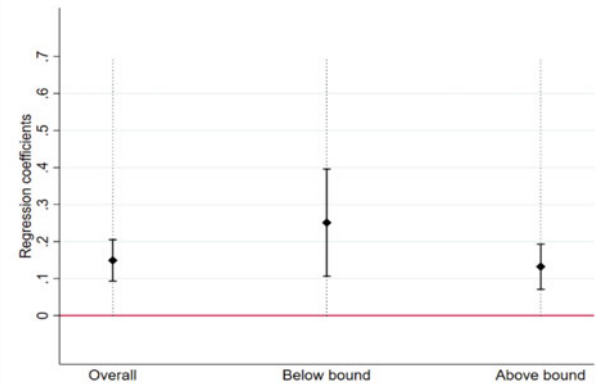
In summary, women's share is converging towards one-third bound as districts with women's share below the bound experience a significant increase in women's share while those above the bound observe a fall in their share. Thus, mandated provision acts as a cushion for women's employment in the wake of increased competition for MGNREGA works even though overall the program favored men.

Sangwan and Sharma (2022) further substantiate these findings with a DID specification that exploits the average number of person-days across bordering districts as a counterfactual outcome for the GKRA districts. They find no significant difference in the number of person-days generated across the two types of districts.

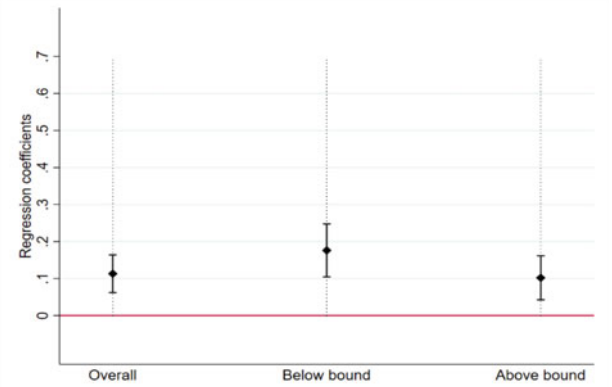
Given that the number of returning migrants is publicly unavailable, the analysis relies on using a dummy for GKRA in a district. To allay concerns of sensitivity to



(a) Overall Person-days

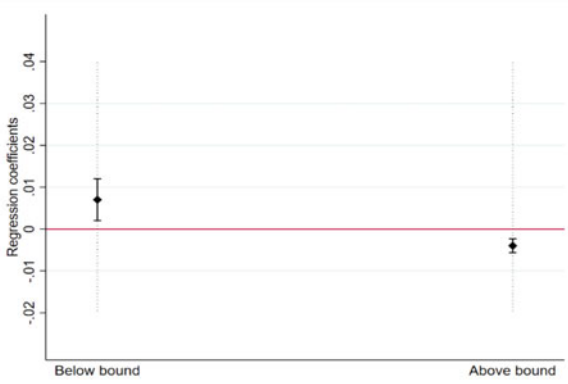


(b) Male Person-days

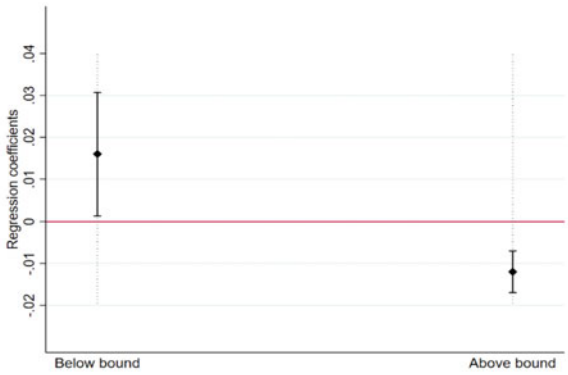


(c) Female Person-days

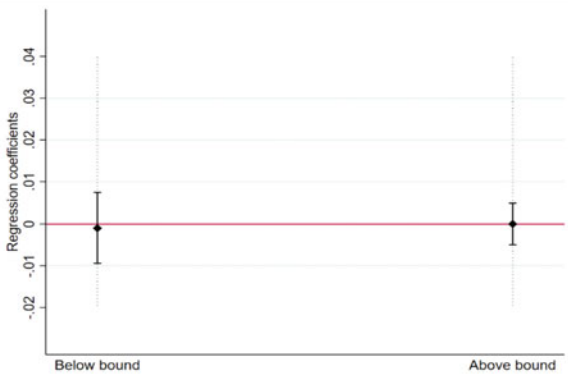
Fig. 7.6 Role of reservation for women in NREGA person-days. *Source* NREGA Public Data Portal (2019–2020) and GKRA Portal. *Note* The figure plots estimates for NREGA person-days (per rural inhabitant)—overall and by gender. Confidence bands with standard errors clustered at District level at 95% level of significance



(a) Overall share of women



(b) Share of women in GKRA districts



(c) Share of women in non-GKRA districts

Fig. 7.7 Share of women in NREGA by GKRA and NREGA reservation. *Source* NREGA Public Data Portal (2019–2020) and GKRA Portal. *Note* The figure plots the share of women in the NREGA person-days for subsamples below and above mandated reservation. All specifications have district fixed effects. Confidence bands with standard errors clustered at District level at 95% level of significance

this binary indicator, we check the robustness of the results using the person-days generated under the GKRA scheme and find qualitatively similar results.

In fact, if we restrict the sample to GKRA districts, we find a very strong correlation in the person-days generated under the two schemes of NREGA and GKRA (67% ($p < 0.01$)). This is expected as GKRA districts are the ones with a higher number of returning migrants, and suggests that GKRA complemented MGNREGA in reducing the stress on rural economies.

Despite the increased dependence on GKRA and NREGA, there was a significant fall in women's share in below bound districts. This highlights the need to have special provisions for women in preserving their employment share.

The main focus of our analysis was to examine the heterogeneity in the results by the provisions under NREGA. For the same, we classified the districts on the basis of the share of women in 2019 (pre-Pandemic) into above and below mandated bound. We checked the robustness of the results using the historical share of women (2015–19) and continue to find qualitatively similar results. This confirms that our findings are not sensitive to the classification of districts on the basis of one year's share.

7.5 Discussion

This study examines the impact of Covid-19 on women's employment, but the insights gained are applicable beyond the pandemic period. In developing countries, women's employment tends to be counter-cyclical, meaning that they join the workforce to support household income during economic crises. However, negative productivity shocks to different sectors may lead to a contraction in employment opportunities and thereby increase the competition for existing jobs. Faced with underlying social norms like the male breadwinner norm and the traditional roles in home production, women are likely to lose more jobs than men.

Without special provisions to protect women's employment, these shocks can have significant welfare losses. For instance, a decrease in women's participation in MGNREGA has direct implications for household welfare and women's agency as suggested by the existing literature. The minimum wage set under the scheme has been shown to cause a substantial increase in private-sector casual wages for women, reducing the gender disparity. This reduced the dependence of women on men for personal savings and consumption. The ensuing economic independence enhances the say of women in household decision-making and translates into better household nutrition, and increased expenditure on child care and health services (see Sangwan and Kumar (2021), Maity (2019), Zimmermann (2012)). Additionally, a recent study by Rodriguez (2022) shows that increased participation of women in MGNREGA leads to an increase in credit demand and savings and a fall in violence against them.

While this study does not have direct data to support these findings, they suggest future research paths that could explore the relationships between women's participation in employment programs, and household welfare. Policymakers must prioritize

protecting women's employment opportunities and supporting their economic independence, particularly during times of economic shock, to promote gender equality and inclusive economic growth.

7.6 Concluding Remarks: Policy Lessons

While there is an overall greater dependence on public works programs during the pandemic year as the fallback option in the rural economy, the cushioning effect on women's employment is limited. Our analysis re-establishes vulnerabilities faced by women due to the pandemic. Using data from social safety nets—MGNREGA and GKRA, we find a positive role of one-third reservation for women. However, additional assistance under GKRA without any mandated provision for women did not help in preserving the employment status of women.

Our results echo the need for targeted special programs to help women cope with the increased competition as they tend to lose employment due to higher competition for limited jobs by men. Of course, multiple mechanisms could result in such a trend along with the societal pressure to take full responsibility for domestic chores, older family members, and children, leading to the withdrawal of women from the labor force. Our results suggest that special provisioning (as seen in MGNREGA districts where one-third reservation is binding) helps in resisting these norms to some extent.

We are able to study the impact of the first wave of COVID-19 as the period coincided with the annual data availability of work undertaken in MGNREGA. There is a need for more transparent data (also of works under GKRA) to fully understand the impact of reverse migration and the second wave to prepare ourselves for upcoming waves or any such unanticipated shocks. Reverse migration was mainly due to distress caused by economic activity shutdowns and lack of safety nets (like MGNREGA) in urban India. Thus, our analysis also supports the need for fallback options in urban India to reduce the burden on rural safety nets and thereby women's welfare.

Appendix

See Table 7.1.

Table 7.1 Works under GKRA

S.No	Work/activity	Scheme	Ministry
1	Community Sanitary Complexes	Swachh Bharat Mission-G (ODF+)	Drinking water & sanitation
2	Gram Panchayat Bhawans	Finance commission Funds/ MG-NREGA	Panchayati Raj/Rural Development
3	Works under Finance Commission funds	Finance commission Funds	Panchayati Raj/Rural Development
4	National Highway works	Bharatmala & others	Road transport & highways (NHAI)
5	Water conservation & Harvesting works	MG-NREGA	Rural Development
6	Wells	MG-NREGA	Rural Development
7	Plantation works (including CAMPA Funds)	MG-NREGA/CAMPA	Rural Development
8	Horticulture	MG-NREGA	Rural Development
9	Anganwadi Centers	MG-NREGA/ WCD	Rural Development/ DoWCD
10	Rural housing works (PMAY-G)	PMAY-Gramin	Rural Development
11	Rural connectivity works (PMGSY)	PMGSY	Rural Development
12	Railway works	–	Railways
13	Shyama Prasad Mukherjee RURBAN Mission	Shyama Prasad Mukherjee RURBAN Mission	Rural Development
14	PM KUSUM works	PM KUSUM	New & Renewal Energy
15	Laying of Optic Fiber under Bharat Net	Bharat Net	Telecommunication
16	Works under Jal Jeevan Mission	Jal Jeevan Mission-MG-NREGA & Har Ghar Nal se Jal	Rural Development/ Drinking water & Sanitation
17	PM Urja Ganga Project	PM Urja Ganga Project	Petroleum & Natural Gas
18	Training through KVK for Livelihoods	–	Agriculture Research & Education
19	Works through District Mineral Fund	DMFT	Mines
20	Solid and liquid waste management works	MG-NREGA	Rural Development
21	Farm ponds	MG-NREGA	Rural Development
22	Cattle Sheds	MG-NREGA	Rural Development

(continued)

Table 7.1 (continued)

S.No	Work/activity	Scheme	Ministry
23	Goat Sheds	MG-NREGA	Rural Development
24	Poultry sheds	MG-NREGA	Rural Development
25	Vermi-composting	MG-NREGA	Rural Development

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Chapter 8
The Covid-19 Pandemic and Gendered Division of Paid Work, Domestic Chores and Leisure: Evidence from India's First Wave

Ashwini Deshpande

Abstract Examining high-frequency national-level panel data from Center for Monitoring Indian Economy (CMIE) on paid work (employment) and unpaid work (time spent on domestic work), this paper examines the effects of the first wave of the Covid-19 pandemic on the gender gaps in paid and unpaid work until December 2020, using difference-in-differences (DID) for estimating the before (the pandemic) and after (the pandemic set in) effects, and event study estimates around the strict national lockdown in April 2020. The DID estimates reveal a lowering of the gender gap in employment probabilities which occurs due to the lower probability of male employment, rather than an increase in female employment. The first month of the national lockdown, April 2020, saw a large contraction in employment for both men and women, where more men lost jobs in absolute terms. Between April and August 2020, male employment recovered steadily as the economy unlocked. The event study estimates show that in August 2020, for women, the likelihood of being employed was 9 percentage points lower than that for men, compared to April 2019, conditional on previous employment. However, by December 2020, gender gaps in employment were at the December 2019 levels. The burden of domestic chores worsened for women during the pandemic. Men spent more time on housework in April 2020 relative to December 2019, but by December 2020, the average male hours had declined to below the pre-pandemic levels, whereas women's average hours increased sharply. Time spent with friends fell sharply between December 2019 and April 2020, with a larger decline in the case of women. The hours spent with friends recovered in August 2020, to again decline by December 2020 to roughly one-third of the pre-pandemic levels. The paper adopts an intersectional lens to examine how these trends vary by social group identity.

Keywords Covid-19 · Lockdown · Employment · Gender · Time use · India

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8.1 Motivation

Historically, large demographic shocks have contributed to shifts in established gendered labor market norms. For instance, evidence suggests that the 1918 Spanish Flu epidemic in India led to a temporary increase in female labor force participation in 1921, believed to have been driven by distress labor supply by widows and rising wages (Fenske et al., 2020). Since India's female labor force participation has been persistently low, a question worth investigating is whether the Covid-19 pandemic altered women's labor force participation in any significant way. India announced a total and stringent lockdown at the end of March 2020, which resulted in a shutdown of virtually all economic activity. The first month of the lockdown (April 2020), saw a sharp drop in employment with fluctuating recovery thereafter. This chapter focuses on data from the first eight months of the Covid-19 pandemic (India's first wave of Covid-19) and investigates how the sudden closure of economic activity affected the gender gaps in employment and labor force participation in India.

Early national-level estimates revealed that in the first month of the stringent nation-wide lockdown in April 2020, in absolute numbers, more men lost employment than women (104 million and 17 million respectively). This is not surprising as more men than women were employed before the pandemic hit. However, conditional on being employed pre-lockdown, women were roughly 20 percentage points less likely to be employed in April 2020 (Deshpande, 2020b). Desai et al. (2020)'s results, based on a survey in the Delhi Metropolitan Area, are similar in direction, in that the absolute loss of employment was greater for men compared to women. Kesar et al. (2020), based on phone survey data in selected states till May, find that women, especially rural women, were more likely to lose employment compared to men. Chiplunkar et al. (2020), using job postings on another employment portal (Shine.com) find a dramatic contraction in hiring in the first months of the pandemic, especially for young, less educated and female job seekers. They find that advertisers post fewer jobs in female dominated occupations.

While the early evidence from the lockdown does not suggest any major shifts in the gender gaps in the labor market, has this pattern changed with the steady unlocking of the economy? A study released by LinkedIn, based on their internal data for India, finds an increase of seven percentage points in women's participation in the labor force between April and July 2020 (Mathur, 2020). Their argument is that normalization of work-from-home (WFH) and flexible hours has allowed women to enter the workforce.

An important dimension that negatively affects women's labor force participation is their predominant responsibility to get housework and domestic chores done. Across the world, women spend more time on domestic chores and care work than men. India has amongst the most unequal gender division of household work globally. Early evidence suggests that the gender gap in average hours spent on domestic work

hours *decreased* in the first month of the lockdown due to an increase in the male distribution of hours (Deshpande, 2020b). Was this shift a very short-lived blip or has this decline in the gender gap persisted beyond the first month? If it is the latter, in principle, it could set the stage for a rise in female labor supply, as suggested by the LinkedIn report. Of course, whether female employment actually increases is a function of several other factors, including demand for female labor and adequate employment opportunities.

The Covid-19 pandemic because of the stress on social distancing has increased isolation and stress, which is compounded by economic and disease-related anxieties (Salari et al., 2020). In this scenario, time spent with friends could act as a stress-buster and provide much-needed emotional support. There is no quantitative data on mental health; I examine the gendered nature of the change in time spent with friends during the pandemic and how this has changed with lockdown and unlockdown of the economy as suggestive of the gendered impact of the pandemic on well-being.

Using nationally representative, high-frequency panel data, this paper examines the evidence from India on the impact of the Covid-19 pandemic on the gendered division of paid work (employment), unpaid work (time spent on domestic work) and time spent with friends. The evidence from India contributes to the rapidly emerging literature on the impact of Covid-19 on inter-group inequalities across the world. If the pandemic had, in fact, managed to shift the needle on sticky gender norms in paid and unpaid work, it would have been a massive silver lining to the dark phase of the pandemic and economic contraction. Any such shift in India has potentially significant implications for livelihoods and quality of life of a third of the world's population. India has been struggling with slowing growth, rising inequality and significant persistent gender gaps and had the pandemic enabled the economy to break out of persistent patterns, this would have been a much-needed and welcome development.

8.1.1 Global Evidence and Related Literature

Global evidence indicates that the slowdown and stoppage of economic activity due to the Covid-19 pandemic is disproportionately hurting women. According to the figures released by the US labor bureau, large numbers of women in the US are dropping out of the labor force altogether. The number of women aged 20 years or older in the labor force (including employed and unemployed women) declined by 865,000 between August and September 2020, compared to a corresponding decline of 216,000 men. There were 2.4 million fewer women in the labor force in September 2020 than exactly one year earlier (September 2019), compared to roughly 1.5 million fewer men (https://www.bls.gov/news.release/empsit.t01.htm). This pattern is confirmed by research studies from various parts of the world which demonstrate that the first-order employment effects are more adverse for women than men (Alan et al., 2020 for the US; Andrew et al., 2020a, b for the UK; Farre et al., 2020 for Spain; Ikkaracan & Memis, 2020 for Turkey, among others).

The impact of recessions on job losses is gendered, but not necessarily in one direction (Deshpande, 2020a). For instance, earlier recessions in the USA (2008–9) resulted in more job losses for men than women. However, this time around, women are more likely to bear the brunt because of the nature of businesses facing extended closure or possibly the threat of permanent closure (Alan et al., 2020). Restaurants, hotels, large retail spaces like malls and department stores, entertainment centers on one end, and domestic workers like maids, nannies, cleaners etc., on the other end of the workspace, are large-scale employers of women.

A review of the evidence from other countries during earlier epidemics (H1N1, Ebola) reveals that increased domestic responsibilities, e.g., due to school closures, had differential effects on men and women. As their childcare burden increased, women's labor force participation fell, either in the form of reduced hours or withdrawal from paid labor altogether (Deshpande, 2020a). In the US, early evidence indicated that mothers were facing a harsh dilemma due to school closures, summed up by the title of a New York Times article: "In the Covid-19 Economy, You Can Have a Kid or a Job. You Can't Have Both" (Perelman, 2020).

As Indian women's participation in paid work is already severely constrained by unpaid work, which includes care work and domestic chores, this paper investigates how this pattern shifted, if at all. The LinkedIn India report suggested that Indian women were able to increase work participation despite school and childcare facilities being closed, due to the presence of domestic help and live-in grandparents, in addition to flexible hours and the ability to work remotely, which presumably allowed them to combine care responsibility with demands of paid work. Does national-level macro data support this shift?

8.1.2 Main Results

The analysis in this paper adopts an intersectional lens to examine how changes in gender gaps vary by social identity. The main results are as follows. Following a sharp drop in employment in April 2020, employment recovered through May–August 2020 for both men and women, but started to decline thereafter. There is no evidence of an increase in female work participation over the six months of the pandemic over and above the recovery to near pre-pandemic levels.

Broken down by education levels, the post-August decline in female employment is driven by the decline in employment of women with very low levels of education: primary and below and illiterate. The highly educated women suffered the least in the job cuts in April, when overall employment plummeted, mean employment for this group of women declined between April and August 2020, i.e., during the recovery phase rather than during the contraction phase. However, between August and December 2020, the average employment is back to its pre-pandemic levels.

Examining changes in employment by social group, the largest decline in employment occurred for SC or Dalit men, followed by Scheduled Tribe (ST), then OBC. Upper caste (UC) men registered the smallest decline in employment.

Female employment in each caste group is lower than male, but the gender gap is (a) narrowest for the ST group, and (b) shows a fair amount of month-to-month fluctuation. In terms of recovery, only UC men seem to be making a recovery by December 2020. All other men and women across all caste groups have not exhibited a clear recovery in employment. The DID estimates, comparing the pre-pandemic (January 2019–March 2020) period to the post-pandemic period (April 2020–December 2020), show that male employment declined from 44 to 38% from the "pre" to the "post" period, whereas female employment declined from 37 to 36%. The gender gap in the probability of employment was 7 percentage points in the pre-pandemic period. This declined significantly in the post-pandemic period (April–December 2020) to 2 percentage points. This decline is due to the lower probability of male employment, rather than due to an increase in the probability of female employment.

The event study estimates for the probability of employment show that accounting for lagged employment, the likelihood of women being employed in August 2020 was 9 percentage points lower than that for men, compared to the pre-pandemic period (April 2019). By December 2020, the gender gaps in the probability of being employed were back to the pre-pandemic levels.

The gender gap in the average hours spent on domestic work registered a decline in the first month of the lockdown (April 2020) due to an increase in male hours. However, in August male hours had declined again, though not to the pre-pandemic levels. By December 2020, women's hours spent on domestic work had increased significantly and the male hours had declined below the pre-pandemic levels, thereby significantly worsening the gender gap. Examining caste differences in time spent on housework reveals that the spike in male hours on housework was due to an increase in Dalit men.

The time spent with friends declined sharply in April 2020 during the month of the strict lockdown. In August 2020, it recovered for both men and women, but was far below the pre-pandemic levels. By December 2020, there was once again a sharp decline to reach levels roughly one-third of the pre-pandemic period. While women spent more time with friends compared to men in the pre-pandemic months, this is no longer the case. Thus, the decline in time spent with friends has been greater for women.

The rest of this paper is organized as follows. Section 8.2 examines the shifts in gender gaps in paid work. Section 8.3 discusses time spent on domestic work (unpaid work) and with friends. Section 8.4 contains a discussion of the main results and offers concluding comments.

8.2 Paid Work: Employment

8.2.1 Data and Summary Statistics

This paper uses data from the Center for Monitoring Indian Economy (CMIE)'s Consumer Pyramids Household Survey (CPHS) as well as Income Pyramids member survey.[1] I use six waves of the CPHS: Wave 16 (January–April 2019), Wave 17 (May–August 2019), Wave 18 (September–December 2019), Wave 19 (January–April 2020), Wave 20 (May–August, 2020) and Wave 21 (September–December, 2020). Since each household is surveyed three times per year, these 24 months allow up to six observations per person, subject to attrition.[2] The data provides us with a pre- and post-pandemic panel of individuals, with nine months in the post-pandemic period (one month in Wave 19, viz., April 2020, and eight months in Waves 20 and 21 (May–December 2020)), which allows us to track changes in the status of the same individuals over time.

The respondent is asked to list the employment status of all members of the household, including household members for whom this question is not applicable, e.g., children or elderly members. If the question is applicable, the options for employment status are employed; not employed, but willing and looking for work; not employed but willing to work; and not employed, not willing and not looking for work. I have classified the latter as out of the labor force (OLF) and the middle two categories as "unemployed".

For all empirical results, I have created a panel of individuals who are observed in all the waves and for whom employment data are available.[3]

Figure 8.1 shows the trend in average employment for men during the 24 months between January 2019 and December 2020. We see a sharp dip in April 2020, followed by a recovery between April and August. After August, the recovery tapers off for men and female employment registers a decline between August and December 2020. CMIE figures reveal that the average employment from January to March 2020 (pre-pandemic) was 403 million, which declined to 282 million in April 2020. By August 2020, this had increased to 393 million. The comparative figures for men are 360, 256 and 353 million respectively, and for women are 43, 26 and 39 million respectively. The male-female gaps in total employment are stark in both pre and post-pandemic periods. *Prima facie*, national-level estimates do not support the evidence of a sharp increase in female employment, as suggested by the

[1] CMIE is a private data provider (with data available only to subscribers) collecting weekly data at the national-level since January 2016. It is a longitudinal data set covering 174, 405 households (roughly 10,900 households per week, and 43,600 per month). Each household is followed three times per year.

[2] There is some attrition, which is to be expected in panel data. Additionally, April 2020 was a particularly disruptive month for ongoing surveys due to the complete lock- down. The CMIE shifted to phone surveys successfully; they have described the process here: https://consumerpyramidsdx.cmie.com/kommon/bin/sr.php?kall=wkb.

[3] The total numbers are not exactly matching due to missing observations on employment status.

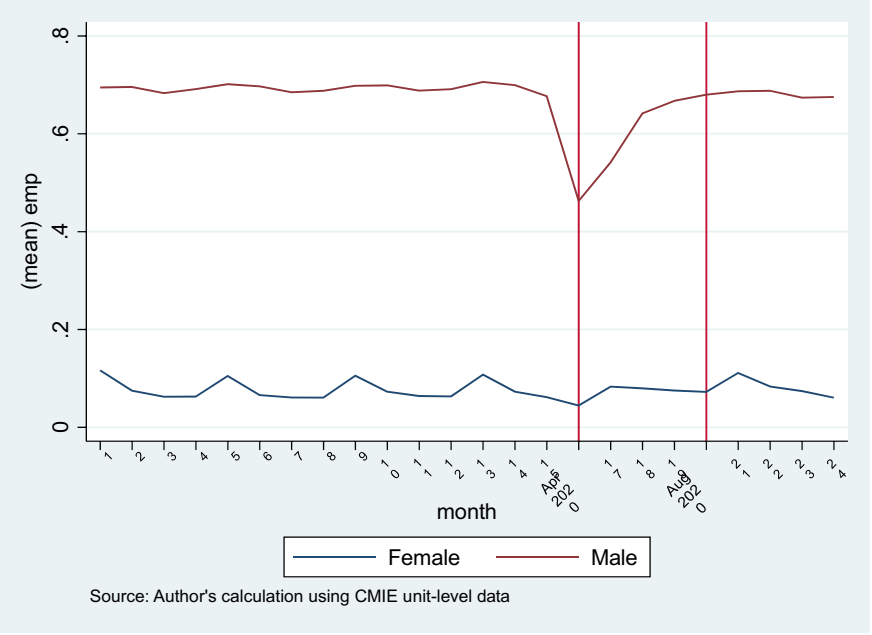

Fig. 8.1 Mean employment, by gender, Jan 2019–Dec 2020

LinkedIn survey. If anything, these numbers suggest an increase in the urban male-female employment ratio from 9.04 in May 2020 to 10.58 in July 2020. For rural areas, the male-female employment ratio was 8.5 in August 2020, an increase from the pre-pandemic average of 7.91.

The month-over-previous-month change in employment during 2020 based on CMIE data reveals the following. Given the pre-existing gender gaps in total employment, more men lost jobs in April, 2020, compared to women. The recovery in employment between May and August was also overwhelmingly male. In August 2020, fewer women were employed compared to July. Male employment increased in August, September and October (m-o-m basis), but the magnitude of increase was far lower compared to May and June. Female employment declined in October, November and December. In November and December, male employment declined compared to the previous month (Deshpande, 2021).

Figure 8.2 shows change in total employment by month and rural-urban sector. The initial drop in employment (between March and April 2020) was higher in urban areas (33%) compared to rural (29%), i.e., employment figures for April 2020 were 67 and 71% of the average employment during the preceding year (March 2019–March 2020), for urban and rural areas, respectively. This was to be expected because sectors that shut down completely included manufacturing and services, which are mostly urban based. Rural women's employment suffered the largest fall at 57% of the previous year's average. This ratio was 73% for rural men, 69% for urban women and

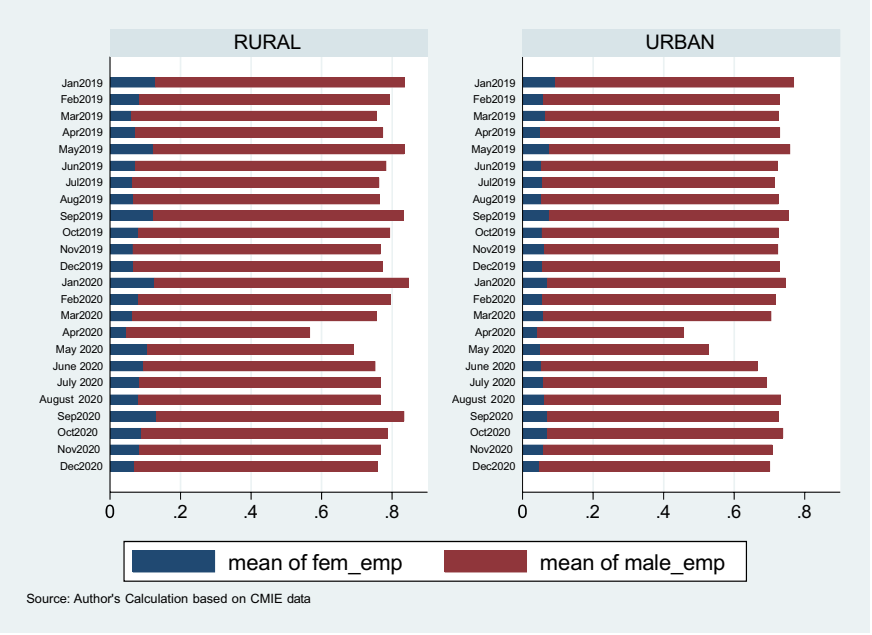

Fig. 8.2 Mean employment, by gender and sector, India

67% for urban men. The decline in female LFPRs since 2004–5 has been driven by a decline in LFPRs of rural women. The pandemic-induced suspension of economic activity revealed a similar pattern.

In rural areas, total employment increased till September and declined thereafter. In urban India, the September to December decline is slightly less sharp compared to urban, and the December 2020 employment is roughly at the immediate pre-lockdown levels. Both rural and urban female employment has been declining since September, with a larger decline in the case of rural women.

Thus, the immediate post-lockdown recovery in employment has not turned is not sustained.

8.2.1.1 Industry and Social Group

Figure 8.3 shows how employment changed over the period across broad industry divisions separately for men and women. In agriculture and allied activities as well as in manufacturing, construction and processing, the decline in female employment in April was larger than male. By December 2020, in agriculture and allied activities, the levels of both male and female employment were back to the pre-pandemic levels.

In manufacturing, construction and processing, female employment recovered after April and fluctuated between September and December to reach a level lower

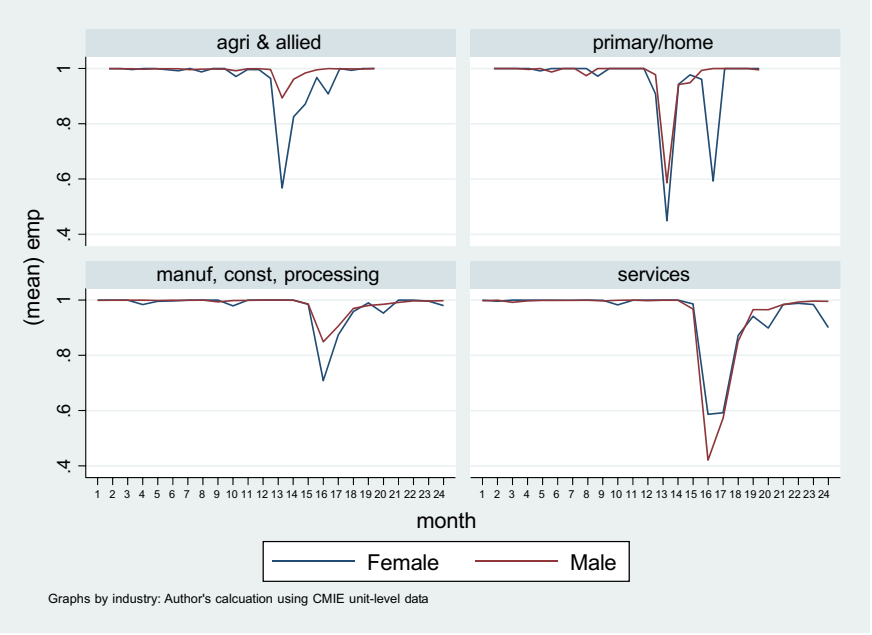

Fig. 8.3 Mean employment, by gender and industry, India

than male employment. The overall fall in employment was steepest in the services sector, and male employment fell more than female in April. However, in subsequent months, male employment in the services sector has steadily risen, whereas female employment has fluctuated with a declining trend in the last three months of 2020. In this sector, the gender gap in employment in December 2020 is larger than in the pre-pandemic period.

In the primary and home production sector, female employment declined sharply twice and more than male: in April as well as in July–August. The second decline was not accompanied by any decline in male employment, thereby leading to a gender gap.

Figure 8.4 shows trends in employment across gender and social group based on the broad administrative categories of Scheduled Castes (SC), Scheduled Tribes (ST), Other Backward Classes (OBCs) and intermediate castes and the residual, who can be seen as a proxy for upper castes. Among the men, we see that the largest decline in employment occurred for SC or Dalit men, followed by Scheduled Tribe (ST), then OBC and finally, upper caste men registered the smallest decline in employment.

Female employment in each caste group is lower than male, but the gender gap is (a) narrowest for the ST group, and (b) shows a fair amount of month-to-month fluctuation. In terms of recovery, only UC men seem to be making a recovery by December 2020. All other men and women across all caste groups have not exhibited a clear recovery in employment.

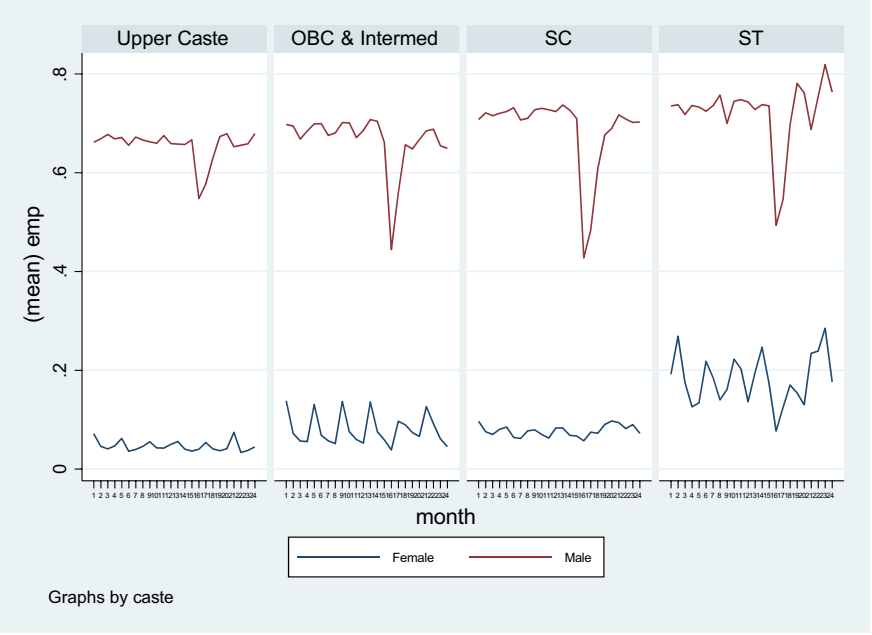

Fig. 8.4 Mean employment, by gender and caste, India

We should note that the CMIE employment and labor force participation figures for women are lower than those available from other widely used surveys such as the official National Sample Survey (NSS), or the publicly available India Human Development Survey (IHDS).[4] Leaving aside the considerable issues related to the (lack of) accurate measurement of women's work, the differences are attributable to definitions used by the various surveys. Very briefly, the CMIE rate is comparable to the "current weekly status" (CWS) definition used by the NSS, and not the principal or usual status definition which measures the majority time in the year, or time spent in any 30-day period in employment. For CWS, a person is considered employed if the person has worked for half a day in the past seven days. CMIE takes the status as of the day of the interview and not the past seven days. If a person is employed for four hours or more on that day, she is considered employed. The CMIE definition is more stringent and therefore the estimates are lower than those obtained via the NSS. For the purpose of this paper, what matters is that the definition remains consistent over time, and we are able to measure increases or decreases accurately.

[4] The most recent round of the former are only available for 2017–18, and for the latter for 2011–12. Thus, the CMIE data are currently the only national-level source for assessing changes in employment in real time, especially if we want to assess the immediate effect of the national lockdown which started in the last week of March, 2020.

8.2.2 Pre and Post-pandemic Panel

In order to examine the main effects of the pandemic, we can begin by examining the overall change between the pre-pandemic months (January 2019–March 2020), and post-pandemic months (April–December 2020). We will call them "pre" and "post" respectively. We can estimate a difference-in-differences equation:

$$\text{Emp}_{\text{it}} = \alpha + \beta \text{female} + \gamma \text{post} + \delta \text{female} * \text{post} + \text{indFE} + c_i \tag{8.1}$$

where Emp_{it} is a dummy for the employment status of individual i in period t, which takes the value 1 if employed. *female* is the dummy variable for women. *post* is a binary variable that takes the value 1 for April 2020 onwards, and zero otherwise, and *female* $*$ *post* is the interaction term which gives the coefficients of interest, the DID estimate of the effect of the pandemic on women's employment relative to men. This is estimated with individual fixed effects, with standard errors clustered at the district level for all individuals 15 years and older.

We estimate the same equation adding interactions, first with sector (rural/urban residence), and then with education levels. Equation 8.2 shows the interactions with education level (*edlow*), which is a binary variable, taking the value 1 for those with up to 10 years of education and 0 for those with education level greater than 10 years.

$$\begin{aligned}\text{Emp}_{\text{it}} &= \alpha + \beta \text{female} + \gamma \text{post} + \theta \text{edlow} + \delta \text{female} * \text{post} \\ &+ \zeta \text{female} * \text{post} * \text{edlevel} + \text{indFE} + c_i\end{aligned} \tag{8.2}$$

Here ζ is the coefficient of interest, which gives us the DID estimate of the differential effect of the pandemic on the employment probability of men and women by their education levels. It allows us to see if the effect of the pandemic varied by low versus high education level.

Figure 8.5 shows the marginal effect of the pandemic, separately for men and women, based on estimates from Equation 8.1 in Panel A, and from Equation 8.2 for *edlevel* in Panel B.[5] For ease of interpretation, Panel B shows the marginal effects in two smaller sub-graphs, one for each level of education.

Panel A of Fig. 8.5 reveals that male employment declined from 44 to 38% from "pre" to "post", whereas female employment declined from 37 to 36%. The gender gap in the probability of employment was 7 percentage points in the pre-pandemic period. This declined significantly in the post-pandemic period (April–December 2020) to 2 percentage points. However, we should note that this decline is due to the lower probability of male employment, rather than due to an increase in the probability of female employment.

Panel B of Fig. 8.2 reveals that male employment declined in both categories of education, but was sharper for men with lower levels of education (i.e., <10 years).

[5] The results by sector are similar to that for the whole sample, i.e., the change between pre- and post-pandemic between male and female employment do not vary significantly by sector, hence not being repro-duced here.

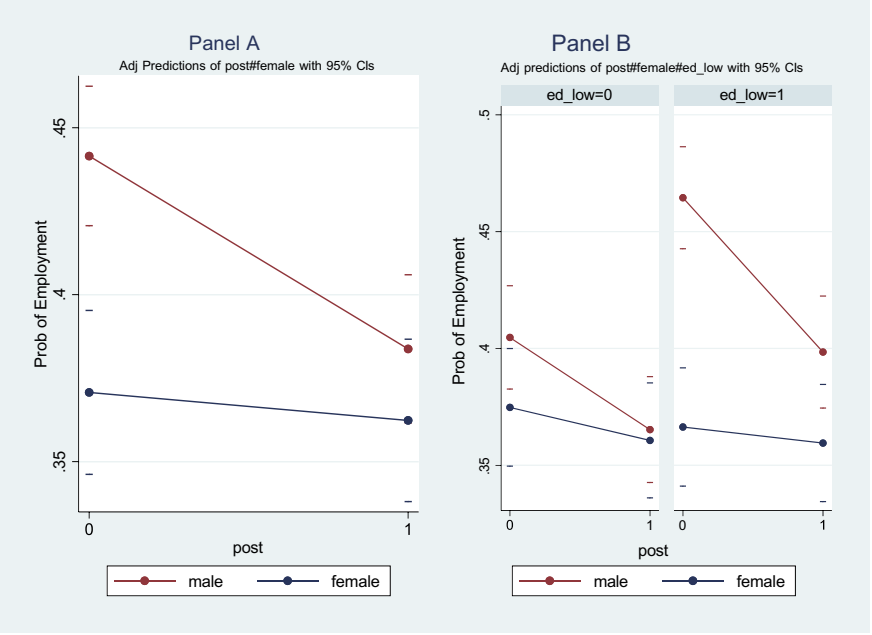

Fig. 8.5 Change in employment by gender, post-pandemic, India (This figure presents the marginal effects of the pandemic from the estimation of Eq. 8.1. $N = 599{,}910$. The Panel A shows the estimation over the whole panel; Panel B shows the results of interaction with two education levels, low and high)

For this category of men, the probability declined from 46 to 39.8%, whereas for men with higher education levels, it declined from 40.4 to 36.5%. Thus, despite the overall recovery in employment, the effect of the pandemic has been to significantly lower the employment probability of men with lower education levels.

A binary division of the entire time period between "pre" and "post" pandemic is useful to see the larger picture, but given the month-by-month changes in the post-pandemic period (as we saw in Fig. 8.1), it is worth investigating changes over shorter intervals to understand the contours of the shifts in paid and unpaid work. Also, the strongest determinant of employment in any one period is lagged employment (employment in the previous period). With only two periods (pre and post), we are not able to introduce lags, but an analysis over shorter time intervals allows us to estimate a dynamic lagged model, as Sect. 2.4 proceeds to do.

8.2.3 The Lockdown Panel

Figure 8.1 demonstrates that the largest contraction in employment happened in one month, *viz.*, April 2020. We can define a "lockdown panel" of individuals surveyed

in April 2020 and compare their outcomes in the pre-pandemic period as well as in the unlockdown or the recovery phase. Most of the April 2020 respondents were interviewed in April 2019 in Wave 1; August 2019 in Wave 2; December 2019 in Wave 3, August 2020 in Wave 5 and December 2020 in Wave 6. Examining the changes in employment status for this panel of individuals will allow us to explore the full impact of the lockdown and subsequent recovery.

Education and Employment

Figure 8.6 plots the marginal effects for the probability of employment for the lockdown panel by gender and educational attainment following an ANOVA estimation. For each education level, in all months for the lockdown panel, the probability of male employment is higher than that for female. Men in all educational categories registered a fall in the probability of employment in April 2020, with fluctuating recovery in subsequent months. Consistent with the larger picture presented in Fig. 8.5, we see that the drop in male employment was sharpest for illiterate men (from 85 to 32% between April 2019 and April 2020), and the recovery in December 2020 (at 64%) is below the pre-pandemic levels. UG men have also seen a trend decline in employment from 71% in December 2019 to 54% in December 2020.

Female employment pattern differs from male in one noteworthy dimension. In April 2020, highly educated women (PG and above) not only did not suffer job losses, on the contrary, their probability of employment increased from 17% in December

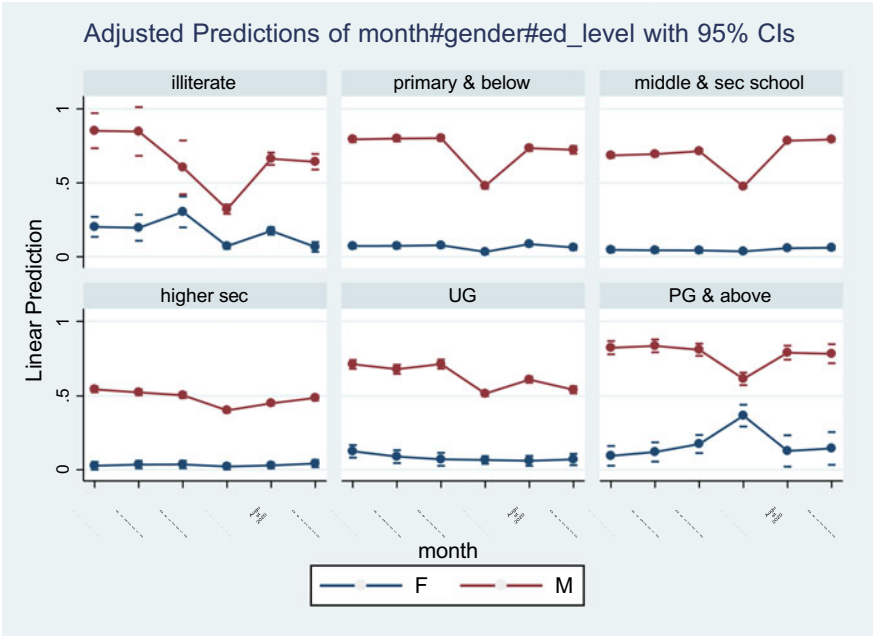

Fig. 8.6 Change in mean employment by gender and Edu level, 15 years & older, India

2019 to 36% in April 2020. This was the only category of workers that registered an increase in the probability of employment during the lockdown. But as the economy unlocked, in May and August 2020, as workers in all other educational categories registered an increase in employment, this category of women registered a decline in the probability of employment to 12.7% in August 2020, which increased to 14.5% in December 2020.

8.2.4 Event Study Estimates: The Lockdown Panel

This section runs regressions similar to Eqs. 8.1 and 8.2, but on the lockdown panel, i.e., individuals who are observed in April 2020. The time variable is "month", instead of "pre" and "post". Variables such as employment, wages, and earnings are strongly path dependent, in that the likelihood of being employed in any period is strongly associated with employment in the previous period. Thus, the question that arises is whether we should run a time invariant fixed effects model (as in Eq. 8.1) or a lagged-dependent variables model, i.e., do a dynamic panel data estimation. Angrish and Pischke (2009) highlight the dilemma of choosing between the two models, as including both fixed effects and lagged-dependent variables introduce a bias, and estimating a time invariant fixed effects model will not estimate the true effect of time varying trends, viz., past employment. Given that the two models are not nested, one cannot estimate one and treat the other as a special case.

Angrish and Pischke (2009) show that using fixed effects when lagged-dependent variables matter will produce a treatment effect that is "too big". On the other hand, using a lagged-dependent dynamic panel data model will produce a treatment effect which will be "too small" as individual fixed effects will not be controlled. Thus, one option is to estimate both models and take the estimates as bounding the causal estimate we are trying to estimate (p. 184).

Accordingly, we estimate a fixed effects model, as in Eq. 8.1, on the lockdown panel, with month dummies capturing the time trends, instead of a binary pre/post time dummy. For the dynamic panel estimation with lagged-dependent variable, we estimate Eq. 8.3 to get the DID estimates to account for the effect of being previously employed. By including a one-period lag, we lose one month of observations.

$$\text{Emp}_{\text{it}} = \alpha + \beta \cdot \text{female} + \gamma \cdot \text{month} + \delta \cdot \text{female*month} + \varphi \cdot \text{Emp}_{\text{it}-1} + c_i \quad (8.3)$$

where $\text{Emp}_{\text{it}-1}$ is the lagged employment and all other terms are the same as in Eq. (8.3). δ is the DID coefficient of interest. This does not include time invariant individual fixed effects. We include district fixed effects and standard errors are clustered at the state level.

The results are shown in Figs. 8.7 and 8.8 respectively. Figure 8.7 with individual fixed effects shows that there was no significant change in the likelihood of being employed in August and December 2019 compared to April 2019. Post-pandemic, in April 2020, for men employment dropped by 22 percentage points compared to

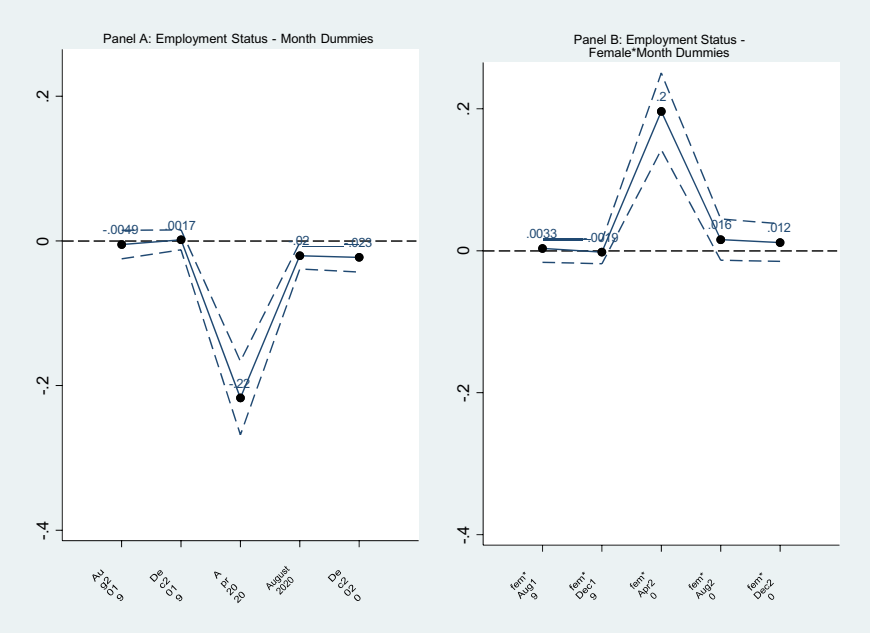

Fig. 8.7 Event study estimates for lockdown panel by month and gender (This figure plots the D-I-D estimates by month arising from estimating Eq. 8.1 on the Lockdown Panel. The dependent variable is a dummy for being employed in period t. $N = 91{,}428$. Intercept $= 0.51$. The omitted month is April 2019)

April 2019. By December 2020, male employment was 2.3 percentage points lower than in April 2019.

The male-female gaps did not change in the pre-pandemic months of August and December 2019. In April 2020, the gender gap in the likelihood of being employed was reduced by 20 percentage points. By December 2020, the gap was back to the pre-pandemic level.

The results of the dynamic panel data model can be seen in Fig. 8.8, based on estimating Eq. (8.3). Accounting for lagged employment, we see that the drop in employment in April 2020 is 24 percentage points (compared to August 2019, since April 2019 gets omitted. However, we know from Fig. 8.5 that the likelihood of being employed in August 2019 is the same as in April). By August 2020, accounting for lagged employment, the likelihood of men being employed is 11 percentage points higher than the pre-pandemic period. For women, after a 22 percentage point convergence in April 2020, the likelihood of being employed in August 2020 is 9.5 percentage points lower than that for men. This indicates that the gender gap in the likelihood of being employed has widened relative to the pre-pandemic level.

It is important to note that the decline in the gender gap is due to the decline in male employment, rather than an increase in female employment, as we had noted in Fig. 8.2.

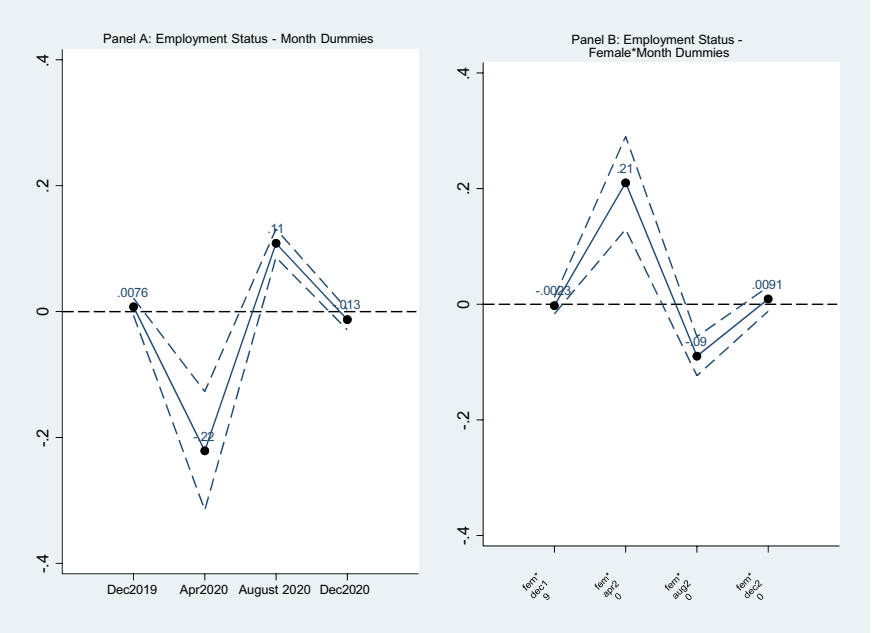

Fig. 8.8 Event study estimates for lockdown panel with lagged employment (This figure plots the D-I-D estimates for the lockdown panel arising from estimating Eq. 8.3. The dependent variable is a dummy for being employed in period t. $N = 76{,}190$. Intercept $= 1.01$. The omitted month is August 2019. The first month, April 2019, drops out because of the inclusion of lags)

Figure 8.9 shows that more clearly as it plots the marginal effects from the *female* $*$ *month* interactions for each month. We see that in August 2020, the gender gap in employment had increased, whereas in December 2020 it is back to the pre-pandemic level (as the estimates in Fig. 8.8 show), but this is due to a decline in the probability of male employment, rather than an increase in female employment.

For those with desk jobs, work during lockdown shifted from the workplace into the home. A key dimension of "Work from Home" (WFH) is having to juggle multiple demands. Andrew et al. (2020a, b), using data for England, are able to examine the quality of time at work, which is critical for productivity and learning. As the authors emphasize, this could impact future earnings and career progression. They find that mothers and fathers doing paid work used to be interrupted during the same proportion of their work hours before the crisis; after the crisis, mothers are interrupted over 50% more often. These data are not available for India, and hence we cannot examine this question, but it is an important gender difference that is likely to be present in several contexts outside England, quite possibly in India.

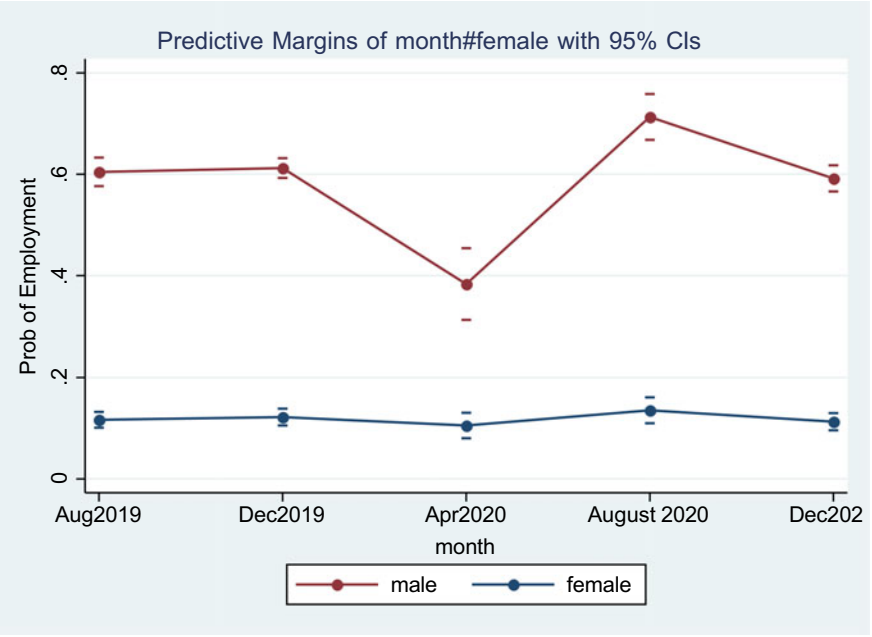

Fig. 8.9 Marginal effects, event study estimation with lagged Emp, lockdown panel (This figure plots the marginal effects of month * gender from the D-I-D estimates for the lockdown panel arising from estimating Eq. 8.3. The dependent variable is a dummy for being employed in period t. $N = 76{,}190$. The omitted month is August 2019. The first month, April 2019, drops out because of the inclusion of lags)

8.3 Unpaid Domestic Work and Leisure

The large demand-side constraint to women's participation in economic activity is the (non-)availability of suitable jobs. There is an important supply side constraint as well. South Asia (India and Pakistan in particular) and MENA (Middle East and North Africa) regions have among the most unequal gender norms in terms of sharing of household chores and domestic work, including care work. While these regions are at one end of the spectrum, women everywhere spend more time doing household chores compared to men. The social norm of women being primarily responsible for housework is one of the key constraints to their being able to access paid work from the supply side (Deshpande & Kabeer, 2019).

	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5		Wave 6	
	F	M	F	M	F	M	F	M	F	M	F	M
	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd
Employed	0.08	0.69	0.07	0.69	0.08	0.69	0.07	0.64	0.08	0.63	0.08	0.68
	(0.27)	(0.46)	(0.26)	(0.46)	(0.27)	(0.46)	(0.26)	(0.48)	(0.27)	(0.48)	(0.28)	(0.47)
Unemployed	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.02	0.02	0.01
	(0.11)	(0.10)	(0.10)	(0.11)	(0.09)	(0.10)	(0.12)	(0.18)	(0.12)	(0.16)	(0.13)	(0.12)
OLF	0.02	0.05	0.02	0.05	0.02	0.06	0.02	0.08	0.02	0.08	0.01	0.04
	(0.12)	(0.22)	(0.13)	(0.23)	(0.14)	(0.23)	(0.14)	(0.27)	(0.13)	(0.28)	(0.12)	(0.20)
Agri	0.41	0.34	0.41	0.36	0.43	0.37	0.43	0.35	0.45	0.37	0.47	0.40
	(0.49)	(0.47)	(0.49)	(0.48)	(0.49)	(0.48)	(0.49)	(0.48)	(0.50)	(0.48)	(0.50)	(0.49)
Primhome	0.04	0.03	0.05	0.02	0.04	0.02	0.04	0.02	0.09	0.03	0.04	0.02
	(0.20)	(0.16)	(0.22)	(0.15)	(0.20)	(0.14)	(0.20)	(0.15)	(0.28)	(0.17)	(0.19)	(0.14)
Secondary	0.14	0.28	0.15	0.28	0.16	0.27	0.14	0.27	0.11	0.25	0.15	0.25
	(0.35)	(0.45)	(0.35)	(0.45)	(0.37)	(0.45)	(0.35)	(0.45)	(0.32)	(0.43)	(0.36)	(0.44)
Services	0.41	0.36	0.39	0.34	0.37	0.34	0.39	0.35	0.35	0.36	0.34	0.33
	(0.49)	(0.48)	(0.49)	(0.47)	(0.48)	(0.47)	(0.49)	(0.48)	(0.48)	(0.48)	(0.47)	(0.47)
Illiterate	0.03	0.01	0.02	0.01	0.02	0.01	0.05	0.01	0.11	0.03	0.08	0.03
	(0.17)	(0.10)	(0.14)	(0.09)	(0.12)	(0.08)	(0.21)	(0.12)	(0.31)	(0.18)	(0.28)	(0.18)
Primarybelow	0.43	0.25	0.43	0.25	0.44	0.25	0.40	0.22	0.29	0.13	0.28	0.12
	(0.49)	(0.44)	(0.50)	(0.44)	(0.50)	(0.43)	(0.49)	(0.42)	(0.45)	(0.34)	(0.45)	(0.33)
Middlesec	0.34	0.40	0.34	0.39	0.34	0.39	0.34	0.40	0.43	0.47	0.45	0.47
	(0.48)	(0.49)	(0.47)	(0.49)	(0.47)	(0.49)	(0.47)	(0.49)	(0.50)	(0.50)	(0.50)	(0.50)

(continued)

(continued)

	Wave 1		Wave 2		Wave 3		Wave 4		Wave 5		Wave 6	
	F	M	F	M	F	M	F	M	F	M	F	M
	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd	Mean/sd
Highersec	0.13	0.21	0.13	0.21	0.14	0.22	0.14	0.22	0.12	0.23	0.13	0.23
	(0.33)	(0.40)	(0.34)	(0.41)	(0.34)	(0.42)	(0.34)	(0.42)	(0.33)	(0.42)	(0.34)	(0.42)
UG	0.05	0.09	0.05	0.09	0.04	0.08	0.05	0.09	0.04	0.11	0.05	0.12
	(0.21)	(0.28)	(0.21)	(0.28)	(0.20)	(0.27)	(0.22)	(0.29)	(0.21)	(0.32)	(0.21)	(0.33)
PGabove	0.02	0.04	0.03	0.05	0.03	0.05	0.02	0.04	0.01	0.02	0.01	0.02
	(0.15)	(0.20)	(0.16)	(0.21)	(0.17)	(0.22)	(0.15)	(0.21)	(0.08)	(0.13)	(0.08)	(0.14)
HHWKHRS					5.23	2.05	5.35	2.24	4.94	2.11	6.27	1.54
	(.)	(.)	(.)	(.)	(2.66)	(1.72)	(2.66)	(1.94)	(2.51)	(1.91)	(4.51)	(2.62)
Friendhrs					1.35	1.20	1.30	1.13	0.70	0.79	0.60	0.51
	(.)	(.)	(.)	(.)	(1.08)	(0.83)	(1.13)	(0.90)	(0.96)	(0.91)	(0.92)	(0.87)
N	99,985		99,985		99,985		99,985		99,985		99,985	

A question actively being investigated in diverse parts of the world in the context of this massive exogenous shock in the form of pandemic is this: Did the lockdown, which forced everyone to stay at home, and the need for social distancing which has resulted in the widespread adoption of WFH, shift the sharing of domestic work towards greater gender equality?

Since the pandemic is still ongoing, and countries are expected to go in and out of lockdowns till a sufficiently large number of people are vaccinated, there cannot be a definitive answer to this question until we emerge out of the pandemic decisively and have data covering the entire period. However, an analysis of the early evidence on this issue is both pertinent and interesting.

The CPHS data has included a question on "time spent on domestic work" in half-hour increments, starting with zero hours, since Wave 18 (September–December 2019). My previous estimates (Deshpande, 2020b), comparing gender gaps in self-reported time spent on domestic work by men and women, revealed a decline in the average gender gap in time spent on housework, due to an increase in male hours men in the lockdown month of April 2020, compared to December 2019. The period of strict lockdown was marked by an absence of domestic helpers, integral to the lifestyles of a large number of Indian families. Anecdotal accounts suggest that men stepped up their contributions to housework in this extraordinary situation. Did the pattern persist with unlockdown as domestic helpers returned to work, and men returned to their paid jobs?

Figure 8.10 presents the marginal effects of gender on the predicted mean housework hours from ANOVA estimates. We see that by August 2020, men's time spent on housework had declined from the April high. Thus, the April spike in men's hours spent on domestic chores was an anomaly. By December 2020, there was a clear increase in the gender division of domestic chores. Women's hours spent on domestic chores have increased sharply and significantly above the pre-pandemic average, whereas men's hours have declined.

Figure 8.11 shows the gender differences in time spent on housework by caste. We see that the April spike in male hours on domestic work was driven to the largest extent by SC or Dalit men's increase, followed by OBCs. UC men registered the smallest increase. However, the increase in female hours between August and December 2020 is seen across all the caste groups.

8.3.1 Time Spent with Friends

I examine another dimension of time allocation, time spent with friends. This is an important indicator, as it not only signifies leisure but also the possibility of de-stressing with someone outside the family, very important for emotional well-being. Figure 8.12 presents the marginal effects of gender on the predicted mean hours spent with friends, separately for rural and urban areas, from ANOVA estimates on the lockdown panel. We see that time spent with friends went down significantly in April for both men and women, but relatively more for women. Thus, in addition

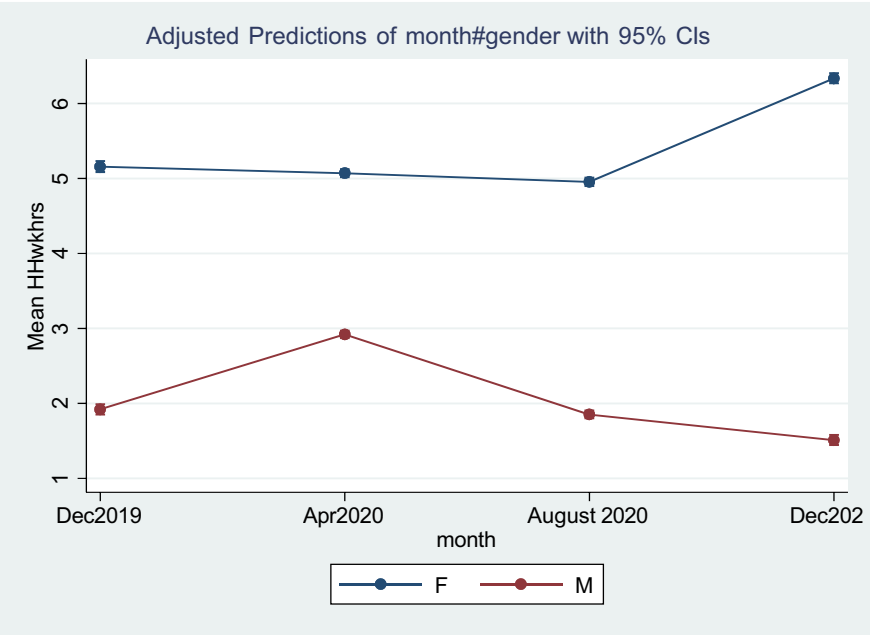

Fig. 8.10 Average hours spent on housework, by gender, India

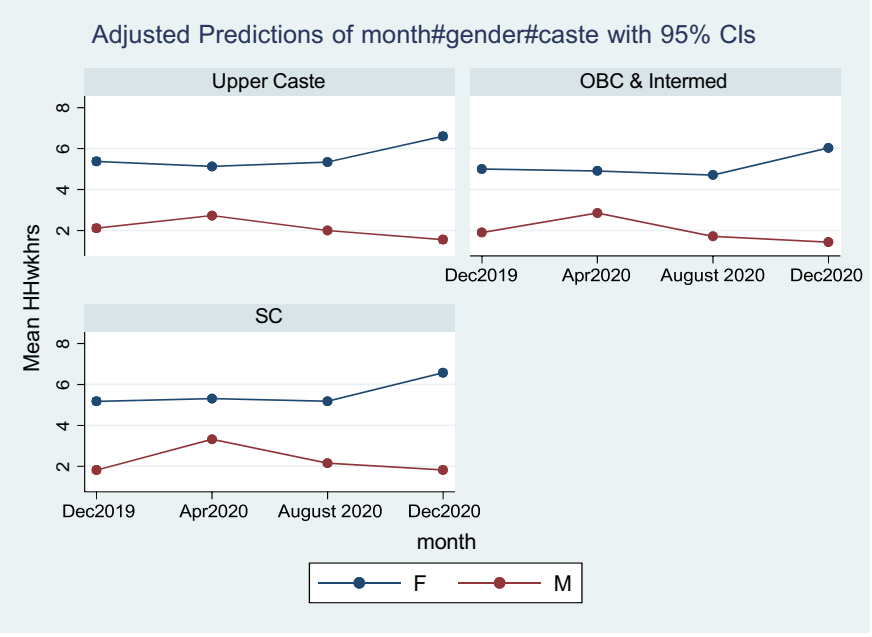

Fig. 8.11 Average hours spent on housework, by caste & gender

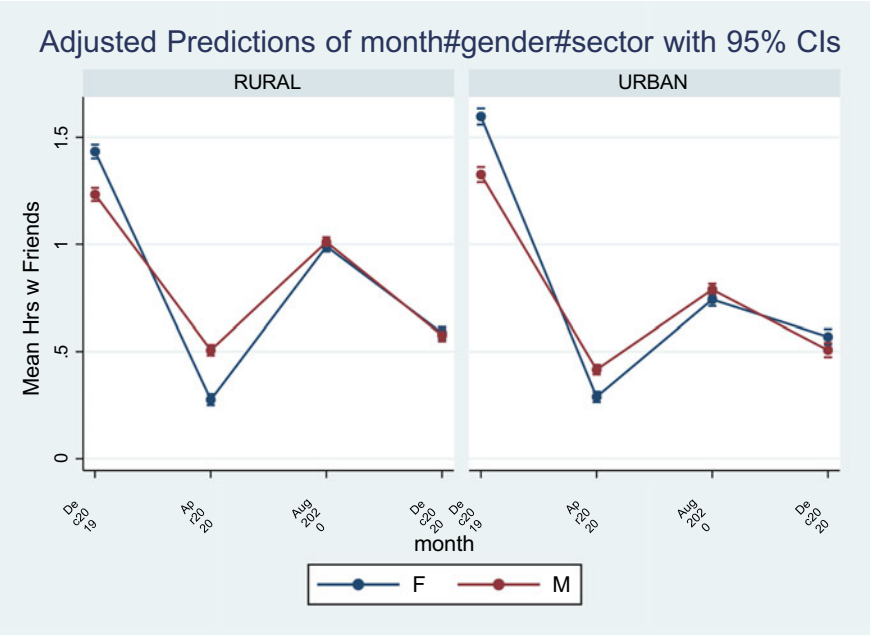

Fig. 8.12 Average hours spent with friends, by gender and sector, India

to the pressure of decreased employment, women had to bear the brunt of less time with their friends.

There was a brief recovery in time spent with friends for both men and women in rural as well as urban sectors. However, the time spent with friends in August 2020 was far lower than the pre-pandemic average. The recovery in urban areas was lower than that for rural areas. But the period between August and December 2020, which was also a period of declining employment, registered a decline in hours spent with friends, for both men and women, in rural and urban areas.

The other noticeable feature is that while women spent more time with friends than men in the pre-pandemic period, in the post-pandemic period, the relative position has reversed. By December 2020, the gender gap appears to have closed. This decline in hours spent with friends does not bode well for emotional well-being and could contribute to stress, anxiety and feeling of isolation.

8.4 Discussion and Concluding Comments

The Covid-19 pandemic has often been described as a great leveler. In several countries, early evidence suggests that regardless of which sections of the population are more vulnerable to the disease, the impact of the lockdown and economic shutdown,

which is the key pandemic control strategy everywhere, has been highly uneven, hitting the already vulnerable groups much harder than. In this sense, the pandemic has exposed the many fault lines that lay beneath the surface across the world.

India, home to a third of the world's population, is no exception to this global pattern. Using six waves of longitudinal national data for roughly 54,000 individuals, this paper presents estimates for differential effects of the lockdown as well as recovery on employment on men and women.

Due to the pre-existing significant and widening gender gaps in labor force participation rates and employment, the absolute number of men who lost employment was larger than the absolute number of women who lost employment in the first month of the lockdown. However, even though pre-lockdown employment was the strongest predictor of post-lockdown employment, its effect was different for men and women. Accounting for lagged employment, women are 9.5 percentage points less likely than men to be employed in August 2020, compared to the pre-pandemic levels. By December 2020, the gender gaps in employment were back to the pre-pandemic levels, but this was due to a decline in male employment, rather than an increase in female employment.

8.4.1 Time Use

India has amongst the most unequal gender division of household work globally. Time Use Surveys, conducted by the Central Statistical Office of the Ministry of Statistics and Program Implementation, provide a reference point against which the CMIE data can be assessed, while we note that the data sources are not comparable. The previous NSS survey in 1998–1999 across six states in India was considered a pilot; the latest national survey is for 2019, i.e., after a gap of two decades. The statistics from these surveys are not comparable, but instructive. The 1998–99 survey found that men spent significantly more time on income earning and personal care (including leisure) activities compared to women. However, women spend 10 times as much time on household work, including unpaid work on family enterprises, compared to men (CSO, 1999).

The main results from the nation-wide 2019 survey indicate that consistent with labor force statistics, women spend significantly less time than men in "employment and related activities". However, consistent with other evidence of women's involvement in unpaid economic work, they spend more time in "production of goods for own final use" compared to men. In "unpaid domestic service", women's participation rate is roughly four times that of men, and they spend about three times more time compared to men. Women spend roughly twice the time in unpaid care work, compared to men. Prima facie, this indicates that the gender gap in unpaid domestic and care work might have reduced over the last two decades. However, we have to note that the 2019 survey is not comparable to the 1998–99 one. We need at least two comparable surveys in order to accurately gauge change over time.

In this paper, comparing hours spent on domestic work pre- and post-lockdown, I find that for both men and women, the gender gap in average hours spent on domestic work hours decreased in the first month of the lockdown. This was due to an increase in male hours on domestic work, which was the highest among Dalit men. However, by August 2020, the male hours had again dropped, but not to the pre-pandemic levels. If this shift persists or gets accentuated, it would indicate a clear shift in gender norms.

8.4.2 What Does History Tell Us?

Severe shocks can shift social norms defining gendered labor force patterns, which in turn could have an impact on the gendered division of domestic chores. For instance, the years after World War II resulted in a rise in female labor force participation in OECD countries (Long, 1958). This was also a time when the division of domestic chores shifted towards greater equality.

Specifically in the context of this pandemic, Alon et al. (2020) find that beyond the immediate crisis, work norms which normalize work from home as well as the norms of fathers participating in childcare might "erode social norms that currently lead to a lopsided distribution of the division of labor in house work and child care". For India, we would need to examine the evidence over a longer time period, as such changes unfold slowly over several years; a month-long lockdown is certainly no proof of the magnitude and persistence of shifts.

Sabarwal et al. (2010) discuss the first and second-order effects of the 2008 financial crisis. They find that the loss of employment for women already in the labor force—the first-order effect—depended on the sector of employment. However, economic crises can lead women outside the labor force to enter the workforce ("added worker effect") in response to declining family incomes. The evidence presented above shows an adverse first-order effect on women during the lockdown. The analysis presented above, with data till August 2020, does not reveal the positive second-order effect.

While women have suffered disproportionately more job losses, risky, hazardous and stigmatized jobs are exclusively their preserve. All frontline health workers, the trinity that forms the backbone of the primary healthcare system—ASHA (Accredited Social Health Activists), ANM (auxiliary nurse and midwife) and Anganwadi workers (the ICDS or Integrated Child Development Scheme workers) are women. Thus, for a very large number of women, the choice seems to be between unemployment and jobs that put them at risk of disease and infection and make them targets of vicious stigma.

Pandemics have implications for women's and children's health outcomes which, in addition to being important in themselves, have implications for women's ability to participate in paid work. For instance, school closures for prolonged periods, combined with the fact that women bear a disproportionate brunt of child-rearing responsibility, would negatively impact women's labor force participation. Minardi

et al. (2020) examine evidence from earlier epidemics (Ebola and H1N1) and outline the multiple negative costs of school closures: lack of school meals which are a vital source of nutrition especially for disadvantaged children; disruption of education can increase the risk of child labor, early marriage, teen pregnancies and gendered sexual assaults.

Thus, lessons from earlier disruptions (wars or pandemics) point towards both negative and positive effects on women's ability to participate in paid work, as well as their role as sole providers of unpaid care work. For the Indian case, evidence so far seems to indicate the presence of most of the negative effects (lower employment, greater care burdens, increased domestic violence), but barring a small shift in gender division of domestic work, none of the positive effects.

India's economy has "suffered even more than most" as a result of the lockdown (Economist, 2020). India's growth rate has been faltering over the last six years, decelerating each year since 2016, to reach 3.1% in the first quarter of 2020 (January–March), just before the Covid-19 pandemic hit India. Recent figures reveal that in the June 2020 quarter, India's GDP contracted by 24%, making it the worst performer among its peers. This has led to expectations of a large contraction over 2020, if not for longer (Kwatra & Shahidi, 2020).

The early recovery in employment as the economy unlocked has already started to falter. Thus, India's employment/unemployment challenge is massive. To create and sustain a momentum in employment generation in the coming months, we need to see strong policies to provide employment and boost demand, in the absence of which job losses might mount, worsening the employment crisis. The results of this paper indicate that in addition to overall unemployment, pre-existing inequalities along gender lines are likely to get reinforced, unless the specific contours of disadvantage are recognized and addressed.

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Chapter 9
Chronicling the Observed Gendered Effects in India's Labor Markets During COVID-19

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Abstract Women bore the disproportionate impact of the pandemic-induced labor market disruptions throughout all three major waves in India. High-frequency monthly data reveals that around 37.1% of women lost their jobs in March–April 2020, compared to only 27.7% of men, following the national lockdown. Accounting for 73% of all job losses, women suffered a higher proportion and a higher number of absolute job losses in April 2021. Finally, in April 2022, even as male employment crossed pre-pandemic levels, women's employment continued to lag, being 2% lower than in April 2019. Chronicling women's lived experiences through over 100 primary consultations undertaken between 2020 and 2022, this paper describes the socio-economic factors behind the observed gender gaps in income and job losses. The gendered digital divide, domestic work responsibilities, mobility restrictions, inadequate skill training, and lack of institutional support amidst hybrid work emerge as key issues restricting women's economic participation. To mitigate these challenges, gender-sensitive interventions need to be mainstreamed across the public, private, and social sectors. By highlighting the depth of the difficulties faced by women throughout the pandemic, this chapter posits the need to keep women at the heart of India's post-COVID-19 recovery strategy.

Keywords Women · India · Labor force · Employment · Jobs · COVID-19 impact · Post-pandemic recovery · Economy

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9.1 Introduction

The COVID-19 outbreak in March 2020 resulted in massive disruptions to the labor force, with millions of workers losing their jobs due to the mobility restrictions implemented to prevent the spread of the virus. India, particularly, had among the strictest containment and closure policies that adversely affected its labor market (Estupinan et al., 2021). Consequently, the already precarious participation of women in the labor force was put at even greater risk. This pandemic-induced inequality has placed India at the 143rd rank among 146 nations in the Economic Participation and Opportunity sub-index of the World Economic Forum's Global Gender Gap Index for 2022.

This chapter aims to analyze women's contribution in the pre-pandemic era and the disproportionate gendered impact of COVID-19 on the labor market. It investigates crucial structural and sociocultural factors that lead to inadequate female employment and explains why women's involvement in the workforce was most affected during the pandemic. We hope to contribute to studies on women's economic empowerment by analyzing factors that influence women's employment through secondary research, and further by delving into their lived experiences through primary consultations (Fig. 9.1).

9.2 Methodology

This chapter employs a mixed methods approach. Secondary data analysis of all-India time series data from 1950 to 2020 from the National Sample Survey Organization (NSSO) enabled the identification of historical trends in labor market outcomes. The effect of COVID-19 on women's economic participation was examined using monthly data on labor market indicators from 2019 to 2022, published by the Center for Monitoring Indian Economy's (CMIE) Economic Outlook Database. Following a thorough literature review, four rounds of consultations were held between September 2020 and September 2022, with varied stakeholders across India, including academics, self-help groups (SHGs), corporate organizations, and women's community-based organizations (CBOs) across 15 states. Qualitative findings from a total of 110 consultations helped contextualize women's experiences during the COVID-19 pandemic, supporting the development of gender-responsive policy recommendations.[1]

[1] The terms 'females' and 'women' have been used interchangeably in this chapter. This is because of the difference in presentation of estimates in these two surveys. Periodic Labor Force Survey uses the term 'females' whereas Center for Monitoring Indian Economy uses 'women'.

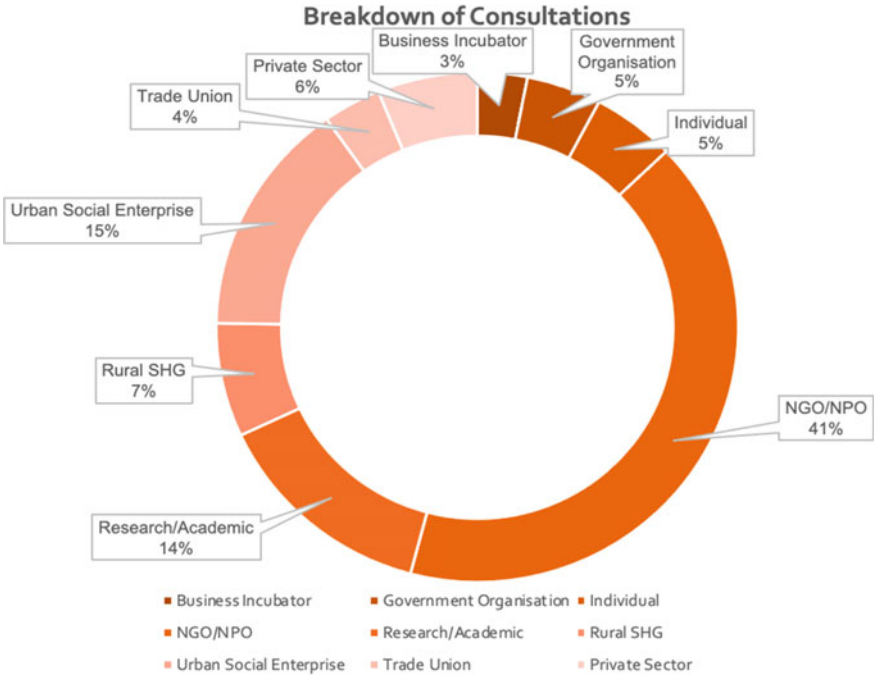

Fig. 9.1 Overview of Consultations with Women's organizations, conducted by Nikore Associates. *Source* Nikore Associates, 2022. *Notes* Of the total 110 organizations consulted, the largest representation was from community-based organizations like non-profit organizations (NPOs), or non-government organizations (NGOs)

9.3 Gendered Divisions in the Labor Market in the Pre-COVID Era

In India, women's economic participation has steadily declined over the past few decades. Women's labor force and workforce participation rates have secularly declined to their lowest levels since Independence, according to an analysis of time series data spanning the last seven decades (1950–2018) (Nikore et al., 2022). According to data from the Periodic Labor Force Surveys (PLFS), the female labor force participation rate (FLFPR) for women aged 15 years and above, decreased gradually from 47.1% in 1987–88 to 24.5% in 2018–19. In 2017, it fell to 23%, its lowest ever level since India's independence in 1947. Across the last four decades, the difference between the proportion of men and women in the labor force has consistently exceeded ~40 percentage points. This decline can largely be attributed to the exodus of rural women from the labor force. Between 1987–88 and 2018–19, the rural FLFPR declined drastically from 53.7 to 24.6%. Over the same period, the urban FLFPR fell from 26.1 to 20.4% (Fig. 9.2).

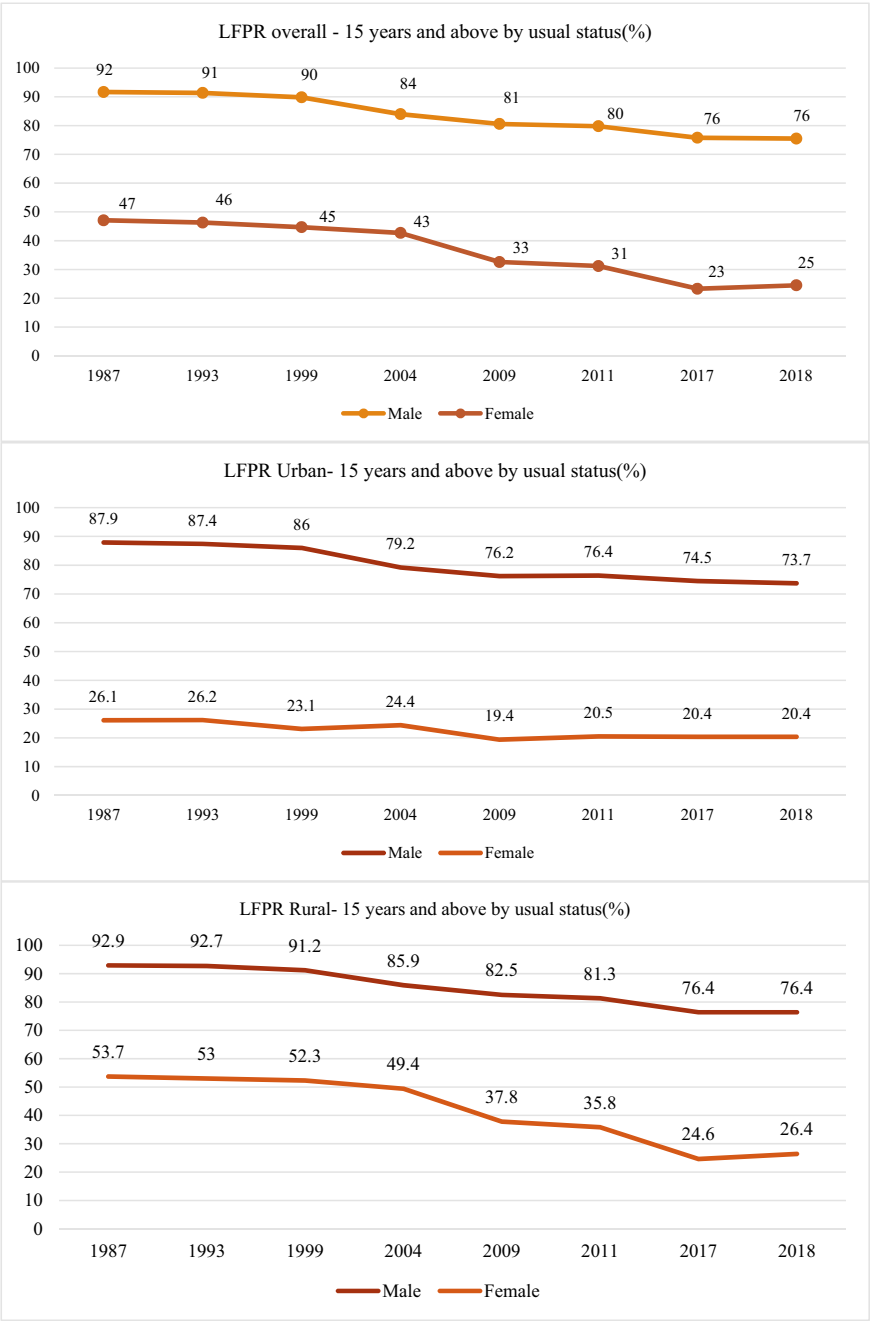

Fig. 9.2 Rural/urban female labor force participation rates and male labor force participation rates (15 years and above) (1987–2018). *Source* NSSO, PLFS (2018–2019)

Daily wage data from the last three decades reveal sticky gender wage gaps for certain worker categories, particularly among workers from rural India engaged in casual work. In 1993–94, the weighted average female daily wage was 59% of the male wage; by 2018–19, it had improved by only 13 percentage points to 72%. This improvement in the overall gender wage ratio is mainly driven by gender wage gaps narrowing for casual urban workers and regular rural workers (Nikore et al., 2022).

These historical disparities in the labor force can be explained by a multitude of structural barriers that have impacted women's economic participation.

9.3.1 Occupational Segregation

Women in India are disproportionately overrepresented in a few traditional, labor-intensive sectors. From 1977–78 to 2018–19, the proportion of rural women working in agriculture fell from 88.1% to only 71.7%. This proportion declined for rural men at a higher rate (from 80.6 to 53.2%) as they shifted to construction, manufacturing, and other services. Urban women's employment in the service sector witnessed a significant increase (from 35.7 to 63.0%), however, they have been confined to specific sectors and jobs, like teaching, nursing, hospitality, and beauty.

9.3.2 Increased mechanization and Automation

Over the last seven decades, rising mechanization and automation across sectors has led to a decline in women's employment. In agriculture, as chemical spraying replaced weeding, husking equipment was used at rice mills, and as the use of seed drillers, harvesters, and threshers increased, men began displacing women workers. Similarly, in the textile industry, technological advancements phased out women's labor (Chakravarty, 2004; Jhabvala & Sinha, 2002; Mehrotra & Sinha, 2017).

9.3.3 Income Effect

Women are traditionally regarded as the secondary income earners of a household. As household incomes increased, secondary income earners, i.e., women found the need for their economic contribution reducing, particularly in rural areas. Moreover, the high cost of care workers created an opportunity cost to women's work, often higher than expected market wages. Kapsos et al. (2014) found that the "income effect" contributed to ~9% of the total decline in FLFPR between 2005 and 2010. Mahajan (2022) also found that increased household income and educational qualifications of married women account for 14% to at most half the fall in workforce participation rates from 1999 to 2011.

9.3.4 Social Norms

The burden of unpaid work and mobility restrictions limits women's work options. Pre-COVID-19, working-age women spent an average of 5.6 h on unpaid work versus 40 min for men, an 8X difference. Nearly 93% of women participate in unpaid work, vs. only a third of men. This gendered imbalance in unpaid work results in extreme time poverty, leaving little time for work (Time Use Survey, 2019).

Nearly 60% of women were not allowed to go to a nearby market, health facility, or outside their village on their own (National Family and Health Survey (NFHS)-5, 2021). Moreover, a strikingly high percentage of women report facing sexual harassment while using public transport—50% in Chennai, 70% in Bengaluru, and 95% in Delhi (World Bank, 2022). As a result, women often must seek their family's permission and choose a job with safer mobility options, and restricted work timings.

9.3.5 Education and Training

Persistent gender disparities in tertiary education and skill training contain women's job-readiness. Women's enrollment in tertiary education increased from 2% in 1971 to barely 30% in 2019 (World Bank Database, 2022a). Additionally, inadequate skill training discourages women from participating in the workforce. In 2018–19, 6.9% of working-age women received informal vocational training, versus 12.9% of working men. In 2018–19, only 2% of working-age women acquired formal vocational skills. Of these women, 47% failed to join the labor force (PLFS, 2019).

9.4 Disproportionate Gendered Impact on Labor Force Participation During COVID-19

An analysis of the high-frequency monthly data from the Center for Monitoring the Indian Economy (CMIE) between January 2019 and July 2022 and the annual data from the Periodic Labor Force Survey (PLFS) between 2019–20 and 2020–21 reveals that across the three major waves of the pandemic in India, women were among the first to lose their jobs, experience increased casualization and prolonged absence from the labor force.

9.4.1 Massive Job Losses Among Women Workers

Wave 1 (March 2020–April 2020)

As soon as the pandemic struck in March 2020, a higher proportion of women left the workforce. According to CMIE estimates, 395.8 million persons (354.2 million men; 41.6 million women) were part of the workforce in March 2020. Following the national lockdown, between March 2020 and April 2020, the size of women's workforce shrank by 37.1% (41.6 million to 26.1 million) compared to 27.7% (354.2 million to 256 million) for men. Rural women's workforce size decreased by 40.2%, (from 29.8 million to 17.8 million), while rural men's workforce size decreased by 25.5% (240.5 million to 179.1 million). Urban men and women faced nearly identical levels of employment loss as their workforce numbers shrank by 29.2% (11.7 million to 8.3 million) and 32.4%, respectively, (113.7 million to 76.8 million). Thus, despite being underrepresented in the labor market, women lost a higher share of the workforce.

Wave 2 (March 2021–April 2021)

Rural women bore the brunt of job losses during the second wave of the pandemic. Following the delta variant induced second wave, though the overall decline in the size of workforce was only 1.8% (398.1–390.7 million) between March 2021 and April 2021, rural women's workforce contracted by 17.3%, from 32.6 to 26.9 million, accounting for 80% of the jobs lost during the second wave of COVID-19. Urban women saw a moderate increase by 2.5% from 9.3 to 9.5 million. On the other hand, men in both urban and rural areas experienced a 0.5% reduction in employment.

Wave 3 (January 2022–February 2022)

While men's overall workforce participation was not affected in the third wave, women across both, rural and urban areas saw a fall in their employment. In January 2022, the size of women's workforce was 3.5% smaller than in January 2020, versus 1.7% for men. The omicron variant, emerged in November 2021, with the third wave of COVID-19 peaking in January 2022. Following the third wave, between January and February 2022, women's employment fell by 12.8%, versus an increase of 0.03% for men (Figs. 9.3 and 9.4).

i *Slow recovery in labor force participation*

Not only did women lose more jobs than men, but they were also slower to recover. Throughout the country's three phases of recovery post-COVID-19 peaks, women's re-entry in the labor force lagged behind that of men.

Wave 1 recovery phase (July 2020–March 2021)

Following the first wave, in July 2020, the overall labor force expanded by 14.8%, versus April 2020 levels. However, the size of the urban female labor force increased at the slowest rate, with a 5% growth compared to an 18.1% increase for urban men.

Fig. 9.3 A year-on-year change in the workforce. *Source* CMIE, Economic Outlook, 2022

The effects of the urban–rural reverse migration during the national lockdown continued throughout the year. Between March 2020 and March 2021, the size of rural women's labor force increased by 4.4%, versus a decrease by 1.3% for rural men during the same period. On other hand, urban women's labor force contracted by 25%, versus only a 1.9% decrease for urban men, showing that even a year after the peak of the first wave, women did not migrate back from rural to urban areas.

Wave 2 recovery phase (July 2021–December 2021)

In the recovery period following the second wave, between March 2021 and July 2021, while men's labor force expanded by 1.3%, women's labor force fell by 2.6%. Even as the size of urban women labor force increased by 1.3%, rural women saw a decline of nearly 4%, showing the lingering impact of the second wave of COVID-19 on rural women.

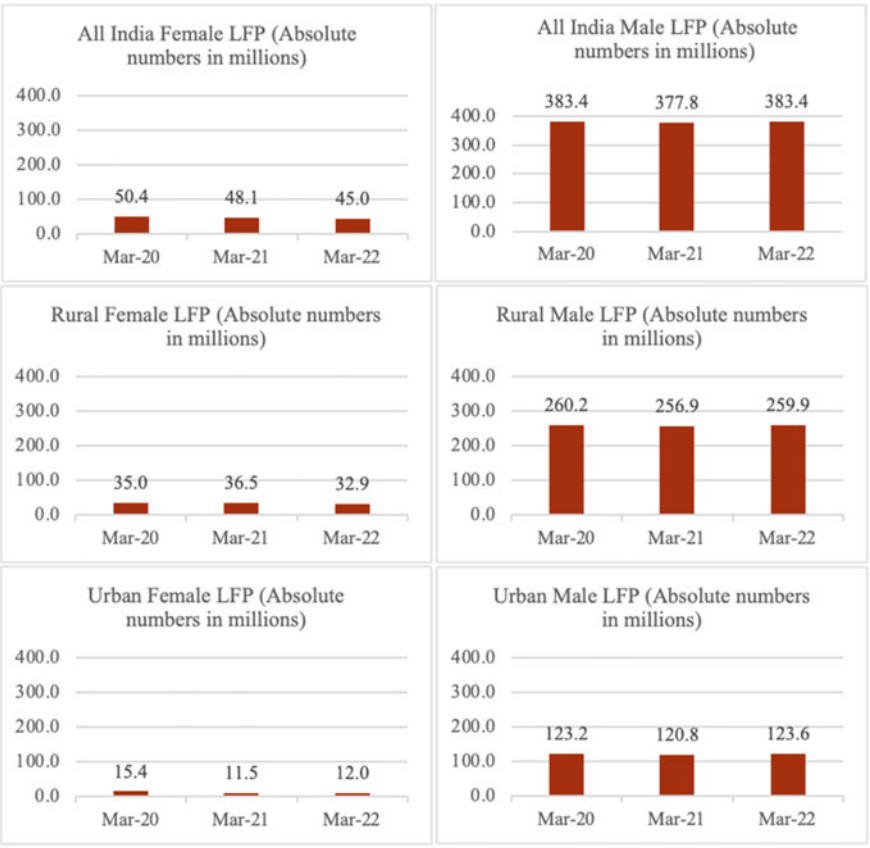

Fig. 9.4 A year-on-year change in the labor force. *Source* CMIE, Economic Outlook, 2022

Wave 3 recovery phase (March 2022)

While men's participation did not suffer significantly at the end of the third wave in March 2022, women's participation saw a significant drop, with an overall decrease of 9% in labor force between January 2022 and March 2022. Even in this period, women were slow to re-enter the labor force, with the size of rural women's labor force shrinking by 11%, and urban women by 3%.

As this wave subsided, the subsequent months of 2022 were marked by fluctuations in women's labor force. The overall size of women's labor force was 42.9 million in October 2022, compared to 51.9 million in October 2019, a 17.3% decrease that continues to lag pre-lockdown levels, even after two years of the pandemic.

ii *Lack of motivation to return to the labor force*

Unemployed rural women are not seeking employment opportunities as actively after the pandemic as before. Between March 2020 and March 2022, there was a

45% increase in the proportion of unemployed women who had given up actively seeking jobs. A closer analysis reveals that this lack of motivation to return to the labor force was more prevalent among rural women, with 70% of unemployed rural women not actively seeking re-employment in March 2022, versus 41% of unemployed urban women (Fig. 9.5).

iii *Sectoral re-distribution in employment*

During and after the pandemic, the distribution of women in the workforce across sectors underwent significant changes. Between 2019–20 and 2020–21, there were shifts to the agriculture sector in both urban and rural areas, massive exits from the hospitality sector in urban areas, and increasing casualization of women's employment, demonstrating the impact of this unprecedented crisis on women's work opportunities (Fig. 9.6).

Agriculture

Urban women saw a significant increase in their participation in the agriculture sector. Between 2019–20 and 2020–21, the proportion of urban women employed in

Fig. 9.5 Change in the number of unemployed persons actively and not actively looking for employment (March 2020–March 2022). *Source* CMIE, Economic Outlook, 2022

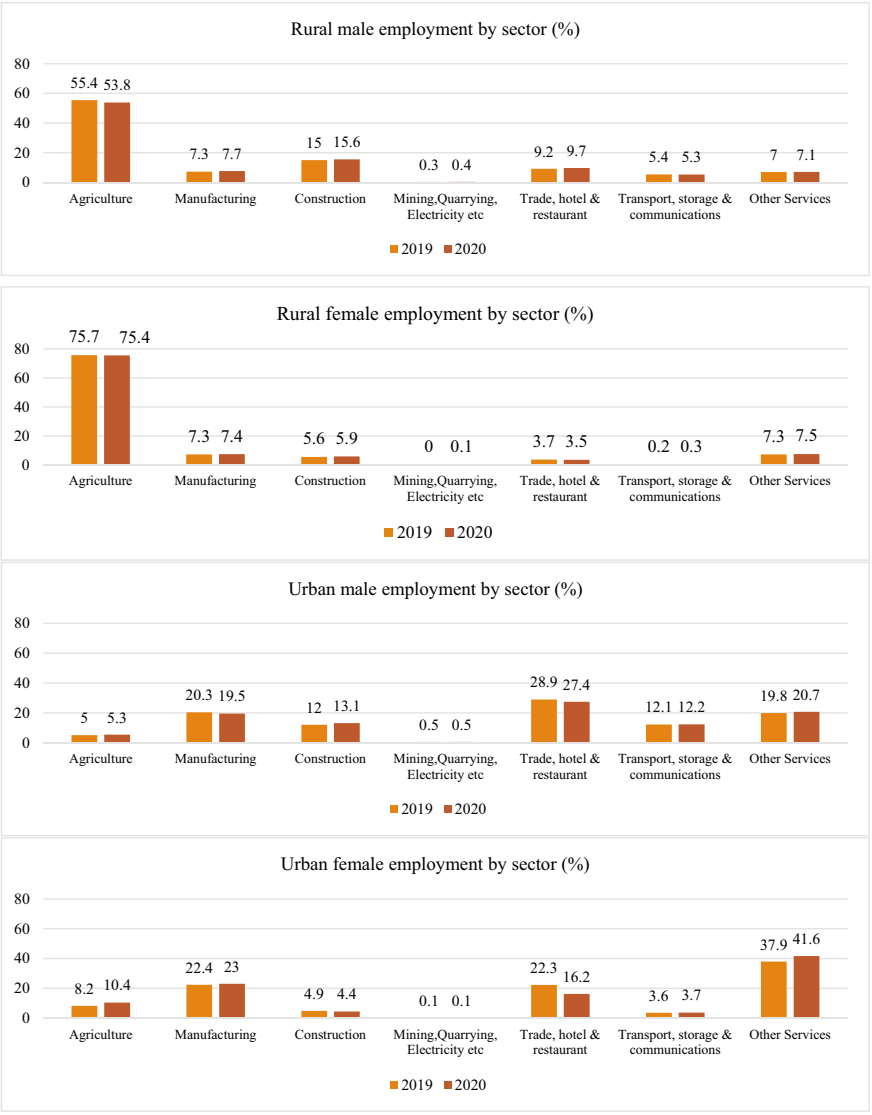

Fig. 9.6 Sectoral shifts in employment observed among females. *Source* NSSO, PLFS (2019–20, 2020–21)

the agriculture sector witnessed an increase for the first time since 2011–12, from 8.2 to 10.4%. For rural women, agriculture continued to account for nearly three-fourth of their employment throughout and after the pandemic.

Trade, hotel, and restaurant:

Women employed in the hospitality sector bore the biggest impact of COVID-19. The proportion of urban women employed in the trade, hotel, and restaurant industry fell from 22.3 to 16.2% between 2019–20 and 2020–21. However, the proportion of males working in this industry only saw a marginal decline, from 28.9 to 27.4%. Notably, the share of rural women employed in this sector declined from 3.7 to 3.5%, however, for rural men, share of employment in this sector rose from 9.2% in 2019–20 to 9.7% in 2020–21.

Increase in casual and self-employment

Women experienced an increased casualization of their employment, particularly as unpaid helpers in household enterprises. Between 2019–20 and 2020–21, both men and women experienced an increase in self-employment and reductions in regular, salaried jobs and casual labor jobs. However, for women, this increase in self-employment came primarily owing to an increase in their work as unpaid helpers in household enterprises. This increase in self-employment was more pronounced among urban women (Fig. 9.7).

Recognizing and comprehending these underlying trends in women's labor force and workforce participation is the first step in assisting women in getting the opportunities and resources they require to enter or return to the workforce post-COVID-19. In the next section, we discuss our findings from stakeholder consultations, to qualify these findings.

9.5 Unpacking the Trends and Understanding the Lived Experience of Women Through the Pandemic

Having assessed the quantum of the impact of pandemic-induced restrictions on female labor force participation in India through the analysis of data on economic participation during and post-COVID-19, we now contextualize the established patterns with the lived experiences of women in India.

Through our primary research via consultations with community-based organizations (CBOs), academic institutions, government agencies, women-led SHGs, corporate sector organizations, and entrepreneurs, multiple factors causing women to leave their work, shut down their businesses, and effectively drop out of the labor force were uncovered. These consultations were used to understand the nuances of the five areas identified as the key challenges that impacted women's participation during and after the pandemic. These challenges are: (i) gendered digital divide, (ii) unpaid work, (iii) the reverse income effect and the need for increased skill training, (iv) mobility restrictions, and (v) hybrid work and lack of institutional support.

Women's experiences have been characterized across the spectrum of possible scenarios as a response to the pandemic's unprecedented disruptions: ranging from whether women had to: (i) withdraw from the labor force (ii) adapt to the disruptions

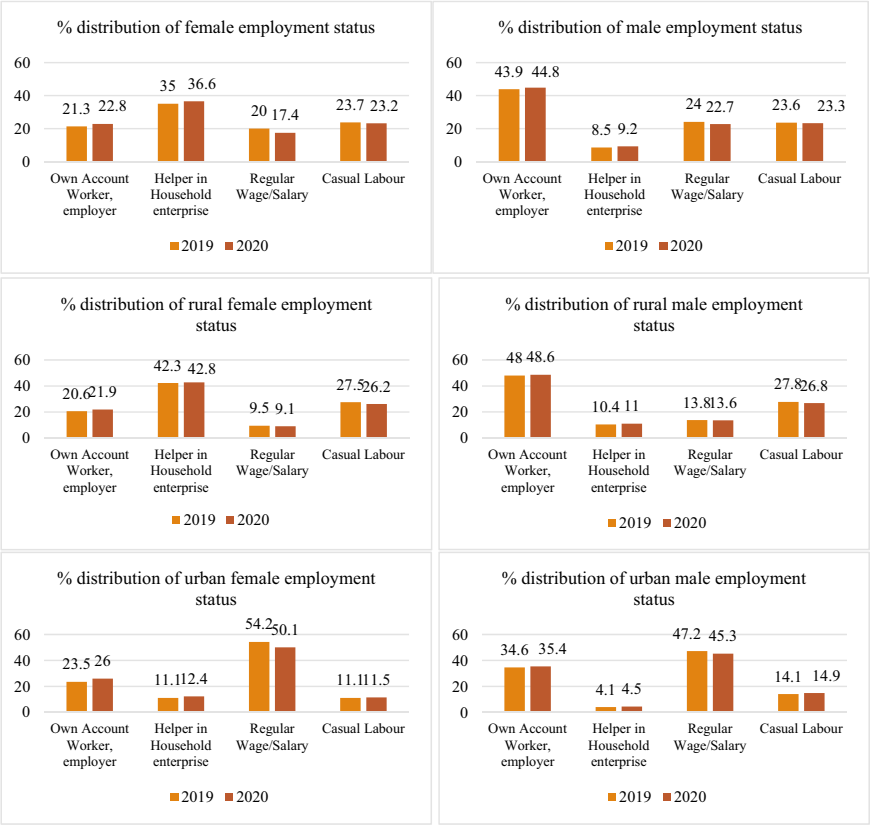

Fig. 9.7 Change in percentage distribution in the status of employment. *Source* NSSO, PLFS (2019–20, 2020–21)

imposed by the pandemic to their work and continue to work with limitations; or (iii) thrive in the face of these challenges. These consultations aid in elucidating the circumstances-specific barriers to female workforce participation, as well as the obstacles they faced or overcame.

9.5.1 The Gendered Digital Divide

The pandemic deepened the pre-existing gender digital divide as the economy transitioned into digital marketplaces. The pandemic increased digital adoption by five years in just two months in 2020 (McKinsey & Company, 2020), with digital transactions averaging 100 million daily, according to the Reserve Bank of India (Mishra, 2020). The reach of e-commerce has widened exponentially, with network presence in nearly all Indian pin codes (Chandra, 2020). However, the digital

revolution has exacerbated the gendered digital divide. Men's mobile internet usage rose from 45% in 2020 to 51% in 2021, but women's stayed steady at 30%, despite technical breakthroughs. Men in rural India are twice as likely to use the internet as women, placing rural women at risk of being unable to participate in a digital economy (GSM Association, 2022).

The profoundly entrenched digital divide is born out of a triple disadvantage for Indian women. First, the rural–urban digital divide: rural broadband prevalence is 29%, compared to 51% nationally. Rural women are less likely to own cell phones, according to NFHS-5. Second, income-based digital divide: given that bandwidth costs $0.68/GB in India, each GB costs low-income people (earning less than $2/day) 3% of their monthly income against 0.2% for middle-income households (earning $10–$20/day). And finally, intra-household discrimination prohibits women from using digital devices, widening the gender-based digital gap. This is a common challenge highlighted in various consultations. An NGO that works to educate and train girls said one family punished their daughter for using the phone, believing it would corrupt her while allowing their son to use his phone for online studies. The NGO had to intervene and convince her family that she was attending training programs.

Digital illiteracy and unfamiliarity with digital platforms deterred women entrepreneurs from moving to online marketplaces post-COVID-19. Consultations with women entrepreneurs throughout the pandemic waves showed that sales were so severely affected that there was virtually no business activity for several months, yet, despite this, transition to online platforms was limited due to several factors such as lack of digital literacy, high cost of data and lack of awareness of how to leverage social media marketing for sales. Some consultations that demonstrated these challenges include the following.

Jhuri-makers (bamboo artisans) in West Bengal were reluctant to transition to online platforms due to insufficient awareness of social media and digital marketing channels, due to high data prices.

Weavers from Assam could not navigate digital marketplaces due to digital illiteracy and low education levels. Even staff that knew how to operate feature phones were unable to process online orders, use online payment methods, or make sales via WhatsApp.

The founder of an NGO working toward social and financial security of women revealed that they had to incur huge losses because launching some of their products on Amazon required a GST registration and resulted in high GST payments.

Consultations with an NGO working to build a self-reliant rural community stated that pre-existing social norms discourage women from using smartphones for work, training, or business. Some do not own the mobile phones they use and cannot sell their products online.

Despite these constraints, concerted efforts to enhance digital literacy and financial support for accessing devices in the community helped improve women's livelihoods even during the pandemic. A community-based financial services enterprise in Maharashtra introduced a low-cost EMI program that allows women to purchase smartphones. The COVID-19 lockdowns boosted demand for smartphones, and nearly 80% of the women in their neighborhood purchased them through this program. Several "*Digital Didis*" trained and helped women navigate online platforms and digital marketplaces. Through these hybrid training programs and focused support, women entrepreneurs joined WhatsApp-based and online marketplaces to sell masks, processed foods, textiles, and other products during COVID-19.

There is a need to increase public investment in digital literacy, as well as in expanding rural-digital connectivity to bridge the gender digital divide. Increasing allocations for the flagship PM Gramin Digital Saksharta Abhiyan and updating scheme regulations to ensure at least one women/girl child per household is provided digital literacy, can help in widening training throughout rural areas. Moreover, launching tailored digital training courses for women entrepreneurs on digital marketing and digital payments can be prioritized. Investment in the rapid implementation of the BharatNet program can enhance rural broadband connectivity and help establish village-level high-speed internet connectivity hubs.

Moreover, ensuring equitable access to smartphones and the internet for women is a must for equal participation in nation building. Providing smartphone loans to women through government schemes, or through public–private partnerships, distributing free mobile devices for school-going girls, female health workers—Accredited Social Health Activists (ASHA) workers, Anganwadi Workers (AWWs) and Auxiliary Nurse-Midwives (ANMs)), female teachers, panchayat, and community leaders; and working with communities to shift norms around mobile phone usage is key to shift social norms.

9.5.2 Unpaid Work

Women have traditionally borne the disproportionate burden of unpaid care work in India, which only increased after the pandemic. Social factors such as marital status, childcare, and mobility restrictions continue to hinder women's participation in the labor market. To add to that, pandemic-induced lockdowns put women's already poor job security at even higher risk. Nearly 66% of informal women workers faced increased domestic duties, while 36% experienced increased child/elderly care responsibilities during the first two months of the lockdown (Chakraborty, 2020). About 43% of urban female solopreneurs reported a loss of productivity due to domestic work (Bain & Company, 2020). A survey of women employed in the corporate sector highlighted that 77% of women experienced increased workload as a result of the pandemic, owing to greater household responsibilities (Deloitte, 2021). Some consultations that demonstrated these challenges include the following.

Pandemic-triggered reverse migration of informal workers increased the burden of unpaid work, making it harder for rural women to work. For instance, a community organizer in Telangana said women who worked in SHGs, industries, and ran shops left their work due to increased demand from domestic duties. A fashion design institute focusing on enhancing the employability of women from low-income families said their staff had to forgo attractive employment offers owing to family pressure to prioritize childcare and domestic obligations during the pandemic.

Closure of domestic support services further increased the burden of domestic and childcare on women. A range of domestic support services, including schools, primary healthcare, and childcare centers, had abruptly shut down during the pandemic, shifting responsibility for their provision to not only married women, but also adolescent girls. Even after the lockdowns, workers at non-profit organizations witnessed the deepening of gender norms in rural households: as parents had to leave homes to resume work, girls were made to stay home for household duties.

With no help from the husbands, the care work burden on women increased manifold. Several stakeholders reported that men were unwilling to contribute to housework, despite being at home during lockdowns, especially in rural areas. A representative from a social service organization shared that during the lockdown, unemployed male family members spent their days playing card games with their friends, neglecting household responsibilities.

Unpaid care work has increased stress and fatigue, worsening women's physical and mental health. Several women stakeholders reported struggles with the increased burden of unpaid domestic care, coupled with depleting mental health due to the death of family members and/or loss of livelihoods during the pandemic.

Investments in childcare infrastructure through a community-led model actually improved women's workforce participation. For instance, Apnalaya, a Mumbai-based community organization, established Community Childcare Centers (CCC) across several informal settlements to generate employment opportunities and provide affordable childcare services. Our consultations with Apnalaya revealed that CCCs play an instrumental role in promoting entrepreneurship and creating financial independence among women. Through partnerships with governments and formal-sector enterprises, these community-level interventions can be upscaled to facilitate a worker-friendly environment for women.

Public investment in care infrastructure and encouraging public–private partnerships for care facilities can help in enhancing women's workforce participation. It is estimated that an additional 2% of the GDP spent in the Indian health and care industry will produce 11 million additional jobs, about a third of which will go to women (De Henau et al., 2017). Governments need to especially expand access to affordable childcare, elderly care, and care services for ailing persons.

A gender-equitable and safe work environment must also be ensured by private-sector employers, who can provide a range of in-situ services such as breastfeeding/lactation rooms, resting rooms for use during menstruation, and parking facilities for

pregnant persons. Corporate tie-ups or financial incentives can considerably support hiring care service providers for childcare, elder care, or long-term care support. Policies that encourage re-distribution of care work within the household, such as shared parental leaves, and maternity leave insurance, can enable parents to combine work and family responsibilities and facilitate women's return to employment after family-related career breaks.

9.5.3 Mobility Restrictions

Lack of safe, affordable transportation and mobility restrictions have hindered Indian women's economic participation. As indicated through the NFHS data in Sect. 3.4, social norms constrain women's mobility and deter them from traveling outside a limited radius. They tend to travel shorter distances with dependents for unpaid care work, often referred to as mobility of care. As women must balance household and work responsibilities to combine multiple tasks, "trip chaining" becomes necessary, where multiple short trips are made as opposed to long unimodal trips. Women also end up paying higher fares for frequently changing directions and using safer modes of transport. Further, the threat and experience of sexual harassment inhibit longer commutes for women, deters them from accessing promising opportunities, and amounts to levying a "pink tax" (World Bank, 2022).

Despite the historic hindrances of social norms on mobility, women form the most significant users of public transport in Indian cities. Even though women and girls comprise 19% of "other workers," 84% of their trips were by either public, intermediate public, or non-motorized modes of transport (Census India Database, 2021). The prevalence of public transport usage is even higher among women from lower income groups. For instance, in Mumbai, women made 67% more trips by bus than train for households with incomes less than INR 5000 per month (World Bank, 2022). Even in our consultations with an NGO working to develop eco-friendly and cost-effective transportation solutions, the predominance of public transportation usage among women was noted. It was stated that because the male members own private vehicles and dictate the use of the family-owned vehicles, women rely primarily on public transportation.

The pandemic-induced lockdowns amplified the pre-existing risks of harassment and violence, with empty public spaces and tightened mobility restrictions. Our consultations show pandemic-induced mobility restriction measures posed new issues for women due to the suspension of public transportation services, increased chances of sexual harassment due to reduced commuter presence, and increased travel costs and accompanying "pink tax."

According to our conversation with a New Delhi-based NGO, 85% of their women trainees who had mobility restrictions imposed by their families, were unable to attend training sessions, and were occupied with domestic care responsibilities during the lockdown.

Mumbai local trains only started operating at pre-pandemic levels in October 2021, over a year and a half after the pandemic began. In conversation with a domestic worker in Mumbai, it was discovered that the closure of local trains had rendered her jobless because she had no other means of getting to her places of employment and that she avoided riding the bus as an alternate mode of transport owing to safety concerns.

Numerous women stakeholders stated that they were discouraged from returning to work during COVID-19 due to a drop in the occupancy of public transportation during the initial waves of the pandemic, which created an unsafe environment for women. A consultation with an association of women entrepreneurs revealed that there were mass layoffs of women from the workforce as they were not able to reach their places of work due to a lack of public transportation.

Owing to the lockdown-induced mobility restrictions, women found it difficult to travel to government facilities to access social protection schemes. For instance, in our consultation with a rural women upliftment organization in Manipur, it was revealed that women were unable to travel to government offices in nearby towns to obtain government services such as bank accounts, Aadhar cards, or even ration cards.

Enhancing women's employment as frontline workers not only gives employment opportunities but also helps to increase women's presence in public spaces, making cities safer. Currently, 12.2% of men's workforce in urban areas are employed in the transportation sector, compared to only 3.7% of women's workforce (PLFS, 2021). Azad Foundation's Women with Wheels program provides training to prepare women to become self-sustaining professional drivers. As indicated by our consultation, the foundation took extra efforts to continue their training while adhering to safety protocols during the pandemic, thinking that the program's observed impact of women's empowerment should not be compromised. Most importantly, the community outreach personnel from the foundation worked with families to sensitize them to the criticality of this training for their daughters, wives, and even mothers.

Rethinking public transportation through gender-sensitive transportation policies can improve women's unfettered access to public spaces and workplaces. Urban local bodies, city authorities, and public transport authorities can use World Bank's Toolkit for Enabling Gender-Responsive Urban Mobility and Public Spaces, which provides a four-pillar framework to make public transport safe and inclusive for women. This involves assessing the ground situation by understanding gender disaggregated mobility patterns and undertaking safety audits to determine the barriers to women's mobility. Further, gender-inclusive policies, as well as capacity building and raising awareness among frontline employees, can aid in narrowing gender gaps. Incorporating a gender lens into the design of streets, stations, and public transportation vehicles, as well as introducing gender-responsive services, such as increasing the proportion of female frontline staff–bus drivers, conductors, and security officials are also crucial steps to be taken by city level implementing agencies.

9.5.4 The Reverse Income Effect and Need for Gender-Responsive Skill Training

The pandemic brought about a "reverse income effect" where women had to engage in subsistence-level economic activities to sustain their household livelihoods. The Indian economy witnessed its first severe economic shock in over three decades thanks to the pandemic. The per capita GDP, grew 4X, from $442 in 1999 to $2,072 in 2019 (World Bank, 2022). As noted in Sect. 9.3, this growth in incomes led a significant proportion of women to exit the workforce, as they were viewed as secondary income earners. In 2020, however, the per capita GDP fell by 6% to $1,933 (World Bank Database, 2022b), and as noted in Sect. 9.4, nearly 115 million lost their jobs in just the first month of the pandemic-related lockdowns, of which 100 million were men. Following these massive job losses, urban–rural reverse migration, and economic hardships caused by the pandemic, women stepped in to support household incomes as unemployment among male members increased, leading to a "reverse income effect."

The rise in the Workforce Participation Rate (WPR) for women during the pandemic points to "distress employment." During the pandemic, women's WPR rose from 28.7% to 31.4%, which was mainly driven by women's employment in rural India (PLFS, 2020, 2021). This increase in rural women's WPR can be explained by a rise in self-employment, driven by own-account employment (i.e., without hiring labor) and unpaid helpers in household enterprises. This indicates that the increase in employment in this category is necessity-driven, not opportunity-driven, and has limited infrastructural and financial capacity for continued job creation (Chakraborty et al., 2022). Several instances of women engaging in distress employment were observed in our consultations.

A women's NGO in Indore shared that while men remained idle at home owing to unemployment during the lockdown, women took on the responsibility of financially assisting their husbands to sustain their households by engaging in any type of job facility that the NGO provided, including paper bag making, etc.

A social organization in Delhi shared that as husbands in the rural areas lost their jobs, women in their community who had never worked before the pandemic suddenly became the sole breadwinners of the household.

Another consultation with an NGO that helps empower women across India, revealed that while rural men were rendered unemployed, they began spending their days playing card games, while women turned to agricultural labor to support their families. These women were in dire need of money and said they would go to work for as little as Rs. 30–40 per day.

However, training in high-demand job-related skills benefited women entering the labor force during the reverse income effect period. According to stakeholders, skill training boosted the income potential of women. Several NGOs, which had been providing training in artisanal and textile skills like sewing, kurtis, and bags pre-pandemic, were able to pivot quickly and repurpose their training programs to

focus on high-demand skills such as manufacturing masks and personal protective equipment (PPE).

A women's handicraft training group based in Udaipur shared that as men migrated from urban to rural areas owing to unemployment, rural women turned to mask production as a means of subsistence during the pandemic.

A stakeholder from the Maharashtra State Rural Livelihood Mission (MSRLM) shared that they successfully produced 11–12 lakh masks by organizing online training sessions for 50 lakh women SHGs on mask production and trade on digital marketing websites. MSRLM also established a collaboration with Amazon to boost sales.

Another NGO in Delhi shared their success story of how their women trainees pivoted to manufacturing masks during the pandemic. Rigorous campaigns and training were organized that helped them create high-quality masks, and they achieved their highest sales in recent years.

Bridging the gender gap in skill training can facilitate women's transition from informal to more formal, organized sector work. Despite an increase in women's employment during COVID-19 owing to economic hardship, many remain informal laborers due to a lack of formal education and skills. Appropriate training associated with post-pandemic labor market skills, plus along with efforts by NGOs, social entrepreneurs, and government programs, can assist women with employment. According to consultations, coordinated skill training has inspired many women to stay in the workforce. Thus, better infrastructure and skill training can improve women's LFPR.

The government could formulate an incentives-based approach with gender targets for all skilling courses under its National Skill Qualification Framework (NSQF). The government could develop a system of incremental reward mechanisms if new modules are devised for women's training or if there is an increase in enrollment and placement of female candidates so that the training partners can benefit from additional funding support.

Gender-sensitive infrastructure at skill training institutes (public and private institutes) can help create an environment conducive to women's empowerment. Education and up-skilling through safe transport, mandates for separate washrooms, strict security, and adherence to a balanced gender ratio of trainers, among other measures, can help widen access to training facilities for women, particularly in rural areas.

9.5.5 Hybrid Work and Lack of Institutional Support

Post-COVID-19, hybrid work has become a new norm, globally and in India. Over 75% of employees and managers believe that hybrid/flexible work will become a standard practice in the coming three years (Google Survey, 2021). Globally, almost

20% of the workforce in corporate set-ups could work remotely three to five days a week (McKinsey & Company, 2020). Recent research from India indicates that 73% of organized sector businesses are evaluating hybrid work models for the near future (CBRE, 2022).

Women are more likely to take up remote work opportunities for balancing unpaid care work responsibilities. Our consultations suggest that both small and large companies, including multi-national corporations, are actively recruiting women for hybrid and remote opportunities, after seeing the productivity benefits, particularly among women employees during the pandemic. The founder of a job portal and networking platform exclusively for women job seekers in India shared that more women are looking for remote or hybrid job roles, as opposed to men, so that they can then effectively balance childcare, elderly care and work responsibilities—saving commute time, and time spent on non-care work in the office.

However, hybrid work can also disadvantage women employees. Attending office provides a physical separation between paid and unpaid work for women. The blurring of this physical separation results in an increased burden of care work, particularly during COVID-19. A survey of women employed in the corporate sector showed that 43% of the women felt that during the work-from-home period, "switching off" from work may negatively affect their appraisal, and almost 64% reported leaving their jobs owing to stress (Deloitte, 2021). Even after a switch to hybrid work, almost 94% of women believe flex-work regulations will affect their chances for a promotion (Deloitte, 2022). In consultations with Human Resources managers from multi-national corporations, nearly all acknowledged that women employees faced heightened stress and burnout owing to increased care responsibilities owing to school closures, and care for family members who were unwell, especially if they contracted COVID-19.

One of the companies' HR mentioned how the women employees of their organization wanted to leave their jobs as they had young children to take care of at home immediately after the first lockdown was imposed. Another HR representative from a leading FMCG company stated that due to the closure of company daycare centers, there was a significant difference in the number of male and female employees working on any given day, with women working much fewer hours than men.

An academic from one of India's leading universities shared that a woman's attire and upkeep at a home-office setup is at risk of being sub-consciously monitored and judged, making the woman employee uncomfortable to turn on the video while taking a call from the remote setup. Lack of personal space in the home to set up their remote work arrangement was also identified as a challenge for female hybrid workers, as any extra space in the house is typically used first by the male member to set up their own arrangement.

A female employee of a global corporation stated that her organization did not modify their Prevention of Sexual Harassment (POSH) policy to include virtual workspace regulations, which adds to the uncertainty of virtual workspace safety and privacy.

Employers' and firm management's active recognition of women's difficulties provides some relief to female hybrid employees. In discussions with HR managers, the majority of them indicated how their organization provides exclusive forums for female employees to address their concerns around hybrid work. Further, rigorous training of line managers on minimizing sub-conscious bias toward remote workers was another common initiative. Another organization reported that to ensure an equitable hybrid work environment, the management did away with the practice of tracking their employees' work attendance.

The government and private-sector can adopt a gendered lens when crafting hybrid work policies to ensure a smooth and equitable transition to hybrid work. Central and state governments could recognize that women are likely to take more hybrid or remote roles. The government can clarify that women are a special interest group under the hybrid work policy and that companies could accommodate their needs. National and subnational policies can lay the groundwork by stipulating non-negotiable provisions to protect women hybrid workers.

Private companies can use the government's hybrid work provisions as guiding principles. As employee-related policies manifest in the workplace, businesses can design policies that go beyond government guidelines and are based on company goals. Companies can design gender-inclusive hybrid work policies by focusing on attrition, productivity, and retention. Ensuring pay parity, evaluation parity, care work allowances, virtual safe spaces, and establishing regular practices to communicate challenges and commensurate manager trainings can all be important components of equitable hybrid work policies.

9.6 Conclusion

Women have been facing disproportionate challenges as part of the labor force for decades even before the pandemic. These challenges highlight the level of vulnerability that women are associated with in comparison to men in the labor force. An analysis of data over the course of the pandemic reveals how women are more susceptible to unprecedented health and economic crises. Women's labor force participation was the hardest hit and the slowest to recover. Structural changes in the economic participation of women in the labor force indicate the low magnitude of control that women have as economic participants. Increase in domestic work, added stress and burnout, and distress employment highlight the challenges that they face as part of the workforce.

To ensure that women's recovery in the economy is not further hampered in India, governments, the private-sector, and the social sector could adopt gender-sensitive solution mechanisms. Tailoring policies, programs, and initiatives in line with the key challenges highlighted in this chapter can provide a targeted intervention strategy that boosts women's economic participation. These stakeholders can implement recovery

strategies with the dual objective of maximizing women's entry to and minimizing their exit from the workforce.

Appendix A: List of Definitions and Abbreviations

A.1 Definitions

1. **Activity Status**

The paper uses the usual status (ps + ss) data to measure the key employment and unemployment indicators, for both rural and urban areas. The usual activity status of a person is determined on the basis of the activities pursued by the person during the reference period of last 365 days preceding the date of survey.

2. **Casual Labor**

Any person who was casually engaged in others' farm/non-farm enterprises—both household and non-household—and, in return, received wages as per the terms of the daily/periodic work contract, is considered as casual labor.

3. **Employers**

Any self-employed person who worked on their own-account or with one or a few partners and who ran their enterprise by hiring labor.

4. **Gender Wage Ratio**

Gender wage ratio is defined as the difference between median earnings of men and women.

5. **Helpers in Household Enterprises**

Any self-employed person who were engaged full time/part time in their household enterprises and did not receive any regular salary/wages in return for the work performed. They did not run the household enterprise on their own but assisted the concerned person living in the same household in running the household enterprise.

6. **Labor Force**

Any person who is either working (or employed) or seeking or available for work (or unemployed) constitutes the labor force.

7. **Labor Force Participation Rate (LFPR)**

LFPR is the number of persons/person-days in the labor force (which includes both the employed and unemployed) per 1000 persons/person-days.

8. **Own-Account Workers**

Any self-employed person who operated their enterprises on their own-account or with one or a few partners and who ran their enterprise without hiring any labor.

9. **Salaried Employees**

Any person who worked in others' farm/non-farm enterprises (both household and non- household) and, in return, received salary or wages on a regular basis (i.e., not on the basis of daily or periodic renewal of work contract).

10. **Self-employed**

Any person who operated their own farm/non-farm enterprises or were engaged independently in a profession/trade on their own or with one or a few partners.

11. **Workforce Participation Rate**

WPR is the number of persons/person-days employed per 1000 persons/person-days.

A.2 Abbreviations

1. **ASHA**: Accredited Social Health Activist
2. **ANM**: Auxiliary Nurse-Midwives
3. **AWW**: Anganwadi Worker
4. **CBO**: Community-Based Organization
5. **CCC**: Community Childcare Center
6. **CMIE**: Center for Monitoring Indian Economy
7. **EMI**: Equated Monthly Installment
8. **FLPFR**: Female Labor Force Participation Rate
9. **FMCG**: Fast-Moving Consumer Goods
10. **GB**: Gigabyte
11. **GDP**: Gross Domestic Product
12. **GST**: Goods and Services Tax
13. **HR**: Human Resources
14. **INR**: Indian Rupee
15. **MSRLM**: Maharashtra State Rural Livelihood Mission
16. **NFHS**: National Family and Health Survey
17. **NGO**: Non-governmental Organization
18. **NPO**: Non-profit Organization
19. **NSQF**: National Skill Qualifying Framework
20. **NSSO**: National Sample Survey Office
21. **PLFS**: Public Labor Force Survey
22. **PPE**: Personal-protection Equipment
23. **SHG**: Self-Help Group
24. **WPR**: Workforce Participation Rate

Appendix B: List of Stakeholder Consultations

In order to deeply analyze the intricacies of women's lived experiences in the backdrop of the disruptions caused by the pandemic to their professional and work lives, the Nikore Associates team undertook 99 consultations with 98 different stakeholders. Few organizations and stakeholders were consulted multiple times over the period of the research.

Organization name	No of consultations	State
Aara Health	1	Maharashtra
Aasara NGO	1	Maharashtra
Adarsh Shiksha Samiti	1	Rajasthan
ALEAP—Association of Lady Entrepreneurs of India	1	Telangana, Andhra Pradesh
Ambiya	1	Maharashtra
Anarock	1	Haryana
Apnalaya	1	Maharashtra
APU	1	Karnataka
Aravani Art Project	1	Karnataka
ASHA	1	Maharashtra
Avtar	1	Tamil Nadu
Azad Foundation	1	Delhi
Azim Premji University	1	Karnataka
BAIF India	1	Gujarat
Baif Jamnagar	1	Gujarat
BlackBox	1	Singapore
Central Square Foundation	1	Delhi
CEQUIN India	1	Delhi
CITU, AIFAWH	1	Delhi
Colorcol	1	Delhi
Conscious Culture	1	Delhi
Brandon Primus (Diversity, Equality, and Inclusion Scholar)	1	New York, United States
Department of Labor	1	Karnataka
Dhara Shakti	1	Rajasthan
Dilli Haat	1	Delhi
Eklavya Residential School, Department of Tribal and Welfare, Government of Madhya Pradesh	1	Madhya Pradesh
GAME	1	Delhi
GiveHer5	1	Maharashtra

(continued)

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Organization name	No of consultations	State
GIZ Project Her&Now	1	Delhi
Good Business Lab	1	Karnataka
Gram Vaani	1	Delhi, Tamil Nadu, Chhattisgarh
Grip	1	Delhi
Guru Nanak Phulkari	1	Delhi
HDRC	1	Gujarat
Hindustan Unilever	1	Maharashtra
IAFFE	1	Brazil
ICCHA/Ikvanshu	1	Maharashtra
IHEID Graduate (Isha Bhasin)	1	Geneva, Switzerland
Aila Bandagi (Independent Consultant)	1	Karnataka
Nupur Dogra (Independent Journalist)	1	Uttar Pradesh
Indian Institute of Management	1	Gujarat
International Center for Research on Women	1	Delhi
ISST	1	Maharashtra
Jajabor Brand Consultancy	1	Delhi
Madhabi Majhi (Jute Entrepreneur, former SHG member)	1	West Bengal
Piyali Bose (Jute Entrepreneur, former SHG member)	1	West Bengal
Poornima Chakra (Jute Entrepreneur, former SHG member)	1	West Bengal
Sonela Chatterjee (Jute Entrepreneurs)	1	West Bengal
Jwala Mahila Samiti	1	Madhya Pradesh
Khwaab	1	Delhi
Kranti	1	Maharashtra
Kudumbashree	1	Kerala
MAKAAM	1	Maharashtra
Mann Deshi Foundation	1	Maharashtra
MasterG	1	Delhi
Mitti Ke Rang	1	Maharashtra
MSME Cluster	1	West Bengal
Myna Mahila Foundation	1	Maharashtra
National Network of Sex Workers	1	Karnataka
NF Infratech	1	Delhi

(continued)

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Organization name	No of consultations	State
NRLM	1	Maharashtra
Oxfam India	1	Uttar Pradesh, Odisha, Bihar and Chhattisgarh
Parati	1	Delhi
Penn Thozilahar Sangam	1	Tamil Nadu
PepsiCo	1	Haryana
Prajnya	1	Tamil Nadu
PwC	1	Maharashtra
Renu & Rekha Art Zone	1	Delhi
Rohaa	1	Mumbai
Rural Women Upliftment Society	1	Manipur
Saath Charitable Trust	1	Gujarat
Samhita Community Development Services	1	Maharashtra
Sangini Resource center	1	Madhya Pradesh
Sattva Consulting	1	Karnataka
SEWA Bharat	2	Delhi
Shakti Shalini	1	Delhi
Shaktishali Mahila Sangathan Samiti	1	Madhya Pradesh
Shanti Sahyog	1	Delhi
Ankita (SHG Consultant)	1	Rajasthan
Society for Promoting Participative Eco-System Management	1	Maharashtra
Soprasteria	1	Karnataka
STOP	1	Delhi
Surendranagar SHG	1	Gujarat
The Goodwork Alliance	1	Geneva, Switzerland
Titli Foundation	1	Uttar Pradesh
TN Women's collective	1	Tamil Nadu
Udayan Care	1	Delhi
Unplugged Moments	1	Maharashtra
Upcyclie	1	Tamil Nadu
Vanita Jyothi Mahila Sangam	1	Telangana, Andhra Pradesh
Vimochana NGO	1	Karnataka (Bangalore)
Vishvodaya Trust	1	Tamil Nadu
WEN	1	Delhi
Women in Econ/Policy	1	Delhi

(continued)

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Organization name	No of consultations	State
Women's Commission Matters	1	Telangana
Women@Work	1	Karnataka
WOMENNOVATOR	1	Delhi
WOTR	1	Maharashtra

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Chapter 10
India's COVID-19 Vaccination Drive: Its Relevance in Managing the Pandemic

Santanu Pramanik and Abhinav Motheram

Abstract After the initial couple of months of the nation-wide lockdown, it became evident that mobility restrictions cannot be the way forward to manage the pandemic as it was impacting people's livelihoods. India did not merely see vaccination as a health response but realized its importance for opening up the economy in a safe manner. An effective rollout of vaccinations against COVID-19 was thought to be the most promising prospect of relaxing COVID-related restrictions, getting back to normalcy and perhaps bringing an end to the pandemic. We track vaccination coverage across states and over time in 2021 when the severity of the disease was the maximum. We focus on inequality in coverage and compliance with two doses of vaccination across states and gender. We also present evidence on potential bottlenecks such as vaccine hesitancy and supply shortages across states and over time and how that might be related to sub-optimal coverage in certain areas and specific time points.

Keyword Compliance · Inequality in coverage · Intra-household influences · Spatio-temporal variation · Vaccine hesitancy

10.1 Introduction

The COVID-19 pandemic has not only affected physical and mental health of people in India and around the world, it has impacted people's livelihood, led to stagnation of economic growth and posed an unprecedented challenge to teaching and learning of students. Moreover, because of COVID-related burden on the health system, the

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disruption of routine health services turned out to be a major area of concern in the wake of COVID-19 (Pramanik et al., 2022; Sharma et al., 2021).

Given the unknown nature of Coronavirus at the beginning and unavailability of enough information about its consequences and the management of COVID-19, India considered a conservative approach to manage the pandemic. The plan adopted by the government was to hedge against the worst case and then move forward using feedback loops by updating the plan based on available information (GoI 2021). Along this thought process, a strict nation-wide lockdown was announced during the initial phase of the pandemic in order to prevent the spread of the virus and at the same time safety nets were created to cushion the impact on the vulnerable population by ensuring food security and bare minimum cash transfer through existing systems. It is true that some needy people did not receive much needed benefits during this crisis (Pramanik et al., 2022), but it was not possible to device a new mechanism or even expand the existing system at that time. In other words, in the context of choosing between lives and livelihoods in shaping policy views, the priority was given on saving lives. However, lockdown made the issue of livelihood and survival a big concern.

Workers are considered to be most affected by lockdown measures or even at risk of job loss if they are working in a non-essential industry and unable to work from home (Estupinan & Sharma, 2020; Pramanik et al., 2022). Using Periodic Labour Force Survey (PLFS, 2017–18) data, the authors found that an estimated 44% of the formal workers in comparison to only 15% of informal workers can work from home when mobility restrictions are in place. This implies that in a country like India, where 90% of the workers are informally employed (PLFS, 2017–18) either in the organized or unorganized sector, the adverse impact of the lockdown period of at least 68 days (25th March – 31st May 2020) on the jobs and wages are significant (Behera et al., 2021; Estupinan & Sharma, 2020; ILO, 2020; Kesar et al., 2021; Mohan et al. 2021; Paul et al., 2021).

After the initial couple of month's nation-wide lockdown, it became evident that lockdown and mobility restrictions cannot be the way forward to manage the pandemic. The consequences faced by India's poor and vulnerable population in terms of loss of livelihood and reduction in income were severe and their risks of impoverishment were high (Pramanik et al., 2022). The need for gradual opening up of the economy was inevitable, however, the looming concern of surge of cases was also a reality. In addition to promoting adherence to COVID-appropriate behaviors in public places, administrators and policy makers around the world were left with no choice but to wait for safe and effective vaccines. India did not merely see vaccination as a health response but realized its importance for opening up the economy in a safe manner, particularly for contact-intensive services. In fact, vaccination was treated as a macro-economic indicator in the economic survey 2021–22 (GoI 2021).

An effective rollout of vaccinations against COVID-19 was thought as the most promising prospect of relaxing COVID-related restrictions, getting back to normalcy and perhaps bringing an end to the pandemic. On 16 January 2021, India rolled out world's second largest vaccination program to date, marking the beginning of an effort to vaccinate a population of 1.3 billion against COVID-19. The central government's

strategy was to first vaccinate the health workers and the frontline workers, followed by people above 60 years of age and those over 45 years with comorbidities from 1 March onwards in a phased manner. Starting April 1, the target beneficiaries of the vaccination drive covered all people more than 45 years of age. From May 1 onwards, it included all adults above the age of 18. The government expected that eligible beneficiaries aged 18 years and above will be fully vaccinated by December 2021 (GoI, 2021; Radhakrishnan & Nihalani, 2022). In this book chapter, we discuss how successful India and its states were in achieving the target of vaccinating all adults by 31 December 2021.

The outline of the remaining chapter is as follows. In Sect. 10.2, we synthesize evidence around the globe on the real world effectiveness of COVID-19 vaccine in reducing SARS-CoV-2 infections, hospitalizations, and deaths associated with COVID-19. Section 10.3 elaborates on the planning and implementation details of the vaccination drive in India. It also discusses about the interim changes made during the course of the vaccination drive and the rationale behind them. In Sect. 10.4, we track India's progress across states and over time in 2021 when the severity of the disease was the maximum. The goal is to quantify how close or far different states were in achieving their target of vaccinating all adults by 31 December 2021. In this section, we focus on inequality in vaccination coverage and compliance with two doses of vaccination across states and gender. In Sect. 10.5, we present evidence on potential bottlenecks such as vaccine hesitancy and supply shortages across states and over time. In this section, we also explore the role of parental and intra-household influences on the decision to get vaccinated. These factors are known to be important in the context of childhood vaccination, but it is unclear how such influences can impact adult vaccination like COVID-19 vaccination. The chapter is concluded (Sect. 10.6) with policy discussions regarding prioritization strategies and lessons learnt.

10.2 Effectiveness of COVID-19 Vaccines

Development of new vaccines typically requires years of research and testing before making the vaccines available to the common public. But in 2020 we witnessed an unprecedented success story of scientists, regulators and policy makers as several effective vaccines became available for inoculation against COVID-19 in less than one year's time. Clearly past investments in vaccine research and innovations in vaccine technology during the period 2000–2019 paid off as the rapid development of vaccines for COVID-19 has relied on the tested vaccine technologies (Kiszewski et al., 2021). All COVID-19 vaccines demonstrated an efficacy rate well above the WHO recommended minimum threshold of 50% efficacy for any acceptable COVID-19 vaccine. Evidence of vaccine efficacy in randomized clinical trials is the key in any vaccine development process, which is defined as the relative percentage reduction in primary outcome among participants who are vaccinated over those who do not receive vaccine (control group). Efficacy of COVID-19 vaccines can be assessed

against different primary outcomes such as clinically tested infection, symptomatic COVID-19, severe COVID-19 requiring hospital and/or ICU admission, death due to COVID-19, and transmission of infection (Hodgson et al., 2021). Most of the clinical trials, particularly those which were conducted in 2020, considered clinically tested infection as the primary outcome to assess vaccine efficacy.

It is to be noted that vaccine efficacy does not always predict vaccine effectiveness which is defined as the protection attributable to a vaccine administered non-randomly in real world settings.

Observational studies using real-time data from mass vaccination programs are important for providing a robust assessment and external validity of vaccine safety and effectiveness in the general population and across diverse populations in a noncontrolled setting (Kim et al., 2021; Polack et al., 2020). Such studies having large sample sizes have the potential to include certain types of individuals that are often excluded from the randomized controlled trials (RCTs) such as patients with unstable comorbid conditions. Additionally, large observational studies using real world data with longer follow-up time may allow the assessment of low-probability events that may not be detected in RCTs (Chodick et al., 2022). In this section, we present findings on vaccine effectiveness in preventing COVID-19 infections and COVID-19 hospitalisations and deaths based on selected studies from different parts of the world.

10.2.1 Evidences from Outside India

Israel is known to fully vaccinate more than 50% of its population with two doses of Pfizer mRNA (BNT162b2) vaccines as early as by March 2021, and was the quickest to achieve the feat in the world (Ritchie et al., 2020). Multiple studies from Israel assessed vaccine effectiveness in noncontrolled settings using varied study designs. At the initial stage of the vaccination campaigns, studies estimated vaccine effectiveness by comparing primary outcomes between vaccinated and unvaccinated individuals (Amit et al., 2021; Dagan et al., 2021). According to one such study using data from Israel's largest health care organization, having matched sample size of 596,618 persons in each group, estimated vaccine effectiveness at 7 or more days after the second dose as follows: for documented infection, 92% (95% CI, 88 to 95); for symptomatic COVID-19, 94% (95% CI, 87 to 98); for hospitalization, 87% (95% CI, 55 to 100); and for severe disease, 92% (95% CI, 75 to 100). The estimated effectiveness of full vaccination (7 or more days after the second dose) was much higher for all outcomes as compared to 14–20 days after the first dose (Dagan et al., 2021).

Later, when most of the people got vaccinated in Israel, some studies assessed the effectiveness of 2-dose BNT162b2 vaccine in a large cohort of immunized individuals, employing a vaccine-only study design (Chodick et al., 2022). The primary outcome was the incidence rate of COVID-19 infection confirmed with real-time polymerase chain reaction (RT-PCR), between 7 and 27 days after the second dose

(protection-period), as compared to 1–7 days after the first dose (reference-period), where no protection by the vaccine is assumed. The overall vaccine effectiveness of protection-period was estimated at 90% (95% CI: 79–95%). It was lower among older age groups, people with diabetes and cardiovascular diseases, and immunosuppressed patients (Chodick et al., 2022).

A multi-country study investigating the association between daily deaths due to COVID-19 and vaccination coverage, after adjusting for potential confounders, found that vaccine effectiveness against deaths is equal to 72%. It uses country level data from 32 countries including European countries and Israel. The time period considered was from the date of the first reported death in Europe, 29 January 2020, up to 15 April 2021. These findings suggest lower effectiveness against death than reported efficacy against severe disease in clinical trials of vaccines (Jabłońska et al., 2021). It should be noted that the analysis in this paper was conducted using country level data, which is known to be a less precise method than the analysis of individual-level data.

To estimate the number of prevented infections, hospitalizations and deaths associated with COVID-19 in the US, a study used a multiplier model and extrapolation method. COVID-19 vaccination was estimated to prevent approximately 27 million (95% CI, 22 million to 34 million) infections, 1.6 million (95% CI, 1.4 million to 1.8 million) hospitalizations, and 235,000 (95% CI, 175,000–305,000) deaths in the US from December 1, 2020, to September 30, 2021, among fully vaccinated adults 18 years or older (Steele et al., 2022).

In order to evaluate the effectiveness of four available vaccines in Iran (Sinopharm, Oxford-AstraZeneca, Sputnik V, and COVIran Barekat), a study linked four administrative datasets and followed up about 1.88 million adults for their vaccination status and three primary outcomes, viz., detected infection (RT-PCR positive), hospital admission for COVID-19 and death due to COVID-19. It was found that the implementation of a vaccination drive including all available vaccine options in the Iranian population was associated with a significant reduction in detected infections as well as hospital admissions and deaths associated with COVID-19 (Mirahmadizadeh et al., 2022). All four vaccines turned out to be more effective in preventing COVID-19 deaths compared to preventing infections.

Another study summarized findings from five countries (Israel, England, Scotland, Sweden, and the United States) where researchers analyzed linked routinely collected person-level data from large community-wide databases that tracked outcomes in vaccinated and unvaccinated individuals (Bernal et al., 2021; Björk et al., 2021; Dagan et al. 2021; Pawlowski et al., 2021; Vasileiou et al., 2021). These studies estimated the effectiveness of the first vaccines to reach market: the BNT162b2 mRNA (Pfizer–BioNTech), mRNA-1273 (Moderna) and ChAdOx1 adenoviral vector (Oxford–AstraZeneca). This perspective piece concluded that the available COVID-19 vaccines appear to be very effective in preventing severe complications and deaths from COVID-19 in adults of all ages (Henry et al., 2021).

10.2.2 Evidences from India

Vaccine effectiveness studies from India are sparse. One cross sectional study was conducted involving patients admitted at a designated COVID hospital in New Delhi between 01 March and 17 May 2021 with moderate to severe COVID-19. The authors studied the association of being fully vaccinated with mortality. The study concluded that vaccination with two doses of COVISHIELD was associated with lower odds of mortality among hospitalized patients with moderate to severe COVID (Muthukrishnan et al., 2021).

A retrospective study was done at a multispecialty hospital in Delhi involving only vaccinated healthcare workers (HCWs) during the initial period of the vaccination drive (January 16 to April 24, 2021). The COVID-19 infection was found in a smaller subset (2.6%) of 3,235 HCWs receiving COVISHIELD vaccine, in both partially vaccinated and fully vaccinated groups. These infections were primarily minor and did not lead to severe disease. Based on this small retrospective pilot study, the authors concluded that the vaccination with ChAdOx1 nCoV-19 vaccine (recombinant) prevented severe infection leading to ICU admission and deaths in the HCWs (Vaishya et al., 2021).

One cohort study (VIN-WIN) was conducted involving 1.59 million HCWs and Frontline Workers (FLWs) of the Indian Armed Forces to evaluate the effectiveness of COVISHIELD vaccine on the occurrence of breakthrough infections and COVID-19 related deaths. Interim results after 135 days of vaccination drive (From 16 January 2021 till 30 May 2021) showed that among the fully vaccinated, vaccine effectiveness ranged from 91.8 to 94.9% for breakthrough infections, depending on the correction methods used to account for changing risk of infection over time (Ghosh et al., 2021). Vaccine effectiveness relating to prevention of COVID deaths was estimated to be quite high, however, wide confidence intervals which occurred due to very few deaths in the vaccinated group, did not allow meaningful conclusions to be drawn.

10.2.3 Duration of Protection

One Lancet systematic review aimed to generate robust evidence for the duration of protection of COVID-19 vaccines against various clinical outcomes, and to assess changes in the rates of breakthrough infection caused by the delta variant with increasing time since vaccination (Feikin et al., 2022).

For this systematic review and meta-regression study, the authors screened 13,744 studies and 310 of them underwent full-text review. After applying two sets of inclusion and exclusion criteria, 18 studies were included in the vaccine efficacy or effectiveness analysis. Among these 18 studies, ten studies evaluated the vaccine efficacy or effectiveness over time for COVID infection. These ten studies include a total of 26 vaccine-specific analysis covering Pfizer–BioNTech-Comirnaty (n = 13), Moderna-mRNA-1273 (n = 9), Janssen-Ad26.COV2.S (n = 2), and AstraZeneca-Vaxzevria (n

= 2) vaccines. Ten vaccine-specific analysis took place in single-variant settings (all delta variants), and 16 others in mixed-variant settings. Out of 26 vaccine-specific analysis, 18 included people of all ages (18 years and above) and eight analysis were done among older people (at least 50 years old) only.

Based on meta-regression analysis, the study claimed that COVID-19 vaccine efficacy or effectiveness against severe disease remained high by 6 months after full vaccination, although it did decrease slightly (10 percentage points), on an average. By contrast, vaccine effectiveness against infection and symptomatic disease decreased approximately 20–30% points by 6 months. The decrease in effectiveness is likely to be caused by waning immunity (Feikin et al., 2022).

10.3 Planning and Implementation of the Vaccination Drive in India

Vaccination has been an integral part of the strategy of Government of India for containment and management of the pandemic (GoI 2022). India's commitment to the COVID-19 vaccination program has been proactive and steady from the beginning. A high level task force, co-chaired by member, NITI Aayog and principal scientific adviser, was formed in April 2020 to enable COVID-19 related research and vaccine development (PIB MoHFW 2020b). National Expert Group on Vaccine Administration for COVID-19 (NEGVAC), co-chaired by member (health) NITI Aayog and union health secretary, was constituted in August 2020 to formulate a comprehensive action plan for vaccine administration based on the concurrent scientific evidence (PIB MoHFW 2020a). The goal of NEGVAC was to guide all aspects of the COVID-19 vaccine introduction in India including regulatory guidance on vaccine trials, vaccine selection, equitable distribution of vaccine, procurements, financing, delivery mechanisms, prioritization of population groups, vaccine safety surveillance, regional cooperation and assisting neighboring countries, communication & media response, among others. Operational guidelines for COVID-19 vaccination were finalized by 28 December 2020 (MoHFW, 2020), followed by 10 days of dry run to test all major steps for COVID-19 vaccination process. Subsequently, the government of India released an advisory on COVID-19 vaccination which detailed precautions, contraindications, and comparison of two approved vaccines, viz., Covishield and Covaxin (Purohit et al., 2022). The central government also set up an empowered group in January 2021, headed by CEO, National Health Authority, on COVID-19 vaccine administration to facilitate optimal utilization of technology to make COVID-19 vaccination transparent, simple, and scalable.

Various Indian pharmaceutical companies like Bharat Biotech, Zydus Cadila, Serum Institute of India (SII) and Dr Reddy's laboratories conducted vaccine clinical trials for Covaxin, ZyCoV-D, Covishield and Sputnik V, respectively, during the course of the pandemic. Restricted emergency approval for Covishield and Covaxin was granted by the Central Drugs Standard Control Organization (CDSCO) in the

first week of January 2021 followed by approval for Sputnik V in April, m-RNA-1273 (Moderna) in last week of June and Johnson and Johnson's single dose vaccine and Zydus Cadila's ZyCoV-D vaccine in August. The vaccine development in India is discussed in detail by researchers from the Post Graduate Institute of Medical Education & Research, Chandigarh (Purohit et al., 2022). Two other vaccines, Corbevax, a protein subunit vaccine by Indian pharma Biological E and COVOVAX recombinant spike protein nanoparticle vaccine of SII have received emergency use authorization in the last week of December 2021.

The central and state governments played important roles in ensuring smooth planning and implementation of COVID-19 vaccination program. The central government was responsible for the formulation of policies and guidelines, emergency use approvals of vaccines, provision of financial support to vaccine manufacturers for expansion of production capacity of vaccines, financing, procurement, and distribution of vaccines and monitoring of the vaccination program. The role of states was to identify vaccination sites, undertake logistic management, train the human resources, and update daily vaccination related data. Both the governments organized awareness campaigns to spread right information for the uptake of the vaccination (Purohit et al., 2022). NEGVAC at the national level, task forces at state, district, and block-level were formed to monitor and supervise the vaccination program. Similarly, core groups were constituted at state, district and block-levels to ensure implementation. There was also a provision for independent external monitors and prioritization of concurrent monitoring in high-risk or hard to reach and low performing areas (Sharma & Pardeshi, 2021).

10.3.1 Use of Digital Technology

One innovative feature of India's vaccination drive was the development and use of the digital platform called CoWIN (Winning over Covid-19) in the form of a mobile app and web portal. It is a cloud-based system that facilitates the creation of users (admins, supervisors, and vaccinators), registration of beneficiaries (individual registration and bulk upload), vaccination centres, and session sites followed by planning and scheduling of sessions and implementation of vaccination process and issuance of vaccination certificates. The government partnered with a number of agencies including the United Nations Development Program (UNDP) for technical support and implementation of CoWIN.

CoWIN reflects the citizen-centric design of India's vaccination program having the overarching objective of ensuring convenient access to vaccines at any place or time. The portal has a simple user interface for beneficiaries to register and select a convenient facility, with an option to choose the vaccine type. They get a digital vaccine certificate delivered in a QR-code format via a text message, or a printed copy at the facility. Vaccinators use the app to verify registered beneficiaries, enter the vaccine doses given and record any adverse events following immunization (Pant, 2022).

People without access to smart phones, internet facilities or an identity card faced a lot of difficulties in getting vaccinated during the initial phase of the vaccination drive. Inconveniences eased out towards the later part of 2021 and the impact of the digital divide on vaccination status started to diminish. Some of the initiatives might have been prioritized after the Supreme Court ruling on 2 June 2021 which criticized the vaccination policy for relying exclusively on a digital portal for vaccinating the adult population and warned that the existing policy might fail to achieve universal immunization owing to a digital divide in the country's infrastructure (Sharma, 2021). Nonetheless, the utilization of CoWIN for procurement, distribution, and monitoring of vaccination has been an ambitious attempt to adopt digital technologies and utilize real-time data for tracking progress and planning of policies (Purohit et al., 2022).

10.3.2 Vaccine Procurement and Distribution Within India

During the initial phase of the vaccination program (16 Jan−30 April 2021), 100% of vaccine doses were procured by the Government of India (GoI) from the domestic manufacturers and the vaccines were provided free of cost to all states and union territories for administering to priority groups in government vaccination centers (MoHFW, 2021). In order to allow flexibility to the states in procuring vaccines directly and administering them as per their requirements and capacity, GoI revised the Guidelines. From 1 May 2021 onwards, GoI deregulated its procurement policy to some extent and started to procure only half of the monthly vaccine production by the domestic manufacturers and continued to provide them to states and UTs free of cost. The State Government and private hospitals were also empowered to directly procure from the remaining 50% vaccine pool. This revised guideline, known as *liberalized pricing and accelerated national COVID-19 vaccination strategy* (GoI 2021), affected the pace of the vaccination program. Many States faced difficulties in managing the funds and logistics of vaccine procurement process. Moreover, smaller and remote private hospitals also faced constraints in procuring vaccines on their own. Based on these learnings, GoI updated their vaccine procurement guidelines on 21 June 2021 reverting to a more centralized approach of procurement and started procuring 75% of the vaccines (MoHFW, 2021). Domestic vaccine manufacturers were given the option to sell directly to private hospitals, but only 25% of their monthly production. GoI mandated order of vaccines through CoWIN portal for private institutions, to keep a check on private vaccine procurement from 1st July 2021.

10.3.3 Revision in Vaccination Dose Schedule

Like other countries of the world, India planned its vaccination drive in phases. The drive started on 16 Jan 2021 with two vaccines, Covishield and Covaxin, with the

objective of vaccinating health workers and the frontline workers first. Shortage of vaccines became a real problem when all adults became eligible for vaccination on 1 May 2021. To adapt to this situation, on 13 May 2021, GoI extended the gap between the first and second doses of Covishield vaccine to 12–16 weeks from 6–8 weeks as per the recommendation from the COVID Working Group (PIB MoHFW, 2021b). This was in line with the evidence from pooled analysis of three single-blind randomized controlled trials—one phase 1/2 study in the UK, one phase 2/3 study in the UK, and a phase 3 study in Brazil—and one double-blind phase 1/2 study in South Africa. The findings suggested that a 3-month dose interval might have advantages over a program with a short dose interval to protect the largest number of individuals in the population as early as possible when supplies are scarce, while also improving protection after receiving a second dose (Voysey et al., 2021). Research from other countries (e.g., US) also suggests that more lives could have been saved by increasing the gap between two doses (Dowd & Zhang, 2022). It is to be noted that the interval between two doses of Covishield was increased to 6–8 weeks from the initially practiced interval of 4–6 weeks on 22 March 2021 based on NTAGI and NEGVAC Recommendation (PIB MoHFW 2021). Throughout the vaccination drive, Covishield vaccine doses were by far the higher number of administered doses in India. For example, till 31 December 2021, 88.8% of all doses administered in India were Covishield and in all states, the share of Covishield doses was above 85%, except for Delhi where it was slightly below 80%.

10.3.4 Special Campaigns to Improve Compliance

With the objective of improving coverage of full vaccination, a special campaign, *Har Ghar Dastak*, was launched on 3 November 2021 (PBI MoHFW, 2022). This campaign aimed to identify and vaccinate those who missed 1st dose and are due for 2nd dose through house-to-house mobilization activity in all states and UTs. Interstate competition for coverage, conducting vaccination camp at Bazaar Haats, utilization of social media to counter anti-vaccine rumours, messaging through influential and credible voices and other innovative approaches were used to improve vaccination coverage (GoI 2021).

10.3.5 Export of Vaccines to Other Countries

India was one of the few developing countries in the world which manufactured COVID-19 vaccines domestically and is self-sufficient when it comes to the availability of doses for vaccination to its people. India started its vaccination drive with Covishield and Covaxin, both are manufactured in India. In addition to satisfying its domestic needs, India also exported vaccines to around 100 countries in the form of

grants, commercial export or through COVAX. COVAX was formed by key international agencies such as WHO, GAVI, UNICEF, among others, to accelerate the development and manufacturing of COVID-19 vaccines and to guarantee fair and equitable access for low and middle income countries. According to the WTO-IMF Vaccine Trade Tracker, as on 31st May 2022, India exported 140.2 million doses to other countries, mostly countries in the Asia–Pacific region (e.g., Bangladesh, Myanmar, Nepal) and Africa. It constitutes 2.3% of world exports and 5.7% of its total supply of vaccines. It is to be noted that there was an export ban in India for about six months between late April and mid-November, 2021 due to the shortage of vaccines in India and soaring number of cases characterized by the delta variant.

10.4 How Did We Fare in 2021 When COVID-19 Was More Threatening?

The year 2021 turned out to be the most devasting one for India when it comes to the number of COVID-19 cases and deaths. In 2021 alone, India recorded approximately 24.5 million confirmed cases and 332,000 confirmed deaths, which account for more than 50% of all cases and more than 60% of COVID deaths the country has experienced till 31 December 2022 (Ritchie et al. 2023). Incidentally, India started its vaccination drive in January 2021. As mentioned in Sect. 10.2, evidence around the world show that COVID vaccination is highly effective in reducing infections, severity of the disease and the number of deaths due to COVID-19. One would expect that higher vaccination coverage would have a direct impact on reducing the severity of the disease. In this section, we evaluate India's vaccination drive and present spatio-temporal variation in the number of doses administered, for India as a whole and for states in India.

Banking on its existing childhood vaccination infrastructure and the domestic manufacturing of COVID-19 vaccines, the government expected that all adults will be fully vaccinated by December 2021 (GoI 2021; Radhakrishnan & Nihalani, 2022). By 31st December 2021, India was able to vaccinate an estimated 89.5% of its adult population with at least one dose of vaccine and fully vaccinate 64.1% of its adult population. Full vaccination coverage varies significantly across states with Punjab, Jharkhand, and Uttar Pradesh having coverage below 50% and Madhya Pradesh, Gujarat, Kerala and Karnataka having coverage more than 78%. These estimates are based on vaccination data from covid19bharat.org with the root source being CoWIN portal. To obtain relevant adult population (18 years and above) figures, we used October 2021 population projection data from 2011–2036 population projection report (National Commission on Population 2020).

10.4.1 How Far Were We from the Target?

Here we present India's vaccination progress over time starting from 16 January 2021 to 31 December 2021. According to the population projection report of the technical group on population projections, India's projected adult population in October 2021 is approximately 945,190 thousand. This implies administering 1,890,380 thousand doses for fully vaccinating all adults since both the vaccines used in 2021 required two doses for full protection. From Fig. 10.1, it is evident that India was behind its set target. The gap was 23.2% in relative terms (Table 10.1).

10.4.1.1 State-Level Comparison Between Target and Achievement

Table 10.1 presents the relative gap between target number of doses for fully vaccinating all adults and actual number of doses administered for all states and union territories, except for Dadra and Nagar Haveli and Daman and Diu which were excluded due to data discrepancies. A negative relative gap, which happened for a few smaller states, implies that actual number of doses administered was more than the required number of doses. This unrealistic situation may arise due to underestimation of number of adult population in respective states.

In Fig. 10.2, we present vaccination progress of 15 selected states over time starting from 16 January 2021 to 31 December 2021. These 15 states cover more than 85% of India's population. The figure shows that for some states such as Madhya Pradesh, Gujarat, Karnataka, Kerala, Andhra Pradesh and Delhi, the target was chased quite

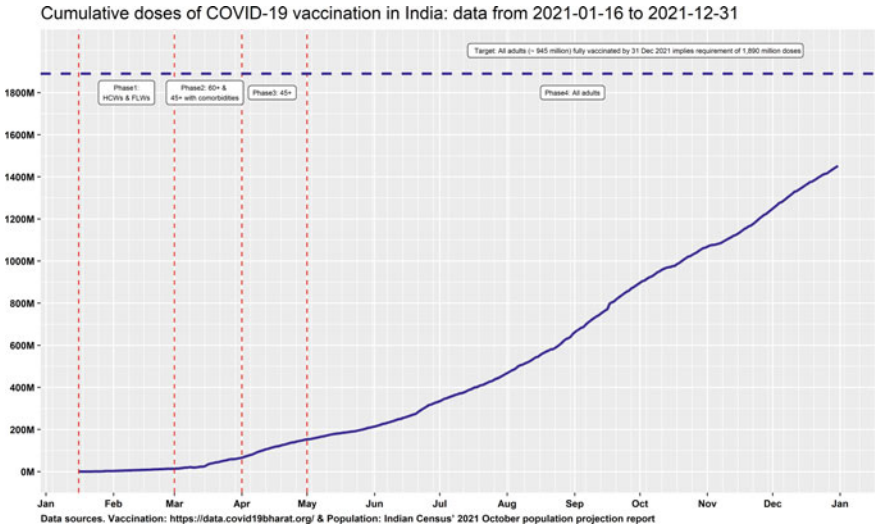

Fig. 10.1 India's vaccination drive over time in 2021: Cumulative doses of vaccines administered from 16 January 2021 to 31 December 2021 with respect to the target (dashed line)

Table 10.1 Comparison between target number of required doses for fully vaccinating all adults and actual number of administered doses: all states and union territories* in India

State	Target number of doses	Doses administered	Relative gap (%)
Lakshadweep	94,021	1,08,486	-15.4
Andaman and Nicobar Islands	5,65,331	5,93,204	-4.9
Goa	23,07,078	24,04,767	-4.2
Chandigarh	16,83,767	17,35,432	-3.1
Himachal Pradesh	1,10,75,367	1,13,60,884	-2.6
Jammu and Kashmir	1,88,97,999	1,86,05,033	1.6
Sikkim	10,42,179	10,08,874	3.2
Ladakh	4,18,240	3,89,630	6.8
Madhya Pradesh	11,06,82,808	10,23,94,341	7.5
Gujarat	9,85,16,195	8,94,47,886	9.2
Kerala	5,35,42,432	4,72,73,408	11.7
Karnataka	9,81,93,501	8,63,15,709	12.1
Andhra Pradesh	7,92,05,721	6,96,06,761	12.1
Uttarakhand	1,62,17,577	1,41,61,093	12.7
Delhi	3,04,97,213	2,63,68,739	13.5
Telangana	5,56,67,959	4,70,35,227	15.5
Haryana	4,14,55,964	3,44,02,647	17.0
Odisha	6,28,48,866	5,00,94,051	20.3
Assam	4,75,82,656	3,76,27,342	20.9
Rajasthan	10,36,79,396	8,15,73,290	21.3
India	**1,89,03,79,876**	**1,45,18,82,186**	**23.2**
Mizoram	17,37,279	13,33,253	23.3
Chhattisgarh	3,95,64,490	2,98,64,612	24.5
Tripura	62,99,454	47,00,783	25.4
Maharashtra	18,37,04,721	13,36,91,165	27.2
West Bengal	14,57,13,133	10,48,87,824	28.0
Tamil Nadu	11,59,87,071	8,32,16,462	28.3
Arunachal Pradesh	20,45,185	14,55,878	28.8
Uttar Pradesh	29,66,28,016	20,14,29,830	32.1
Bihar	14,81,74,208	10,00,99,243	32.4
Puducherry	22,71,264	14,05,157	38.1
Jharkhand	5,01,04,150	2,97,27,664	40.7
Punjab	4,56,44,870	2,63,97,664	42.2
Meghalaya	40,86,205	21,18,655	48.2

(continued)

Table 10.1 (continued)

Manipur	46,92,115	23,16,098	50.6
Nagaland	29,83,977	13,32,714	55.3

* Data for Dadra and Nagar Haveli and Daman and Diu have been excluded due to some data discrepancies

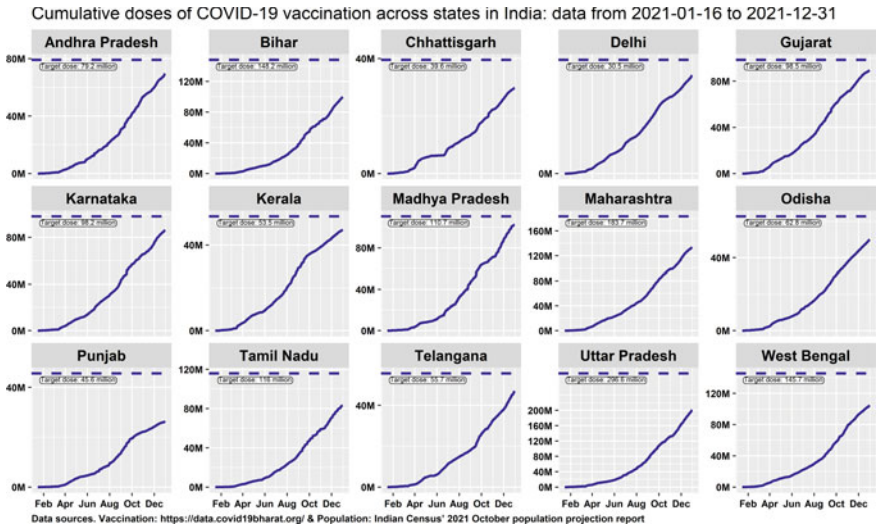

Fig. 10.2 Progress of vaccination drive for selected states over time in 2021: Cumulative doses of vaccines administered from 16 January 2021 to 31 December 2021 with respect to the target (dashed line)

successfully. On the other hand, states like Punjab, Bihar, Uttar Pradesh, Tamil Nadu and West Bengal fell short of the target by a significant margin.

10.4.2 Vaccination Coverage by Gender Across States

In this subsection, we explore potential gender inequality in vaccination doses across selected states with respect to the required number of target doses for men and women. At the India level, there is hardly any gender difference in achieving the target of full vaccination as the relative gaps for adult males and adult females are 23.1 and 23.8, respectively. In Fig. 10.3, we show progress separately for men and women in selected states. For states like Punjab, Delhi, Uttar Pradesh, Gujarat, and Maharashtra, the required number of target doses are higher for men compared to women, possibly because of the lower sex ratio prevalent in the states. On the other hand, the target number of doses is higher for females in Kerala and Odisha. The

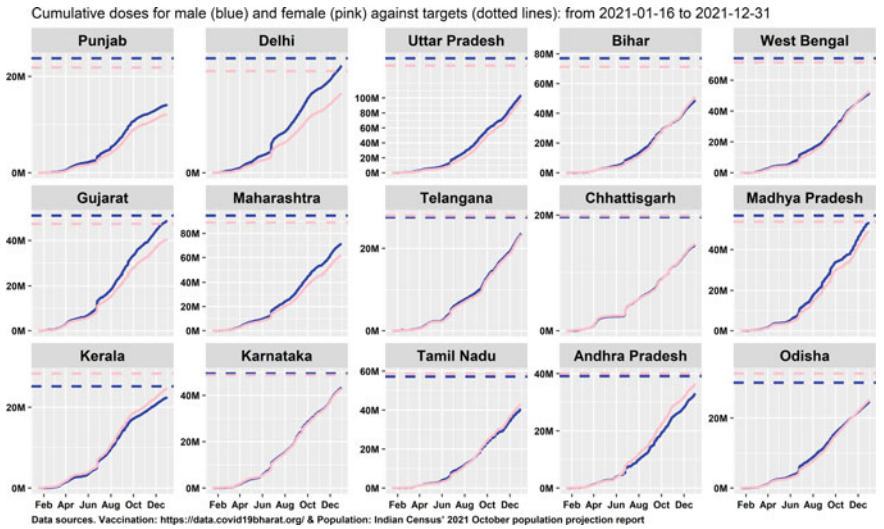

Fig. 10.3 Progress of vaccination drive for selected large states over time in 2021: Cumulative doses of vaccines administered to males (blue) and females (pink) from 16 January 2021 to 31 December 2021 with respect to targets (dashed lines)

relative gaps in achieving the target for males and females are similar for most of the selected states, with a few exceptions. For example, in states like Delhi (21.6% versus 6.4%), Gujarat (14.3% versus 4.5%) and Maharashtra (30.2% versus 24.4%) relative gaps are significantly higher for females. In some states, relative gaps are higher for males such as Andhra Pradesh (15.4% versus 9%), West Bengal (30.3% versus 25.7%), and Bihar (36.4% versus 28.2%). In Punjab, the relative gap in achieving the target by 31 December 2021 is the highest for both males and females.

10.4.3 Compliance in Receiving Two Doses of Vaccine

Earlier in Sect. 10.2, we have seen evidences around the world that full vaccination provides better protection against COVID-19. In Figure 10.4, we present the percentage of adults who received at least one dose of the vaccine and the full vaccination coverage over 12 months of 2021. Naturally, the gap between coverage of at least one dose and two doses decreases with time, particularly in the last two months of November and December. At the end of October 2021, full vaccination coverage was the lowest in Uttar Pradesh (22%), Bihar (24.8%), Punjab (27.3%), West Bengal (29.6%) and Tamil Nadu (30.4%). The gap between coverage of at least one dose and two doses was the highest in Madhya Pradesh (52.5%), West Bengal (47.5%), Telangana (45.7%), Odisha (45.1%), Uttar Pradesh (44.2%). However, after two months, the full vaccination coverage has improved significantly in Madhya Pradesh. The

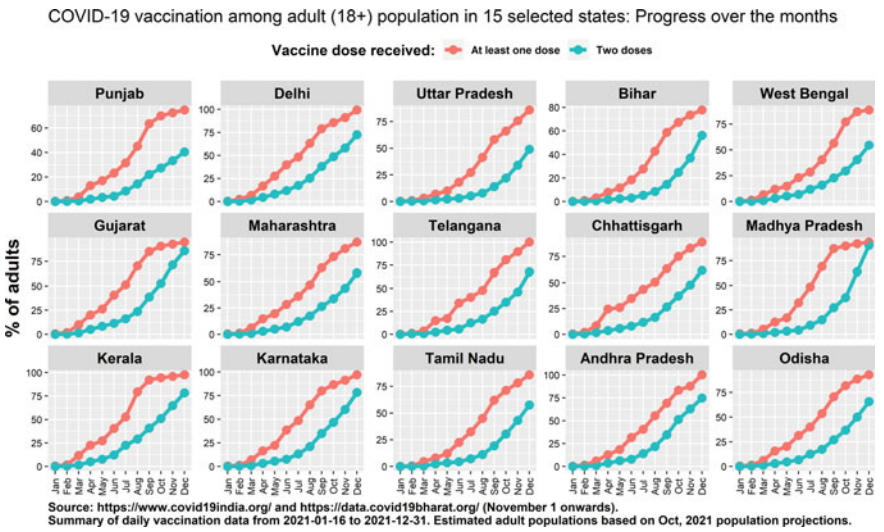

Fig. 10.4 Percentage of adults receiving at least one dose of vaccine and two doses of the vaccine: Progress over months for selected states

gap between coverage of at least one dose and two doses decreased from 52.5% in October to 3.2% in December in MP, better than any other state in the country (Fig. 10.4).

10.5 Potential Bottlenecks

In this section, we present evidence on potential bottlenecks and barriers to vaccination coverage such as vaccine hesitancy and supply shortages. We also examine the role of parental or intra-household influences on the decision to get vaccinated.

It is widely acknowledged that both supply-side and demand-side factors contribute to less than optimal vaccination coverage. Among supply-side factors, fast and smooth cross border movement of vaccines and related supplies are essential, insufficient number of vaccination sites can lead to concerns of long travel, wage loss, and crowding among the beneficiaries, and lack of adequately trained staff could be a hindrance to the optimal number of vaccination sites, digital registration system might be a hindrance to equitable coverage. Among demand-side factors, vaccine hesitancy is known to be a key bottleneck towards maintaining a high level of coverage at crucial time points during the pandemic. Vaccine hesitancy can be loosely defined as unwillingness of people in getting vaccinated even with the availability of free vaccines and no supply-side issues.

10.5.1 Vaccine Hesitancy

During the initial phase of the planning and implementation of the vaccination drive, most dialogues and public discussions were centered around the supply-side constraints that the government was anticipating. To smooth out the massive drive of vaccinating a large population, the Health Ministry tried to ensure that all logistical arrangements are in place. Examples include, ramping up of vaccine storage facilities, developing the CoWIN web portal and mobile application for registration, conducting trainings of vaccinators, and undertaking dry runs of vaccination activities in states. However, insufficient attention was given to the demand-side hurdles such as vaccine hesitancy (Chowdhury et al., 2021).

Using data from COVID-19 Trends and Impact Survey (CTIS) from India, we present temporal trends in vaccine hesitancy in unvaccinated adults during the time period 21 December 2020 to 3 September 2021 (Fig. 10.5). CTIS was conducted by Carnegie Mellon University in the United States and University of Maryland (UMD) in other parts of the world using Facebook active user base aged 18 years and above as the sampling frame (Barkay et al., 2020; Kreuter et al., 2020). CTIS is the largest public health survey till date which was conducted daily in the form of web survey since April 2020 in more than 200 countries or territories globally. The survey estimates have been used widely in research and to formulate public health policy (Adjodah et al. 2021; Babalola et al., 2021; Chowdhury et al., 2021; Salomon et al., 2021; Sukumaran et al., 2020).

Figure 10.5 suggests that during the crucial phase of the vaccination drive, when most people were unvaccinated, the level of hesitancy was alarmingly high in some

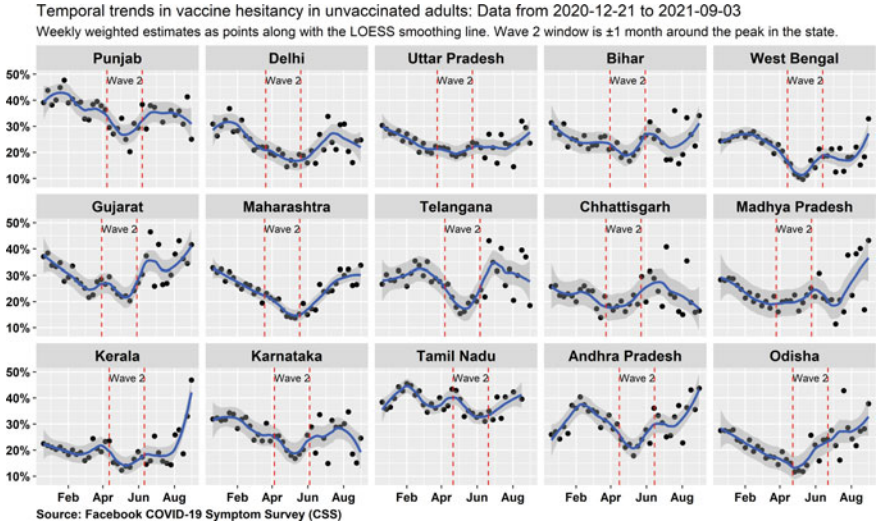

Fig. 10.5 Vaccine hesitancy among unvaccinated population: weighted estimates from the COVID-19 Trends and Impact Survey (CTIS)

states such as Tamil Nadu and Punjab. It was consistently low in states like Kerala and Odisha. In almost all states, vaccine hesitancy started to decline during the fierce wave 2. Lower vaccination coverage in Punjab and Tamil Nadu, as discussed in Sect. 10.4, can be attributed to the high level of vaccine hesitancy. Further exploration of CTIS data reveals three key responses behind hesitancy as: (1) Concerns of vaccine safety, (2) Other people need it more than I do right now, and (3) Concerns of side effects (Chowdhury et al., 2021). For the definite hesitant group, who were certain about not taking COVID-19 vaccines at the time of the survey, mentioned reasons like lack of trust in the government and not perceiving the need for vaccination as they either plan to follow other COVID-appropriate behaviors or do not have much interaction with high-risk people.

10.5.2 Supply Shortage and State Allocation

Before all adults became eligible for vaccination starting 1 May 2021, it was expected that in the months of April and May the domestic manufacturers would be able to increase their production to match the high demand. However, both Serum Institute and Bharat Biotech struggled to ramp up production due to financial constraints and United States' restrictions on the export of raw materials needed for vaccine production (Pandey et al., 2021).

There seems to be a lack of clarity in the criteria for allocation of vaccine doses from the center to the states and UTs. The criteria perhaps kept revising depending on the evolving nature of the pandemic. One source suggests that the allocation was based on infection rate, speed of vaccination and extent of wastage of vaccines (Purohit et al., 2022). Another press release from the government claims that the allocation is decided on the vaccine consumption pattern, population and vaccine wastage (PIB MoHFW, 2021a), and it ignores the infection rate. State-level vaccine supply data from center to the states are not readily available in the public domain, except for a couple of data points as on 14 April 2021 and 11 May 2021. Various media reports suggest that some states, such as Maharashtra and Delhi, complained to Union health minister about the vaccine shortage hampering their inoculation drive. Researchers from the International Institute for Population Sciences (IIPS) worked out an integrated formula that uses six predictors covering three dimensions: demography, severity of the current wave, and vulnerability to infection (Singh & Mishra, 2021). They have compared the allocation based on their formula with the actual allocation in the month of April 2021 and found that the vaccine allocation is unfair to some states, including Delhi and Maharashtra. However, it is to be noted that their formula does not penalize states for unused vaccines and vaccine wastage.

10.5.3 Do Household Heads Influence the Vaccination Choice of Household Members?

Vaccination is widely understood and perceived to be an individual choice (Dubé et al., 2013; Yaqub et al., 2014). The role of social norms and peer pressures interacting with individual choice in leading to one's decision to vaccinate or not is also widely studied (Cerda & García, 2021; Korn et al., 2020). However, relatively less efforts have gone into examining the role of family structures and family functioning in influencing the individual's decision to vaccinate or not. It is certainly true and well established that parental attitudes towards vaccination are vitally important in the case of children's vaccination as parental consent is a requirement in almost all countries (Karafillakis et al., 2021; Lee et al., 2017; Lin et al., 2021).

Using data from a panel study in 4 states of the Delhi National Capital Region (Delhi-NCR), we look into the role of household heads in influencing the vaccination outcomes of adult family members in the context of COVID-19 vaccinations. The endline round of data collection for the Delhi Metropolitan Area Study (DMAS) covered 4,292 households and 22,684 members which amount to an average household size of 5.3 (NCAER NDIC 2022b). During the survey time period between August to November 2021, vaccination was only open to adults 18 years or older. Our analytic sample therefore consists of 15,250 eligible adult members.

In Fig. 10.6, we present the univariate distribution of vaccinated adults out of the eligible members in the household. The bimodal distribution highlights the stark differences in households with about 50% of the households completely vaccinated and more than 10% of the households not having any adult of the household vaccinated. This suggests that there might be some factors which are common to the households in their decision to get vaccinated or not.

As household heads are the dominant decision makers in the household, we hypothesize that the vaccination status of household head has a significant effect

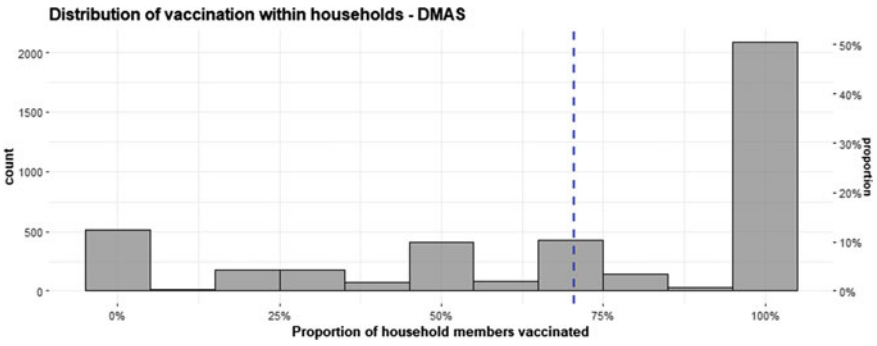

Fig. 10.6 Overall distribution of proportion of vaccinated members in the households from Delhi NCR: Delhi metropolitan area study endline survey (August−November 2021)

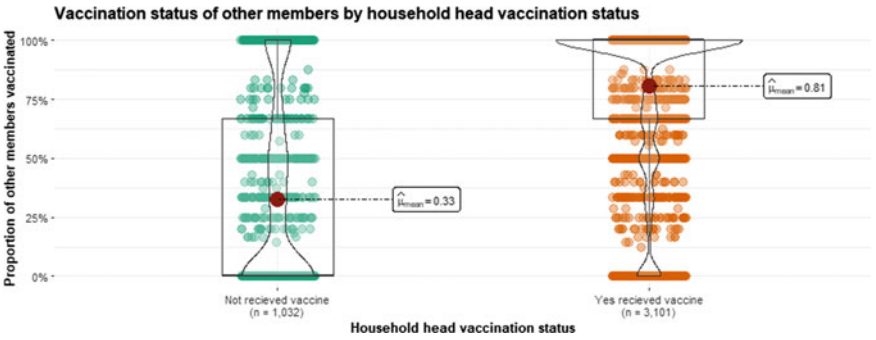

Fig. 10.7 Vaccination status of other household members by vaccination status of head of household: Delhi Metropolitan area study endline survey (August−November 2021)

on the vaccination status of their family members. Figure 10.7 presents the distribution of proportion of other household members in the household by vaccination status of household heads. Households with head of the household vaccinated have about 81% of other adult members vaccinated and where the household head is not vaccinated, only 33% of other members are vaccinated. The clustering of points at zero proportion and head of the household not having received vaccine potentially indicates factors which are common to a household as a whole in getting themselves vaccinated or otherwise. The findings suggest that vaccination is not just an individual decision but a family decision and targeted efforts to promote vaccination rates should take it into consideration.

10.6 Conclusion

The burden of COVID-19 cases and deaths was high in India. An effective rollout of vaccinations against COVID-19 was thought by the policy makers as the most promising prospect of relaxing COVID-related restrictions, getting back to normalcy and perhaps bringing an end to the pandemic. Real-life studies on vaccine effectiveness from different parts of the world suggest that two doses of vaccination is effective in preventing SARS-CoV-2 infections and COVID-19 hospitalizations and deaths.

Leveraging its existing childhood vaccination infrastructure and the domestic manufacturing of COVID-19 vaccines, India was able to vaccinate majority of its adult population by 31 December 2021. An estimated 89.5% of its adult population received at least one dose of vaccine and 64.1% were fully vaccinated. In terms of achieving the target of full vaccination of all adults by 31 December 2021, India fell short by 23.2% with respect to its target number of doses at the national level. There were wide spatio-temporal variations in coverage of at least one dose and full vaccination. Significant gender inequality in coverage was not observed, except in

few states such as Delhi, Gujarat and Maharashtra, where relative gaps in achieving the target for adult females were significantly higher than that of adult males.

The pace of vaccination in India varied significantly during the months of 2021. It has been particularly sluggish during the initial phase. Out of 30 million health care and frontline workers prioritized for the first phase, about 11.1 million received their first dose and only 2.46 million were fully vaccinated before the start of the second phase on March 1 (Pandey et al., 2021). By the end of February 2021, only four states (Gujarat, Rajasthan, Chhattisgarh and Uttarakhand) were able to vaccinate at least half of those eligible with the first dose. Less than 20% of eligible individuals received the first dose in some states, including Punjab and Tamil Nadu where vaccine hesitancy was quite high. Later when the vaccination drive was opened up for the general public, then also it failed to pick up the expected speed due to shortages of vaccines. Revision in dose schedule of Covishield vaccine on 13 May 2021 helped overcoming the supply shortage of vaccines and also resulted in wider coverage of the population with at least one dose.

The key reasons behind the slow pace of vaccination during the initial phases include vaccine hesitancy and exclusive reliance on a digital portal. In the period before the vaccine was rolled out, most dialogues and public discussions were centered around the supply-side constraints that the government was expected to face. Addressing vaccine hesitancy did not seem to be the priority. Although COVID-19 vaccine operational guidelines did touch upon the communication and social mobilization strategy to address vaccine hesitancy and eagerness (MoHFW, 2020), it failed to gauge the extent of the problem as has been highlighted in multiple studies (Chowdhury et al. 2021; Danabal et al., 2021; Pandey et al., 2021; Pramanik & Desai, 2021; Shashidhara et al., 2022; Tolia et al., 2022).

Vaccine safety and concerns of side effects seem to be the most significant reasons behind hesitancy. In many small qualitative studies conducted in 2021, respondents shared stories of vaccinated individuals suffering with severe side effects and also cases of fatalities within their community (Jain & Gantayat, 2021; Pramanik et al., 2022; Tolia et al., 2022). Though it is hard to establish causality between the incidents reported by the respondents and the event of vaccination, it is quite insensitive to label them under the category of misinformation without proper investigation. Hesitancy could have been dealt with effective communication and transparency starting from the beginning. Most of our communication strategies tend to leverage credible voices in the quest to address vaccine hesitancy. In addition to that, to eliminate concerns of vaccine safety and side effects, adverse event following immunization (AEFI) data and the follow-up investigation findings could have been disseminated more widely. This approach has the potential to counter the small sample bias problem that qualitative studies often suffer from. Building a robust system of AEFI surveillance, transparency in reporting, and timely investigation can help in building trust and increase vaccine acceptance.

Vaccine hesitancy started to decline during the fierce wave 2 in almost all states suggesting that the severity of the disease and the perception of risk have a direct association with vaccine acceptance. Parental or intra-household influences on the

decision to get vaccinated, which are known to be important in the context of childhood vaccination, turned out to be key determinants in the case of adult COVID-19 vaccination as well.

The COVID-19 vaccination rollout was initially restricted to self-registration on the CoWIN web portal or mobile application. This suggests that only households having access to smartphones or laptops were likely to be vaccinated as it was much easier for them to book appointment for vaccination in the CoWIN app. The impact of digital divide on vaccination status started to diminish towards the later part of 2021 through introduction of more walk-in vaccination centers, near to home temporary vaccination centers in non-health facility based settings, on-site registration, and vaccination at government and private work places. The above-mentioned initiatives by the Ministry of Health and Family Welfare might have been prioritized after the Supreme Court ruling on 2 June 2021 which criticized the vaccination policy for relying exclusively on a digital portal for vaccinating the adult population and warned that the existing policy might fail to achieve universal immunization owing to a digital divide in the country's infrastructure (Sharma, 2021).

India's COVID vaccination drive leveraged its existing childhood vaccination infrastructure which includes a large number of trained public health and community health workers such as auxiliary nurse midwives (ANMs), accredited social health activists (ASHAs), and Anganwadi workers (AWWs), a comprehensive network of vaccine cold chains, digital vaccine supply chain system, among others. This rerouting of health resources for COVID vaccination might have had an adverse impact on routine healthcare that needs to be studied in various contexts. Otherwise, the success story of India's COVID-19 vaccination drive would be incomplete.

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Chapter 11
COVID-19 Vaccination Status and Hesitancy: Survey Evidence from Rural India

Sneha Shashidhara, Sharon Barnhardt, and Shagata Mukherjee

Abstract While vaccine hesitancy has been a large part of the COVID-19 vaccination discourse in India, there is a significant lack of empirical evidence about hesitancy in rural India. To bridge this gap, we conducted a quasi-representative, in-person survey spanning 32 districts across rural Uttar Pradesh and Bihar in India to comprehensively characterize the barriers to vaccination and understand the attitudes towards the COVID-19 vaccine. We surveyed 6319 adults during April and May of 2022, of which 36% were unvaccinated, 33% were partially vaccinated, and 31% were fully vaccinated. Overall, there was a high intention to get vaccinated among the unvaccinated, with only 20% saying they would never get a vaccine for COVID. We use probit models to estimate the relationships between demographic variables and being vaccinated and the associations between stated barriers and vaccination status. The primary barriers were pregnancy and breastfeeding, and pre-existing medical conditions. The unvaccinated had lower vaccine-related knowledge, more misinformation, and less vaccine-related trust in medical professionals but assigned similar importance to COVID-appropriate behaviors. We also establish a high intention to vaccinate children against COVID, although it varies among adult vaccination statuses, with unvaccinated parents being the least willing to vaccinate their children.

Keyword Vaccine hesitancy · Rural India · COVID · Maternal health · Behavior science

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11.1 Introduction

A fair amount of anecdotal evidence suggests that hesitancy to take a COVID-19 vaccine has been a problem in India (Mashal & Kumar, 2021; Mishra, 2021; Singh, 2021; Sinha, 2021). However, there is surprisingly little quantitative evidence on the level of hesitancy and, more importantly, the beliefs and barriers behind the hesitancy, especially in rural areas. Large online surveys sampling from multiple states in India (IANS, 2021; Jain, 2021; Local Circles, 2021; Mukherjee et al., 2022; Tagat et al., 2022) have focused on getting rapid measurements of hesitancy levels. They ask respondents to select from non-exhaustive lists of possible reasons for vaccine hesitancy (barriers) and do not solicit or report adequate demographic information about respondents. Facebook has been deploying surveys in association with the University of Maryland and Carnegie Mellon University since December 2020, measuring various COVID-19-related outcomes, including symptoms, behavior, vaccine attitudes and uptake. Analysis of the urban samples from India finds seven types of hesitant individuals, or "personas," ranging from "Afraid (but willing)," those who are more concerned with side effects to "Anti-vaxxers" who do not believe the vaccine works (Daral & Shashidhara, 2022).

While the Facebook data collection exercise is relatively concise in investigating barriers and attitudes, its sampling frame consists exclusively of its users. UNDP (2019) finds that Facebook is primarily an urban-male-youth phenomenon in India, casting doubt over how well such surveys could represent attitudes of marginalized persons (e.g., women, low-income groups, senior citizens) in rural India, who have had historically lower rates of access to the internet and technology. As online studies do not represent individuals without access to smartphones or the internet, they are less than ideal for making policy recommendations that affect the broader population. A study comparing COVID-19 vaccine attitudes of rural and urban communities in Tamil Nadu found much higher mistrust in health systems and COVID vaccines in rural populations than in urban populations (Danabal et al., 2021). They conducted in-person interviews, used a random sampling method and highlighted the need for such studies in rural India.

This paper presents results from a large-scale in-person survey in rural Uttar Pradesh and Bihar in India conducted in early 2022. We measured both demand and supply-side barriers critical to vaccination, knowledge, and attitudes about COVID-19 and its vaccination. We also investigated problems faced by partially vaccinated people preventing them from getting the second dose of the vaccine and attitudes towards vaccinating children against COVID-19 of both vaccinated and unvaccinated parents.

11.1.1 What is Vaccine Hesitancy

At the peak of the recent COVID-19 pandemic, it became clear that vaccines would be one of the most efficient ways to limit the spread of the disease. The government, pharmaceutical companies, and academic experts from several countries came together to develop efficacious and clinically safe vaccines against COVID-19. However, their efforts were met with a resistant faction of people who stood against the vaccine and hindered the vaccine rollout's efficient attainment (Nath et al., 2021). An increasing number of people have begun to question vaccines in general, seeking alternative vaccination schedules and sometimes delaying or outright refusing vaccination owing to the rapid global sharing of public concerns and uncertainty around vaccines (Larson et al., 2014).

These tendencies have been grouped together in recent years under the umbrella term of *vaccine hesitancy,* which refers to delayed acceptance or refusal of vaccines despite the availability of vaccination services (Dubé et al., 2014). Vaccine-hesitant individuals have been defined as a heterogeneous group in the middle of a continuum ranging from *total acceptors* to *complete refusers*. *Hesitant* individuals may refuse some vaccines but agree to others, delay vaccines, or accept vaccines but are unsure about doing so (Larson et al., 2014). However, vaccine hesitancy has not been consistently defined and thus can be subjectively interpreted based on context, time, place, and other factors.

11.1.2 Determinants of Vaccine Hesitancy and Vaccine Uptake Intention

The *5C Model* of psychological antecedents to measure vaccine hesitancy comprises confidence, complacency, constraints, calculation, and collective responsibility (Betsch et al., 2018). Confidence in a vaccine's safety and a sense of collective responsibility positively impact COVID vaccination intentions, but calculating the costs and benefits regarding vaccines and the constraints faced both reduce uptake (Nath et al., 2021). Complacency does not seem to have an effect. Hossain et al., 2021 showed that the theory of planned behavior model better explained norms and attitudes towards the COVID vaccine than the 5C model. We include elements of both frameworks as questions in our survey.

More specific to low and middle-income countries, *vaccine uptake intention* (VUI) has always been a challenge due to supply-side determinants such as financial and technical constraints and accessibility issues (Moola et al., 2021). These are aggravated by demand-side barriers such as individual risk perceptions and motivation plus demographic characteristics (Bono et al., 2021).

Associations between COVID-19 vaccine hesitancy, gender, socioeconomic status, and level of education have been found across multiple studies in India, Bangladesh, and Nigeria (Bono et al., 2021, Lazarus et al., 2021, Lim et al., 2021,

Moola et al., 2021). Recent findings from India suggest that hesitancy is high among the younger cohort, female respondents, those with lower educational levels, and those from low-income families (Umakanthan et al., 2021; Mukherjee et al., 2022). Some of the concerns surrounding women's vaccination could be regarding vaccine safety and infection risk, especially for pregnant and lactating women (Kumari et al., 2022).

Many of these anticipated risks have been brought about through suboptimal science communication, lack of public engagement, and inadequate trust that governments will act in the best interests of public health and safety based on sound scientific evidence (Bhopal & Nielsen, 2020). Vaccine Uptake Intention has been positively associated with trust in government-sourced information (Nath et al., 2021). A multi-nation study across six Asian and African countries, including India showed a strong correlation between conspiracy beliefs and hesitancy (Salman et al., 2022). Mukherjee et al. (2022) find lower vaccination among people with lower perceptions of COVID vaccine effectiveness in India.

Therefore, one way to gain confidence for improved VUI could be to maintain transparent communication on how vaccines are developed, how they work, their effectiveness, and safety. However, with open internet and social media access, it can be difficult to moderate the inflow of misinformation, incomplete information, and even conspiracy theories that abound in people's conversations about vaccines. Additionally, receiving information from relatives or any other informal or unverified sources has also led to significant misconceptions and fears about vaccination safety (Moola et al., 2021). This finding makes vaccine misinformation an important line of inquiry in India and elsewhere.

11.2 Methods

11.2.1 Survey Instrument Design

In our survey, unvaccinated respondents were asked questions about their vaccination intention and anticipated and experienced barriers to vaccination.[1] We included two open-ended questions for the unvaccinated. First was the reason for not taking the vaccine, and second was what would convince them to take it. The surveyor read the question and requested the respondent to speak on the smartphone to record their response.

We also gave respondents a list of nine common barriers to COVID vaccination, drawn from the Facebook instrument, and asked respondents which barriers, if any, they faced. This list was presented to all respondents, including the fully vaccinated.

[1] Our project was pre-approved by the Institutional Review Board at Ashoka University.

Additionally, the instrument covered knowledge about the COVID vaccine, COVID-19-appropriate behavior, trust in various information sources, risk perceptions around the vaccine (specifically in the context of vulnerable populations), and demographics.

The survey was conducted in Hindi, and it lasted around 30 min. Participants were not incentivized in any manner.

11.2.2 Sampling and Data Collection

Our sample consisted of rural populations in Uttar Pradesh and Bihar. We selected the 50% of districts in each state with the highest rural population according to the 2011 Census, yielding 36 states in Uttar Pradesh and 19 in Bihar). From these, we selected the top ~ 60% of districts in Uttar Pradesh and Bihar, based on having the lowest percentage of the population that had at least one dose of the COVID-19 vaccine from the Co-WIN dashboard (Ministry of Health & Family Welfare, 2021). This process ensured we maximized the possibility of identifying rural unvaccinated people in large districts. The final list of 20 UP districts and 12 Bihar districts surveyed is shown in the appendix (Table A1).

Within each sampled district, we randomly selected eight villages for data collection and an additional five villages as a buffer. We ensured that a nearly equal number of unvaccinated, partially vaccinated (people with one dose of the vaccine), and fully vaccinated adults were selected for the survey in each village by setting a target of approximately four men and four women from each vaccination status category in each village. Given that the survey topic was the reasons behind vaccine hesitancy, we intentionally oversampled the unvaccinated. They already accounted for less than one-third of the population at the time of the survey.

Enumerators started at one end of the village and visited every alternate house. They requested to speak to the male head of the household in one house and the female head in the next and continue alternatively to maintain gender balance in the sample. Only participants above the age of 18 years were surveyed. They continued until reaching their target for the village.

Enumerators from the NYAS research agency were hired to administer in-person surveys on the licensed Survey CTO offline app. Surveys were conducted door-to-door by these trained enumerators and collected digitally on a mobile phone application. All enumerators tested the full instrument by collecting complete pilot surveys. This was to ensure the survey was programmed without error, enumerators were well-trained, and to surface any concerns in the field before starting the proper survey.

To ensure the quality of the data, we conducted backcheck interviews. Ten percent of participants across enumerators were chosen for an additional short survey. A separate enumerator conducted these surveys via a phone call one to three weeks after the primary survey. It included questions about vaccination status, intention,

knowledge, and demographics. All analysis, including data checks, were conducted using custom-made MATLAB (The MathWorks, Inc) and R (R Core Team, 2014) scripts.

11.3 Sample Demographics

In this COVID vaccination hesitancy study in rural UP and Bihar, we conducted a total of 6319 surveys, of which 2288 people were unvaccinated (36%), 2042 were vaccinated once (33%), and 1989 were vaccinated twice (31%).[2] These do not reflect population percentages as we oversampled unvaccinated individuals. Only completed surveys were used for analysis, and no participants with partial surveys were re-contacted to resume the survey.

Our sampling strategy successfully reached a new demographic not often covered in COVID vaccination hesitancy surveys. Over half are women, and roughly 30% belong to scheduled castes. Twenty percent have not completed education beyond primary school, and only 26% are Facebook users.

Respondents' ages ranged from 18–100 years, with a mean age of 35 (SD = 16.76). Most participants were Hindus, and only 14.7% belonged to the general (upper) caste category. Approximately 36% of respondents were not employed. All demographic characteristics are presented by vaccination status in Table 11.1.

11.4 Results

11.4.1 Associations Between Demographics and Vaccination Status

Our first question of interest is whether demographic factors such as age and wealth are associated with the likelihood of taking a COVID vaccine. Table 11.1 presents the means of these variables by vaccine status.

We use a probit regression to estimate the relationship between demographic (independent) variables and whether or not an individual is vaccinated (at all) as our dependent variable (see Table 11.2 for full results).

We find many significant associations between demographic characteristics and vaccination status. Hindus are 1.25 times ($p < 0.01$) more likely to be vaccinated

[2] We intended to recruit 6,000 participants for the study, allowing us to calculate sample estimates of vaccine hesitancy for the ~ 247 million rural population of UP and Bihar with a 99% confidence interval and margin of error of about 1.7%. While we planned a representative survey of rural UP, due to the incredible success of the Indian vaccination program, by March 2022, a considerable proportion of the population was already vaccinated. Thus, we changed our design to oversample the unvaccinated to understand their reasons for not vaccinating.

Table 11.1 Sample demographics by vaccination status

Number of vaccine doses	0 (Unvaccinated)	1 (Partially)	2 (Fully)
Total completed surveys	2288	2042	1989
% Women	63.2	52.1	43.5
Mean age	36	32	38
% Hindu	82.4	86.5	88.6
% General caste	14.1	13.2	16.8
% OBC	43.3	41.6	43.1
% Scheduled caste	30.9	31.8	28
% Primary education or lower	20.4	19.5	16.9
Monthly HH income INR: Less than 5 k	30.6	27.6	28.5
Household members	6.8	6.48	6.4
% Not working	43.4	38	26.8
% Married	84.3	76	81.8
% Have children between 15–18 years	12.1	14.5	28.7
% Support the central government	81.8	83.1	87.6
% Households with a toilet	61.1	58.7	67.7
% Households with a groundwater source	64.2	65.2	64
% Tobacco, alcohol or paan users	75.7	70.5	68.6
% Hospital access less than 20 min	26.4	29.5	30.2
% Facebook users	19.3	29.4	30.1
% Whatsapp users	33.3	44	44
% With a pre-existing medical condition	34.3	15.6	14.8
% Pregnant or breastfeeding	31.1	18.3	5.8
% Has taken COVID Test	40.6	45.5	51.5

than other religious groups. People with education up to eighth, tenth, and twelfth grade and graduation are all more likely to be vaccinated compared to people with no schooling by a factor of 1.12 ($p < 0.05$), 1.16 ($p < 0.05$), 1.36 ($p < 0.01$), and 1.54 ($p < 0.01$) respectively.

Unemployed people, homemakers, migrant laborers, and those that report employment as "other" are less likely to be vaccinated by a factor of 1.93 ($p < 0.01$), 1.21 ($p < 0.01$), 1.12 ($p < 0.1$), 1.15 ($p < 0.1$) respectively compared to those working in the agricultural sector.

For every increase of one member in the household, vaccination is less likely by a factor of 1.02 ($p < 0.01$). People with a monthly household income of Rs.10,000 to 15,000 are 1.18 times ($p < 0.01$) more likely to be vaccinated, and those that do not report an income are 1.33 times ($p < 0.01$) less likely to be vaccinated compared to those that report having less than Rs.5,000 per month.

Individuals with a previously existing medical condition or those who are pregnant or breastfeeding are less likely to be vaccinated by a factor of 2.39 ($p < 0.01$). Married

Table 11.2 *Regression results: Outcome variable* "is vaccinated" (yes/no)

Factors	Odds ratio	Standard error
UP State	0.919*	–0.049
Hindu	1.246***	–0.055
Female	0.982	–0.054
Highest Education: Primary	1.06	–0.055
Highest Education: 8th Standard	1.123**	–0.059
Highest Education: 10th Standard	1.175**	–0.067
Highest Education: 12th Standard	1.361***	–0.072
Highest Education: Diploma, College or Higher	1.536***	–0.086
Highest Education: Other	0.776	–0.232
Support Central Gov	1.024	–0.05
Age	1	–0.002
HH Members	0.980***	–0.006
Consumes tobacco	0.982	–0.05
Is WhatsApp user	1.05	–0.044
Occupation: Self-Employed	1.021	–0.074
Occupation: Migrant Labor	0.896*	–0.061
Occupation: Service (Private or Gov)	0.935	–0.106
Occupation: Unemployed	0.518***	–0.11
Occupation: Student	1.158	–0.099
Occupation: Homemaker	0.825***	–0.063
Occupation: Other	0.868*	–0.076
HH Income INR: 5-10 k	1.005	–0.049
HH Income INR: 10-15 k	1.177***	–0.061
HH Income INR: > 15 k	1.01	–0.06
HH Income INR: Other	0.750***	–0.072
Have a comorbidity	0.418***	–0.048
Are breastfeeding or pregnant	0.418***	–0.058
Married	1.312***	–0.065
Have children of 15–18 years	1.408***	–0.053
Has taken a COVID test	1.416***	–0.038
Constant	1.481***	–0.143
Observations	5,902	
Log Likelihood	–3,189.09	
Akaike Inf. Crit	6,460.19	

Note * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ Not reporting these insignificant factors due to space: Reservation category OBC, EC, SC/ST or Other, HH has toilet, HH has piped water, HH has another water source. Hospital access 20–60 min, hospital access > 60 min. The full results are available on request

people are more likely to be vaccinated by a factor of 1.31 ($p < 0.01$) compared to unmarried and people with children between the ages of 15–18 years are 1.41 ($p < 0.01$) times more likely to be vaccinated against COVID.

11.4.2 Demand-Side Barriers to Vaccination Among the Unvaccinated

We now turn to our primary question of vaccination hesitancy. Twenty percent of unvaccinated individuals reported they would never take a COVID vaccine. However, among the unvaccinated, 58.2% said they tried to get the vaccine. Further, 67% said they would *definitely* take the vaccine, and 48% said they would get it *immediately* when asked about the timeframe.

Descriptive evidence from our open-ended question about reasons for not getting vaccinated paints a clear picture of the reasons for not being vaccinated. The two main barriers that came out were 33% saying they did not take the vaccine due to a health issue and 22% saying they were pregnant or breastfeeding (Fig. 11.1). Despite over 50% of the answers mentioning health, only 98 (4.3%) mention a doctor. Thus, many holdouts may be due to misinformation about eligibility rather than genuine medical complications.

ID-related issues are a significant supply-side barrier for 12% of unvaccinated individuals, as a valid government ID is required to get the vaccine across India. Interestingly, vaccine-related reasons, such as disliking the vaccine, not considering it necessary, and being afraid of it, are least reported at 2%. A complete set of the barriers is in the appendix (Table A2).

After answering open-ended questions, unvaccinated respondents indicated if each item from a list of nine common barriers applied to them. This list was taken from the University of Maryland's COVID-19 trends and impact survey in partnership with Facebook (Fan et al., 2020). The most common barriers picked by respondents were side effects, wanting to wait and watch before taking the vaccine, and that others needed it more; the least common one was religious beliefs. These barriers are more common in those who did not try to get the vaccine than those who did, except for cost concerns and religious reasons (Fig. 11.2).

11.4.3 Supply-Side Barriers to Vaccination Among the Unvaccinated

More than half of the unvaccinated reported trying to get the vaccine, indicating the likelihood that supply-side barriers persist despite real efforts to provide access to COVID vaccines in UP and Bihar. These people were asked about the problems they faced while trying to get vaccinated.

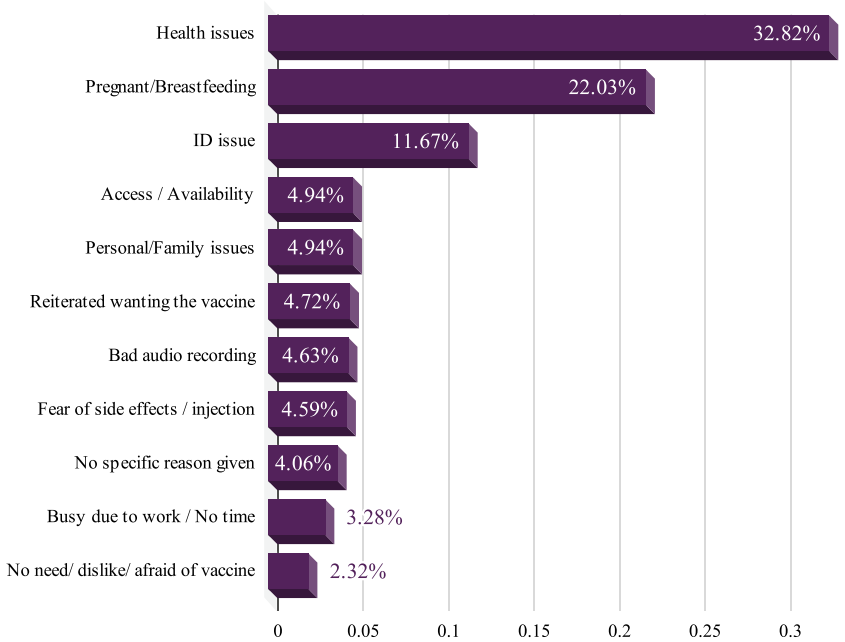

Fig. 11.1 The main reason for not taking the vaccine, reported by participants in an open-ended question (n = 2288 unvaccinated individuals)

While many did not explicitly report a problem, 23% said they were deemed ineligible for pregnancy or breastfeeding. Access and availability issues also surfaced, with 15% saying the vaccination center was far and 14% saying it ran out of vaccines when they went. Another 20% mentioned some administrative issues, be it the portal, ID, or health worker related.

11.4.4 Barriers Among the Partially and Fully Vaccinated

We surveyed 2042 partially vaccinated respondents, having taken only one dose of the COVID-19 vaccine, and 62.4% reported trying to get the second dose. We use this structure to investigate if either the partially or fully vaccinated differed from the unvaccinated in knowledge about the COVID-19 vaccine and attitudes toward it.

There is a gap of 10% points between the fraction eligible to take the second dose (82.9% had completed their waiting period) and the 73% who said they would take the vaccine immediately. Only 2% of these individuals said they would *never take* the next vaccine. Many partially vaccinated people who tried to take the second dose did not report a specific problem in getting a vaccination. Some did mention the vaccination center being far from home, running out of vaccines, and having too

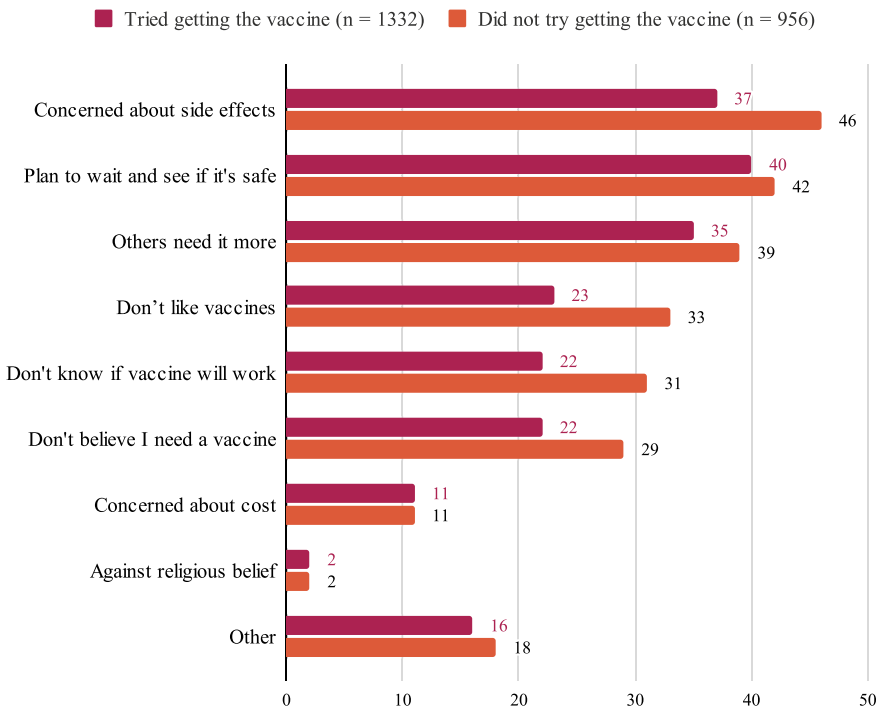

Fig. 11.2 Percentage of respondents who indicated a reason as contributing to their decision not to take the vaccine (n = 2288 unvaccinated individuals)

much work as potential issues. Generally, each possible issue was reported more by partially vaccinated than fully vaccinated (Figs. 11.3 and 11.4).

11.4.5 Drivers for Vaccination

We asked all partially and fully vaccinated respondents whether each of the 16 common reasons contributed to their decision to vaccinate (Fig. 11.4). There were several common answers: 91.5% said they were vaccinated to protect from COVID infection, 60.5% said because many people are taking the vaccine, 58.1% said due to societal responsibility, and 54.2% said there is no harm in taking the vaccine. The reason chosen by the least number of people was recommended by a national political leader (9%).

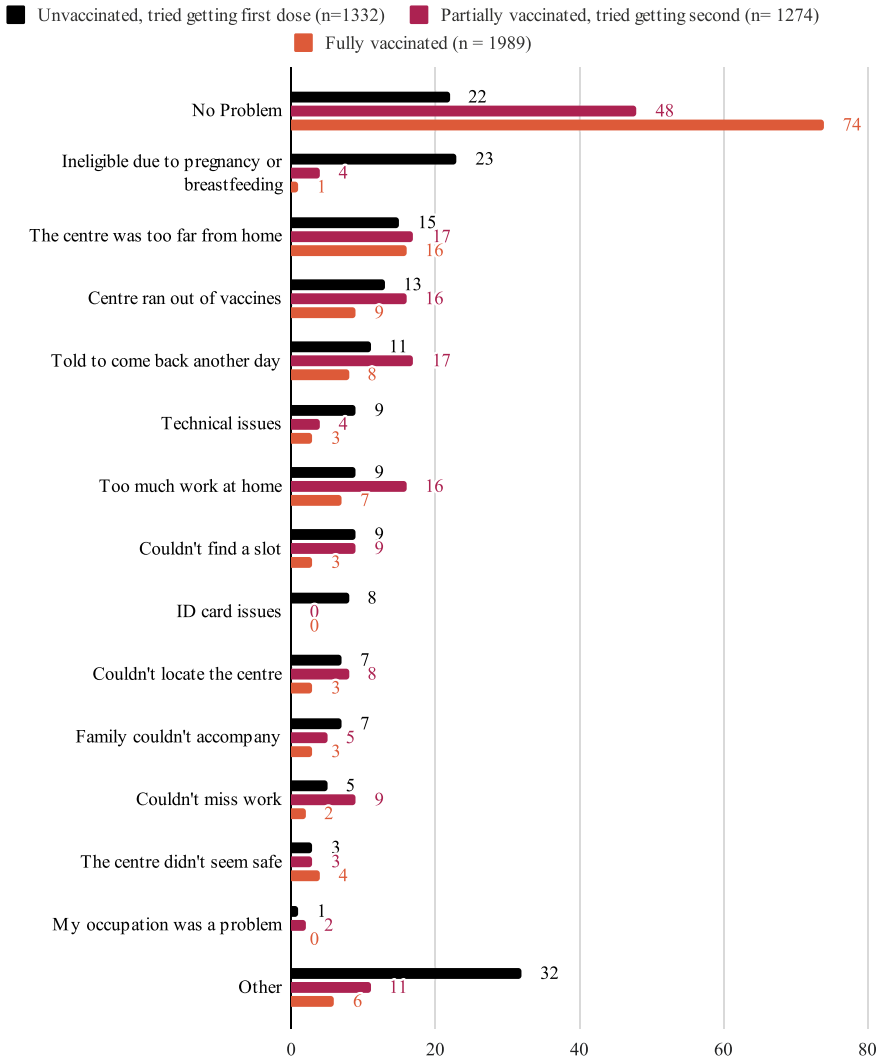

Fig. 11.3 Fraction reporting specific problem in the way of vaccination. Other includes: Doctor said no, health worker/administrative issues, the centre was too crowded

11.4.6 Knowledge and Attitudes Towards the COVID-19 Vaccine

We now address knowledge and attitudes and their relationships with vaccine status. Table 11.3 shows the raw proportions of individuals who reported the statement shown by vaccination status. Most people strongly agree with a national mandate for the COVID-19 vaccine (94.3% overall).

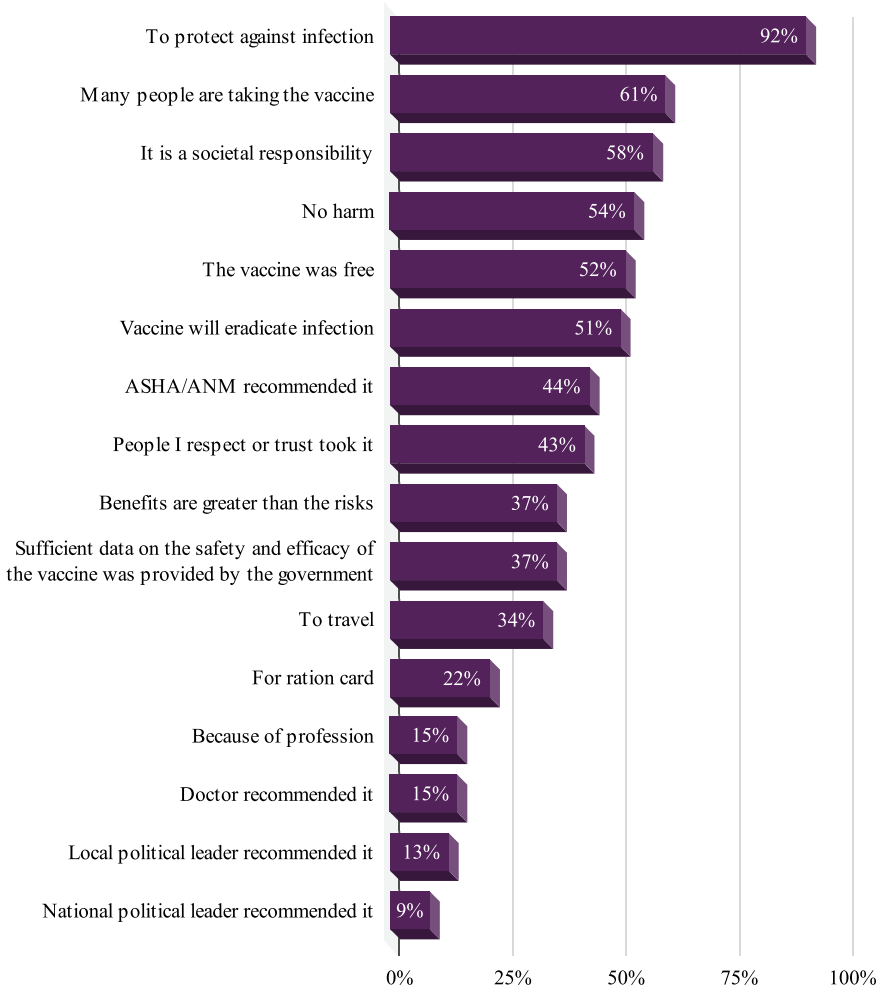

Fig. 11.4 Fraction reporting reasons for taking a COVID vaccine (all vaccinated, n = 4031)

We investigate if knowledge and attitudes are associated with vaccination status (unvaccinated, partially, or fully) controlling for demographic variables. In the probit regressions reported in Table 11.4, vaccination status is a categorical outcome.

The partially and fully vaccinated are 1.56 ($p < 0.01$) and 1.28 ($p < 0.01$) times more likely to agree strongly with a national mandate than the unvaccinated. The vaccinated are more likely to believe the vaccine prevents infection (1.21 ($p < 0.01$) and 1.20 ($p < 0.01$) for partially and fully vaccinated, respectively), and 1.11 ($p < 0.05$) and 1.15 ($p < 0.05$) times more likely to believe the vaccine prevents death. All groups are equally likely to think the vaccine prevents hospitalization.

Table 11.3 Knowledge and attitudes around COVID and the vaccine (proportions)

	Unvaccinated (%)	Partially (%)	Fully (%)
Strongly agree with a national mandate for COVID-19 vaccine	93	95	95
Vaccine protects from infection	91	94	94
Vaccine protects from hospitalization	86	87	86
Vaccine protects from death	82	85	86
Consider taking second dose on time absolutely essential	88	92	96
Definitely agree should wear masks even after getting the vaccine	64	70	74
Definitely agree children can get COVID-19	64	71	75
Recommend the vaccine to Pregnant women	60	66	67
Recommend the vaccine to Breastfeeding women	65	69	72
Recommend the vaccine to Diabetics	54	54	60
Recommend the vaccine to TB Patients	52	54	58
Recommend the vaccine to Cancer Patients	48	49	53
Avoid people all the time during the peak of the second wave	30	28	28
Social distancing is very effective in preventing infection	83	82	83
Wearing masks is very effective in preventing infection	91	91	91
Completely likely to vaccinate children	86	90	93
Strongly agree with a COVID-19 vaccine mandate for schools	93	95	95
Trust frontline health workers as a COVID-19 information source	93	94	95
Trust Indian scientists as a COVID-19 information source	91	94	95
Trust WHO as a COVID-19 information source	89	91	93
Trust government officials as a COVID-19 information source	93	95	96
Trust politicians as a COVID-19 information source	74	73	67
Trust journalists as a COVID-19 information source	84	85	83
Trust friends and family as a COVID-19 information source	94	94	94
Trust religious leaders as a COVID-19 information source	76	75	70

Table 11.4 Regression results: Knowledge and attitudes around COVID and the vaccine

Dependent variables Independent variables →	Partially	Fully
National mandate for COVID-19 vaccine	1.56*** (0.15)	1.28*** (0.16)
Vaccine protects from infection	1.22*** (0.07)	1.21*** (0.07)
Vaccine protects from hospitalization	$1.07^{n.s}$ (0.05)	$1.07^{n.s}$ (0.06)
Vaccine protects from death	1.11** (0.05)	1.15** (0.06)
Importance of taking second dose on time	0.94 (0.14)	1.83*** (0.17)
People should wear masks even after getting the vaccine	$1.09^{n.s}$ (0.07)	1.14* (0.08)
Children can get COVID-19	$1.09^{n.s}$ (0.08)	1.16* (0.08)
Recommend the vaccine to pregnant women	1.16*** (0.04)	1.11** (0.05)
Recommend the vaccine to breastfeeding women	1.12** (0.04)	1.12** (0.05)
Recommend the vaccine to diabetics	$1.01^{n.s}$ (0.04)	$1.05^{n.s}$ (0.05)
Recommend the vaccine to TB patients	$1.05^{n.s}$ (0.04)	1.11** (0.05)
Recommend the vaccine to cancer patients	$1.05^{n.s}$ (0.04)	$1.07^{n.s}$ (0.05)
Avoid people during the peak of the second wave	$0.96^{n.s}$ (0.06)	$0.89^{n.s}$ (0.07)
Social distancing is effective in preventing infection	$0.87^{n.s}$ (0.09)	$0.87^{n.s}$ (0.10)
Wearing masks is effective in preventing infection	$0.87^{n.s}$ (0.13)	$0.86^{n.s}$ (0.13)
Likely to vaccinate children	1.27** (0.11)	1.55*** (0.13)
Strongly agree with a COVID-19 vaccine mandate for schools	$1.17^{n.s}$ (0.15)	$1.15^{n.s}$ (0.17)
Trust frontline health workers as a COVID-19 information source	$1.08^{n.s}$ (0.07)	1.26*** (0.07)
Trust Indian scientists as a COVID-19 information source	$1.06^{n.s}$ (0.07)	1.25*** (0.08)
Trust WHO as a COVID-19 information source	$0.99^{n.s}$ (0.06)	$1.07^{n.s}$ (0.07)
Trust government officials as a COVID-19 information source	1.13* (0.07)	1.16* (0.08)

(continued)

Table 11.4 (continued)

Dependent variables Independent variables →	Partially	Fully
Trust politicians as a COVID-19 information source	1.00$^{n.s}$ (0.05)	0.91* (0.05)
Trust journalists as a COVID-19 information source	1.01$^{n.s}$ (0.05)	0.10$^{n.s}$ (0.06)
Trust friends and family as a COVID-19 information source	1.10$^{n.s}$ (0.07)	1.04$^{n.s}$ (0.07)
Trust religious leaders as a COVID-19 information source	0.99$^{n.s}$ (0.05)	0.92* (0.05)

$p < 0.1 = *$, $p < 0.05 = **$, $p < 0.01 = ***$

Figures reported are odds ratios from probit regressions. Controls include: age, gender, highest level of education, occupation, household income per month, number of members in the household, state, religion, reservation category, distance to the nearest medical center, whether the house has a toilet, the type of water source used by the household, whether the participant consumes paan, alcohol or tobacco, whether the participant is a WhatsApp user, whether they support the current central government, whether they have a pre-existing medical condition, whether they are married, whether they are currently pregnant or breastfeeding, whether they have children between the age of 15–18 years, and whether they have ever taken a COVID test

Fully vaccinated people are 1.79 times ($p < 0.01$) more likely than unvaccinated people to think taking a second dose on time is essential. Perhaps expectedly, partially vaccinated and unvaccinated people have similar importance ratings for taking the second dose on time. Fully vaccinated show less misinformation as they are 1.16 times ($p < 0.1$) more likely to know children can get COVID-19 and 1.15 times ($p < 0.1$) more likely to think people should wear masks after vaccination. There is no difference between the partially vaccinated and the unvaccinated.

Another measure of misinformation is to check if people would recommend the vaccine to pregnant women and people with comorbidities. The vaccinated are more likely to recommend the vaccine to pregnant women (Partially: 1.15 times ($p < 0.01$), Fully: 1.12 times ($p < 0.01$)) and breastfeeding women (Partially: 1.10 times ($p < 0.01$), Fully: 1.13 times ($p < 0.01$)). Fully vaccinated are 1.12 times ($p < 0.05$) more likely to recommend the vaccine to TB patients (no difference between partially vaccinated and unvaccinated). All groups were equally likely to recommend the vaccine to diabetics and cancer patients. None of the groups showed a difference in COVID-19 protective behavior regarding avoiding contact, wearing masks, and social distancing to prevent infection.

Vaccinated people are more likely to say they would vaccinate their children if a vaccine were available and approved than unvaccinated (Partially: 1.27 times ($p < 0.05$), Fully: 1.55 times ($p < 0.01$)). All groups are equally likely to support a vaccine mandate for schools.

Frontline health workers and Indian scientists are more trusted as COVID-19 sources by the completely vaccinated (1.25 ($p < 0.01$), and 1.23 ($p < 0.01$) times) than the unvaccinated. On the other hand, politicians and religious leaders were less likely to be trusted by completely vaccinated participants by a factor of 1.11 ($p < 0.05$) and 1.10 ($p < 0.1$), respectively. There is no difference between the partially vaccinated and the unvaccinated. Government officials were more trusted by the vaccinated (Partially: 1.14 ($p < 0.1$), Fully: 1.15 ($p < 0.1$)). All groups equally trust the WHO, journalists, and friends and family.

11.5 Discussion

Vaccine uptake is one of the most important frontiers of our efforts against the COVID-19 pandemic. Through our large-scale in-person survey around vaccine hesitancy in rural India, we probe the reasons for hesitancy and attitudes around adult and child vaccination. The survey was conducted in person to target the digitally marginalized populations not represented by online surveys. We succeeded in that, as only 19% of our unvaccinated users were Facebook users, and 33% were WhatsApp users.

Vaccine equity is an essential part of the COVID-19 discourse. In rural UP and Bihar, there are disparities between those who took the vaccine and those who did not, with employment, higher education, higher income, and the majority religion all predicting vaccination. Interestingly, caste is not a significant factor. Gender is also not significant but breastfeeding or being pregnant reduces the probability of vaccination. We see that vaccinated people have higher knowledge of the vaccine and are more likely to support a national or a school mandate. They also have higher intentions to vaccinate their children. While we see differences in knowledge, misinformation, the importance of the second dose, and child vaccination, COVID-19 protective behaviors of avoiding contact, social distancing, and mask-wearing are not different.

We also find that pre-existing medical conditions decrease the probability of vaccination. While some ($n = 54$) explicitly indicated not taking the vaccine due to the doctor's recommendation, most did not. This is in line with the literature citing previous health conditions as a barrier to vaccine uptake (Bono et al., 2021). Similarly, Abedin et al., 2021 found that people with chronic conditions, including diabetes, hypertension, and cancer were less likely to vaccinate than those without (difference in the mean acceptance rate of 8.7%). It is especially concerning that only 52–60% are willing to recommend the vaccine to people with diabetes and TB patients, both dangerous comorbidities for the infection (Tadolini et al., 2020; Lin et al., 2021). Low recommendations of the vaccine to vulnerable groups have been previously established in a large Indian web-based survey (Kumari et al., 2021). This has important policy implications for adult vaccination and child immunization. It could be perilous if people decide not to take the vaccine due to medical conditions without consulting a doctor, as many common illnesses are known to worsen the disease prognosis (CDC,

2022). Similarly, if a pre-existing health condition becomes a barrier to vaccination among children, then it will have serious repercussions as India is yet to reach complete coverage on even routine child immunization. Therefore, the government should proactively launch IEC (Information Education Communication) campaigns in local languages to nudge parents of children with pre-conditions not only for the COVID vaccine for children but also for routine immunization.

Another much-discussed topic is that of the information source or the messenger of COVID-19-related information. Interestingly we see that politicians and religious leaders are less trusted by the completely vaccinated, while health workers, scientists, and government officials are more trusted. National political leaders recommending the vaccine is also the least cited reason for the vaccinated to decide to take the vaccine. Thus, based on this finding, the policy recommendation will be to do vaccine uptake messaging through frontline health workers who are more trusted by the community than through local or national politicians.

Finally, our results suggest that the last few holdouts of the COVID-19 vaccine are better explained by mistakenly waiting to take the vaccine due to various health conditions fuelled by misinformation rather than disbelief in the COVID pandemic or the efficacy of the vaccine. In particular, misinformation about the vaccine's safety with pregnancy and breastfeeding and any pre-existing conditions are critical factors that systematically delay vaccinations and deny them to those that may need them the most. A large-scale survey of pregnant women in 16 countries, including India, as early as November 2020 found 52% of pregnant women indicated intent to vaccinate as opposed to 73% of non-pregnant women (Skjefte et al., 2021). In our survey, also only 60–70% of the respondents were willing to recommend the vaccine to pregnant women. It is also one of the most cited reasons in our open-ended audio questions, which we then classify as misinformation, as very few (4.3%) mention a doctor's recommendation or even consulting with one. This misinformation is also seen in frontline health workers and those administering vaccines as among unvaccinated people who tried getting vaccinated, 23% reported being deemed ineligible due to their pregnancy or breastfeeding. Therefore, the policy recommendation will be to do targeted messaging to pregnant women as The Ministry of Health in India discusses the possibility of premature birth due to COVID-19 infections (MoHFW, 2022). Thus, timely counseling and assuring pregnant and lactating women about the vaccine's safety will lead to closing the last-mile gap of complete COVID vaccination among the rural population of India.

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Appendix

See Tables A1 and A2

Table A1 Districts covered by survey

State	District
Bihar 12 districts	Araria
	Begusarai
	Bhojpur
	Jamui
	Khagaria
	Madhepura
	Madhubani
	Muzaffarpur
	Samastipur
	Sitamarhi
	Vaishali
	West Champaran
Uttar Pradesh 20 districts	Aligarh
	Badaun
	Bahraich
	Barabanki
	Bijnour
	Bulandshahr
	Deoria
	Fatehpur
	Gonda
	Hardoi
	Kushinagar
	Lakhimpur Kheri
	Maharajganj
	Moradabad
	Muzaffarnagar
	Raebareli
	Saharanpur
	Siddharthnagar
	Sitapur
	Sultanpur

Table A2 Barriers mentioned by unvaccinated in open-ended question recordings

Barrier	Number who mentioned
Pregnant/Breastfeeding	504
Long term health condition	330
Unwell (Temporary illness/fever/allergy)	269
ID issue	267
I want to get vaccine	108
Bad audio recording	106
Poor health (General/Old age/Weakness/no info)	102
Infant/Small child at home	100
No specific reason given	93
Fear of fever/side effects	89
Vaccine wasn't available	41
No time	40
I wasn't here when vaccination was happening	39
Busy with work	35
Afraid to vaccinate	32
Recent surgery/Major health episode/taking medication	31
Fear of injection	16
Disability/Immobile	10
Injury	9
No health worker visited the house to vaccinate	8
Center was crowded	7
Mentally disturbed/facing personal problems	7
No need: no benefit to vaccination	7
No need: Not interested	5
Problem getting to the center	4
Unaware that the vaccine was available	4
Child was unwell	3
Didn't find slots	3
Live alone	3
Refused to vaccinate at the center	3
Vaccine is harmful	3
Friend died from vaccine	2
My family/friends did not take the vaccine	2
Death in the family	1
Don't like the vaccine	1
Don't want the vaccine	1
Misinformation: mobile number is required for vaccination	1

(continued)

Table A2 (continued)

Barrier	Number who mentioned
No need: No COVID now	1
Vaccine causes COVID	1

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Chapter 12
Impact of COVID-19 on Agricultural Markets: Assessing the Roles of Commodity Characteristics, Disease Caseload, and Market Reforms

Deepak Varshney, Devesh Roy, and J. V. Meenakshi

Abstract This paper assesses the impact of the spread of COVID-19 and the lockdown on wholesale prices and quantities traded in agricultural markets. We compare whether these impacts differ across non-perishable (wheat) and perishable commodities (tomato and onions), and the extent to which any adverse impacts are mitigated by the adoption of a greater number of agricultural market reform measures. We use a granular data set comprising daily observations for three months from nearly 1000 markets across five states and use a double- and triple-difference estimation strategy. Expectedly, our results differ by type of commodity and period of analysis. While all prices spiked initially in April, they recovered relatively quickly, underscoring the importance of time duration for analysis. Wheat prices were anchored in large part by the minimum support price, while tomato prices were lower in some months. Supply constraints began easing in May with greater market arrivals perhaps reflecting distress sales. Market reform measures did help in insulating farmers from lower prices, but these effects are salient for the perishable goods, and not so much for wheat where the government remained the dominant market player. Taken together, these results point to considerable resilience in agricultural markets in dealing with the COVID-19 shock, buffered by adequate policy support.

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12.1 Introduction

There is no gainsaying the fact that in addition to its impact on public health, COVID-19 and the lockdown that was undertaken beginning in March 2020 in an attempt to contain its spread, have had a major economic impact that has affected all sectors of the economy. The agricultural sector and agricultural markets are no exception. Unlike many other countries, the agricultural sector in India accounts for 60% of all rural employment and is thus the single largest source of livelihoods.

Notwithstanding the fact that food comes under the ambit of essential commodities that in principle are exempt from movement restrictions, India's food markets have been significantly impacted by the spread of the novel coronavirus (and COVID-19 disease). The impact has manifested itself in the form of demand as well as supply shocks. The employment and income shocks that translated into an across-the-board demand compression have been further exacerbated by the closure of hotels, restaurants, and institutions (HRI). Also, consumers' buying behavior has changed, with greater online transactions and home-delivery services displacing in-person purchases and restaurant meals. Produce growers and distributors are being forced to shift supplies from food service outlets to retail channels. On the supply side, all across the value chain, there are labor and logistical constraints. All these factors have implications for the quantities of goods that arrive at the wholesale markets that feed retail outlets, and the prices at which trade occurs.

While these effects of the COVID-19 crisis are not unique to India (see for example, Chetty et al., 2020), they are likely magnified. This is because agricultural markets in India, unlike in more developed countries, are heavily dependent on cash transactions. Also, cash flow constraints are more salient in agricultural markets than in other sectors of the Indian economy. Partly as a consequence, throughout the value chain, growers, traders, and retailers accustomed to traditional methods of stocking and choosing suitable inventory management mechanisms, do not have built-in systems to deal with such disruption. Indeed, with COVID-19, they face shocks in both supply and demand of an order of magnitude never seen before in Indian markets, arguably exceeding that faced during the 2016 episode of demonetization.

Of particular concern is the primary commodity end of the value chain. For instance, a record wheat harvest was anticipated (Business Standard, February 18, 2020); and the lockdown coincided with peak harvest times. It is conceivable that the pandemic would affect the availability of labor for harvest, even though the return of urban migrants to their rural homes may have eased this constraint. COVID-19 and lockdowns could also affect the transport of grain and, as a consequence, prices

that farmers receive. Although the government responded with urgency in opening trade in agricultural commodities (these were the first set of exemptions to lockdown measures), this alone may not have been enough to provide sufficient cash in the system for agricultural markets to function.

It is in this context that we attempt to assess the impact of the spread of COVID-19 and the lockdown. We review the nature of changes in the functioning of agricultural markets and assess the net impact on (a) prices and (b) arrivals of commodities at wholesale markets. These impacts may be viewed as net consequences of behavioral responses from consumers, wholesalers, and retailers through to farmers. Farm incomes are by their very nature seasonal, and prices and quantities traded of commodities whose harvest times begin from late March are a key determinant of the liquidity of farmers, and how their livelihoods are being affected by the pandemic. Our focus is on impacts in the immediate months following the lockdown starting in March 2020.

We consider markets in five major wheat-producing states: Uttar Pradesh, Madhya Pradesh, Rajasthan, Punjab, and Haryana. We compare whether the short-term, immediate impact on prices of wheat (non-perishable, easier for farmers to store and tide over periods of depressed prices) differed from that on two perishable commodities, tomato and onion (absent cold storage, the limited ability of farmers to time sales). We also assess if states that had undertaken a greater degree of market reforms were better able to protect farmers from disruption. Additional details are provided below.

Our paper contributes to this literature in several ways. First, the analysis disaggregates the period of post-lockdown coverage to consider immediate (within a month) versus short-term (over three months till end June). As we see later, this matters to the analysis. Second, we consider a wider geography of nearly 1000 markets across five states with daily price observations for 91 days across 2 years, 2019 and 2020. Third, we use the spread of COVID-19 (using data on caseloads in each district), as distinct from the lockdown itself, to identify differential impacts. Fourth, we compare whether these effects differed across non-perishable and perishable crops. Fifth, we explicitly examine the role of government policy—specifically, procurement and agricultural market reforms—in mitigating any adverse impacts in terms of holding the markets. We focus in particular on the delisting of fruits and vegetables as part of the reform package. We believe this is the first attempt to quantify these effects and to focus both on procurement and agricultural market reform interventions.

We restrict our attention to three crops. As mentioned earlier, the wheat harvest was to take place during the lockdown, with over 107 million tons of harvest (up from 103.6 million tons from last year) potentially at stake. The five states included in this paper account for over 80% of the national cropped area in wheat. They together have over 44 million farmers. Apart from the non-perishable nature of wheat and its status as a principal cereal, there is another reason to focus on it. Except for Rajasthan and the eastern part of Uttar Pradesh, there is active government involvement in procurement operations—either by the Food Corporation of India or by decentralized systems at the state level.

The five states also account for a sizeable share of the acreage under cultivation of the two other crops, onion (20% of the national cropped area) and tomato (17%). These two vegetables rank second and third in terms of area under vegetable cultivation nationwide (potato has the highest area but a bulk of the harvest in these states was completed before the lockdown began). While tomatoes and onions are not subject to government procurement, we examine what impact, if any, agricultural market reforms in the form of deregulation, had on market outcomes.

In the empirical analysis, we first consider the COVID-19 caseload at market locations and its association with prices and quantities traded—the expectation is that market outcomes will be impacted more in areas with higher caseloads as people either voluntarily self-quarantine, or there are cases detected in the markets leading to temporary shutdowns, or because restrictions are enforced more stringently.

Next, we look at outcomes differentiated by the degree of regulatory reforms adopted by states. The first generation of agricultural market reforms was introduced in 2003 through a model Agriculture Produce Marketing Committee (APMC) act. More recently in 2017, an Agriculture Produce and Livestock Marketing Act (APLMA) was introduced with an aim to rebuild appropriate market infrastructure for the public and private sectors to benefit both farmers and consumers. As agriculture is a state subject in India, states could embark on and adopt various provisions of the APLMA to suit their local conditions with the driving spirit being the welfare of farmers.

Different states have adopted these reforms to varying degrees. A priori, locations in states with a greater implementation of market reforms should see at the margin lower variation in the form of collapse or volatility in outcomes. In principle, by expanding choices available to various participants in the value chain, the APLMA reforms should attenuate any crashes or spirals in quantities and prices in markets induced by the pandemic and lockdown, and also moderate the extent of changes in prices and market arrivals. In the case of fruits and vegetables, in most states, the earlier APMC act prohibited sales outside of notified market yards. In states where these commodities are now delisted from this regulation as recommended by the APLMA, farmers are free to choose to trade with anyone and at any place, including at the farm gate. Delisting also entailed doing away with market fees and intermediary agents' commission (even if the sale took place in a notified mandi). Mishra and Tilton, (2019) find that this deregulation played a role in reducing marketing margins, which was then transmitted as lower rates of retail food price increases.

Apart from short run impacts, there will be longer term consequences of COVID-19 that are likely to persist for not just the entire duration of the pandemic, but longer. This underscores the need to understand the success with which market reform policies can deal with shocks. As such, research on the impact of agricultural market reforms on farmer and market related outcomes in India is scant. Further, how the effects of shocks are differentiated across markets as a function of reforms remain unknown. This paper uses the COVID-19 shock to assess any differential outcomes across markets with different intensities of reform.

More generally, the exogenous COVID-19 shock and associated lockdowns provide a natural setting for assessing differences in impacts based on product,

market, and institutional characteristics in agricultural markets. We compare market outcomes in 2020 to the immediate past in 2019 in day-on-day (d-o-d) comparisons to isolate any market differences that are not in line with the normal drift.

To estimate the causal impact of the pandemic and lockdown, we employ a difference-in-difference (DID) estimation by assessing differential outcomes (the treatment effect) between high- and low-COVID caseload locations. In triple-difference estimation, we additionally invoke the extent to which states had adopted agricultural market reforms to see whether it made any difference to the impacts of COVID-19. The null hypotheses that we test are the following:

(i) Market outcomes in terms of prices and quantities transacted are no different in high- versus low-COVID caseload locations relative to 2019.
(ii) Prices and quantities were not impacted for a long time and recovered quickly.
(iii) Markets in states that implemented more agricultural market reforms did not experience impacts on prices and quantities any different than those in areas with lower tier of reforms.

Our salient results are: first, a spike in prices, wherever it occurred, was concentrated in first month of the lockdown. Prices fell subsequently, suggesting that markets responded relatively quickly. However, impacts were commodity specific. Wheat saw a trend reduction in prices, but it was no different from a similar period in the previous year, leading to a statistically insignificant differential impact. In large part, this was because of minimum support price (MSP) operations that served to anchor wholesale prices. Among perishable commodities, DID price effects were negative in May for tomato, and insignificant for onion. In contrast, market arrivals, especially of the two perishable goods, were significantly higher in districts with high caseloads, consistent with evidence of sales conducted to generate cash. That the magnitude of (positive) market arrival effects was much larger than that of the (negative) price effects is testimony to the resilience of agricultural markets.

Second, as far as agricultural market reforms are concerned, they did not seem to matter much to wheat prices: a mere one percentage point distinguished differential price effects across high- and low-COVID caseload districts. This is once again consistent with the anchoring effects of the MSP. In contrast, deregulation effects are clearly discernible for the perishables. Our results suggest that states that delisted fruits and vegetables were able to prevent a decrease in prices by over 10 percentage points. Market arrivals mirror price effects, with relatively more sales being facilitated for perishables in states that had deregulated their marketing. Taken together, our results find support for a strong but nuanced role for government policy, both in its procurement and market reform aspects.

The paper is organized as follows. The second section presents a brief description of the coverage of wholesale markets, COVID-19 incidence, and market reforms. The third section presents trends in market arrivals and prices. The fourth section presents the methodology, while the fifth section discusses results, and the sixth ends with conclusions.

12.2 Data

12.2.1 Wholesale Markets (Mandis) Covered

The data for this paper was downloaded from Government of India's agriculture market information portal, which records daily arrivals and prices at the mandi (wholesale market) level. The database includes information for all 979 mandis across 182 districts (in the 5 states mentioned above) that trade wheat, tomato, and onion. The sample has an average of five mandis in every district.

12.2.2 COVID-19 Incidence

Mandi regime changes in relation to COVID-19 can be mapped into the different phases of lockdown that started from the end of March 2020. Figure 12.1 presents the distribution of districts by the total number of COVID-19 cases. Among assessed districts, 35% had less than 100 COVID-19 confirmed cases; 21% had between 100 and 200 cases; 15% had 200–300; while 29% had greater than 300 cases. The average per district was 337, indicating the concentrated nature of disease spread. Note that these are recorded cases; the actual caseload is expected to be much higher. However, this under-reporting does not matter for our analysis, unless the extent of under-reporting varies systematically across districts. It is the relative variation between "high" and "low" caseloads that the empirical strategy exploits.

Also, the relaxation of regulations governing movement and economic activity were based largely on the total number of confirmed COVID-19 cases. In fact, the

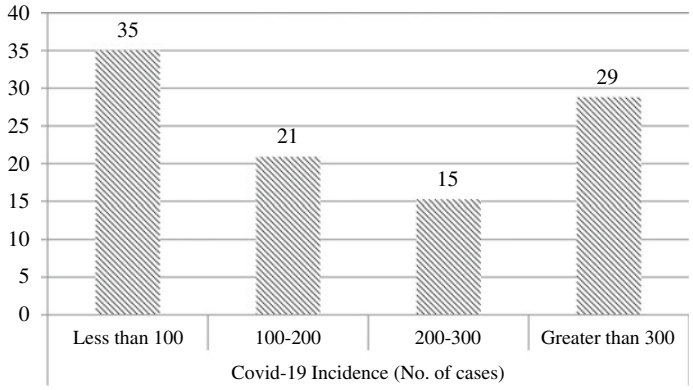

Fig. 12.1 Distribution of districts by incidence of COVID-19 cases (percent). *Source* https://covidindia.org, *accessed on 1/7/2020*

Table 12.1 Lockdown and unlock timelines and activities allowed

	Duration	Activities allowed
Phase-1 lockdown	25 March–14 April 2020	Nearly all activities were suspended
Phase-2 lockdown	15 April–3 May 2020	Allowed agricultural activities starting from 20 April 2020
Phase-3 lockdown	4 May–17 May 2020	Districts were classified into three zones: red zones (130 districts), orange zones (284 districts), and green zones (319 districts). Districts in green zones have additional relaxations
Phase-4 lockdown	18 May–31 May 2020	Movement allowed with some conditions across districts and states. States given a larger say in the demarcation of green, orange, and red zones and the implementation roadmap
Unlock 1	1 June–30 June	Reopening phase with an economic focus. Lockdown restrictions imposed only in containment zones; activities permitted in other zones in a phased manner

Source Ministry of Home Affairs, Government of India

government classified districts as green, yellow, and red zones based on recorded positive cases.

Table 12.1 presents the lockdown and unlock timelines along with delineation of various associated measures. The first period consists of phases 1 and 2 of the lockdown, from 1 April[1] to 3 May. Phase 1 consisted of the strictest measures that would have affected activities related to the agricultural sector as well. From phase 2 onward, there were different levels of relaxations, with exemptions for the agricultural sector being first granted. The second period covers phases 3 and 4 of the lockdown from 4 May to 31 May. In phase 3, further activities were allowed in green districts, with phase four allowing for decentralized decision making based on color-coded zones. The final period was from 1 to 30 June, labeled unlock-1, with an emphasis on re-starting economic activities.

This categorization into periods is important in assessing market dynamics following the COVID-19 shock. If one were to take a short window corresponding to phase 1 of the lockdown, when several markets were indeed closed, the picture would seem to be one of market collapse and sharp price spike, as the studies cited above find. But depending on the scale and stringency of the measures implemented subsequently, agricultural markets did rebound relatively quickly. The speed and extent to which this recovery took place is a function of the type of commodity, COVID-19 caseload and level of market reforms undertaken by state governments.

[1] The lockdown started on March 25, our dataset began on April 1.

Table 12.2 Adoption status of APLMA 2017 provisions

State	Provisions adopted
Uttar Pradesh	Single point levy of market fee, Single unified trading license, E-trading, Direct marketing, Private markets, Administrative reforms, Declaring warehouse/cold storages as deemed market
Madhya Pradesh	Single point levy of market fee, Single unified trading license, E-trading, Direct marketing, D-regulation of marketing of fruits and vegetables
Rajasthan	Single point levy of market fee, Single unified trading license, E-trading, Direct marketing, Private market, Administrative reforms, Deregulation of marketing of fruits and vegetables
Punjab	Single point levy of market fee, Single unified trading license, E-trading, Direct marketing, Private markets
Haryana	Single point levy of market fee, Single unified trading license, E-trading, Direct marketing, Deregulation of marketing of fruits and vegetables

Source Niti Aayog (Courtesy Professor Ramesh Chand)

12.2.3 Market Reforms

As noted earlier, the APLMA was introduced in 2017 with a focus on rebuilding market infrastructure for both public and private players. It contained several measures aimed at improving overall welfare, especially of farmers. Uttar Pradesh and Rajasthan each adopted seven provisions of the APLMA. For example, both states adopted single point levy of market fee, single unified trading license, e-trading, direct marketing, establishment of private markets, and separation of powers and functions among administrative functionaries.[2] Madhya Pradesh, Punjab, and Haryana adopted five provisions each, four of which are common to Madhya Pradesh and Haryana. The details of specific provisions are set out in Table 12.2.

The analysis uses this information to categorize states into two groups capturing variation in the extent of reforms undertaken. For wheat, the variable is based on the number of provisions of the APLMA that a state adopted. In the case of tomato and onion, the variable captures whether or not a state delisted fruits and vegetables from the purview of a more restrictive earlier APMC regulation.

12.3 Trends in Market Arrivals and Prices

We compare daily prices and market arrivals for the months of April, May, and June across 2019 and 2020. We also use the 2018 data for robustness checks. The price metric used in the analysis is the modal price in each mandi, expressed in real 2020 terms (using monthly wholesale price indices).

[2] Uttar Pradesh also implemented the declaration of warehouses and cold storages as deemed markets, while Rajasthan deregulated the marketing of fruits and vegetables.

For wheat, Fig. 12.2 shows that the first two phases of the lockdown saw a significant decrease in quantities arriving at the mandis as compared to the previous year. The gap is particularly high during phase 2 which coincided with the peak harvest. During phases 3 and 4 of the lockdown, market arrivals recovered. Possibly due to pent up demand or because farmers who could store wheat stocks could now unload them, unlock-1 saw marginally higher quantities of arrivals as compared to the previous year.

Mirroring the collapse in market arrivals, prices of wheat) Fig. 12.3 shows that prices were significantly higher in phase 1 than in the previous year. In phases 2, 3, and 4, wheat prices were significantly lower compared to 2019 but were for the most part anchored at the MSP. Subsequently in unlock-1 from June onwards, wheat prices decoupled from and trended below the MSP, perhaps in part a reflection of demand compression.

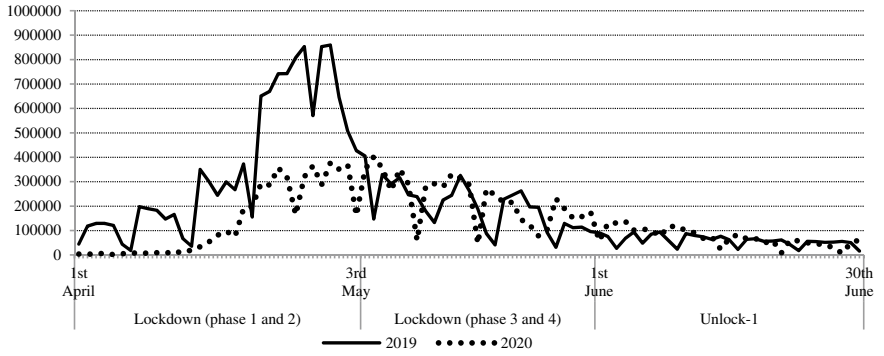

Fig. 12.2 Daily wheat arrivals (in tons). *Source* https://agmarknet.gov.in/, accessed on 10th July 2020

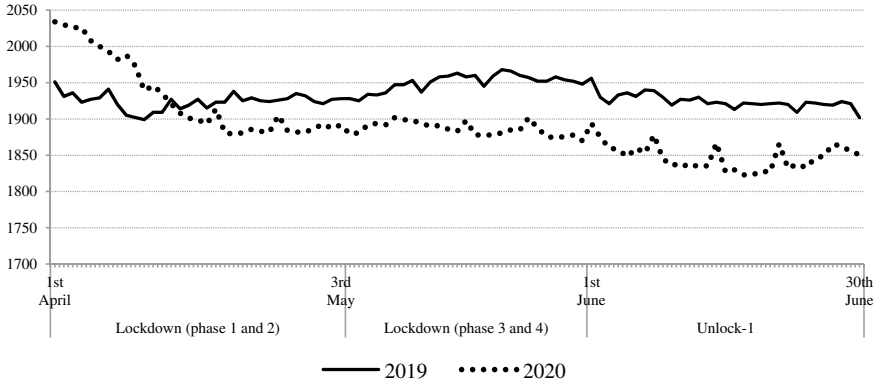

Fig. 12.3 Wheat price trends (₹ per quintal). *Source* https://agmarknet.gov.in/, accessed on 10th July 2020

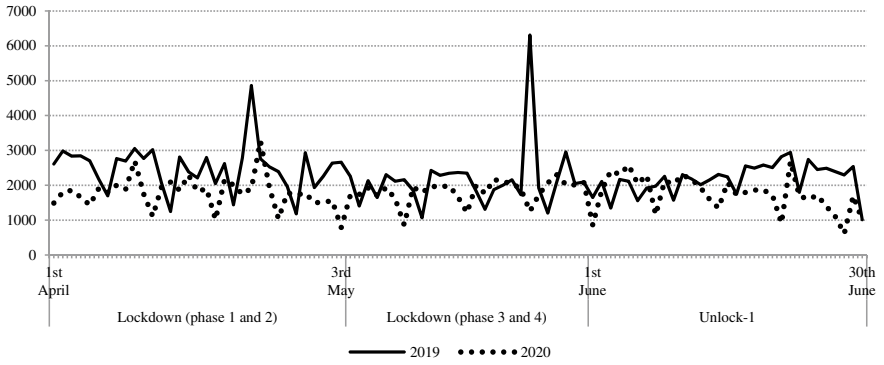

Fig. 12.4 Tomato arrivals (tons). *Source* https://agmarknet.gov.in/, accessed on 10th July 2020

While it is common for procurement operations to be suspended by the end of the marketing season in the end of May, two states, Haryana and Uttar Pradesh, had announced measures to extend procurement operations through the end of June and also offer bonuses for later arrivals. To what extent were these efforts successful? Annex Figure 12.8 shows that these two states were able to maintain the wholesale price at the level of the MSP. In 2019, when procurement operations ceased at the end of May, there was a noticeable drop in wholesale prices, as would be expected when a large player, in this case, the government, exits the market. But in 2020, there is no such dip, and prices were maintained largely at the level of the MSP. Thus, the decoupling of the wholesale price from the MSP seen in Fig. 12.3 was driven largely by price movements in the other three states.

As indicated in Fig. 12.4 quantities of tomato arriving in the mandis were significantly lower than in the previous year[3] for both lockdown and unlock-1 phases. Consequently, prices (Fig. 12.5) were higher, but were trending downward. It is only after 15 June during unlock-1 that prices started increasing and were significantly higher than in the previous year. The period of unlock 1 coincided with unseasonal pre-monsoon rains that affected the prices of all vegetables. It is difficult to disentangle the effect of demand changes due to the unlock (expected to have pushed up demand) from the weather shock that affected the supply of vegetables.

Figure 12.6 presents the quantities of onion traded in the mandis each day; during all three periods, market arrivals were significantly lower than in the previous year. They started trending upward in the initial 2 weeks of unlock-1 but again trended downward; day-to-day variability in this unlock period was high. Prices (Fig. 12.7) were higher therefore in the initial period but were declining gradually since the start of the first lockdown. There was a modest recovery toward the latter half of the unlock-1 period. Two characteristics of onion are important in relation to the kinetics of price and quantity. The supply of onions is relatively concentrated, but demand is well dispersed. Though supply chain disruptions would have played a role for

[3] We are unable to confirm whether the two spikes in prices noticed in 2019 were data entry errors.

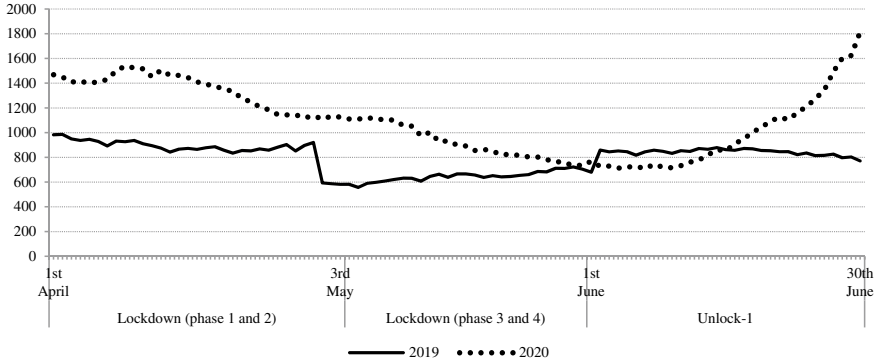

Fig. 12.5 Tomato price trends (₹ per quintal). *Source* https://agmarknet.gov.in/, accessed on 10 July 2020

onions given its concentrated production centers, the demand shock was likely also quite strong with the closure of hotels, restaurants, and other food enterprises that use onions more than usual normal household consumption. In addition, there were unsubstantiated reports that consumers perceived poultry to be a source of COVID-19, and hence the poultry sector may also have experienced a concurrent shock. This may have affected the demand for onions that constitute a big part of meat-based food preparations in India.

Further evidence of the disruption in supply chains caused by the pandemic can be seen in the shifts in the distribution of prices between 2019 and 2020. A Kolmogorov–Smirnov test (not presented) indicates that the two sets of price distributions were statistically different for each of the three crops.

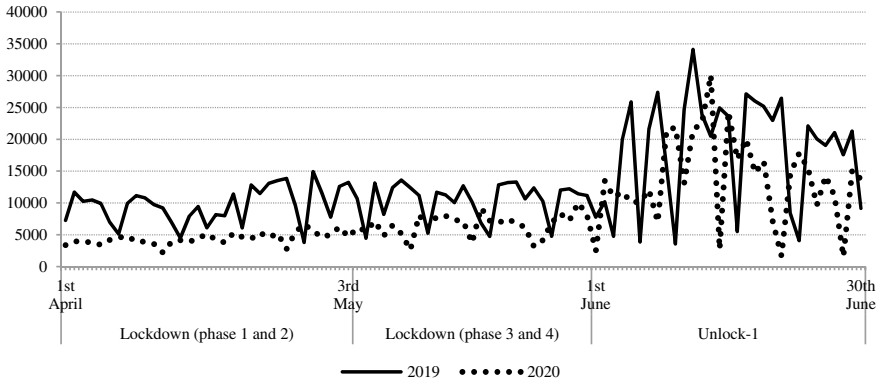

Fig. 12.6 Onion arrivals (tons). *Source* https://agmarknet.gov.in/, accessed on 10th July 2020

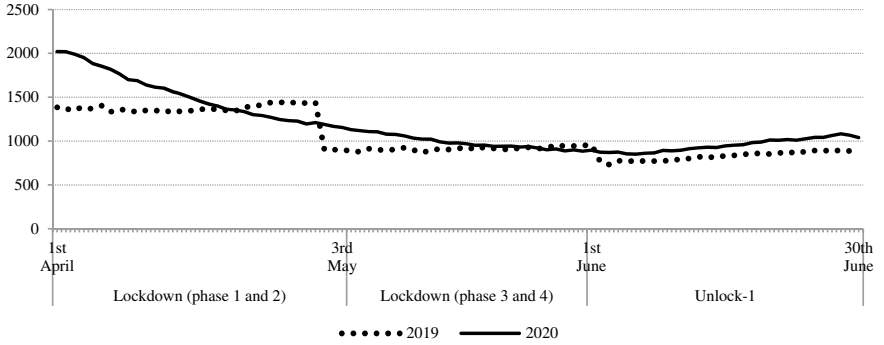

Fig. 12.7 Onion price trends (₹ per quintal). *Source* https://agmarknet.gov.in/, accessed on 10 July 2020

12.4 Identification Strategy

12.4.1 Impact of COVID-19 Incidence

COVID-19 is of course one among many factors leading to differential outcomes in terms of prices and quantities in agricultural markets. There are several confounders such as weather differences, market infrastructure and policy changes. To try and account for these, our identification strategy exploits two important aspects of the data described above. The first is the significant variation in COVID-19 caseloads across districts. The second is the availability of data on prices and quantities for the pre-COVID-19 period on a d-o-d basis. Using variation in COVID-19 caseloads, we classify agricultural markets into two categories: mandis located in districts with (i) high COVID-19 incidence versus (ii) low COVID-19 incidence. This enables us to examine whether, after accounting for various confounders (by differencing them out), there are any differences in outcomes in markets across treatment (high COVID incidence districts) and control groups (low COVID incidence districts). Further, we compare changes in outcomes between low- and high-COVID incidence markets over the period 2019 (pre-COVID-19) and 2020 (COVID-19). Conditional on existence of pre-COVID parallel trends, a standard difference-in-difference impact estimate can be vested with causal interpretation. That is, it is the impact of COVID-19 under the assumption that had the pandemic not occurred, a change in outcomes would not be systematically different in the treatment and control areas.

We estimate the following DID specification:

$$Y_{idt} = \alpha_0 + \alpha_1([High\ Covid]_{idt} * Time_t) + \alpha_2[High\ Covid]_{idt} + \alpha_3(State * Time_t) + \Omega_i + \varepsilon_{idt} \quad (12.1)$$

where i stands for mandi, d for district, and t for year (either 2020 or 2019). Y is daily (subscript suppressed) modal price of wheat, tomato, or onion expressed in

real terms. *HighCovid* is a dummy variable and takes value 1 for markets located in a high COVID caseload district, and equals 0 otherwise. Specifically, *HighCovid* mandis are located in districts with greater than 100 COVID-19 cases.[4] As part of robustness checks, we experimented with moving the cut off for *HighCovid* from 100 to 200 and then to 300; the results are robust. *Time* is a dummy variable and takes value 1 for the year 2020 and 0 for 2019; Ω_i is the mandi fixed effect and ε is the error term. All price regressions are weighted by market arrivals. Standard errors are clustered at the week and year levels.[5] We run the same specification using daily mandi arrivals as the outcome.

The coefficient of interest is α_1 that identifies the impact of COVID-19 caseload. As a check on the identifying assumption, we re-run specification 1 for the pre-COVID-19 years (2018 and 2019). The emerging literature on DID focuses on the need to address why the original levels of the treatment and control groups differed, and uses this to justify impact coefficients. Thus, parallel pre-COVID trends are neither necessary nor sufficient for the comparable counterfactual trends condition to hold (Kahn-Lang & Lang, 2020). In this paper, however, we stay with the conventional DID practice of interpreting impacts as causal only upon finding parallel trends (the coefficients are italicized in the tables when this assumption is not met).

We estimate five variants of specification 1. The first is for the month of April (period 1 that covers phases 1 and 2 of lockdown). The second is for the month of May (sub-period 2 that covers phases 3 and 4). The third is from the month of June coinciding with unlock-1. A fourth variant combines the lockdown months of April and May, while a fifth variant includes the entire period from the months of April to June.

12.4.2 Differential Impact of Market Reforms

As noted earlier, market reforms have not been adopted to the same degree by all states. Based on the extent of adoption of the recommendations of the APLMA, we classify Uttar Pradesh and Rajasthan as states with high intensity of adoption of market reforms, and the remaining states as low intensity of adoption of market reforms. We study the differential impact of the varying degree of adoption of market

[4] We are unable to exploit daily variation in caseloads because of the patchy nature of this data. However, given the exponential nature of the spread of Covid-19, the choice of using caseloads effective June 30 does not matter to the analysis as it exploits variation in high versus low caseload districts; the absolute number of infections does not matter. We acknowledge however that this may not completely capture the fact of localized outbreaks as migrants returned from the cities to rural areas.

[5] For each crop, year and outcome combination, we conducted a test of the null hypothesis that the series contained a unit root. We were able reject the null hypothesis for 11 of 12 cases, the exception being of tomato prices in 2019. As a further robustness check, both Eqs. (12.1) and (2) were re-estimated after including date fixed effects; all the results presented here remain robust to this inclusion.

reforms across low- and high- COVID incidence markets, and across time, using a triple difference (TD) framework. Analogous to the DID framework, the TD approach identifies impact of market reforms if confounding factors are time invariant. We test for these parallel trends using 2018 and 2019 data and provide a causal interpretation to the results only when they are met. We estimate the following triple difference specification:

$$\begin{aligned} Y_{idt} &= \gamma_0 + \gamma_1 HighCovid_{idt} + \gamma_2 Time_t + \gamma_3 HIMarket\text{Re}form_{idt} \\ &+ \gamma_4 (HighCovid_{idt} * Time_t) + \gamma_5 (HighCovid_{idt} * HIMarket\text{Re}form_{idt}) \\ &+ \gamma_6 (HIMarket\text{Re}form_{idt} * Time_t) \\ &+ \gamma_7 (HighCovid_{idt} * Time_t * HIMarket\text{Re}form_{idt}) \\ &+ \Omega_i + \mu_{idt} \end{aligned} \tag{12.2}$$

All notation carries over from above, except *HIMarketReform* that takes value 1 if the mandi is in a high intensity market reform state and 0 otherwise.[6] The coefficient of interest is γ_7 that can be interpreted as the differential impact of COVID incidence in high intensity of reform states. The coefficient γ_6 provides the association of states with higher degree of market reforms in low COVID incidence markets, while γ_4 provides the impact of *HighCovid* on states with lower degree of market reforms.

We run similar specifications for tomato and onion, except the *HIMarketReform* variable takes value 1 if the state had deregulated the marketing of fruits and vegetables and zero if not.

12.5 Results

12.5.1 Impact of COVID-19 Incidence

Table 12.3 presents DID impact estimates for prices. For wheat (Panel A), there was an insignificant impact on prices because of high COVID-19 incidence in the month of April. In May (phases 3 and 4 of lockdown), we find a pre-COVID-19 trend and hence do not interpret the coefficient. But during unlock-1 in June, there was a decline in prices in *HighCovid* markets. The government's decision to provide free rations of 5 kg of wheat per individual through the Pradhan Mantri Garib Kalyan Yojana by drawing down on public stocks beginning in April may have had a negative effect on the demand for wheat (see for example, Varshney et al., 2020). For the entire period of April–June, there was no adverse differential impact on prices—the coefficient is insignificant. This is consistent with the MSP playing an anchoring role in wheat prices.

[6] There is no confound in the data between high COVID caseload districts and states that adopted more market reforms.

Table 12.3 DID estimates of impact of COVID-19 incidence on wholesale prices of wheat, tomato, and onion

	April (log) prices	May (log) prices	June (log) prices	April–May (log) prices	April–June (log) prices
Panel A: Wheat					
High COVID*Year 2020, α_1	0.007 (0.005)	*−0.010*** *(0.003)*	−0.021*** (0.002)	−0.003 (0.003)	−0.006 (0.004)
Observations	18,998	24,310	20,777	43,308	64,085
R square	0.470	0.608	0.740	0.420	0.435
Panel B: Tomato					
High COVID*Year 2020, α_1	0.028 (0.026)	−0.086*** (0.024)	−0.034 (0.033)	−0.062* (0.031)	−0.031 (0.024)
Observations	15,877	16,216	15,369	32,093	47,462
R square	0.745	0.550	0.692	0.451	0.418
Panel C: Onion					
High COVID*Year 2020, α_1	*0.012 (0.028)*	0.050 (0.029)	*−0.059 (0.040)*	−0.005 (0.024)	*0.007 (0.028)*
Observations	16,281	16,857	15,909	33,138	49,047
R square	0.820	0.867	0.859	0.706	0.746

Notes All regressions are based on specification 12.1 as described in the text. Coefficients in *italics* have pre-COVID-19 trends. Standard errors are clustered at the week and year level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

There was also no statistically significant impact on tomato prices (Panel B) in the month of April, but prices did decline in May, so that for the aggregate of April and May, prices in 2020 in high caseload districts registered a modest decline relative to 2019 and relative to low caseload districts. However, by unlock-1 in June, there was some recovery as reflected in an insignificant impact on prices; this was also true of the entire period of April–June. This is contrary to other studies that suggest prices of vegetables increased significantly in the month of May (NCAER, 2020).[7] For onion (Panel C), the impact estimates are either insignificant or not robust to parallel trends for all periods.

Table 12.4 examines whether these results are largely mirrored by trends in market arrivals. For wheat, while the DID coefficients suggest there was no impact for each of the individual periods, across the three months, the magnitude of impact was positive, at 12%. Similarly, the differential impact on quantities traded of tomatoes, depending on the month/period ranged between 25 to 30%, and for onions, 15 to 20%. Particularly noteworthy are the magnitudes of these coefficients, which suggest that

[7] This survey also reported that 38% of surveyed households experienced an increase in prices of grains and pulses in the month of May.

Table 12.4 DID estimates of impact of COVID-19 incidence on market arrivals of wheat, tomato and onion

	April (log) quantity	May (log) quantity	June (log) quantity	April–May (log) quantity	April-June (log) quantity
Panel A: Wheat					
High Covid*Year 2020, α_1	−0.016 (0.113)	*0.191*** *(0.073)*	*0.202*** *(0.064)*	0.053 (0.075)	0.119** (0.057)
Observations	19,687	25,444	21,714	45,131	66,845
R square	0.626	0.612	0.642	0.566	0.538
Panel B: Tomato					
High Covid*Year 2020, α_1	*0.266**** *(0.030)*	0.319*** (0.048)	0.213*** (0.046)	0.286*** (0.027)	0.248*** (0.024)
Observations	16,340	16,961	16,265	33,301	49,566
R square	0.869	0.819	0.869	0.829	0.829
Panel C: Onion					
High Covid*Year 2020, α_1	*0.219**** *(0.022)*	0.153** (0.046)	0.211*** (0.022)	0.193*** (0.046)	*0.182**** *(0.040)*
Observations	16,766	17,364	16,375	34,130	50,505
R square	0.836	0.848	0.853	0.821	0.813

Notes All regressions are based on specification 12.1 as described in the text. Coefficients in *italics* have pre-COVID-19 trends. Standard errors are clustered at the week and year level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

the difference in market arrivals between the same months across 2019 and 2020 was higher in mandis located in high caseload districts than in low caseload districts. Further the magnitudes are highest for tomato, the most perishable among the three, and least for wheat (non-perishable). This is consistent with farmers seeking to offload stocks given uncertainty or cash constraints. The states considered here are important for onion but are not the most important producers (Maharashtra, Madhya Pradesh and Karnataka together account for nearly 65% of the total onion production in India).

12.5.2 Differential Impact of Market Reforms

To what extent did the impact differ in states that undertook a greater degree of market reforms? We assess this using a triple difference approach and focus on the period April–June. Table 12.5 presents selected coefficients. For wheat, states that adopted a greater degree of market reforms saw 1.2% (γ_7) higher changes in prices as compared to states that had implemented fewer reforms. While statistically

significant, the magnitude is small. At the same time, high COVID incidence markets saw an insignificant impact on prices in states with lower degree of market reforms. This is consistent with prices being anchored at the MSP. Market arrival coefficient magnitudes are not robust.

Market reforms had a much greater impact on the two perishable goods. In Table 12.6, the TD coefficient γ_7 suggests that states which adopted more market reforms saw an 11.2% higher difference in tomato prices (Panel A). For onion (Panel B), the figure is 10.5%. Thus, for these commodities, reforms do seem to have shielded farmers from a higher extent of price collapse. That these effects are statistically significant assumes salience given that for the two perishables, the distinction between low- and high-intensity of adoption of market reforms was one of deregulation and delisting.

For both tomato and onion, γ_6 is insignificant; that is, states with deregulation of fruits and vegetables were not different from those that did not: market reforms did not have a role to play in influencing price differences over time in low COVID incidence markets. In a sense this serves as a falsification test, since market reforms were initiated before 2019, and there is no reason to expect a differential impact of these reforms in low COVID caseload mandis. At the same time, for tomato, as expected, prices in high COVID incidence markets were nearly 7% lower in states which did not undertake high intensity of market reforms relative to those that did (in other words, this is a double difference, conditional on high COVID incidence). For onion, the results are not robust to parallel trends.

The market arrival coefficients are in the expected opposite sign relative to prices, and as before, are of much higher magnitudes than that those associated with prices.

Table 12.5 Differential (TD) impact of market reform intensity on the prices and market arrivals of wheat

	Log prices (April-June)	Log market arrivals (April-June)
HighCovid*HIMarket−Reforms*Year 2020, γ_7	0.012** (0.005)	*−0.245 (0.149)*
HIMarket-Reforms*Year 2020, γ_6	*−0.009*** (0.003)*	*0.055 (0.181)*
HighCovid* Year 2020, γ_4	0.003 (0.004)	*0.171 (0.130)*
Observations	64,085	66,845
R square	0.417	0.535

Notes All regressions are based on specification 12.2 as described in the text. Coefficients in *italics* have pre-COVID-19 trends. Standard errors are clustered at the week and year level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

Table 12.6 Differential (TD) impact of deregulation of fruits and vegetables on the prices and market arrivals of tomato and onion

	Log prices (April-June)	Log market arrivals (April-June)
Panel A: Tomato		
HighCovid*Deregulation*Year 2020, γ_7	0.112^{*} (0.059)	-0.513^{***} (0.061)
Deregulation*Year 2020, γ_6	−0.034 (0.059)	*0.428^{***}* *(0.045)*
HighCovid*Year 2020, γ_4	-0.067^{**} (0.028)	0.342^{***} (0.027)
Observations	47,462	49,566
R square	0.411	0.828
Panel B: Onion		
HighCovid*Deregulation * Year 2020, γ_7	0.105^{**} (0.047)	-0.248^{**} (0.119)
Deregulation*Year 2020, γ_6	−0.096 (0.078)	0.149 (0.111)
HighCovid*Year 2020, γ_4	*-0.048^{***}* *(0.013)*	*0.265^{***}* *(0.027)*
Observations	49,047	50,505
R square	0.745	0.813

Notes All regressions are based on specification 12.2 as described in the text. Coefficients in *italics* have pre-COVID trends. A Standard errors in the parentheses are clustered by week and year. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

12.6 Discussion and Conclusions

Since this paper was first published, there has of course been a large literature on the impact of COVID 19. We review these briefly, focusing only on studies pertaining to Indian food and agricultural markets. A common theme in virtually all these studies is the supply chain disruptions that occurred immediately after the lockdown. These affected a number of outcomes, including prices, price volatility, margins, and quantities, at various points in the supply chain. These effects were, however, reasonably short-lived.

Mahajan and Tomar (2020) find that there was a drop of 10% in the online availability of various foods following the first lockdown, with a drop of nearly 20% in market arrivals of vegetables and fruits in a few cities between March and April of 2020. They find that the longer supply chains were the hardest hit. Narayanan and Saha, (2021), analyzing retail and wholesale prices through the end of August, find that for many commodities, including pulses and edible oils, among others, prices witnessed a sharp spike immediately after the lockdown. They find that movement restrictions acted to limit arbitrage possibilities across cities and contributed to

increased spread in prices. Ramakumar, (2020) also notes that for cereals, although the initial months saw a decrease in wholesale prices for cereals, urban consumer prices increased, reflecting supply chain disruptions. However, for other commodities they remained stable, and followed trends similar to those seen in 2019 for the same months. Other literature finds that COVID-19 disruptions meant that, while the pre-pandemic year was characterized by spatial convergence in prices, this broke down during 2020 (Akber & Paltasingh, 2022). Imai et al., (2020) use impulse response functions to find that price effects tamped down relatively soon after the lockdowns were lifted.

Rajkhowa and Kornher's (2022) analysis looks at a longer time frame, and examines a wider range of outcomes, including retail and wholesale prices, price markups, and dispersion (spatial), and considers a larger number of crops that includes both staples and perishables. They use a dynamic panel data setup and find that prices increased for crops with longer shelf life, and decreased for perishables. Market distortions were least for crops where the government plays a large role, and were highest for pulses.

In addition to these studies which largely use administrative data on prices, market arrivals, and sales, there are studies that rely on survey data. For example, Bairagi et al., (2022) use high-frequency phone surveys conducted by the World Bank in six states in May and July 2020. Based on these responses they estimate an inverse demand function and find that price impacts varied among staple crops, ranging from 3 to 16% increases in the prices of wheat flour and rice, respectively. Ceballos et al., (2021) also undertook a phone survey of farmers in Haryana to find that wheat farmers adjusted the timing of the harvest in response to the lockdown and more than one-fifth of farmers reported spending more for harvesting.

Much of government intervention, perhaps understandably, addressed food insecurity by ensuring free access to foods which are less perishable. But nutrition security extends beyond calories to encompass a diet rich in vegetables, fruit, dairy, etc. How did the pandemic affect these commodities? Some of the studies cited above do include horticultural crops. For example, Bairagi et al.,'s (2022) findings based on the phone survey suggest a substantial decline in onion prices. Ceballos et al., (2021) report that tomato farmers suffered large losses in incomes, with half the surveyed farmers reporting that they sold their crops at prices below what they expected to receive in a normal year; this was especially true for those who had to harvest their crop early. This had knock-on effects on food insecurity as well.

A few papers, however, focus exclusively on the vegetables. For example, Paul and Birthal, (2021) examine prices of tomatoes, onions, and potatoes in major cities using data from the National Horticultural Research and Development Foundation. They find that prices of all three commodities increased in the initial phases of the lockdown and continued to increase, with the degree of increase varying across cities and crops. They employ time series methods to find that there was heterogeneity in the increase in volatility in prices in the first phase, but that the degree of volatility reduced over time. At the retail level, Rajpoot et al., (2022) also exploit time series analysis to examine potato and onion prices at the retail level in cities. They find

that, while there was a substantial spike in the initial months, by May 2020 prices decreased, perhaps also in part due to decreased demand.

Against the backdrop of the research cited above, much of which was published after the present work, we turn now to a summary of our research. Our paper was probably one of the first to estimate the *causal* impacts of COVID-19 on agricultural prices, and to pay explicit attention to the role of market regulation. In general, if the tenure of market price and quantity changes and the shortness in duration for mean reversal in these outcomes were to be a marker for resilience, it can be said that agricultural markets in India have been quite supple in the face of the COVID-19 shock. We find that COVID-19 and its associated disruptions had a differentiated impact—both across commodities and over time. Although all three commodities saw a positive impact coefficient for wholesale prices in April, these were either insignificant, not robust to parallel trends, or both. Wheat saw a decrease in price differentials in June, but the overall impact across the three months was insignificant. This is likely because government procurement operations helped anchor wheat prices at the MSP. This continued through June in the two states that extended their period of procurement. The role of state participation in agricultural markets in mitigating the effect of shocks has been corroborated in other studies. Cariappa et al., (2022) conclude that state interventions helped build resilience in wheat markets. This is also echoed by Ceballos et al., (2021).

Prices for tomato fell in May, but there was no statistically robust impact otherwise. Also, onion prices were unaffected—this may reflect the concentrated nature of its supply and the relatively dispersed nature of its demand. It is worth reiterating that the five states considered here are not major suppliers of onion; it is likely that there were significant disruptions in supplying markets in Maharashtra, Madhya Pradesh, and Karnataka, which account for two-thirds of its production. Additionally, government efforts to support demand through various stimulus provisions may have borne fruit (although we have no way of quantifying this) in limiting the extent of decline or arresting falling wholesale prices.

In comparison, all the market arrival impact magnitudes were positive and significant, especially for the two perishable goods. That the magnitudes of differentials in market arrivals were much higher than those in prices is suggestive (but not conclusive) evidence that supply constraints began easing beginning in May. In the case of the perishables, the positive coefficients on market arrivals may well be a reflection of distress sales and/or the need to address cash flow constraints. Together, these results suggest that while there were undoubtedly short-term disruptions in agricultural markets, they were also relatively resilient, in the sense that market arrivals were quick to recover after the initial month, and that possible distress sales did not result in a disproportionate fall in prices. To this extent, our results are broadly in line with the literature reviewed above.

Assessing the extent of supply chain disruptions attributable to COVID-19—unmatched in recent times even by the demonetization episode—is important from the perspective of public policy (Inoue & Todo, 2020). Reardon et al., (2020) comment that the COVID-19 response in India should consist of the government enabling markets to function better and rely less on extensive emergency measures.

Our analysis suggests that a more nuanced stance is necessary. The findings indicate a major role for government intervention in two fundamental ways. In cereals, where the government is a major buyer through procurement at MSP, it played an important role in keeping the supply chain intact and helped mitigate price risk. There is of course an active debate about whether the government should be involved in the physical handling of grain in support operations, how efficiently it does so, and whether the cereal-focused nature of government procurement continues to be relevant.

This paper is not the forum for engaging in this debate. Suffice it to say, the fact that wheat prices were anchored at the MSP for the better part of 2 months and even later through June in the two states that extended the period of procurement, undoubtedly helped livelihoods for millions of wheat cultivators by mitigating the decrease in prices they might otherwise have faced. Despite their low and declining shares of agricultural value added and the consumer's budget, cereals are cultivated in vast areas and are the single largest source of consumers' caloric intakes. With wheat, what in normal times would be a price support, worked as an insurance (and perhaps even as a stimulus) to the agriculture sector during this pandemic. Procurement is likely to also have ameliorated concerns of cash flow, critical to the functioning of agricultural markets.

The second fundamental way in which policies play a mitigating role relates to agricultural market reforms. States where markets are less restricted did better in managing price volatility; where the distinction for perishables was based simply on whether fruits and vegetables were deregulated and delisted. Market reforms that expand options for both buyers and sellers are certainly needed, as these enable the better absorption of shocks such as COVID-19. But the extent of market reform cannot be judged by the number of regulations alone; there needs to be a commensurate investment in infrastructure to help farmers mitigate the effects of such unprecedented shocks. This cannot happen overnight and will require a sustained focus, investment, and creative ways of engaging with market intermediaries all across the value chain.

Annex Fig. 12.8

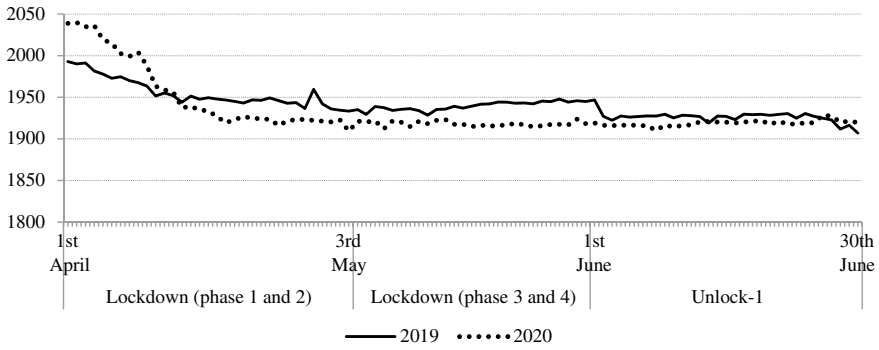

Fig. 12.8 Wheat price trends in Uttar Pradesh and Haryana (₹ per quintal)

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Chapter 13
India's Credit Landscape in a Post-pandemic World

Rajeswari Sengupta and Harsh Vardhan

Abstract In this paper we study the impact of the Covid-19 pandemic on the financial sector of the Indian economy, specifically on the banking sector, the non-banking finance companies (NBFCs) and the bond market, for the period March 2020 to March 2022. In order to set the context, we first summarise the conditions of the financial sector in the pre-pandemic period. We highlight the long-term structural trends and their underlying drivers that were conspicuous in this sector even before the pandemic. These issues have direct consequences for the manner in which the pandemic impacted the financial sector which is what we discuss next. Finally, we describe the way forward for the Indian credit landscape in terms of the major opportunities and challenges.

JEL Codes G21 · G23 · G28

Keywords Banking sector · Credit ecosystem · Pandemic · Consumer credit · Bond market

13.1 Introduction

Stable availability of credit for business and commerce is a necessary pre-condition for investment and hence growth in any economy. For an emerging economy like India, supply of credit for investments is critical for achieving and sustaining a high GDP (gross domestic product) growth rate. Historically, the banking system has been

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the primary, formal provider of commercial (i.e. non-government) credit in India. In the last decade or so, the corporate bond market has also emerged as an important source of credit. The growth and wider spread of mutual funds and insurance firms have channelised increasing share of household savings into corporate bonds. Moreover, the non-banking finance companies (NBFCs) have proved to be critical for providing credit to some segments of borrowers unserved or underserved by banks. External commercial borrowings (ECB) by firms have gone up as well during the last decade, though the access to ECB is regulated and it is a relatively smaller share of domestic credit.

The last decade witnessed several events that profoundly impacted the delivery and the availability of credit in India across all these sources. The prolonged NPA cycle from 2013 to 2019, Asset Quality Review in the banking system by the RBI in 2016, Demonetisation in 2016, the launch of the Goods and Services Tax (GST) in 2017 and issues related to its implementation, the enactment of the Insolvency and Bankruptcy Code in 2016, the default of a large NBFC in 2018, the Covid-19 pandemic that began spreading in India in 2020 and finally heightened global uncertainty in a post-pandemic world—all these events have impacted the availability of credit. Actions of the key participants in the credit ecosystem—banks, non-banking finance companies (NBFCs), bond markets, regulators (RBI and SEBI) and the government—in response to these events have shaped the evolution of the credit landscape.

In this chapter, we analyse these developments in the overall credit ecosystem in India during the period from FY2011 to FY2022, primarily with a focus on the impact of the Covid-19 pandemic.[1] In order to understand the repercussions of the pandemic and the response of the Indian financial system, it is important to provide a broader and longer context. Using a detailed data analysis, we throw light on some of the noteworthy trends and patterns that can be discerned in the evolution of the financial and specifically in the credit landscape of India during the last decade. While the pandemic was an external shock for the financial system, several long-term trends were visible from before, some of which got amplified during the pandemic whereas some of the long-standing issues got resolved to a certain extent. We end this essay with a brief description of the important opportunities and challenges faced by the Indian credit landscape as it enters into the next decade.

13.2 Pre-pandemic Period

In the years preceding the pandemic, the financial sector in India underwent several significant changes which impacted all sources of credit—the banks, the NBFCs as well as the corporate bond market. In this section we take a brief look at some of these developments. We first analyse the trends and patterns in the overall credit landscape

[1] i.e. 2010–11 to 2021–22 with each financial year (FY) ending on March 31 and starting on April 1. We discuss in terms of financial years throughout the paper.

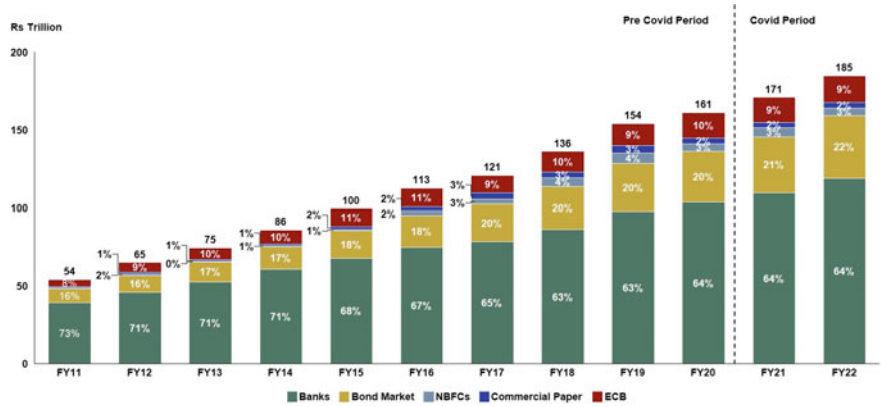

Fig. 13.1 Shares of various credit sources in total credit, 2011–2022. *Source* RBI, SEBI, CRISIL, authors' computations. *Note* Numbers on the stacks depict share in total credit. Years are financial years ending March of that year. Total credit refers to total commercial or non-government credit; credit by NBFCs is *net* of credit from banks and bond market to them

and then focus specifically on the banking sector which is still the largest provider of credit in India. While we show the graphs and tables for the period FY2011-FY2022, we focus on the decade prior to the pandemic, i.e. FY2011-FY2020. Throughout our paper we analyse total non-government credit, generally referred to as 'commercial credit' or 'credit to the commercial sector' by the RBI.

13.2.1 Growth and Composition of Total Credit

There are four main sources of commercial (i.e. non-government) credit in India—the banking system, the non-banking finance companies (NBFCs, including housing finance companies (HFCs)), the bond market which includes dated bonds and commercial paper (CP), and external commercial borrowing (ECB).[2] Figure 13.1 below depicts the evolution of the shares of these credit sources over the period from financial years 2011 to 2022.[3] The credit from NBFCs is *net* of their borrowing from banks and the bond market.

The most noteworthy trend from this figure is that the share of the banking sector declined from 73% in 2011 to 64% in 2020, while at the same time, the share of the bond market went up from 16 to 20%. The shares of NBFCs (net of NBFCs' borrowing from banks and bond market) and commercial paper also inched up while the share of ECB remained more or less steady at 9−10%. The figure also shows that total outstanding commercial credit grew from Rs 54 trillion in 2011 to Rs 185 trillion in 2022 at a compounded annual growth rate (CAGR) of 11.8%.

[2] In this paper by "credit" we mean commercial or non-government credit.

[3] All years are financial years starting on April 1 and ending on March 31.

Table 13.1 Growth (CAGR) of commercial credit in India, financial year 2011–2020

Source	2011–2020 (%)	2011–2015 (%)	2015–2020 (%)
Bonds	15.5	18.4	13.2
Banks	11.3	14.6	8.8
NBFCs	25.5	5.0	44.8
CPs	17.6	24.7	12.3
ECB	15.6	25.9	7.9
Total	12.9	16.4	10.1

Source RBI, SEBI, CRISIL, authors' computations
Note CPs denote commercial papers and ECB denotes external commercial borrowing by firms. Years are financial years ending March of that year. Credit refers to total commercial or non-government credit

Table 13.1 below shows the growth rates of credit from the main sources during the pre-pandemic period. We find that credit from the bond market outpaced that from banks with a CAGR of 15.5% as against 11.3% for bank credit. While credit through commercial paper (CP) also grew faster than banks, their share in the overall credit remains very small. A remarkable development was that net credit from NBFCs grew at a staggering CAGR of 25.5%. Growth in ECB also outpaced overall credit growth with CAGR of 15.6%.

These decadal growth rates, however, obscure the dramatic change that happened during the decade. To throw more light on this, we split the pre-pandemic decade into two halves.

We see that across all sources of credit (barring NBFCs) there was a sharp decline in growth in the second half (2015–2020) of the decade. The overall credit growth declined from 16.4% in the first half (2011–2015) of the decade to 10.1% in the 2015–2020 period. The credit growth decline is especially large for bond markets (including commercial papers). The only source of credit that experienced a sharp increase in growth rate was the NBFCs whose credit growth went up dramatically from 5% to close to 45%. We discuss this in greater detail in subsequent sections.

We next look at the changes in the composition of the borrower segments for total credit. For simplicity, we divide the borrowers into three segments: (i) business, which includes large and MSME enterprises as well as service businesses including non-consumer credit of NBFCs (ii) agriculture and (iii) consumer credit (i.e. individuals and households). The evolution over time of the shares in total credit of these three segments is depicted in Fig. 13.2.

The figure shows that there has been a significant 'consumerisation' of credit in India over the last decade (Sengupta & Vardhan, 2021). In the pre-pandemic period, the share of consumer credit in total credit went up from around 23% in 2012 to 32% by 2020. There has been a parallel decline in the share of credit to businesses, from 68 to 60%. The share of agriculture has remained flat at about 9%. It is important to note that this consumerisation of the overall credit landscape has happened almost entirely due to the rise of consumer credit in the banking system and to a smaller

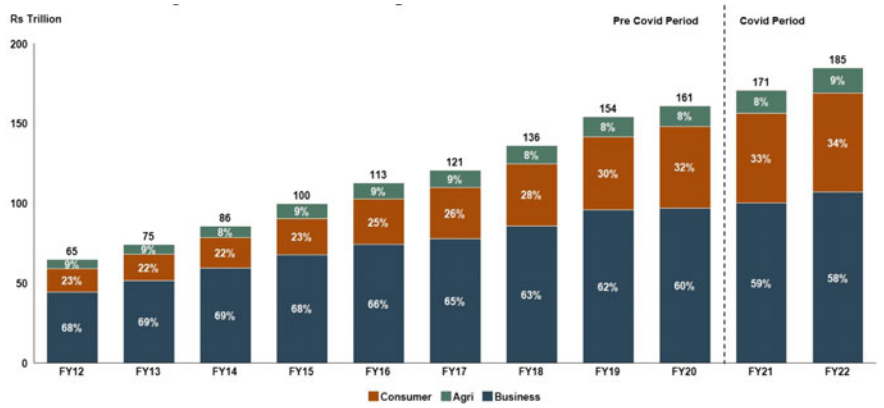

Fig. 13.2 Borrower composition of total credit, 2012–2022. *Note* Numbers on the stack bars are the share of the segment in overall credit. Years are financial years ending March of that year. Credit refers to total commercial or non-government credit. *Source* RBI, authors' computations

extent from NBFCs. Other sources of credit—bond market and commercial paper, ECB—are accessible to only a small section of large and established corporations.

For consumers, agriculture and a vast majority of MSME (Micro, Small and Medium enterprises) borrowers in India, the banking system is the only source of credit. Therefore, in order to better understand the credit landscape, we take a closer look at banking credit.

13.2.1.1 Banking Credit

Banks remain the largest provider of credit in India.[4] There are several segments of borrowers for whom the banking system is the only source of formal credit. While NBFCs have emerged as significant credit institutions in the last decade, it is important to keep in mind that nearly 50% of funding for NBFCs comes from the banking system. Except for the large 20 or so NBFCs that have access to the bond market, other NBFCs rely almost entirely on the banking system for funding. To obtain a comprehensive understanding of the Indian credit landscape, therefore, we have to take a close look at the banking sector.

Despite their share of total outstanding credit having declined from 2011 as mentioned earlier, banks still account for nearly two-thirds of the total outstanding credit. Over the 10-year period from 2011 to 2020, total outstanding credit from the banking sector grew at a CAGR of 11.3% (Table 13.1). However, the first half of the decade witnessed a growth of banking credit of 14.6% and it declined to 8.8% in the second half. We throw some more light on this development in Sect. 2.3.

[4] Here we primarily mean scheduled commercial banks; the shares of other banks such as co-operative banks, regional rural banks, small finance banks, etc. are very small.

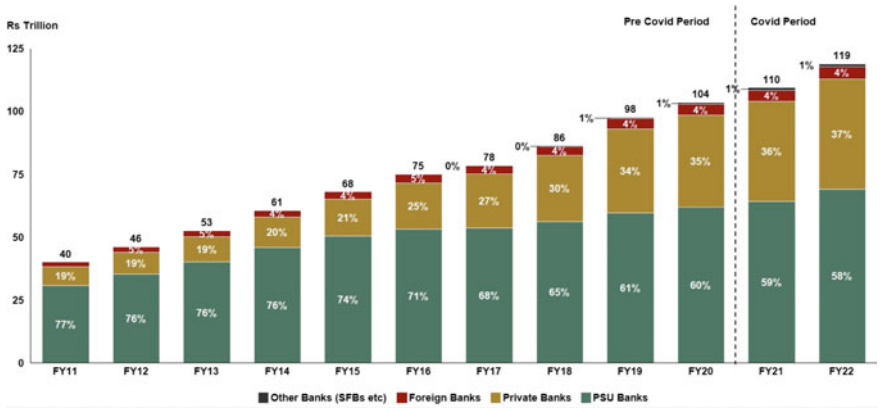

Fig. 13.3 Share of bank categories in total bank credit, financial year 2011–2022. *Source* RBI, authors' computations. *Note* Years are financial years ending March of that year. Total bank credit refers to total non-government credit disbursed by the scheduled commercial banks

Indian banking sector has three main ownership categories of banks: government owned banks that are generally referred to as the public sector banks (PSBs), private sector banks and foreign banks. There are other types of banks such as the co-operative banks and the small finance banks (SFBs), but their collective share of the overall credit is very small. Figure 13.3 details the evolution of the shares of these three categories in the overall bank credit over the last decade.

This figure shows the dramatic shift of market shares from public sector banks (PSBs) to private banks. In 2011, PSBs accounted for 77% of total banking credit and this share declined to 60% by 2020. Nearly this entire lost share of PSBs went to the private banks whose share went up from 19% to 35% in the same period. The share of foreign banks has remained almost flat at 4%.

In terms of rates of credit growth, our data highlights a stark difference between the PSBs and the private banks. We find that the PSBs experienced a substantial decline in credit growth, from close to 9% in the first half of the pre-pandemic decade to less than 5% in the second half, whereas the private sector banks hardly witnessed any change in credit growth rate in the pre-pandemic period. For the foreign banks, growth rate remained almost unchanged during the pre-pandemic period.

We also look at the mix of borrowers of the banking system. Figure 13.4 below gives the breakup of banking credit across various borrower segments for the pre-pandemic decade. From this figure we get the same picture of a dramatic 'consumerisation' trend in the Indian banking in the pre-pandemic period, similar to what we had seen in Fig. 13.2 for the entire credit landscape. In 2011, the total share of industry (large and MSME firms) was 44% which collapsed to 31% by 2020. The share of consumer credit went up substantially from 19% in 2011 to 30% in 2020. About half of this was unsecured or quasi-secured (secured against weak collateral) consumer credit (labelled as Consumer-Other in Fig. 13.4).

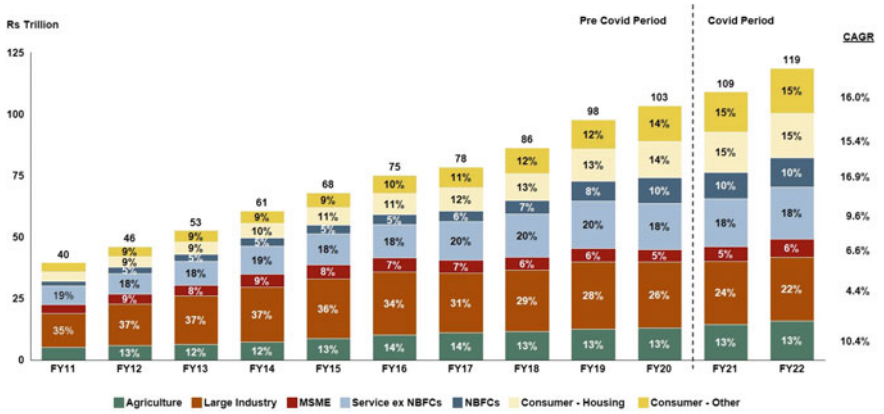

Fig. 13.4 Borrower segment-wise breakup of bank credit, financial year 2011–2022. *Source* RBI, authors' computations. *Note* Numbers on the stack bars are the share of the segment in overall credit. Years are financial years ending March of that year. Credit refers to total commercial or non-government credit

The other segment whose share in banking credit went up remarkably is the NBFC segment. Their share doubled from about 5% in 2011 to 10% in 2020. It is important to note that 60% of the NBFCs credit is to the consumer segment. Thus, the share of banking credit going to consumers, directly and indirectly (via NBFCs) has now reached well above 30%. While that of industry is barely 30%. Shares of agriculture and non-NBFC services have remained almost constant through this period at 13% and 18% respectively.

Table 13.2 below shows the growth rate (CAGR) of bank credit according to the borrower segments during the pre-pandemic decade and the numbers confirm the findings we gleaned from Fig. 13.4. We see that between 2011–2015 and 2015–2020, growth rate of credit to industry declined sharply from 15.4 to 1.9%, credit to MSMEs shrank, while growth of credit to NBFCs nearly doubled. We also find that growth rate of credit to the 'other-personal' category (i.e. unsecured consumer credit) increased in the second half of the pre-pandemic decade.

13.2.1.2 Non-banking Credit

As is clear from the above discussion, one of the major changes that took place in the Indian credit landscape in the pre-pandemic period was the declining share of the banking sector in total credit (Fig. 13.1) as well as the fall in the growth of bank credit (Table 13.1). In fact, Table 13.1 shows that during the decade from 2011 to 2022, of all the sources of commercial credit, bank credit grew at the slowest pace at only 11.3%. During this time, NBFCs emerged as important credit providers (Sengupta et al, 2022).

Table 13.2 Growth (CAGR) of segment-wise bank credit, 2011–2020

Segment	2011–2020 (%)	2011–2015 (%)	2015–2020 (%)
Agriculture	10.9	14.0	8.5
Large industry	7.7	15.4	1.9
MSME	4.0	13.0	–2.7
Service ex NBFCs	10.7	13.2	8.7
NBFCs	20.3	15.7	24.0
Personal housing	16.2	13.4	19.3
Total	11.3	14.6	8.8

Source RBI, authors' computations
Note Years are financial years ending March of that year. Credit refers to total commercial or non-government credit

The CAGR of credit disbursed by NBFCs was 44.8% in the 2015–2020 period as opposed to 8.8% of bank credit (Table 13.1). Figure 13.5 below shows the evolution of institutional credit (i.e. credit from banks and NBFCs) over the last decade. Note that in this chart the NBFC credit is net of only bank credit and not net of bond issuances by NBFCs which was the case in Fig. 13.1. Between FY 2015 and FY 2020, the share of NBFCs and HFCs (housing finance companies) in institutional credit (i.e. credit from banks and non-bank financial institutions) increased from 20 to 27%, net of bank credit. This implies that some part of the shortfall in credit from the banking sector was compensated by flows of credit from NBFCs.

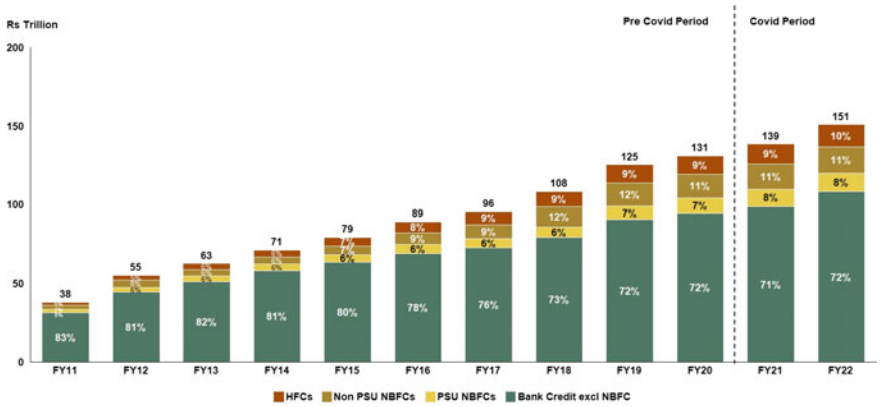

Fig. 13.5 Evolution of institutional credit, financial year 2011–2022. *Source* RBI, authors' calculations

13.2.2 Analysing the Pre-pandemic Trends

It is important to understand the factors contributing to the changing trends and patterns in India's credit landscape in the pre-pandemic period as this would help us get a better understanding of the impact of the pandemic and also the road ahead for the financial sector.

One of the most critical events in this period was the twin-balance sheet (TBS) crisis which manifested in the form of burgeoning non-performing assets (NPAs) on bank balance sheets, especially for the inadequately capitalised public sector banks (Government of India, 2017; Sengupta and Vardhan, 2017, 2019), combined with over-leveraged and financially stressed firms in the private corporate sector. The balance sheet problems in both the banking sector and the private corporate sector became apparent particularly from 2014 onwards and peaked in 2018 when gross NPAs reached a level of almost 14% of total loans (Fig. 13.6, right panel). The rise in NPAs as a share of gross advances was particularly acute for the PSBs.

This triggered the introduction of the asset quality review (AQR) by RBI in 2016, which forced the banks to recognise stressed assets on their books. The AQR was applicable to both private banks and PSBs. The banking sector's response to the bad-loans crisis and to the actions taken by the government and the RBI to address the crisis was to avoid risks (Sengupta & Vardhan, 2020a). The net result of the rise in risk aversion was a decline in the risk asset density which is the ratio of risk weighted assets to total assets of the banking system. This is depicted in Fig. 13.6, right panel. This ratio which was 65% until 2016 dropped below 55% by 2020.

The heightened risk aversion was also reflected in rising share of investments in safe government securities (called the Statutory Liquidity Ratio or SLR investments) and elevated levels of 'secured' credit (Fig. 13.6, left panel). Against the regulatory requirement of 18% banks' investment in SLR securities increased from about 20%

Fig. 13.6 NPAs and Risk aversion in the banking sector. *Source* RBI, bank disclosures, authors' computations

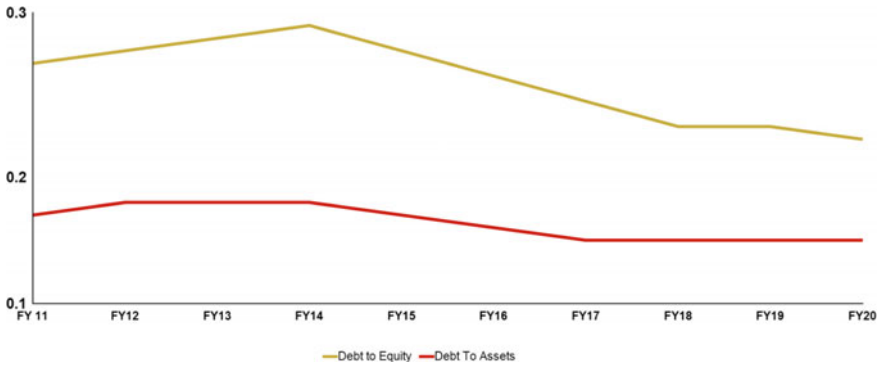

Fig. 13.7 De-leveraging of large corporations. *Source* Prowess database of CMIE, authors' calculation

to more than 22% of net time and demand liabilities (NDTL) between 2016 and 2022.

Alongside the bank NPA problem, corporate balance sheets were also stressed. Credit Suisse reported that by early 2017, around 40% of the corporate debt monitored by it was owed by companies that had an interest coverage ratio of less than 1; they did not earn enough to pay the interest obligations on their loans. The balance sheet stress faced by the private corporate sector resulted in a collapse of demand for credit, both for capacity expansion as well as for working capital requirements.

In fact, the pre-pandemic period witnessed a remarkable deleveraging trend among Indian firms. Large companies systematically reduced their leverage. Figure 13.7 below presents key leverage ratios for the top 200 non-financial firms by market capitalisation for the period of 2011 to 2020. It shows that leverage measured as ratio of debt to equity and debt to total assets declined in this period. The decline is especially sharp after 2015 which is also when the RBI's AQR took place and NPA ratios in the banking sector skyrocketed (Vardhan, 2021).

In summary, the TBS crisis had multiple repercussions for the overall credit landscape of the Indian economy during the pre-pandemic period. It led to the drastic decline in the share of industrial credit in total bank credit as shown earlier in Fig. 13.3, which was a combined result of heightened risk aversion in the banking system and deleveraging by the non-financial firms. The crisis was also largely responsible for the overall decline, both in the share of the banking sector in total credit (Fig. 13.1) and in the growth rate of total bank credit (Table 13.1) in the second half of the pre-pandemic decade. Among other factors explained in Sengupta and Vardhan (2021), this also helps explain the dramatic increase in the share of retail bank credit especially from 2015 onward.

Moreover, as the banking sector started reporting high levels of NPAs, the bond market emerged as an alternative to the banking sector especially for the top-rated firms. This trend also gets reflected in the numbers shown in Fig. 13.1 and Table 13.1. As mentioned earlier, the NBFCs stepped in as well to fill up the gap created by the

Fig. 13.8 Credit spreads on 5-Year AAA paper. *Source* Bloomberg database, authors' calculations

withdrawal of commercial banks from the corporate credit landscape. The rise of the NBFCs was further aided by the emergence of mutual funds as important players in the Indian financial landscape, yet another notable development during this period (Sengupta et al, 2022).

As the NPA crisis began plateauing out, the financial system faced another blow when a large NBFC, IL&FS (Infrastructure Leasing & Financial Services) defaulted on its debts in September 2018. This sent shockwaves through the banking system as well as the debt markets—the two biggest funding sources for the NBFC sector. This was followed by other relatively low-impact shocks due to problems in NBFCs such as DHFL (Dewan Housing and Finance Limited) and IndiaBulls Housing Finance as well as in Yes Bank. As a result of these shocks, the risk perceptions in the bond market went up (Sengupta & Vardhan, 2020b) as shown below in Fig. 13.8 which depicts a sharp increase in credit spreads of all financial sector (ie NBFC that were privately owned) bond issuers.

The most important metric for assessing risk perception in the bond market is the credit spread which is the difference between the yield of a corporate bond and of a government security of comparable maturity. Using monthly data, we look at the credit spreads of AAA rated bonds of 3 years and 5 years of maturity from April 2018 to the start of the pandemic. As we see from the figure, prior to September 2018, the credit spreads on the NBFC, private corporate and PSU bonds were fairly stable.

Between September and November 2018, in the immediate aftermath of the IL&FS default and consequent turmoil in the financial markets, the credit spreads on NBFC AAA bond of 5-year maturity nearly doubled and reached 160 basis points by February 2019. After a small dip, the spreads went back to around 140–150 basis points by July 2019 and stayed at this high level, with some fluctuations, till November 2019. During this period, crisis in other NBFCs (such as the Dewan Housing and Finance Limited (DHFL)) as well as in Yes bank, added to the overall risk perception of the bond market. This is reflected in the credit spreads remaining high 1 year after the IL&FS default. By February 2020, the spreads had declined to some extent from the high levels of 2018 and 2019.

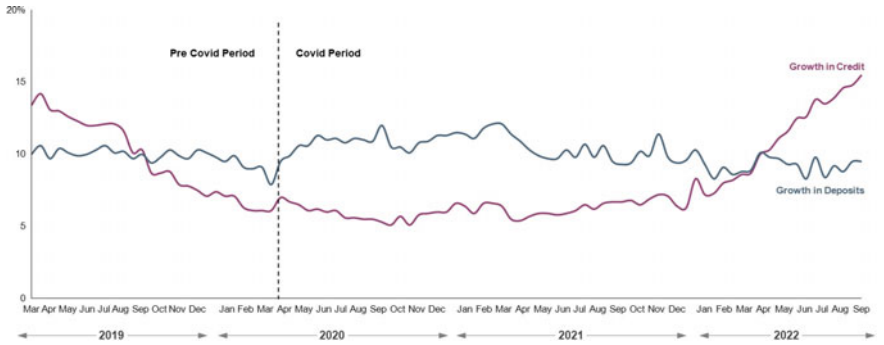

Fig. 13.9 Year-on-year (YoY) credit and deposit growth of the banking sector. *Source* RBI, authors' calculations

While banks continued lending to the NBFCs (this is reflected in the rise of bank credit to NBFCs as shown in Fig. 13.4 and Table 13.2), primarily encouraged by the RBI and the government, this lending was limited to a handful of highly rated NBFCs.

The IL&FS episode further worsened the risk appetite of the banks and triggered risk aversion in the debt markets as well. This along with the sluggish private sector investment help explain why bank credit growth declined sharply in 2019 despite the RBI lowering the policy repo rate by 135 basis points to 5.15%–this was the lowest policy rate in nearly a decade (Fig. 13.9).

13.3 Outbreak of Covid-19

In early 2020, even as the banking sector was recovering from the prolonged NPA crisis and the bond market was recovering from the shock of the IL&FS default followed by crises in DHFL and Yes Bank, the Indian economy got hit by an unprecedented shock in the form of the Covid-19 pandemic which rapidly engulfed the world in a health crisis. By the time Covid-19 began spreading in India, not only was the financial sector reeling under heightened risk aversion, but bank credit growth fallen below 7%, as shown in Fig. 11. The pandemic hit the country also at a time when the overall economy was weakening (Dev & Sengupta, 2020).

Steps adopted by governments all over the world to restrict the spread of Covid inflicted massive damage to their economies. In the case of India, the government announced one of the most stringent nationwide lockdowns on March 24, 2020 as a result of which all manner of economic activity came to an abrupt halt and stayed so for at least the next 2–3 months. Subsequent data showed that in the April–June, 2020 quarter the Indian economy contracted by more than 20%, recording one of the deepest recessions in the world. In an economy already slowing down since 2018, this was the worst contraction since the 1970s (Dev & Sengupta, 2020, 2022). In this

section, we analyse the impact of the pandemic on the general credit environment during the period FY2021 and FY2022 and on the banking sector in particular.

13.3.1 Credit Landscape During Pandemic

Table 13.3 describes the growth rate (CAGR) of credit across the major sources for the 2 years of the pandemic, FY2021 and FY2022 and also for the pre-pandemic period and the full sample period, FY2011 to FY2022. We see that during the first year of the pandemic, credit growth from all sources slowed down. Bank credit growth almost halved from a CAGR of 11.3% in the previous decade to 5.6%—the lowest in almost six decades. It recovered to 8.6% in the second year of the pandemic. Also drastic was the decline in credit growth from NBFCs, from 25.5 to 15.1% in the first year followed by a contraction in the second year. The NBFCs were already struggling in the pre-pandemic period as discussed earlier and the pandemic was yet another massive blow to their balance sheets.

While bond market credit grew at a steady rate of 11% during the pandemic, the commercial paper market collapsed in the second year, registering a contraction. We see from Fig. 13.8 above that credit spreads in the bond market began rising sharply from the middle of March 2020, once again reflecting growing risk perceptions. The figure highlights the increase in the spreads around the time when the nationwide lockdown was announced on 24 March.

For both NBFC and corporate bonds, the spreads rose by about 30–40 basis points between February 2020 and April 2020. For both categories of bonds the credit spreads reached their peak in the first half of May, close to 180 basis points for NBFCs and 170 basis points for the corporate bonds. The peak of the credit spreads during the first wave of the pandemic was higher than the peak reached in the aftermath of the IL&FS default episode.

Finally, external commercial borrowing by firms recorded a contraction in FY2021 and thereafter recovered to some extent in FY2022. Thus, during the pandemic, credit from the bond market grew at a faster pace than bank credit. By FY2022, overall

Table 13.3 Growth (CAGR) of credit across sources, 2011–2022

Source	2011–2020 (%)	2020–2021 (%)	2021–2022 (%)	2011–2022
Bonds	15.5	11.0	11.2	14.7
Banks	11.3	5.6	8.6	10.6
NBFCs	25.5	15.1	9.7	20.9
CPs	17.6	5.8	–3.3	14.4
ECB	15.6	–3.9	7.6	13.0
Total	12.9	6.0	8.2	11.8

Source RBI, author's computations

credit growth had increased from 6 to 8.2% but was still lower than the CAGR of the previous decade.

In terms of the shares of the various credit sources, we see from Fig. 13.1 that the share of banks in total credit continued to be 64%, share of the bond market marginally increased to 22% by FY2022, while shares of NBFCs, CPs and ECBs remained steady compared to the pre-pandemic period.

In Table 13.4 we focus exclusively on the banking sector and analyse the growth patterns across the various borrower segments. During the pandemic while growth of bank credit to agriculture remained steady at 9–10%, credit to large industry shrank and recovered only marginally by FY2022. Credit to NBFCs also declined. The pre-pandemic consumerisation of credit trend came under pressure during this time with average consumer credit growth falling to 10–11% from a CAGR of 16% in the pre-pandemic decade.

However, though the growth of consumer credit slowed down, it continued to outpace the growth of industrial credit, especially when we take into account credit to the large firms. This shows that the trend of consumerisation of bank credit continued during the pandemic as well. Most notably, bank credit to MSMEs grew rapidly at 16.6% in FY2021 and almost by 30% in FY2022 compared to the lacklustre growth of 4% in the previous decade.

In terms of shares of the various borrowing segments, we see from Fig. 13.4 that the share of large industry declined from 26% in FY2020 to 22% by FY2022 and while MSME credit grew dramatically, their share more or less remained constant at 5–6% compared to the pre-pandemic period. Interestingly, while the growth of consumer credit slowed down during the pandemic, the share went up from 28% in FY2020 to 30% in FY2022.

It is worth nothing that by the second year of the pandemic, the health of the banking sector had improved substantially compared to the pre-pandemic period when banks had been struggling to resolve NPAs. This improvement in banks' financials has primarily come about due to multiple rounds of capital infusion in public sector banks by the government, resolution of bad assets by the Insolvency and

Table 13.4 Segment wise bank credit growth, 2011–2022

Segment	2011–2020 (%)	2020–2021 (%)	2021–2022 (%)	2011–2022
Agriculture	10.9	10.6	9.4	10.7
Large industry	7.7	3.8	0.7	6.0
MSME	4.0	16.6	29.1	7.1
Service ex NBFCs	10.7	3.8	8.0	9.8
NBFCs	20.3	2.4	9.7	17.5
Personal housing	16.2	10.8	11.5	15.2
Other personal	16.6	12.3	11.5	15.7
Total	11.3	12.3	8.8	10.5

Source RBI, authors' calculations

Bankruptcy Code (IBC), and also due to the decline in credit growth rate that we have discussed at length in the previous sections.

Two key indicators demonstrate the banking system's progress. Successive waves of recapitalization by the government gave the PSBs enough resources to write off most of their bad loans. As a result, they have been able to bring down their gross NPAs from 11% of total advances in FY 2018 to 5.9% in FY 2022. NPAs for industrial credit have been reduced even more dramatically, from 23 to 8.4%. Even after these large write-offs, most banks retain comfortable levels of capital. Undoubtedly this is a significant achievement, considering the stress of the previous decade, the shock of the pandemic and the associated slowdown of the economy.

13.3.2 Policy Actions During Pandemic

In this section we analyse the credit patterns revealed in Tables 13.3 and 13.4. In order to help mitigate the adverse impact of the pandemic on the economy, the government and the RBI announced a slew of policy actions. These actions were predominantly channelised through the banking sector, this being the most important financial intermediary in the Indian economy. For example, the Indian banking served as the conduit of nearly 70% of the fiscal stimulus announced by the central government to address the economic challenge presented by the pandemic.

In addition, there were several important regulatory and legal actions that had a direct impact on banks, including the year-long suspension of the insolvency and bankruptcy code (IBC) ordered by the Supreme Court, imposition of a moratorium on the recognition of non-performing loans, launch of a credit guarantee scheme for MSME borrowers, and a loan restructuring package for banks announced by RBI.

In the immediate aftermath of the lockdown announcement of March 24, 2020, the RBI announced a sharp reduction in policy rates, release of huge liquidity into the banking system through unconventional monetary policy measures such as the TLTRO (Targeted long-term repo operations) and also a six-month moratorium on loan repayments (Dev & Sengupta, 2020; Felman & Sengupta, 2020; Sengupta & Vardhan, 2020c). The RBI expanded its balance sheet substantially during the 2 years of the pandemic. From Rs 50 trillion in March 2020, the total balance sheet of the RBI expanded to Rs 64 trillion by December 2021 and then declined slightly to Rs 62 Trillion March 2022. The RBI also injected a massive amount of liquidity into the banking system which reached a level of Rs 13 trillion by March 2022. As a result, the long-term (10 year) bond yields in the GSec market remained more or less capped at 6% throughout the pandemic.

The government on the other hand mostly announced policy actions to support the low income segments of the population worst affected by the pandemic, as opposed to announcing large fiscal stimulus measures unlike the US or European governments. Among other measures, the Indian government announced collateral-free bank loans of up to Rs. 3 trillion to MSMEs with 100% credit guarantee (called the Extended Credit Line Guarantee Scheme or ECLGS Scheme).

The objective of the policy actions announced by the RBI was primarily to enhance credit flow in the economy, to extend financing to firms to enable them to stay solvent amidst the massive disruptions caused by the pandemic and also to provide temporary relief to the stressed borrowers. However, it is debatable whether these actions had much of the intended impact. This is because, while the policy rate cuts arguably relieved the debt-servicing burden of the stressed firms to some extent and hence, eased the pressure on the banks, risk-averse banks were reluctant to lend despite the rate cuts and liquidity injection as seen from the lacklustre growth of bank credit during the pandemic (Table 13.3). Part of this credit decline was also because of a slump in credit demand given the widespread fall in economic activity during the pandemic. In fact, instead of increasing lending, the banks used much of the liquidity injected by the RBI either to buy bonds of large corporations or safe assets such as government securities (GSecs).

The RBI also launched Targeted Long Term Repo operations (TLTRO) where banks could provide collateral of their GSecs holding to raise long-term (3 years) funding with which they could buy high rated corporate bonds. This was done in order to facilitate credit flow to the corporate bond market. Arguably this led to bond market credit growth outpacing bank credit during the pandemic as shown in Table 13.3 above.

The credit guarantee scheme (ECLGS) announced by the government for the MSMEs was a step in the right direction. Given the heightened risk aversion in the banking system, the government stepped in to bear some of the credit risk, so that banks could focus on what they are good at, which is, allocating capital. This resulted in a phenomenal increase in the growth of bank credit to MSMEs as shown in Table 13.4. In a way this also underscores the extent of risk aversion in the banking sector because it implies that banks were willing to lend only when the government backstopped the loans. And this was despite the RBI lowering the policy repo rate to 4%, the lowest level in more than two decades.

In summary, the pandemic amplified some of the trends of the previous decade such as decline in bank credit especially to the large industry, continued pre-existing trends such as consumerisation of credit and to some extent reversed some trends as manifested in the remarkable growth of credit to the MSME sector.

13.3.3 Epilogue: Credit in the First Half of FY2023

Since February 2022 the recovery of the Indian economy from the pandemic has been disrupted by multiple other shocks even as the pandemic has gradually subsided and become mostly endemic (Dev & Sengupta, 2022). Towards the end of February 2022, Russia invaded Ukraine and itself became the subject of numerous economic sanctions imposed by the US and other Western countries. The war and associated sanctions dealt a huge blow to the global supply chains of various crucial commodities such as crude oil, natural gas, edible oils, fertilisers, wheat, etc. Already the pandemic had disrupted supply chains across countries and the war further aggravated this

problem. It led to escalation in the prices of many commodities as supplies began winding. Most notably, price of crude oil shot up which was an adverse shock for India because India is a major importer of crude oil.

The supply shocks combined with the demand stimulus provided by the developed country government and central banks triggered a rapid rise in global inflation. India was no exception to this. Consumer price index (CPI) inflation exceeded the RBI's 6% upper threshold of the inflation targeting band for three quarters in a row in the January–September, 2022 period. Central banks in developed countries responded to the highest inflation in four decades by tightening monetary policy at the fastest pace ever. In India the RBI too exited the easy monetary policy, and began raising the policy repo rate from May 2022 onwards. By December 2022 the repo rate has been increased by 225 basis points.

This rate hike is now slowly getting transmitted through the credit system. Banks have already passed on roughly 100 basis points by increasing their lending rates. However, in spite of the increase in interest rates, credit growth has seen a sharp upturn in FY2023. Currently the bank credit growth is at about 18% and bond market issuances also remain strong. Deposit growth, on the other hand, has remained muted at slightly below 10%.

The strong credit growth seems primarily driven by growth in unsecured consumer credit as well as home loans. Growth of credit to MSMEs remains strong on the back of the ECLGS scheme which has been extended by the government. There is also some uptick in credit demand due to capital expenditure in sectors such as renewable energy, logistics, etc. Government expenditure on infrastructure such as roads is creating demand for credit from EPC contractors and construction companies. Meanwhile, much of the lending to private industry has been in the form of working capital loans, necessitated by the increase in commodity prices, which has led to a sharp rise in the cost of holding inventories.

However, despite an improvement in banks' financial health, lending to large industries has been stagnant in nominal terms during the last 2 years, implying that it has declined sharply in real terms. There has also been little lending for private sector investment. Over the last 1 year, bank lending to infrastructure has grown by 9% up from 3% in FY2020, but this has been fuelled mainly by public sector capital expenditure. This is primarily because there are no signs yet of a revival of private investment which has been sluggish for nearly a decade.

The current differential growth in deposit and credit is also creating a liquidity challenge for banks. Between April and August 2022, incremental bank credit exceeded incremental bank deposits by a staggering Rs 40,000 crore. This is only the fourth time in last 25 years that such a large differential has emerged. Lack of adequate deposit growth may start imposing a limit on credit growth in the next few quarters, unless banks start increasing their deposit rates to attract more funds. At the same time the monetary contraction that is being implemented by the RBI to tackle inflation might also eventually dampen credit growth. To what extent the credit growth would decline and what impact the decline would have on economic output remains to be seen.

13.4 The Road Ahead: Opportunities and Challenges

In the medium term the Indian economy will endeavour to fully recover from the long-lasting repercussions of the Covid-19 pandemic. It will also need to gear up to face renewed challenges in the form of an adverse global economic environment characterised by deep concerns about recessions in the developed countries triggered by the aggressive monetary policy tightening by the respective central banks. In this context, it is worth pondering about the opportunities and challenges confronted by the Indian financial sector. Indeed, the evolution of the credit landscape in India as discussed in the sections above raises several issues, as outlined below.

Low credit growth: Historically in the Indian economy, credit has grown faster than GDP. The ratio of nominal credit growth to nominal GDP growth for the 60-year period from 1950 to 2020 was about 1.4. This means that credit has grown at a rate that is 1.4 times higher than the rate of growth of nominal GDP. However, total commercial credit in India in the decade from 2012 to 2022 grew at a CAGR of 11% which was only slightly higher than the nominal GDP CAGR of 10.4%. This implies that the growth of credit in the last decade has been significantly lower than the long-term rate. In fact, annual incremental credit measured as a percentage of nominal GDP collapsed from around 14% at the beginning of the decade to below 5% (Vardhan, 2021).

The relationship between credit growth and GDP growth goes, perhaps, both ways. Last decade, especially in the second half, witnessed a complete collapse of private sector investments which may, at least partially, explain the collapse of credit. Credit to industry, both large and MSME, dragged down the overall credit growth.

For Indian GDP to regain a path of strong and sustainable growth, credit growth will have to be much stronger than it has been in the last decade. Historically, Indian credit has been driven by long-term borrowing for the purpose of building industrial capacity. It may be argued that as the composition of the Indian GDP mix has skewed towards services that now contribute to more than 50% of the GDP, capital intensity of the Indian economy has gone down. This may imply that the economy now needs less capital.

However, given the stage of development that the Indian economy is in, it will need continued (private) capital investment in industrial capacity and infrastructure for which credit growth will have to pick up.

In addition to the growth of credit demand triggered by a revival of the capital expenditure cycle, some of the current impediments to credit supply will have to be removed as well in order to achieve a sustainable higher level of credit growth. These include among other things, resolving the problem of heightened risk aversion in the banking sector, developing a deeper and more liquid corporate bond market, and encouraging a larger share of foreign debt capital infusion. Each of these areas will require specific policy initiatives.

Rise of the bond market: The last decade saw the share of bonds in the overall non-government credit going up from 14 to 22%. Growth rate of credit through

bonds outpaced credit from banks. This is a welcome trend. Slowly and steadily the bond market is becoming an important contributor to the supply of credit in India especially for the larger, highly rated firms. There are several implications of this trend:

- **Less bank centric credit system**: Rise of the share of the bond market would arguably make the Indian financial system much less bank centric. It would result in better distribution of credit risk in the economy instead of the risk being concentrated in the banking system.
- **Larger role for SEBI**: The bond market is under SEBI's (Securities and Exchange Board of India) oversight. Hence, with a growing share of the bond market, a larger share of credit in India would fall under the regulatory oversight of SEBI. Historically, credit oversight has primarily been the responsibility of the RBI which regulates and supervises banking, ECB and even commercial papers. As the share of the bond market continues to grow, there will need to be better harmonisation of the regulatory approaches of SEBI and RBI.
- **Persistent skew in the bond market**: While the overall share of bonds has increased, bond market continues to be highly skewed and accessible only to large, established, highly rated (low perceived credit risk) firms. Over 85% of bonds issued are rated AA and above. It is important to keep in mind that the median rating of a bank loan in India is BBB. On the other hand, bonds rated BBB and A, which are technically 'investment grade', find very few takers in the bond market. Further, issuances are dominated by several government owned enterprises (such as Power Finance Corporation, Rural Electrification Corporation, National Highway Authority among others) that are seen by bond market investors as 'near sovereign' risk in the absence of any formal or explicit government guarantee. Credit spreads for these bonds are generally somewhat lower than the comparably rated private sector issuers. This tacit government guarantee on these bonds gives them a pricing advantage and perhaps results in some crowding out of private sector issuers.
- **Secondary market illiquidity**: While primary market issuances of bonds have maintained a strong trajectory over the last decade, secondary market is still highly illiquid. With over Rs 40 trillion outstanding bonds, daily trading volume rarely goes beyond Rs 10,000 cr. Further, secondary market trading is limited to a small set of bonds (what the market terms as 'liquids'). This lack of liquidity in the secondary market implies that for a vast majority of bonds, frequent price discovery is absent. An extreme example of this effect was witnessed in the IL&FS episode when the bonds issued by IL&FS, which were almost completely illiquid, were downgraded from AAA to D, almost overnight, leaving many investors stranded. One reason for this high level of illiquidity is that the dominant investment pools in the bond market—insurers and pension funds—are 'buy and hold' investors who do not normally trade in bonds.
- **Shorter-maturity bonds**: Bonds issued in India are predominantly (over 90%) of less than 5 years of maturity. A small fraction of bonds that are issued with

longer maturity, often have embedded call options that are inevitably exercised. This means that the bond market presently does not provide long-term credit.

Bond market in India, thus, overwhelming prefers relatively shorter maturity and highly rated papers. This implies that credit for infrastructure which by its very nature is long term and, in most cases, higher risk, will be hard to come by unless there are explicit credit enhancement and market making mechanisms in place.

Rise of the credit AIFs: An interesting trend visible in the last 5 years or so, is the increasing amount of capital invested in bonds through the credit alternative investment funds (AIFs) which under the SEBI nomenclature are called AIF category II. This signals the emergence of a private credit market in India. While the exact assets under management (AuM) of credit AIFs are not publicly available, they are estimated to be about Rs 0.5 to 1.0 trillion. Despite being a small percentage of the total credit, they are performing a very important role in widening the issuer base of bonds. By nature these funds seek higher returns and hence higher risk. A majority of them invest in bonds that are right above or below the investment grade. Thus, these funds invest in bonds ranging from A to B credit rating. The investors in these bonds are 'qualified' in the sense that they have to abide by the minimum investment corpus (currently at Rs 25 lakhs) prescribed by SEBI to qualify as an investor. It is assumed that such high value investors will be 'informed' and hence able to take on the risk inherent in these investments. High net-worth individuals, family offices, corporate treasuries, etc. are the most common investors. Increasingly foreign portfolio investors such as the Canadian pension funds have also invested in these AIFs.

While these funds are performing a critical role of developing the lower rated bond market, they also present a different kind of regulatory challenge. An analogue of these funds in China are the so-called 'trust companies' which grew very rapidly on the back of investments in high yielding high risk debt (majority of it issued by real estate developers) but in recent times, with the bursting of the credit bubble, have presented a challenge to the regulators. Credit AIFs in India are quite small in size today and hence they have not yet attracted enough regulatory attention. In fact, they get clubbed in the AIF Category II along with private equity funds and their corpus is not separately reported. Regulators will have to encourage the development of these funds so that the bond market becomes deeper. At the same time, risks arising from this market will need to be better understood, monitored and managed through norms on governance, reporting and disclosures, etc.

Role of NBFCs and FinTechs: The last decade witnessed a dramatic rise in the role of NBFCs as providers of institutional credit in India. This was partly due to the turmoil that the banking sector went through as a consequence of the TBS crisis and the regulatory actions (AQR) in response. Deepening of the bond market on the other hand helped the NBFCs, at least the larger ones, to access funding.

In 2022 the RBI, which also regulates NBFCs, changed its regulatory approach; it now has a size-based tiered classification of NBFCs. The largest NBFCs are called the top layer and have far more stringent regulatory oversight compared to the other relatively smaller ones. In fact, the top layer NBFC regulations are now similar to

those for commercial banks and include liquidity ratio, approvals for appointment of CEOs, etc. akin to banks. RBI has made its preference clear that it expects some of these large NBFCs to eventually become commercial banks. This might diminish some of the intrinsic benefits the NBFCs introduced in the Indian credit landscape (Sengupta et al, 2022).

In the last couple of years, technology led financial firms (or FinTechs) have also seen a phenomenal growth in India. Lockdowns and isolation imposed by the pandemic gave a boost to these firms as they could offer customers remote services. While they have made the greatest impact in the payments space, increasingly FinTechs are entering lending businesses too. RBI recently tightened the regulations on the so-called Buy Now Pay Later (BNPL) business which was unsecured lending done mostly by FinTechs. It has also formalised regulations regarding co-lending partnerships between FinTechs/NBFCs and commercial banks where the Fintech/NBFCs can originate credit business which would be jointly done by them with a commercial bank in a pre-agreed ratio.

It is unclear how these developments will impact the credit landscape in the long run. In the medium term we may see NBFC credit growth slowing down. We may also see a large number of co-lending partnerships emerge between NBFCs/FinTechs and commercial banks.

Inadequate credit access: Despite the growth and broadening of credit in India, several segments of borrowers continue to lack adequate access to credit. Credit to agriculture and MSMEs is especially scarce. The only source of credit to these segments is the banking system. The share of credit to agriculture has remained almost flat at around 12% for a long time. Owing to the priority sector lending obligations, banks are mandated to divert 12% of their loans to agriculture. If agriculture productivity is to improve, investments will be needed which in turn will require greater availability of credit.

Similarly, MSMEs are chronically credit starved. Credit to MSMEs in the second half of the last decade was stagnant until 2020. As discussed earlier, the credit guarantee scheme launched by the government during pandemic triggered a phenomenal growth of bank credit to these MSMEs by FY2022. This highlights the need for a permanent credit guarantee or a credit enhancement setup that the government could establish in order to ensure, with appropriate checks and balances, better availability of credit to this segment.

Consumerisation of credit: As noted earlier in Sect. 13.2, a noteworthy trend in the Indian credit landscape over the last decade, even before the pandemic hit the Indian economy was the consistent rise of consumer credit. It went up from 23% of total credit to about 34% entirely on the back of growth of bank and NBFC consumer credit. Of the total consumer credit of about Rs 60 trillion today, about 50% is for housing (or secured) and the other half is 'other' consumer credit which includes vehicle loans, personal loans and credit card receivables (quasi-secured or unsecured). The rise of consumer credit is attributed to several factors including demographic (coming of age of the millennials) and economic changes (crossing the $2000 per capital income levels) and also due to institutional factors such as

the widening coverage of credit bureaus (Sengupta & Vardhan, 2021). One can also argue that the skew towards consumer credit, especially, in the second half of the last decade reflects the risk aversion that developed in the banking system post the NPA crisis, as described earlier.

Consumer lending by banks began around 2000 and since then India has not witnessed a consumer credit bust yet. The growth of unsecured consumer credit at over 20% for the last few years increases the likelihood of such consumer credit getting into trouble. It is important to note that India does not have a well defined and modern legal framework to deal with bankruptcy of individuals. This is a segment that the banking regulator will need to monitor with great care especially as the demand of industrial and business credit picks up.

13.5 Conclusion

The Covid-19 pandemic hit the Indian economy at a time when the financial sector, and in particular the banking sector was dealing with secularly declining credit growth due to heightened risk aversion in banks as well as in large (commercial) borrowers after years of a series of balance sheet crises. The pandemic which was an unprecedented shock to the economy in general, dealt a further blow to credit growth and arguably worsened the risk aversion of the financial sector. Two years later while credit growth has improved to some extent, and balance sheets have become healthier both due to deleveraging of firms and the absence of strong credit growth, new challenges have cropped up as the global economic environment turns adverse and also given the structural changes the financial sector has been undergoing over the last decade.

The net effect of all the trends we describe in this paper has been a steady reconfiguration of the Indian credit landscape. From being an overwhelmingly bank centric system, steadily the supply of credit is getting diversified. Large, high rated borrowers have migrated to the bond market to source their credit requirements either through bonds or commercial papers. At the lower end of the rating curve, credit AIFs and to some extend NBFCs (including microfinance companies) are becoming dominant. Banks are getting squeezed into the mid rated corporate borrowers (BBB to A rated) and consumer lending.

While this reconfiguration has a positive aspect of better distribution of risks across savers and investors, it also poses regulatory and policy challenges of ensuring that all segments of the economy have equitable and adequate access to credit and the systemic risk arising from such reconfiguration is contained. In the coming years, these are some of the challenges that the financial sector regulators and the policymakers will have to grapple with.

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Chapter 14
Trust and Public Policy: Lessons from the Pandemic

Mausumi Das and Ajit Mishra

Trust is the foundation upon which the legitimacy of democratic institutions rests. Public trust helps governments govern on a daily basis and respond to the major challenges of today and tomorrow.
—'Building Trust to Reinforce Democracy' , OECD Report, 2022.

Abstract This paper examines the importance of mutual confidence or trust between a government and its citizens on the effectiveness of public policies. We develop a theoretical framework where the designing of government policies and the concomitant actions of the citizens are meditated by the degree of social trust. We introduce a short-term aggregative health shock—a pandemic—which is novel: its characteristics are not fully known at the onset. This creates scope for government intervention in the form of framing the policy announcement and its information content. We use this framework to examine the relationship between government communication, social trust and compliance. For any given level of trust, we analyse the equilibrium framing of the policy as well as the corresponding response and examine the degree of policy effectiveness as a function of the existing level of trust.

Keywords Trust · Public policy · Pandemic

JEL Classifications H11 · I12 · I18

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14.1 Introduction

This paper examines the importance of mutual confidence or trust between a government and its citizens for the effectiveness of public policy at the time of a pandemic. Policies become ineffective when either the delivery agents (government officials) or citizens for whom the policies are designed act in manners which negate the intended outcome of these policies. Much of the public policy literature has focused on one crucial aspect of effective policy making: incentives. In this paper, we highlight another equally important aspect: trust.

Trust is broadly defined as 'cooperative attitude outside the family circle'.[1] It also entails an element of reciprocity. According to Coleman (1990), an individual exhibits trust if he or she places voluntary resources at the disposal of another party without any legal commitment from the latter, but with the expectation that the act of trust will pay off. In the case of the government trusting its citizens, the absence of legal precommitment is important.

The relationship between trust and economic development is now well recognized. Trust is believed to foster development through multiple channels. First, trust forms the backbone of any market exchange. As Arrow (1972) wrote: 'virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time'. Moreover, in a world of incomplete contracts and imperfect information, trust directly impacts overall economic efficiency by reducing transaction costs and increasing information sharing. Second, since investment in physical and human capital entails interaction among agents over multiple periods, the level of trust could influence their rate of accumulation. Third, trust constitutes the very foundation of international trade relations. Fourth, trust could facilitate R&D investment and technology transfer.[2]

While the role of trust in commercial transactions has been explored in detail (both theoretically and empirically), its role in the arena of policymaking has remained relatively unexplored. It is obvious that if common people do not have trust in the government then implementation of even the most well-intentioned policies would become a challenge. At the same time, if the government believes that citizens are subversive, then it is likely to spend too much effort and resources in monitoring and regulating, which are economically wasteful. Moreover, too much regulation may signal a prickly government, which can further erode the trust of the citizens. Thus, the lack of mutual trust between a government and its citizens can snowball into a bad equilibrium where the private agents are discouraged from taking any productive initiative while a major part of the government resources is spent on policing the agents.

These inefficiencies can become more pronounced during periods of great uncertainty—such as a pandemic. As we know, the COVID-19 pandemic was quite

[1] Algan and Cahuc (2014).

[2] Dearmona and Grier (2009) provide strong empirical support for a positive relationship between trust and economic growth using panel data for 51 countries. Also, see Algan and Cahuc (2014) for a comprehensive survey.

unprecedented not only in terms of its spread but also in terms of the scarcity of information about its infectivity and virulence (at least at the onset). As governments across the globe started gathering information and processing them quickly to come up with appropriate policies, their effectiveness depended on compliance by the common people. This is where trust would have played a critical role. States which have had a history of participatory governance structure would have found it easier to implement various COVID-appropriate policies and ensure compliance than states which have historically been more authoritarian.

Articles published in various national and global media at the onset of the pandemic as well as various interim reports of international agencies, such as the WHO, indeed lent credence to this view. A case in point is the state of Kerala in India. Kerala reported its first case of COVID-19—the first reported case in India—on 30 January 2020. The patient was a medical student who travelled from Wuhan, China to her hometown in Kerala on January 23. Upon returning, the student was asked to report to the nearby hospital for screenings and to self-isolate at home. At the same time, the Health Department of the state of Kerala also initiated an intensive tracking system to trace individuals who came in contact with the student; they were also told to quarantine in their homes. A week later, on January 30, the student tested positive for the virus, whereupon she was immediately transferred to an isolation ward at the Thrissur Medical College hospital. She stayed there for the next 28 days—being treated following all COVID protocols and also being tested for the virus every alternate day. The student was released from the hospital on February 20 after she tested negative for a whole week, and was allowed to return home. Despite being isolated for more than a month, the student was full of praise about the treatment she received from medical staff and the state. In a report published in the National Post, she was quoted as follows: 'The nurses and doctors who attended to me were calm and friendly, even though they had to camp out in the hospital. I had counsellors to speak to when I felt low. Even the health minister called to tell me the whole state was behind me and praying for my quick recovery'.[3] In the same newspaper article, Dr. Anant Bhan, a researcher in bioethics and global health policy, commented that the student's account of her experience probably added to public trust in the system, especially after concern and complaints had been registered in other parts of the country: 'It helped people understand that they would be taken care of and increased chances that they would report to the government for testing'. This was in sharp contrast with repeated reports of people escaping hospitals or quarantine in some other states, forcing them to undertake draconian measures to ensure compliance.[4] A report of WHO, published in July 2020, attributed the success of Kerala in controlling the initial spread of the infection to its timely and comprehensive response in

[3] See Desai (2020).

[4] For example, the state of Uttar Pradesh passed an ordinance in May 2020 that made hiding coronavirus infection a crime with a jail term of one to three years and a hefty fine of Rs 10000–Rs 10 lakh. For details, see Sharma (2020).

collaboration with key stakeholders and strong community engagement.[5] This policy template, hailed in the WHO report as 'a great example for other states to emulate', was obviously based on broad community support and mutual trust between the government and its citizens.

In this paper, we develop a theoretical framework where the designing of government policies and the concomitant actions of the citizens are meditated by the level of social trust. We introduce a short term (one period) health shock in our model, whose characteristics are not fully known in the current time period.[6] This creates scope for government intervention in the form of framing the policy announcement and its information content. We use this framework to examine the relationship between government communication, social trust and compliance. For any given level of trust, we analyse the equilibrium framing of the policy as well as the corresponding response and examine the degree of policy effectiveness as a function of the existing level of trust. We then allow for a dynamic interaction between the framing of the policy today and the level of social trust tomorrow and analyse its long run consequences from the perspective of governance structure as well as preparedness for future uncertainties.

Our paper is close in spirit to that of Aghion et al. (2010), but our model structure is very different. In our model, the main policy tool under consideration is public communication, which directly interacts with people's degree of social trust. Ours is a dynamic framework where the degree of social trust evolves over time. Moreover, introduction of a short-term uncertainty allows us to examine the possible deviations from the non-pandemic steady state and its long-run implications. It also makes our model suitable for analysing policies at the time of the COVID-19 pandemic.

Our work is directly motivated by an emerging empirical literature that links public trust with the efficacy of COVID-19 response by governments in different countries. In the section that follows we first discuss this motivating evidence. We then present our model in Sect. 14.3. Section 14.4 concludes by offering some directions for future research.

14.2 Motivating Evidence

Reported incidence and mortality from the COVID-19 virus varied greatly not only from country to country but also within the same geographical regions. It also defied the usual trend of death observed for other communicable diseases. Unlike malaria, typhoid, diphtheria or H.I.V., wealthier countries with more healthcare resources have had a greater burden from COVID-19 than have low-income countries with fewer healthcare resources, which Mukherjee (2021) referred to as an 'epidemiological mystery'. This unusual pattern in the spread and impact of the pandemic has led

[5] See here: https://www.who.int/india/news/feature-stories/detail/responding-to-covid-19---learnings-from-kerala.

[6] This could be interpreted as an epidemiological shock arising out of the novel coronavirus.

researchers to explore factors other than per capita income and health infrastructure to explain the observed geographical variation in the incidence and mortality rate of COVID-19. One of the key factors that has been repeatedly highlighted in this recent literature is the degree of social trust.

In a study published in Lancet, Bollyky et al. (2022) used data on daily SARS-CoV-2 infections and COVID-19 deaths for 177 countries and territories and 181 subnational locations for a period of 21 months (from 1 January 2020 to 30 September 2021) to assess the potential correlates of COVID-19 prevention and treatment across these countries. To this end, they estimated the cumulative infection rate and infection-fatality ratio (IFR) for all these countries, which were further standardized for environmental, demographic, biological and economic factors. The authors then tested for the correlation of these standardized national cumulative infection rates and IFRs with a number of variables such as pandemic preparedness indices; health system capacity indicators; governance indicators; inequality and societies' trust in their government, science and their communities. Their results are presented in Table 14.1.

This study clearly identifies social trust as one of the key factors in lowering the infection rate due to COVID-19 pandemic. As Fig. 14.1 shows, while most of the health and governance indicators were not meaningfully associated with standardized infection rates or IFR, measures of trust in the government and interpersonal trust, as well as less government corruption, had large, statistically significant associations with lower standardized infection rates and IFR. Indeed, according to the authors, 'If these modelled associations were to be causal, an increase in trust of governments such that all countries had societies that attained at least the amount of trust in government or interpersonal trust measured in Denmark, which is in the 75th percentile across these spectrums, might have reduced global infections by 12.9% for government trust and 40.3% for interpersonal trust'. High levels of government and interpersonal trust, as well as less government corruption, were also found to be associated with higher COVID-19 vaccine coverage among middle-income and high-income countries, where vaccines were readily available.

Another study by Lenton et al. (2022) examines the role of social and cultural factors in determining country-level resilience to COVID-19. 'Resilience' is defined as the rate of recovery of a system from perturbation back towards a presumed, pre-existing stable state—here zero infection and associated deaths—where rapid recovery equals high resilience. Using data for 157 countries, the authors report that resilience to COVID-19 varied by a factor of approximately 40 between countries for cases per capita, and approximately 25 for deaths per capita. Looking for an explanation for this variance, the authors found that trust within society was positively correlated with country-level resilience to COVID-19, as was the adaptive increase in stringency of government interventions when epidemic waves occur. By contrast, countries where governments maintained greater background stringency tended to have lower trust within society and tended to be less resilient. In fact, all countries where more than 40% of the respondents agree that 'most people can be trusted' achieved a nearly complete reduction of new cases and deaths. Based on these results, the authors comment that 'trust can improve resilience to epidemics and other unexpected disruptions, of which COVID-19 is unlikely to be the last'.

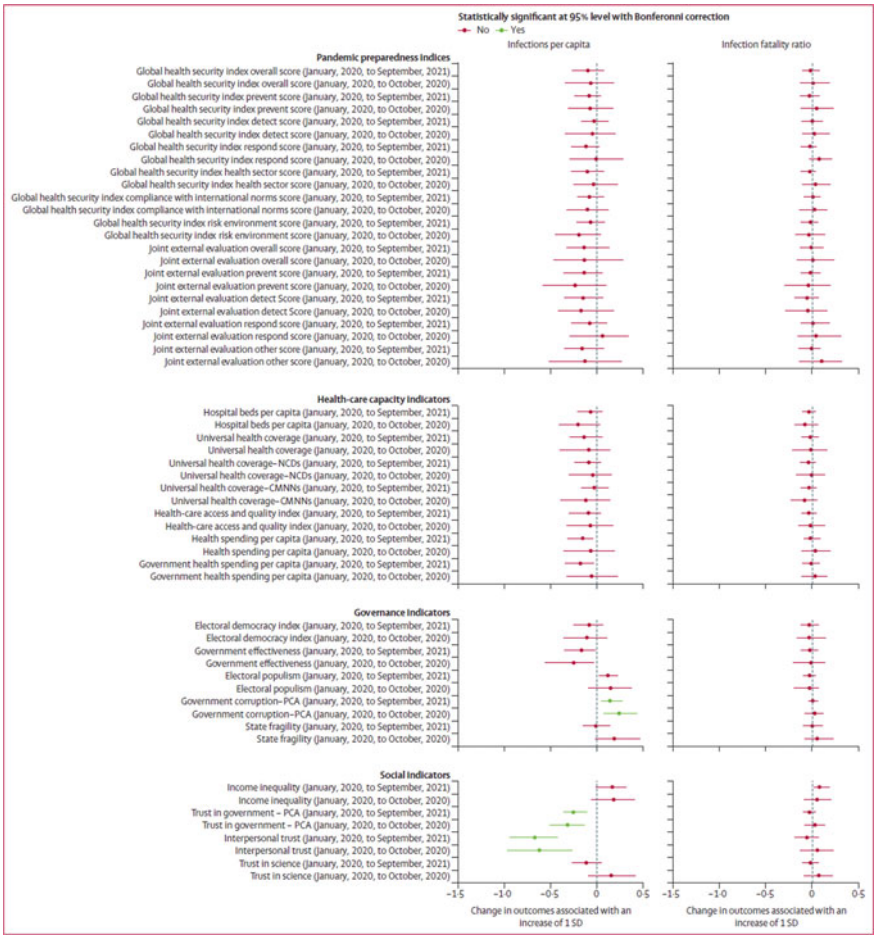

Fig. 14.1 Correlates of infection rate and IFR (*Source* Bollyky et al. (2022))

Our final piece of motivating evidence comes from Israelsen and Malji (2021), who undertook a comparative study of the initial COVID-19 response by two states in India: Kerala and Gujarat. Both states have a democratically elected government in charge of the state adminstartion, but the two states differ in their overall governance structure. Kerala has had a history of strong popular movements such as the temple entry movement of the 1930s, workers movements in the 1950s and 1960s, literacy movements in the 1980s and gender, caste and people's movements from the 1990s onwards, which have contributed towards the development of a strong civil society and inclusive social policies, making it a vibrant participatory democracy.[7]

[7] In this context it is worth a mention that Kerala, despite having the largest minority concentrations of Christians and Muslims than any other Indian state (each group roughly representing 20% of the

Table 14.1 COVID data—average: first 100 days

	India	Kerala	Gujarat
Case fatality rate (%)	3.20	0.64	6.20
Total cases	474,391	3603	29520
Covid case per 100k	30	11	94

(*Source* Israelsen and Malji (2021))

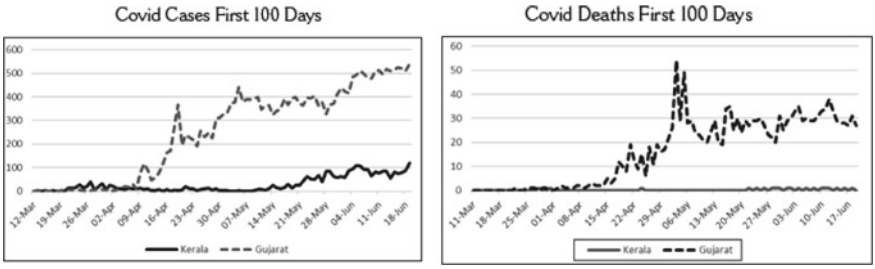

Fig. 14.2 COVID data in Kerala and Gujarat—first 100 days (*Source* Israelsen and Malji (2021))

In contrast, in Gujarat, the state's relationship with its citizens is organized around a centralized delivery of public goods that promote market interactions (e.g. roads, ports and power), but leaves little scope for social mobilization and cohesion. Indeed, despite being economically one of the most prosperous states in India, it lags behind in terms of many of the social indicators of development. Gujarat also has had a long history of communal conflicts in the post-independence era. It is therefore expected that the degree of social trust would be high in Kerala and low in Gujarat. In this backdrop, Israelsen and Malji (2021) compare the initial impact of COVID-19 in Kerala vis-a-vis Gujarat for the first 100 days—starting on 11 March 2020, when the WHO declared the novel coronavirus a global pandemic, to 19 June 2020. The authors argue that during this initial period, Kerala did a much better job in terms of 'flattening the curve' than Gujarat, which is reflected in Table 14.1.

The stark contrast in initial COVID numbers between the two states is apparent not only in terms of the averages but also in terms of the dynamics of the disease over the first 100 days, as captured by the progress of the absolute number of COVID cases and COVID deaths in the first 100 days. These are shown in Fig. 14.2.

Israelsen and Malji (2021) argue that inclusionary social policies, along with state official's transparency and communicativeness concerning the handling of the pandemic, meant that there was a high level of public trust in the government, ensuring that there would be a high level of citizen cooperation in attempts at 'flattening the curve' in Kerala, which was lacking in Gujarat.

population), has rarely seen a communal conflict in the post-independence era. See Heller (2020) for elaboration.

The empirical evidence presented here suggests a strong correlation between social trust and effectiveness of government policies at the time of a pandemic. We now develop a theoretical model that attempts to capture the precise mechanism through which this correlation works.

14.3 The Model

Consider an economy populated with a continuum of risk-neutral agents of mass one, each endowed with one unit of labour. A single final commodity is produced in the economy using labour as the only input. However, the same good can be produced in two sectors, which are characterized by different technologies as well as different social distancing opportunities:

(i) a modern industrial sector which generates α units of final good per unit of labour employed;
(ii) a home production sector which generates β units of final good per unit of labour employed, where $\beta < \alpha$.

The industrial sector also requires workers to congregate in a confined physical space (a factory) where there is little scope for social distancing. In situations of a pandemic, this creates a potential health hazard, generating a negative externality for everybody engaged in industry production. The negative externality is measured by a disutility cost δ, which is directly related to the intensity of the pandemic.

The health hazard due to the pandemic can however be mitigated if people follow COVID-appropriate behaviour such as wearing masks, cleaning hands regularly, avoiding public gatherings and so on. The individual cost of maintaining these COVID protocols is small, measured by a number ε close to zero. But their impact can be large depending on how many people in the community are adhering to these protocols.[8] Accordingly, we posit that for any pandemic of a given intensity δ, its health hazard can be reduced by some percentage ρ, where the exact value of ρ is endogenous: it depends on agents' collective behaviour. In particular, if everybody in the community adheres to the COVID protocols, then the health hazard associated with the pandemic is brought down to its minimum level, assumed to be zero.[9] On the other hand, if nobody in the community follows the COVID-appropriate behaviour, then the pandemic affects people with its full intensity. Thus, we define the effective health hazard (δ^e) associated with a pandemic of intensity δ as

[8] Many studies found that community mask adherence and community attitudes towards masks were associated with a substantive reduction in COVID-19 cases and deaths. See for example, Adjodah et al. (2021).

[9] The assumption that everybody following the COVID protocols can reduce the effective health hazard of a pandemic to zero—irrespective of its intensity—is of course an exaggeration. However, there is no doubt that a coordinated effort by all agents in the community can greatly reduce the risk of infection. The qualitative results of our model will not change even if we allow a small percentage of transmission possibility when everybody is masked.

$$\delta^e = \rho(n_m)\,\delta;\ \rho' < 0;\ \rho(0) = 1;\ \rho(1) = 0. \tag{14.1}$$

Here, $n_m \in [0, 1]$ denotes the fraction of the people in the society who follow COVID-appropriate behaviour.

Perfect competition in both sectors ensures that the sectoral wage rates are equal to the respective marginal/average products of labour. It is then obvious that when there is no pandemic, all agents will be engaged in industrial production, which offers a higher wage α. The concomitant utility and aggregate income, also measured by α, are at their maximum possible level. This non-pandemic steady state constitutes our benchmark—an ideal scenario where atomistic agents acting in isolation attain the best possible outcome for themselves and for the society.

Keeping this benchmark in mind, we now focus on a pandemic situation, when working in the industrial sector entails a health hazard. The impact of the health hazard depends on the intensity of the pandemic as well as on the preventive measures undertaken at the community level to contain the spread of the virus. Since agents acting in isolation can no longer ensure the best possible outcome for themselves, trust in others—in the community and in the government—now assumes special significance.

14.3.1 Pandemic, Uncertainty and Trust

One unique feature of the COVID-19 virus was that very little was known about it at the onset of the pandemic. Government health officials in various countries were investing time, effort and resouces in gathering information, often in coordination with international health agencies such as the WHO. Given the general lack of information and uncertainty, the communication strategy of the government was of paramount importance. When confronted with a novel virus for which there is no pre-existing treatment or vaccine, the most effective way for a government to protect its citizens is by convincing them to take measures to protect themselves and one another. Compliance with government guidance on maskwearing, physical distancing, contact tracing or a new vaccine depends on citizens' confidence that the government is trustworthy—a belief that the government knows what it is doing and is acting for the common good. Thus, the presence of uncertainty creates the scope for effective government intervention, but its effectiveness depends crucially on the degree of public trust.

Trust is important not only for compliance with government policy but also for maintaing prosocial behaviour and cooperation among citizens in a crisis time like the COVID-19 pandemic. Indeed, many of the behaviours that are known to be effective in reducing the transmission of the virus involve a tradeoff between self and collective interests, requiring people to bear individual costs (albeit small) to benefit others. Yet, these same behaviours offer benefits of protecting the community from exposure to the virus, reducing the spread of the virus, and maintaining well-functioning healthcare institutions. Thus, everyone would fare better by acting cooperatively.

Whether such cooperation occurs or not depends on how much confidence people have in one another, i.e. on the degree of interpersonal trust.

In the theoretical construct that follows, we distinguish between two different types of social trust: (a) Public trust—the trust a citizen places in the government and other public institutions; (b) Interpersonal trust—the trust a citizen places in his fellow citizens.[10] As we argue below, both play a crucial role in determining the equilibrium outcome at the time of a pandemic.

As mentioned earlier, at the onset of the COVID pandemic, even government authorities lacked enough information about the infectivity of the virus and its virulence. Nonetheless, the state officials were better informed than the ordinary citizens because of their access to large-scale data and their close links with officials in other countries and international agencies. We therefore postulate that based on collected data, the government first receives a signal δ about the intensity of the pandemic, drawing from a uniform distribution with support $[\underline{\delta}, \bar{\delta}]$. It then decides to communicate this to the public along with some broad guidelines about COVID-appropriate behaviour, such as wearing masks, cleaning hands, avoiding crowded places etc. At the moment, we shall assume that the government communicates the entire signal content truthfully to its citizens.

Upon receiving the message from the government, an agent chooses his best course of action. The action space of agent consists of two decisions:

(i) Whether to work in the industrial sector or engage in home production;
(ii) Contingent on working in the industrial sector, whether to follow the COVID-appropriate behaviour or not.

Working in home production generates a pay-off β, which is independent of δ. Since the agent stays at home, there is neither a chance of him being exposed to the virus nor any need to follow COVID-appropriate behaviour. On the other hand, if the agent joins the industrial sector, then in the absence of any COVID-appropriate behaviour, the pay-off of the agent is given by $\alpha - \delta$. If however he and some others—altogether n_m fraction of agents in the community—adhere to the COVID-appropriate behaviour, then working in the industrial sector generates a pay-off $\alpha - \varepsilon - \rho(n_m)\delta$. A decision tree showing the actions of an agent i and his corresponding pay-offs is depicted in Fig. 14.3.

It is obvious that the optimal choice of action by an agent depends on the intensity of the pandemic (δ) as well as the fraction of people who undertake the COVID-appropriate behaviour (n_m). Given ε, the agent will join the industrial sector if and only if his pay-off from working in the industrial sector, denoted by $\pi(\delta, n_m)$, is at least as high as β. When the individual cost of following the COVID protocols (ε) is negligible, one can easily verify that there exists a threshold level of pandemic intensity, defined by $\hat{\delta} \equiv \alpha - \beta$, such that

[10] Similar distinction is also made between trust within a close group such as family and clan on one hand, and within ties outside—as they have different implications. See Banfield (1958).

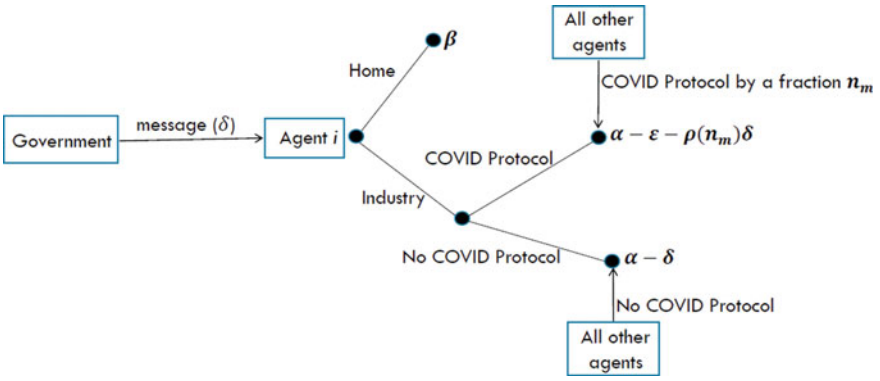

Fig. 14.3 Decision tree

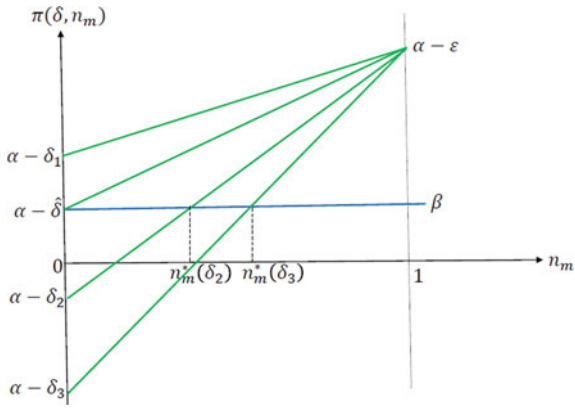

Fig. 14.4 Pay-off comparison: industry versus home production

$$\text{for } \delta \leqq \hat{\delta},\ \pi(\delta, n_m) \geqslant \beta \ \text{ for all } n_m \in [0, 1]\,;$$

$$\text{for } \delta > \hat{\delta},\ \pi(\delta, n_m) \gtreqless \beta \text{ iff } n_m \gtreqless n_m^*(\delta) \equiv \rho^{-1}\left(\frac{\alpha - \varepsilon - \beta}{\delta}\right).$$

These pay-off comparisons are shown in Fig. 14.4, where we plot the $\pi(\delta, n_m)$ function with respect to n_m. The characterization of the $\rho(n_m)$ function specified in Eq. (14.1) allows us to fix the two intercept terms $\pi(\delta, 0)$ and $\pi(\delta, 1)$ for different values of δ. Since we have postulated that when everybody in the community strictly adheres to the COVID protocols (i.e. when $n_m = 1$), the effective health cost associated with the pandemic is brought down to zero irrespective of the intensity of the pandemic, it implies that the intercept term at $n_m = 1$ remains unchanged as the pay-off line shifts responding to a change in δ.

In Fig. 14.4, we have depicted four cases—each corresponding to a different value of δ. One of them relates to the threshold value $\hat{\delta}$: in this case, $\pi(\hat{\delta}, 0) = \beta$, which implies that even when nobody in the community follows the COVID protocols, pay-off from working in industrial production—despite the infection—exactly matches the pay-off from working in home production. Needless to say, as more and more people adhere to the COVID protocols, the risk of getting infected goes down, raising the pay-off from working in industry production vis-a-vis home production. If the intensity of the pandemic is even weaker than $\hat{\delta}$, as depicted in Fig. 14.4 by δ_1, then working in the industrial sector *always* generates higher pay-off than working at home production. The other two cases depicted in Fig. 14.4 relate to strong pandemic intensities δ_2 and δ_3- both of which are higher than the threshold value $\hat{\delta}$. In this case, working in the industrial sector generates higher pay-off if and only if enough people in the community ($n_m^*(\delta_2)$ and $n_m^*(\delta_3)$, respectively) adhere to the COVID protocols. A pandemic of greater intensity ($\delta_3 > \delta_2$) requires a higher fraction of the population to follow COVID appropriate behaviour ($n_m^*(\delta_2) > n_m^*(\delta_3)$) in order to make the pay-off from the industrial sector comparable to that from home production. Since the relative pay-off from the industrial sector now depends crucially on the action of other agents in the economy, this is where the level of social trust—public as well as interpersonal— plays a critical role.

To make things interesting, let us assume

$$\hat{\delta} \in (\underline{\delta}, \bar{\delta}). \qquad \textbf{(Assumption 1)}$$

Assumption 1 implies that the signal observed by the government could lie below or above the threshold level. This allows us to explore a whole range of possibilities where the degree of social trust interacts with the intensity of the pandemic to generate the equilibrium outcome.

Consider two types of societies: a high-trust society and a low trust society. The high-trust society is characterized by a high degree of public trust *and* interpersonal trust. Thus, in the high-trust society, agents fully believe in any message communicated by the government. They also have full trust in the cooperative behaviour of their fellow citizens. In contrast, the low-trust society is characterized by a low degree of public trust, compounded by a low level of interpersonal trust. Thus, in the low-trust society, agents believe that the government is not being truthful in its message conveyed to the public. In addition, they have little faith in their fellow citizens and do not expect any cooperation from them. We now compare the equilibrium outcomes during a pandemic in high-trust vis-a-vis low-trust societies.

14.3.1.1 High-Trust Society

In a high-trust society, all agents believe the government announcement that there is a pandemic of intensity δ. They also believe that their fellow citizens will abide by the announced guidelines regarding COVID-appropriate behaviour. Thus, in equilibrium, $n_m = 1$. Therefore, from Fig. 14.4, it is obvious that everybody in the high-trust

society will join the industrial sector, irrespective of the value of δ. The equilibrium pay-off of an agent is the high-trust society given by

$$\pi(\delta, 1) = \alpha - \varepsilon > \beta \tag{14.2}$$

Note that, when the individual cost of following the COVID protocols (ε) is negligible, the equilibrium outcome in a high-trust society becomes almost equivalent to that of the no-pandemic benchmark. Thus, in a high-trust society, individuals' optimal course of action also generates the socially optimal outcome, which makes proactive government policies redundant. Indeed, the only policy that a government needs to follow is to truthfully convey the received signal content to the citizens and outline the appropriate COVID protocols; there is no need to take recourse to restrictive policies such as travel restrictions or lockdown.[11]

14.3.1.2 Low-Trust Society

Now consider a society where agents are low in trust. Hence, when the government announced that there is a pandemic of intensity δ, the agents believe that the government is not being truthful about the intensity. They also believe that none of their fellow citizens will follow any COVID protocols. Thus, in equilibrium, $n_m = 0$.

Notice that, even if the agents believe in the government's message about the pandemic intensity, lack of interpersonal trust means that they will always operate at an inefficient equilibrium. From Fig. 14.4, it is easy to see that for any pandemic intensity $\delta \leqslant \hat{\delta}$, everybody in the economy will join the industrial sector, but nobody will follow COVID-appropriate behaviour. On the other hand, for any pandemic intensity $\delta > \hat{\delta}$, the agents will stay at home—working in home production, since working in the industrial sector without any COVID protocols now gives lower returns. The equilibrium pay-off of an agent in this case is given by

$$\pi(\delta, 0) = \begin{cases} \alpha - \delta & \text{for } \delta \leqslant \hat{\delta}; \\ \beta & \text{for } \delta > \hat{\delta}. \end{cases} \tag{14.3}$$

The problem gets compounded when the agents are also lacking in public trust. To see this, suppose the agents believe that the government is misreporting the intensity

[11] In this context, one might recall the Swedish experiment. In February 2020, as COVID-19 had begun sweeping across Europe leading to a complete shutdown of many countries, Sweden remained open. The country's approach at that time was controversial. Although the death rate from COVID-19 did go up sharply in Sweden, some have argued that compared to other countries in Europe, it was not the worst off. For example, It was not as bad as Italy, Spain, the U.K. and Belgium. According to Pickett (2021), the Swedish Government allowed for small liberties such as going to restaurants, bars and parties, which made the government appear quite permissive. Staying at home was optional rather than mandatory, but mobility data from cell phones show that Swedes did significantly reduce their movement. This seems to support our hypothesis that a trusting population will respond favourably to the permissive policy of the government on their own, making coercive policies such as a lockdown redundant.

and the true pandemic intensity is $\tilde{\delta} \neq \delta$. Given that the agents earn a higher income from the industrial sector, it seems plausible to assume that they underplay the threat of infection from working in this sector, such that $\tilde{\delta} < \delta$. Accordingly, we postulate that

$$\tilde{\delta} = \gamma\delta;\ 0 < \gamma < 1, \qquad \textbf{(Assumption 2)}$$

where γ measures the degree of public trust. A high value of γ means high public trust.

The agent will now choose their optimal course of action based on their perceived pandemic threat $\tilde{\delta}$, instead of the received signal δ. When the pandemic intensity is low, i.e. $\delta \leqslant \hat{\delta}$, this distrust in government does not impact the optimal occupation choice of an agent. Since they underplay the pandemic threat, they join the industrial sector anyway, without any COVID protocol. Nevertheless, there is now a difference between the agents' expected pay-off $\pi(\gamma\delta, 0)$, and their actual pay-off $\pi(\delta, 0)$, such that

$$\pi(\delta, 0) < \pi(\gamma\delta, 0).$$

Lack of public trust can however precipitate a serious health crisis if the pandemic intensity is sufficiently high, i.e. $\delta > \hat{\delta}$. In this case, agents underplaying the pandemic threat means that they might decide to join the industrial sector without adhering to any COVID protocol, when they should have actually stayed home. These possibilities are shown in Fig. 14.5.

In Fig. 14.5, the red dotted lines represent an agent's expected pay-off under a pandemic of intensity δ, while the green lines depict the corresponding actual pay-off. It is easy to see that for any δ-value greater than $\hat{\delta}$, a possibility now arises where the distrusting agents, who underplay the government's message and defy the broad directives issued by the government, not only end up with a lower actual pay-off than they had anticipated but also choose a course of action which is socially harmful.

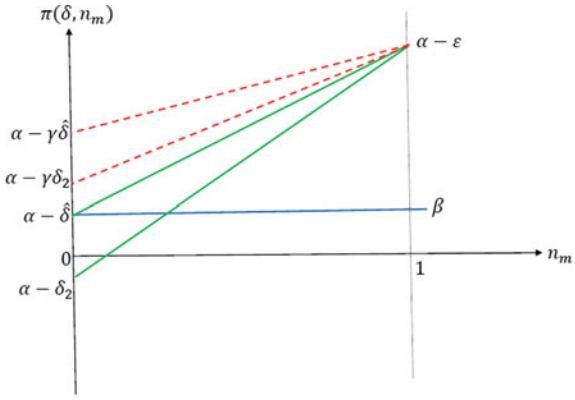

Fig. 14.5 Pay-offs under distrust

This situation is depicted in Fig. 14.5 by the lines corresponding to δ_2. By joining the industrial sector without COVID protocol, the agents now create a negative health externality for everybody, lowering their pay-offs below that from home production. Thus, not only do they deviate from what is socially optimal but also harm themselves in the process.

This range of possibilities of course depends on the degree of public trust (γ). In particular, there exists an interval of δ values, given by $(\alpha - \beta, \frac{\alpha-\beta}{\gamma})$, such that if the received signal lies within this range, then the distrusting agents, though better off by working at home, will land up in the factories defying the government directives—thereby creating a health crisis. Higher is the value of γ, greater is the length of this interval where the agents' act of defiance results in a health crisis. In such cases, (costly) coercive actions are needed to make agents follow the directives issued by the government.

14.3.1.3 Manipulation of Information and Trust Dynamics

Coercive actions are economically and politically costly. They are economically costly because the government has to spend resources in monitoring the agents. They are politically costly because the government forces agents undertake actions which they are not willing to undertake otherwise, which obviously does not make the government very popular! This brings us to an alternative policy consideration: what if the government willfully distorts the information it communicates to the people, knowing that people are going to process this information is a biased manner anyway? In particular, suppose instead of truthfully communicating the received signal δ to its citizens, the government now announces a δ' where $\delta' \neq \delta$? Indeed, if the government is perfectly aware of the degree of trust γ, then it can cleverly manipulate the information content of its announcement by declaring that $\delta' = \frac{\delta}{\gamma}$. The distrusting agents will make a downward adjustment to the announced intensity by exactly the same factor γ, and will operate on the basis of the actual δ, which perfectly suits the purpose of the government. This seems to be a win-win strategy for the government, where it can get agents to behave by simply misreporting some information, thereby avoiding the economic and political costs associated with a coercive policy![12]

[12] Public authorities suppressing information at the time of COVID was not uncommon at all, although in most of these cases, the governments were accused of under-reporting rather than over-reporting the intensity of the disease. For example, Nayanan (2021) writes: 'Over a year of the pandemic, the Indian government's communication has been marked by mixed messaging, the downplaying of potential threats, grandstanding on the administration's handling of the crisis and a reluctance to share information'. More recently, WHO officials complained that China's COVID-19 data does not convey an accurate picture of the situation there and underplays the impact of the disease. See here: https://www.reuters.com/world/china/whos-tedros-concerned-by-china-covid-surge-calls-again-data-2023-01-04/.

Such a strategy however can be problematic on several accounts. First, it is not obvious that the cost of this strategy is necessarily negligible. After all, declaring that the pandemic is going to be of very high intensity (even though it actually may not be) could create unnecessary panic and disorder, making governance difficult. Secondly, projecting that the pandemic is likely to cause a lot of damage may be seen as an acknowledgement of a weak healthcare system, which would dent the reputation of the government. Last, but not least, distortion of information, even if effective in the short run, may further erode the trust of the citizens which will have adverse consequences for the future.

This latter idea can be formally explored by bringing in a time dimension into the picture and by postulating that the signal content changes in every time period, which necessitates the government and the private agents to recalibrate their actions in every period.[13] It is also reasonable to assume that while the government receives the signal at the beginning of the period, agents can costlessly verify the signal content at the end of the period—after they have undertaken their optimal course of action. If the government is truthful about communicating the signal content to the citizens, then this verification process does not yield any surprises: the game is played in the second period exactly the same way, albeit with a fresh draw of δ. But if the government is found to have suppressed/distorted the information content of the signal, then in the next period the degree of public trust (γ) goes down. In particular, one can formulate a dynamic equation capturing the evolution of trust such that

$$\gamma_{t+1} = \gamma_t - f\left(\left|\delta - \delta'\right|\right);\ f(0) = 0;\ f' > 0.$$

To the extent, public trust is an important determinant of compliance, such erosion of trust would seriously jeopardize the effectiveness of policies in confronting a fresh wave of the epidemic or any similar health shock arising in the future.

14.4 Conclusion

The objective of the paper has been simply to highlight the role of trust (of different kinds) in the context of policy effectiveness, without delving into the formal treatment of equilibria. The analysis in this paper can be extended in several directions. Note that we have only considered the case of homogenous society where individuals behave in the same manner. We can model heterogeneous individual behaviour explicitly by considering individuals with different costs of compliance or attitude towards trust.

Second, as the example in the text shows, in a low-trust society the government can improve social welfare by deviating from truth telling. For example, should it exaggerate the pandemic intensity to induce efficient decisions by citizens? But once

[13] This assumption is not very outlandish. Over time, as more information about COVID-19 became available, both the WHO and state officials changed their directives multiple times. Moreover, the virus mutated many times, making the previous prediction about its infectivity and potency invalid.

this is allowed, individuals can factor this deviation into account and trust dynamics will be affected. Government has been a passive player in our analysis—but this extension will incorporate strategic behaviour by the government also.

Lastly, we can also consider information acquisition by the citizens. There was an explosion of information (misinformation) during the pandemic. In many cases, citizens would benefit from additional information about the underlying states, so that optimal action can be chosen. For example, government announces δ but the exact ρ function may depend on some another state of nature. The individual can acquire this information about ρ to take optimal decisions. Given that information is likely to be noisy (especially during the pandemic and with a free-for-all social media), and such information may be costly to acquire, this issue of information acquisition deserves careful attention.

These avenues are to be explored in our future work.

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