सत्यमेव जयते

Economic Survey 2018-19

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Preface

At the outset, we would like to express our sincere gratitude to the leadership provided by previous Chief Economic Advisors, which has elevated the Economic Survey to a much anticipated event in India's economic calendar. The contribution they have made through their erudition, rigour and, most importantly, their ideas can only be expressed through Sir Isaac Newton's immortal quote: *"If I have seen further than others, it is by standing upon the shoulders of giants."* This Survey makes a humble effort to carry forward this glorious tradition.

This Survey is the first for the new Government, which came to power with an overwhelming mandate. With the aspirations that have been kindled among our predominantly young population, India stands at a historic moment when sustained high economic growth has become a national imperative. Aptly, the Honourable Prime Minister laid down the vision of India becoming a $5 trillion economy by 2025 (*#Economy@5trillion*) and has inspired every citizen to contribute his or her bit to this worthy cause. In his words, *"If every one of the 130 crore Indians takes one step forward, the country too will go that many steps ahead."* By laying out the strategic blueprint for fructifying this vision, the Survey extends its absolute commitment to a collective endeavour: 130 crore Indians creating an inclusive India by 2022 when we, as a nation, complete 75 years of Independence (*#India@75*).

Imbued by the power of the opportunity that beckons, the team for Economic Survey 2018-19 has been guided by "blue sky thinking." The Survey adopts an unfettered approach in thinking about the appropriate economic model for India. This endeavour is reflected in the *sky blue cover* of the Survey. To achieve the vision of *#Economy@5trillion*, India needs to shift its gears to accelerate and sustain a real GDP growth rate of 8%. The Survey departs from traditional thinking by viewing the economy as being either in a virtuous or a vicious cycle, and thus never in equilibrium. Rather than viewing the national priorities of fostering economic growth, demand, exports and job creation as separate problems, the Survey views these macroeconomic phenomena as complementary to each other. The cover design captures the idea of complementary inter-linkages between these macroeconomic variables using the pictorial description of several inter-linked gears.

Drawing upon the trajectories followed by East Asian economies that experienced long periods of high growth, the Survey postulates the centrality of investment as the "key driver" that catalyses the economy into a self-sustaining virtuous cycle when supported by a favourable demographic phase. After laying out the strategic blueprint for fulfilling the vision of *#Economy@5trillion*, the Survey describes some of the tactical devices required to navigate an uncertain world in constant dis-equilibrium. *Inter alia,* the Survey focuses on nourishing MSMEs to create jobs and become more productive so that they can become internationally competitive, enhancing legal reform, ensuring consistency of policy with the vision and the strategic blueprint, reducing the cost of capital, and rationalizing the risk-return trade-off for investments.

In its attempt at unfettered thinking, the Survey utilises the significant advances made in Behavioural Economics in the last few decades, which culminated in the 2017 Nobel Prize in Economic Sciences being awarded to Prof. Richard Thaler. The impact created by Government's flagship initiatives such as *Swacch Bharat Mission, Jan Dhan Yojana* and the *Beti Bachao Beti Padhao* provide testimony to the potential for behavioural change in India. Given our rich cultural and spiritual heritage, social norms play a very important role in shaping the behaviour of each one of us. Behavioural economics provides the necessary tools and principles to not only understand how norms affect behaviour but also to utilise these norms to effect behavioural change. The Survey, therefore, lays out an ambitious agenda for behavioural change by applying the principles of behavioural economics to several issues including gender equality, a healthy and beautiful India, savings, tax compliance and credit quality.

Heading into a century where data has become the new oil and analytics from data the new tool for decision making, the Survey foresees countless opportunities in creating data as a public good "of the people, for the people and by the people".

In preparing this Survey, time and talent have been devoted to make our analysis understandable to all readers while maintaining the necessary level of rigor. To illuminate the key insights and demystify the concept for readers across all disciplines, an *Abstract* and a *Chapter at a Glance* have been included for each Chapter of the Survey.

We chose to continue with the popular tradition of presenting the Survey in two volumes. Volume I, which attempts to capture our "blue sky thinking", provides evidence based economic analyses of recent economic developments to enable informed policymaking. Volume II reviews recent developments in the major sectors of the economy and is supported by relevant statistical tables and data. This would serve as the ready reckoner for the existing status and policies in a sector.

The Economic Survey attributes its existence and popularity to the collaborative effort of all Ministries and Departments of Government of India, the prodigious resource base of the Indian Economic Service officers, valuable inputs of researchers, consultants and think tanks both within and outside the government and the consistent support of all officials of the Economic Division, Department of Economic Affairs. The Survey has made a sincere effort to live up to the expectation of being an indispensable guide for following, understanding and thinking about the Indian economy. While our immensely enriching journey represents our ultimate reward, we hope readers share the sense of excitement with which we present the Survey.

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ABBREVIATIONS

AgDSM	Agriculture Demand Side Management
ANBC	Adjusted Net Bank Credit
API	Application Programming Interface
APL	Above Poverty Line
APL	Aadhaar Linked Payments
ASI	Annual Survey of Industries
BAU	Business as Usual
BBBP	Beti Bachao, Beti Padhao
BCE	Before Christian Era
BEE	Bureau of Energy Efficiency
BEVs	Battery Electric Vehicles
BHIM	Bharat Interface for Money
BPL	Below Poverty Line
BRICS	Brazil, Russia, India, China, South Africa
CAFE	Corporate Average Fuel Efficiency
CAGR	Compound Annual Growth Rates
CBSE	Central Board of Secondary Education
CCR	Case Clearance Rate
CEPEJ	Commission for the Efficiency of Justice
CO2	Carbon Dioxide
CPI	Consumer Price Index
CSC	Common Service Centre
CV	Coefficient of Variation
D&S courts	District and Subordinate courts
DBT	Direct Benefit Transfer
DBTL	Direct Benefit Transfer for LPG
DC	Designated Consumers
DDU GKY	Deen Dayal Upadhyaya Grameen Kaushalya Yojana
DISCOMs	Distribution Companies
DSM	Demand Side Management
E- NAM	National Agriculture Market
ECBC	Energy Conservation Building Code
ECC	Employment Conditions Commission
EESL	Energy Efficiency Services Limited
EODB	Ease of Doing Business
EPU	Economic Policy Uncertainty
ESCerts	Energy Saving Certificates
EUS	Employment & Unemployment Survey
EVs	Electric Vehicles
FAME	Faster Adoption and Manufacturing of Electric vehicles
FCEVs	Fuel Cell Electric Vehicle
FII	Foreign Institutional Investment
GHG	Greenhouse Gas
GIS	Geographic Information System
GST	Goods and Services Tax
GVA	Gross Value Added
HDI	Human Development Index
HRD	Human Resource Development
ICAR	Indian Council of Agricultural Research
ICDS	Integrated Child Development Services
ICT	Information and Communications Technology
IDA	Industrial Disputes Act
IHHL	Individual Household Latrine
IIPS	International Institute for Population Sciences
ILC	International Labour Conference
ILO	International Labour Organization
IMD	India Meteorological Department
ISRO	Indian Space Research Organisation
IVA	Independent Verification Agency
JAM	Jan Dhan, Aadhaar and Mobile
KUSUM	Kisan Urja Suraksha Evam Utthaan Mahabhiyan
LCR/R and P	Lower Courts Records - Records and Proceedings
LED	Light-Emitting Diode
LFPR	Labour Force Participation Rate
LPG	Liquefied Petroleum Gas
MAA	Mothers' Absolute Affection
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MIS	Management Information System
MoDWS	Ministry of Drinking Water and Sanitation
MoEF&CC	Ministry of Environment, Forest and Climate Change
MoU	Memorandum of Understanding
MPCE	Monthly Per Capita Expenditure
MSME	Micro, Small & Medium Enterprises
MtCO2	Metric Tons of Carbon Dioxide Equivalent
MTOE	Million Tonne of Oil Equivalent
NARSS	National Annual Rural Sanitation Survey
NBFC AA	Non Banking Financial Company Axxount Aggregators
NDC	Nationally Determined Contribution
NEFMS	National Electronic Fund Management System
NEMMP	National Electric Mobility Mission Plan
NEV	New Energy Vehicle
NFLMW	National Floor Level Minimum Wage
NJDG	National Judicial Data Grid
NRM	Natural Resource Management
NSSO	National Sample Survey Organisation
NVA	Net Value Added
ODF	Open Defecation Free
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary Least Squares
ORS	Oral Rehydration Solutions
OSH	Occupational Safety and Health
PAN	Permanent Account Number
PAT	Perform Achieve and Trade
PDS	Public Distribution System
PHEVs	Plug-in Hybrid Electric Vehicles
PMAY-G	Pradhan Mantri Awas Yojana- Gramin

PMJDY	Pradhan Mantri Jan Dhan Yojana
PMO	Prime Minister's Office
PSL	Priority Sector Lending
RE	Renewable Energy
SBM	Swachh Bharat Mission
SBM(G)	Swachh Bharat Mission (Gramin)
SDGs	Sustainable Development Goals
SLWM	Solid and Liquid Waste Management
SRB	Sex Ratio at Birth
SSI	Small Scale Industries
TFR	Total Fertility Rate
TOE	Tonnes of Oil Equivalent
TWh	Terawatt-hour
UAE	United Arab Emirates
UIDAI	Unique Identification Authority of India
UJALA	Unnati Jyoti by Affordable LEDs
UK	United Kingdom
ULBs	Urban Local Bodies
UNICEF	United Nations International Children's Emergency Fund
UPI	Unified Payments Interface
USA	United States of America
UTs	Union Territories
VDA	Variable Dearness Allowance
WHO	World Health Organization
ZEVs	Zero Emission Vehicles

Shifting Gears: Private Investment as the Key Driver of Growth, Jobs, Exports and Demand

01
CHAPTER

During the last five years, India's economy has performed well. By opening up several pathways for trickle-down, the government has ensured that the benefits of growth and macroeconomic stability reach the bottom of the pyramid. To achieve the objective of becoming a USD 5 trillion economy by 2024-25, as laid down by the Prime Minister, India needs to sustain a real GDP growth rate of 8%. International experience, especially from high-growth East Asian economies, suggests that such growth can only be sustained by a "virtuous cycle" of savings, investment and exports catalysed and supported by a favourable demographic phase. Investment, especially private investment, is the "key driver" that drives demand, creates capacity, increases labour productivity, introduces new technology, allows creative destruction, and generates jobs. Exports must form an integral part of the growth model because higher savings preclude domestic consumption as the driver of final demand. Similarly, job creation is driven by this virtuous cycle. While the claim is often made that investment displaces jobs, this remains true only when viewed within the silo of a specific activity. When examined across the entire value chain, capital investment fosters job creation as the production of capital goods, research & development and supply chains generate jobs.

The Survey departs from traditional Anglo-Saxon thinking by advocating a growth model for India that views the economy as being either in a virtuous or a vicious cycle, and thus never in equilibrium. This model, in turn, stems from two key departures from the traditional view. First, the Survey departs from the concept of equilibrium as a key tenet, which is being challenged increasingly following the Global Financial Crisis. Second, the traditional view often attempts to solve job creation, demand, exports, and economic growth as separate problems. As these macro-economic phenomena exhibit significant complementarities, the Survey postulates the centrality of the triggering macro-economic variable that catalyses the economy into a virtuous cycle. The Survey makes the case for investment as that key driver. By presenting data as a public good, emphasizing legal reform, ensuring policy consistency, and encouraging behaviour change using principles of behavioural economics, the Survey aims to enable a self-sustaining virtuous cycle. Key ingredients include a focus on policies that nourish MSMEs to create

more jobs and become more productive, reduce the cost of capital, and rationalise the risk-return trade-off for investments.

LAST FIVE YEARS: THE ACCOMPLISHMENTS

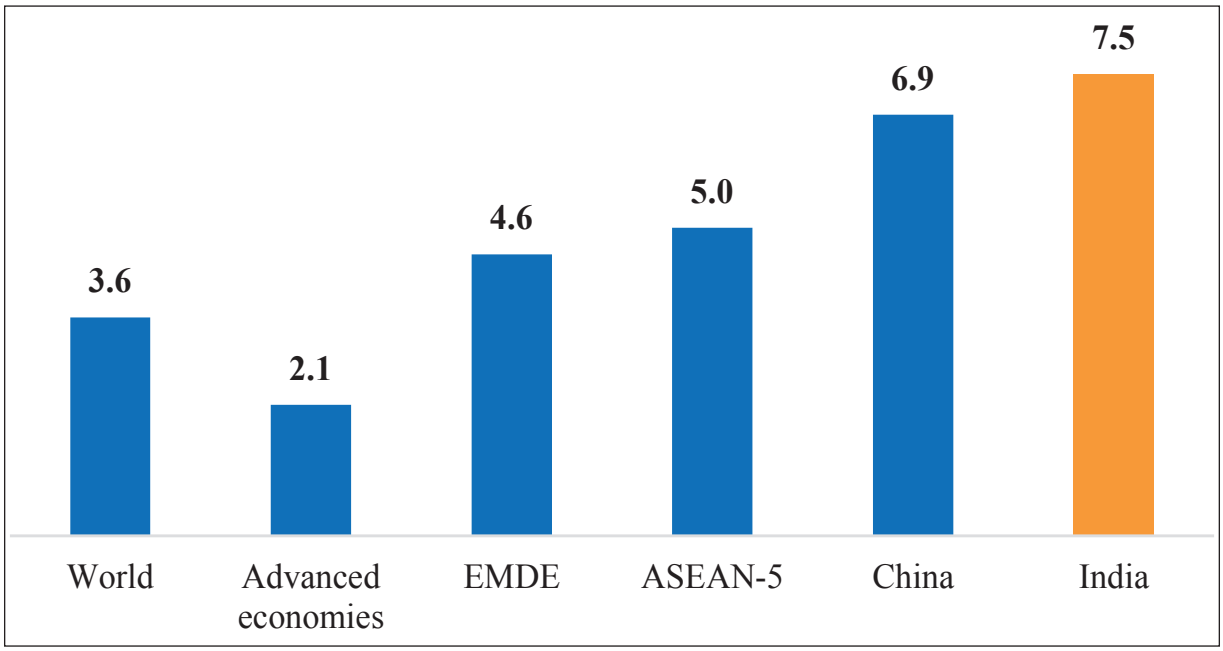
Macroeconomic Stability

1.1 World output grew at 3.6 per cent in 2014 and again in 2018. In the intervening period, when the world did not appear to have changed much, India took a few giant strides forward. India became the sixth largest economy by sustaining growth rates higher than China, thereby earning the epaulette of being the fastest growing major economy in the world (Figure 1). Importantly, this pace of growth was sustained while re-establishing macro-economic stability.

1.2 Average inflation in these five years was less than half the inflation level of the preceding five years, matching the lowest levels attained in the country's post-independence history. The current account deficit (CAD) remained within manageable levels and foreign exchange reserves rose to all-time highs.

1.3 The performance was not just a one-time adjustment but stemmed from a new institutional framework. Following an agreement between Government of India (GOI) and Reserve Bank of India (RBI), a Monetary Policy Committee (MPC) was constituted in February, 2015 with the mandate to target a headline inflation of 4 per cent, with a band of two percentage points on either side. The framework has been successful in containing inflation. Since April 2015, when the MPC was first convened, the monthly headline inflation has always remained within the band except for one month.

Figure 1: Growth of GDP in India and the world



Source: World Economic Outlook, April 2019, IMF

Note: (1). EMDE – Emerging Market and Developing Economies; (2). ASEAN-5 composed of 5 countries: Indonesia, Malaysia, Philippines, Thailand, and Vietnam.

1.4 Discipline was also imposed on the Gross Fiscal Deficit (GFD). The Fiscal Responsibility and Budget Management (FRBM) Act of 2003, which got a new lease of life since 2016, determines the glide path for the ratio of GFD to GDP to reach an eventual target of 3 per cent. The ratio declined from 4.5 per cent in 2013-14 to 3.4 per cent in 2018-19. Other macro-stability indicators have similarly improved.

Beneficiary focus and targeted delivery

1.5 In addition to re-establising macroeconomic stability, the government also focused on last-mile delivery of basic services to the poor, on basic safety-nets, and on creating pathways for the benefits of growth to reach the bottom of the socio-economic ladder. The promulgation of the Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits, and Services) Act, 2016 was one such initiative that opened a major pathway to this trickle-down. By assigning a unique identification number to every individual, the government now has the ability to provide targeted support. Presently, Aadhaar coverage stands at more than 90 per cent of the country's population.

1.6 Another pathway for the trickle-down is the Pradhan Mantri Jan Dhan Yojana (PMJDY), a financial inclusion initiative. The linking of mobile numbers with bank account numbers and subsequently Aadhaar, created a JAM (Jan Dhan, Aadhaar, Mobile) trinity that further secured Direct Benefit Transfers (DBT) to the intended beneficiaries. Presently close to ₹1 lakh crore is deposited in more than 35 crore bank accounts opened under PMJDY. The JAM trinity has enabled cumulative transfers thus far of around ₹7.3 lakh crore. Presently 55 central ministries through 370 cash-based schemes are transferring benefits under the DBT mechanism. Chapter 10 in Volume I of the Survey, in fact, provides careful evidence of this targeting.

1.7 Major schemes implemented under DBT include MGNREGS (Mahatma Gandhi National Rural Employment Guarantee Scheme), NSAP (National Social Assistance Program), PMAY-G (Pradhan Mantri Awas Yojna- Gramin), besides various scholarships and fertilizer subsidy schemes. A key initiative for last-mile delivery was the Pradhan Mantri Ujjwala Yojana (PMUY) that was launched in 2016. The PMUY had originally targeted to provide 5 crore LPG connections over a span of three years to BPL (Below Poverty Line) families with a support of ₹1,600 per connection. Till date more than 70 million PMUY-LPG connections have been released to women residing in more than 700 districts. In 2018, another effort to provide a basic safety net was launched through the Ayushman Bharat Yojana (ABY), which provides an insurance cover of ₹5,00,000 for cashless treatment to each of the 100 million BPL families at a nominal premium of ₹100 per month. Till date, the scheme has empaneled more than 15,000 hospitals, which have admitted about 2.6 million persons from the 346 million enlisted beneficiaries.

Infrastructure

1.8 The creation of physical infrastructure accelerated significantly during 2014-19. In April 2018, electricity finally reached every village in India with the effort to electrify every home still ongoing. The construction of national highways (NH) proceeded at a rapid pace with more than 20 per cent of the existing highway length of 132,000 km being constructed in the last four years alone. The UDAAN scheme was launched in 2017 to foster regional connectivity by extending flight connectivity to Tier-3 and Tier-4 towns in the country. Over 30 unserved and underserved airports have been mainstreamed under UDAAN with flights creating additional 40 lakh seating capacity. The scheme has also sparked significant increase in helicopter services in hilly areas and islands that engage

31 heliports. The infrastructure of the North-Eastern states was a special focus and there has been a significant improvement in connectivity with the building of key bridges, and the expansion of railways/highways. The 4.94 km long Bogibeel bridge in Assam was inaugurated in December 2018; it is the second longest rail-cum-road bridge in Asia.

Federalism

1.9 Fiscal federalism strengthened significantly when the Fourteenth Finance Commission increased the share of states in the divisible pool of central taxes from 32 per cent to 42 per cent. Although central grants to states saw compensatory cuts, the shift empowers states to manage their revenues and expenditures independently.

1.10 The launch of the GST (Goods and Services Tax) in July, 2017 added a new dimension to centre-state and inter-state financial relations. The GST Council experience provides key learning for implementing cooperative federalism in several other areas such as labour and land regulation. Niti Aayog has helped institutionalize cooperative federalism by setting up teams from both the states and the central government to jointly evolve strategies for addressing development challenges. States have also been involved in a friendly competition to improve their Key Performance Indicators (KPIs).

Corporate Exits

1.11 When the Insolvency and Bankruptcy Code (IBC) was introduced in 2016, it consolidated the insolvency resolution process into a single law by repealing/amending multiple rules and processes earlier in operation. IBC set a time limit for closing of insolvency and bankruptcy cases within which assets of a defaulting borrower are auctioned to pay off the debt owed to lending institutions. Following the operationalization of IBC since 2017, a significant number of non-performing assets have been brought under its ambit. In addition to the large sums recovered by creditors from resolution or liquidation, the introduction of a framework for exit has improved the overall business culture of the country. Chapter 3 in Volume II of the Survey explores this topic in detail.

THE NEXT FIVE YEARS: A BLUEPRINT FOR GROWTH AND JOBS

1.12 With the micro-economic and macro-economic foundations laid over the last five years, the Indian economy is ready to shift gears so that economic growth, jobs and exports can be pushed up to the next level. For this purpose, the Survey presents a blueprint.

Emphasising Growth

1.13 As articulated by the Prime Minister, Shri. Narendra Modi, India aims to grow into a USD 5 trillion economy by 2024-25, which will make India the third-largest economy in the world. Given 4% inflation, as the Monetary Policy Framework specified by the Government for the Reserve Bank of India, this requires real annual growth rate in GDP of 8 per cent.[1] What are the ingredients of a model that can generate such growth?

1.14 To understand this key question, we examine the drivers of economic growth followed by countries across the globe. In

[1] Among the different modelling possibilities, assume a 0.7% increase in total factor productivity in India when compared to the U.S. and a constant real effective exchange rate. This then translates into an exchange rate of INR 75 per USD in March 2025, which implies that the Indian economy must have a nominal GDP of 375 lakh crores in March 2025. An 8% real growth rate for GDP combined with 4% inflation would deliver this nominal GDP. While the export growth required to deliver the 8% real GDP growth rate may require a depreciation of the real effective exchange rate, we emphasize export growth stemming from increases in productivity rather than currency depreciation.

recent times, Chinese economic growth stands out for its explosive growth over a long period of four decades. Post war economic expansion in Western Europe led to high growth rates of its economies. During 1950-73, Japan's GDP growth rate frequently exceeded 10 per cent. Post World War II, Hong Kong, Singapore, South Korea, and Taiwan successfully maintained a rapid growth rate of more than 7 per cent until 1980s.

A virtuous cycle of savings, investment, exports and growth with investment as the "central driver"

1.15 The overwhelming evidence across the globe, especially from China and East Asia in recent times, is that high growth rates have only been sustained by a growth model driven by a virtuous cycle of savings, investment and exports catalysed and supported by a favourable demographic phase. As we explain in detail below, investment, especially private investment, is the "key driver" that drives demand, creates capacity, increases labour productivity, introduces new technology, allows creative destruction, and generates jobs.

1.16 We depart from traditional thinking by outlining a growth model that views the economy as being in *constant disequilibrium-a virtuous cycle or a vicious cycle*. When the economy is in a virtuous cycle, investment, productivity growth, job creation, demand and exports feed into each other and enable animal spirits in the economy to thrive. In contrast, when the economy is in a vicious cycle, moderation in these variables dampen each other and thereby dampen the animal spirits in the economy.

1.17 As we describe in the next section, our view of the economy in either a virtuous or a vicious cycle—with investment as the key driver of this cycle—stems from two key departures from the traditional Anglo-Saxon view of the economy.

1.18 First, the traditional view, which has come under significant challenge following the Global Financial Crisis, considers the concept of equilibrium as a key tenet. In contrast, by imbibing some of the new learning from the economics literature following the Global Financial Crisis, we view the economy as being in a constant state of disequilibrium as captured by a virtuous or a vicious cycle.

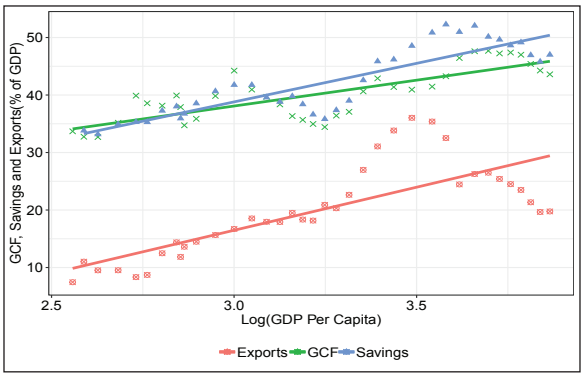
1.19 Second, the traditional view often attempts to solve job creation, demand, exports, and economic growth as separate problems. In contrast, as we show below, these macro-economic phenomena exhibit significant complementarities. Therefore, understanding the "key driver" and enhancing the same enables simultaneous growth in each of the other macro phenomena.

1.20 When viewed in this manner, the triggering macro-economic "key driver" that catalyses the economy into a virtuous cycle becomes critical. This Survey makes the case for investment as the "key driver" that can create a self-sustaining virtuous cycle in India. This investment can be both government investments in infrastructure, as such investment crowds in private investment (Chakrabarti, Subramanian and Sesha, 2017), and private investment in itself.

Evidence supporting the "virtuous cycle" view

1.21 Figure 2 shows how the share of GCF, savings and exports in GDP evolved for China as a function of the log of GDP per capita from 1980 to 2017. Crucially, we note that all the three macro-variables increased as the country became richer. Thus, as the economy started doing better, as measured by

Figure 2: Share of GCF, Savings and Exports in GDP vs. log GDP Per Capita in constant 2010 US$: China (1980-2017)[2]



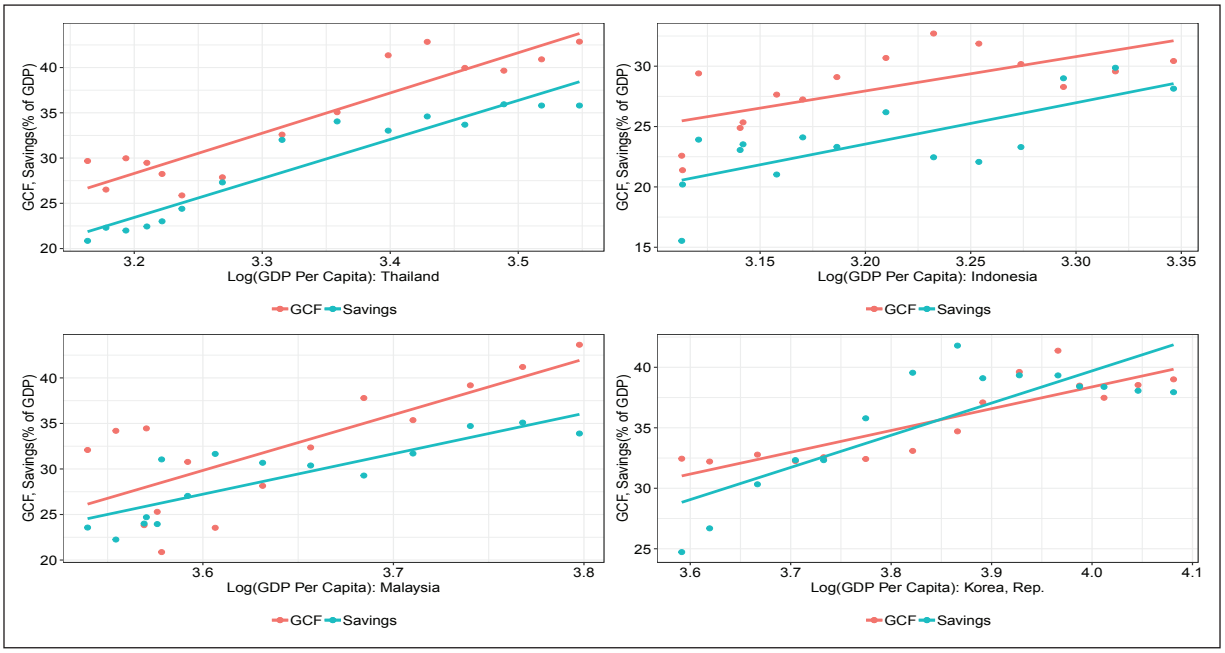
Source: World Bank

Note: GDP per capita is in constant 2010 US$ and the time period used is 1980-2017. The logarithmic scale taken for the x-axis is with base 10 to enable ease of reading.

the rising GDP per capita, China's savings, investment and exports increased further.[3] Figures 3 and 4 show the same relationships for saving and investment for four countries in East Asia (Thailand, Indonesia, Malaysia and South Korea), which witnessed high growth before the Asian Financial Crisis. The time period employed in these charts is 1980-1995, i.e. before the Asian Financial Crisis. While Figure 3 shows the relationship of investment and savings, Figure 4 shows the same for exports except for South Korea. The inference that we made using China, thus, remains unchanged by examining Figure 3 and 4.

1.22 Sandri (2014) provides a different way of looking at the same phenomenon.

Figure 3: Share of GCF and Savings in GDP vs. log GDP Per Capita in constant 2010 US$: High Growth East Asian Economies ex-China (1980-1995)



Source: World Bank

Notes: GDP per capita is in constant 2010 US$ and the time period used is 1980-1995. The logarithmic scale taken for the x-axis is with base 10 to enable ease of reading. High Growth East Asian Economies correspond to Indonesia, Malaysia, South Korea and Thailand.

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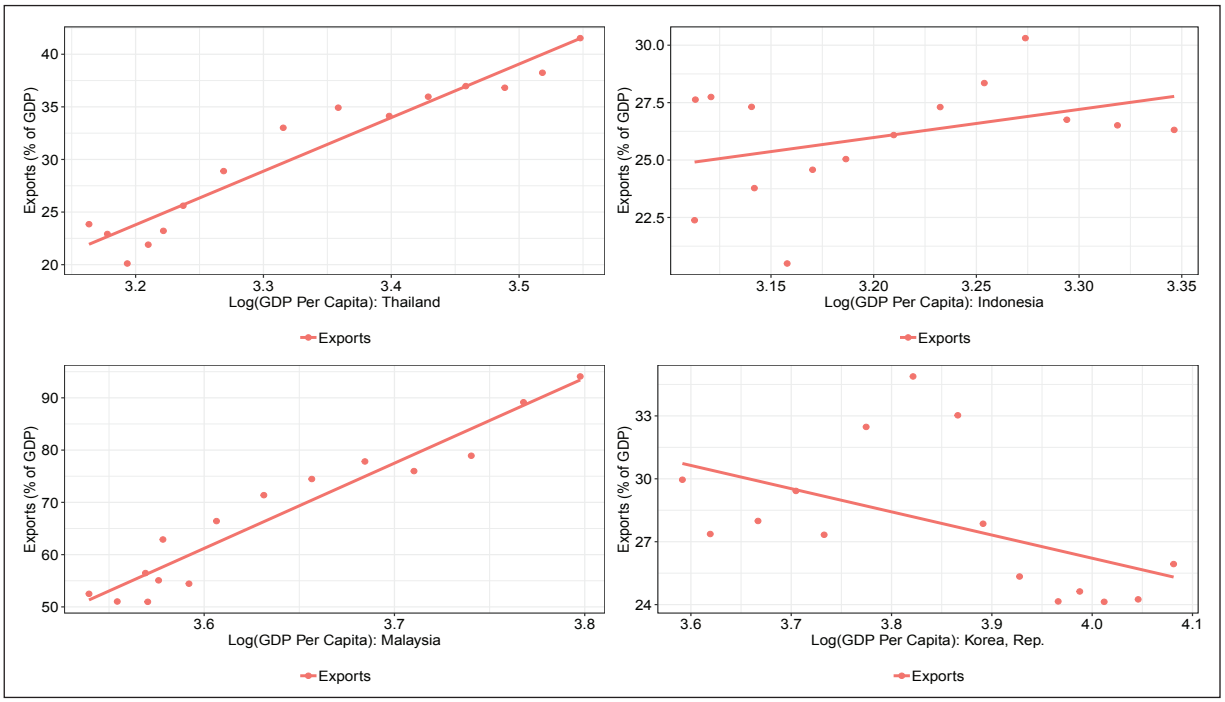
[2] Instead of examining the relationship between log of investment and log of GDP per capita, which would not capture the non-linearities embedded in a virtuous cycle, we examine the relationship between the share of investment in GDP to log of GDP per capita so that the change in this share with a change in GDP per capita can be examined. A similar rationale applies for the use of shares of exports and savings to GDP on the y-axis.

[3] Though there is an exponential increase and then a dip post the year 2000 in the export to GDP ratio for China, the overall linear trend is still increasing.

Figure 4: Share of Exports in GDP (%) vs. log GDP Per Capita in constant 2010 US$: High Growth East Asian Economies ex China (1980-1995)



Source: World Bank

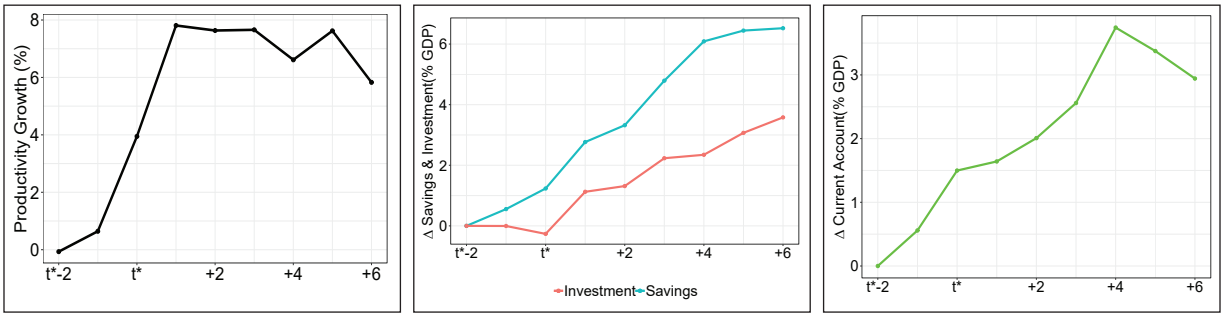
Notes: GDP per capita is in constant 2010 US$ and the time period used is 1980-1995. The logarithmic scale taken for the x-axis is with base 10 to enable ease of reading. High Growth East Asian Economies Correspond to Indonesia, Malaysia, South Korea and Thailand.

By averaging across 62 episodes of growth spurts from 1960 to 2011 among non-OECD countries, Sandri (2014) demonstrates that productivity growth across these episodes is combined with a rapidly rising investment rate and an even more steeply increasing savings rate.

1.23 China has relied primarily on savings and investment with consumption decreasing significantly as a share of GDP (Figure 6). China remains an investment-driven economy even today with its investment and savings rates reaching about 45% of GDP even in 2017.

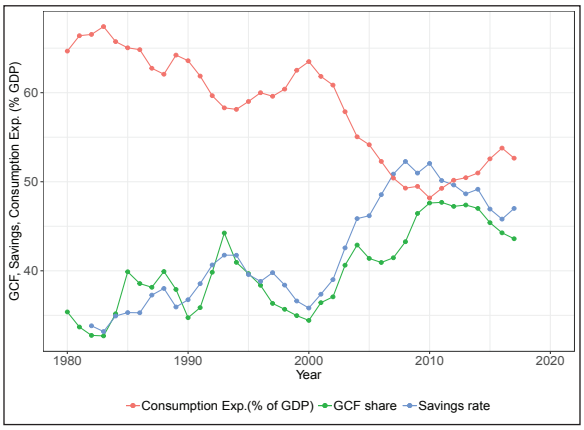
1.24 For China and other East Asian Economies, Figure 7 shows the strong

Figure 5: Changes in productivity, investment, savings and current account across 62 episodes of growth accelerations in non-OECD countries (1960-2011)



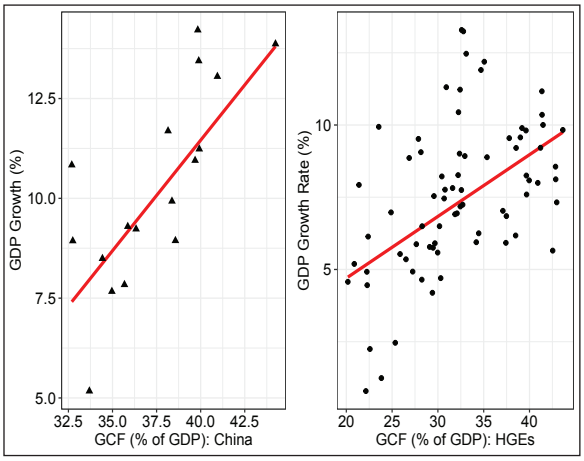
Source: Sandri (2014)

Figure 6: Consumption, Gross Capital Formation and Savings to GDP for China (1980-2017)



Source: World Bank

Figure 7: GDP Growth vs. Gross Capital Formation to GDP for China and High Growth East Asian Economies ex-China (1980-2000)



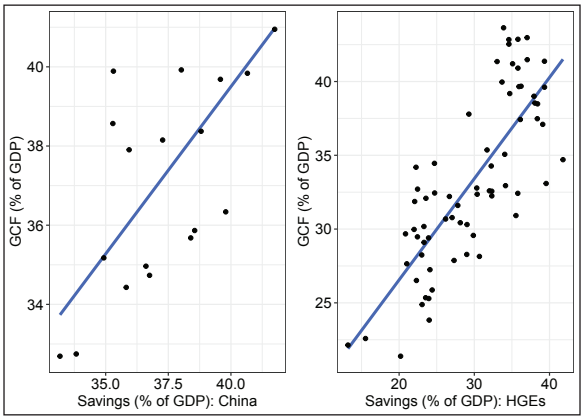
Source: World Bank

Notes: The left panel shows the relationship for China while the right panel shows the same for the four high growth East Asian economies of Thailand, Indonesia, Malaysia and South Korea. Time period used is 1980-2000. HGEs correspond to the four High Growth East Asian economies of Thailand, Indonesia, Malaysia and South Korea.

correlation between investment as measured by the Gross Capital Formation and GDP growth while Figure 8 shows an equally stronger correlation between investment and savings.

1.25 Thus, the evidence in this section

Figure 8: Gross Capital Formation to GDP vs. Savings rate for China and High Growth East Asian Economies ex-China (1980-2000)



Source: World Bank

Notes: The left panel shows the relationship for China while the right panel shows the same for the four high growth East Asian economies of Thailand, Indonesia, Malaysia and South Korea. Time period taken is 1980-2000.

suggests that savings, investment and GDP growth have grown in a virtuous cycle in the high growth economies, be it China or other East Asian economies.

Importance of savings

1.26 As Feldstein and Horioka (1980) demonstrated in what has since been labelled the "Feldstein-Horioka puzzle", a high investment effort must be backed by domestic savings. Further research (Carroll and Weil, 1994; Attanasio, Picci and Scorcu, 2000; Rodrik, 2000) has since shown that savings and growth are not only positively correlated but their positive correlation is even stronger than that between growth and investment (Gourinchas and Jeanne, 2013). In fact, Sandri (2014) argues that as investment is risky, entrepreneurs are exposed to the risk of idiosyncratic business failure that leads to the loss of the invested capital. Therefore, savings have to increase more than investment to allow for the accumulation of precautionary savings. The evidence from Sandri (2014) for the 62 episodes of growth acceleration

(Figure 5) and China (Figure 6) shows the same as well.

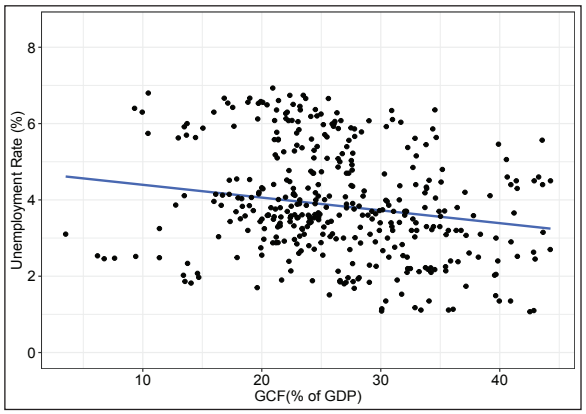
Jobs

1.27 A general apprehension is that high investment rate will substitute labour. This thinking has led to much debate about labour-intensive versus capital-intensive modes of production. However, the Chinese experience illustrates how a country with the highest investment rates also created the most jobs. What matters most is whether or not investment enhances productivity and thereby international competitiveness. The misconception arises from a view buried in the silo of a specific activity. When examined in the full value chain, capital investment fosters job creation as capital goods production, research and development, and supply chains also generate jobs. International evidence also suggests that capital and labour are complementary when high investment rate drives growth. For instance, Lin (2011) shows that the coming of software and computers, while having replaced some white collar tasks, have also generated new labour centric tasks related to software and application development, computer security, and specialised tasks for loan application analysts and medical equipment technicians.[4] Figure 9 shows how unemployment rates decreases with greater gross capital formation in East Asia and Pacific, thereby providing additional evidence that labour and investment complement each other. Therefore, job creation can indeed be fostered by encouraging investment.

Exports

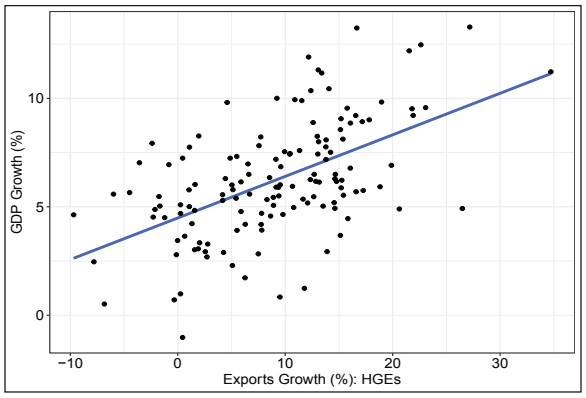
1.28 With the share of consumption in GDP constrained by the high level of savings, domestic consumption can be, at best, act as a force-multiplier when high income growth feeds consumption. So, where would the final demand for the large capacities created by high investment come from? The answer is exports. This is why an aggressive export strategy must be a part of any investment-driven growth model. Figure 10 shows the

Figure 9: Unemployment Rate vs. Gross Capital Formation (GCF) to GDP for East Asia and Pacific (1960-2017)



Source: World Bank

Figure 10: GDP Growth vs. Growth in Exports for High Growth East Asian Economies (1980-2017)



Source: World Bank

Note: Time period taken is 1980-2017 and High Growth East Asian Economies correspond to Indonesia, Malaysia, South Korea and Thailand.

[4] The success story of Town and Village Enterprises (TVEs) in China becoming the engines of its spectacular growth shows how labour-intensive manufacturing investment can simultaneously boost productivity, job creation and exports (Wei and Balasubramanyam, 2015). While in 1980, there were about 1.4 million TVEs with 30 million employees, by 1996, there were 23.4 million TVEs with 135 million workers contributing nearly 30% of China's GDP and 50% of the industrial output (Perotti et al., 1999). By 1999, TVE exports accounted for 48% of China's total exports and much of these were labour-intensive products involving simple production techniques (Fu and Balasubramanyam, 2005).

strong correlation between growth in exports and GDP growth for the high growth East Asian economies.

1.29 The global market is extremely competitive with the firms that are able to produce at the lowest costs having the ability to gain market share in exports. So, average productivity of firms in the economy becomes crucial to export competitiveness. As seen in Figure 11, capital investment enhances total factor productivity, which in turn enhances export performance. Therefore, investment becomes crucial to enhancing export performance.

1.30 While it is true that world trade is currently facing some disruptions, India's share in global exports is so low that it should focus on market share. One could even argue that the current disruptions provide an opportunity for India to insert itself into global supply chains. The High Level Advisory Group, chaired by Dr Surjit Bhalla, submitted its report in June 2019 on how India can enhance its exports. Its recommendations need to be studied and implemented where possible.

GOING BEYOND THE ECONOMICS OF 'EQUILIBRIUM' IN THE BLUEPRINT

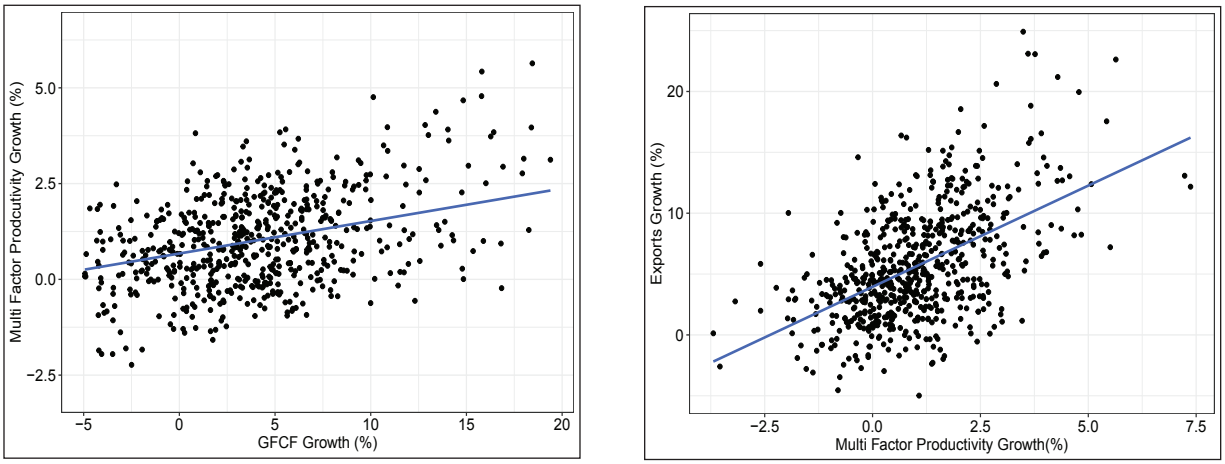
"If man is not to do more harm than good in his efforts to improve the social order, he will learn that in this, as in all other fields where essential complexity of an organized kind prevails, he cannot acquire the full knowledge which will make mastery of the events possible. He will therefore have to use what knowledge he can achieve, not to shape the results as the craftsman shapes his handiwork, but rather to cultivate a growth by providing the appropriate environment, in the manner in which the gardener does this for his plants."

Friederich Von Hayek, Nobel prize speech, 1974.

1.31 As the above quote from Hayek (1974) illustrates, the blueprint starts from the philosophy that economies are intricately interwoven systems. Therefore, they can neither be meaningfully viewed in silos nor can they be analysed without accounting for dynamic effects over time. Moreover, economies may rarely be in a state of equilibrium. While writing about economic theories following the Global Financial Crisis, Rodrik (2018) laments:

"Why do we focus so much on the perfectly rational individual even though real people do not seem to behave quite that way? Shouldn't we be paying a wee bit more attention to

Figure 11: Effect of GCFC Growth on Productivity and in turn on exports for OECD countries (1985-2017)



Source: OECD Database.

disequilibrium, in addition to equilibrium? Why do our models exclude social and institutional features without which markets could not work? Why do we emphasize math so much and disregard things that cannot be easily quantified?"

1.32 To highlight the inadequacies in economic models following the Global Financial Crisis, the OECD created the group New Approaches to Economic Challenges (NAEC). In a blog post on NEAC, Ramos (2017) highlights:

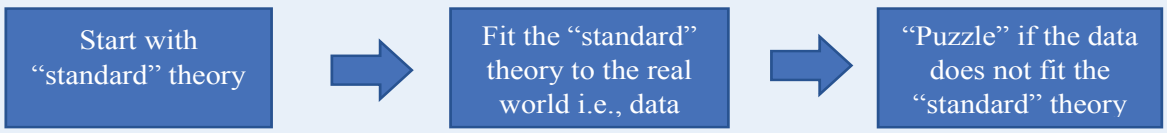
"The very name of (traditional economic) models, general equilibrium, shows that they assume that the economy is basically in balance until an outside shock upsets it. They assume that you can understand the economy by studying a representative agent whose expectations and decisions are rational. This view is essentially linear, and the policy advice it generates is tailored to a linear system, where an action produces a fairly predictable reaction… Real life is not like that… We need a new approach to economics that isn't just about quantitative economics. An approach that integrates behavioural economics and complex systems theory, as well as economic history."

1.33 As Box 1 illustrates, the meltdown of economic activity following the Global Financial Crisis highlighted that economies may be in a vicious cycle, where moderation in demand, jobs and investment feed into each other and thereby dampen the animal spirits in the economy. Therefore, as highlighted by Romer (2015), Ramos (2017) and Rodrik (2018), economic thinkers now recognise the need for economics to embrace the learning from other fields. They acknowledge that the concept of treating an economy as always being in equilibrium may "force fit" the "standard" framework to an ever-changing world. Instead, thinking about economies as being in the constant disequilibrium of virtuous or vicious cycles provides a more apt framework for the current times. Therefore, when the economy is viewed, proper sequencing of policy levers assumes importance, especially because of the presence of complementarities between different elements of an economy.

Box 1: The need for economic theory to be contextualised to India

The Global Financial Crisis exposed the problems embedded in conventional macroeconomic theories. Yet, to use this failure as an excuse to disband economic thinking would be to throw the "proverbial baby with the bath water" for theories are required in our field to discipline our thinking and thereby enable careful policymaking. Therefore, economic theories, in general and macroeconomics, in particular, may need to adapt to a world that is in constant disequilibrium. In this context, it is useful to understand the process of theory building in economics and contrast the same with other disciplines to enable us to develop the appropriate model for economic development in India.

The process of building theories in economics proceeds as follows:

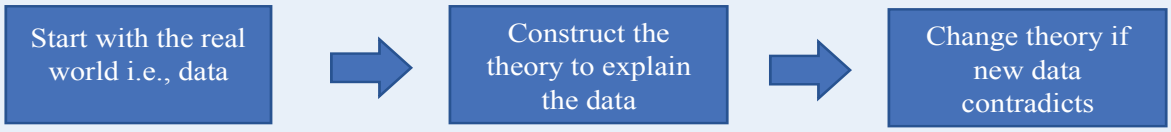


Consider the classic paper by Lucas (1990) to understand this flaw in the theory building process in economics. The paper attempts to explain why capital does not flow, as standard theory predicts, from capital-rich to capital-poor countries, because the latter would have higher returns. The theory starts

with some assumptions in "standard" theory such as individuals always making "rational" decisions, the preferences of a collection of individuals captured by the preference of a "representative agent", the law of diminishing returns, etc.

Having constructed the "standard" theory, the paper finds that the theory does not fit the real world, where capital flows from the poor to rich countries rather than vice versa. Capital flows from China to the United States provides a salient example though the phenomenon is more pervasive. As the "standard" theory does not fit the real world, the study labels the real world phenomenon "a puzzle".

In contrast, in other disciplines, especially the natural sciences and engineering, the process of building theories proceeds in the following direction:



If we adopt this discipline, the phenomenon studied in Lucas (1990) may not be a puzzle. Consider a business that becomes extremely productive and is able to produce goods at very low prices, thereby capturing large market share and generating huge profits. The profits are usually ploughed back into the business to fund further investment. But suppose the profits are so large that even after reinvesting the entire amount required for funding new projects, the business is still left with a surplus. What would the business do? Invest this excess surplus in "other assets." For instance, the business may invest in other firms. This is what China is doing. Why is it a puzzle then?

Another prominent example of "standard" theory is the use of the dynamic stochastic general equilibrium (DSGE) model in macroeconomics. Despite the large literature in this area, which posited DSGE models of enormous varieties, the pre-crisis models assumed the financial sector as a side-show. Therefore, any problems arising from potential misallocations within the financial sector were absent from the DGSE models. This is especially relevant in the Indian context given the recent experience of distress in the banking sector and the overhang that it created on the economy.

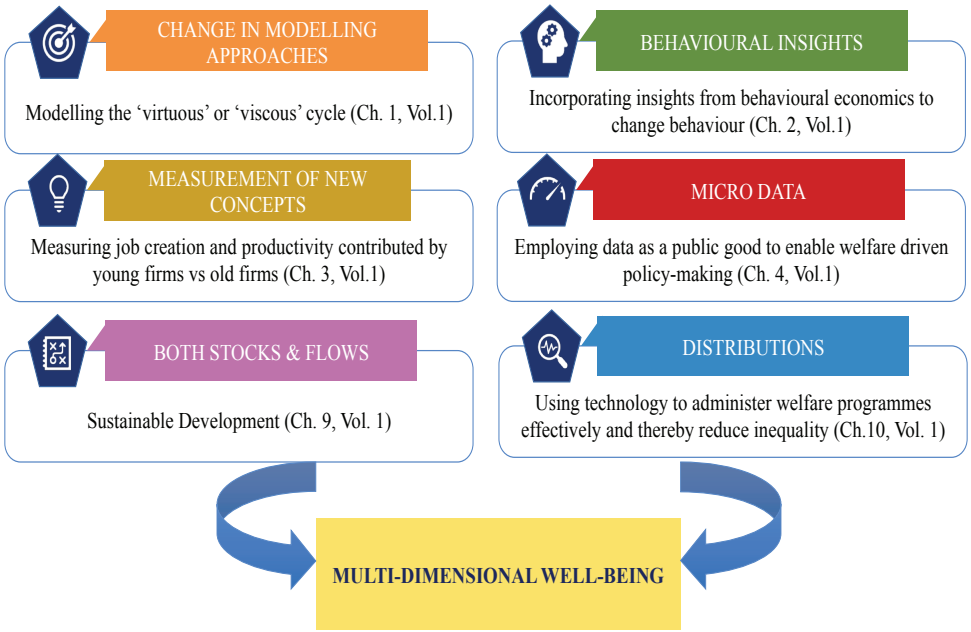
While a growing literature has since fixed the problem in DGSE models, such *ex post facto* fixing may not be adequate as some other critical element omitted from the current models will have to wait for next crisis to uncover. This ex post fixing stems from the insistence on using the "standard" theory to understand real world phenomeona. The adapting of DGSE models to the Indian reality is critical because the financial sector in India differs significantly from those in the Anglo-Saxon countries.

The case of Lucas (1990) and the over-reliance on DGSE models are but two examples that highlight the need for evolving macroeconomic thinking that fits the institutional differences in a country like India vis-à-vis the Anglo-Saxon economies.

NAVIGATING A WORLD OF CONSTANT DIS-EQUILIBRIUM

1.34 An economy that is in a constant state of dis-equilibrium needs a new approach to navigate. The earlier attempt to create five-year plans, largely using the equilibrium framework, failed because it was too prescriptive for an inherently unpredictable world. Therefore, navigating this uncertain world of dis-equilibrium requires three elements : (i) a clear vision; (ii) a general strategy to achieve the vision; and (iii) the flexibility and willingness to continously recalibrate tactics in response to unanticipated situations. In earlier sections, we have described a broad strategy to achieve the vision of a US$5 trillion economy. We now turn to some of the tactics. Figure

Figure 12: Tools for navigating the economy in a constant state of disequilibrium



Source: Adapted from NEAC, OECD

12 below shows the approach advocated by NEAC, OECD to navigate this world. Apart from the need to model the different elements of the economy simultaneously in an integrated manner, this approach critically requires assimilation of several other tools. Several chapters in Volume 1 of The Survey lay out the policy details for navigating this world. This chapter lays out the framework for integrated modelling of the various economic phenomena. Chapter 2 in Volume 1 delves deep into utilising the insights from behavioural economics for behaviour change that can thereby foster productivity and economic growth. Chapter 3 in Volume 1 pursues the measurement of new concepts by examining the impact of young versus old firms in fostering job creation and enhancing productivity. Chapter 10 in Volume 1 studies how the benefits of technology can be applied to enhance the efficacy of welfare programmes and thereby generate better distributional outcomes in the Indian society. Chapter 4 in Volume 1 describes the use of data as a public good for enhancing welfare. Chapter 9 focuses on the use of energy for sustainable development of the Indian economy.

Behavioural economics

1.35 As policymaking must keep real people as its focus, rather than the optimization-focused robots that conventional economics assumes, the insights from behavioural economics need to be integrated into policymaking to foster productivity and economic growth. Chapter 2 of the Survey, therefore, delves deep into this subject. By analysing the successful behavioural change effected by the Swachh Bharat Mission and the Beti Bachao, Beti Padhao campaigns, the chapter incorporates their learning and lays out frameworks for integrating behavioural economics into policymaking in various contexts:

(i) The Beti Bachao, Beti Padhao campaign has helped in improving child sex ratios, particularly in large states where the child sex ratio was poor. Therefore, the campaign has had the maximum impact in states that plausibly also needed the

greatest pivot in their social norms. Taking the learning from this campaign, the chapter attempts to further the cause of Gender equality by coining the slogan of BADLAV (Beti Aapki Dhan Lakshmi Aur Vijay-lakshmi) to *inter alia* enhance contribution of women in the workforce and the economy;

(ii) The Swachh Bharat Mission has helped increase the percentage of villages that are Open Defecation Free and has enhanced access and usage of toilets. This improvement in sanitation has helped improve health outcomes as is seen in the number of malaria and diarrhoea cases and the number of still births and children with low birth weight. Incorporating the learning from this successful behavioural change, the chapter develops the framework to use behavioural insights for a healthy India. The framework embeds the idea of taking off from the Swachh Bharat Mission into "Swasth + Ayushman = Sundar" Bharat. This would enhance labour productivity and enhance savings, and thereby investment;

(iii) The creation of the Insolvency and Bankruptcy (IBC) process has helped bring a large number of non-performing assets into the IBC process. Further, the threat created of losing control under IBC is helping change the credit culture in the country. Insights from behavioural economics can be utilised to enhance the credit culture, especially with respect to frauds and wilful defaults, by drawing on the social and cultural norm of the "doctrine of pious obligation." This, in turn, will foster credit growth and investment.

(iv) Several changes brought through the use of technology in tax administration have decreased manual intervention in tax administration, and have thereby improved the experience of a large majority of taxpayers. Behavioural insights can be leveraged to transform the tax culture from one of tax evasion to tax compliance. This would then provide the necessary revenues for investments in both the hard infrastructure of roads, ports, railways, etc. and the soft infrastructure of skills and education;

(v) The introduction of the GST represented a salient instance where policymakers exhibited the appetite to introduce bold reform by eschewing loss aversion, whereby a policy that creates some short-term losses while creating large long-term benefits may lack enough support (Milkman et al. 2012). Behavioural insights can build on the positive outcome of enacting such a path-breaking policy change to reduce loss aversion and thereby improve policy and legislative outcomes.

1.36 Figure 13 below summarises the seven principles of behavioural economics that can be applied to achieve the above outcomes. Chapter 2 of the Survey explicitly lays out applications in each of these areas.

Data as a public good

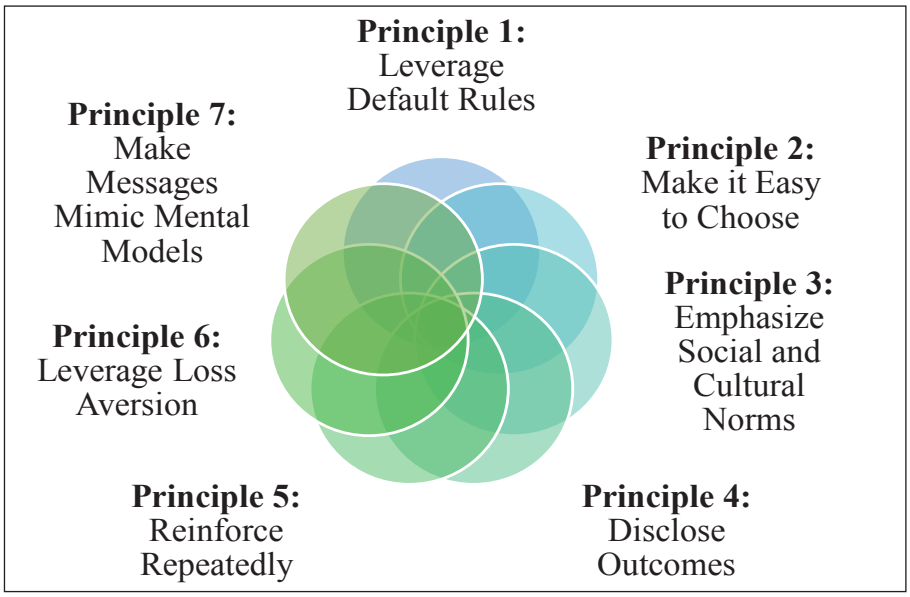
"Cross the river by feeling the stones."

- Deng Xiaoping

1.37 Having set out the broad strategy for achieving the goal of a US$5 trillion economy, continuous re-calibration of policies to achieve this goal is necessary. Data-driven evidence enables this re-calibration. Deng Xiaoping's exhortation to "cross the river by feeling the stones" is relevant in this context. If the economy in constant disequilibrium represents the flowing river, then data-driven policymaking represents the process of feeling the stones for necessary re-calibration.

1.38 Chapter 4 in Volume 1 of the Survey

Figure 13: Principles of behavioural economics to foster behavioural change



lays out the framework for creating data "of the people, by the people, for the people." The chapter surmises that society's optimal consumption of data is higher than ever before because of the exponential decline in the marginal cost of data combined with the manifold increase in its marginal benefits to society. While private sector does a good job of harnessing data where it is profitable, government intervention is needed in social sectors of the country where private investment in data remains inadequate. Governments already hold a rich repository of administrative, survey, institutional and transactions data about citizens. However, these data are scattered across numerous government bodies. Utilising the information embedded in these distinct datasets would *inter alia* enable government to enhance ease of living for citizens, enable truly evidence-based policy, improve targeting in welfare schemes, uncover unmet needs, integrate fragmented markets, bring greater accountability in public services, generate greater citizen participation in governance, etc. Given that sophisticated technologies already exist to protect privacy and share confidential information, governments can create data as a public good within the legal framework of data privacy.

Legal Systems and Contract Enforcement

1.39 The economic model described in the blueprint is explicitly about creating virtuous cycles in an evolving, complex landscape. It is about investment, risk-taking and innovation in an environment that is inherently uncertain and unpredictable due to a range of factors from changing technology and consumer preferences to geopolitics and economic cycles. This is a world of "butterfly effects" and unintended consequences, where uncertainty is inevitable. As uncertainty exacerbates the temptation to renege on contracts when the ex post outcome is different from the one expected ex ante, the ability to enforce contracts and the rule of law become critical to navigating an uncertain world (Acharya and Subramanian, 2009; Acharya, Baghai and Subramanian, 2013, 2014; Chava et al., 2013; Sapra, Subramanian and Subramanian, 2013; Subramanian and Tung, 2016; Subramanian and Megginson, 2018). While a well-functioning legal system is important to economies in all situations, it

is absolutely central to one that aims to drive economic growth through high investment rates in an unpredictable world.

1.40 The importance of the legal system and contract enforcement are repeatedly emphasized by ancient Indian economic thinkers such as Kautilya and Kamandak. They saw the Rule of Law as key to averting Matsya-nyaya or Law of the Fish (i.e., law of the jungle). Nobel prize-winning Austrian economist Friedrich von Hayek echoed the same sentiment in his famous book 'The Road to Serfdom':

"Nothing distinguished more clearly conditions in a free country from those in a country under arbitrary government than the observance in the former of the great principles known as the Rule of Law".

1.41 Unfortunately, India's legal system, burdened by 3.5 crore pending cases, is arguably now the single biggest constraint to doing business in India and thereby fostering investment. The World Bank's latest Ease of Doing Business Report ranked India at 163 for contract enforcement. Experience shows that every other field of economic reform, be it property rights, taxes and insolvency, eventually flounders because it gets entangled in the legal system. This is why the legal sector reforms must be a top priority.

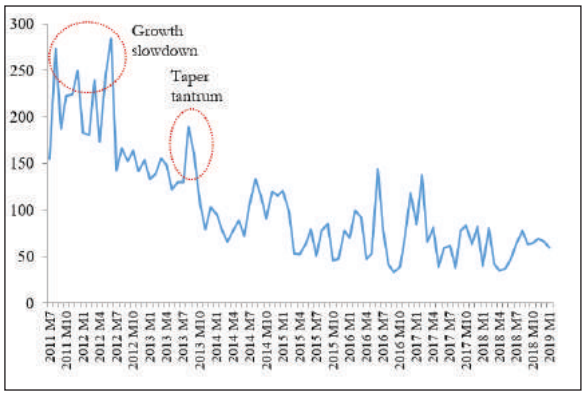
1.42 The good news is that the problem is not insurmountable. A scenario analysis of the effort needed to clear the backlog in five years suggests that significant efficiency gains are also necessary. At sanctioned strength, productivity will need to increase by 24.5 per cent, 4.3 per cent and 18 per cent for lower courts, High Court and Supreme Court respectively. The use of technology, increase in working days and administrative/ process reforms can enable these ambitious yet achievable efficiency gains. Given the potential economic and social multipliers of a well-functioning legal system, strengthening the legal system may be the best investment Indian reformers can make.

Consistency in Economic Policymaking

1.43 In the world of constant uncertainty, economic policymaking can either alleviate the uncertainty faced by investors or exacerbate it. The earlier attempt to create five-year plans, largely using the equilibrium framework, aimed to solve this problem. However, as we discovered to our dismay, the best-laid plans can get unravelled in an uncertain world that is in perpetual dis-equilibrium. Therefore, navigating this uncertain world of dis-equilibrium requires three elements: (i) a clear vision; (ii) a general strategy to achieve the vision; and (iii) the flexibility and willingness to continuously recalibrate tactics in response to unanticipated situations. Having taken the Prime Minister's vision of a US$5 trillion economy, this Economic Survey lays out a general blueprint as the strategy to achieve this vision. However, as discussed above, policies must respond continually to the flow of real-time data.

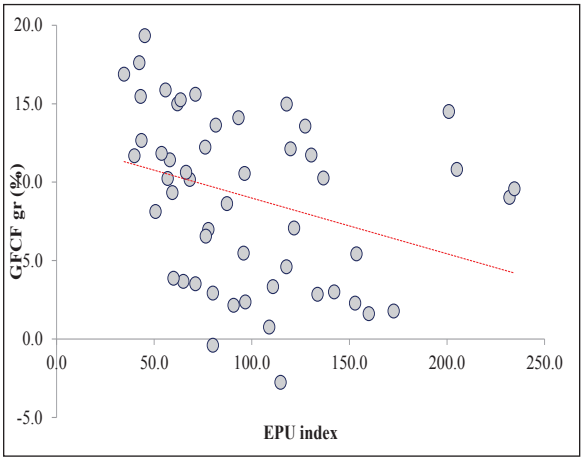
1.44 The obvious problem from having such tactical flexibility is that it creates its own uncertainty. This is particularly the case when major reforms are being carried out. In this context, in Chapter 6 of Volume 1 of the Survey, we examine how economic policy uncertainty has evolved in India over the last few years. More importantly, given our emphasis on investment as the key driver of the virtuous cycle, we examine the relationship of economic policy uncertainty with investment. To capture economic policy uncertainty, we use the Baker et al. (2016) index, which has been used widely across the world. We find that while this uncertainty was higher during episodes of greater uncertainty such as the taper tantrum in 2013, overall economic policy uncertainty has significantly decreased over the last decade (Figure 14). A noteworthy feature of this Figure is that

Figure 14: Economic policy uncertainty in India (2011-2019)



Source: http://www.policyuncertainty.com/

Figure 15: Investment growth and economic policy uncertainty index



Source: http://www.policyuncertainty.com/, CSO

the introduction of GST barely increased the economic policy uncertainty despite the enormous change that it entailed. This illustrates that path-breaking reforms that are consistent with a well-articulated vision do not create as much disruption as some people may fear. The continued decrease in economic policy uncertainty in India post 2015 is as exceptional because it contrasts sharply with the increase in economic policy uncertainty in major countries during this period, including the U.S.

1.45 Surges in economic policy uncertainty increase the systematic risk, and thereby the cost of capital in the economy. As a result, higher economic policy uncertainty lowers investment, especially because of the irreversibility of investment. Consistent with this thesis, we find that an increase in economic policy uncertainty dampens investment growth in India (Figure 15). The impulse-response function suggests that an increase in economic policy uncertainty affects growth in investment for about five quarters.

1.46 This effect of economic policy uncertainty, therefore, provides important policy implications for managing an economy in constant disequilibrium. First, the predictability of policy stems from being consistent with the overall vision and strategy rather than from tactical inflexibility. Second, "what gets measured gets acted upon". So, economic policy uncertainty index must be tracked at the highest level on a quarterly basis. Finally, quality assurance of processes in policymaking must be implemented in government via international quality certifications.

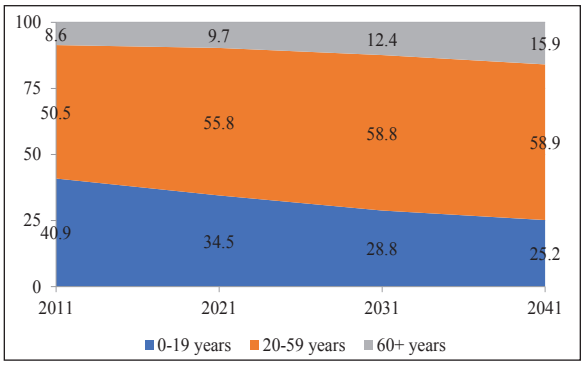
MAJOR FACTORS, REFORMS AND RISKS

Role of demographics in the "virtuous cycle"

1.47 As we shall discuss in Chapter 7 in Volume 1 of the Survey, India has already entered this demographic phase of a high share of working age population, and will remain in this "demographic dividend" zone for over two decades. Figure 16, in fact, highlights that the working age population (20-59 years), which comprised 50.5 per cent of the overall population in 2011, will increase to about 60 per cent in 2041.

1.48 Change in demographics, especially in the age structure of the population, has been shown to have had a significant effect on economic growth throughout Asia between 1960 and 1990 (Bloom and Williamson, 1998). A rise in the share of the working-age

Figure 16: Demographic composition in India (2011-2041)

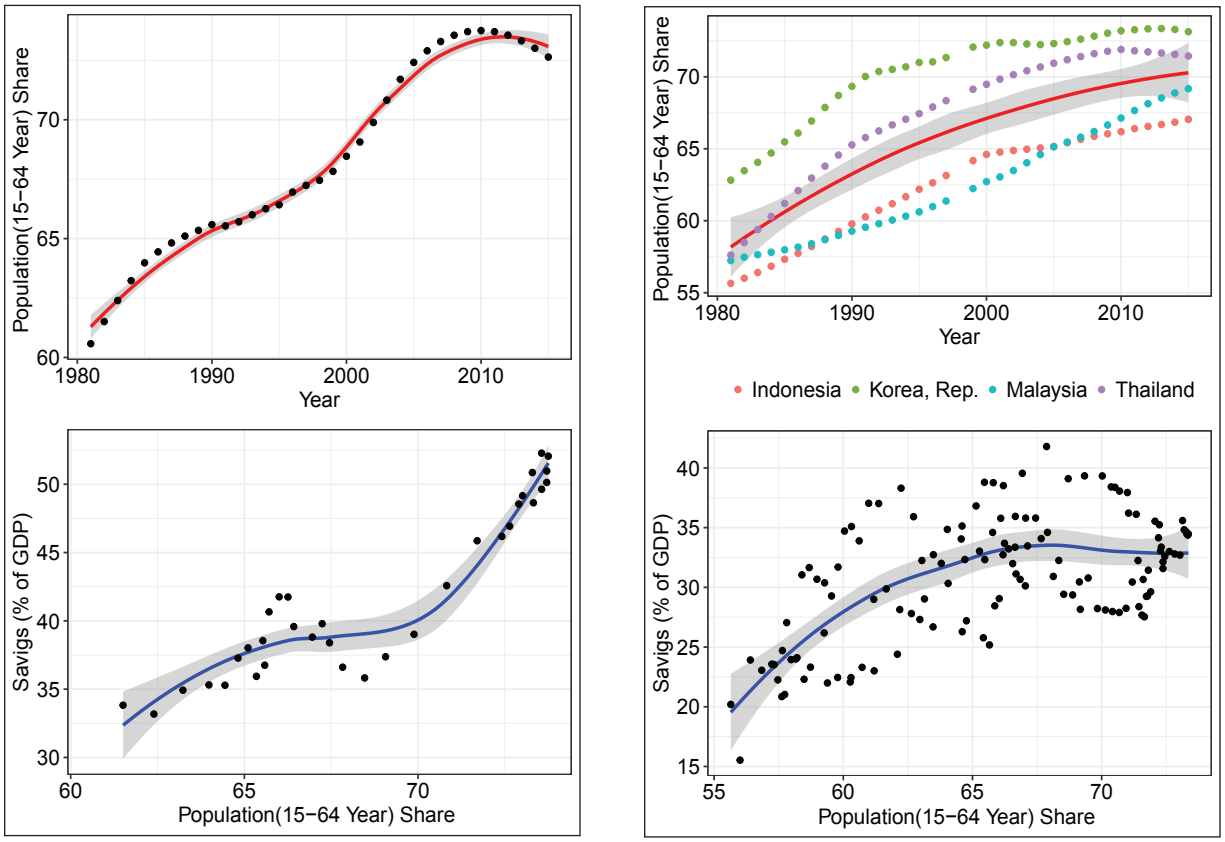


Source: Survey Calculations

population, brought about by a decline in the fertility rate, increases income per capita as output per worker remains unchanged but the number of youth dependents declines. The rise in the working-age share in Asia created this accounting effect, but it also brought with it behavioural changes. Savings increased as life expectancy increased (Lee, Mason and Miller 2000; Bloom, Canning, Mansfield and Moore 2007), and consequently investment increased. In fact, changes in growth of labour force per capita, changes in the savings rate, and changes in the investment rate are three plausible mechanisms by which demographics affects the economic growth (Higgins and Williamson, 1997; Bloom and Williamson, 1998).

1.49 Figure 17 shows how savings rate in China and other high-growth East Asian economies was driven significantly by change in its demographics from a predominantly young to an older population. While the top panels show the change in the demographics,

Figure 17: Impact of demographics on savings for China and other High-growth East Asian Economies



Source: World Bank

Note: Time period taken is 1980-2015 and High Growth Economies pertain to Indonesia, Malaysia, South Korea and Thailand.

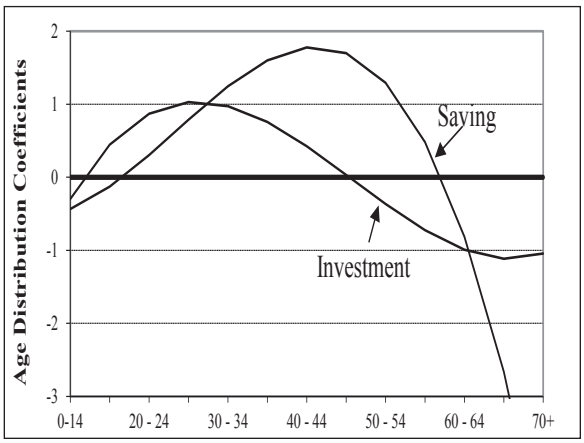
the bottom panels illustrate how closely the household saving rate and the working age proportion of the population move together in China and other high-growth East Asian economies. This makes sense because only people who are earning income can save, and the majority of income for the majority of people will be labour income. But, in addition to this effect of demographic composition, having fewer "mouths to feed" raises the availability of resources that can be saved for the future. Second, due to the importance of children as a source of retirement income in the Asian/Indian context, the decline in the number of children by the working generation promotes saving as they must rely more on savings for retirement in comparison to previous generations. Finally, saving also increases as a result of a composition effect: a large portion of saving tends to occur between the ages of 40 to 65 as people start to save for retirement.

1.50 As Bosworth and Chowdorow-Reich (2007) show for Asia, both savings and investment rise with the proportion of the working population (Figure 18). Notice that this figure shows the coefficient of the effect of proportion of each age group in the population on investment and savings. A positive coefficient indicates that the effect of the age group is to increase savings/investment while a negative coefficient indicates that this effect decreases savings/investment. Investment rises significantly with an increase in each of the age cohorts till age 50 while savings rises significantly with an increase in each of the age cohorts till age 60.

1.51 Figure 19 shows how wages affected China's savings rate. This relationship is crucial to note because without an increase in the earnings of the working population, neither consumption nor savings can increase. Therefore, jobs that pay meaningful wages become crucial in driving savings rate in the economy. The "virtuous cycle" that we describe fosters job creation by exploiting the complementarity between capital and labour, on the one hand, and by increase overall productivity and labour productivity, on the other hand. Policy changes to enhance productivity and job creation in the economy, which we describe in Section 5.2, become crucial in this context.

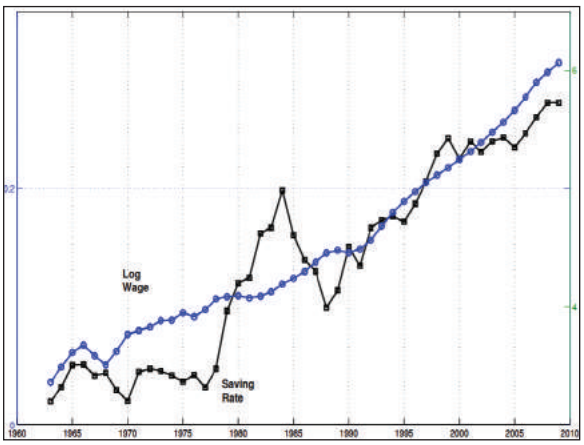
1.52 Our analysis, thus, shows that savings is driven primarily by demographics and income growth. Therefore, keeping domestic interest rates high may not encourage savings behaviour; a mildly positive real rate is good

Figure 18: Impact of composition of demographics on savings in Asia



Source: Bosworth and Chowdorow-Reich (2007)

Figure 19: Impact of wages on savings in China (1963-2009)



Source: Curtis, Lugauer and Mark (2011)

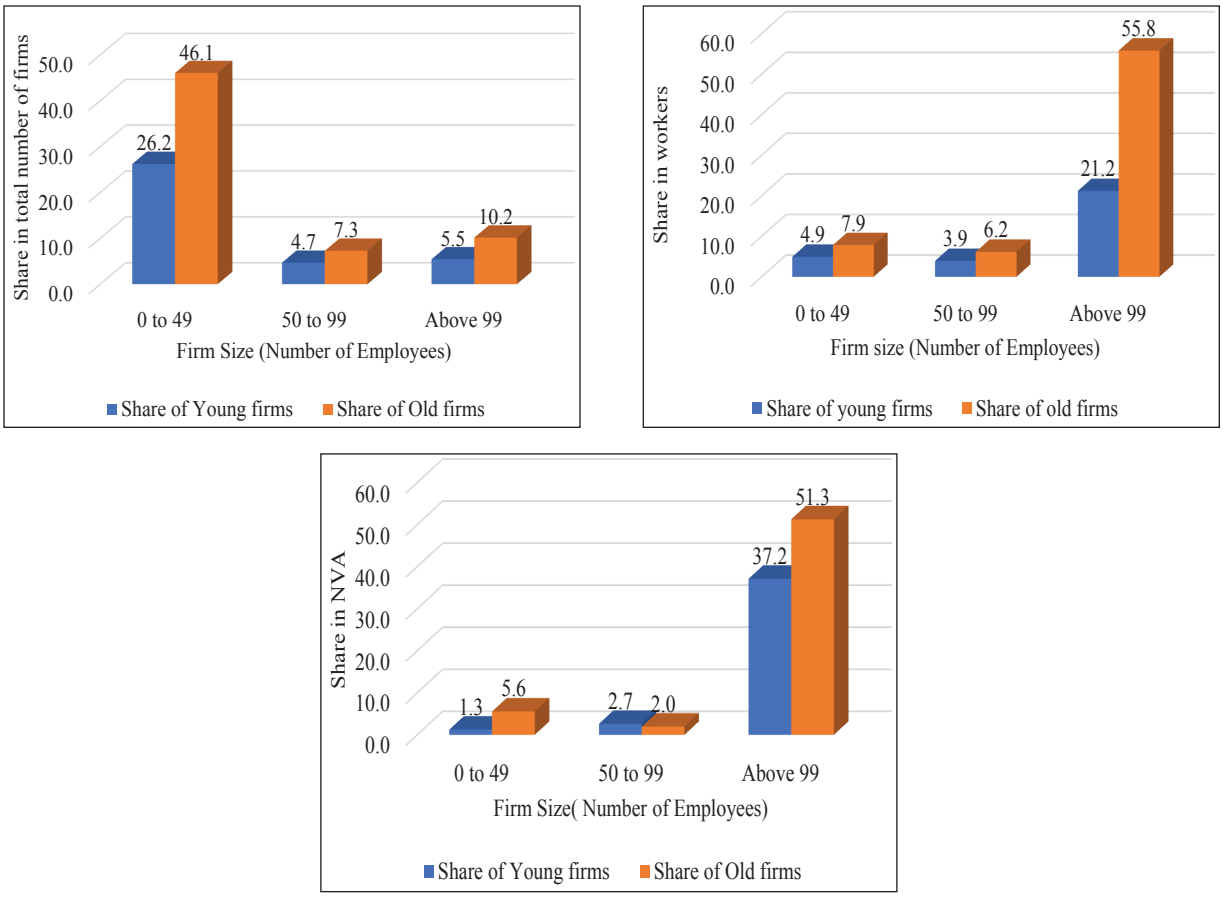
enough. As demographics and wages are the major factors that drive savings, policymakers obtain a key degree of freedom. Specifically, the two parts of the financial system, the savers and the borrowers, can be disentangled. As investment depends crucially on a low cost of capital, reducing real interest rates need not necessarily lower savings when the demographics are favourable. At the same time, the reduction in real interest rates can foster investment and thereby set in motion the virtuous cycle of investment, growth, exports and jobs.

Role of job creation and earnings

1.53 Chapter 3 in Volume 1 of the Survey recognises a startling fact. Dwarfs, which we define as small firms that never grow beyond their small size, dominates the Indian economy and holds back job creation and productivity. Firms employing less than 100 workers are categorized as small and firms employing 100 or more workers as relatively large. Though a firm employing 100 workers is definitely not large in the global context, they are relatively large in the Indian context. Firms that are both small and older than ten years are categorized as dwarfs as these firms have continued to be stunted in their growth despite surviving for more than 10 years.[5]

1.54 Figure 20 shows the share of dwarfs in the number of firms, the share in employment

Figure 20: Share of dwarfs versus other firms in number, employment and productivity



Source: Annual Survey of Industries, 2016-17 and Survey Calculations

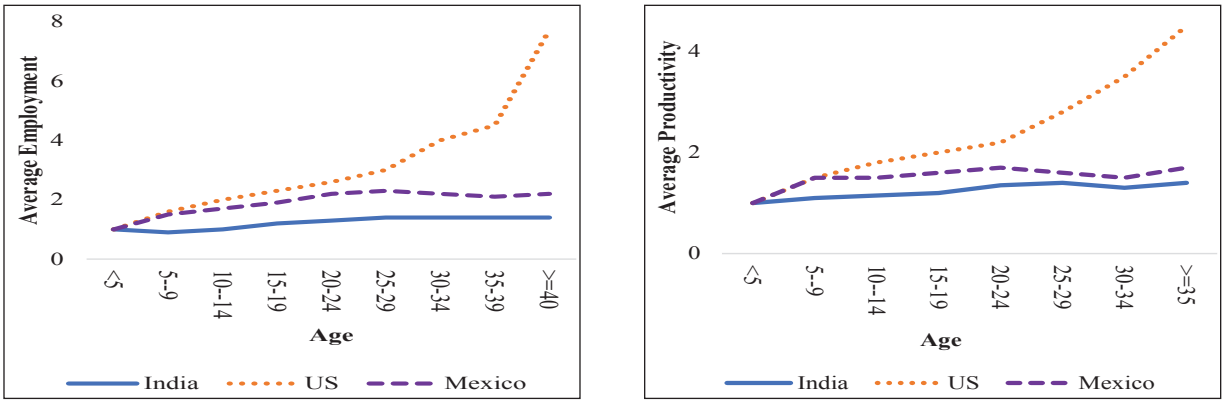
[5] Disclaimer: The Survey uses the term "dwarfs" for firms that remain small despite being old is contrasted to "infants" for firms that are small because they are young. **This usage is purely for firms and has no correlation with such usage for individuals and is therefore not intended to harm any sensibilities, whatsoever.**

and their share in Net Value Added (NVA). This analysis has been conducted using *firm-level* data from the Annual Survey of Industries for the year 2016-17, which is the latest available. While dwarfs account for half of all the firms in organized manufacturing by number, their share in employment is only 13.3%. In fact, their share in NVA is a miniscule 4.7% despite them dominating half the economic landscape. In contrast, young, large firms (firms that have more than 100 employees and are not more than 10 years old) account for only 6.2% of firms by number but contribute a quarter of the employment and 38% of the NVA. Large, but old firms (firms that have more than 100 employees and are more than 10 years old) account for only 9.5% of firms by number but contribute half of the employment as well as the NVA. Thus, firms that are able to grow over time to become large are the biggest contributors to employment and productivity in the economy. In contrast, dwarfs that remain small despite becoming older remain the lowest contributors to employment and productivity in the economy.

1.55 As a cross-country comparison, the Chapter shows that an average firm in the U.S. employs more than seven times as many workers when it is 40 years of age when compared to the average workers it employed when it was less than five years of age. An average firm in Mexico doubles its employment when it is forty years of age when compared to the workers it employed when it was less than five years of age. In contrast, an average firm in India only employs 40% more workers when it is forty years of age when compared to the workers it employed when it was less than five years of age. Thus, firms in India do not grow enough to create the necessary jobs and productivity in the economy (Figure 21).

1.56 Chapter 3 of the Survey then highlights that restrictive labour regulations, which exempt small firms from such regulations, and other size based incentives, which provide benefits to MSMEs irrespective of their age, have played a crucial role in providing perverse incentives for firms to remain significantly smaller in the Indian economic landscape. The Chapter, therefore, recommends focusing incentives on infant firms, i.e. firms less than ten years of age, with the appropriate grandfathering of the existing pattern of incentives to MSMEs. Further, the Chapter highlights using the labour law changes in Rajasthan that reforms of restrictive labour regulation can foster job creation and capital accumulation in the

Figure 21: Growth of jobs and productivity with age for firms in India, Mexico and U.S.



Source: Hsieh and Klenow (2014)

Note: Y-axis shows the average employment/gross value added at each age cohort as a multiple of the average employment/gross value added when the firm was less than five years old.

states. The labour law changes are crucial also because they can enhance investment (Subramanian and Tung, 2016; Subramanian and Megginson, 2018).

The role of the financial sector

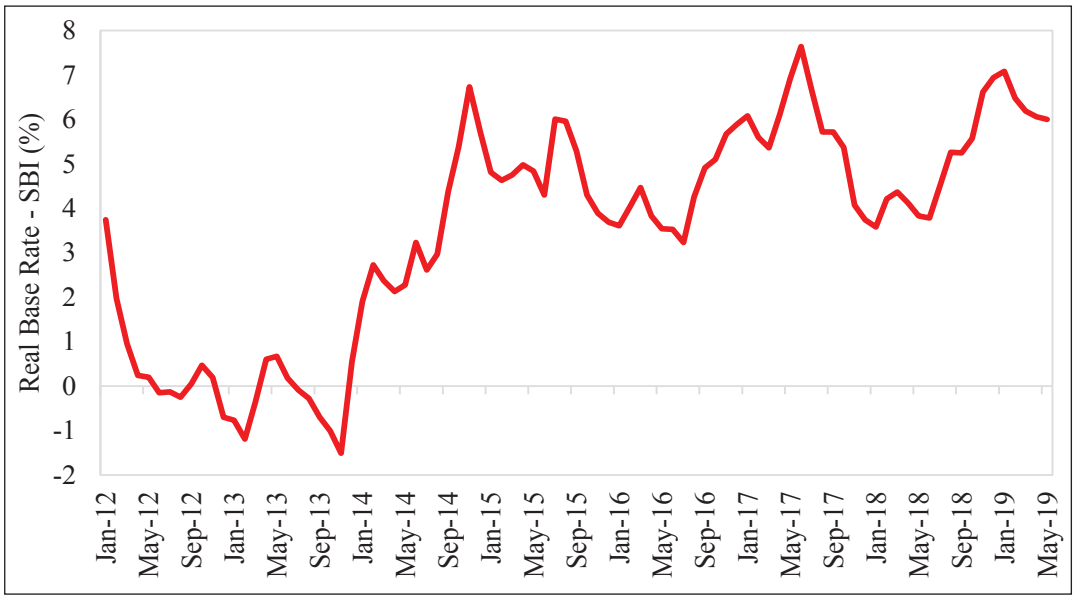
1.57 The investment-led growth model implies a rapid expansion in the financial system by a factor of magnitude – both banks and capital markets. In turn, this runs up the risk that such a rapid expansion could be disrupted by a major financial crisis that derails the savings-investment dynamic. This is no idle concern as illustrated by the Asian Crisis of 1997-98. Some South-East Asian countries appeared to be recreating the East Asian miracle in the nineties, but were unable to sustain the virtuous cycle because of large scale misallocation of capital. Our own experience of rapid credit expansion from 2006 to 2012 illustrates the same risk, where the quality of credit sharply deteriorated when the quantity was expanded. In this context, recent efforts to clean up the banks and establish a bankruptcy process should be seen as valuable investment that must be completed. If India had attempted to press the accelerator five years ago, it would have almost certainly been hit by a major financial crisis in a few years. Painful as it may have seemed, the banking sector clean up and the IBC framework are important foundations that will now reap benefits when the investment-driven growth model is put into motion as the incentives get aligned towards better quality lending (Sarkar, Subramanian and Tantri, 2019).

1.58 Now that the foundations for expansion have been laid, it is now time to significantly lower the cost of capital. Figure 22 shows how the real rate of interest has increased significantly in India over the years. In fact, a cross-country comparison shows that the cost of capital remains quite high in India (see Figure 23), which affects investment prospects in the country.

The risk-return trade-off in the economy

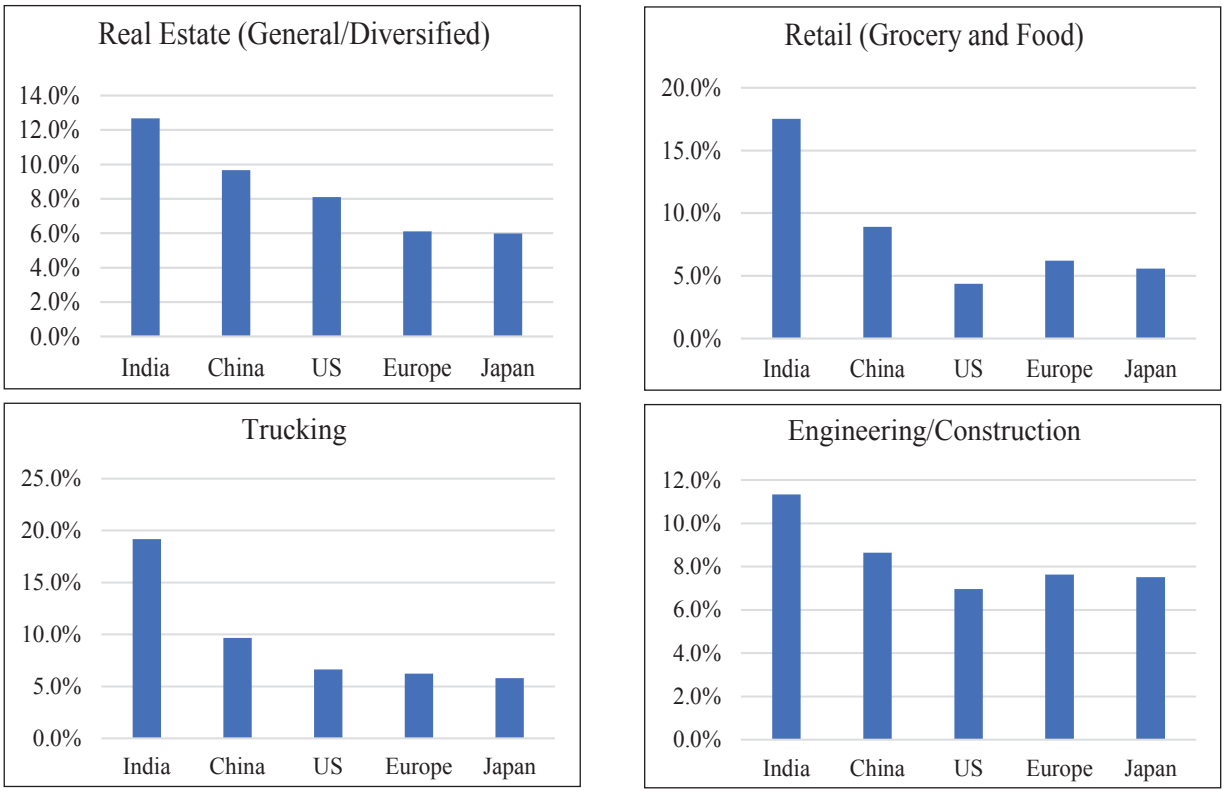
1.59 Another aspect that constrains the savings-investment driven model for growth, jobs and exports pertains to the incentive structure prevailing for risk-taking in the

Figure 22: Real rates of interest (Jan 2012 – May 2019)



Source: State Bank of India and Survey Calculations

Figure 23: Cross-country comparison of Cost of Capital across some sectors



Source: Damodaran(2019)

economy. The following aspects of the risk-return trade-off need attention.

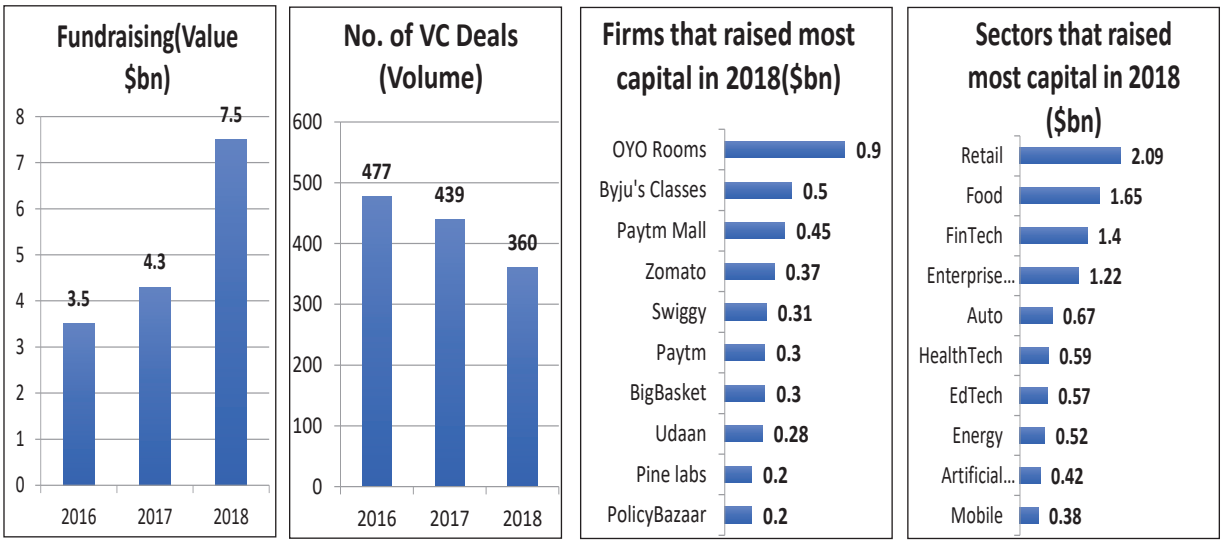
1.60 As investment represents a forward-looking activity, investors eventually make their decisions to invest based on the risk-adjusted return they expect. In other words, if two projects offer the same return but one of them is riskier, then investors choose the less risky project to invest. Therefore, systematically lowering the risks faced by investors in India is critical for the success of the investment-driven model for economic growth. Risk pertains to the possibilities of upside, when a project performs well, and downside, when the project fails. So, the implementation of the IBC is crucial in this regard as it puts into process a framework for reconfiguration of assets following business failure. However, the after-tax return for successful projects crucially affects the risk-return trade-off and thereby becomes critical to foster investment.

1.61 Optimal tax policy plays a crucial role in this regard. Countries across the world recognise the need to evolve tax system that can foster innovation. Therefore, tax policy and its implementation for start-ups must be rationalised to foster innovative investments in the Indian economy. Several studies have also suggested that capital gains tax can have significant economic consequences for individual investors in terms of its lock-in effects and associated deterring incentives to use capital gains into riskier investments (Meade, 1990). Design of optimal tax policy also aims to raise revenue efficiently and fairly, while encouraging the bonafide taxpayers and punishing the malafide ones. However, achieving this optimality is not an easy task. Therefore, to foster investment, getting this balance right is extremely critical in the Indian context.

1.62 Growth in the new economy cannot be fostered without an ecosystem that rewards innovation and entrepreneurship (Acharya and Subramanian, 2009; Acharya, Baghai and Subramanian, 2013, 2014; Chava et al., 2013; Sapra, Subramanian and Subramanian, 2013). Startups and innovative ventures face significantly greater uncertainty than traditional "brick-and-mortar" firms. Yet, policy ambiguities that create collateral damage for genuine risk-takers can affect investments by dampening the animal spirits in the economy.

1.63 Ranked third in the world in the start-up ecosystem, a growing number of domestic Indian enterprises are developing solutions aimed at managing and solving urban challenges. While a majority of these are tech-start-ups concerned with e-commerce and consumer products and services, 2018 was touted as the year of food start-ups. Figure 24 shows statistics that depict the vibrant start-up ecosystem that has developed in India. B2C start-ups concerned with easing public service delivery and driving efficiencies, whether in waste, water or energy, are slowly

Figure 24: Trends in India's start-ups (2018)



Unicorn Club

	Total Funding($bn)	Post-money valuation($ bn)	Time taken to become an unicorn(yrs) (RHS)
Flipkart	6.1	15.51	3
OYO Rooms	1.35	4.18	5
Ola	2.8	4	2
Byju's Classes	0.74	3.02	4
Snapdeal	1.8	2.47	3
Paytm Mall	0.653	2.01	Less than 1
Zomato	0.58	2	5
Swiggy	0.46	1.21	3
Quikr	0.37	0.88	7
PolicyBazaar	0.37	0.44	10

Unicorn Aspirers

	Total Funding($bn)	Post-money valuation($ bn)
Rivigo	0.17	0.92
Billdesk	0.16	0.83
BookMyShow	0.23	0.78
BigBasket	0.56	0.72
Delhivery	0.26	0.60
Sharechat	0.12	0.50
UrbanClap	0.11	0.47
CarDekho	0.28	0.45
CarTrade	0.25	0.40
CapitalFloat	0.11	0.35

Mergers and Acquisitions

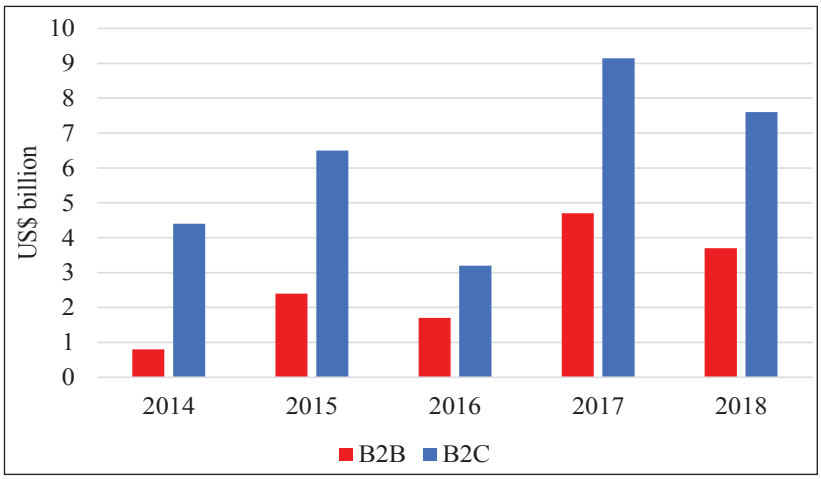
Target	Acquired by	Value ($ bn)
Flipkart	Walmart	16
Embibe	RIL	0.18
Saavn	RIL	0.10
Ridlr	Ola Cabs	0.05
Minjar	Nutanix	0.05
Mettl	Mercer	0.40
TicketNew	PayTm	0.40
Liv.ai	Flipkart	0.40
Tapzo	Amazon	0.40
Walnut	CapitalFloat	0.30

Source: Sarkar (2018)

but surely emerging. Figure 25 highlights this fact as private investment into B2C start-ups is much higher than that into B2B start-ups.

1.64 Continuing the creation of an ecosystem for private investment, especially in the new economy, is therefore critical to enable the virtuous cycle of investment, demand, exports, growth and jobs.

Figure 25: Funding in B2C startups higher than in B2B startups



Source: Goyal (2019)

CHAPTER AT A GLANCE

- During the last five years, India's economy has performed well. By opening up several pathways for trickle-down, the government has ensured that the benefits of growth and macroeconomic stability reach the bottom of the pyramid.
- To achieve the objective of becoming a US$5 trillion economy by 2024-25, India needs to sustain a real GDP growth rate of 8%. International experience, especially from high-growth East Asian economies, suggests that such growth can only be sustained by a "virtuous cycle" of savings, investment and exports catalysed and supported by a favourable demographic phase. Investment, especially private investment, is the "key driver" that drives demand, creates capacity, increases labour productivity, introduces new technology, allows creative destruction and generates jobs.
- Exports must form an integral part of the growth model because higher savings preclude domestic consumption as the driver of final demand. Similarly, job creation is driven by this virtuous cycle. While the claim is often made that investment displaces jobs, this remains true only when viewed within the silo of a specific activity. When examined across the entire value chain, capital investment fosters job creation as production of capital goods, research & development and supply chains generate jobs.
- In postulating the above growth model, the Survey departs from traditional Anglo-Saxon thinking by viewing the economy as being either in a virtuous or a vicious cycle, and thus never in equilibrium.
- By presenting data as a public good, emphasizing legal reform, ensuring policy consistency, and encouraging behaviour change using principles of behavioural economics, the Survey aims to enable a self-sustaining virtuous cycle. Key ingredients include a focus on policies that nourish MSMEs to create more jobs and become more productive, reduce the cost of capital, and rationalise the risk-return trade-off for investments.

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Policy for *Homo Sapiens*, Not *Homo Economicus*: Leveraging the Behavioural Economics of "Nudge"

02
CHAPTER

तर्कोऽप्रतिष्ठः श्रुतयोविभिन्नानैको ऋषिर्यस्य मतं प्रमाणम्।

We cannot rely totally on rational thinking to gain information, as it is not without its bias.

Decisions made by real people often deviate from the impractical robots theorized in classical economics. Drawing on the psychology of human behaviour, behavioural economics provides insights to 'nudge' people towards desirable behaviour. This chapter illustrates how the Swachh Bharat Mission (SBM) and the Beti Bachao Beti Padhao (BBBP) have successfully employed behavioural insights. Using such learning, the chapter lays out an ambitious agenda for social change: (i) from BBBP to BADLAV (Beti Aapki Dhan Lakshmi Aur Vijay Lakshmi); (ii) from Swachh Bharat to Sundar Bharat; (iii) from "Give it up" for the LPG subsidy to "Think about the Subsidy"; and (iv) from tax evasion to tax compliance. First, a key principle of behavioural economics is that while people's behaviour is influenced significantly by social norms, understanding the drivers of these social norms can enable change. In India, where social and religious norms play such a dominant role in influencing behaviour, behavioural economics can therefore provide a valuable instrument for change. So, beneficial social norms can be furthered by drawing attention to positive influencers, especially friends/neighbours that represent role models with which people can identify. Second, as people are given to tremendous inertia when making a choice, they prefer sticking to the default option. By the nearly costless act of changing the default to overcome this inertia, desired behaviour can be encouraged without affecting people's choices. Third, as people find it difficult to sustain good habits, repeated reinforcements and reminders of successful past actions can help sustain changed behaviour.

THE INFLUENCE SPECTRUM OF PUBLIC POLICY

2.1 Public policy affects all aspects of our lives. Public policy influences people to act in a socially desirable way, be it driving safely, conserving natural resources, educating children, respecting the human rights of fellow citizens or saving for retirement. Some policies subtly influence by fostering the right incentives while others mandate desired behaviour or ban undesirable ones.

2.2 Public policies can, therefore, be graded on a spectrum capturing how strongly

they influence (or coerce) behaviour (see Figure 1). On one extreme is *laissez faire,* i.e. doing nothing and leaving individuals/ firms to chart their own course. *Laissez faire* works well when markets achieve socially desirable outcomes on their own. Where markets fail, *laissez faire* fails. For instance, individuals/firms in a free market would not restrain pollution. Public policy – in the form of regulation – mandates people to act in a socially desirable manner. Sandwiched between these extremes are policies that incentivize good behaviour or dis-incentivize bad behaviour, such as subsidies for renewable energy and taxes on tobacco.

2.3 Recently, behavioural economists have discovered the efficacy of a new class of "nudge" policies that lie between *laissez faire* and incentives. Such policies leverage insights from human psychology to influence the choice architecture of people. Nudge policies gently steer people towards desirable behaviour even while preserving their liberty to choose.

Figure 1: From Minimal Influence to Coercion

2.4 Adam Smith, in his book the 'Theory of Moral Sentiment', noted that a wide range of human choices are driven and limited by our mental resources i.e., cognitive ability, attention and motivation. Behavioural economics relies on this essential insight from human psychology that real people do not always behave like robots, rational and unbiased individuals that form the basis of classical economic theory called "*homo economicus*" (Thaler, 2000). To a *homo economicus*, the choice architecture is irrelevant, as she will make the optimal choice irrespective of the way the choices are presented to her. However, real people respond to the choice architecture. For example, a large fraction of individuals opt for the default choice, irrespective of their intrinsic preferences. This is because individuals suffer from a cognitive bias called "*anchoring bias",* viz., once a default option is presented to them, they anchor on to it (Tversky and Kahneman, 1974). Anchoring bias, along with several others that we describe in this chapter, drives a wedge between people's intrinsic preferences and the choices they eventually make.

2.5 As individuals suffer from tremendous inertia when they have to make a choice, they tend to stick to the default option (Thaler and Sunstein 2008; Samson 2014). The nearly costless act of changing the default on an enrolment form harvests this inertia for people's own good. At the same time, this form of paternalism preserves people's right to choose as the choice architecture makes it easy for an individual to opt out of the scheme. For example, studies have shown that enrolment rates in a healthcare or retirement savings plan improve dramatically if the plan is designed as an opt-in by default embedded with the option to opt-out, as opposed to voluntary enrolment by opting in.

2.6 Understanding these principles of behavioural economics, therefore, can bridge the gap between people's preferences and the choices they make, and thereby enable informed policymaking. Many governments, including the U.S., the U.K. and Australia, have set up dedicated units to use behavioural insights for effective policymaking. Innovative interventions across the world that utilize the principles of behavioural economics are tabulated in Table 1.

Table 1: Innovative Global Behaviour Change Interventions

Sector	Problem	Intervention	Observations
Pension Policy (USA)	People tend to go with defaults. When the default in a saving plan is non-enrolment, most people do not enrol even when they want to.	Instead of employees checking a box to enrol in savings plans, employees check a box to *not* enrol; i.e. the default option is to be enrolled.	Automatic enrolment increased savings by up to 40 per cent (Beshears et. al, 2005)
Tax Compliance (UK)	People need reminders and positive reinforcement to sustain socially desirable behaviour.	People were sent variations of text messages on how their taxes make a difference to public services.	People who owed most tax were also most responsive to messages asking them to pay. Compliance increased without increase in tax surveillance costs (UK Cabinet Office, Behavioural Insights Team, 2012).
Agriculture (Africa)	Inertia makes people procrastinate important, time-sensitive decisions even when they are aware of the consequences of delay.	To tackle farmers' procrastination in buying fertilizer (possibly because of the hassle of traveling to town), home delivery of fertilizer early in the season was attempted.	Fertilizer use increased by 70 per cent (Duflo et al., 2011). Early home delivery increased fertilizer use by 70 per cent. The effect was as much as a 50 per cent price subsidy would have accomplished.
Savings (Philippines)	People save much less than they want to because of lack of adequate self-control in spending.	People were offered specially designed savings accounts that locked up funds until a self-specified target was met.	Nearly 30 per cent of those who were offered the account adopted it. Saving balance increased by 81 per cent in a year (Ashraf et al., 2006).
Savings (Bolivia, Peru, Philippines)	People save much less than they want to because of inertia and lack of positive reinforcement.	People were sent periodic and timely reminders about their self-determined saving goals.	Reminders increased the amount saved by six per cent (Karlan et al., 2010).
Education (Madagascar)	Many parents underestimate the returns to spending another year at school. They think schooling is worthless unless the child is able to go all the way through high school. Many allow their children to drop out with even fewer years of schooling than they can afford.	Parents were informed about the average income gains from spending one more year in school for children from backgrounds like their own.	Information dissemination increased children's test scores by 0.37 standard deviations, particularly for those parents who had underestimated the return to education (Nguyen, 2008).

2.7 Behavioural economics is, however, not a panacea to policymaking; its potential needs to be understood and put in perspective. Nudge policies cannot and should not supplant every incentive-based and mandate-based policy. For example, a policy that merely nudges people to refrain from assaulting others will fail as such situations warrant strict decree or, at least, a stronger push than a mere nudge. However, the majority of public policy issues are amenable to incorporating nudges. In fact, many incentive and mandate-based policies may be clubbed with a nudge effect to increase their efficacy.

SUCCESSFUL APPLICATIONS OF BEHAVIOURAL INSIGHTS IN INDIA

2.8 In India, policies to alter behaviour have spanned the influence spectrum, as is shown in Figure 2.

Figure 2: Policies spanning the influence spectrum in India

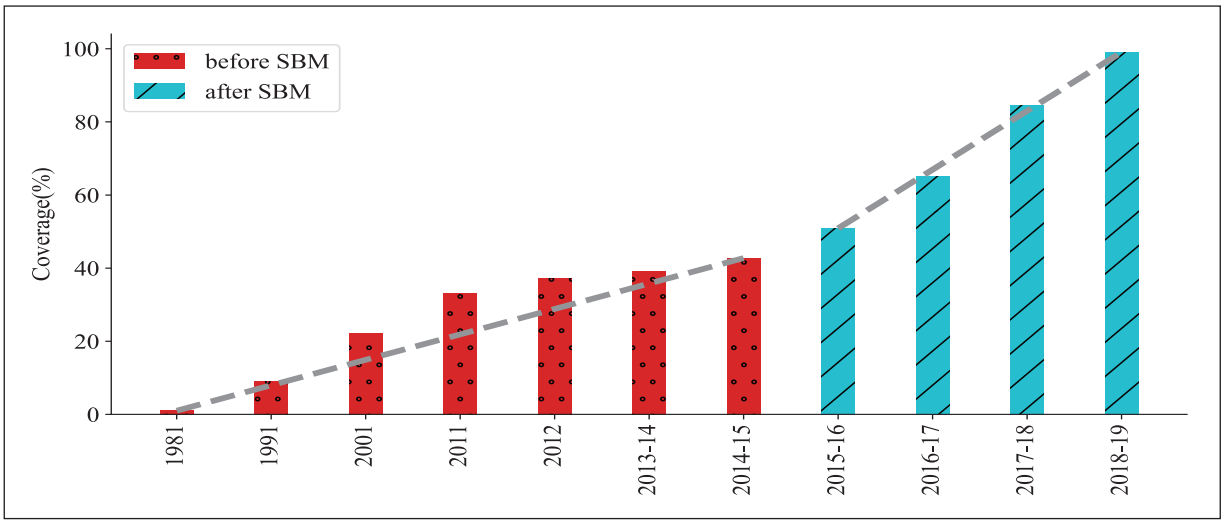
Policy	Level of influence			
	Laissez faire	Nudge	Incentivize	Mandate
Give It Up				
Aadhaar				
Jan DhanYojana				
Beti Bachao, Beti Padhao				
Swachh Bharat Mission				
Taxes on tobacco				
Compulsory voting in panchayat elections in some states				
Ban on alcohol in some states				

2.9 Many Indian schemes that employ insights from behavioural economics have met with success. The Swachh Bharat Mission (SBM) and the Beti Bachao, Beti Padhao (BBBP) scheme are cases in point. Behavioural economists have long touted the power of the "*social norm*" as most people want to behave or be seen to behave in congruity with these norms (Dolan et al., 2010). People are more likely to stop defecating in the open if their neighbours stop or are more likely to value their girl children if that is touted as the social norm.

Swachh Bharat Mission (SBM)

2.10 SBM was launched on 2nd October, 2014 to achieve universal sanitation coverage. It is not the first programme to address sanitation concerns. However, there were no dramatic shifts in the access rates until SBM as is shown in Figure 3. SBM is the first one to emphasize behaviour change as much as, if not more than, construction of toilets. Within five years of the launch of SBM, household access to toilets has increased to nearly 100 per cent in all states.

Figure 3: National Sanitation Coverage before and after SBM

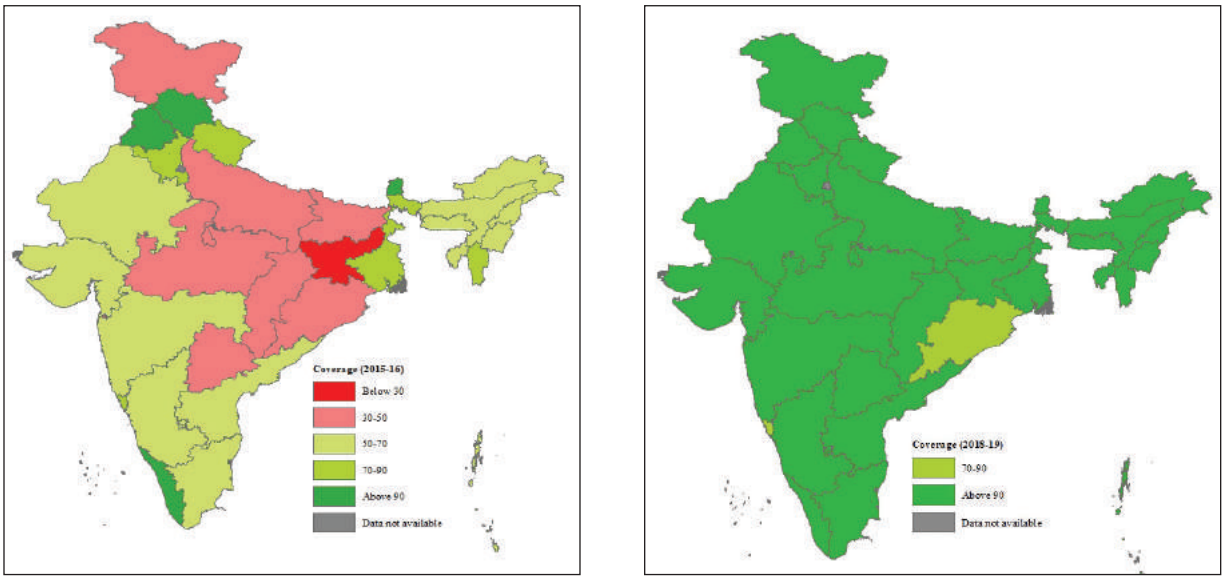


Source: Ministry of Drinking Water and Sanitation (MoDWS)
Note: Data for 1981-2011 is as per Census.

2.11 SBM has achieved success in not only providing toilets but also in ensuring that these toilets are *used*. An independent verification of SBM through the National Annual Rural Sanitation Survey (NARSS) 2018-19 has found that 93.1 per cent of rural households had access to toilets, 96.5 per cent of the households in rural India who have access to a toilet use it. This re-confirmed the Open Defecation Free (ODF) status of 90.7 per cent of villages that were previously declared and verified as ODF by various districts/states. This is also evident in the maps/charts below depicting the state-wise increase in coverage of individual household latrines (IHHL) from 2015-16 to 2018-19 (Figure 4) and the percentage of villages in each state that have been declared and verified ODF (Figure 5).

Figure 4: Coverage of Individual Household Latrine (IHHL)

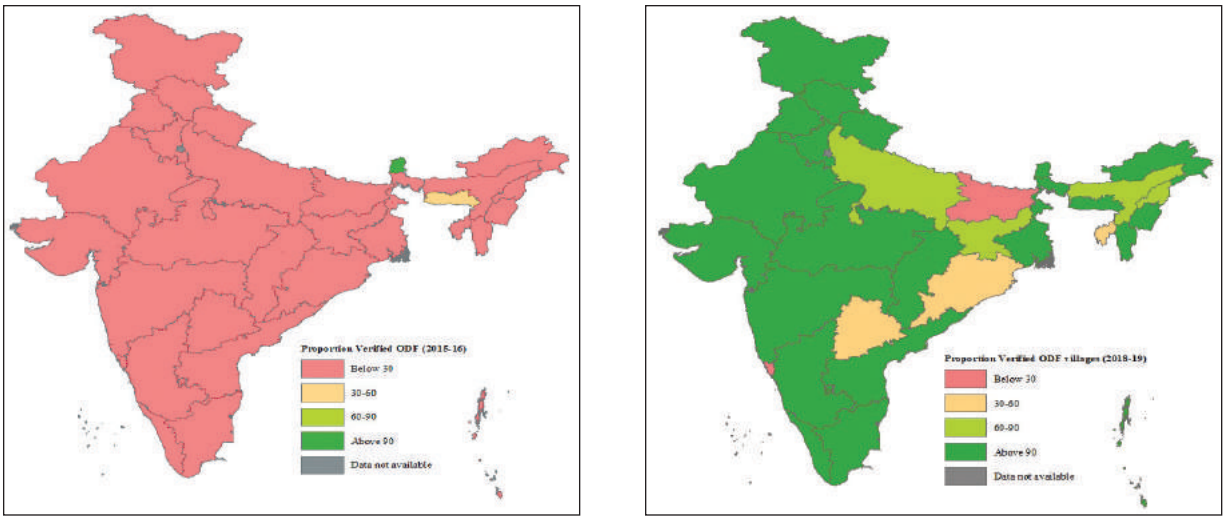
2015-16 **2018-19**



Source: MoDWS

Figure 5: Verified ODF Villages

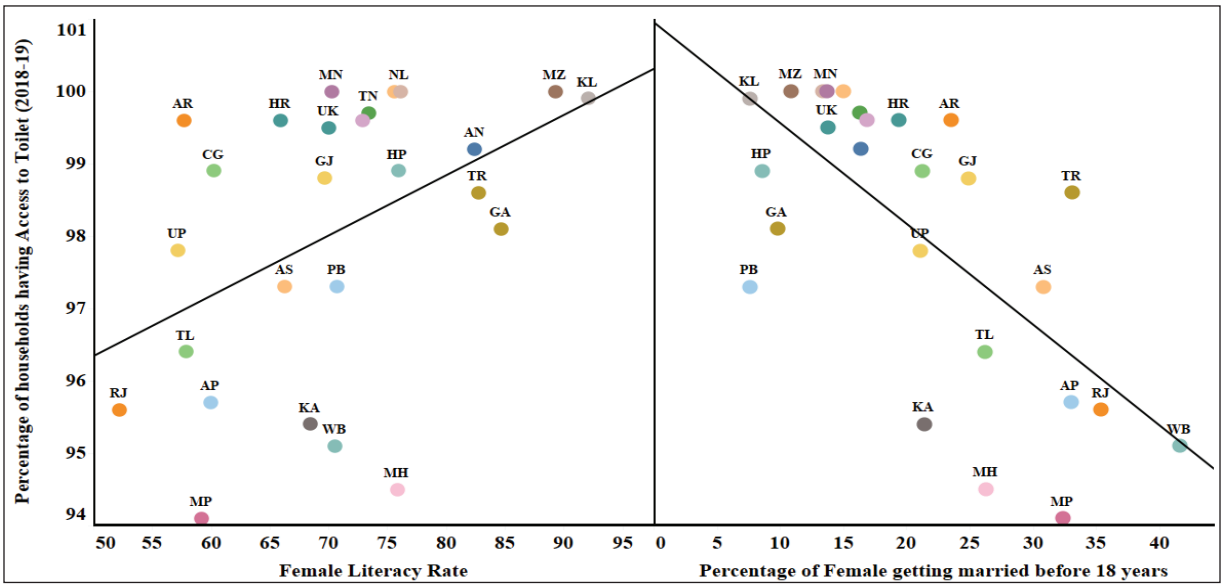
2015-16 **2018-19**



Source: MoDWS

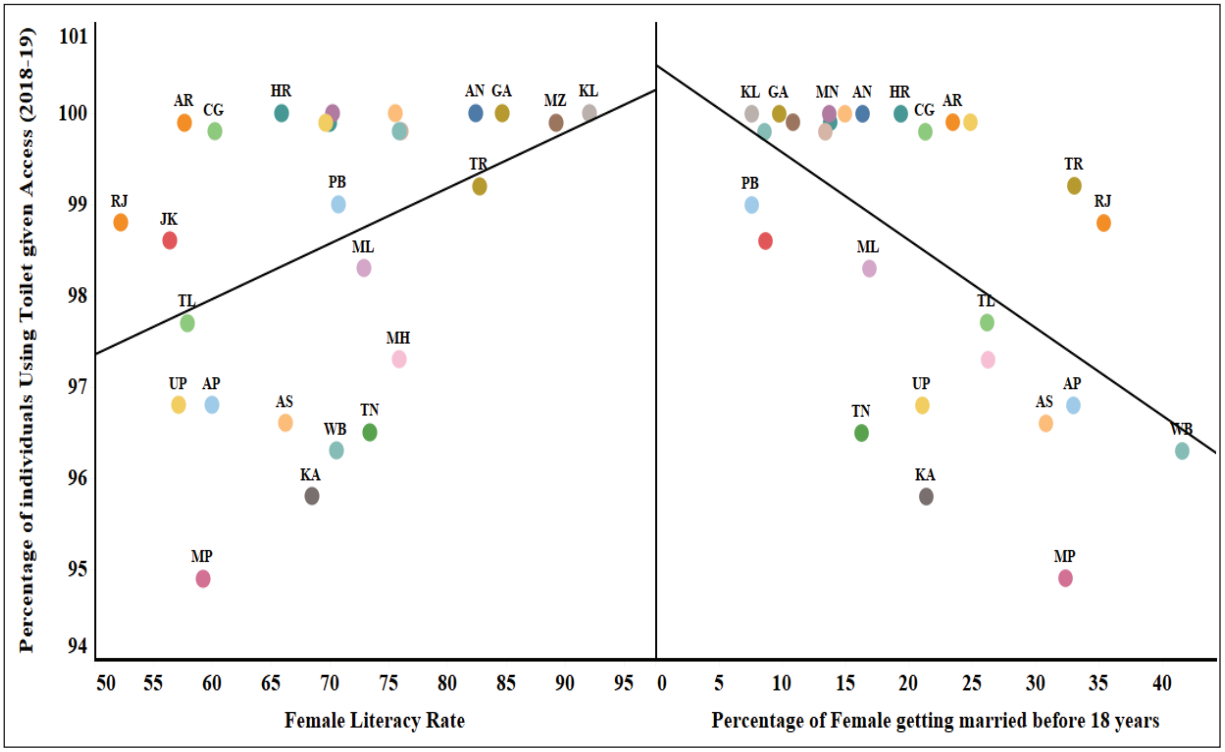
2.12 The above figures highlight the tremendous success of SBM. As is highlighted in Figure 2, the principles of behavioural economics were applied in SBM. Figures 6 to 8 examine the role of these principles in the success of SBM. Measures of female literacy and early marriages of girls, which associate strongly with rigid social norms, correlate powerfully with access and usage of toilets across states. This shows that toilet access and usage can be suitably increased with behavioural nudges that push female literacy rates up and discourage early marriages of girls. In this respect, the BBBP scheme, which we describe next as a scheme aimed at empowering the girl child, complements SBM strongly as factors related to gender empowerment are seen to be significantly correlated with toilet access and usage. This interplay can be effectively used to improve the efficacy of both the schemes.

Figure 6: Correlation between Access to Toilets with Female Literacy and Female Age at Marriage



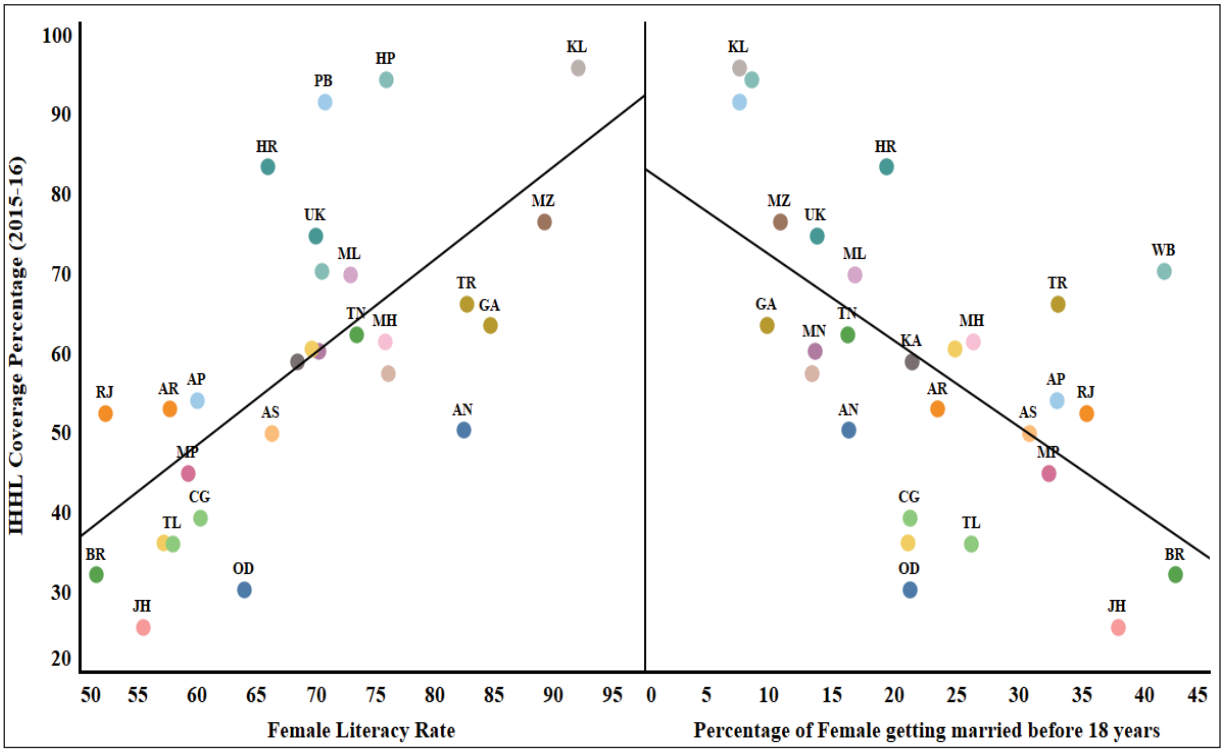
Source: MoDWS, Census 2011, NFHS 2015-16

Figure 7: Correlation between Use of Toilets (given access) with Female Literacy and Female Age at Marriage



Source:MoDWS, Census 2011, NFHS 2015-16

Figure 8: Correlation between IHHL Coverage with Female Literacy and Female Age at Marriage



Source: MoDWS, Census 2011, NFHS 2015-16

Box 1: Use of Behavioural insights in the SBM

SBM, as a nation-wide cleanliness drive, was launched on 2nd October, 2014, the birthday of India's most revered 'role model' Mahatma Gandhi. The day was chosen to leverage the values propagated by him and thereby create a mass movement on the lines of 'satyagraha' for a cleaner India. The symbol used for SBM invokes Gandhiji's ideas. Behavioural economics emphasises the role of context in influencing choices and decisions, which has been effectively adopted by the SBM campaign.

To initiate behavioural change in usage of toilets, more than five lakh *swachhagrahis*, foot soldiers of the SBM, were recruited; *the similarity with satyagrahis is intentional to reinforce the message*. As each village has at least one *swachhagrahi*, who is a local, these *swachhagrahis* were able to leverage their social ties within their villages to effect change. People are more likely to listen to and emulate someone they know, which is why local ambassadors of change are more effective in getting through to people than mass media campaigns.

Further, SBM relies on community-based approaches to sanitation. Behaviour change techniques such as Participatory Rural Appraisal and Community-led Total Sanitation induce people to come together, appraise their community's open defecation situation and plan the next course of action. This makes sanitation a community-level concern rather than an obscure campaign of a distant government. Non-conformers, therefore, find their act more visible to their community. The fear of community scorn, or a desire to fit in, or both, have led many to renounce open defecation.

SBM used yet another behavioural insight – that people internalize messages better when these messages make them *feel* a certain way. Arcane concerns about hygiene and disease appeal to few; it is natural that those who have defecated in the open all their lives without consequence would fail to absorb the message that open defecation can have deleterious effects. On the other hand, appealing to people's emotions, for example by attaching a sense of disgust to open defecation, has a better chance of moving people to change.

Many *swachhagrahis* delivered the message that open defecation is tantamount to eating one's own excreta, as flies sit on excreta left in open spaces and then sit on food. The act of provoking disgust or shaming people for open defecation has been controversial; some have considered it disrespectful. That may well be the case, but it does not take away from the fact that campaigns that elicit emotional reactions are more effective than those that deliver plain, recondite messages.

Beti Bachao, Beti Padhao (BBBP)

2.13 As is well known, India's child sex ratio had been consistently falling for decades. Between the 2001 and 2011 censuses, 21 out of 29 states registered a decline in child sex ratio. India's sex ratio at birth[1] (SRB) was on a steady decline until the first decade of the twenty-first century, when a number of initiatives, including BBBP, were launched in quick succession to arrest this trend.

2.14 BBBP Scheme was launched on 22nd January, 2015 to address the issue of decline in Child Sex Ratio and related issues of empowerment of girls and women. The campaign was flagged from Panipat, Haryana, which had the worst child sex ratio at 834 among Indian states as compared with the national average of 919 (as per Census, 2011).

1 Sex Ratio at Birth = (Total Number of Live Female Births/Total Number of Live Male Births)*1000

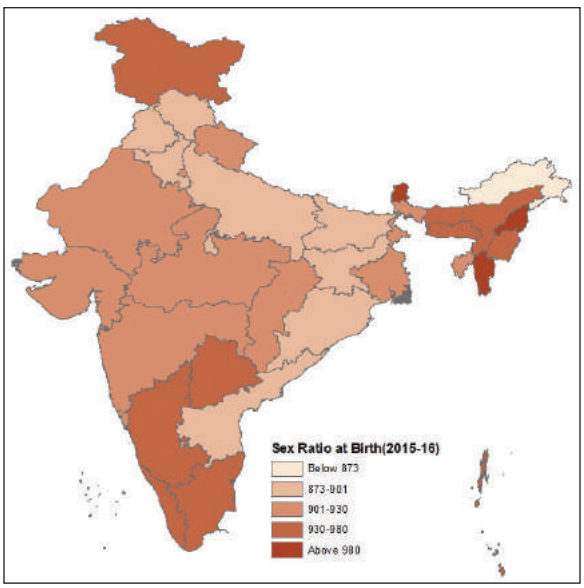
The choice of Panipat in the battle against the socially ingrained bias against the girl child was also symbolic through the association with the famous battles fought at Panipat in 1526, 1556 and 1761. As we highlight later, one of the principles of behavioural economics is to adapt the message to match "mental models" of people. The symbolism captured by the choice of Panipat in Haryana helped significantly in matching the message to the relevant mental model.

2.15 The scheme was initially launched in 100 districts in 2014-15, and was expanded to 61 additional districts in 2015-16. The initiative was expanded to all districts of the Country on March 8, 2018 from Jhunjunu, Rajasthan. The date and location was again selected carefully to ensure that the symbolism behind the message matched the relevant mental model. Rajasthan was chosen as the State improved by 34 points from 888 girls per 1000 boys in 2011 to 922 per 1000 boys in 2017-18 to indicate that good performance receives a reward. Also, International Women's Day was chosen to launch to reinforce the stress on gender empowerment and establish the social norm of 'girls are valuable'.

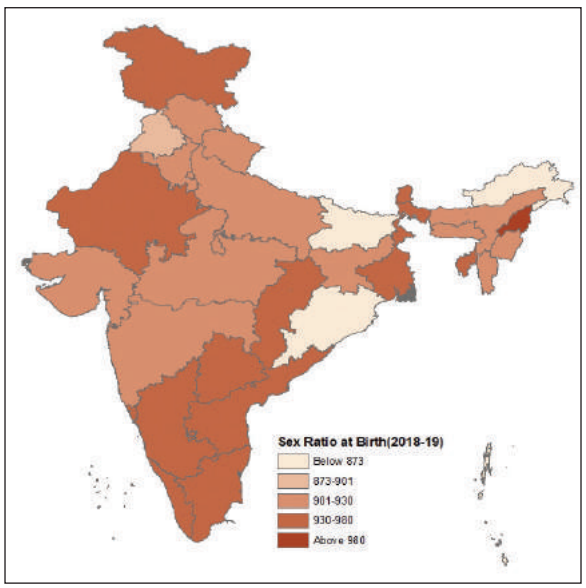
2.16 It is, of course, difficult to attribute the improving child sex ratio to a single scheme, especially because awareness programmes do not create results overnight. However, the timing of the launch of these schemes and the inter-state variation in existing social norms may be used to assess the impact of BBBP. Consider the large states of Uttar Pradesh, Madhya Pradesh, Rajasthan, Chhattisgarh, Andhra Pradesh and Jharkhand, all of which had registered declining child sex ratios between the 2001 and 2011 censuses. Around the launch of the BBBP in 2015-16, they had among the poorest sex ratios at birth, as evident in Figure 9. But by 2018-19, all these states showed a reversal of the trend, registering an increase in SRB between 2015-16 and 2018-19 (Figure 10). BBBP has had an impact particularly on large states with very poor child sex ratios – states that plausibly also needed the greatest pivot in their social norms.

Figure 9: Sex Ratio at Birth

2015-16



2018-19



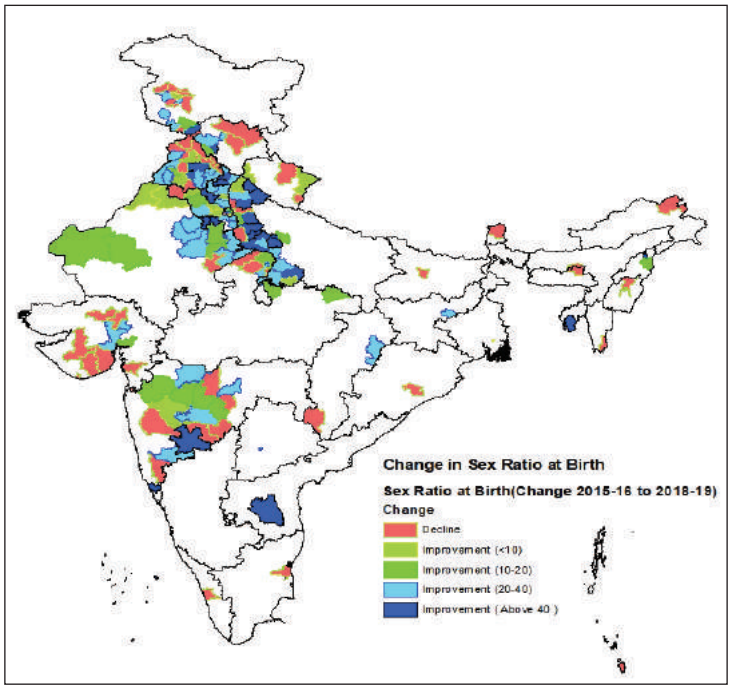
Source: Derived from Health Management Information System (HMIS), Ministry of Health and Family Welfare
Note: SRB figures are calculated using average of BBBP districts.

Figure 10: States with an improvement in Sex Ratio at Birth from 2015-16 to 2018-19

Source: Derived from Health Management Information System(HMIS), Ministry of Health and Family Welfare

2.17 The impact of BBBP in the 161 districts where it was initially implemented is shown in Figure 11. The SRB has improved in 107 districts within a period of 4 years viz., from 2015-16 to 2018-19. On an average, the sex ratio for 161 districts has improved from 909 in 2015-16 to 919 in 2018-19.

Figure 11: Change in Sex Ratio at Birth from 2015-16 to 2018-19 in 161 BBBP Districts



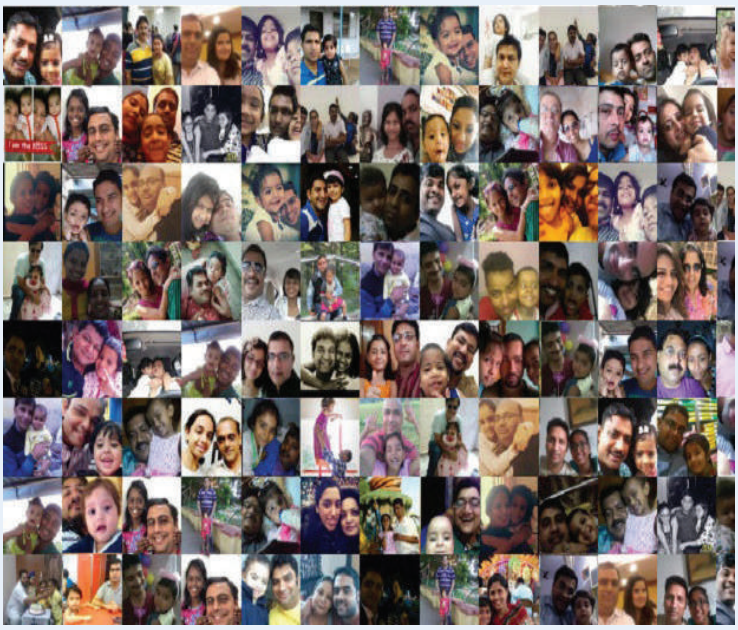
Source: Derived from Health Management Information System (HMIS), Ministry of Health and Family Welfare

Box 2: Effective Use of "Social norm" in BBBP

The success of the BBBP Scheme demonstrates a powerful use of the insight on 'social norm' in its 'Selfie with Daughter' initiative. This scheme was launched to address a highly imbalanced child sex ratio in India. People's attitude towards the girl child needed to change – people needed to stop viewing girls as burdens and start celebrating them instead. The selfie campaign showcased examples of parents around the country who were doing exactly that. The celebration of the girl child quickly became the norm. Most people wanted to conform, and more and more parents posted selfies with their girls. Started by one proud father in a village in Haryana, the campaign went viral and #SelfieWithDaughter became a worldwide hit.

Two elements enabled the campaign's success: first, telling people what the norm is, and second, showcasing the thousands of other people who were acting in line with that norm.

The strategy addresses a cognitive bias called '*failure bias*' (Baumeister and Bratslavsky, 2001). The failure bias is the tendency to focus on failures rather than successes, mostly because failures have greater visibility. Because failures get the spotlight, people tend to think that failing is the norm, or at least that failing is more prevalent than it really is. Therefore, in the context of BBBP, focus must be on people who treat their girls fairly; this corrects the failure bias and makes the social norm of fair treatment of girls unequivocally clear.



BBBP's work is far from over, of course, as posting a selfie is not tantamount to subverting entrenched orthodox mind-sets overnight, but its leverage of social norms is certainly a step in the right direction.

The Power of Clear Messaging

2.18 Apart from the SBM and BBBP programmes that have successfully employed the power of messaging, several other programmes have utilised this power. The success of any programme depends upon the level of involvement of all the relevant stakeholders. Use of socially and culturally identifiable names gives a clear message of the objectives of the programme – one of the principles of behavioural economics is that the messaging needs to be clear and simple and aligned to a mental model. This is evident from the names used for various recent schemes, some of which are tabulated in table 2 below.

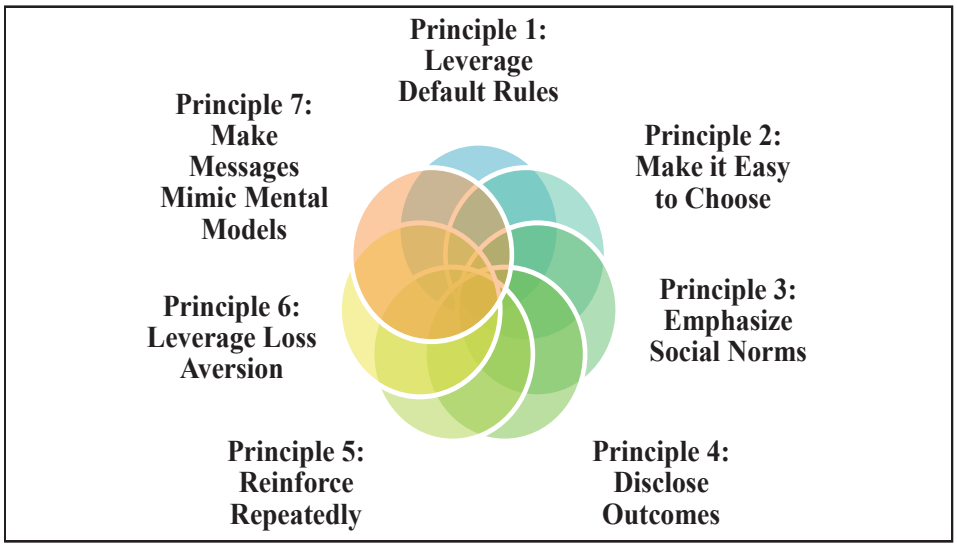
Table 2: Use of clear messaging for Schemes

Name of the Scheme	Literal Meaning of the Name	Objective of the Scheme Cultural/Societal aspect used
Namami Gange	Namami Gange means 'I pray to Ganga' as the river Ganga is revered in our culture.	To arrest the pollution of Ganga River and revive the river.
POSHAN Abhiyan	Poshan means holistic nutrition	Multi-ministerial convergence mission to ensure a malnutrition free India by 2022.
Ujjwala	Means 'bright, clear'	To safeguard the health of women by providing them with clean cooking fuel – LPG.
PM Mudra Yojana	Mudra means "currency, coins"	Provides loans upto 10 lakh to the non-corporate, non-farm small/ micro enterprises.
Jan DhanYojana	Jan Dhan implies "money of the people"	Financial inclusion program to expand access to financial services.
Ayushman Bharat	Ayushman means "Being Blessed with long life"	Universal and affordable access to good quality health care services.

PRINCIPLES FOR APPLYING BEHAVIOURAL INSIGHTS TO PUBLIC POLICY

2.19 While several Indian programmes have applied the principles of behavioural economics, there is still ample scope for leveraging these insights to enhance the efficacy of programmes in India. To outline such applications, Figure 12 describes the seven key principles of behavioural economics that public policy must employ.

Figure 12: Principles of Behavioural Economics



2.20 The cognitive biases, the principle that can be applied to alleviate the cognitive bias, and the relevant applications are summarized below in Table 3.

Table 3: Using Behavioural Principles to Overcome Cognitive Biases

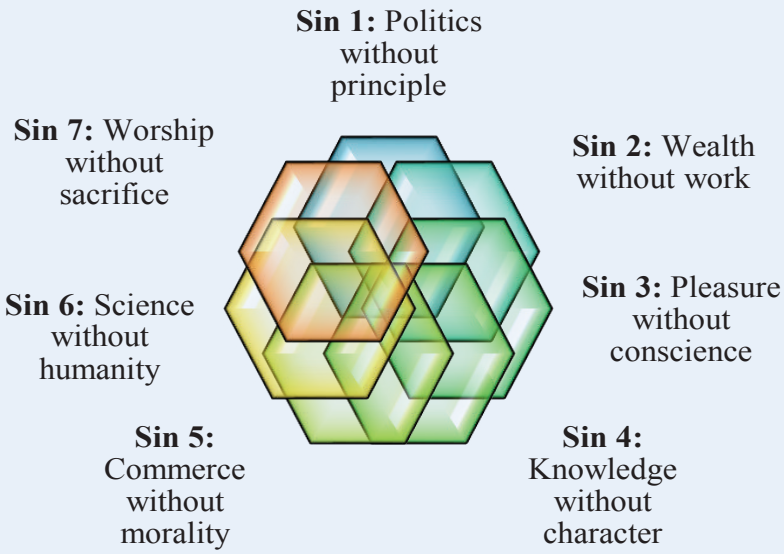
Cognitive bias	Behavioural principle	General application across all programs
Anchoring bias	Principle 1: Leverage default rules	• Choose the right default; default choice should maximise welfare. • Make the default 'opt-in' for welfare programs like insurance, retirement savings, organ donation, etc. • Make the default 'opt-out' for purchasing add-on services, enrolling for a subsidy, etc.
	Principle 2: Make it easy to choose	• Keep options few in number and easy to comprehend. • Reduce logistical and administrative impediments to choosing. • Offer micro-incentives.
Failure bias	Principle 3: Emphasize social norm	• Emphasize the number of people who vote, save regularly, file taxes on time, etc. – the enhancers of good behaviour. • Wherever possible, clarify the insignificant role of detractors/ negative influencers to avoid "failure bias". • Focus on influencers that people can relate to, for example those in the same geography or age group.
	Principle 4: Disclose outcomes	• Disclose the realized benefits of good behaviour.
Sunk cost bias	Principle 5: Reinforce repeatedly	• Remind people of past good behaviour, for example, that they saved regularly for the last three months, to invoke the sunk cost fallacy; people tend to continue their past behaviour, especially when reminded about the same. • Elicit a pre-commitment for desired behaviour, and if possible, enable immediate action as per the commitment.
Loss aversion bias	Principle 6: Leverage loss aversion	• Design incentives to reward good behaviour *ex ante* with threat to revoke reward later if behaviour fails to match expectations.
Flawed mental models and confirmation bias	Principle 7: Make messages match mental models	• Train people to shift to new rules of thumb, for example, "fluids out – so fluids in" to increase fluid intake during diarrhoea. • Make the rules of thumb catchy, easy to remember and intuitive.

AN ASPIRATIONAL AGENDA FOR PATH-BREAKING CHANGE

2.21 The successful application of behavioural insights, both in India and elsewhere, illustrates how their power can be tapped in several other programs to enhance policy impact. To this purpose, the current section draws on the principles outlined above to create an aspirational agenda for path-breaking change. The section combines (i) suggestions for transforming some of the existing programmes into revolutionary ones aimed at removing social ills; and (ii) ways to radically improve existing programmes.

Box 3: Citizen@75-Using Behavioral Economics to Avoid the Seven Social Sins

The destiny of a nation is shaped by its citizens. India @75 is envisaged as a 'New India' where every individual realizes his or her full potential and looks for opportunities to contribute rather than claim entitlements. A new spirit of independence needs to be imbibed from all extrinsic and intrinsic fetters to shape the future of India. Mahatma Gandhi's *Seven Social Sins,* published in *Young India* on October 22, 1925, provide deep insights into the role of social and political conditions shaping human behavior. Each of these is a statement of principle that can be interpreted and utilized for nudging people towards desirable behaviour.



Social Sins of Gandhiji	Related Principles of Behavioral Economics	Applications
Politics without principle	Leverage loss aversion	Growing perceptions of criminalization of politics, misuse of public office and lack of effective governance has led to increased apathy towards participation in political processes. Studies from behavioral economics and public administration show that policy makers and legislators exhibit loss-aversion in decision-making and seemingly harsh policy decisions do not garner enough support. Behavioral insights to address the loss aversion of policymakers can improve policy and legislative outcomes and uphold 'Politics with principle'. This would also enhance broader participation in politics and contribute to a vibrant democracy.

Wealth without work	Disclose outcomes	"Work is worship" – Indian ethos has always worshipped the fruits of one's own efforts. Work also leads to dignity and self-reliance. The perception of getting things for 'free' as an entitlement has to be reoriented towards discharging our obligations towards society by rendering productive work and contributing to national growth. The Principles of behavioral economics, viz. disclose the realized benefits of good behavior and the adverse outcomes of bad behaviour, on the one hand, and emphasizing social norms, on the other hand, offer insights towards enhancing productivity and tax compliance.
Pleasure without conscience	Leverage default rules	When less deserving people claim benefits of a development programme, it is an act of pleasure without conscience or a sense of responsibility. Such claiming of benefits neglects welfare concerns of their relatively unfortunate fellow counterparts. To learn to give and take, to live selflessly, to be sensitive, to be considerate, is our challenge. The behavioural principle of leveraging default rules like making the default 'opt-out' for availing subsidy, etc. can be employed to nudge people towards confident displays and conduct of altruism. The "Give it up" campaign can use this principle more effectively to broaden its adoption to surrendering all types of subsidies.
Knowledge without character	Match messages to mental models	With globalizing societies witnessing an information explosion today, a lack of moral element underlying this information bears the risk of desensitizing societies to ethics of harmony and brotherhood. Gender based violence, internet trolling, and rise of drug abuse amongst teenagers show how people, while mindlessly becoming more aware about the world around them, are ironically becoming less self-aware of their actions and outcomes of the same. People can be nudged with messages matching their mental models to make them realize that such biases exist and that soft skills like self-control, altruism, patience, and trust are as important as cognitive skills.
Commerce without morality	Emphasizing social norms	Ethics are moral principles that govern a person's actions and reflect beliefs about right and wrong, just and unjust in terms of human behaviour. These morals are shaped by social and cultural norms and religious practices.

		Emphasizing social norms is a powerful way of shaping choices and navigating human actions towards desired behaviour. Highlighting information regarding people who exhibit good behaviour and clarifying insignificant role of negative influencers can help enhance conformity and deter unethical social behaviours. The National Corporate Social Responsibility Awards of Ministry of Corporate Affairs is an initiative in this direction. These awards emphasize ethical behaviour and acknowledge companies that have positively impacted both business and society.
Science without humanity	Making it easy to choose	Science and Technology has a huge potential to simplify and benefit human lives. Chapter 10 in this volume dwells on an application of technology to improve the effectiveness of welfare programmes. Chapter 4 shows how data can be created as a public good within the legal framework of data privacy using technology. Using the behavioral principle of "Making it easy to choose", technology can make things simple to understand, cut through layers of processes and target the benefit to the actual beneficiary.
Worship without sacrifice	Reinforce repeatedly	Practicing religion without developing an embedded sense of sacrifice, empathy and humility to serve the needs of other people is self-defeating. Across all religions, positive mythological insights about gender and caste equality as well as universal brotherhood have been available and deeply understood in Indian society since the ages. So, repeatedly reinforcing examples of people following these positive sentiments as truly spiritual people can help establish the correct social norm that "serving man is serving God." This may also be seen in the MARD (Men Against Rape and Discrimination) campaign underlying which is the sacrifice of the male ego in a patriarchal society for the larger good of gender equality. The Good Samaritan guidelines of the Central Government and the policy adopted by several State governments, where people who help road accident victims receive a monetary incentive and an appreciation certificate, leverage behavioral insights to reinforce the correct social norm of selfless service of mankind.

Transforming Gender Equations: From BBBP to BADLAV (Beti Aapki Dhan Lakshmi Aur Vijay Lakshmi)

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2.22 While the BBBP campaign has helped, gender inequality needs a revolutionary campaign that utilises the benefits of behavioural economics. Our scriptures worship women as the embodiment of Shakti and exhort, as captured in the shloka above, that societies where women are respected prosper. Given the importance of messaging as highlighted before, the campaign must draw on cultural and social norms because they affect behaviour so crucially in India. Therefore, this campaign can be labelled BADLAV (Beti Aapki Dhan Lakshmi Aur Vijay Lakshmi) to represent the 'change' towards gender equality. By drawing on the imagery of the forms of Goddess Lakshmi that symbolises wealth (Dhan Lakshmi) and victory (Vijay Lakshmi), the message of treating women as the forms of Lakshmi needs to be emphasized. Box 3 outlines ideas for utilising the power of role models from Indian mythology to create the social norm that "women are equal to men." Table 4 details the explicit use of the seven behavioural principles outlined above to empower BADLAV and thereby create the new norm.

Box 4: Drawing on Mythological role models to reinforce the message of BADLAV (Beti Aapki Dhan Lakshmi Aur Vijay Lakshmi)

Indian women have enjoyed a position of respect and reverence in ancient Indian society. *Ardhanareshwar* – a half male-half female representation of Lord Shiva – captures the equality between men and women. The Rigveda identified many women sages as treasures of knowledge and foresight: the prophetess *Gargi*, who questioned the origin of all existence in her Vedic hymns and the great *Maitreyi*, who rejected half her husband's wealth in favour of spiritual knowledge. The long philosophical conversations between sage Agasthya and his highly educated wife Lopamudra are legendary. Men in ancient Indian society were identified with their mothers, *Yashoda-Nandan*, *Kaushalya-Nandan*, *Gandhari-Putra,* as well as their wives/consorts*, Janaki-Raman, Radha-Krishna*.

Since such positive mythological insights about gender equality are readily available and deeply understood in Indian society, these can be used as part of a revolutionary BADLAV programme for the following:

a) to explicity state the new norm of gender equality,

b) to focus attention on all those who adopt the new norm, and

c) to continuously reinforce the norm over time.

The last step is crucial because people's memories are short-lived. They need to be reminded of what is socially acceptable behaviour and repeatedly shown examples of their conforming neighbours, until the norm becomes entrenched in society. Seeing is believing, i.e. only when people can see counter-stereotypical role models of gender equality often, will their beliefs start to change. A marketing campaign by the U.S. government leveraged this idea perfectly when they sought to recruit women for "men's jobs" in factories. They supported their marketing effort by caricaturing a cultural icon –*Rosie the Riveter* – a female taking a "man's job" without losing her femininity.

Telling people what the others are doing is most effective when people can relate to the 'others'. People are more likely to alter their behaviours if the 'others' belong to their community. Information campaigns promoting gender equality should emphasize, for each group of people, what the others from their own geography or ethnic identity are doing in this direction. This would help the "What is" to become the "What should be" because of people's innate desire to follow the herd, compete with them and/or gain social approval.

Table 4: Using Behavioural Principles for BADLAV

Principle	Applying the principle to BADLAV
1. Make it easy to choose	• Simplify procedures to make it easier for women to, *inter alia,* report incidences of harassment and discrimination, to open bank accounts, to get government documents such as passports, visas etc.
2. Emphasize social norms	• Prominent women, including many female and male Hollywood and Bollywood stars, played an important role in raising the profile of the recent "Me too" movement, thereby contributing to changing the norm and illustrating that change in social norm is possible. • Instead of highlighting the number of top companies that have few women on their boards, it is more effective to highlight how many do. Similarly, showing how prevalent and pervasive gender based violence is, runs the risk of normalising it; instead emphasising on how many people are not perpetrators or reinforcing injunctive norms against it can be more helpful in shaping correct norms towards gender equality. • Research shows that girls and women who observed female village chiefs exhibit behaviour that highlights them as equal to men. Villagers who had exposure to at least two female chiefs rated male and female leaders equally. Therefore, women village leaders must be advertised as role models as people can relate to proximate "others". Mass media must be utilised for regular efforts to change the social norm via BADLAV.
3. Disclose outcomes	• Publishing gender rankings or audits in public domain, whether for numbers of women in legislatures, in political parties, in bureaucracy or on company boards, can prompt organisations to take action to avoid bad publicity or looking worse than their competitors. Mandating organisations to report the "Gender pay gap" can reinforce this trend.
4. Reinforce repeatedly	• Having multiple visually descriptive posters in every corridor of workplaces and public places regarding what constitutes sexual harassment at workplace can reinforce the norm of it not being acceptable. Similarly, regular TV advertisements that reinforce the positive norm of gender equality can help to reinforce repeatedly.
5. Leverage loss aversion	• Evidence from field studies and experiments shows that among men and women of equal abilities, men often choose to compete twice as often as women. Reward structures can be modified to ameliorate the higher aversion of women to competition. For instance, application fees for women applicants in jobs can be waived. Removing demographic information from job applications can also help.

6. Make messages match mental models	• Women consistently tend to place more value on flexibility at workplace. Companies that offer flexibility as the default norm have many more women applicants and employees. • Women are less likely to apply for jobs perceived as "male-labelled." Skill training and apprenticeship programmes can be redesigned with appropriately gendered wording to attract female applicants in male dominated professions. • Stereotypes regarding innate ability linked to gender and/or race can impact standardized test performance. Gender stereotype threats (filling demographic information before tests) can influence test scores of girls and boys differentially. These insights are crucial for building gender and race sensitive curriculum and evaluation procedures in schools.

From Swachh and Ayushman Bharat to Sundar Bharath

2.23 A strong way to reinforce behaviour is by getting people to pre-commit to a certain course of action. Studies find that if people pre-commit to doing something, they are much more likely to do it. For instance, a simple act of asking people if they will vote, enrol in a smoking cessation programme or save money, increases the likelihood that people will act in accordance with their goals. SBM *swachhagrahis* may use this strategy to make people pre-commit to sanitation goals. Further, the *swachhagrahis* may also assist people in assessing themselves periodically, say once a month. An assisted reflection session in the community or on a one-on-one basis with the local *swachhagrahi* can prompt people to think about whether they acted as planned and how many times they detracted. These reflection sessions should culminate in a commitment about how people plan to act in the near-term future – whether they will refrain from open defecation next month or not.

2.24 Further, people often respond to disclosure of outcomes; they are more likely to sustain their new behaviour if told about tangible benefits that they can internalize; not aggregate statistics that they may not care about. For example, a *swachhagrahi* may disseminate information about the incidence of sanitation-related illness *in her village* and how this rate has improved after the adoption of sanitation practices. When people realize the tangible outcomes of their actions, they are more likely to sustain their behaviour. This is of tremendous importance for SBM because it relies on a *sustained* change in behaviour, not a one-time change. To drive the point home, *swachhagrahis* may also help individual households reflect on the incidence of illness in their own families in, say, the last six months or since the time they quit open defecation. If people find that their health outcomes are better after adopting the new practice, they are likely to persist in that practice.

2.25 Taking our learning from the power of behavioural economics in the Swachh Bharat scheme, the way forward is to develop an all-encompassing behavioural economics architecture for the entire health sector as health signifies inner beauty. Given the unique characteristics of the health sector i.e. information asymmetry between the doctor and the patient, hyperbolic tendencies of health consumers, and high variability of health care expenditures, people often make decisions in health care that are not in their best interest. This ranges from failing to enrol in health insurance to which they are entitled, to engaging in harmful behaviour like smoking and drug abuse. A potentially richer set of behavioural tools than provided by traditional economic theory is necessary to understand and influence health care behaviour.

Table 5: Using Behavioural Principles for Sundar Bharat

Principle	Applying the principle
1. Leverage default rules	• Giving individuals default flu shot appointment time can increase influenza vaccination rates. • Providing smart insurance plan defaults can significantly simplify health insurance choice.
2. Make it easy to choose	• Asking consumers the factors that are most important to them while choosing a health plan and restricting the plan to these factors can make choice easier and thereby enhance take-up of health insurance. • Minor behavioural alterations in school and college canteen menus (giving interesting names to healthy options, putting them near the cash counter, making the process of buying unhealthy options more time taking) can increase uptake of nutritious food.
3. Emphasize social norms	• Adolescents often overestimate how much alcohol or drugs their peers take making heavier consumption to be perceived as a socially desirable behaviour. Campaigns focusing on number of people who don't drink or take drugs may be more effective. • Youth may be more responsive to a drug prevention program after the death of a celebrity from drug overdose. • Giving out messages in information campaigns such as "90 per cent of doctors agree that vaccines are safe" can significantly reduce public concern about childhood vaccine, establish the social norm that vaccinations are safe and enhance vaccination. • Presenting information on how many people in the neighbourhood have chosen to take up the health insurance plan and the benefits it has offered to families with similar disease in that area can increase enrolment rates.
4. Disclose outcomes	• Disclosing to people about the realized benefits of hand-washing and, or family planning practices experienced by other people in their community, can enable them to take up these health practices.
5. Reinforce repeatedly	• Sending messages to patients that asked the patient to write down the day and time they planned to get their next vaccination can boost uptake of vaccines. • Doctors asking patients coming to hospitals for a signed pledge or a verbal commitment, preferably in the presence of someone the signee respects, called "accountability partner" to take up Yoga and walks can encourage such healthy lifestyle practices. A monthly appreciation (joint coupon rewards) for following the pledge, after being certified by the "accountability partner", can sustain such behaviour. • Many people suffering from critical diseases do not take their medicines regularly. Use of simple text messages & pill bottles that light up if not opened at the right time can increase drug adherence. Delivering an appreciation certificate at the end of the month for following their prescription schedule can sustain adherence.
6. Leverage loss aversion	• People often find it difficult to achieve goals like weight loss or ceasing to smoke. People voluntarily made to post bonds (deposit contracts) or lottery tickets on a website that will be returned to them if they achieve their goals, but are forfeited otherwise, can help them achieve these difficult goals.

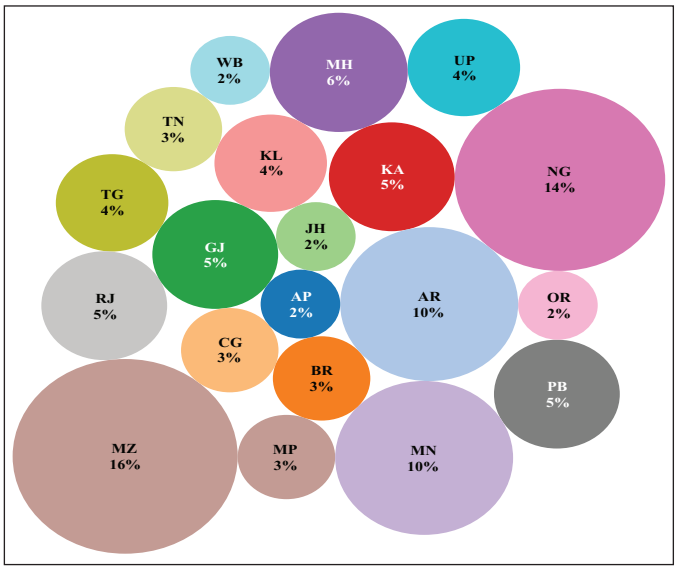
7. Make messages match mental models	• Control of diarrhoea suffers from a flawed mental model: the perception that the solution is to decrease the child's fluid intake and to keep the child 'dry', implying less use of Oral Rehydration Solution. Information campaigns on adoption of ORS can overturn this flawed mental model. • Message boards in public hospitals and medical advertisements on media must emphasize *gains* from smoke cessation and breastfeeding to foster preventive action. Similarly, messages for sexually transmitted diseases and breast cancer must focus on the *loss* to deter and encourage early diagnosis respectively. • The Mother's Absolute Affection (MAA) Programme campaign leverages role of influencers (the relationship between mother-in-law and the daughter-in-law) and the idea of commitment devices ("Vaada" i.e., promise) to reinforce the idea of breastfeeding the child within one hour of birth. Cultural tailoring of health messages in this area can nudge them to adopt breastfeeding.

Think about the Subsidy

2.26 "Give It Up" encouraged Above-poverty line (APL) households to voluntarily surrender their LPG subsidies – for every household that "gave it up," a BPL household would receive a gas connection. The lack of economic incentives in this programme means the campaign relies entirely on the better judgment of people to voluntarily give up their subsidies.

2.27 As Figure 13 shows, while the "Give It Up" campaign heralded a significant change in the form of voluntary giving up of subsidies, the overall response to the campaign could be improved from the one crore who have given it up. While this represents a good beginning, the potential to expand this number remains large. It can be further observed that north eastern states like Arunachal Pradesh, Nagaland, Manipur and Mizoram have higher rate of subsidy surrender as compared to larger states availing much more subsidy. Like BBBP and SBM, "Give It Up" also relies on a change in behaviour. In fact, Give It Up's task is less arduous than BBBP and SBM – while the latter programmes require continuous effort to dislodge mind-sets that have prevailed for decades, "Give It Up" requires only a one-time action that is inconsequential to most affluent households.

Figure 13: State-wise percentage of APL Consumers who surrendered LPG Subsidy



Source: Data from Ministry of Petroleum & Natural Gas

2.28 Behavioural economics tells us that even if people are truly interested in giving up their subsidies; their actions may differ from their intent as they need to be moved to action with a gentle nudge. A good choice architecture can aid in closing this gap between intention and action. For campaigns like Give It Up, the default choice matters immensely. People have a strong tendency to go with the status quo. Many governments have leveraged this insight to change the default option and thereby increase efficacy of their programmes. "Give It Up" needs to employ this insight. Given their inertia, of the nineteen crore people who did not give up their subsidy, many may have intended to give up their subsidy but have simply not been nudged to action.

2.29 Give It Up, however, incorporates other behavioural insights. It is easy and nearly effortless to give up one's subsidy – an intuitive online interface ensures the process takes only a few minutes. This is essential because every additional minute that it takes to give up the subsidy increases the chances that one will drop out in the middle of the process.

2.30 The campaign also attempts to leverage the power of social norms, but with limited success. People act when they see others act. Information campaigns do not, however, adequately emphasize what the (metaphorical) neighbours are doing. The Give It Up website has a "scroll of honour" to felicitate participants, but this feature relies on people to go looking for the social norm, instead of actively advertising the social norm. A click on the "scroll of honour" makes the user choose between three gas companies, as the lists are maintained on these companies' websites. To find a name on these long lists, one needs to enter one's consumer number. Since no one is likely to know anyone else's consumer number, people cannot find their friends, relatives or neighbours.

2.31 People act positively when they see others act positively, and particularly when they can relate to such individuals. In fact, people can relate to others through even seemingly innocuous traits such as a shared geographical locality. The "scroll of honour" does not leverage this crucial insight, as people simply cannot find others they may know or can relate to. Maintaining a centralized list of names (independent of the gas company) and displaying the photographs of other participants in the same locality may increase the efficacy of the "scroll of honour." Table 6 describes the applications of the behavioural principles to implement the "Think about the Subsidy."

Table 6: Using Behavioural Principles for "Think about the Subsidy"

Principle	Applying the principle
1. Leverage default rules	For campaigns like Give It Up, the default choice matters immensely. People have a strong tendency to go with the status quo. The default option can be modified so that households above a certain income threshold have to opt in to continue their subsidies with the default option being "opt out" of the subsidy. It is critical to ensure that people find it extremely easy – through only a text message, a phone-call or a few clicks – to opt in to continue their subsidy.
2. Make it easy to choose	For people who donate impulsively, reducing the friction between the moment when their intention to give up the subsidy appears and when they feel they can take action can make them more likely to give up the subsidy. Prepopulating fields of subsidy giving up forms can make it more likely that people will submit applications. Mobile phones and apps can also make impulsive giving up easier.

3. Emphasize social norms	Making people feel good about giving up subsidies can help establish the correct social norm. To discourage the middle-class and the comparatively rich people from enrolling for subsidies like kerosene, cooking gas etc., the government could, in its advertisements of the particular schemes, state that the scheme is intended to help the poor who make X per cent of the population and who earn less than Y per month. Advertisements could suggest that by not enrolling, the rich are becoming contributors to eradication of extreme poverty from the country. Social networks could support live "Give it Up" events where participation is acknowledged with visual changes to people's online profiles. Creating quick outlets such as a simple phone app or physical kiosks for exercising our general intentions of donating small amounts can build the overall social norm of being charitable. Increasing visibility of donors can encourage giving up of subsidies, especially for people who think and donate based on their alignment with the causes they choose to support. Highlighting the noble act of giving in general using respected leaders in the world, and not just giving up a subsidy could increase the visibility of a more deliberate approach to giving.
4. Disclose outcomes	Displaying the names and photographs of people who give up subsidy on the website and while filling the form can bolster the act of giving it up.
5. Reinforce repeatedly	Immediately and vividly showing givers the effect of them giving up the subsidy can make giving feel really good. Givers could view personal photos of the people benefitting from the subsidy or a video with a beneficiary saying thank you. During tax filing time, people could fill an extra field in the form about whether they would like to give up their subsidy (a form of tax payment) for the cause of the nation. Givers could sign up for personalized reminders to bring attention to their giving up objectives throughout the year.
6. Leverage loss aversion	Loss aversion can be used to explain why majority of LPG users have not given up their subsidy. This reinforces the policy of setting the subsidy schemes default to opt-out with a fairly easy process to opt in. Asking individuals to pledge a certain amount of subsidy when they feel most inspired, possibly when watching a social movie in the theatre, with the payment coming later can encourage giving. They can be prompted to set a giving goal in advance to track their progress.
7. Match messages to mental models	Behavioural techniques can help achieve desirable outcomes from subsidy programmes and in turn reduce the effective costs of subsidy. Sometimes individuals do not take up vaccinations because they either forget the location of the clinic or the time of appointment. Fiscal subsidies to make people take up vaccinations can be made more cost effective if such set of individuals are reminded more frequently about the time and locationor encouraged to make a concrete plan about when and where they will get their vaccination.

Jan Dhan Yojana

2.32 While the Jan Dhan Yojana opened a large number of bank accounts in a short span of time, its success relies on people *using* these accounts regularly. The programme's mandate is not only to open accounts but to enable access to credit, insurance, pension schemes and other facilities offered by the formal banking sector. Going forward, the programme offers tremendous scope to employ behavioural insights.

Table 7: Using Behavioural Principles to enhance impact of Jan DhanYojana

Principle	Applying the principle
1. Leverage default rules	• Make auto enrolment into a savings plan the default while offering people the option to opt out.

2. Make it easy to choose	• Regulator must ensure that products for the poor do not confound with too many options. The Government's *Jeevan Jyoti Bima Yojana* is an example of a straight forward product that implements this option.
3. Emphasize social norms	• Information campaigns should highlight the number of people who use their bank accounts in the local village. Every person can be sent an SMS at the end of the month about his/her transactions, those of others in his village, and his relative standing in the village on this metric. This simple strategy can further the social norm for use of Jan Dhan account.
4. Disclose outcomes	• Holders of dormant accounts may be periodically reminded of the number of people in their neighbourhood who actively use their accounts. To regular users, even a simple SMS such as "You made three withdrawals this month – congratulations" in the vernacular language, followed by a happy emoticon, may remind people of the norm and sustain their usage of bank accounts.
5. Reinforce repeatedly	• Reminding people about the savings that they have done can in the past can help reinforce good behaviour. By simply asking people whether they plan to save next month, the intention to save can be reinforced. Committing people to how much they plan to save can also help reinforce the intention to save.
6. Leverage loss aversion	• A propitious time to get people to save more is when salary increases. At such times, people are less likely to consider increased savings as a loss than at other times of year. This feature can be combined with default rules to automatically increase enrolment into the savings while offering people the option to opt out of such automatic increases.
7. Make messages match mental models	• Money set aside for, say, education will unlikely be used for another purpose, whereas 'general' money not earmarked for any purpose is spent much faster. People may be asked to choose their own names such as "home savings plan" or "education savings plan." All outgoing communications from banks should stress the chosen name to reinforce savings.

Improving Tax Compliance

2.33 The great philosopher, Plato, convincingly argued centuries ago: "What is honoured in a country is cultivated there." Consider military service in India, which employs one of the largest group of armed personnel in the world (over 14 lakhs). While the economic incentives offered to army personnel are attractive, a large section joins the armed forces because serving in the armed forces is considered *honourable*. Similarly, in order to enhance tax compliance, behavioural insights need to be employed to modify the social norm from "evading taxes is acceptable" to "paying taxes honestly is honourable." A start has been made through the budget speech of February 2019, which publicly and explicitly thanked tax payers, perhaps for the first time, thereby seeking to honour honest tax payers.

2.34 Across countries, research has highlighted that tax evasion is driven significantly by *tax morale*, viz., the intrinsic motivation of taxpayers in a country to pay taxes. Tax morale itself is driven primarily by two perceptive factors: (i) vertical fairness, i.e. what I pay in taxes is commensurate to the benefits I receive as services from the Government; and (ii) horizontal fairness, i.e., differences in the taxes paid by various

sections of society. For instance, citizens perceive vertical fairness to be low if they find their tax payments being squandered in wasteful public expenditure or by corruption. Similarly, perceptions of horizontal fairness suffer when the employee class is forced to contribute disproportionately to income taxes while the class of self-employed gets away paying minimal taxes. Both perceptions contribute to high tax evasion in a country.

2.35 To correct vertical unfairness that can lead to tax evasion, the Government should utilise the behavioural insight that people identify with their neighbourhood. Signboards showing "tax money at work" in constructions projects in a panchayat/ district explicitly convey to citizens that their tax money is used in valuable public goods, thereby lowering perceptions of vertical unfairness. Similarly, highlighting the tax paid by other taxpayers, especially self-employed individuals, in the panchayat/ district through SMS, billboards etc., can correct perceptions of horizontal unfairness. Such information can propagate the social norm that "paying taxes honestly is honourable."

2.36 As people often indulge in conspicuous consumption to convey their social status, top 10 highest tax payers within a district can be highlighted and accorded due recognition. This may take the form of expedited boarding privileges at airports, fast-lane privileges on roads and toll booths, special "diplomatic" type lanes at immigration counters, etc. Further, the highest taxpayers over a decade could be recognised by naming important buildings, monuments, roads, trains, initiatives, schools and universities, hospitals and airports in their name. The idea is to create exclusive membership of "clubs" that exude not only social status but also honour. Such steps can also help propagate the social norm that "paying taxes honestly is honourable." Table 8 describes the applications of the behavioural principles to enhance tax compliance.

Table 8: Using Behavioural Principles to enhance tax compliance

Principle	Applying the principle
1. Leverage default rules	Automatic deduction of tax and directing all or portion of refunds into savings accounts can be used to encourage savings, including retirement savings. Sending messages to individuals suggesting that not declaring taxes is a deliberate and intentional choice on their part can help them overcome status quo bias and improve compliance.
2. Make it easy to choose	Filing of tax forms even for zero payment of tax. Removing barriers to filing taxes- procrastination, hassle of filling forms, or failing to understand the terms- can improve compliance. Automated tax collection can make individuals pay less attention to tax collected (Salience effects).
3. Emphasize social norms	Providing information about peer behaviour can make taxpayers adjust their reported income. Messages in the form of moral appeals to taxpayers regarding payment of taxes may have limited effects. Tax amnesties might reduce tax compliance if taxpayers perceive amnesties as unfair. Amnesties can decrease the government's credibility and the taxpayers' intrinsic motivation to comply by setting the incorrect social norm.

4. Disclose outcomes	Public shaming of individuals who don't pay taxes can reduce non-compliance if they are reintegrated immediately. However, persistent public shaming can be detrimental for compliance because of stigmatisation effects. If cheaters feel that the probability of their detection has increased, voluntary disclosure programs for tax payments can increase tax evasion incidence as these programs may offer the possibility to avoid strict punishments.
5. Reinforce repeatedly	Repeatedly sending fairness driven and normative messages added to standard reminder letters that referred to the facts that (a) most people in your local community pay their taxes on time and (b) the person concerned was in the very small minority who had not yet done so can help reduce late tax payments.
6. Leverage loss aversion	Tax withholding followed by refunds at the time of tax filing may increase tax compliance and total taxes paid. Taxpayers are more concerned about tax deduction claims when they owe additional tax (loss) at the time of filing than when they expect a refund (gain). Framing tax cuts: tax cuts presented as a bonus (gain) are more likely to be spent than tax cuts presented as a rebate (loss).
7. Match messages to mental models	Reminding tax payers that public goods can only be provided in return for tax compliance (reciprocity appeal) can boost tax morale.

Box 5:Tax evasion, wilful default, and the Doctrine of Pious Obligation

In Hinduism, non-payment of debts is a sin and also a crime. The scriptures ordain that if a person's debts are not paid and he dies in a state of indebtedness, his soul may have to face evil consequences. Therefore, it is the duty of his children to save him from such evil consequences. This duty or obligation of a child to repay the debts of the deceased parent is rested upon a special doctrine, known as "The Doctrine of Pious Obligation".

Under Islam, Prophet Muhammad advocated – "*Allaahummainnia'oodhibika min al-ma'thamwa'l-maghram (O Allaah, I seek refuge with You from sin and heavy debt)*." A person cannot enter Paradise until his debt was paid off. All of his wealth could be used to pay the debt and if it is insufficient then one or more heirs of the deceased could voluntarily pay for him.

The Bible says, "*Let no debt remain outstanding except the continuing debt to love one another* - Romans 13:8" and "*The wicked borrows and does not repay, but the righteous shows mercy and gives* -Psalm 37:21."

Thus, the repayment of debt in one's own life is prescribed as necessary by scriptures across religions. Given the importance of religion in the Indian culture,the principles of behavioural economics need to be combined with this "spiritual/religious norm" to reduce tax evasion and wilful default in the country.

IMPLEMENTING THE ASPIRATIONAL AGENDA FOR BEHAVIOURAL CHANGE

2.37 The previous section outlines an ambitious agenda for behavioural change, from BBBP to BADLAV, from Swachh Bharat to Swasth Bharat, from "Give It Up" for the LPG subsidy to "Think about the Subsidy", and from tax evasion to tax compliance. The possibilities, however, to employ the principles of behavioural economics to policymaking, especially in India where social norms so crucially influence behaviour are enormous. To avail these benefits, the following measures are suggested for implementation.

2.38 First, the proposal to set up a behavioural economics unit in the *Niti Aayog* must be immediately activated. Care, however, must be taken in setting up the unit as applying the principles of behavioural economics seems innocuously and misleadingly simple; after all, everyone can claim to be an expert in understanding human behaviour. However, as research in behavioural economics itself clearly highlights, there is a world of difference between *anecdotes* and *averages*. While insights gathered from careful research rely on averages, everyday experience is often driven by anecdotes. As anecdotes are more likely to represent outliers than averages, behavioural policymaking driven by anecdotal evidence can create more damage than good. Therefore, the temptation to appoint those who are not experts in this area must be avoided.

2.39 Second, every program must go through a "behavioural economics" audit before its implementation. This audit may adhere to the principles of behavioural economics outlined above to conduct its audit. Such an audit and the modifications undertaken, therein, can significantly enhance the efficacy of the program. A simple application of this approach is in the Government communication that goes to citizens. For example, recent experience of the Department of Revenue showed that perceptions of "tax terrorism" often had more to do with the language employed in the communication than any Government action in reality. Therefore, by the mere act of altering the language, it may be possible to change the relationship between the Department and the taxpayer from adversarial to collaborative.

2.40 Third, as several programs are administered by state governments, the behavioural economics team can work with various state governments not only to inform them about the potential benefits but also help them to improve the efficacy of the programs.

2.41 While social norms impact behaviour significantly in India, the power to employ behavioural change to alter these norms has not been adequately tapped. Implementing the agenda in this chapter would be a valuable step in this direction.

CHAPTER AT A GLANCE

- Decisions made by real people often deviate from the impractical robots theorized in classical economics
- Drawing on the psychology of human behaviour, behavioural economics provides insights to 'nudge' people towards desirable behaviour.
- The key principles of behavioural economics are 'emphasising the beneficial social norm', 'changing the default option' and 'repeated reinforcements'.
- Swachh Bharat Mission (SBM) and the Beti Bachao Beti Padhao (BBBP) have successfully employed behavioural insights.
- Insights from behavioural economics can be strategically utilised to create an aspirational agenda for social change: (i) from BBBP to BADLAV (Beti Aapki Dhan Lakshmi Aur Vijay Lakshmi); (ii) from Swachh Bharat to Sundar Bharat; (iii) from "Give It Up" for the LPG subsidy to "Think about the Subsidy"; and (iv) from tax evasion to tax compliance.

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Nourishing Dwarfs to become Giants: Reorienting policies for MSME Growth[1]

03
CHAPTER

ॐ पूर्णमदः पूर्णमिदम्-पूर्णात् पूर्णमुदच्-यते।
From the complete, the complete is born.
From a seed, a mature tree is born.

MSMEs that grow not only create greater profits for their promoters but also contribute to job creation and productivity in the economy. Our policies must, therefore, focus on enabling MSMEs to grow by unshackling them. Job creation in India, however, suffers from policies that foster dwarfs, i.e. small firms that never grow, instead of infant firms that have the potential to grow and become giants rapidly. While dwarfs, i.e., firms with less than 100 workers despite being more than ten years old, account for more than half of all organized firms in manufacturing by number, their contribution to employment is only 14 per cent and to productivity is a mere 8 per cent. In contrast, large firms (more than 100 employees) account for three-quarters of such employment and close to 90 per cent of productivity despite accounting for about 15 per cent by number. The perception of small firms being significant job creators pervades because job destruction by small firms is ignored in this calculus: small firms find it difficult to sustain the jobs they create. In contrast, large firms create permanent jobs in larger numbers. Also, young firms create more jobs at an increasing rate than older firms. Size-based incentives that are provided irrespective of firm age and inflexible labour regulation, which contain size-based limitations, contribute to this predicament. To unshackle MSMEs and thereby enable them to grow, all size-based incentives must have a sunset clause of less than ten years with necessary grand-fathering. Deregulating labour law restrictions can create significantly more jobs, as seen by the recent changes in Rajasthan when compared to the rest of the states.

INTRODUCTION

3.1 Job creation in large numbers remains an urgent imperative to provide financial and social inclusion for our young population. After all, a well-paying job provides the best form of financial and social inclusion to not only the individual but also his/her entire family. Chapter 7 in this volume of the Survey predicts that the working-age population will grow by roughly 97 lakh per year during the coming decade and 42 lakh per year in the

[1] Disclaimer: In this chapter, the term "dwarfs" for firms that remain small despite being old is contrasted to "infants" for firms that are small because they are young. This usage is purely for firms and has no correlation with such usage for individuals and is therefore not intended to harm any sensibilities, whatsoever.

2030s. If we assume that the labour force participation rate (LFPR) would remain at about 60 per cent in the next two decades, about 55-60 lakh jobs will have to be created annually over the next decade. In this context, this chapter examines how policies followed over the last seven decades stifle the growth of Micro, Small & Medium Enterprises (MSMEs) in the economy. MSMEs that grow not only create greater profits for their promoters but also contribute to job creation and productivity in the economy. Our policies must, therefore, focus on enabling MSMEs to grow by unshackling them. The chapter then lays out the policy map for re-orienting the policy stance to foster the growth of MSMEs and thereby greater job creation and productivity in the economy.

THE BANE OF DWARFISM AND ITS IMPACT ON JOBS AND PRODUCTIVITY

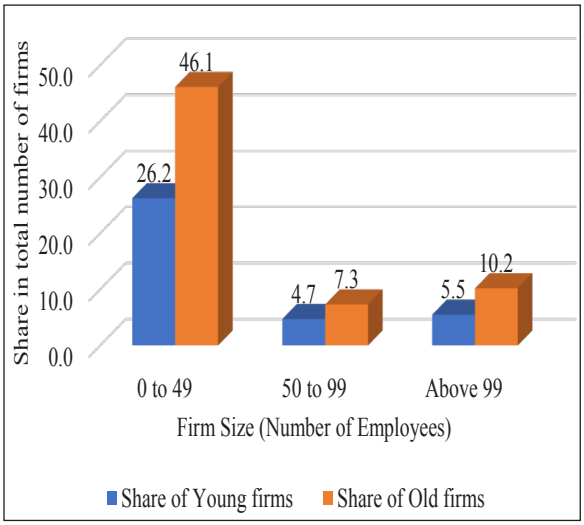
Domination of 'Dwarfs' in number

3.2 A startling fact is how the bane of dwarfs, which are defined as small firms that never grow beyond their small size, dominates the Indian economy and holds back job creation and productivity. For the purposes of the analysis in this section, firms employing less than 100 workers are categorized as small and firms employing 100 or more workers as relatively large. Though a firm employing 100 workers is definitely not large in the global context, as we show below, firms employing 100 workers are relatively large in the Indian context. Firms that are both small and older than ten years are categorized as dwarfs as these firms have continued to be stunted in their growth despite surviving for more than 10 years.[2]

3.3 Figures 1(a) to (c) show the share of dwarfs in the number of firms, the share in employment and their share in Net Value Added (NVA). This analysis has been conducted using *firm-level* data from the Annual Survey of Industries (ASI) for the year 2016-17, which is the latest available. While dwarfs account for half of all the firms in organized manufacturing by number, their share in employment is only 14.1 per cent. In fact, their share in NVA is a miniscule 7.6 per cent despite them dominating half the economic landscape. In contrast, young, large firms (firms that have more than 100 employees and are not more than 10 years old) account for only 5.5 per cent of firms by number but contribute 21.2 per cent of the employment and 37.2 per cent of the NVA. Large, but old, firms (firms that have more than 100 employees and are more than 10 years old) account for only 10.2 per cent of firms by number but contribute half of the employment as well as the NVA. Thus, firms that are able to grow over time to become large are the biggest contributors to employment and productivity in the economy. In contrast, dwarfs that remain small despite becoming older remain the lowest contributors to employment and productivity in the economy.

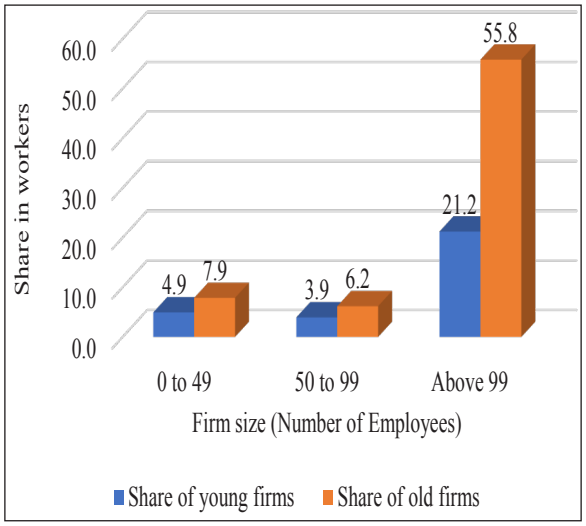
[2] Disclaimer: In this chapter, the term "dwarfs" for firms that remain small despite being old is contrasted to "infants" for firms that are small because they are young. This usage is purely for firms and has no correlation with such usage for individuals and is therefore not intended to harm any sensibilities, whatsoever.

Figure 1(a). Share of dwarfs versus others in number of firms (as of 2016-17)



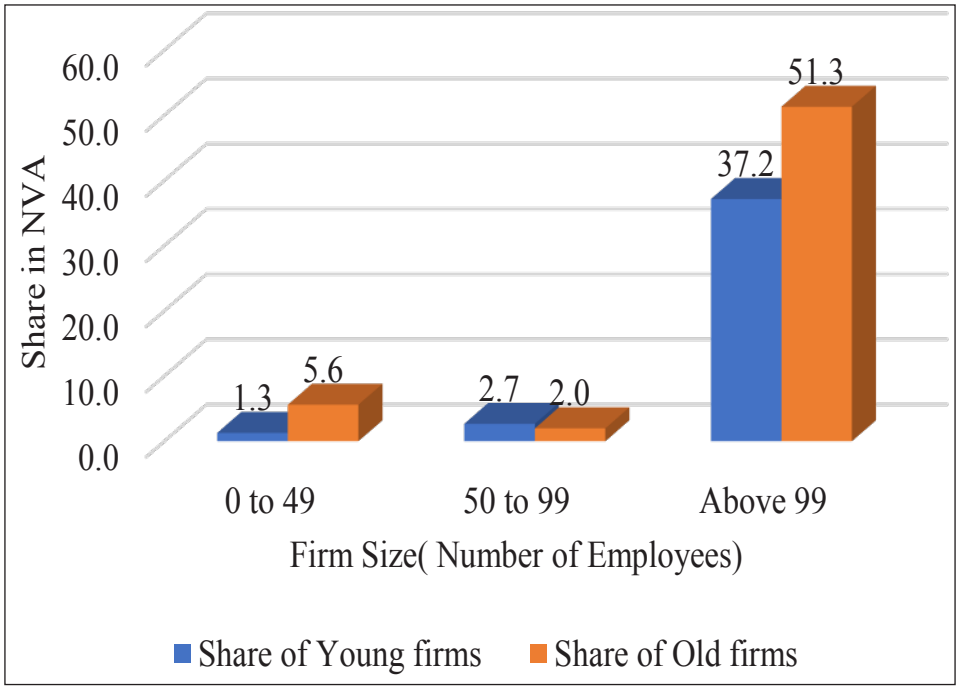
Source: ASI Firm level data

Figure 1 (b). Share of dwarfs versus others in employment (as of 2016-17)



Source: ASI Firm level data

Figure 1(c). Share of dwarfs versus others in Net Value Added (as of 2016-17)

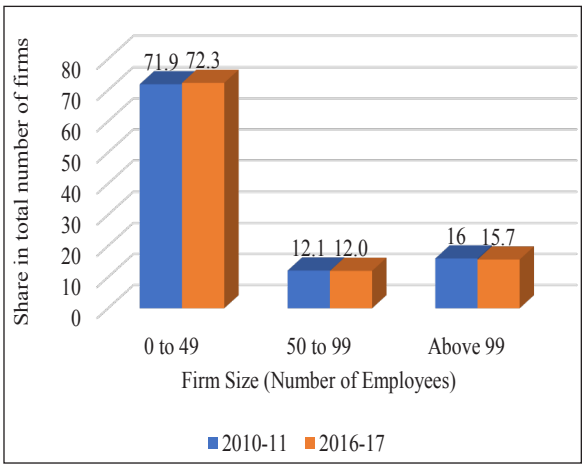


Source: ASI Firm level data

3.4 When examined purely according to size, we note that the proportion of small firms in organized manufacturing is around 85 per cent. In contrast, large firms account for only around 15 per cent of all the firms in organized manufacturing. These proportions have not changed much over time as seen in 2010-11 (Figure 2 (a)). Thus, small firms definitely dominate the economic landscape in India. Crucially, however, small firms accounted for only 23 per cent of the total employment in organized manufacturing in 2016-17 while the large firms accounted for over 77 per cent of the total employment. These proportions remain similar to those in 2010-11 (Figure 2(b)). Even more tellingly,

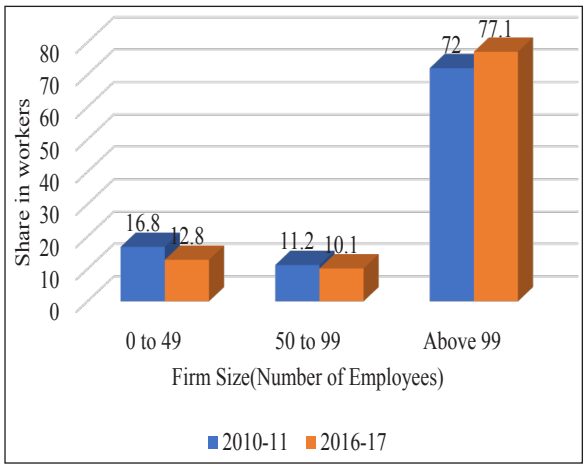
the share of small firms in Net Value Added (NVA) from organized manufacturing was only 11.5 per cent whereas the share of large firms in NVA was 88.5 per cent in 2016-17; these proportions are not different in 2010-11 either (Figure 2(c)). Even among the small firms, firms with less than 50 employees dominate the most numerically but create the least jobs and remain the most unproductive. Thus, the contribution of small firms to output and employment in the manufacturing sector is insignificant though they account for close to 85 per cent of all firms.

Figure 2(a). Distribution of number of factories by firm size



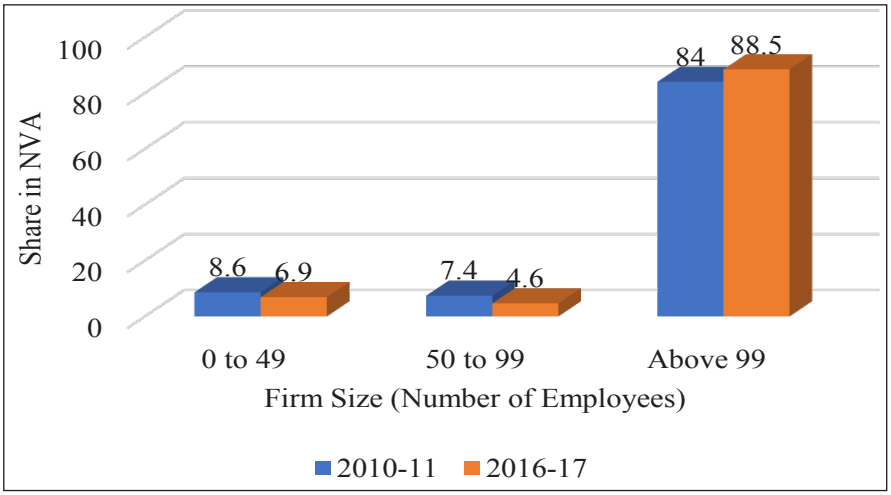
Source: ASI Firm level data

Figure 2(b). Distribution of employment across firms by firm size



Source: ASI Firm level data

Figure 2(c). Distribution of NVA Share by firm size



Source: ASI Firm level data

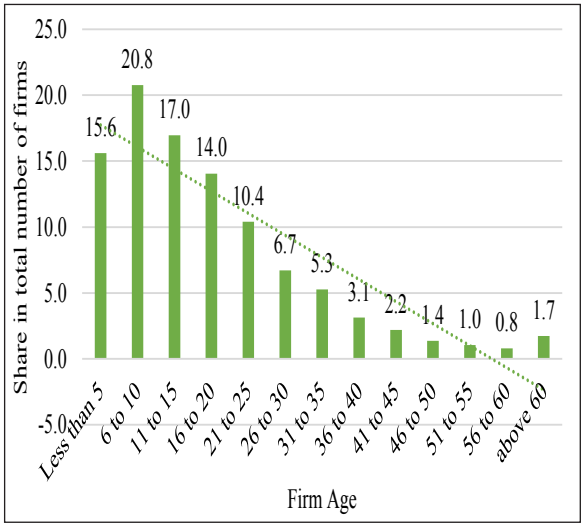
3.5 The above findings dispel the common notion that small firms generate the most employment. Small firms may generate a higher number of new jobs. However, they destroy as many jobs as well. Thus, higher levels of job creation in small firms co-exist with job destruction, thereby leading to lower levels of net job creation (Li and Rama, 2015). This common perception also stems from the fact that the effect of size confounds the effect of age. Specifically, most young firms are small (though most small firms are not young, at least in the Indian context). Absent careful distinction between the effect of age

versus that of size, the notion that small firms create jobs has prevailed because it is the young firms, who also happen to be small, create the most jobs. To establish this fact, the proportion of firms, share of employment and share of NVA by age has been examined.

Effect of Size compared to Effect of age

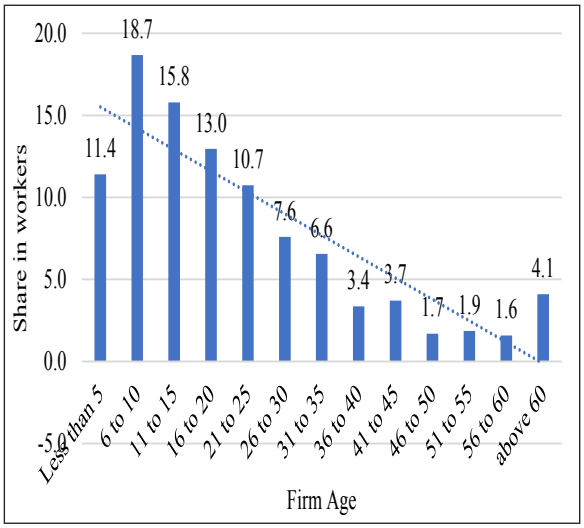
3.6 As compared to the small firms, it is the young firms that contribute significantly to employment and value added. Firms less than 10 years of age account for about 30 per cent of employment and about half the NVA. In fact, we crucially note that the share in employment as well the share in NVA trend downwards with an increase in firm age. This is despite the fact that young firms are on average smaller than older firms. Thus, young firms account for a disproportionate share of employment and productivity (Figure 3).

Figure 3(a). Proportion of firms by firm age



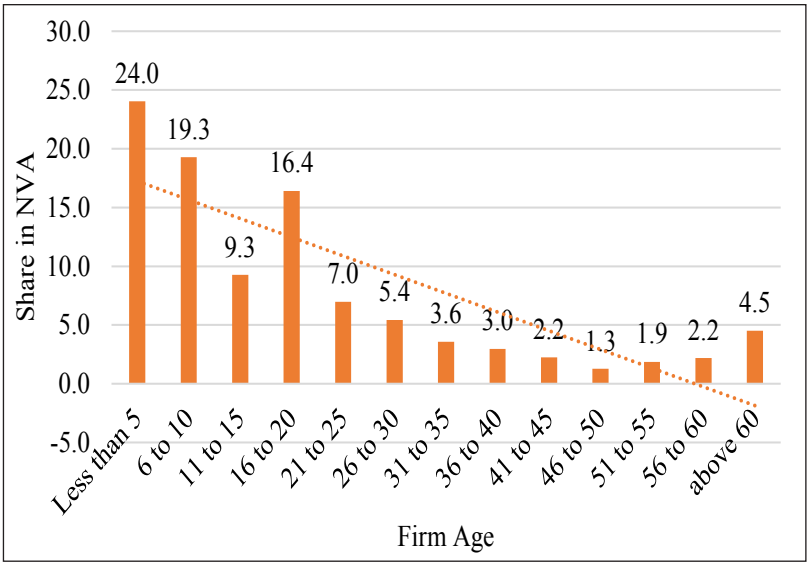
Source: ASI Firm level data

Figure 3(b). Employment share by firm age



Source: ASI Firm level data

Figure 3(c). NVA share by firm age



Source: ASI Firm level data

Cross-Sectional Comparison

3.7 What is the impact of the above size distribution of firms on jobs and productivity? Figure 4 compares growth of employment and productivity with firm age in three countries: U.S., Mexico and India (Hseih and Klenow, 2014). The comparison is done using both organized and unorganized manufacturing firms. For India, the data include both from the ASI and the surveys of unorganized manufacturing organized by the National Sample Survey Organization (NSSO). The left and the right panels use the size and productivity as of age five or younger as the base for comparison. The average employment level for 40-year old enterprises in the U.S. was more than seven times that of the employment when the enterprise is newly set up. In contrast, the average employment level for 40-year old firms in India was only 40 per cent greater than the employment when the enterprise is newly set up. Thus, once they survive for forty years, the average 40-year old firm in the U.S. generates five times (=7/1.4) as much more employment than the average 40-year old Indian firm. Even Mexico does far better on this dimension than India. The average employment level for 40-year old firms in Mexico is double that of the employment when the enterprise is newly set up. Thus, once they survive for forty years, the average 40-year old firm in Mexico generates 40 per cent more (=2/1.4) employment than the average 40-year old Indian firm.

Figure 4(a). Change in employment with firm age

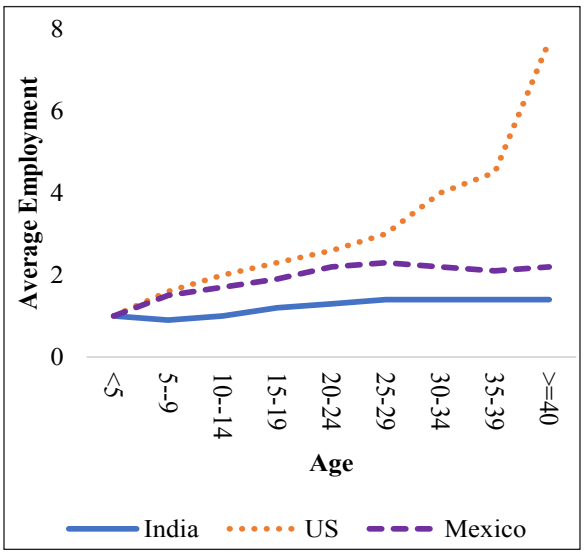
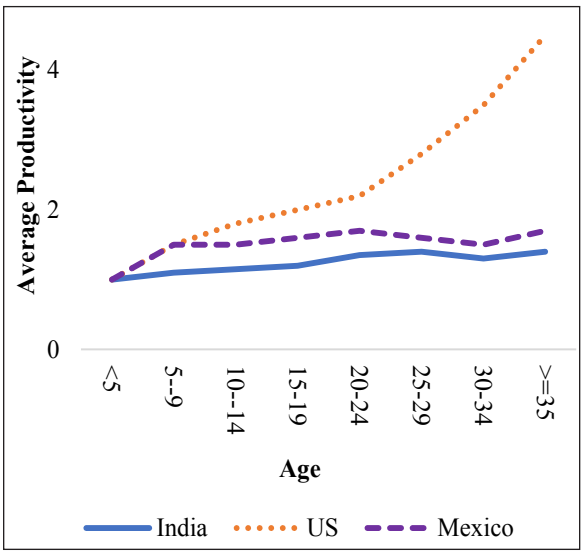


Figure 4(b). Change in productivity with firm age



Source: Hseih and Klenow (2014)

3.8 A similar tale unfolds with productivity as well when we compare these three countries for the effect of aging of firms on productivity. The average productivity level for 40-year old enterprises in the U.S. was more than four times that of the productivity of an enterprise that is newly set up. In contrast, the average productivity level for 40-year old firms in India was only 60 per cent greater than the productivity of an enterprise that is newly set up. Thus, once they survive for forty years, the average 40-year old firm in the U.S. is 2.5 times (=4/1.6) more productive than the average 40-year old Indian firm. Mexico does far better than India on this dimension as well. The average productivity level for 40-year old firms in Mexico is 1.7 times that of the productivity of an enterprise that is newly set up.

3.9 Thus, the comparison with other countries highlights that both employment creation and productivity do not grow adequately as firms age in India.

THE ROLE OF POLICY IN FOSTERING DWARFISM

3.10 In this section, we highlight that our policies – across the board – protect and foster *dwarfs* rather than *infants*. The key distinction here is that while infant firms are small and young, dwarfs are small but old. Thus, while infant firms can grow to become large firms that are not only more productive and generate significant employment, dwarfs remain small and contribute neither to productivity nor to jobs.

3.11 As we show below, these policies create a "perverse" incentive for firms to remain small. If the firms grow beyond the thresholds that these policies employ, then they will be unable to obtain the said benefits. Therefore, rather than grow the firm beyond the said threshold, entrepreneurs find it optimal to start a new firm to continue availing these benefits. As economies of scale stem primarily from firm size, these firms are unable to enjoy such benefits and therefore remain unproductive. The lack of productivity and growth inhibits the ability of the dwarfs to create jobs.

Impact of Labour Regulation

3.12 India has a plethora of labour laws, regulations and rules, both at the centre and the state levels that govern the employer-employee relationship. Each of these legislations exempts smaller firms from complying with these legislations. Table 1 shows the size thresholds applicable to each piece of labour regulation. For instance, the Industrial Disputes Act (IDA), 1947 (Chapter VB) mandates companies to get permission from the Government before retrenchment of employees. This restriction is, however, applicable only to firms with more than 100 employees. Thus, firms with less than 100 employees are exempt from the need to get permission from the Government before retrenching their employees. Given the transaction costs inherent in complying with such regulations, naturally a large majority of firms would prefer to be below the threshold of 100 employees. Thus, such labour legislation creates perverse incentives for firms to remain small. In this sense, labour legislation complements other benefits provided to small firms in providing such perverse incentives.

Table 1. Size based Limitations posed by Key Labour Legislations

S.No.	Labour Acts	Applicability to Establishments
1	Industrial Disputes Act,1947, Chapter V relating to strikes, lockouts, retrenchment, layoff	Employing 100 or more workers
2	Trade Union Act, 2001-Registration of trade unions	Membership of 10 per cent or 100 workmen whichever is less
3	Industrial Employment (Standing Orders) Act, 1946	100 or more workmen
4	Factories Act,1948	10 or more workers with power and 20 or more workers without power
5	Contract Labour (Regulation & Abolition) Act, 1970	20 or more workers engaged as contract labour
6	The Minimum Wages Act, 1948	Employment in the schedule having more than 1000 workers in the State
7	Employees' State Insurance Act,1948 - ESI Scheme	10 or more workers and employees monthly wage does not exceed ₹21000
8	Employees' Provident Fund & Miscellaneous Provisions Act, 1952	20 or more workers

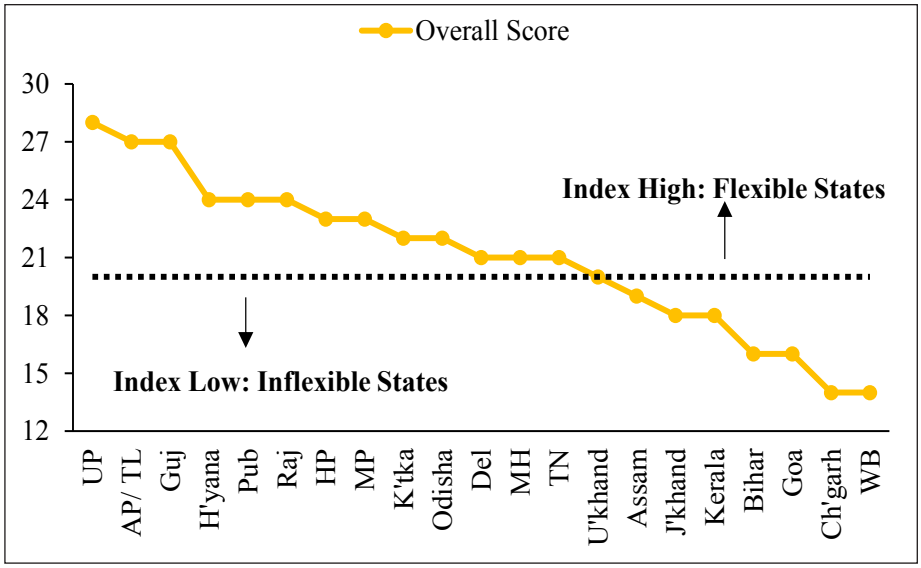
Source: Compiled from Ministry of Labour and Employment

Comparing productivity indicators in "inflexible" versus "flexible" states

3.13 To examine the impact of labour regulations, states are classified as flexible and inflexible based on the restrictiveness of their labour regulations. For this purpose, we build on the state-level survey that was conducted by OECD in 2007.[3] This survey covered eight major labour related legislations and indicators: IDA, 1947, Factories Act, 1948, State Shops and Commercial Establishments Acts (State Act), Contract Labour (Regulation & Abolition) Act, 1970, the role of inspectors, the maintenance of registers, the filing of returns and union representation. 21 States were surveyed and the responses were compiled by the OECD into an index that reflects the extent to which procedural changes have reduced transaction costs by limiting the scope of regulations, providing greater clarity in the application of regulations, or simplifying compliance procedures. Answers were then scored as "1" if they reduced transaction costs, "0" if they did not, and (for two questions) "2" for a further reduction, with a maximum score of 50. This index has been updated by covering the labour reforms initiated by the States till 2013-14.

3.14 No major labour reforms were initiated by the states from 2007 to 2014. In 2014, Rajasthan was the first State that introduced labour reforms in the major Acts. Thereafter many States followed on the path of Rajasthan. The year 2014 is, therefore, fixed as the cut off year to classify and rank States as *Flexible* and *Inflexible*. *Flexible* states include those states that score 20 or more out of a maximum score of 50, i.e., states that have reduced transaction costs by at least 40 per cent. Other states are denoted as *Inflexible*. Figure 5 shows that Assam, Jharkhand, Kerala, Bihar, Goa, Chhattisgarh and West Bengal are classified as inflexible states while the other 14 states are classified as flexible.

Figure 5. Classification of States as Flexible & Inflexible based on labour restrictions



Source: OECD Economic Survey, 2007 updated with Survey calculations.

3.15 A comparison between the indicators for labour, capital and productivity of manufacturing firms in the Inflexible and Flexible States makes it amply clear that flexibility in labour laws creates a more conducive environment for growth of industry

[3] OECD Economic Surveys: India. Volume 2007, Issue no. 14.

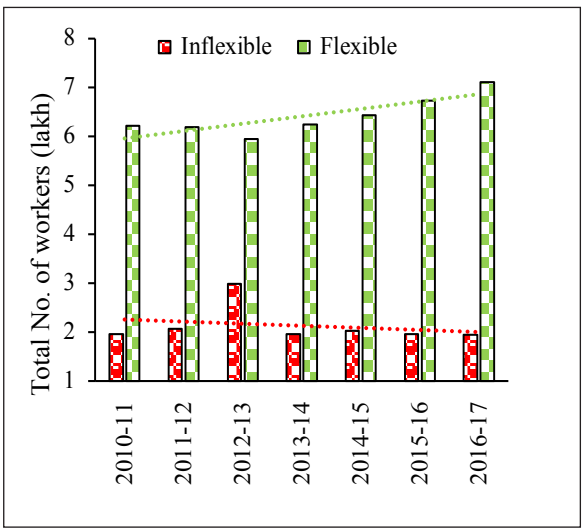
and employment generation. The comparison of various indicators between Inflexible and Flexible States using ASI data is displayed in Figure 6.

3.16 The *Flexible States* contribute disproportionately more, on average, to labour, capital and productivity when compared to the Inflexible States. The aggregate number of workers, capital and NVA are significantly higher on average in the *Flexible States* than in the *Inflexible States*. The average number of workers per factory, capital per factory and wages per factory are also higher in the Flexible states than in the Inflexible states. Moreover, the linear trend lines in each case indicate that the number of workers, capital and NVA are increasing at a faster pace in *Flexible* States than in the *Inflexible* states.

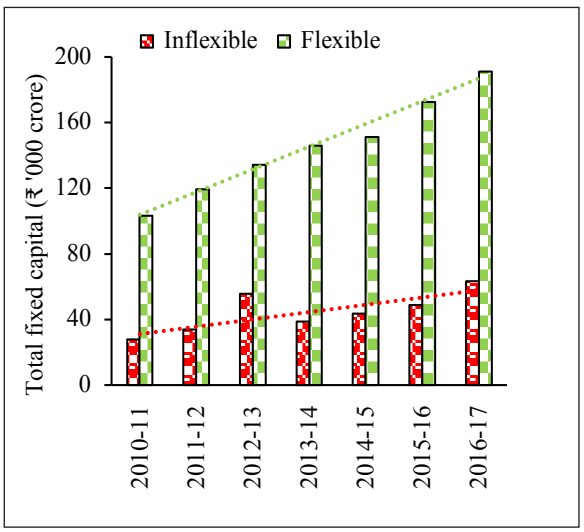
3.17 Moreover, due to rigidity in the labour laws, employers in *Inflexible* States prefer substituting labour with capital. This can be seen from (a) negative rate of growth in total number of workers in the state and average number of workers per factory, and (b) positive rate of growth in total fixed capital in the state and average fixed capital per factory.

Figure 6. Comparison between Inflexible vs. Flexible States

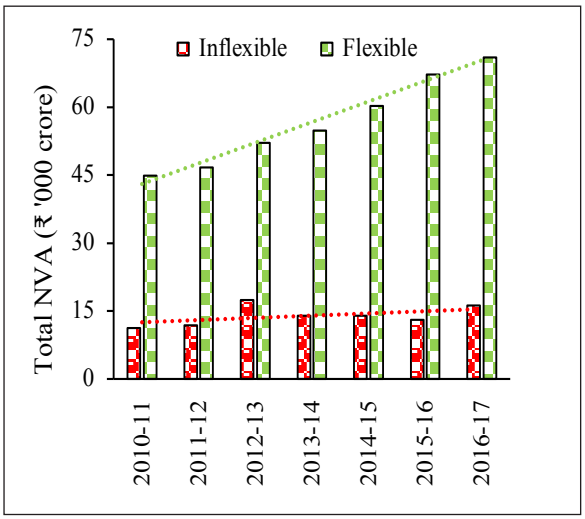
(a) Total Number of Workers in the State*



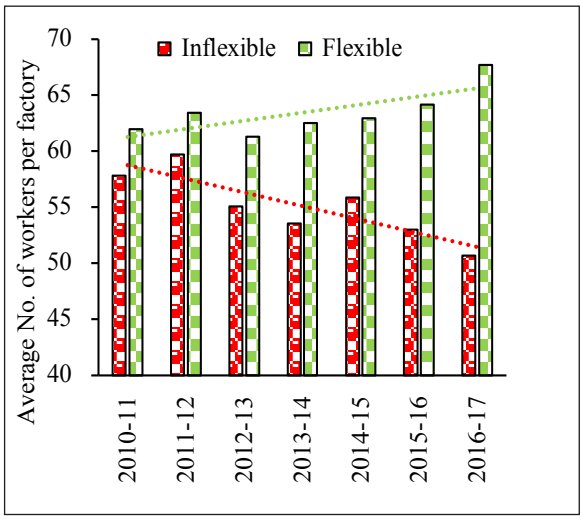
(b) Total Fixed Capital in the State*



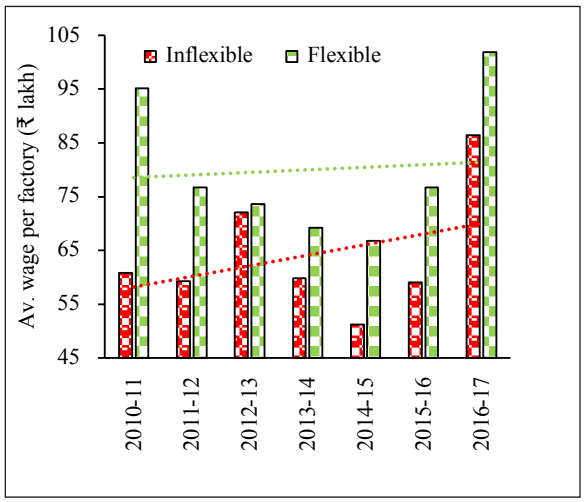
(c) Total NVA in the State*



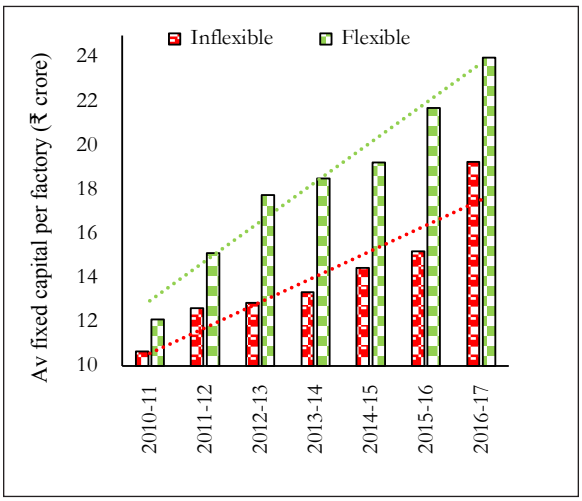
(d) Average Number of Workers per Factory



(e) Average Wages per Factory



(f) Average Fixed Capital per Factory



Source: ASI data (2011-17).
* shows mean values per state per year

3.18 Thus, the evidence comparing the Flexible states to the Inflexible states with respect to the rigidity of their labour laws clearly shows that the inflexible states are suffering in all dimensions. They are unable to create enough employment, cannot attract adequate capital into their states and their wages are lower as their productivity is lower. Furthermore, these parameters are either deteriorating or growing at a slower pace in the Inflexible states when compared to the Flexible states.

Impact of the labour law change in Rajasthan

3.19 Studies have found that on average, plants in labour-intensive industries and in states that have transited towards more flexible labour markets, such as Uttar Pradesh or Gujarat, are 25.4 per cent more productive than their counterparts in states like West Bengal or Chhattisgarh that continue to have labour rigidities (Dougherty, Frisancho and Krishna, 2014). In this context, the case study of Rajasthan is examined, which implemented labour reforms in 2014-15. The factory level data from ASI from 2011 to 2017 is analyzed to see the effect of the said labour law amendments.

3.20 As described in Table 2, the major reforms undertaken by the State of Rajasthan included the amendments in IDA, 1947, Factories Act, 1948, The Contract Labour (Regulation & Abolition) Act, 1970 and the Apprentices Act, 1961. The summary of the major amendments made in these legislations to make the labour market more flexible are stated in Table 2.

Table 2. Summary of labour reforms in Rajasthan

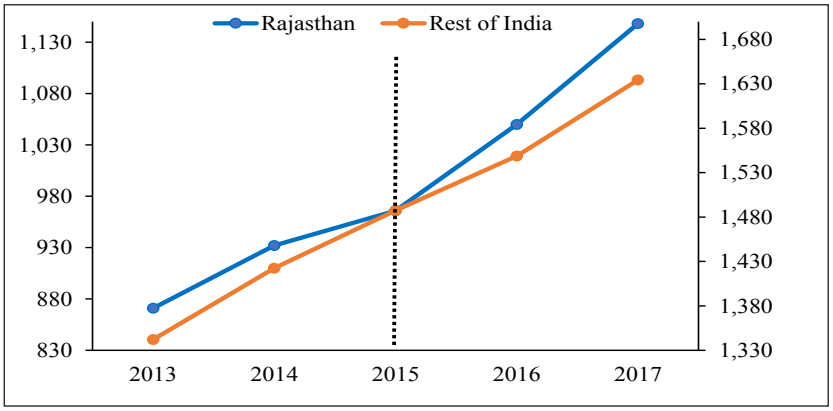
Labour Acts	Amendments introduced in Rajasthan as part of Labour Reforms
Industrial Disputes Act, 1947	• To form any union, requirement of membership as a proportion of total workmen increased from 15 per cent to 30 per cent. • No government nod required for companies employing up to 300 workers for retrenching, laying off or shutting down units. Earlier limit was 100 workers. • A worker should raise an objection within three years. There was no timeline set in the earlier version with regard to discharge or termination.

Factories Act, 1948	• Threshold limit increased from 10 or more workers with power to 20 or more workers with power. • 20 or more workers without power to 40 or more workers without power. • Complaints against the employer about violation of this Act would not receive cognizance by a court without prior written permission from the State government.
The Contract Labour (Regulation and Abolition) Act, 1970	• Applicable to establishments that employ 50 or more workers on contract against the earlier 20 or more workers.
Apprentices Act, 1961	• Fix the number of apprentice-training related seats in industry and establishments. • The stipend for apprentices will be no less than the minimum wage. • To encourage skilling, government to bear part of costs of apprentice training.

Source: Ministry of Labour & Employment and Survey compilation

3.21 The effect of the amendments in labour laws in Rajasthan on various outcomes are evaluated in Figures 7 and 8 using data from ASI. Figure 7 shows the time-series of the average number of factories having more than 100 employees for Rajasthan and the Rest of India[1]. The measure for the Rest of India[4] is averaged over all the states. As the law changes occurred in 2014-15, we examine this variable from two years before to two years after the law change. In 2014-15, the average number of firms with 100 employees or more are similar for Rajasthan and the Rest of India. However, following the law change, the number of firms with 100 employees or more have increased at a significantly higher rate in Rajasthan than in the Rest of India. This figure illustrates in essence the difference-in-difference that is estimated: the before-after difference for Rajasthan vis-à-vis the same estimate for the Rest of India. As the law change that Rajasthan effected did not occur for the Rest of India, Figure 7 clearly shows that the law change increased the number of larger firms.

Figure 7. Average number of factories employing at least 100 workers in Rajasthan and Rest of India



Source: Survey Computations using ASI, 2013-2017.

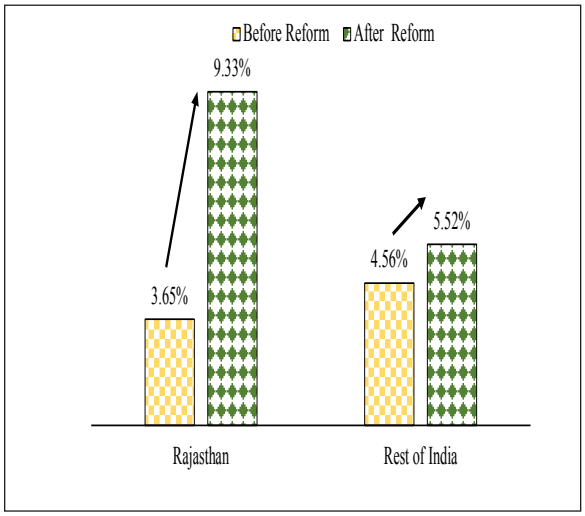
Note: Averages are computed for Rajasthan and for the Rest of India (RoI) separately.

[4] Rest of India includes 20 biggest states of India namely, Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Andhra Pradesh &Telangana, Tamil Nadu, Uttarakhand, Uttar Pradesh, and West Bengal. These states cumulatively constitute over 95 per cent to Net Value Added.

3.22 Figure 8 shows explicitly the change in Compound Annual Growth Rates (CAGR) two years before and two years after the law change. We compare the number of operating factories employing more than 100 employees in the state, average number of workers per factory in a state, total output in the state and total output per factory in the state. It can be clearly seen that, for all variables, CAGR post labour reforms in Rajasthan has increased significantly vis-à-vis the Rest of India. Table 3 shows the results of estimating this difference-in-difference in a panel data setup including tighter controls for various confounding factors. The results remain unchanged from those seen in Figure 8. Thus, overall the evidence clearly demonstrates that each of these outcomes was positively impacted by the labour law change in Rajasthan.

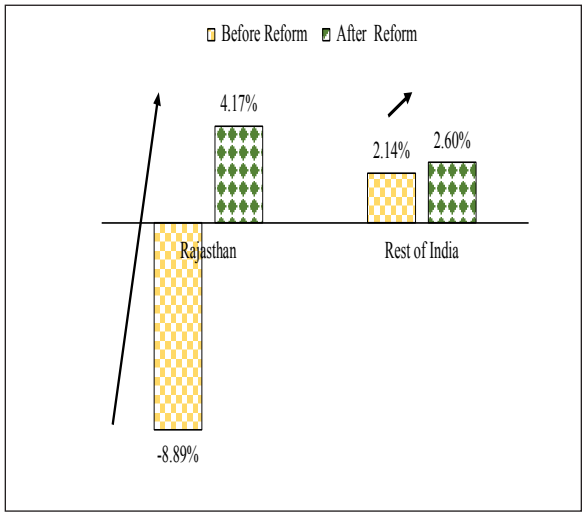
Figure 8. Impact of Deregulation of Labour market in Rajasthan (as reflected in CAGR of the variables)

a) Number of factories with >100 employees

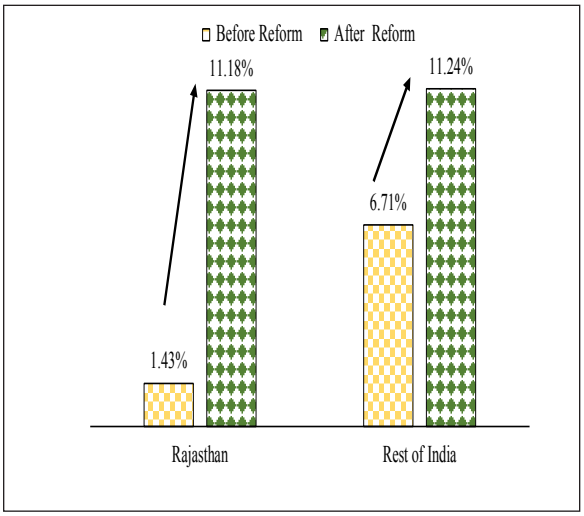


(b) Total output

(c) Number of workers per factory



(d) Total output per factory



Source: Survey Computations using ASI, 2011-2017.
Note: Averages are computed for Rajasthan and for the Rest of India separately.

Table 3. Difference-in-Difference estimates of Labour Law Amendments in Rajasthan

Variables	Log (No of Factories with >100 employees)	Log (No. of Workers)	Log (No of Workers per Factory)	Log (Total Output)	Log (Total Output per Factory)	Log (Total Wages)	Log (Wages per Factory)
Difference-in-difference estimate	**0.04*** **	**0.02** **	**0.05*** **	**0.04*** **	**0.05*** **	**0.04*** **	**0.05*** **
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	146	146	146	146	146	146	146
R-squared	0.9924	0.9957	0.9605	0.9933	0.9735	0.9921	0.9655
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Computations based on ASI data.
Robust standard errors in parentheses
Note: *** and ** denote statistically significant at 99 and 95 per cent level of significance.

Impact of Small Scale Reservation

3.23 The policies targeted at the small firms referred to as the MSMEs include priority sector lending, incentives/exemptions till they reach an investment upper limit quantified in terms of investment in plant & machinery. As Table 4 shows, all these policies promote small firms irrespective of their age.

Table 4. Incentives Available to Small Scale Firms (irrespective of their age)

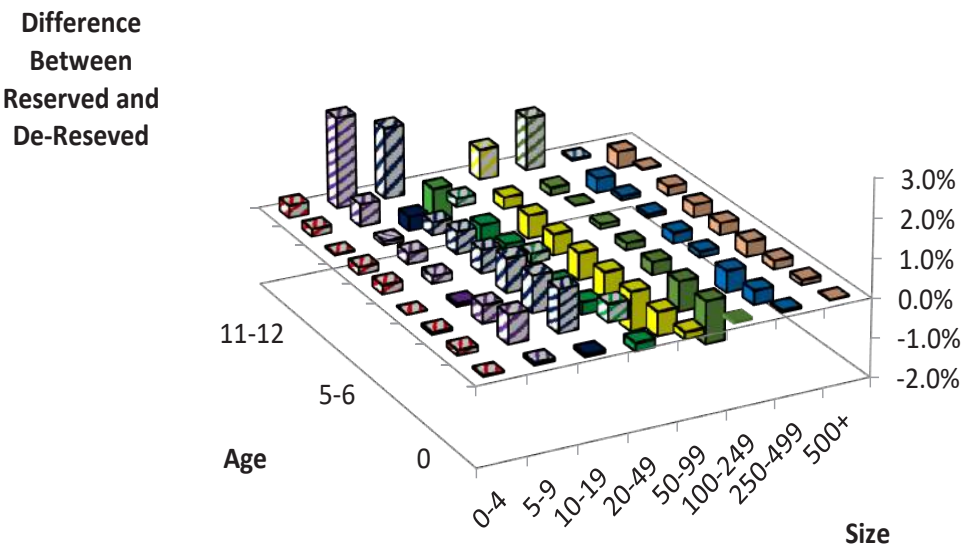
Scheme	Objective
Priority Sector Lending	Direct and indirect finance at subsidized interest rates shall include all loans given to micro and small enterprises, irrespective of their age.
Credit Guarantee Fund Scheme	This scheme makes available collateral-free credit to the micro and small enterprises, irrespective of their age.
Purchase Preference Policy	A group of items (Group IV) are reserved for exclusive purchase from small scale units, irrespective of their age. Group V items are to be purchased from MSMEs, irrespective of their age, up to 75 per cent of the requirement.
Price Preference Policy	For selected items that are produced by both small scale and large scale units, price preference is provided to small firms, irrespective of their age. This price preference amounts to a 15 per cent premium over the lowest quotation of the large-scale units.
Benefits in tendering	MSMEs, irrespective of their age, can avail benefits such as availability of tender sets free of cost, exemption from payment of earnest money deposit, exemption from payment of security deposit.
Raw Material Assistance Scheme of National Small Industries Corporation (NSIC)	This scheme aims to help MSMEs, irrespective of their age, with financing the purchase of raw material (both indigenous and imported).

Marketing Assistance Scheme	Provides assistance to MSMEs, irrespective of their age, for the following activities: organization of exhibitions abroad, co-sponsoring of exhibitions organized by other organizations, organizing buyer-seller meets, intensive campaigns and marketing promotion activities.
GST Composition scheme	Scheme allows MSME firms, irrespective of their age, to pay GST at a flat rate. The turnover limit for businesses availing of the GST composition scheme is set at ₹1.5 crore.
Exemption under Central Excise law	Small scale units below a turnover of ₹4 crore, irrespective of their age, manufacturing good specified in SSI are eligible for exemption.

3.24 The Small Scale Industries (SSI) reservation policy was introduced in 1967 to promote employment growth and income re-distribution. Given the predominance of dwarfs in the Indian economy and the low productivity and employment generation, as shown above, it is crucial to examine the role of the SSI reservation policy.

3.25 Figure 9 below plots the share of establishments manufacturing de-reserved products minus the share of establishments manufacturing reserved products within a (size, age) cohort in the year 2007. A positive value indicates that a firm in the (size, age) cohort is likely to manufacture the de-reserved product while a negative value indicates that a firm in the (size, age) cohort is likely to manufacture the reserved product. The figure clearly shows that dwarfs, i.e., firms that are small and old, are significantly more likely to manufacture reserved products than any other category of firm. Also, larger firms (above 50 employees) and younger firms are significantly more likely to manufacture de-reserved products than smaller firms.

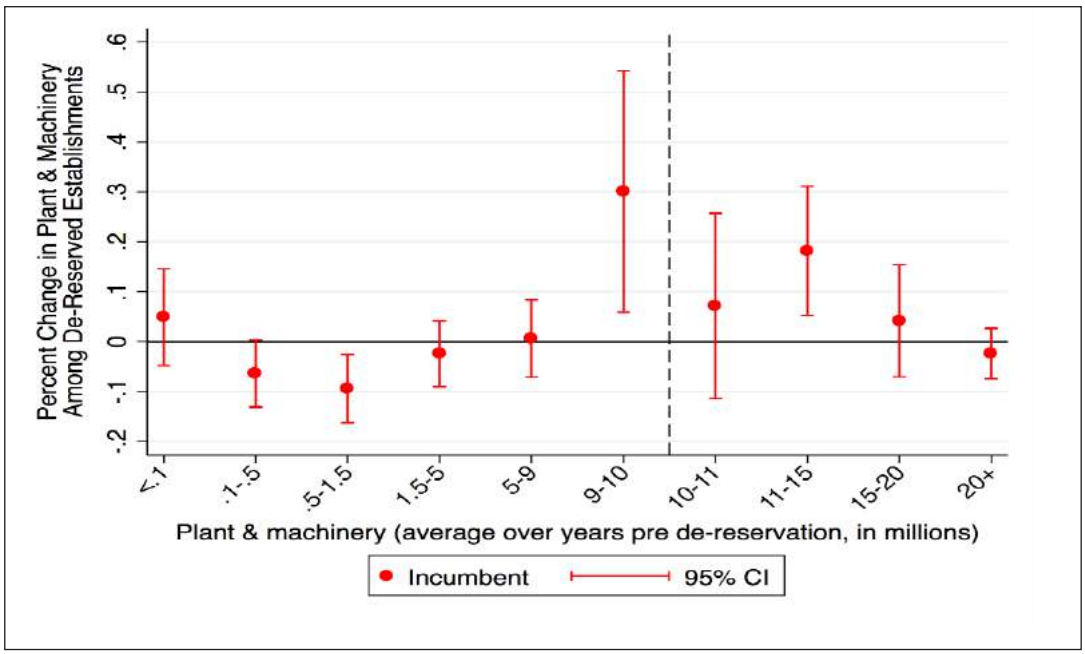
Figure 9. Use of Small Scale Reservation by Firms of Different Size and Age



Source: Martin, Nataraj & Harrison, 2014.
Notes: The chart plots the share of establishments manufacturing de-reserved products minus the share of establishments manufacturing reserved products within a (size, age) cohort as of 2007. A positive value indicates that a firm in the (size, age) cohort is likely to manufacture the de-reserved product while a negative value indicates that a firm in the (size, age) cohort is likely to manufacture the reserved product.

3.26 From 1997 to 2007, several product categories reserved for small-scale firms were eliminated in a phased manner. Martin, Nataraj & Harrison (2014) analyse the impact of this phased de-reservation on job creation and destruction among incumbents and entrants by their size and age. Figure 10 examines whether the size based reservation was limiting in the first place or not. As MSMEs were defined based on the size of their plant and machinery, this figure examines the change in the plant, property and equipment among the incumbent firms; the vertical line in the figure shows the threshold averaged across various product categories. It is clear from the figure 6 that plant and machinery increased the most among incumbent firms just below the threshold in the 9-10 million category. In contrast, plant and machinery decreased among incumbent firms below the thresholds in the 0.1-0.5 million and 0.5-1.5 million categories. Thus, this analysis at the threshold clearly suggests that small-scale reservation limited the incumbent firms that intended to grow before de-reservation but could not do so without losing out the benefits provided by the reservation.

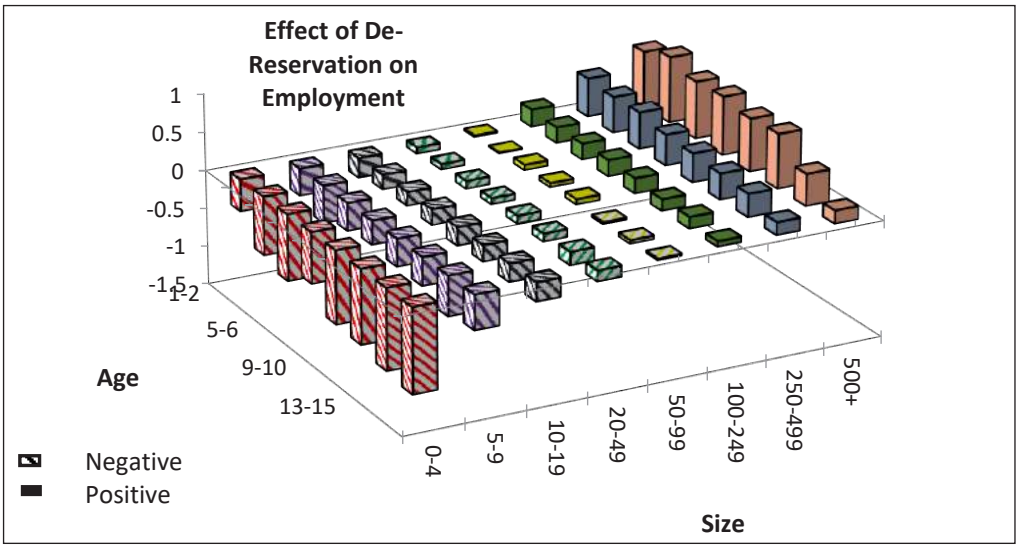
Figure 10. The Impact of Small Scale Reservation at the Threshold



Source: Martin, Nataraj & Harrison, 2014.

3.27 Figure 11 shows the impact of the phased elimination of small scale reservations on employment (from Martin, Nataraj & Harrison, 2014). This figure clearly shows that while small firms lost jobs following de-reservation, large firms created jobs. In fact, across all age categories, the effect of de-reservation on net job creation (negative in the case of job destruction and positive in the case of job creation) monotonically increased with firm size. Specifically, within each age cohort, job destruction was the maximum among the smallest firms (1-4 employees) and least among the firms with 50-99 employees. In contrast, within each age cohort, job creation was the maximum among the largest firms (500+ employees) and least among the firms with 50-99 employees. This figure also shows that across the various size categories, the effect of de-reservation on net job creation decreased with firm age.

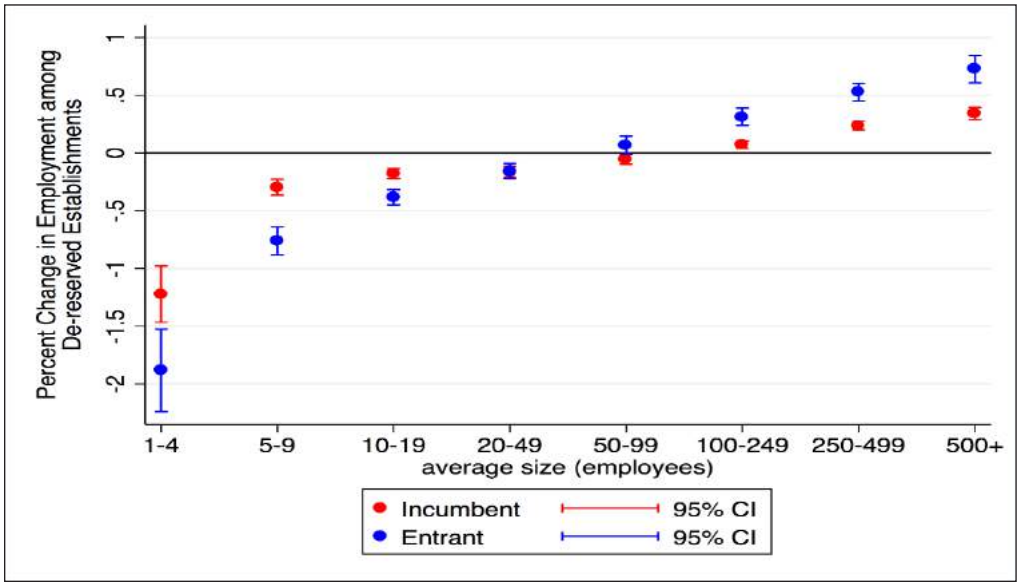
Figure 11. Impact of Removal of Small Scale Reservations on Employment by Size and Age



Source: Martin, Nataraj & Harrison, 2014.

3.28 Figures 12 and 13 display the impact of the phased elimination of small scale reservations on employment for both incumbents and entrants by their size and age category respectively (from Martin, Nataraj & Harrison, 2014). Figure 12 shows the impact by size categories while Figure 13 shows the impact by age categories.

Figure 12. Use of Small Scale Reservation by Firms of Different Sizes

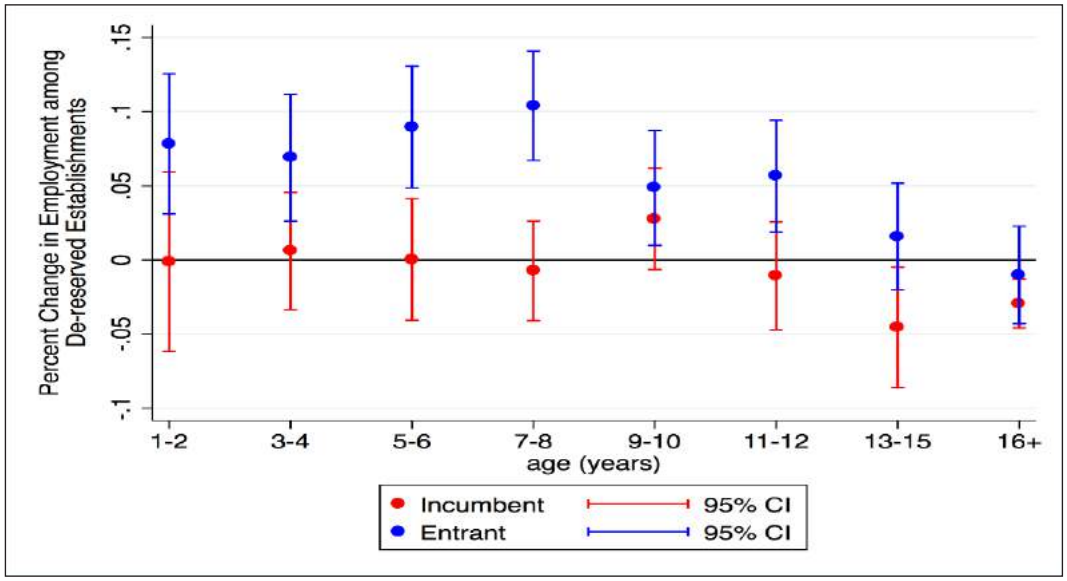


Source: Martin, Nataraj & Harrison, 2014.
Notes: The chart plots the point estimate and the 95% confidence interval for the effect of the de-reservation of products on employment. The chart shows the effect for both new entrants and incumbents by different size categories.

3.29 Figure 12 provides several key takeaways. First, on average, after the elimination of reservations, large firms – be it new entrants or incumbents – have created more employment than small firms. Across both new entrants and incumbents, the small firms destroyed jobs while the large firms created jobs. Second, net job creation

(negative in the case of job destruction and positive in the case of job creation) increased with firm size for both new entrants and incumbents. Specifically, job destruction was the maximum among the smallest incumbent firms (1-4 employees) and least among the incumbent firms with 50-99 employees.[5] In contrast, job creation was the maximum among the largest entrant firms (500+ employees) and least among the entrant firms with 50-99 employees. Third, large entrants created the maximum employment as seen in the effect of entrants with more than 500 employees. Finally, the growth in employment was both by the entrants that started producing the de-reserved products, especially the large incumbents that were constrained by the ceilings on production owing to the SSI reservation policy. Among firms with at least 50 employees, job creation by entrants was greater than job creation by incumbents.

Figure 13. Use of Small Scale Reservation by Firms of Different Ages



Source: Martin, Nataraj & Harrison, 2014.
Notes: The chart plots the point estimate and the 95% confidence interval for the effect of the de-reservation of products on employment. The chart shows the effect for both new entrants and incumbents by different age categories.

3.30 Figure 13 provides the following takeaways. First, when the effects of de-reservation on incumbent firms are examined by their age, i.e., when one averages across all size categories among firms of a particular age, a very different picture emerges from that observed in Figure 12. Specifically, across all age categories, incumbent firms either lost jobs or did not create jobs. The oldest incumbents (firms that are 13 years or older) lost jobs; however, the effect was insignificant for the younger incumbents. In contrast, younger entrants (firms that are 12 years or younger) created jobs; however, the effect was insignificant for the older entrants.

3.31 Overall, when benefits reserved for small firms are eliminated, younger and larger entrants create the most jobs while older and smaller incumbents destroy the

[5] As the coefficient is the log of labour, the economic magnitude has to be calculated as exp(coefficient) – 1. For instance for the 1-4 category, the economic magnitude is calculated as exp(-1.1)-1 = -67%.

maximum jobs. Together with the fact that older and smaller firms utilize the reservation policies the most, this evidence highlights further that benefits provided to small scale firms irrespective of their age create perverse incentives for firms to remain dwarfs and thereby limit their contribution to jobs. In contrast, infant firms, especially new entrants, create the most jobs. These findings are consistent with the evidence provided by Li and Rama (2015), who show that in developing countries young firms experience rapid gains in productivity and employment making them one of the most important sources of economic growth.

3.32 Santana and Pijoan-Mas (2010) find that the distortions brought forth by size dependent policies like SSI reservation have resulted in substantial misallocation of resources and productivity losses to the Indian economy. They provide empirical evidence that the lifting of the SSI reservation policy would increase output per worker by 3.2 per cent, capital per worker by 7.1 per cent and aggregate Total Factor Productivity (TFP) by 0.8 per cent in India. When focused only within the manufacturing sector, lifting of the SSI reservation policy would increase output per worker would increase by 9.8 per cent, capital per worker by 12.5 per cent and TFP by 3.6 per cent.

3.33 The misallocation of resources due to SSI reservation policy originates from four sources (Santana and Pijoan-Mas, 2010). First, SSI policies substantially lower the average capital to labour ratio when compared to the efficient level. Second, because of the lower capital accumulation, the overall demand for labour and the market wage rate are much lower due to SSI policies than the efficient level. Third, SSI policies result in inefficient allocation of managerial talent, which in turn affects productivity. Fourth, the inefficient allocation of resources results in price of manufactured products in restricted economy being too high, which then renders these products uncompetitive in a global economy.

3.34 Overall, the evidence clearly shows that infants, not dwarfs, contribute significantly to job creation and productivity in the economy. As young firms are usually small though all small firms are not young, there is a strong correlation between firm size and firm age. Earlier data on firm age was not so easily available. So, the effect on employment of firm age could not be distinguished from the effect of firm size. But, with availability of such data that distinguishes firm size and age, the evidence for both U.S. and India clearly shows that young firms, not smaller firms, produce more jobs (Haltiwanger, Jarmin and Miranda, 2012 for the U.S. and Martin, Nataraj & Harrison, 2014 and Li and Rama, 2013 for India).

WAY FORWARD

3.35 MSMEs that grow not only create greater profits for their promoters but also contribute to job creation and productivity in the economy. Our policies must, therefore, focus on enabling MSMEs to grow by unshackling them.

3.36 The evidence provided above highlights that dwarfs, i.e., small firms that have continued to remain small despite aging, have low productivity and low value added in manufacturing. In contrast, infants, i.e., small firms that are small when they are young but can grow to become large firms as they age, have high productivity and higher value added in manufacturing. Therefore, while dwarfs consume vital resources that could possibly be given to infant firms, they contribute less to creation of jobs and economic growth as compared to infant firms. This necessitates

re-calibration of policy towards supporting infant firms as detailed below:

3.37 **Incentivizing 'infant' firms rather than 'small' firms:** With the appropriate grandfathering of existing incentives, they need to be shifted away from dwarfs to infants. When such incentives are provided to firms irrespective of their age, the incentives create "perverse" incentives for firms to stay small. Such perverse incentives would not be there if age is the criterion. Misuse of the age based criterion can be easily avoided using Aadhaar. For instance, if a promoter starts a new firm, utilizes the benefits for ten years when the age-based policy is available and then closes the firm to start a new one to avail the age-based benefits through this new firm, then the Aadhaar of the promoter can alert authorities about this misuse. Therefore, given the benefits of Aadhaar, the age-based policies can be implemented to ensure removal of the perverse incentives. Once small firms know that they would receive no benefit from continuing to remain small despite aging, their natural incentives to grow would get activated. This will generate economic growth and employment.

3.38 **Re-orienting Priority Sector Lending (PSL):** As per extant policy, certain targets have been prescribed for banks for lending to the Micro, Small and Medium (MSME) sector that exacerbates perverse incentives to firms to remain small. As per PSL guidelines, 7.5 per cent of Adjusted Net Bank Credit (ANBC) or Credit Equivalent Amount of Off-Balance Sheet Exposure, whichever is higher is applicable to Micro enterprises.[6] Under MSME's PSL targets, it is necessary to prioritize 'start ups' and 'infants' in high employment elastic sectors. This would enhance direct credit flow to sectors that can create the most jobs in the economy. The table below shows the high employment elastic sub-sectors and their employment elasticity.

Table 5. Employment Elasticity of Various Subsectors in Manufacturing

Subsector	Employment Elasticity
Rubber and Plastic Products	0.85
Electrical and Optical Equipment	0.48
Transport Equipment	0.27
Electricity, Gas and Water Supply	0.22
Machinery	0.15
Basic Metals and Fabricated Metal Products	0.10
Chemicals and Chemical Products	0.07
Textiles, Textile Products, Leather and Footwear	0.02
Other Non-Metallic Mineral Products	0.02
Wood and Products of wood	0.01

Source: Derived from KLEMS data from 2005-06 to 2015-16

3.39 **Sunset Clause for Incentives:** With appropriate grandfathering, every incentive for fostering growth should have a 'sunset' clause, say, for a period of five to seven years after which the firm should be able to sustain itself. The policy focus would thereby remain on infant firms.

[6] As on 28th December 2018,for classification under priority sector, no limits are prescribed for bank loans sanctioned to Micro, Small and Medium Enterprises engaged in the manufacture or production of goods under any industry specified in the first schedule to the Industries (Development and Regulation) Act, 1951 and as notified by the Government from time to time. The manufacturing enterprises are defined in terms of investment in plant and machinery under MSMED Act 2006. Bank loans to Micro, Small and Medium Enterprises engaged in providing or rendering of services and defined in terms of investment in equipment under MSMED Act, 2006, irrespective of loan limits, are eligible for classification under priority sector, w.e.f. March 1, 2018.

3.40 **Focus on High Employment Elastic Sectors:** The manufacture of rubber and plastic products, electronic and optical products, transport equipment, machinery, basic metals and fabricated metal products, chemicals and chemical products, textiles and leather & leather products, are the sub-sectors with highest employment elasticities. To step up the impact of economy growth on employment, the focus has to be on such high employment elastic sectors.

3.41 **Focus on Service Sectors with high Spillover Effects such as Tourism:** Developing key tourist centres will have ripple effects on job creation in areas such as tour and safari guides, hotels, catering and housekeeping staff, shops at tourist spots etc. It is possible to identify 10 tourism spots in each of the larger 20 states and 5 spots in the 9 smaller states and build road and air connectivity in these tourist attractions, which would boost economic activity along the entire route and would also reduce the migration of the rural labour force who form a major proportion of the total labour force.

CHAPTER AT A GLANCE

- MSMEs that grow not only create greater profits for their promoters but also contribute to job creation and productivity in the economy. Our policies must, therefore, focus on enabling MSMEs to grow by unshackling them.
- Job creation in India, however, suffers from policies that foster dwarfs, i.e., small firms that never grow, instead of infant firms that have the potential to grow and become giants rapidly.
- While dwarfs, i.e., firms with less than 100 workers despite being more than ten years old, account for more than half of all organized firms in manufacturing by number, their contribution to employment is only 14 per cent and to productivity is a mere 8 per cent. In contrast, large firms (more than 100 employees) account for three-quarters of such employment and close to 90 per cent of productivity despite accounting for about 15 per cent by number.
- The perception of small firms being significant job creators pervades because job destruction by small firms is ignored in this calculus: small firms destroy jobs as much as they create. In contrast, large firms create permanent jobs in larger numbers. Also, young firms create more jobs at an increasing rate than older firms.
- Size-based incentives that are provided irrespective of firm age and inflexible labour regulation, which contain size-based limitations, contribute to this predicament.
- To unshackle MSMEs and thereby enable them to grow, all size-based incentives must have a sunset clause of less than ten years with necessary grand-fathering.
- Deregulating labour law restrictions can create significantly more jobs, as seen by the recent changes in Rajasthan when compared to the rest of the States.
- Direct credit flow to young firms in high employment elastic sectors to accelerate employment generation by re-calibrating Priority Sector Lending (PSL) guidelines.
- Focus must be on service sectors such as tourism, which has high spillover effects on other sectors such as hotel & catering, transport, real estate, entertainment etc. Identifying and promoting tourist spots for development will help create jobs.

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Data "Of the People, By the People, For the People"

04
CHAPTER

"Cross the river by feeling the stones."
- Deng Xiaoping

Navigating in an uncertain, wobbly world requires constant monitoring of the path followed by the economy using real-time indicators. Thus, data can serve as the stones that enable one to cross the river. Concurrent with the data explosion of recent years, the marginal cost of data has declined exponentially while its marginal benefit to society has increased manifold. Therefore, society's optimal consumption of data is higher than ever. While private sector does a good job of harnessing data where it is profitable, government intervention is needed in social sectors of the country where private investment in data remains inadequate. Governments already hold a rich repository of administrative, survey, institutional and transactions data about citizens, but these data are scattered across numerous government bodies. Utilising the information embedded in these distinct datasets would inter alia enable government to enhance ease of living for citizens, enable truly evidence-based policy, improve targeting in welfare schemes, uncover unmet needs, integrate fragmented markets, bring greater accountability in public services, generate greater citizen participation in governance, etc. Given that sophisticated technologies already exist to protect privacy and share confidential information, governments can create data as a public good within the legal framework of data privacy. In the spirit of the Constitution of India, data should be "of the people, by the people, for the people."

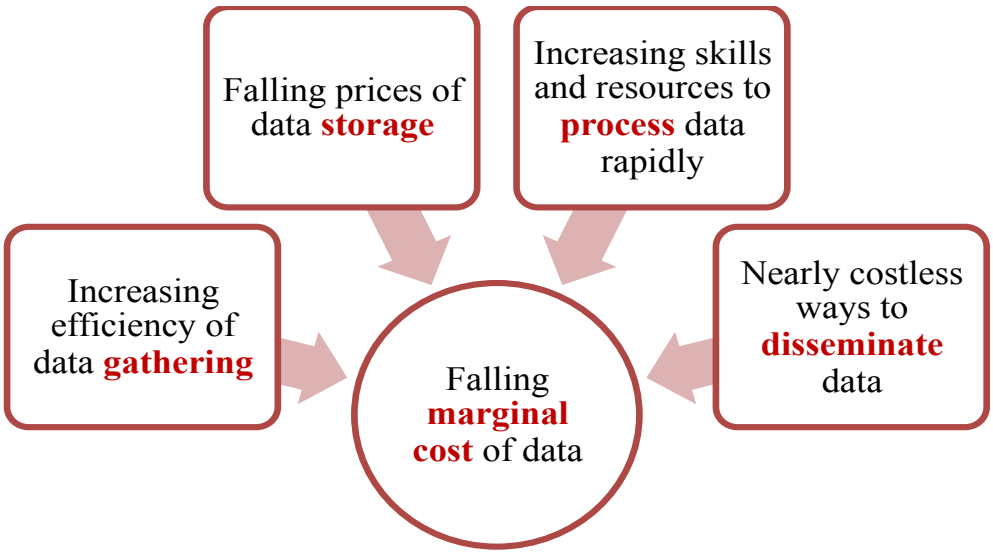
THE ECONOMICS OF DATA AND SOCIAL WELFARE

4.1 In recent years, the world has witnessed an information explosion – exponential increases in the amount of published data. As people increasingly use digital services to talk to each other, look up information, purchase goods and services, pay bills, transact in financial markets, file taxes, avail welfare services and engage with local leaders, data is being generated at an unprecedented scale. The global data infrastructure has largely proved reliable, fast and secure enough to handle this deluge of data (Mckinsey, 2011).

4.2 Concurrent with this data explosion, the marginal cost of data has declined exponentially and the marginal benefit to society of using this data is higher than ever.

4.3 As people shift their day-to-day activities online, they leave digital footprints

Figure 1: Falling Marginal Cost of Data



of these activities. Put differently, people produce data about themselves and store this data on public and private servers, every day, of their own accord. Data that would have involved a laborious survey to gather a few decades ago is today accumulating online at a near-zero cost, although it is scattered across sources.

4.4 Not everyone participates in the digital economy, of course. A majority of the poor still have no digital footprint. Among those who do, the range of activities undertaken online is quite limited. However, the cost of gathering data is still much lower than it was a few decades ago. Even if a door-to-door survey is the only way to gather a certain kind of data, we possess cheap technologies to log data online in real time, circumventing an otherwise laborious paper-based survey followed by a tedious data entry process.

4.5 Alongside the decreasing cost of gathering data, storage costs have decreased precipitously. The cost per gigabyte of storage has fallen from ₹61,050 in 1981 to less than ₹3.48 today. However, the surfeit of data and a limitless capacity to store it is of no use unless one can make sense of these colossal quantities of data in a reasonable time. Fortunately, human and technical capital to process data has evolved in parallel to the data inundation. Data science has evolved as a distinct, well-funded field of study that is constantly innovating ways to put data to efficient use. Courses in analytics have become ubiquitous. An increasing number of people are equipped with skills to handle large datasets. Data is still relatively expensive to process because it tends to be noisy, heterogeneous and inconsistent across sources, but technology is incessantly developing solutions to these problems.

4.6 Once processed, the cost of disseminating insights is negligible – it is nearly costless to transfer information through the internet. However, dissemination of data entails another cost – that of ensuring data privacy and security. Before data is disseminated, it needs to be stripped of personal identifiers and aggregated. While this is a direct cost, an indirect cost also exists – the cost of misuse of data. Accidental data leaks may bring forth legal consequences and substantial financial implications. However, technology has largely kept pace to mitigate

these risks.

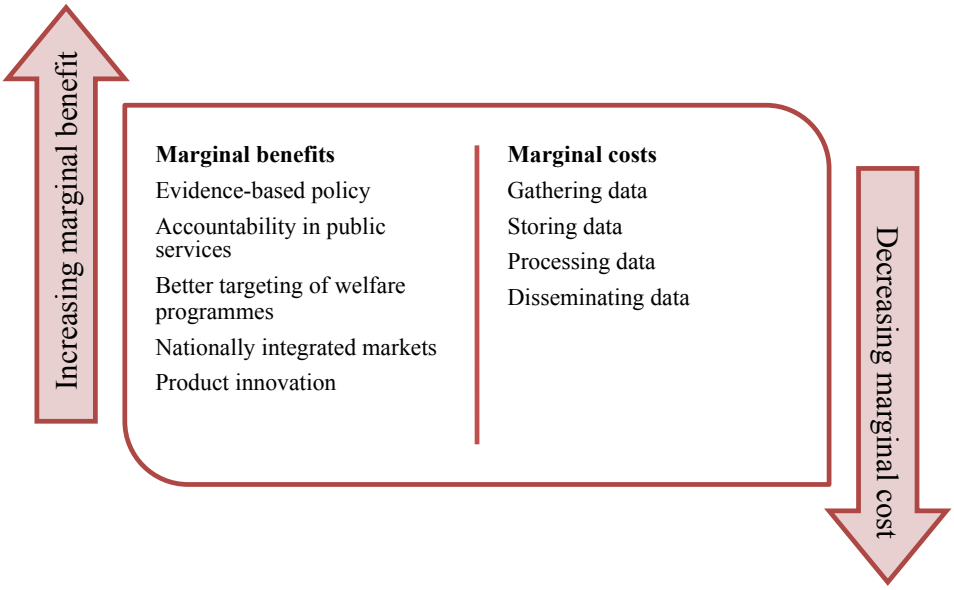
4.7 Together, the advancements in gathering, storing, processing and dissemination have lowered the marginal cost of data to unprecedented levels. Figure 1 summarises this phenomenon. Concurrently, the marginal benefit of data is higher than ever. A district education officer can make better decisions if he knows, for each school in his district, attendance rates of students and teachers, average test scores and status of school toilets. Similarly, parents can make better decisions about which school to send their children to if they know the average absenteeism rate of teachers in their village and can compare the rate to that in the neighbouring village. A multitude of scenarios exist in which harnessing the marginal unit of data can lead to sharp increases in public welfare.

4.8 Consider data that the Government maintains about its citizens. Currently, much of the data is dispersed across different registries maintained by different ministries. This is why every time a citizen has to access a new service, they are asked to collect all the documents to prove their identity and prove their claim on the process. For example, to get subsidies or benefits due to a farmer, such as free electricity, an incomplete list of documents include the Ownership Certificate issued by Village Administrative Officer, Chitta Adangal (extract from land registry), a Patta (Record of Rights) or Sale Deed, No Objection Certificate from any Government Project nearby and other documents to prove that one is a farmer on that land. The effort involved in this application mostly doesn't involve any new audits or inspections from any government department. The citizen faces the inconvenience of having to retrieve data trapped in paper files within the government system to unlock a benefit she is entitled to. The government can thereby deliver a better experience to the citizen by bringing disparate datasets scattered across various ministries together.

4.9 If the information embedded in these datasets is utilised together, data offers potential to reduce targeting error in welfare schemes. For example, consider a hypothetical individual who is affluent enough to own a car but is able to avail BPL welfare schemes, though unwarranted. When datasets are unconnected, the vehicle registry does not speak to, say, the public distribution system registry. Consequently, the public distribution system continues to subsidise this individual erroneously. However, if the two datasets are integrated, such inclusion error can be minimised, saving valuable Government resources. In the same way, exclusion errors can be rectified.

4.10 In fact, the declining cost of data has spawned new benefits that did not exist a few years ago. Consider, for example, an app that informs farmers of the prices of produce across the country. There was a time when, even if the app existed, it would have been useless – knowing that prices are higher in the next district would not have mattered to a farmer as he would have had no way to access those prices without substantial costs in transport, storage and distribution (including the cost of a dozen middlemen). Today, with platforms such as e-NAM (the electronic National Agriculture Market, we possess the technology to allow farmers to make the sale online, locking in the higher price with delivery to follow seamlessly. In this way, data has the potential to integrate markets nationally, reduce the need for middlemen, reduce prices for end consumers and increase prices for farmers. Figure 2 summarises these costs and benefits.

Figure 2: Increasing Marginal Benefits and Decreasing Marginal Cost of Data



WHY MUST DATA BE TREATED AS A PUBLIC GOOD?

4.11 The decline in marginal cost of data clubbed with an increase in marginal benefit means that the optimal quantum of data that society should consume is much higher than before. If so, economic theory predicts that the economy should have, by now, seen a surge in efforts to harness and use data. This has indeed happened, but only partially.

4.12 Private sector investment in data-related endeavours is higher than ever before. A 2017 Forbes survey found that 53 per cent of companies actively use big data to make decisions (Dresner, 2017). The trend holds across industries as disparate as healthcare and financial services, and across geographies and company sizes. In fact, in the last two decades, the world has witnessed the emergence of companies, such as Facebook, Amazon, Instagram, etc., who earn revenue exclusively from people's data.

4.13 But, there are several areas where data is not as ubiquitously harnessed and used. Consider, for example, the agriculture market. If the marginal benefit to a farmer of acquiring price information is higher than the marginal cost of that information, he would pay for that information. Consequently, the private sector would cater to his need by gathering and selling him the information he wants. This would eventually lead to a nationally integrated agriculture market with one price. However, India does not yet have such a nationally integrated agriculture market, which should have happened if the marginal benefit of data today is indeed higher than the cost. Why has the corporate sector's data wave not found a parallel in the agriculture sector?

4.14 The economics of data we considered so far is as it pertains to society, not to an individual agent, be it a farmer or a firm. The economics facing a private company that contemplates providing data to farmers is different from that facing a social planner. To the private firm, the prospect of a nationally integrated agriculture market, and the resulting social welfare, is a positive externality. It is not a benefit that accrues to the firm as the firm cannot, in practice, charge the numerous agents in the economy who

would experience welfare gains. Therefore, the private firm's marginal benefit is not as high as society's marginal benefit. Because the firm does not internalize the benefit of social welfare, the optimal amount of data that the firm would gather and disseminate falls short of the social optimum.

4.15 Second, data comes in many forms with each form offering a different benefit. Data linked to an individual can range from extremely intimate – such as their biometric details, to the extremely public – such as their name. It includes data that is generated by human actions, and data that is derived through analysis, typically involving an algorithm. For example, whether an individual has paid his taxes is a generated data point. But, using the tax records and other data points, a credit bureau may assign the individual a credit score, which is a derived data point. Data that is not linked to a specific individual but is still available at an individual level of granularity, is called Anonymized data. Anonymized data is critical in some areas such as medical research. Data neither linked to an individual, nor at an individual level of granularity is known as public data, such as the census.

4.16 While the private sector has done an impressive job of harnessing some kinds of data – the kind that can be converted into a private profit – government intervention is required in other areas where private investment in data remains inadequate. The social sectors of the economy, such as education and healthcare, have lagged the commercial sectors in exploiting data. Because the private sector cannot internalize the social benefits of data in these sectors, the market for data in these sectors has so far not developed.

4.17 To ensure that the socially optimum amount of data is harvested and used, the government needs to step in, either by providing the data itself or correcting the incentive structure faced by the private sector, depending on the nature and sensitivity of data. Indeed, in the agriculture sector, the Government has done exactly this by creating the e-NAM, as it is unlikely that the private sector would come up with a solution like this on its own.

Ensuring data privacy while creating data as a public good

4.18 In the endeavour to create data as a public good, it is very important to consider the privacy implications and inherent fairness of data being used. Needless to say, the processes required for ensuring privacy of intimate data is very different from that required for anonymized or public data. The key difference in dealing with these different types of data is the knowledge and consent of the data principal. Even if not explicitly mentioned every time data is talked about in this chapter, it is assumed that *the processing of data will be in compliance with accepted privacy norms and the upcoming privacy law, currently tabled in Parliament.*

Economies of scale and scope in the data generation process

4.19 Apart from the obvious necessity that data must be accurate, the need for a Government-driven data revolution is motivated by three key characteristics that data must possess for the synergistic benefits to accrue. Specifically, the data generation process exhibits significant economies of scale and scope.

4.20 First, when it comes to data, the whole is larger than the sum of its parts, i.e., it is more useful when it is married with other data. Consider, for example, the merging of disparate datasets maintained by different government agencies, such as transactions data extracted from the Jan Dhan accounts of the Department of Financial Services, Ministry of Finance, married to demand

for MGNREGA work from the Ministry of Rural Development. As MGNREGA can be a real-time indicator of rural distress (as discussed in Chapter 10 in this volume), the credit scoring done using the transactions data of Jan Dhan accounts can be used to provide credit in districts/panchayats that are experiencing distress. Such combining of disparate datasets can be extremely useful in obtaining the necessary richness required to design and implement welfare policies.

4.21 Second, data needs to cover a critical mass of individuals/firms so that comparisons and correlations can be assessed among individuals/firms to generate useful policy insights. Thus, to gather price data on trades across various product markets and across the country, a very large number of producers and buyers need to log their transactions on a platform in real time. To induce numerous agents to report transaction information regularly is a task that requires significant initial investment, which may prove prohibitive for the private sector.

4.22 Finally, data must have a long enough time-series so that dynamic effects can be studied and employed for policymaking. For instance, to undertake before-after evaluations to assess the effectiveness of policies, data that spans a long-enough time series is critical.

4.23 Data that contains all these three features is much more valuable than three different and disparate datasets that possess each of these criteria separately. Thus, the data generation process exhibits significant economies of scope. Also, the scale of effort required to create such data that exhibits all three features implies that the data generation process exhibits significant economies of scale as well because the (upfront) fixed costs involved in generating such data are significant. Private sector may not have the risk appetite or the capital to make the necessary investments required for generating data that possesses all three characteristics, viz., marries disparate datasets, covers a critical mass of individuals/ firms, and spans a large time-series. Even if private sector were to put such rich data together, this would result in a monopoly that would reduce citizen welfare, on the one hand, and violate the principle of data by citizens, and, therefore, for citizens.

4.24 Most importantly, data carries some of the characteristics of public goods. It is non-rivalrous, i.e., consumption by one individual does not reduce the quantum available for others. In principle, data can be made excludable, i.e., it is possible to exclude people from accessing data, as many database firms do by erecting pay walls. However, there are some kinds of data – particularly data gathered by governments on issues of social interest – that should be democratised in the interest of social welfare. Such data should be made public goods. As the private sector would fail to provide an optimal amount of any non-rivalrous, non-excludable good, government intervention is required.

4.25 Data are generated by the people, of the people and should be used for the people. As a public good, data can be democratised and put to the best possible use. Box 1 describes the Open Government Data initiative taken by the Government, which is an illustration of the spirit of data as a public good. While this is an excellent start, the enormous benefits that can be reaped from treating data as a public good imply that Government must redouble its efforts in this direction.

BUILDING THE SYSTEM

4.26 The data system envisioned here involves predominantly data that people share with Government bodies with fully informed consent or is data that is legally sanctioned to be collected by the state for

Box 1: Open Government Data and citizen engagement

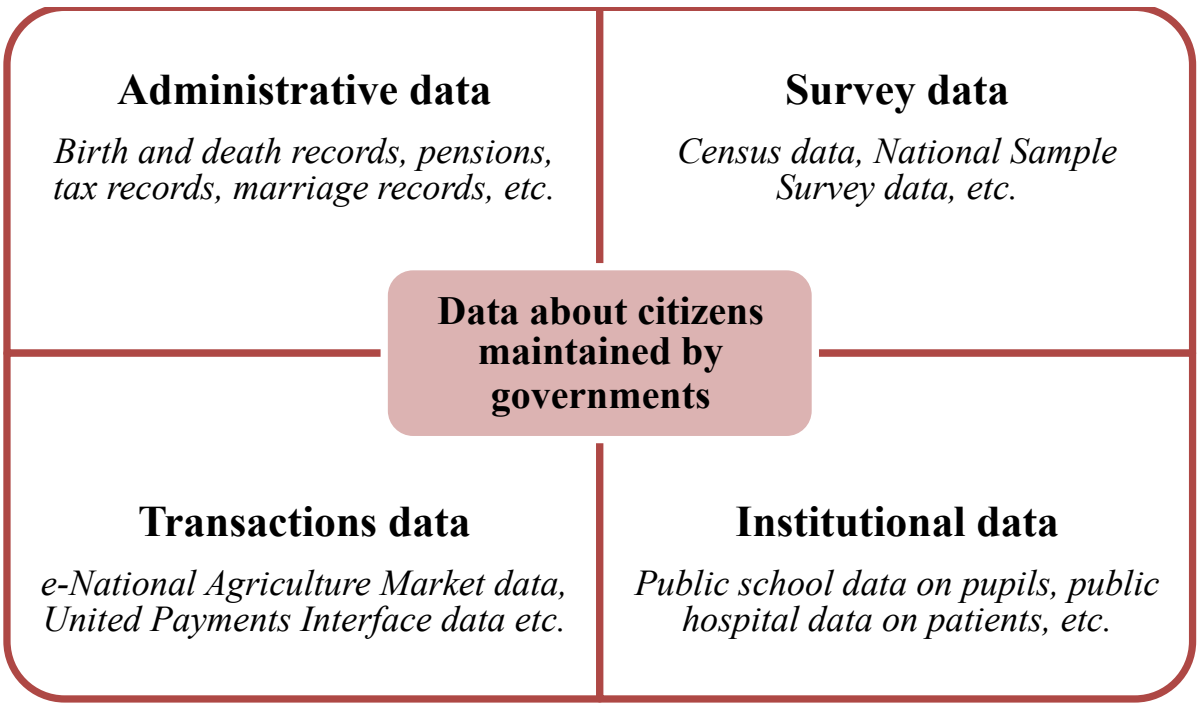
The Union government's Open Government Data platform allows citizens to access a range of government data in machine-readable form in one place. The portal allows union ministries and departments to publish datasets, documents, services, tools and applications collected by them for public use. Excluding datasets which contain confidential information, all other datasets are made available to the public, ranging from data on welfare schemes to surveys to macroeconomic indicators. The platform also includes citizen engagement tools like feedback forms, data visualisations, Application Programming Interface (APIs) etc.

Open data not only helps government officials make better decisions but also gets people involved in solving problems. Throwing open government data to the public multiplies the number of people analysing and deriving insights from data. Consequently, the usability of data itself increases.

To engage people meaningfully in solving problems, the Ministry of Human Resource Development recently initiated the Smart India Hackathon – an open innovation model to discover new, disruptive technologies that could solve India's most pressing problems. Smart India Hackathons are product development competitions in which participants get a problem statement and relevant data, using which they develop a prototype software or hardware. These competitions crowd-source solutions to improve governance and increase the efficacy of welfare schemes. None of this would be possible, of course, without reliable data.

an explicit purpose such as tax collection, or delivering welfare. The Government of India collects four distinct sets of data about people – administrative, survey, institutional and transactions data (see Figure 3 for summary and Box 2 for details). While the latter two databases are in a fledgling state, the first two are comprehensive and robustly maintained.

Figure 3: Data collected by the Government of India



Box 2: Rich data on citizens that Government can harness for the welfare of its citizens

Governments hold *administrative data* for mainly non-statistical purposes. Administrative datasets include birth and death records, crime reports, land and property registrations, vehicle registrations, movement of people across national borders, tax records etc. Governments also gather data to evaluate welfare schemes; for example, the Ministry of Drinking Water and Sanitation gathers data on toilet usage to assess the efficacy of the Swachh Bharat Mission.

Survey data, on the other hand, is data gathered predominantly for statistical purposes through systematic, periodic surveys. For example, the National Sample Survey Office conducts large-scale sample surveys across India on indicators of employment, education, nutrition, literacy etc. Because these data are gathered for statistical analyses, the identity of participants is irrelevant and unreported, although these identities may be securely stored at the back-end without violating any legal guidelines on privacy.

Institutional data refers to data held by public institutions about people. For example, a government-run district hospital maintains medical records of all its patients. A government-run school maintains personal information about all its pupils. State-run universities maintain records of students' educational attainment and degrees awarded to them. Most such data are held locally, predominantly in paper-based form. This data can be digitized to enable aggregation at the regional or national level.

Transactions data are data on an individual's transactions such as those executed on the United Payment Interface (UPI) or BHIM Aadhaar Pay. This is a nascent category of data but is likely to grow as more people transition to cashless payment services.

4.27 Data collection in India is highly decentralised. For each indicator of social welfare, responsibility to gather data lies with the corresponding union ministry and its state counterparts. Consequently, data gathered by one ministry is maintained separately from that gathered by another. Data on an individual's vehicle registrations, for example, is maintained by one ministry, whereas the same individual's property ownership records lie with another ministry. These datasets are further distinct from the individual's educational attainment records maintained by the state-run university he/she attended and from other demographic information gathered in the decennial Census survey. Because these datasets are unconnected (see below), each ministry only has a small piece of the jigsaw puzzle that is the individual/firm. However, if these different pieces could be put together, we would find that the whole is greater than the sum of parts. As learning from global best practices, boxes 3 and 4 highlight the case studies of Transport for London's data initiative and the data initiatives of the U.S. Government. Box 5 illustrates similar learning from closer home: the Samagra Vedika initiative by the Government of Telangana.

Box 3: Benefits of opening up Transport for London's data

Transport for London (TfL) releases a significant amount of data – such as timetables, service status and disruption information – in an open format for anyone to use, free of charge. Open travel data can support travel apps and real-time alerts to save time, reduce uncertainty and lower information costs, supporting growth in the tech economy and increasing the use of public transport. At last count, more than 600 apps were being powered specifically using the TfL open data feeds, used by 42 per cent of Londoners.

TfL has demonstrated that releasing data to the public can save users time to the economic value of between £15m and £58m per year. An analysis by Deloitte found that the provision of transport information through travel apps and real-time alerts is saving £70m-£95m per year in time, reduced uncertainty and lower information costs. Further, release of open data by TfL has supported the growth of London's tech economy to the value of £14m annually in gross value added (GVA) and over 700 jobs. It has also unlocked new revenue and savings opportunities and new ways of working at TfL, including a £20m increase in bus usage as customers are more aware of service opportunities. This data has been used by a range of apps, from early stage start-ups to global leading technology platforms, saving time and reducing stress. There are currently 13,700 registered users of TfL's open data.

The London Infrastructure Mapping Application is a new platform that allows utilities, boroughs, the Mayor of London and TfL to share information relevant to infrastructure investment and planning. By bringing together a range of data, the application facilitates improved collaboration between actors, joined-up approaches to construction and design, and better identification of future demand and capacity constraints. Information is visualised spatially through a bespoke mapping application that has been developed in consultation with users. Early evidence has found that the tool supports better alignment of investment – unlocking housing growth and reducing disruption throughout London – by allowing projects such as road works to be timed better, and saving costs through joined-up approaches to construction (e.g. joint ducting of utility cables and pipes).

TfL is currently developing a new tool that will analyse data feeds from Tube trains to provide maintenance staff with live information about the condition of a train. Using the tool, staff can analyse the data and identify where faults exist or might be developing and remedy them before they cause service issues. The tool has strong potential to make maintenance planning more efficient and prevent costly faults leading to service delays from occurring. The in-house capability will also help TfL save money by reducing third-party spend – currently around £46m over five years on an external maintenance support contract.

Source: National Infrastructure Commission Report on Data as a Public Good available at https://www.nic.org.uk/wp-content/uploads/Data-for-the-Public-Good-NIC-Report.pdf

Box 4: Data Initiatives taken by U.S. Government

On January 29, 2009, U.S. President Barack H. Obama issued a memorandum on open and transparent government and asked his administration to establish "a system of transparency, public participation, and collaboration". The open-government initiative mandates federal government and public agencies to publish their data online for public use in machine-readable format. In a bid to democratise its data, U.S. government made more than 138,000 data sets available to the public. In February 2015, the U.S. government appointed DJ Patil as its first ever Chief Data Scientist in the Office of Science and Technology Policy to unleash the power of data for the benefit of the American public.

Data.gov, the preeminent platform of U.S. Government shares data and meta-data from various public agencies and has 'value added' features like:

(i) Ability to filter by location, data-set type, tag, format, community etc.;

(ii) A tool to integrate data-sets and create visualizations;

(iii) Engagement with public to provide feedback and participation in various forums, blogs and communities to improve the quality of data-sets;

(iv) Resources that provide links to all federal agency API's;

(v) Developer hub with software development kits, open-source resources and repositories of code;

(vi) Enabling of data-driven decisions through education apps (search for college, search for public school districts), energy and environment apps (alternate fuel locator) and food and nutrition apps (fooducate, goodguide);

(vi) A platform of cities.data.gov to publish datasets from different cities across U.S.;

(vii) disaster.data.gov web portal for collaborative efforts in disaster management, healthcare, policing, and climate change;

(viii) Precision Medicine Initiative (PMI), a leading open data project that aims to create individualized treatments, expand genetically based clinical cancer trials and establish a national "Cancer Knowledge Network" to help with treatment decisions.

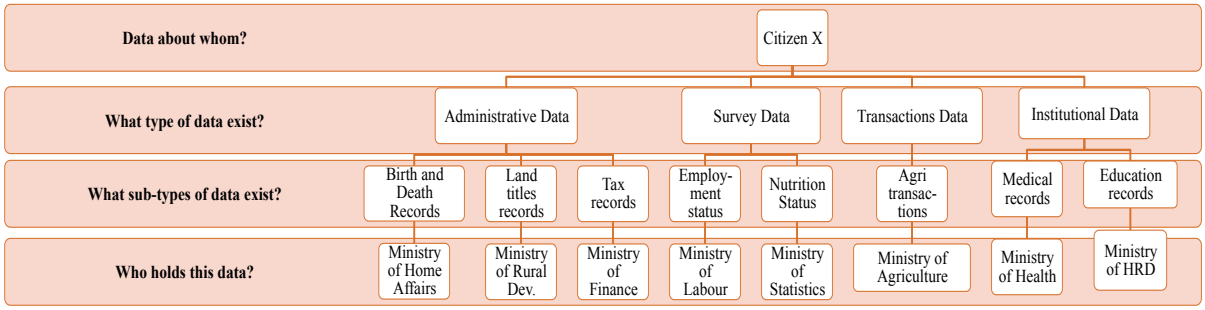
United States Department of Agriculture (USDA) releases regular forecasts for prices of various agricultural commodities that are used worldwide. The projections identify major forces and uncertainties affecting future agricultural markets; prospects for long-term global economic growth, agricultural production, consumption, and trade; and U.S. exports of major farm commodities and future price movements. The projections can also be used to analyse impacts of alternative policy scenarios. This easy availability of data projections, in effect, drives agricultural markets across the U.S.

Box 5: Federalism in learning among governments: Telangana Government's Samagra Vedika initiative

The Telangana Government's Samagra Vedika initiative gives a flavour of the potential benefits of integrating data sets. The initiative links around twenty-five existing government datasets using a common identifier – the name and address of an individual. Seven categories of information about each individual were linked in this aggregation exercise – crimes, assets, utilities, subsidies, education, taxes and identity information. Each individual was then further linked to relatives such as spouse, siblings, parents and other known associates. The initiative also puts in place all the necessary safeguards to preclude any tampering of data or violation of privacy. The right to add or edit data in the database varies by ministry or department. A given department can only write data for select fields – the motor vehicles department cannot, for instance, manipulate data relating to education, even though it can view the data.

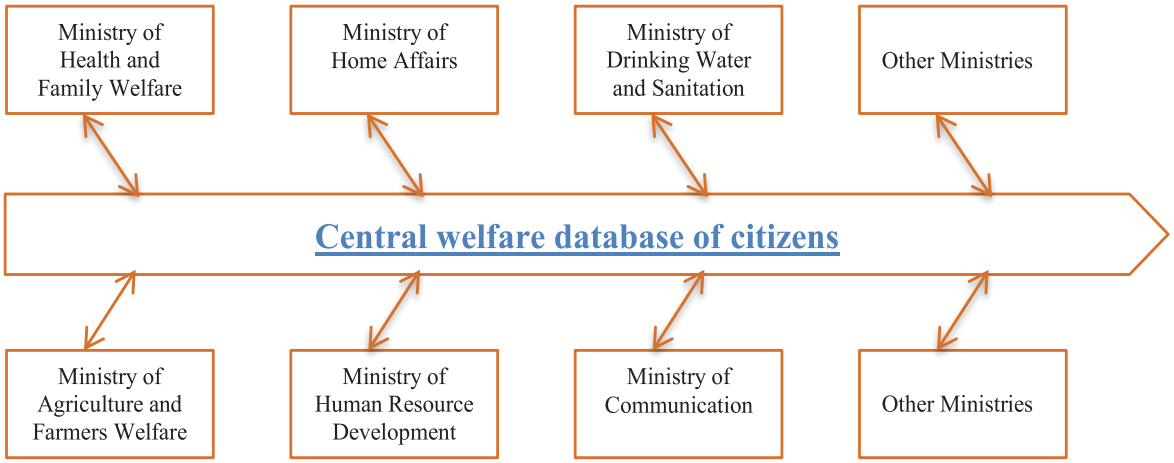
4.28 Of late, there have been some discussions around the "linking" of datasets – primarily through the seeding of an Aadhaar number across databases such as PAN database, bank accounts, mobile numbers, etc. A point of clarification is in order here. When one adds an Aadhaar number to an existing database such as a database of bank accounts, it is only one more column that is added to the table. The linking is so to speak "one-way". Banks can now use the tokenized Aadhaar Number (i.e., a proxy 64-digit number that is based on, but not equal to the individual's 12-digit Aadhaar Number) to combine duplicate records and weed out benaami accounts. But, this does not mean that the UIDAI or government can now read the bank account information or other data related to the individual.

Figure 4: Illustration: Data about a hypothetical citizen X is dispersed across multiple, unconnected datasets



Note: Names of some ministries abbreviated. Data types and sub-types are illustrative examples only and not exhaustive.

Figure 5: An enterprise architecture for Governance



4.29 Figure 4 illustrates the current system. Data about a hypothetical citizen X is spread across ministries. In fact, the illustration is an oversimplification. For example, data about X's medical records would lie with the Government-run district hospital where she was most recently treated. In all likelihood, these medical records are in paper-based form and do not get aggregated for analysis at the state level, let alone the central level. Nevertheless, the illustration depicts the union ministries ultimately responsible for each kind of data.

4.30 Figure 5 illustrates the Data Access Fiduciary Architecture. Each department of the government is responsible for making available the data they hold as a data provider. These departments must take care to appropriately treat private data and public data with the standards they require. This data is then made available through a Data Access Fiduciary to the Data Requestors. Data Requestors may be public or private institutions but can only access the data if they have appropriate user consent. The Data Access Fiduciary themselves have no visibility on the data due to end-to-end encryption. *Such a model puts user consent in the centre of the government's initiative to make Data a Public Good.*

4.31 A citizen is, of course, not the only possible unit of analysis. One may want to analyse schools, villages or hospitals. Different databases of villages, for example, may be utilised together if a unique identifier for every village exists. Unfortunately, in many cases, ministries and departments have their own codes for a given geographical area; for example each village is characterised by a pin code assigned by the Department of Post, a village code assigned by the Department of Rural Development and a health block assigned by the Ministry of Health and Family Welfare. The lack of a common identifier makes it difficult to consolidate information.

4.32 An initiative to address this issue is the Local Government Directory, an application developed by the Ministry of Panchayati Raj. A comprehensive directory of all local administrative units, the platform maps each land region entity to a local Government body (like villages with their respective gram panchayats) and assigns location codes compliant with Census 2011. The Local Government Directory is a great example of Data as a Public Good. The Ministry of Panchayati Raj has made important headway in solving a difficult problem, common to every government and private institution trying to serve rural India – the lack of formal addresses – by assigning a code to every place. Instead of simply sitting on that data, the Ministry has also published it for all to use. If all government databases requiring location codes are aligned with the codes in this directory, then all databases will share a common location field that can help in merging data, and reduce accuracy errors in the distribution of welfare.

Utilizing technological advances to eliminate all privacy concerns

4.33 The integrated system's efficacy relies on three critical features. First, while any ministry should be able to view the complete database, a given ministry can manipulate only those data fields for which it is responsible. Second, updating of data should happen in real time and in such a way that one ministry's engagement with the database does not affect other ministries' access. Third and most importantly, the database should be secure with absolutely no room for tampering.

4.34 The prospect of empowering the government with such comprehensive, exhaustive information about every citizen may sound alarming at first. However, this is far from the truth. First, large quantities of data already exist in government records, and the objective is only to use this data in a more efficient way. The proposal envisioned here does not gather any new information; rather, it seeks to make available all data within the government for citizens, government, private and public institutions to utilize the data subject to user consent and appropriate privacy and fairness related constraints.

4.35 Second, people can always opt out of divulging data to the government, where possible. For example, one can choose not to participate in a survey or use government-run payments services. There are exceptions, of course. People cannot buy and drive vehicles without a license and registration certificate; but not requiring these data would threaten the enforcement of property rights, road safety and national security, which cannot be compromised. But for the remaining categories of data – institutional, survey and transactions – people have the choice.

4.36 Third, even if there is no viable private market choice of certain public services, the choice to share the individually linked data from such services will always be with the citizen under the Data Access Fiduciary Architecture. Further, immutable access logs

for all data would be available so that citizens know who has seen their data and why.

4.37 The principle is that most data are generated by the people, of the people and should be used for the people. Enabling the sharing of information across datasets would improve the delivery of social welfare, empower people to make better decisions, and democratize an important public good.

TRANSFORMING INDIA'S DATA INFRASTRUCTURE

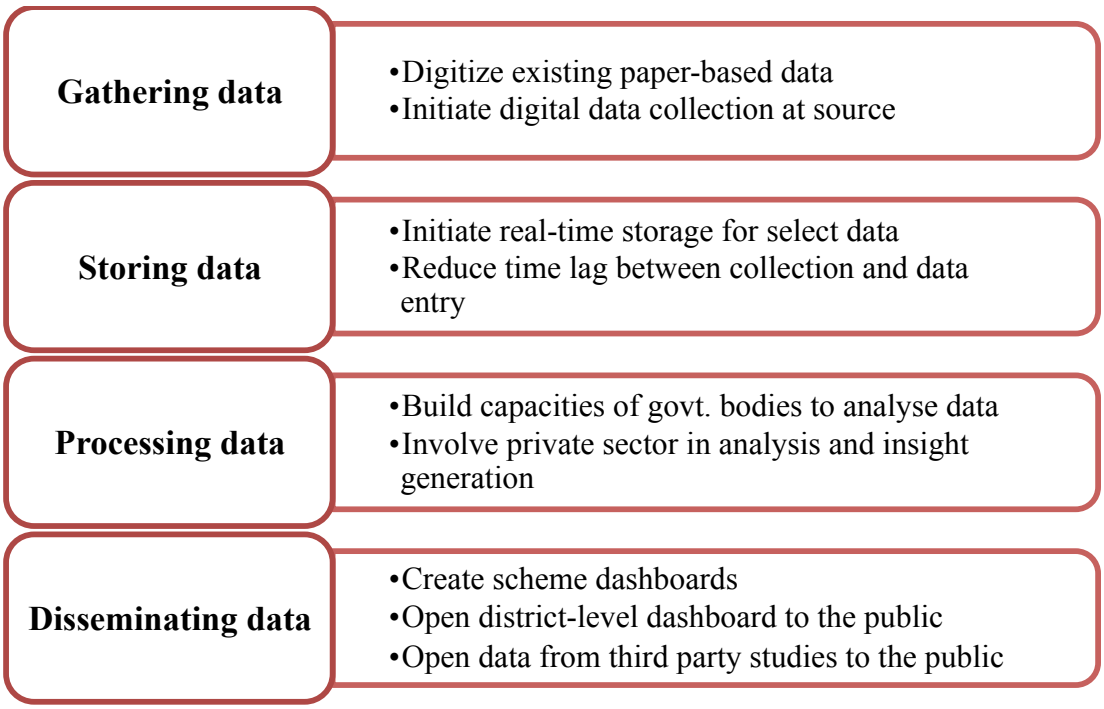
4.38 Undoubtedly, the system outlined above requires a robust data infrastructure. While combining datasets will itself reap rewards, the benefit is limited if data is of an uncertain quality, not amenable to easy processing etc. Harnessing data consists of four steps – gathering, storing, processing and disseminating data, each of which offers room for improvement in India (see Figure 6).

Gathering data: Directly digital rather than paper to digital

4.39 Unless data is in a digital, machine readable format, its utility is limited. Paper records of data cannot be accessed by all stakeholders. Even if paper records of schemes are scanned and stored in a digital repository, they do not lend themselves to easy analysis. For data to serve its purpose, it needs to be transmuted into a digital, machine readable form that can be downloaded and analysed. While most state and national level data is already in this form, digital records are not yet ubiquitous at the more granular administrative levels. For example, a citizen cannot view his village's sanitation status on a digital database. At best, he can look up his district. For many schemes, data is available only at the state level.

4.40 The recently launched Digitize India initiative is an ingenious solution to the

Figure 6: Transforming data gathering, storage, processing and dissemination



tedious task of converting paper-based data into digital form. The initiative crowd-sources the data entry effort by presenting volunteering citizens with snippets of scanned documents, which they type into a data entry portal. Correct entries earn cash rewards for the contributor (see Box 6 for details).

4.41 While the scheme goes a long way to digitize existing paper records, a parallel initiative is needed to convert the very process of data collection into a digital one, as opposed to collecting on paper first and converting to a digital format later. Undoubtedly, the exercise of supplying every hospital, gram panchayat, school or block office with an electronic data-entry device is quite ambitious, but achievable. Digital data collection at the source ensures that data is logged exactly as observed, obviates the redundancy of data entry, and eliminates data entry errors. A truly digital ecosystem is achievable only when all layers of information that constitute the ecosystem are digitized.

Storing data

4.42 Public service delivery can benefit from real-time storage of data. The city of St. Petersburg, Florida, recently created a citizen dashboard called St. Pete Stat, where citizens can view dynamically updated information about the performance of city departments, status of development projects. The dashboard includes various interactive tools such as an interactive map of all police calls in the city.

4.43 Not all types of data are amenable to real-time storage, of course. Further, the incremental cost of a real-time database may not always justify its marginal benefit. However, there are a few sectors where, if not real-time, at least a high frequency of logging data on the server can yield substantial benefits.

4.44 Education is one such example. Even a seemingly short period of six months is a long time in the life of a child – it amounts to half an academic year. Say a school does not have a functional toilet for girls, leading girls to remain absent from school. The problem needs to be rectified as soon as possible; otherwise these girls would lose out on valuable schooldays. The block or district education officer should receive a daily, or at least weekly, report of the status of toilets so that in case a problem is not rectified within a week or two, they can take the required action.

Box 6: How Digitize India works

Government departments upload scanned copies of paper records on the Digitize India platform. These scanned documents are shredded into snippets with meaningful data. These snippets are randomly served to digital contributors. Digital contributors are citizens who volunteer their time on the portal. Upon receiving snippets, the contributor reads the information and types it into a data entry portal. All converted data are verified against the corresponding snippet. Correct entries earn their contributors reward points, which can either be redeemed for cash or donated to the Digital India initiative. Once all snippets corresponding to a particular document are converted into digital data, the platform reassembles the document in digital form and supplies it back to the government department. Any Indian citizen with an Aadhaar number can participate as a digital contributor. Citizens are incentivised through reward points and recognition as 'digital contributors' and may even earn certificates as 'Data Entry Operators'. Ingeniously, the program also features a mobile app so that even citizens without a laptop or desktop computer can participate.

If the problem takes months to come to the notice of the block or district officer, the girl children in the school will have lost months' worth of learning! Digital dashboards updated in real time or at least weekly would avert such harsh consequences. Similarly, consider agriculture, where farmers need data about weather conditions, expected rainfall, input and output prices in real time to make daily decisions. Facilitating real-time access to such data is essential to improve agricultural productivity and farmer incomes.

4.45 With the widespread adoption of ICT approaches in public service delivery, real time data collection and storage is no longer an ambitious and distant dream but very much realisable, at least in select sectors and contexts.

Processing data

4.46 A deluge of data will be created when data is collected digitally, stored in real-time, and utilised with existing data. While this deluge has tremendous potential to transform governance, unleashing this potential requires skill. A district government official, for example, should have the analytical skills to make use of the data in that district. In the absence of such skill, investing in the data infrastructure is of limited use.

4.47 Governments at all administrative levels should invest in building their internal capacities to exploit data in real time, perform analyses and translate data into meaningful information. While every government department may have a dedicated analytics or data insights division, Ministry of Statistics and Program Implementation and Ministry of Electronics & Information Technology can act as nodal departments to steer such efforts at the national level.

4.48 The government may also consider opening certain kinds of data to private players with all the necessary security safeguards. Data shared with the public on the Open Government Data portal is completely anonymised and aggregated over a large number of individuals. Such data precludes careful statistical analyses, where individual-level observations are required. However, after obfuscating all personally identifiable information, if this data is shared with the private sector, government can harness the skills and enthusiasm of data analytics professionals to gain the maximum possible insights from the data.

Disseminating data

4.49 The Open Government Data portal is an effective tool to disseminate data to the public. But, as most citizens do not have the time or skills to employ analytical tools to dissect databases, easy visualisation tools are critical. The portal has enabled several visualisation tools already, and these may be augmented with the following.

4.50 First, the Government may initiate scheme dashboards for every major Government scheme with granular data, all the way to the village level. Dashboards should be ready recipients of data from the concerned government body and ready displayers of the same data in real-time to the public. The Swachh Bharat Mission is an exemplar dashboard that may be replicated for other schemes to allow citizens to track the physical and financial performance of welfare schemes. Currently, these dashboards exist only for a small number of schemes. For example, ICDS Anganwadi Services scheme, the largest scheme for women and child development in India, does not have a publicly available dashboard.

4.51 In existing dashboards, the metrics showcased may be augmented, especially to show progress at the more granular levels of administration. For example, the Swachh Bharat dashboard can include information on the number of swachhta doots (sanitation helpers) deployed at the district level or the number of information, education and communication (IEC) campaigns in that district. In all likelihood, the data on these metrics is available with the government but is not open to the public, perhaps because the data is not in digital form.

4.52 Second, many state governments have instituted district-level dashboards based on Management Information Systems (MIS) for various programmes. These states include Andhra Pradesh, West Bengal, Madhya Pradesh and Chhattisgarh. Except for the Andhra Pradesh and West Bengal ones, these dashboards are not easily accessible to citizens. They require a password, which is only available to the local administration. Some dashboards are not operational anymore (broken links), others display outdated data. While the investment to initiate such a dashboard is commendable, the benefits will be greater if the state governments continually maintain these dashboards to disseminate information.

4.53 Finally, many central ministries and state departments commission data collection initiatives to conduct needs assessments or impact evaluations of schemes. Although most of these studies are made public, the underlying data are not. As these studies are carried out in partnership with government bodies, they should be made available to the public so that independent analyses may be carried out to validate the findings of these studies.

APPLICATIONS

4.54 Once the infrastructure is in place, the applications are innumerable. A robust data backbone can empower every stakeholder in society, from the Central Government to a local government body, from citizens to

Box 7: NREGAsoft and e-governance in MGNREGA

NREGAsoft is a comprehensive e-governance system for the MGNREGA scheme. Accessible by a range of stakeholders, it captures the complete flow of all MGNREGA work at every level – from the centre all the way to the panchayat. In the spirit of citizens' right to information, the system makes available documents like muster rolls, registration application register, job card/employment register/ muster roll issue register and muster roll receipt register, which are otherwise inaccessible to the public.

The system has no language barriers to usage; it is accessible in a number of local languages. In fact, even the illiterate can use the interface as it leverages sounds and icons in a touch-screen kiosk model. It is designed to be used by a range of stakeholders, from workers who are beneficiaries of the scheme to gram panchayats to district programme coordinators to banks and post offices. Even citizens who are not beneficiaries of the scheme may view information on the portal.

The software consists of several modules, which together comprehensively span all activities and all stakeholders. For example, while the worker management module forms the backbone of all worker-related services, a fund management module tracks the movement of funds from the central ministry all the way to the workers' pockets, a grievance redressal module helps stakeholders including the illiterate to lodge complaints and track responses, and a bank/post office module allows financial institutions to get wage information and enter details of money credited in accounts. Other modules assist with cost estimation, social audit, knowledge network etc.

the private sector. A few (inexhaustive and illustrative) potential benefits are described below.

Governments themselves as beneficiaries

4.55 Being able to retrieve authentic data and documents instantly, governments can improve targeting in welfare schemes and subsidies by reducing both inclusion and exclusion errors. Datasets that utilise information across various datasets can also improve public service delivery. For example, cross-verification of the income-tax return with the GST return can highlight possible tax evasion.

Private sector firms as beneficiaries

4.56 The private sector may be granted access to select databases for commercial use. Consistent with the notion of data as a public good, there is no reason to preclude commercial use of this data for profit. Undoubtedly, the data revolution envisioned here is going to cost funds. Although the social benefits would far exceed the cost to the government, at least a part of the generated data should be monetised to ease the pressure on government finances. Given that the private sector has the potential to reap massive dividends from this data, it is only fair to charge them for its use.

4.57 Consider, for example, allowing the private sector access to data about students' test scores across districts (with all personal information completely obfuscated). Using test scores of students, demographic characteristics of each district and publicly available data on the efficacy of public education schemes, a private firm may be able to uncover unmet needs in education and cater to these needs by developing innovative tutoring products tailored to the specific needs of specific districts. These products would not only create profits for the private sector, but also monetize data and generate revenues for the government, in addition to improving education levels and social welfare.

4.58 Alternatively, datasets may be sold to analytics agencies that process the data, generate insights, and sell the insights further to the corporate sector, which may in turn use these insights to predict demand, discover untapped markets or innovate new products. Either way, there is tremendous scope for the private sector to benefit from the data and they should be allowed to do so, at a charge. Fortunately, stringent technological mechanisms exist to safeguard data privacy and confidentiality even while allowing the private sector to benefit from the data.

Citizens as beneficiaries

4.59 Citizens are the largest group of beneficiaries of the proposed data revolution. Consider the case of Digital Locker. It is in many ways similar to the plan we have outlined above. But it is restricted to certain

Box 8: The National Scholarship Portal

The Government of India has already made headway in integrating data on scholarships. The National Scholarship Portal was initiated to harmonize all scholarship schemes implemented by various ministries at the central and state levels. The portal serves as an umbrella platform for all scholarship related services ranging from student application, application receipt, processing and sanction to disbursal of funds. In addition to creating a transparent database of all beneficiaries of all government scholarship schemes at various levels, the portal reduces hassles in discovering scholarships and facilitates direct benefit transfer (DBT).

documents that the state issues. Citizens no longer need to run from pillar to post to get "original" documents from the state such as their driving licence, Aadhaar card, PAN card, CBSE results, etc. These documents are critical in the life of every resident of India. These documents are most needed by those who depend on the state for welfare. They are also often the hardest to secure for the same vulnerable group.

4.60 DigiLocker makes all their documents available, in a verified format, in one place on the cloud. Citizens only need an internet connected device, smartphone or computer to access the locker. It helps digitize downstream processes such as college admissions. For anyone who has had to retrieve a lost or missing document from the government or have to get photocopies "attested", the DigiLocker experience is immensely more time-saving and user-friendly. They do not have to live in the fear of their precious documents being lost to the elements or other misfortune.

4.61 In a similar vein, the Reserve Bank of India has announced the Non-Banking Financial Company-Account Aggregator (NBFC-AA). Even in the finance industry, an individual leads a complex financial life with their data spread across multiple providers. One may hold a bank account with State Bank of India, but take a loan from HDFC. Their mutual fund investments may be through Axis Bank, but their insurance is through LIC. They also have a credit card from Standard Chartered and use Motilal Oswal to invest in some stocks directly. In such a case, the data needed by the individual to piece together their own financial life is distributed across many data providers. The NBFC-AA allows users to pull that data together, for any purpose the citizen requires. This may be for personal finance management, or maybe to apply digitally for a new housing loan. The NBFC-AA neither reads data nor creates an invasive 360-degree dataset. It simply enables citizens to demand their data from these institutions in a machine-readable format, so that it can be used by them meaningfully.

WAY FORWARD

Through Aadhaar, India has been at the forefront of the data and technology revolution that is unfolding. As data for social welfare may not be generated by the private sector in optimal quantity, government needs to view data as a public good and make the necessary investments. The benefits of creating data as a public good can be generated within the legal framework of data privacy. Going forward, the data and information highway must be

Box 9: Idea of a National Health Registry

For Swachh Bharat to transform into Swasth Bharat and eventually Sundar Bharat, citizens' health is paramount. Prevention is far more important in this endeavour than cure. A national health register, that maintains health records of citizens with all the necessary privacy safeguards can go a long way in enabling health analytics for predictive and prescriptive purposes. Such a national health register would be identified using a citizen's Aadhar. As a doctor can access the medical history of a patient from this national health register, this facility would be especially useful in emergency/trauma cases and can potentially save several lives. The various components of this register can include databases for (i) hospitals and public health centres, (ii) surveillance of syndromes, (iii) immunization information systems, (iv) electronic laboratory reporting, and (v) sub-registries for key diseases requiring intervention such as diabetes, hypertension, cancer, AIDS, etc. Anonymized data from the register can be sold to private parties for analytics, which would then enhance prevention by offering predictive and prescriptive knowledge.

viewed as equally important infrastructure as the physical highways. Such a stance can help India leapfrog to utilise the benefits of technological advances for the welfare of its people. In the spirit of the Constitution of India, data "of the people, by the people, for the people" must therefore become the mantra for the government.

CHAPTER AT A GLANCE
➢ Given technological advances in gathering and storage of data, society's optimal consumption of data is higher than ever.
➢ As private sector may not invest in harnessing data where it is profitable, government must intervene is creating data as a public good, especially of the poor and in social sectors of the country.
➢ Governments already hold a rich repository of administrative, survey, institutional and transactions data about citizens, but these data are scattered across numerous government bodies. Merging these distinct datasets would generate multiple benefits with the applications being limitless.
➢ Given that sophisticated technologies already exist to protect and share confidential information, data can be created as a public good within the legal framework of data privacy. In thinking about data as a public good, care must also be taken to not impose the elite's preference of privacy on the poor, who care for a better quality of living the most.
➢ As data of societal interest is generated by the people, it should be "of the people, by the people, for the people."

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Ending Matsyanyaya: How To Ramp Up Capacity In The Lower Judiciary

05
CHAPTER

"The Rule of Law and maintenance of order is the science of governance"
- Kautilya's Arthashastra, 4th century B.C.

"No branch of knowledge and policy is of any avail if the Rule of Law is neglected"
- Kamandak's Nitisara, 4th century A.D.

Arguably the single biggest constraint to ease of doing business in India is now the ability to enforce contracts and resolve disputes. This is not surprising given the 3.5 crore cases pending in the judicial system. Much of the problem is concentrated in the district and subordinate courts. Contrary to conventional belief, however, the problem is not insurmountable. A case clearance rate of 100 per cent (i.e. zero accumulation) can be achieved with the addition of merely 2,279 judges in the lower courts and 93 in High Courts even without efficiency gains. This is already within sanctioned strength and only needs filling vacancies. Scenario analysis of efficiency gains needed to clear the backlog in five years suggest that the required productivity gains are ambitions, but achievable. Given the potential economic and social multipliers of a well-functioning legal system, this may well be the best investment India can make.

INTRODUCTION

5.1 The relationship between economic governance and the Rule of Law *(Dandaniti)* has been emphasized by Indian thinkers since ancient times. It is seen as the key to prosperity, and a bulwark against *Matsyanyaya* (i.e. law of the fish/jungle). It should be no surprise, therefore, that the Preamble to the Constitution of India defines that the first role of the State is *'to secure for all its citizens: Justice, social, economic, and political'*. In other words, it is well accepted that economic success and prosperity are closely linked to the ability to enforce contracts and resolve disputes.

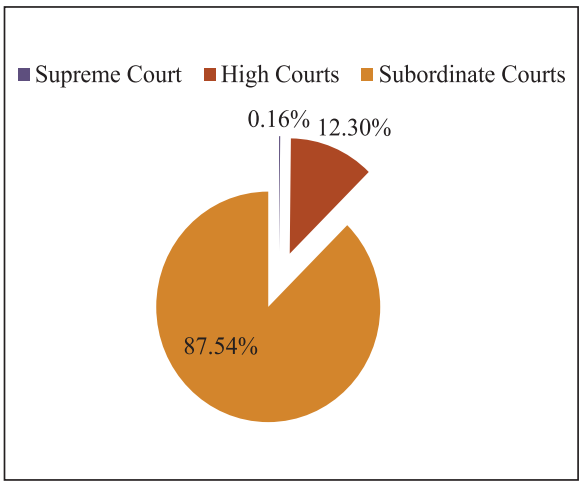
5.2 Last year's Economic Survey (2017-18) presented evidence of the backlog of cases that weighs down the Indian judiciary, economic tribunals and the tax department, thereby constraining economic growth. It also highlighted how the government's efforts to improve the present regime, by introducing the Insolvency and Bankruptcy Code and the adoption of the Goods and Services Tax, have had a profound impact on improving Ease of Doing Business (EODB) in India[1].

[1] India was one of the biggest 'improvers' in the World Bank's Ease of Doing Business Report (EODB), 2019 with its rank jumping to 77 from 142 in the last four years.

5.3 This progress notwithstanding, India continues to lag on the indicator for enforcing contracts, climbing only one rank from 164 to 163 in the latest report of EODB, 2018. In spite of a number of actions to expedite and improve the contract enforcement regime, economic activity is being affected by the long shadow of delays and pendency across the legal landscape[2]. Contract enforcement remains the single biggest constraint to improve our EODB ranking. This is ironical for a country that has long idealized contract enforcement. As Tulsi Ramayana puts it, *"praan jayi par vachan na jayi"* i.e., "one's promise is worth more than one's life".

5.4 The Indian judicial system has over 3.53 crore pending cases[3] (see Figure 1). At first glance, this number looks very large and insurmountable, but this Chapter will argue it is a potentially solvable problem. Indeed, given the potential benefits, this may be the best investment that the Indian economy can make.

Figure 1: Distribution of Pending Cases among different levels of Courts in India



Source: Supreme Court of India and NJDG, 2019.

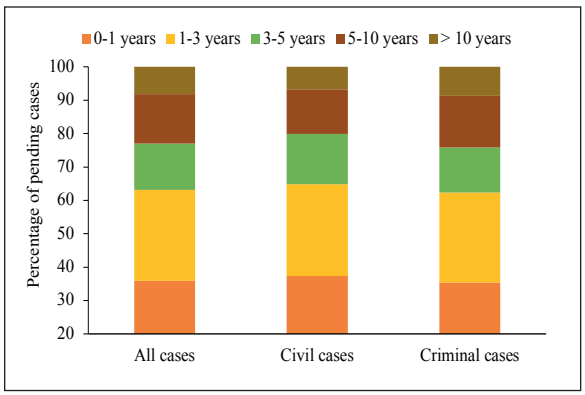
5.5 Given that District and Subordinate courts (D&S courts) account for 87.54 per cent of pending cases, this chapter will focus on this segment and evaluate its performance on parameters such as disposal time, pendency time, case types and case clearance rate. The Chapter further analyses the requirement of additional judges and efficiency gains across the various levels of courts to achieve 100 per cent clearance rate as well as to eliminate the stock of pendency in the next five years.

5.6 The following sections provide an overview of the performance of D&S courts, using metrics that quantify different aspects of the litigant's experience. These include average age of cases, (both pending and disposed), the number of days between hearings, and the average amount of time spent on the life cycle of cases.

PENDENCY

5.7 The pendency of a case on a given date is the time since the date of filing. The distribution of ages of pending cases as on May 31, 2019 is shown in Figure 2. It reveals that the distribution of pendency of both civil

Figure 2: Distribution of Pending Cases (age-wise) in D&S courts

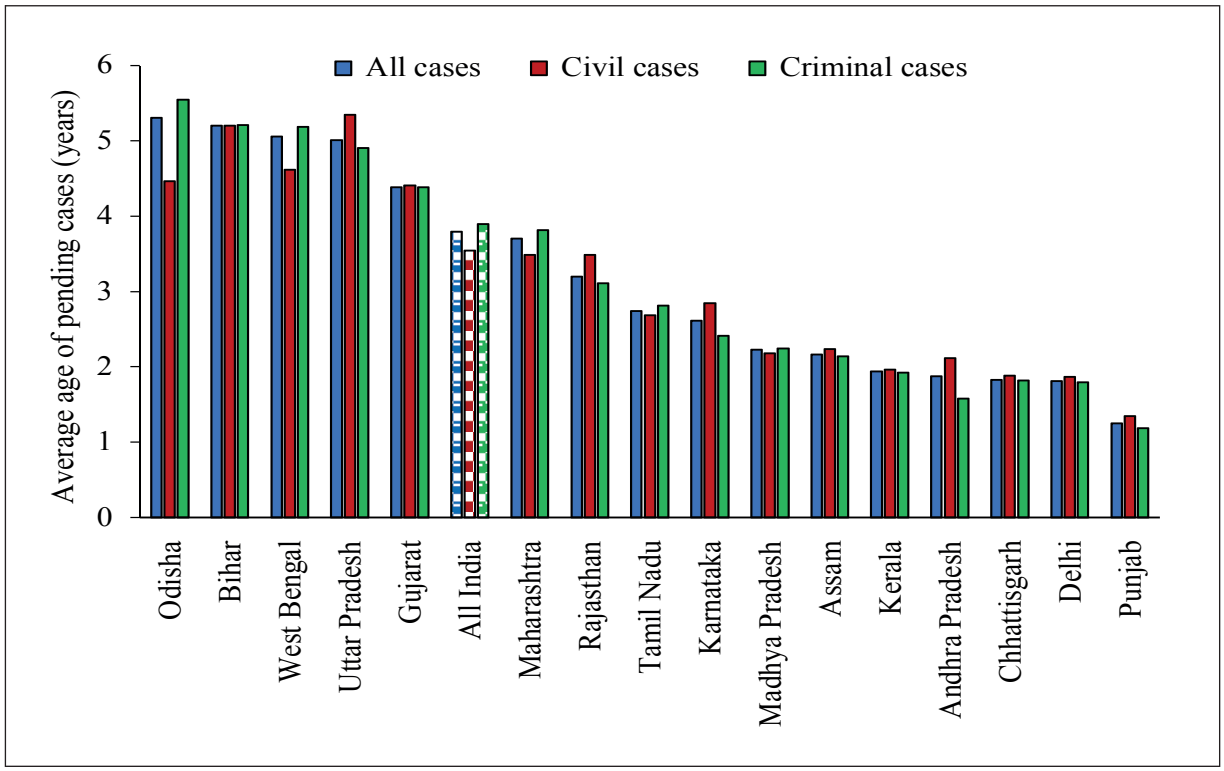


Source: NJDG, As on May 31, 2019.

[2] See Economic Survey 2018 Chapter 9, Volume I.

[3] Source: Data for High Courts and Subordinate Courts is from the National Judicial Data Grid (NJDG) as on May 31, 2019 and data for the Supreme Court of India is from its website, as on May 1, 2019.

Figure 3: State-wise Average Pendency in D&S courts



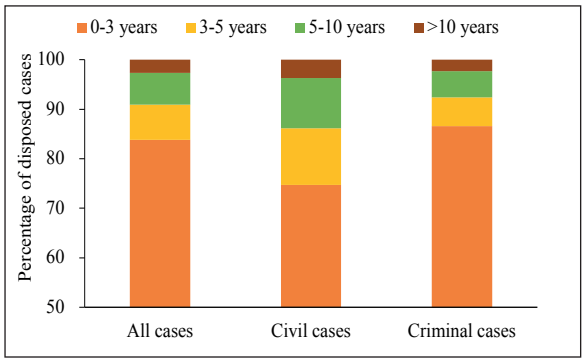
Source: NJDG, As on May 31, 2019.

and criminal cases is more or less the same. More than 64 per cent of all cases are pending for more than one year. Figure 3 shows the inter-state variation in average pendency of cases in D&S courts. It reveals that Odisha, Bihar, West Bengal, Uttar Pradesh and Gujarat have higher average pendency for both civil and criminal cases as compared to the national averages whereas Punjab and Delhi have the least average pendency of cases. It may not be a coincidence that the worst performing states are usually (albeit not always) also the poorest.

DISPOSAL

5.8 Disposal time is measured as the time span between the date of filing and the date when the decision is passed. The age-wise distribution of the disposal time for D&S courts in 2018 is presented in Figure 4. It

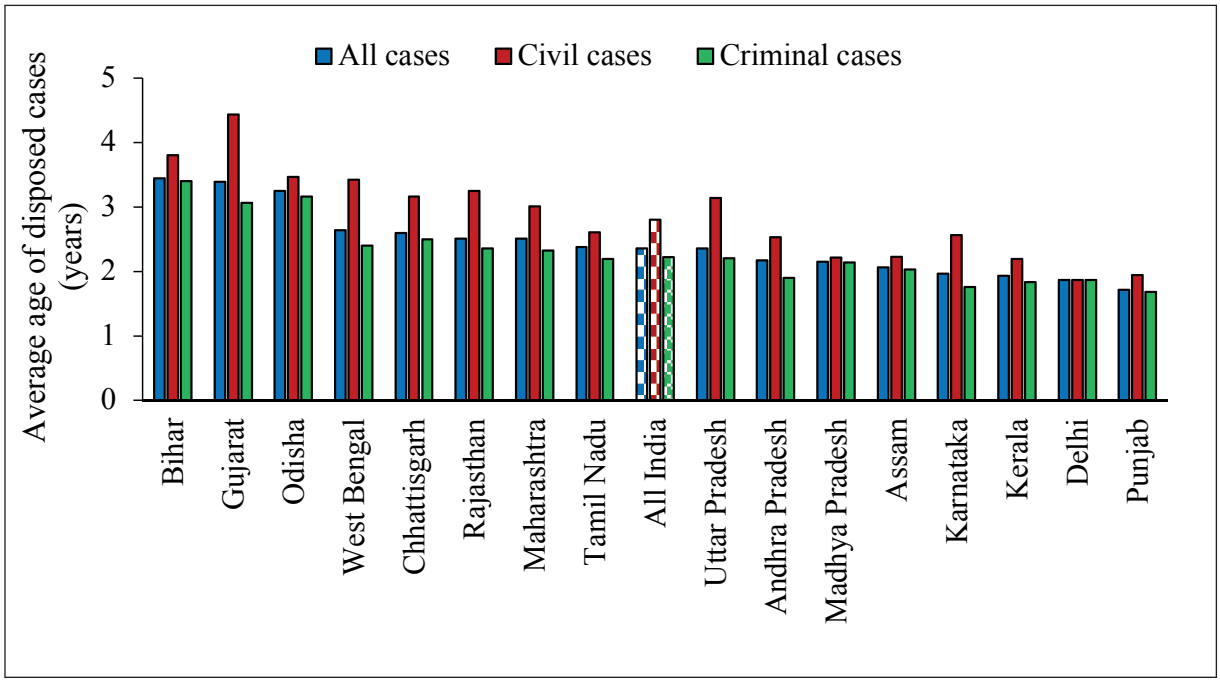
Figure 4: Distribution of Disposed Cases in D&S courts - 2018



Source: NJDG, 2019.

reveals that 74.7 per cent of the civil cases and 86.5 per cent of the criminal cases are disposed within three years. Further, the distribution of state-wise disposal rate is presented in Figure 5. It shows that Bihar, Odisha and West Bengal have higher average disposal time than the national average for

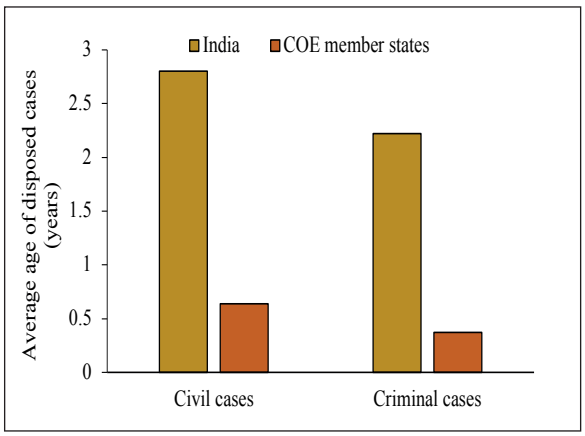
Figure 5: State-wise Average Disposal Time in D&S courts (2018)



Source: NJDG, 2019.

both civil and criminal cases. Further, Punjab and Delhi have the lowest average disposal time. These trends are consistent with the distribution of average pendency age across states. Again, the states in eastern India perform poorly although Gujarat too has higher disposal time.

Figure 6: Average Disposal Time - India and Council of Europe



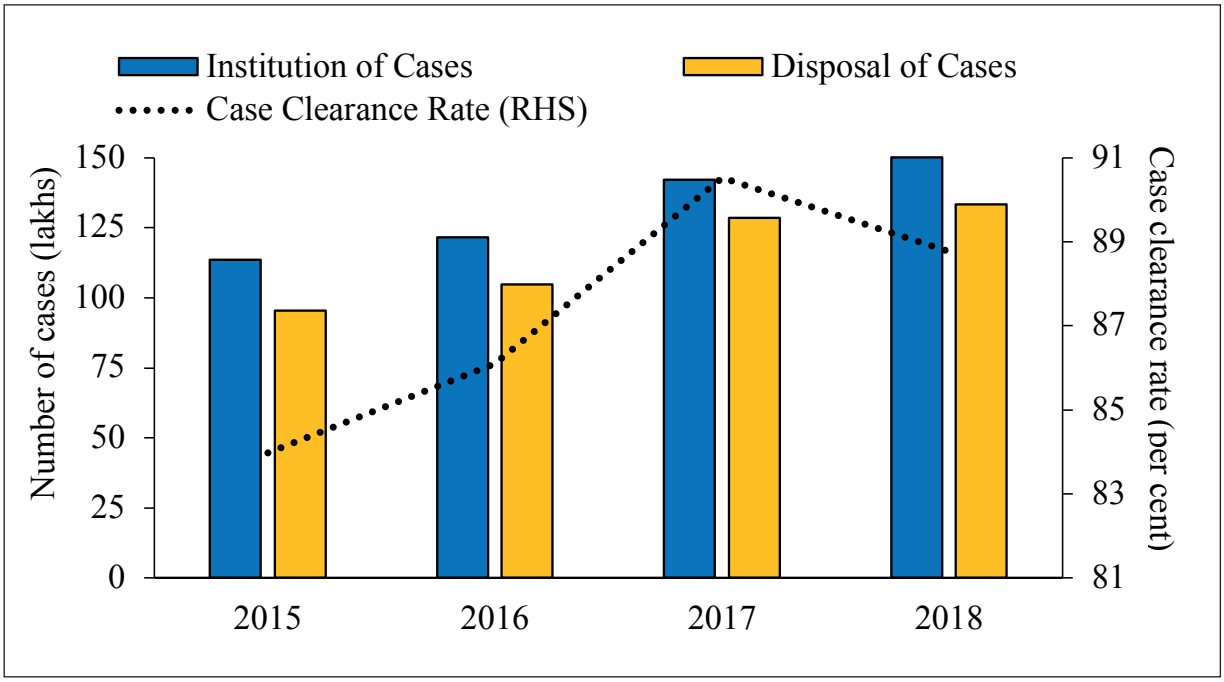
Source: NJDG, 2019 Council of Europe, European Commission for the Efficiency of Justice (CEPEJ, 2016).

5.9 International comparison of disposal rate is presented in Figure 6. The data reveals that the average disposal time for civil and criminal cases in Indian D&S courts in 2018 was 4.4 fold and 6 fold higher respectively when compared with the average of Council of Europe members (2016). This indicates that there is huge scope for improvement in the disposal time for Indian D&S courts. The following section provides a detailed analysis of the effectiveness and efficiency of courts using the framework of Case Clearance Rate.

CASE CLEARANCE RATE

5.10 The Case Clearance Rate (CCR) is the ratio of the number of cases disposed of in a given year to the number of cases instituted in that year, expressed as a percentage. It may be noted that the cases disposed of need not have been filed in the same year, as some proportion of them will typically be backlog from previous years – clearance rate

Figure 7: Institutions, Disposals, and Case Clearance Rate in D&S courts



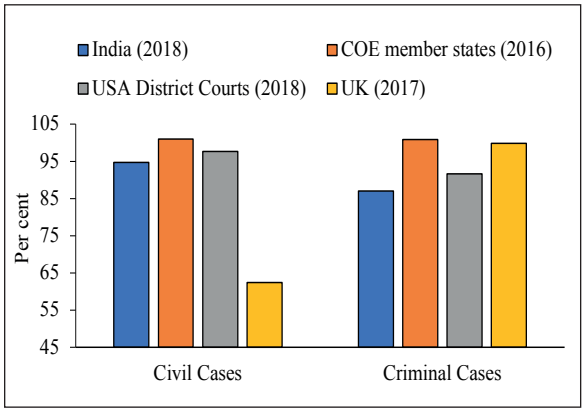
Source: NJDG, 2019.

is mainly used to understand the efficiency of the system in proportion to the inflow of cases.

5.11 Figure 7 shows the relationship between the institution, disposal of cases, and CCR at all India level. While the number of cases instituted each year in D&S courts has gone up, so has the number of disposals. However, the gap between institution and disposals allows cases to accumulate and results in an increase in pendency. This is because the CCR remains structurally below 100 per cent. An encouraging sign was that the CCR had increased from 86.1 per cent in 2015 to 90.5 per cent in 2017, but then declined to 88.7 per cent in 2018.

5.12 The international comparison of CCR is presented in Figure 8. It shows that the CCR for civil and criminal cases in India was 94.76 per cent and 87.41 per cent respectively in 2018 while the COE member has already achieved the CCR above 100 per cent in 2016 for both civil and criminal cases. With a CCR below 100 per cent and a heavy backlog of pre-existing cases, Indian courts suffer from increasing delays. USA's district courts have better CCR of 98 per cent and 92 per cent for civil cases and criminal cases respectively. While criminal courts in

Figure 8: International Comparison of Case Clearance Rate



Source: NJDG, CEPEJ, US Courts, UK Parliament research briefing, 2019.

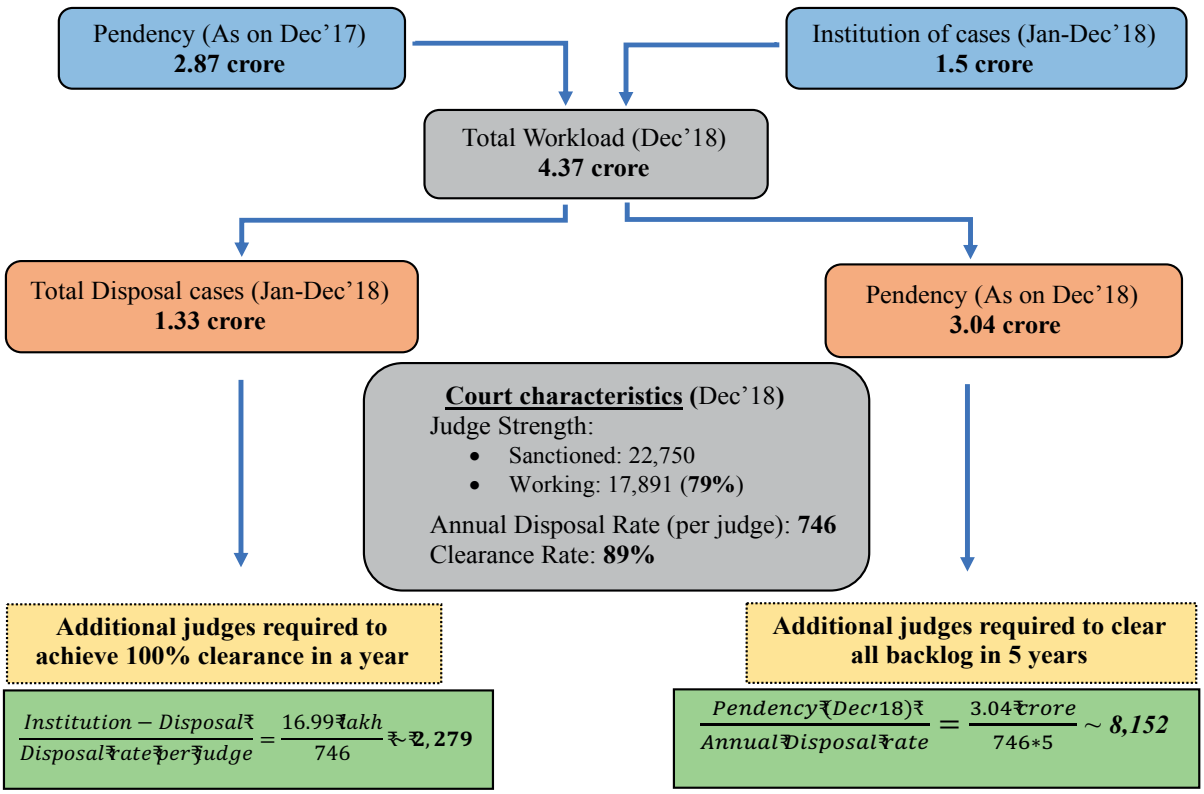
the UK's England and Wales court system perform relatively well, with a clearance rate of roughly 100 per cent, their civil courts fare poorly in comparison to India, the USA, and the COE average, with a clearance rate of just 62 per cent.

CAN THE LEGAL LOGJAM BE CLEARED?

5.13 There are two key issues at hand that need to be dealt with in order to make the judiciary more efficient. Firstly, to achieve a 100 per cent clearance rate must be achieved so that there is zero accumulation to the existing pendency. Secondly, the backlog of cases already present in the system must be removed. The following analysis is done to solve the above mentioned issues by using the concept of an input–output matrix of cases at different court levels. It is recognized that the disposal rate can be increased. However, productivity is assumed to be constant for the purpose of this analysis.

5.14 Using a simple input-output model, the survey estimates the number of additional lower court judges that would be needed to stop further accretion of pendency and clear the backlog. The D&S courts received 1.5 crore additional cases in 2018 and had a backlog of 2.87 crore (as on January 1, 2018). The number of cases disposed of in 2018 was 1.33 crore. Thus, the closing balance in end-2018 was 3.04 crore. There are currently 17,891 judges compared to the sanctioned strength of 22,750. On average, a judge disposes 746 cases. Chart 1 shows the

Chart 1: Additional Judges required in D&S courts (At Current Efficiency)



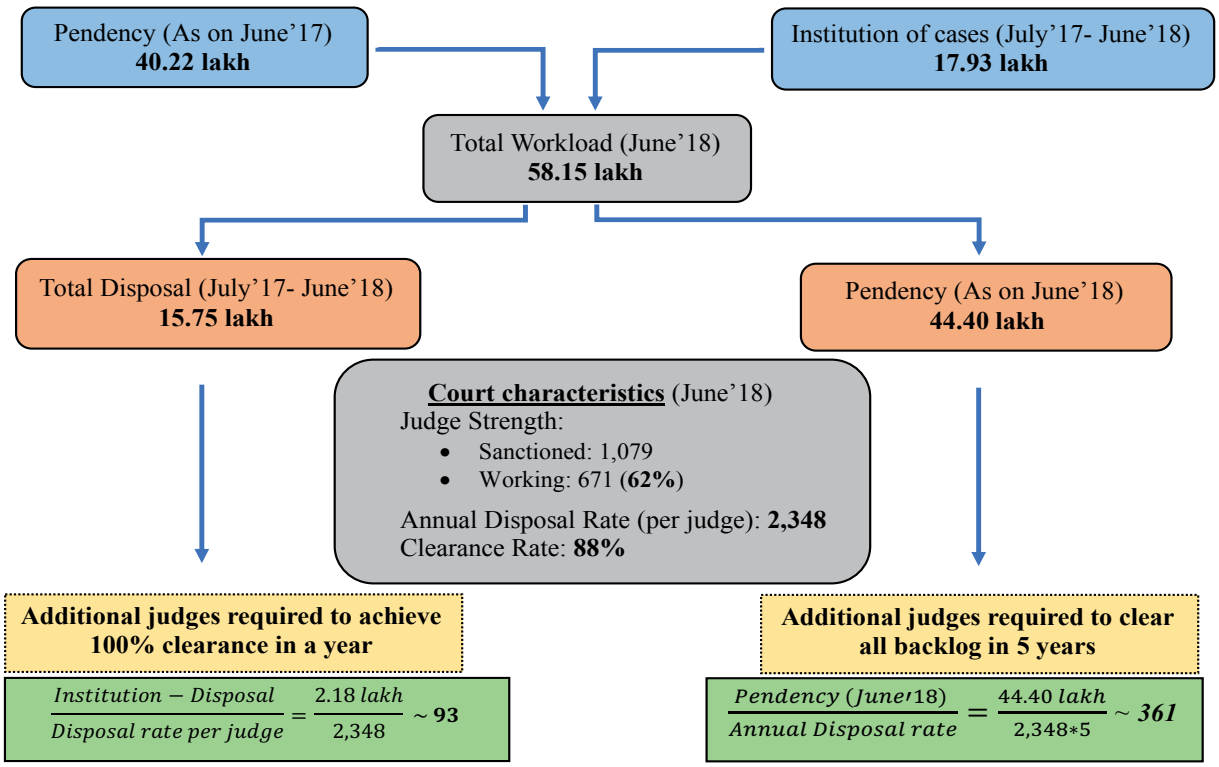
Source: Court News-Supreme Court, NJDG, 2019 and Survey calculations.

calculation for the requirement of additional judges in D&S courts. In order to reach 100 per cent CCR in 2018, the D&S courts needed 2,279 additional judges. This is within the sanctioned strength! However, in order to clear all the backlog in the next five years, further 8,152 judges are needed. This is no more than a rough calculation, but it shows that efficiency gains are also required.

5.15 Applying the same framework to higher courts, we found that the numbers are even smaller (note that the data sets here are from July-June). As of June 2017, High Court judges were working at 62 per cent of their sanctioned strength. With a case clearance rate of 88 per cent, each judge achieved an average disposal rate of 2,348 cases per year. The backlog of cases as on June, 2018 was 44.40 lakh. In order to reach 100 per cent CCR, they needed just 93 additional judges. This is already within the present sanctioned strength for High Courts. To clear all backlogs in the next five years, the High Courts need a further 361 additional judges.

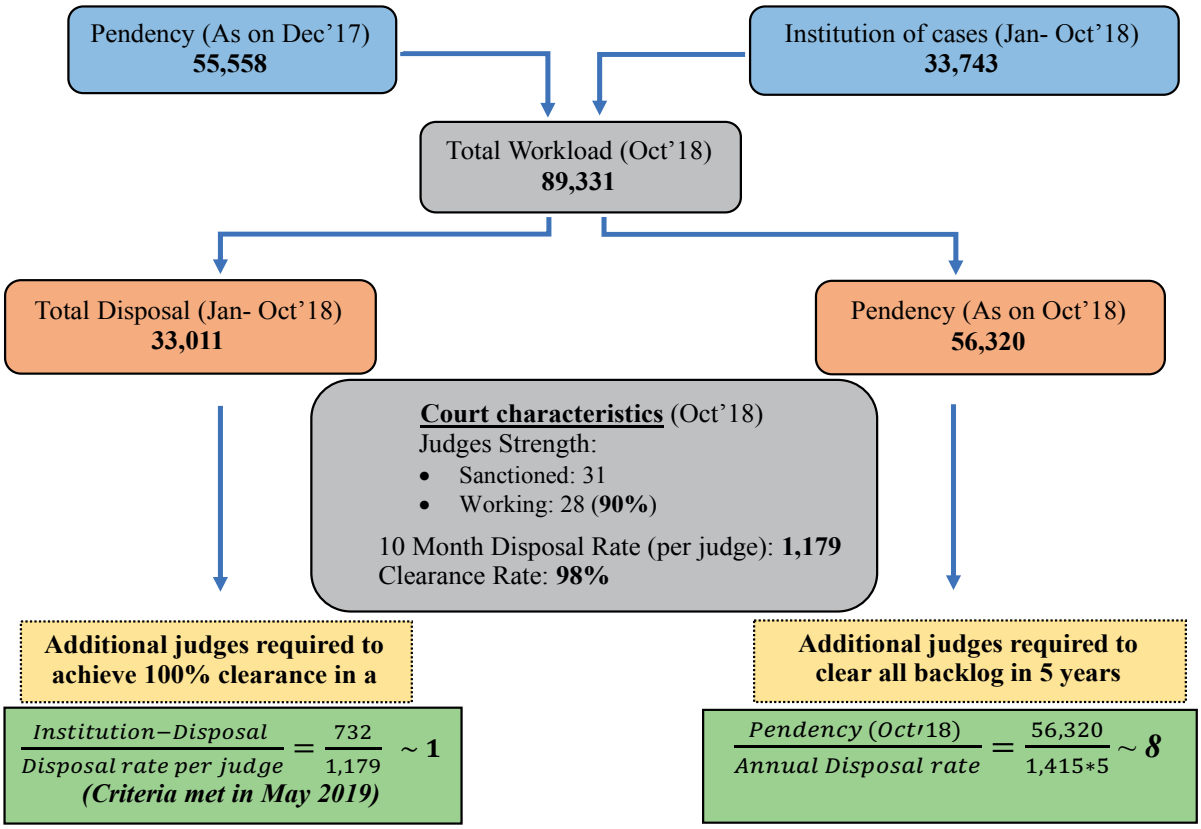
5.16 As of October 2018, Supreme Court judges were working at 90 per cent of their sanctioned strength. With a high case clearance rate of 98 per cent, each judge disposes 1,415 cases per year on average. The backlog of cases as on October 2018 was 56,320. In order to reach 100 per cent CCR, the Supreme Court would have needed only one extra judge in 2018. To clear all backlog in the next five years, an additional eight judges are required. In May 2019, three additional judges were appointed to the Supreme Court raising their number to the full sanctioned strength of 31. To clear backlog, the Supreme Court needs to increase its sanctioned strength by six.

Chart 2: Additional Judges required in High Courts (At Current Efficiency)



Source: Supreme Court Annual Report, 2018 and Survey calculations.

Chart 3: Additional Judges required in the Supreme Court (At Current Efficiency)



Source: Supreme Court Annual Report, 2018 and Survey calculations.

Note: For calculation of additional judges to clear all backlog in five years, disposal rate is adjusted for full year.

5.17 The main point of this analysis is that a major hurdle to economic growth and social well-being can be stabilized through a relatively small investment in the legal system. The numbers above are illustrative, but it shows that the much debated judicial logjam is solvable.

HOWSHOULDTHEADDITIONAL JUDGES BE ALLOCATED?

5.18 In order to optimally allocate these additional D&S judges, the following section has analysed common case types in both civil and criminal pendency. This will help understand which case types require additional judges.

Case Types

5.19 The types of civil and criminal cases, based on their subject matter and the legislation under which they have been filed, can result in significant variation along with the metrics used in this chapter. The complexity and gravity of a case type can determine the stages and process that it must go through. A snapshot of the distribution of common pending case type for both civil and criminal cases at the national level in D&S courts is presented in Table 1 below:

5.20 Table 1 reveals that as on May 31, 2019, the civil cases contribute a mere 28.38 per cent of total pendency while criminal cases contribute about 71.62 per cent in D&S

Table 1: Common Cases Types Weight in Total Pendency (As on May 31, 2019)

Common Case Types		in Per cent
A. Civil cases		
Civil Original Suits	Civil Suit	14.00
	Motor Vehicle	2.84
	Marriage Petition	1.22
	Land Reference	0.49
	Other Civil	2.06
Total Civil Original Suits		20.60
Civil Application		1.96
Civil Execution		4.21
Civil Appeal		1.61
Total Civil Suits		**28.38**
B. Criminal cases		
Criminal Original Suits	Warrant/ Summons	56.63
	Sessions Cases	5.60
	Other Criminal	2.03
Total Criminal Original Suits		64.26
Criminal Applications	Pre-Trail	1.57
	Bail Application	1.57
	Others Application	2.66
Total Criminal Applications		5.80
Criminal Appeal		1.56
Total Criminal Suits		**71.62**

Source: NJDG, 2019.

courts. Further, civil suit, civil execution, warrant/ summons and criminal application are common case types stuck in the backlog. These contribute 14 per cent, 4.21 per cent, 55.63 per cent and 2.8 per cent share in total backlog, respectively. We calculate case type clearance rate in D&S courts for 2018, so as to understand which of these cases have a tendency to have backlogs. This is presented in Table 2 below:

5.21 Table 2 reveals that average CCR for all civil and criminal cases in D&S courts for 2018 was 94.76 per cent and 87.41 per cent

Table 2: Case Type Institution, Disposal and CCR for D&S courts in 2018

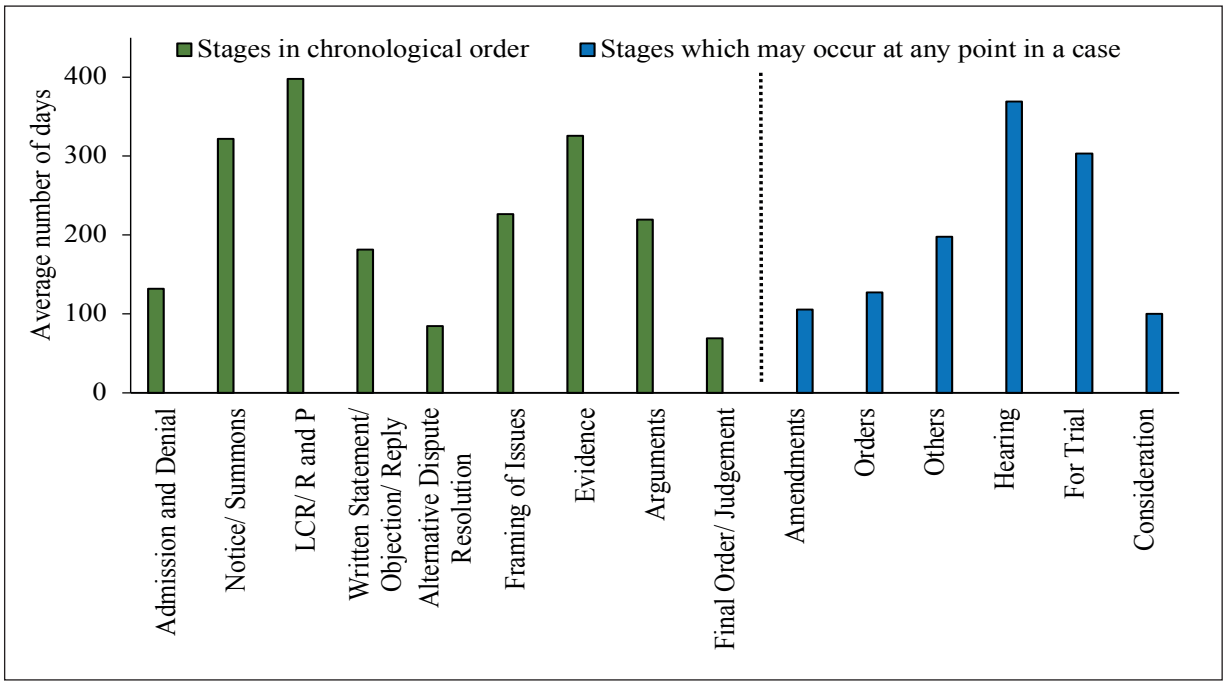
Common Case Types		Institution	Disposal	CCR (%)
A. Civil cases (Overall)		32,96,242	31,23,642	**94.76**
Civil Original Suits		21,77,722	21,09,102	96.85
	Civil Suit	11,66,259	10,81,236	92.71
	Motor Vehicle	3,71,686	3,99,873	107.58
	Marriage Petition	3,06,932	2,66,649	86.88
	Land Reference	30,409	58,586	192.66
Civil Application		4,02,449	3,76,400	93.53
Civil Execution		5,11,118	4,46,677	87.39
Civil Appeal		1,74,283	1,71,790	98.57
B. Criminal cases (Overall)		1,16,23,439	1,01,60,317	**87.41**
Criminal Original Suit		86,10,411	73,44,581	85.30
	Warrant/ Summons	76,28,227	64,52,314	84.58
	Sessions Cases	5,29,694	4,79,828	90.59
Criminal Applications		27,20,351	25,44,683	93.54
	Pre Trail	3,76,786	3,45,299	96.71
	Bail Application	11,50,573	11,12,717	93.68
Criminal Appeal		2,63,407	2,46,756	93.68

Source: NJDG, 2019.

respectively. This means that not only the backlog of criminal cases is about 2.5 fold higher than civil cases, criminal case type also has lower CCR (even lower than the national CCR of 88.7 per cent). This means that the situation for criminal cases is distinctly worsening. The problem is especially acute for criminal original suits such as summons, warrants etc. These contribute 64 per cent of the total pendency as of May 31, 2019 with a clearance rate of 85.3 per cent. This implies that the additional judges need to specialize in these case types so as to speed up the disposal of such cases. Note that this is a case not merely for additional judges and legal reforms, but also for police reforms (a matter we will take up in a future Economic Survey). Lastly, it may be noted that 'Motor Vehicle' and 'Land Reference' case types have done quite well, maintaining a CCR of 107.58 and 192.66 per cent respectively in 2018. These areas need to maintain the current pace.

5.22 Some economists may take the view that the relatively poor performance of the criminal justice system is of no direct consequence to the economy. However, a behavioural approach would make no distinction since human beings are seen to respond to the overall context. A culture of Rule of Law must pervade as all of the governance and cannot be improved in silos.

Figure 9: Average Number of Days Spent at a given Stage - Civil Cases



Source: eCourts and Daksh, 2019.

Life-cycle Analysis

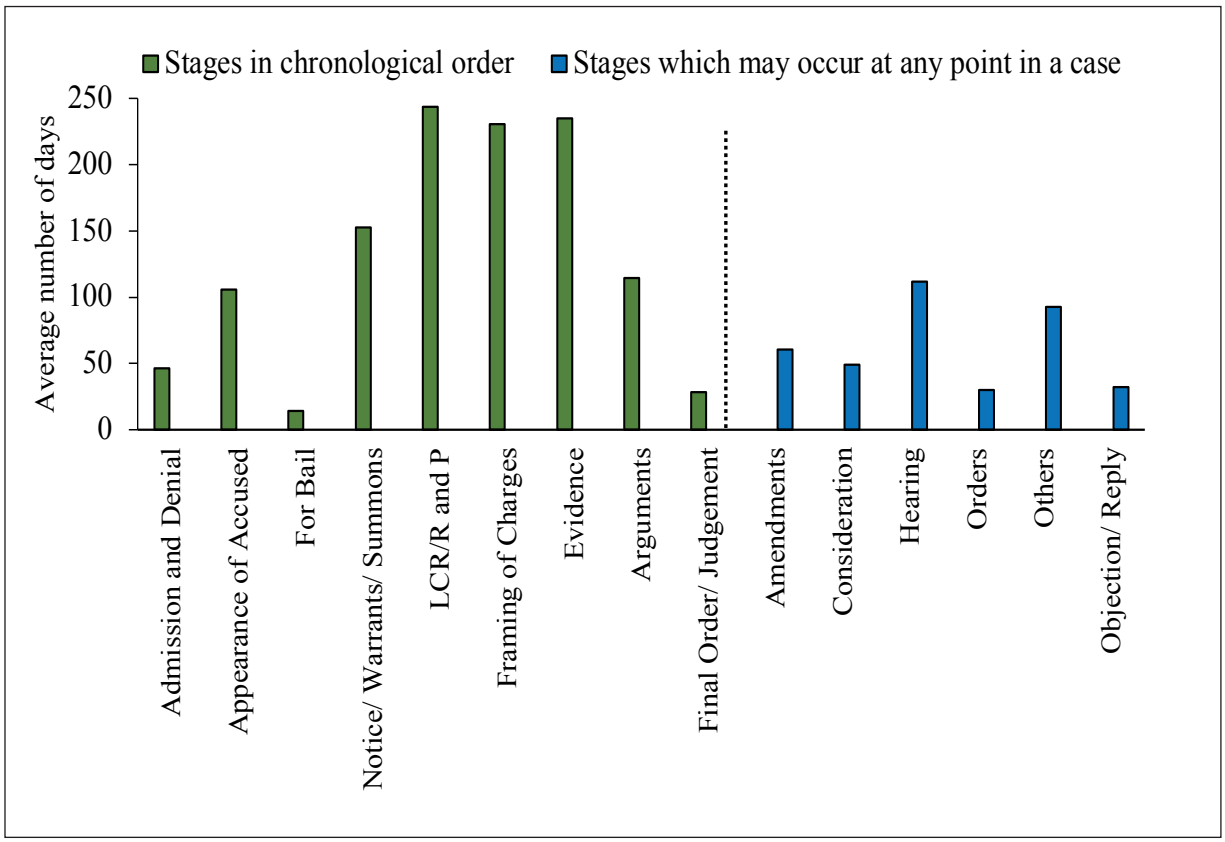
5.23 The progress of a case through various stages reveals to a large extent where judicial delays occur and can aid policy formulation to reduce delays and backlog. Analysis of life-cycle can be used to precisely identify causes of delay, whether they are procedural inefficiencies or shortages of human and physical resources. The average per cent of case life-cycle spent in a civil case is presented below. For the purpose of this section, we have used data from eCourts services portal covering District and Sessions Courts across 15 States, extracted between September 18, 2018 and January 29, 2019.

5.24 Figure 9 shows the stages in chronological order, from left to right. However, not all occur at specific points of a stage, as some can occur at any point, such as orders. In addition, not all cases go through all stages, but those that go through a particular stage may spend a significant part of its life in that stage.

5.25 The data from eCourts shows that most of the time is spent in the 'LCR/R and P' (Lower Courts Records – Records and Proceedings) stage. Here, cases cannot proceed as the court must first receive the case's records from the lower court. Civil cases spend an average of 398 days in this stage and 369 days in the 'Hearing' stage. This inefficiency consumes a significant proportion of a case's life, and is a major factor contributing to delays and backlog. The 'Notice/Summons' and 'Evidence' stages are also time consuming at 322 and 325 days on average, respectively.

5.26 Figure 10 reveals that, as with civil cases, awaiting lower court records causes delays for criminal cases, being the stage in which they spend the largest amount of time of 243 days, on average. The 'Evidence' stage and 'Framing of Charges' stages consume 235 and 231, respectively, while all other

Figure 10: Average Number of Days Spent at a given Stage - Criminal Cases



Source: eCourts and Daksh, 2019.

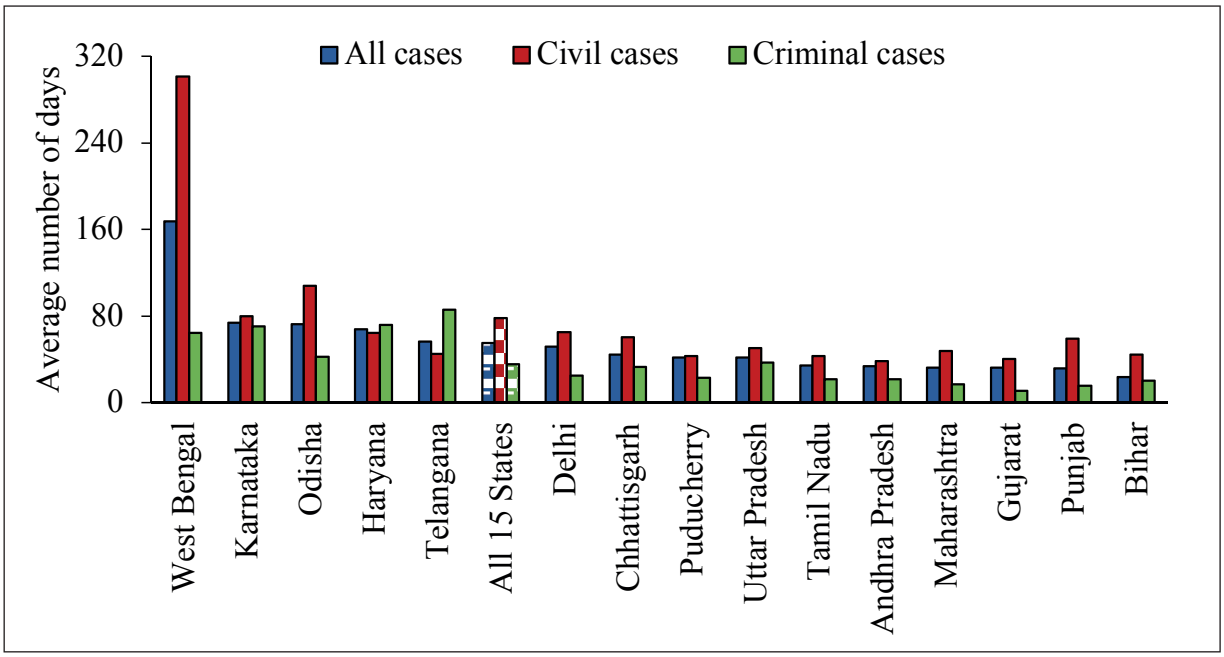
stages of criminal cases take much less time. The process for both civil and criminal cases can be significantly sped up by targeting the delay in these specific stages.

5.27 Further, Figure 11 shows that state-wise average number of the days between hearings for civil and criminal cases. Its shows that West Bengal, particularly for civil matters, spends much more time between hearings than any other state – approximately 301.4 days, as compared to the average (across 15 states) of 78.1 days for civil cases. The average for all cases is also the highest in West Bengal - 167.7 days between hearings, compared to the 15-state average of 55.1 days.

State-wise CCR

5.28 Figure 12 shows that Gujarat and Chhattisgarh have clearance rates of above 100 per cent in 2018. These states have achieved a level of efficiency where they are not only able to cope with fresh filings but can also address backlog from previous years. Madhya Pradesh, Assam and Tamil Nadu have impressively high clearance rates of close to 100 per cent. Again, eastern Indian states perform poorly. Bihar, Odisha, and West Bengal have low clearance rates of 55.58 per cent, 62.18 per cent, and 78.63 per cent respectively. Hence, we suggest that these states should be given priority in the appointment of additional judges.

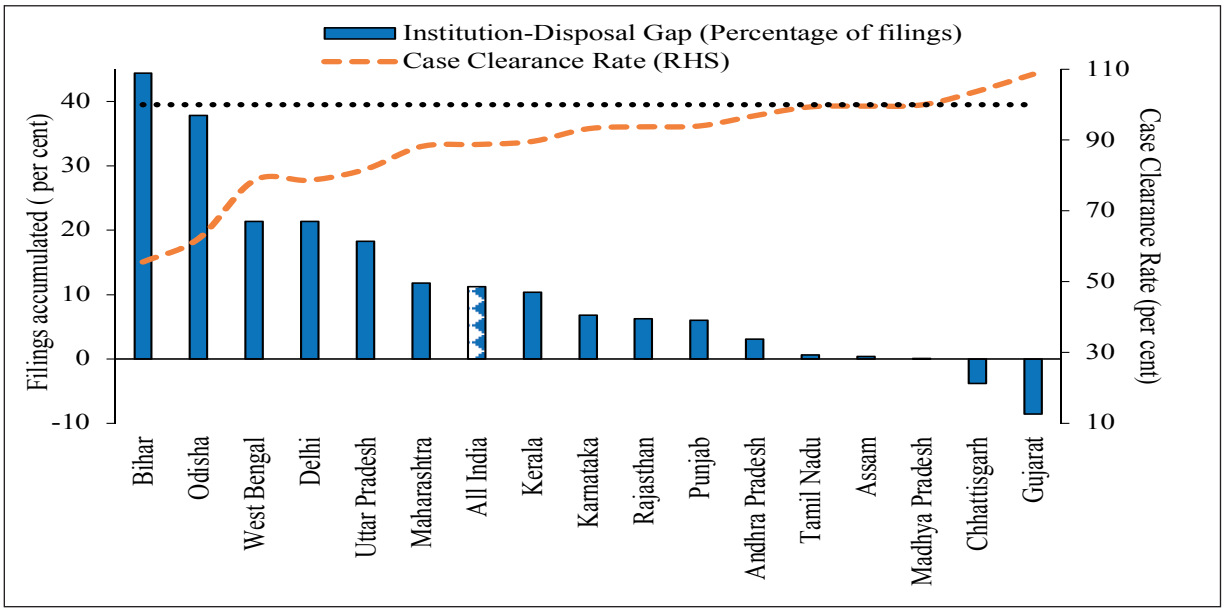
Figure 11: State-wise Average Number of Days between Hearings - Civil and Criminal Cases



Source: eCourts and Daksh, 2019.

5.29 There is a great amount of variation in the extent to which the subordinate judiciary in each state is capable of dealing with the inflow of new cases. There are, therefore huge gaps between the demand for courts and the current capacity of the subordinate courts in many states – possibly a key factor in the development inequalities between states.

Figure 12: State-wise Institution - Disposal Gap and CCR in D&S courts - 2018

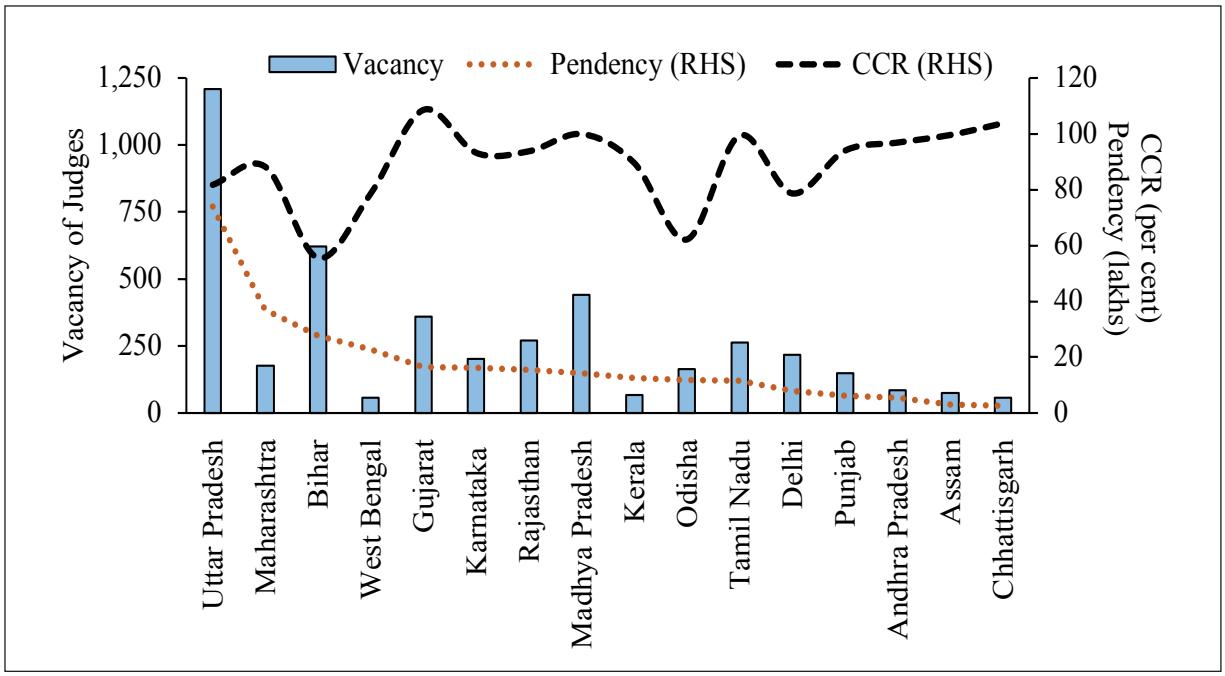


Source: NJDG, 2019.

5.30 Figure 13 reveals that there is some correlation between vacancy and pendency. This is especially true for Uttar Pradesh and Bihar. In these states, the focus should be on filling vacancies. However, note that West Bengal and Maharashtra have few vacancies but high pendency. This means that the national allocation of judges also has to be revisited.

5.31 It may be further noted that although Gujarat and Madhya Pradesh have high pendency, they have also achieved CCR of 108.59 per cent and 99.94 per cent respectively. NJDG data suggests that this is due to relatively recent improvements. Perhaps the efficiency gains of these states should be studied and replicated.

Figure 13: State-wise Pendency of Cases, Vacancy of Judges CCR in D&S courts



Source: NJDG and Lok Sabha Unstarred Question No. 675, 2019.
Note: Pendancy as on June 2, 2019.

MAKING INDIAN COURTS MORE PRODUCTIVE

5.32 The analysis thus far has provided a gauge of how many judges would be needed in order to increase the clearance rate at the existing efficiency rate and the nature of the delays. However, there is a large scope for improving the efficiency of the process. As shown in Table 3, the backlog in lower courts can be cleared in five years at full sanctioned strength with an efficiency gain of 24.5 per cent. At current working strength, it would take an efficiency gain of 58 per cent. With full sanctioned strength, High Courts would need only 4.3 per cent increase in efficiency to clear the backlog although, given high vacancy rates, the required rate at current working strength is 68 per cent. The equivalent numbers for the Supreme Court are 18 per cent and 31 per cent respectively.

5.33 Over the years, many suggestions have been put forward by researchers and official committees for enhancing productivity in the judiciary. Some of the suggestions are discussed below:

Table 3: Scenario Analysis of Required Efficiency Gains

Particulars	D&S courts	High Courts	Supreme Court
Institution of cases in 2018	1,50,40,971	17,93,546	33,743
Disposal of cases in 2018	1,33,41,478	15,75,435	33,011
Backlog of cases	3,03,95,534	42,39,966	56,320
Sanctioned Strength of Judges	22,750	1,079	31
Working Strength of Judges	17,891	671	28
Current **Disposal Rate** per Judge	746	2,348	1,415*
Case Clearance Rate	89%	88%	98%
Scenario I: Constant Productivity			
Total judges required to reach 100% CCR	20,170	764	29
Additional Judges required to reach 100% CCR (above existing working strength)	2,279	93	1
Additional Judges required to clear backlog in five years	10,431	454	9
Additional Judges required to clear backlog in five years (above existing sanctioned strength)	5,572	46	6
Scenario II: Required Productivity Gains			
Required Productivity Gains to clear backlog in five years at full sanctioned strength	24.5%	4.3%	18%
Required Productivity Gains to clear backlog in five years at current working strength	58%	68%	31%#
Average number of working days	244	232	190

Source: Supreme Court Annual Report 2018, Various Court Calenders 2019, NJDG 2019 and Survey calculations.

Note: Data for backlog of cases, sanctioned and working strength of judges for D&S courts, HCs and SC is as on December 2018, June 2018 and October 2018 respectively.

*Adjusted for full year using January-October 2018 data.

As of May 2019, SC is working at its full sanctioned strength.

a) **Increase number of working days:** It has often been pointed out that Indian courts close down for significant periods due to vacations. The length of these vacations varies a great deal from court-to-court, but appears to have a palpable impact on the number of working days. For instance, the Supreme Court's official calendar for 2019 suggests that it would close for 49 days for summer vacations, 14 days for winter break, and a further 18 days for Holi, Diwali and Dussehra. After accounting for weekends and public holidays, it leaves 190 working days for the Supreme Court. In contrast, the average is 232 working days for High Courts and 244 days for Subordinate courts. There is a great deal of variation

between states, and many courts make up for vacations by working on Saturdays. For comparison, central government offices will be open for 244 working days in 2019 (note that the above calculations exclude personal leaves).

The main finding is that increasing the number of working days may improve productivity of the Supreme Court and in some High Courts, but is unlikely to significantly impact lower courts. Subordinate courts, which account for the bulk of pendency, seem to work almost as many days as government offices.

b) **Establishment of Indian Courts and Tribunal Services:** Most judicial reforms tend to focus only on the quality and quantity of judges, but a major problem lies with the quality of the administration of the courts system, particularly backend functions and processes. This is critical to reducing the process delays identified earlier in this Chapter. As a recent report by the National Institute of Public Finance and Policy put it, "For effective functioning, courts require competent administration to ensure that processes are followed, documents are submitted and stored, facilities are maintained and human resources are managed. Court administration must support the judges in performing their core judicial function efficiently."[4]

In the current system, the main responsibility for administration in Indian courts is assigned to the chief judicial officer. In addition to significant demands on his/her time, this approach is not conducive to systemic reforms and gradual accumulation of institutional knowledge on administrative matters. In this context, it has been proposed to create a specialized service called Indian Courts and Tribunal Services (ICTS) that focuses on the administrative aspects of the legal system. The major roles to be played by ICTS would be (i) provide administrative support functions needed by the judiciary (ii) identify process inefficiencies and advise the judiciary on legal reforms (iii) implement the process re-engineering.

The ICTS is not a unique model. Similar, court management services exist in other countries: Her Majesty's Court and Tribunals Services (UK), Administrative Office of US Courts (US), Court Administration Service (Canada).

c) **Deployment of Technology:** Technology can significantly improve the efficiency of courts. One major effort in this direction is the eCourts Mission Mode Project that is being rolled out in phases by the Ministry of Law and Justice. This has allowed the creation of the National Judicial Data Grid (NJDG). The system is already able to capture most cases, their status and progress. Most of the analysis in this chapter has been made possible by real time data made publicly available on the NJDG and eCourts portals. The digitalization of cases is now allowing stake-holders to keep track of individual cases and their evolving status. It is not possible yet to statistically measure the efficiency gains from this effort, but it is certainly a big step forward.

[4] Pratik Dutta *et al.*, "How to Modernize the Working of Courts and Tribunals in India", NIPFP Working Paper, 258, March 2019.

5.34 There are significant productivity gains to be derived from better administration, increase in working days, and technology deployment (including likely future applications of Artificial Intelligence). It is difficult to predict the exact improvement, but the purpose of this analysis is to show that the required efficiency gains for clearing the backlog are ambitious but achievable if combined with speeding up appointments. Given the social and economic importance of this issue, it should be given top priority by policy-makers.

CHAPTER AT A GLANCE	
➢	Delays in contract enforcement and disposal resolution are arguably now the single biggest hurdle to the ease of doing business in India and higher GDP growth.
➢	Around 87.5 per cent of pending cases are in the District and Subordinate courts. Therefore, this segment must be the focus of reform.
➢	The study found that 100 per cent clearance rate can be achieved by merely filling out the vacancies in the lower courts and in the High Courts (even without the productivity gains)
➢	Simulations of efficiency gains and additional judges needed to clear the backlog in five years suggest that the numbers are large but achievable.
➢	The states of Uttar Pradesh, Bihar, Odisha and West Bengal need special attention.

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How does Policy Uncertainty affect Investment?

06
CHAPTER

Economic Policy Uncertainty in India has reduced significantly over the last decade. Coinciding with the years of policy paralysis, economic policy uncertainty was the highest in 2011-12. Since then, economic policy uncertainty has declined secularly. The continued decrease in economic policy uncertainty in India post 2015 is exceptional because it contrasts sharply with the increase in economic policy uncertainty in major countries during this period, including the US. As is expected, episodes of greater uncertainty, such as the taper tantrum in 2013 exhibit elevated economic policy uncertainty. Economic policy uncertainty also correlates strongly with the macroeconomic environment, business conditions and other economic variables that affect investment. Surges in economic policy uncertainty increase the systematic risk, and thereby the cost of capital in the economy. As a result, higher economic policy uncertainty lowers investment, especially because of the irreversibility of investment. Consistent with this thesis, an increase in economic policy uncertainty dampens investment growth in India for about five quarters. Unlike generic economic uncertainty, which cannot be controlled, policymakers can reduce economic policy uncertainty to foster a salutary investment climate in the country. The following policy changes are recommended. First, policymakers' must make their actions predictable, provide forward guidance on the stance of policy, and reduce ambiguity/arbitrariness in policy implementation. Second, "what gets measured gets acted upon". So, economic policy uncertainty index must be tracked at the highest level on a quarterly basis. Finally, quality assurance of processes in policy making must be implemented in Government via international quality certifications.

INTRODUCTION

6.1 What is the effect of uncertainty/ambiguity in policy making on the investment climate in the economy? Consider, for instance, a poorly drafted law that is riddled with ambiguities, amendments, clarifications and exemptions that inevitably lead to conflicting interpretations and spawn endless litigation. Needless to say, such uncertainty can spook investors and spoil the investment climate in the economy. Such uncertainty in economic policy can be avoided. In contrast, a nation state that ensures predictability of policy action, provides forward guidance on policy action, maintains broad consistency in actual policy with the forward guidance, reduces ambiguity and arbitrariness in policy implementation creates economic policy certainty. Investors may enjoy the certainty provided by such an environment and flock to invest in this environment.

6.2 To examine this critical question and frame appropriate policy responses, it is critical to understand the differences between risk and uncertainty. Both fundamentally affect economic activity. However, while risk

can be quantified, uncertainty is inherently hard to measure[1]. As policy making relies on judgment – within the framework set by constitutional rules and other legal constraints – it often involves discretion. Such discretion can generate uncertainty, which can impact economic activity. Among different sources of economic uncertainty, *economic policy uncertainty* matters significantly because this uncertainty refers to one that policymakers can control and thereby influence economic activity. For instance, while the monsoon impacts economic activity, policymakers have absolutely no control over it. However, economic policy uncertainty captures uncertainty that policymakers *can control*.

6.3 As uncertainty itself inherently cannot be quantified, economic policy uncertainty is difficult to quantify. However, advances in data analytics, in general, and text analytics, in particular, have made it possible to quantify uncertainty, in general, and economic policy uncertainty, in particular. A globally recognized attempt at quantifying economic policy uncertainty is the one by Baker et al. (2016), who develop an Economic Policy Uncertainty (EPU) index for various countries including India. To measure economic policy uncertainty, the index is created by quantifying newspaper coverage of policy-related economic uncertainty. The index reflects frequency of articles in leading newspapers that contain the following triple: 'economic' or 'economy'; 'uncertain' or 'uncertainty'; and one or more of policy related words 'fiscal policy', 'monetary policy', 'PMO', 'parliament'. Other terms for 'policy' include 'regulation', 'deficit', 'legislation', 'reform', 'central bank', 'RBI', 'Reserve Bank', 'finance ministry', 'policymakers, 'finance minister', 'lawmakers, 'planning commission', 'economic advisor', 'Prime Minister's Office', 'PM Office', 'Prime Minister Economic Advisory Council.' Only those articles that have words from *all three categories* are counted for measuring economic policy uncertainty. Articles are taken from various newspapers, including, Economic Times, Times of India, Hindustan Times, The Hindu, Financial Express, Indian Express and the Statesman using access world news.

6.4 As shown later in this chapter, EPU index picks up the period of economic policy uncertainty, such as the taper tantrum of 2013, and correlates very well with other vulnerability indices like inflation volatility, stock market volatility, business sentiment index, and other macroeconomic vulnerability indices.

6.5 We then examine the impact of economic policy uncertainty on investment as it forms the core of the process of economic growth. Two key features of the decision to invest highlight the key role of uncertainty. First, investment represents a forward-looking activity. Second, it is irreversible (Pindyck and Salimano, 1993; Caballero and Pindyck, 1993; Chen and Funke, 2003; Bloom, Floetotto and Jaimovich, 2009). As investment is forward-looking, future expectations play a critical role in the decision to invest. Specifically, an investor invests in a project if the upfront costs are less than the present value of the expected rewards from the investment. As uncertainty influences these expectations, irrespective of its source, it affects the decision to invest. Conceptually, the Capital Asset Pricing model postulates

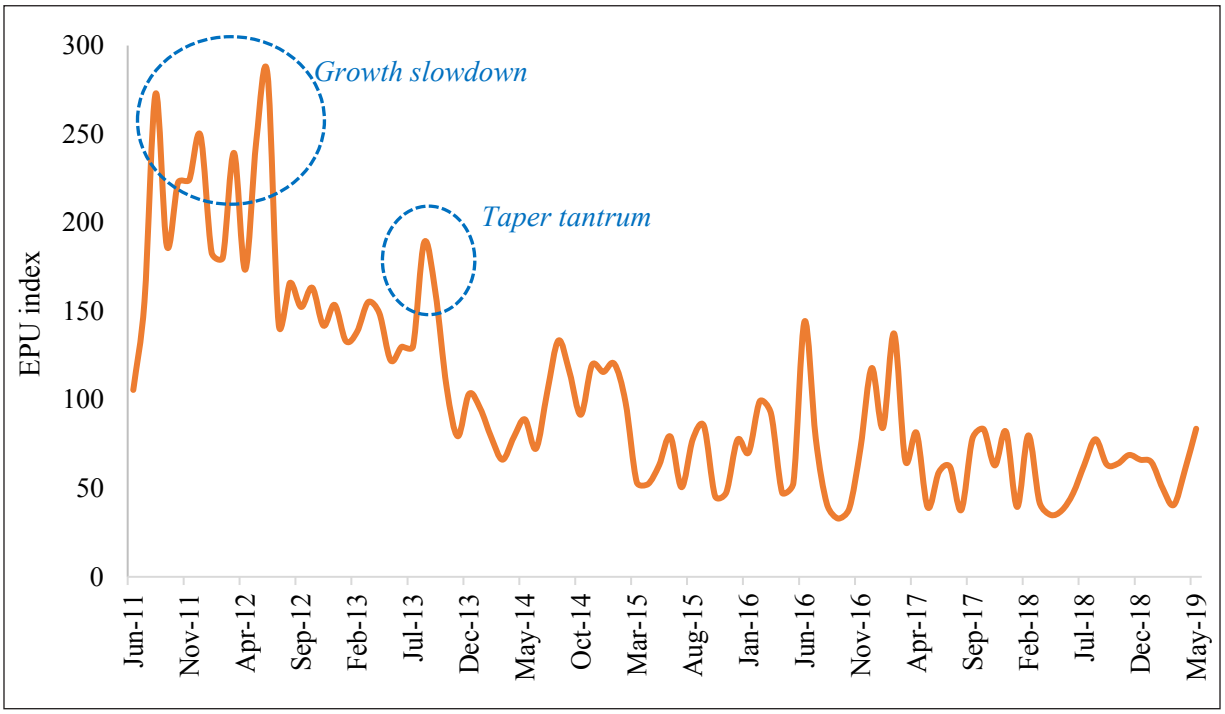
1 The Webster's dictionary defines risk as the "possibility of loss or injury; peril" and uncertainty as "indefinite, indeterminate" and "not known beyond a doubt." Knight (1921), who did seminal work in distinguishing risk from uncertainty, distinguishes risk and uncertainty as follows: "risk is present when future events occur with measurable probability while uncertainty is present when the likelihood of future events is indefinite or incalculable."

that the required return on investment correlates positively with the systematic risk underlying the investment. An increase in uncertainty in the economy increases this systematic risk and thereby increases the rate of return required to justify the investment. As a result, projects that generate a return lower than this required return become unviable when uncertainty increases in the economy. Also, as fixed investment is irreversible, uncertainty exacerbates risk-aversion, increases the premium demanded for assuming risk, and eventually dampens investment. Consistent with this thesis, the analysis indicated that an increase in economic policy uncertainty dampens investment growth in India for about five quarters. One standard deviation increase in uncertainty leads to about one percentage point decline in investment growth rate. Thus, economic policy uncertainty materially impacts the investment climate in the country.

ECONOMIC POLICY UNCERTAINTY IN INDIA

6.6 Economic Policy Uncertainty when measured using EPU index was the highest in 2011-12 coinciding with the years of policy paralysis. Economic policy uncertainty has reduced significantly over the last decade in India. Figure 1 shows that economic policy uncertainty has secularly declined from July 2012 onwards, though with intermittent episodes of elevated uncertainty in between. As is expected, episodes of greater uncertainty, such as the taper tantrum in 2013, exhibit elevated levels of the economic policy uncertainty index. Following the announcement by the Federal Reserve of tapering of their policy of monetary easing, investors in emerging markets faced uncertainty about the policies that would be adopted in these countries to control the impact of this Fed policy change. Thus, the EPU index captures this economic policy uncertainty as expected.

Figure 1: Economic Policy Uncertainty in India



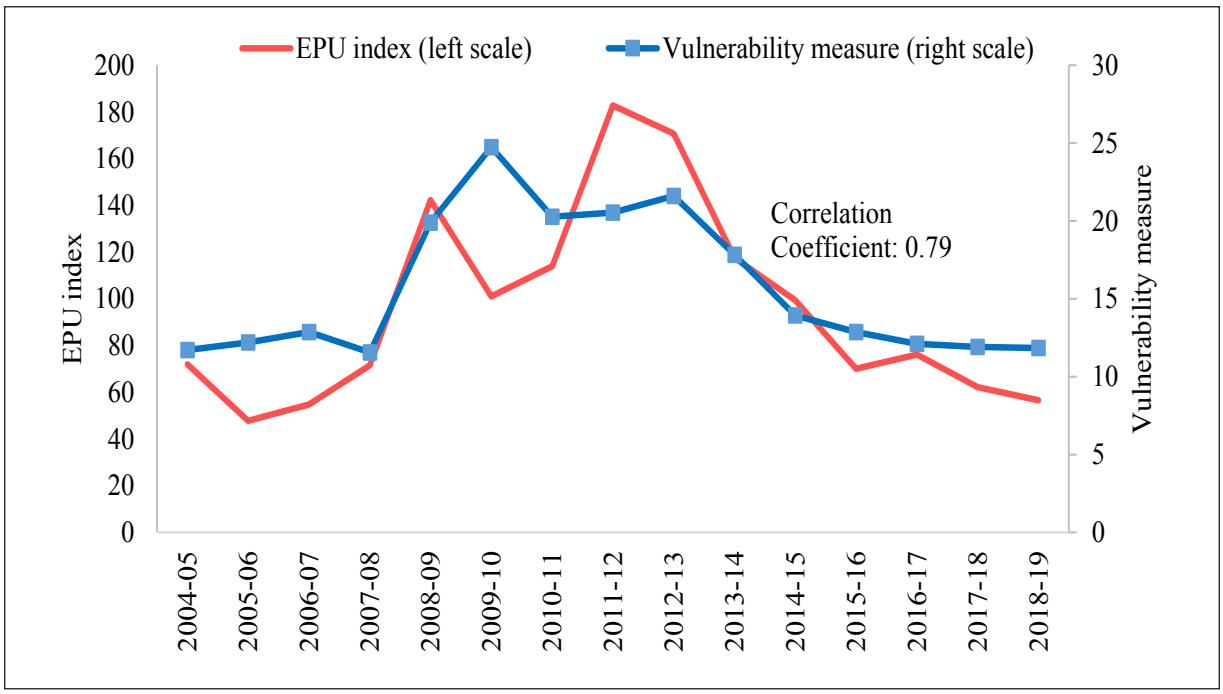
Source: http://www.policyuncertainty.com/

6.7 The index of economic policy uncertainty for India shows peaks in few months of 2011 and 2012, reflecting the policy paralysis during that period, which witnessed the problems of the high twin deficits and high inflation, thereby exacerbating macroeconomic vulnerability. The index is also high in the second half of 2013 when the economy faced the episode of "taper tantrum" leading to volatile capital flows, depreciation of rupee vis-à-vis US dollar (Figure 2). The peak during GST is not as sharp, maybe due to the fact that the discussions around GST policy were happening much before it was actually implemented in July 2017. This shows that the index is picking up time periods characterized by increasing economic policy uncertainty.

6.8 The EPU index correlates very strongly to macroeconomic stability. To examine this correlation, we use the vulnerability measure created and employed in the Economic Survey 2014-15. This measure is a sum of twin deficits i.e., fiscal deficit and current account deficit, and inflation. Figure 2 shows a strong correlation of 0.8 of this vulnerability measure with EPU index. Both the indices show almost same movements over time. This also points towards aptness of economic policy uncertainty index to be used as a yardstick for measuring impact of uncertainty with investment.

6.9 Apart from this, EPU index is very strongly correlated to volatility in exchange rate, stock market & inflation and various other macroeconomic variables. There is a correlation of around 0.7 between volatility in exchange rate and EPU index. The EPU index closely tracks both the deterioration of the future expectation index and India VIX index which monitors the volatility in stock market. It is strongly correlated to inflation rate and repo rate as well (Figures 3 to 8).

Figure 2: Correlation of EPU index with macroeconomic vulnerability



Source: RBI, CSO and Central Government Budget Documents

Note: Vulnerability index is measured as sum of Fiscal Deficit to GDP, CAD to GDP and Inflation rate.

Figure 3: Exchange rate volatility and EPU index

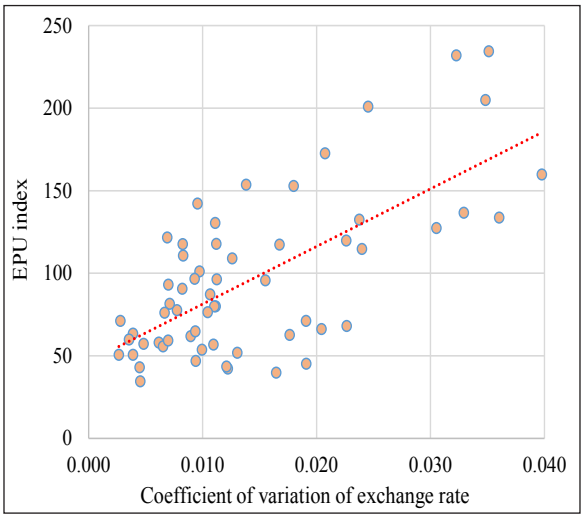


Figure 4: Future expection index and EPU index

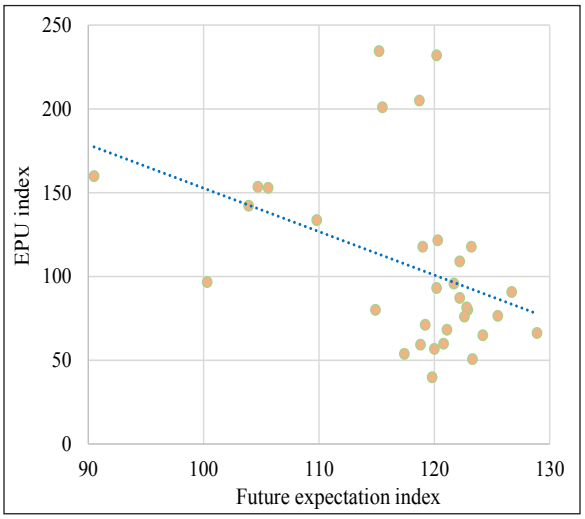


Figure 5: EPU index and India VIX

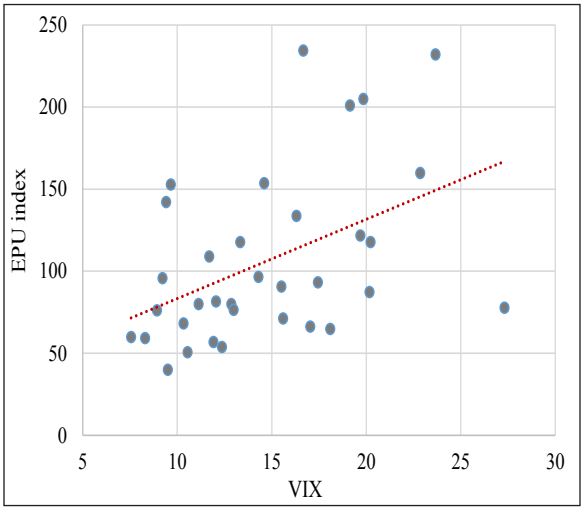


Figure 6: EPU index and Inflation volatility

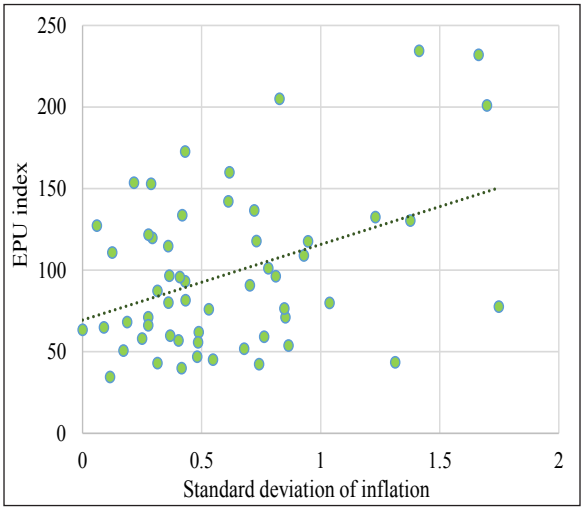


Figure 7: EPU index and Repo rate

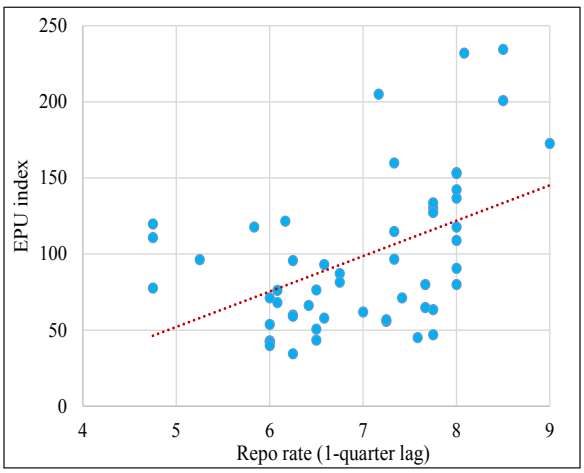
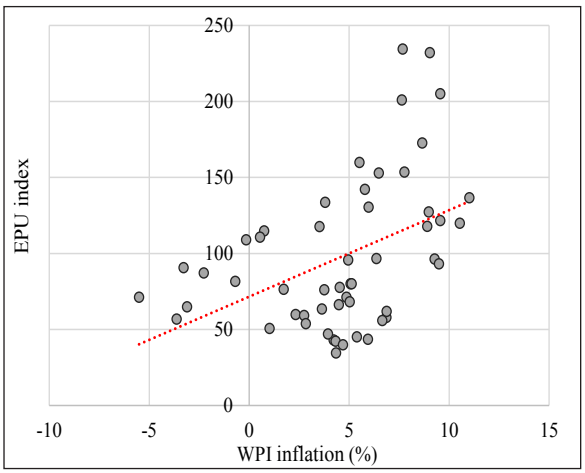


Figure 8: EPU index and WPI inflation



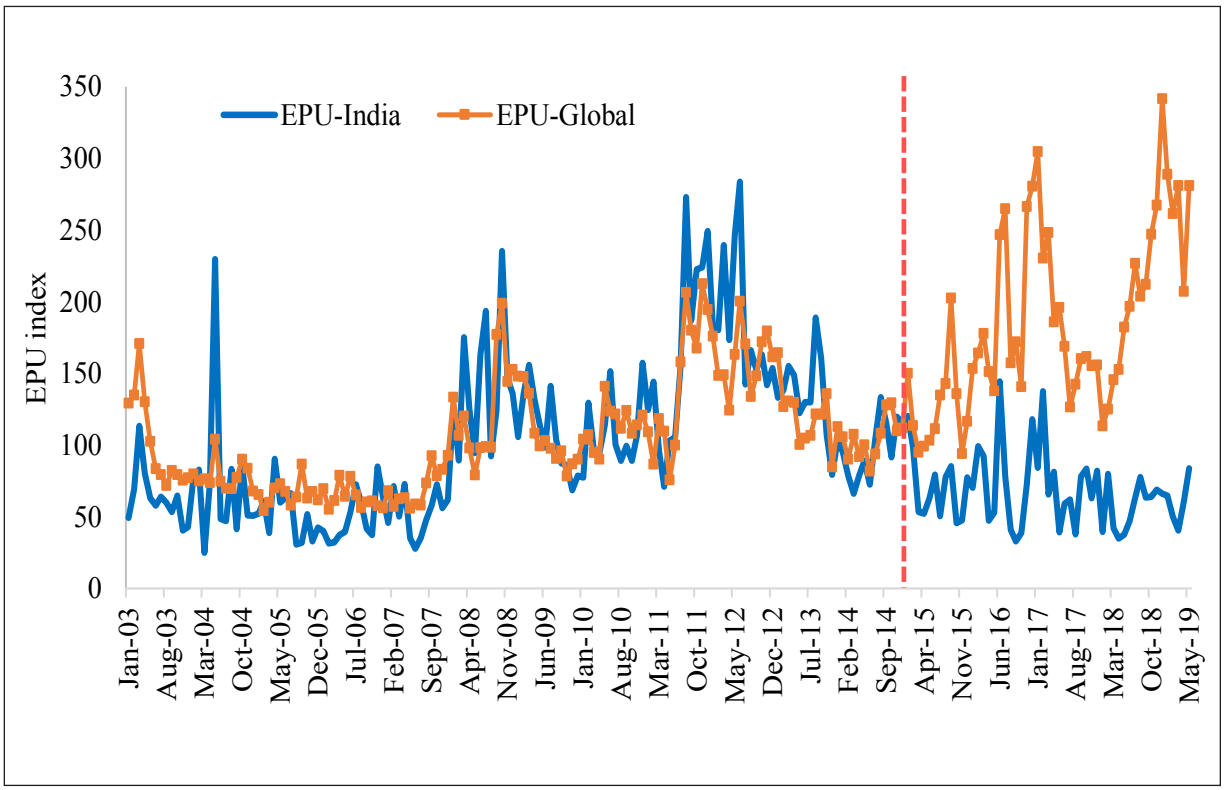
Source: RBI, NIFTY, CSO and http://www.policyuncertainty.com/ (from Figure 3 to 8)

DECOUPLING OF ECONOMIC POLICY UNCERTAINTY IN INDIA SINCE 2015

6.10 Economic policy uncertainty peaked in India during the late 2011 and early 2012 and has since been declining with intermittent increases in between. Economic policy uncertainty in India moved closely in tandem with global uncertainty until 2014. However, it started diverging since early 2015 and seems to have completely decoupled in 2018. In recent times, while the economic policy uncertainty has been increasing across the world, including US, UK and China; India's economic policy uncertainty has been falling. Uncertainty seems to have stabilized at lower levels in case of India since last few years, which is noteworthy given the recent surge in global uncertainty, partly due to rising trade tensions between US and China, uncertainty about outcome of Brexit, slower world growth. Year 2018 saw sharp divergence of India's economic policy uncertainty index with that of global uncertainty index, which increased sharply (Figure 9). Global uncertainty index increased from 112 to 341 in the same year, whereas that of India remained below 100.

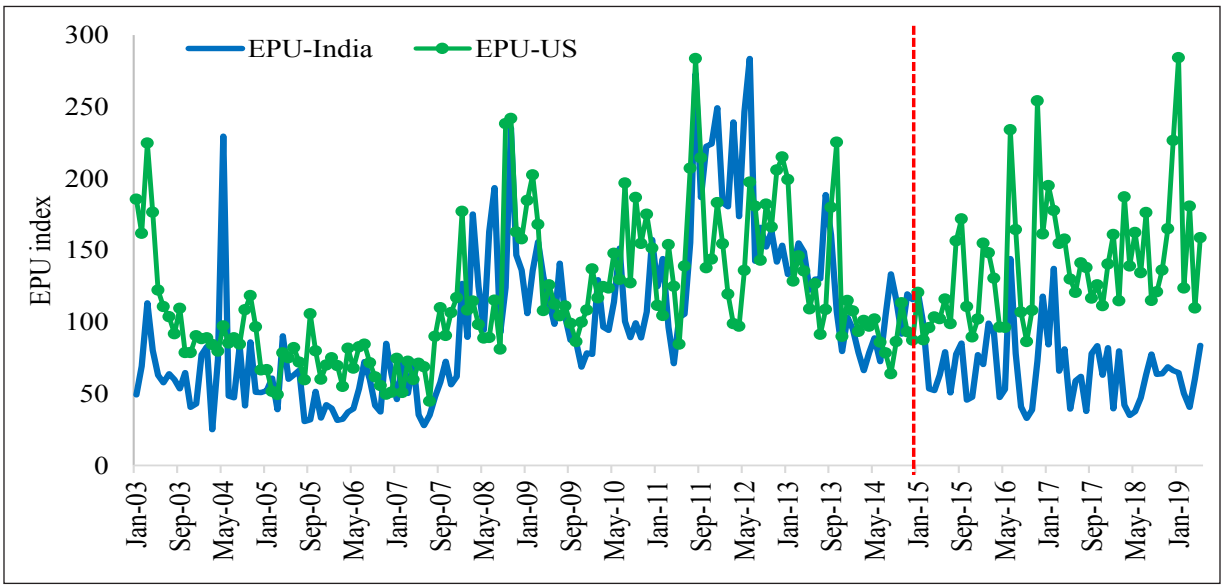
6.11 Specifically, EPU index shows that the movements in India were almost similar to that of the US until 2015; however, the two series have diverged since then. Economic policy uncertainty in India has consistently been lower than that of US since then (Figure 10). The divergence has increased sharply since mid-2018, probably due to the rising trade tensions of US with China. The low economic policy uncertainty index for India in last one year points towards resilience of the economy even in times of global trade uncertainty.

Figure 9: Comparison of India's and global EPU index



Source: http://www.policyuncertainty.com/

Figure 10: Comparison of EPU index of India with United States

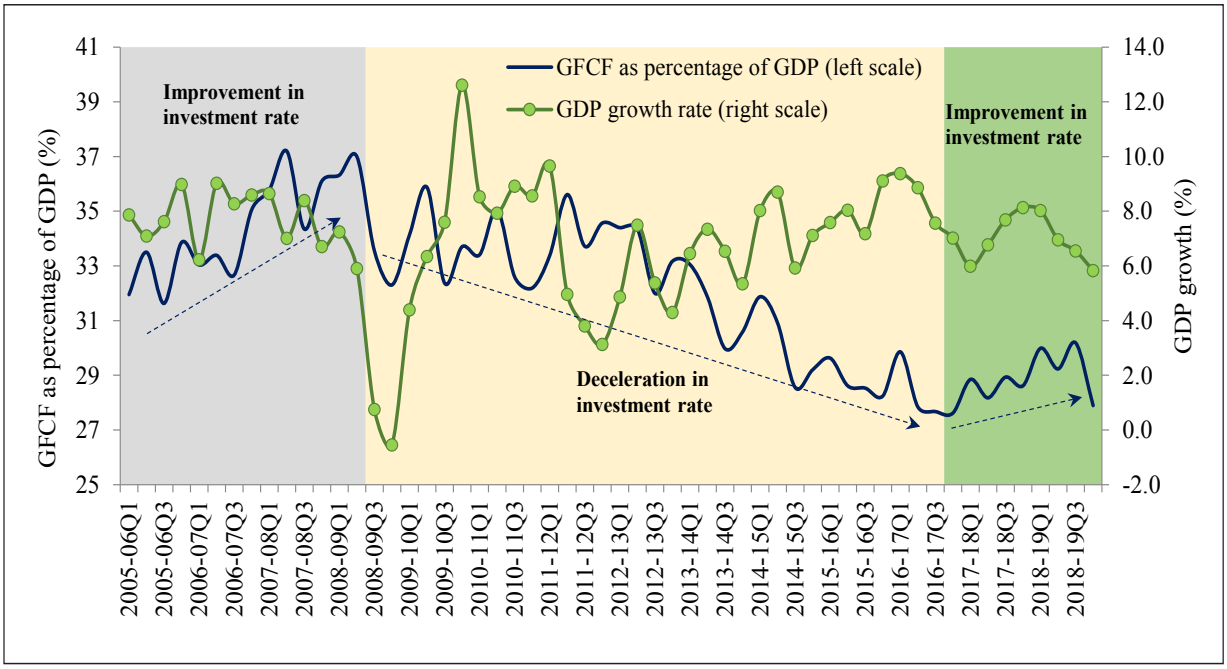


Source: http://www.policyuncertainty.com/

GREEN SHOOTS OF TURNAROUND IN INVESTMENT ACTIVITY

6.12 Figure 11 shows that after falling for close to a decade since 2008, investment activity has turned the corner since Q1 of 2017-18. In fact, gross fixed capital formation as a proportion of GDP, commonly referred to as the fixed investment rate, fell from 37 per cent in 2007-08 to 27 per cent in the following ten years but has since recovered

Figure 11: Investment rate and GDP growth



Source: Central Statistics Office.

Note: Quarterly GFCF rate from 2005-06 Q1 to 2010-11 Q4 has been calculated using the quarterly to annual ratio from 2004-05 series.

to approximately 28 per cent recently. While several factors led to the investment slowdown till 2017-18, *inter-alia*, including the twin balance sheet problem discussed in detail in Economic Survey 2016-17, we show that a secular trend of reducing economic policy uncertainty may have helped to foster the turnaround in investment activity.

6.13 The continued resolution of the twin balance sheet problem following implementation of Insolvency and Bankruptcy Code 2016 and recapitalization of banks helped to promote investment. Focus on improvement in the business climate via measures to improve ease of doing business, clarity in the policy for FDI liberalization may have also helped in this regard by reducing economic policy uncertainty.

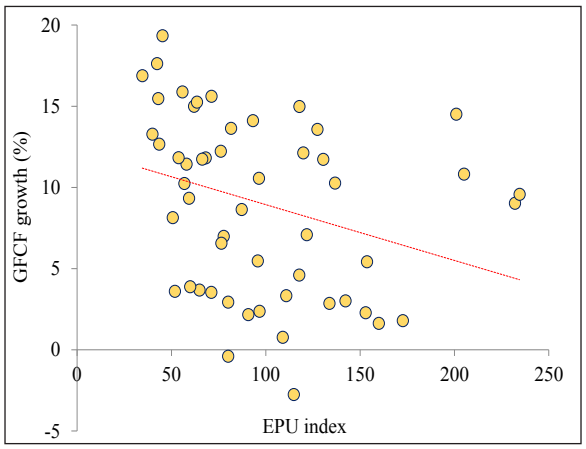
RELATIONSHIP OF ECONOMIC POLICY UNCERTAINTY WITH INVESTMENT IN INDIA

6.14 Internationally, there are many studies showing a significant dynamic relationship between economic policy uncertainty and real macroeconomic variables. Economic policy uncertainty as measured by EPU index foreshadows a decline in economic growth, banking crisis (Baker et al. 2016). Anand et al. (2014) found that high uncertainty and deteriorating business confidence played a role in the investment slowdown in India. Bloom et al. (2018) found that uncertainty shocks can generate drop in GDP of around 2.5 per cent with heterogeneous firms. Gluen and Ion (2013) using EPU index find that policy related uncertainty is negatively related to firm and industry level investment, and the economic magnitude of the effect is substantial. Their estimates indicate that approximately two thirds of the 32 per cent drop in corporate investments in US observed during the 2007-2009 crisis period can be attributed to policy related uncertainty. Hardouvelis et al (2018) find that shocks to economic policy uncertainty are associated with a subsequent decline in investment, industrial production, GDP, economic sentiment and the stock market. These shocks go a long way to explain not only the direction but also the magnitude of the changes in macro and financial variables during the Greek economic crisis.

6.15 The relationship of uncertainty in economic policy with investment may be through two channels. First is the direct relationship of economic policy uncertainty with investment growth and second is the relationship of EPU with other variables which in turn affect investment.

6.16 Figure 12 shows that there is a strong negative relationship between EPU index and investment growth. There is a correlation of (-)0.30 between these two variables (from Q1 of 2005-06 to Q4 of 2018-19). However, the relationship was weaker for some time period i.e., Q3 of 2009-10 to Q4 of 2013-14, when the uncertainty in the economy was declining and even the investment growth rate was declining.

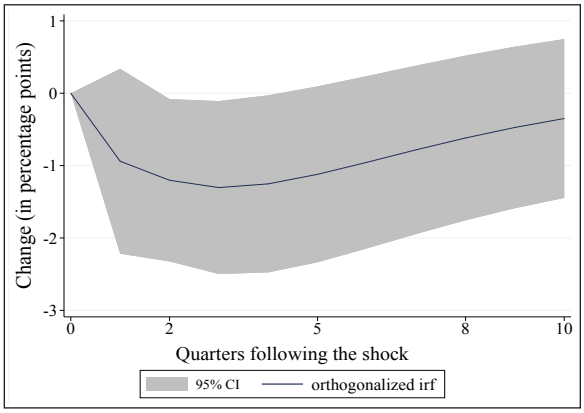
Figure 12: Investment growth and EPU index



Source: http://www.policyuncertainty.com/, CSO

6.17 Impulse response functions from the Vector Autoregressive Regression (VAR) model show after a shock i.e., higher uncertainty, the investment rate falls and then the impact withers away with time (Figure 14). The impact of a one standard deviation shock to EPU index is about 1 percentage point and it remains for many quarters (Figure 13). In fact, it can be said with sufficient confidence that the impact remains for at least five quarters (the 95 per cent confidence band remains below zero till five quarters).

Figure 13: Impulse Response of GFCF growth to EPU index



Source: Survey calculations.

6.18 Foreign investments are also expected to be negatively related to the economic policy certainty in the economy and the data shows so as well (Figure 14 and Figure 15). Both Foreign Direct Investment (FDI) flows and Foreign Institutional Investment (FII) flows are negatively correlated to EPU index, implying that not only the short term inflows, but also long term capital inflows are affected by higher uncertainty in economic policy. Impulse Response Function of VAR also shows a significant negative impact of the shock, which lingers on about three to four quarters. However, another point to note is that the initial impact is sharper for FDI flows (Figure 16 and 17).

6.19 There are various other factors affecting investment. First important factor that affects investment decision is cost of borrowing. Borrowing costs, with a lag, are expected to be negatively associated with investment as they reflect higher input costs. As expected, fixed investment is negatively correlated with repo rate[2], weighted average lending rate and marginal cost of lending rates of SBI. Second important factor for

Figure 14: FDI growth and EPU index

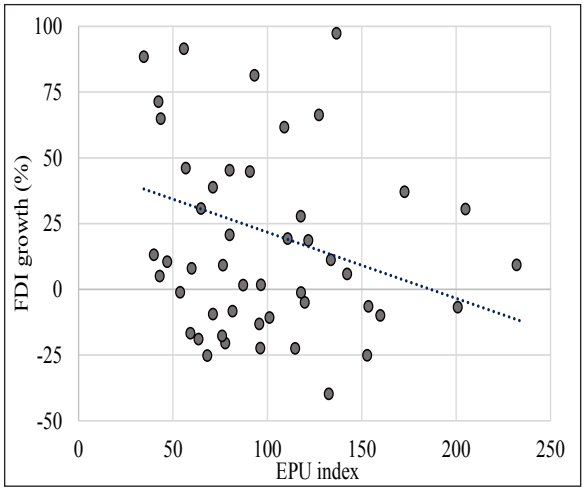
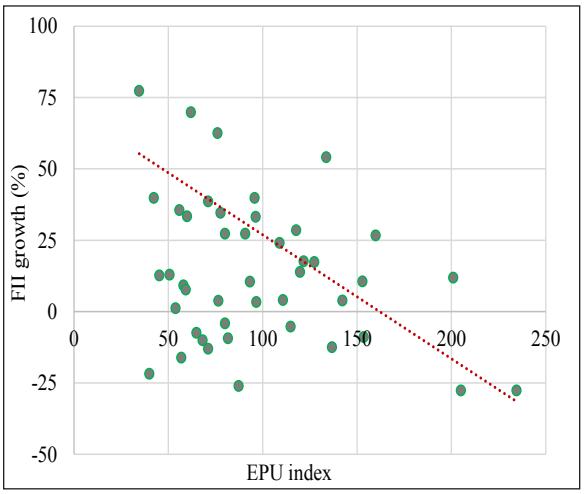


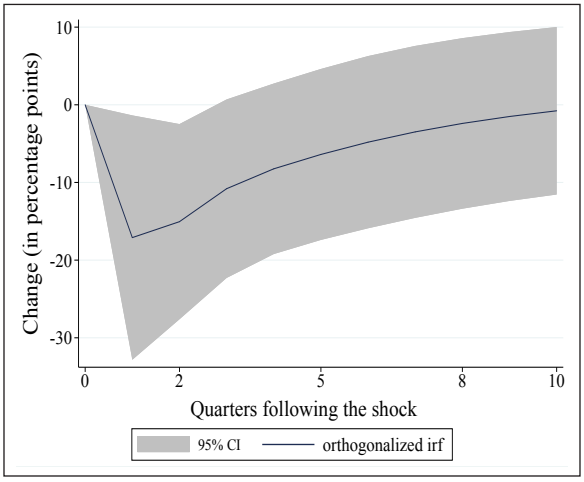
Figure 15: FII growth and EPU index



Source: http://www.policyuncertainty.com/, RBI

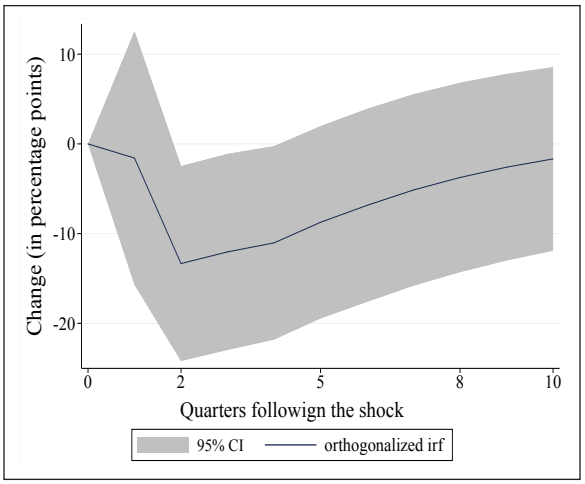
[2] Borrowing costs here are represented by repo rate, which is the rate of interest charged by RBI to banks for their borrowings from RBI. Although the actual borrowing cost of firms' will be different and significantly higher than repo rate, it is expected to move in the same direction.

Figure 16 : Impulse-response of FDI growth to EPU index



Source: Survey calculations.

Figure 17 : Impulse-response of FII growth to EPU index



Source: Survey calculations.

investment is the prices that producers get for their products. Rise in prices are expected to trigger greater investments as businesses find it profitable to do so as long as consumption demand is sufficiently strong to overcome the impact of inflation. This is seen, as the investment growth is positively correlated to wholesale price inflation, but negatively to consumer price inflation. This may be due to the fact the producers would realize producer prices which are closer to wholesale prices upon selling any product, whereas consumers have to pay consumer prices and higher prices may dampen the demand. Third important factor affecting investment is capacity utilization. The utilization of capacity in any quarter is expected to have a positive relationship with investment growth in the following quarter, as excess unutilized capacity in the previous quarter may lower the need for new investment in the current quarter. Data shows a positive correlation between investment growth and capacity utilization in previous quarter (details in annex of the Chapter).

6.20 The foreign component of fixed investment, FDI and FII flows are expected to be negatively related to the volatility of exchange rate, measured by its coefficient of variation. This is because the returns that the foreign investors actually realize are in foreign currency terms, which depend on the exchange rate. If the volatility of the exchange rate is higher, it may decrease the growth of foreign inflows. It is seen that the relationship between growth in FDI and volatility of exchange rate is weak suggesting that foreign investors in projects have other considerations as well. On the other hand, a negative relationship, is seen between FII inflows and volatility of exchange rate. The negative relationship suggests that the portfolio investments which are generally short term investments are more affected by the volatility in exchange rate, as compared to FDI flows, which are generally for longer duration (details in annex of the Chapter).

6.21 Can EPU index proxy for all variables examined for impacting fixed investment in the economy? It can, if it is strongly correlated with these variables and results in previous section indicate that it is indeed correct. EPU is positively correlated to all the factors discussed above- repo rate, WPI inflation, volatility of exchange rate, and Capacity Utilization (as shown in Figure 3 to 8).

CONCLUSION AND POLICY RECOMMENDATIONS

6.22 While economic uncertainty stemming from uncontrollable factors remains beyond the control of policymakers, they can control economic policy uncertainty. Reducing economic policy uncertainty is critical because both domestic investment and foreign investment are strongly deterred by increases in domestic economic policy uncertainty.

6.23 India has secularly decreased domestic economic policy uncertainty since 2012 and has been exceptional in reducing this uncertainty since 2015 amidst a global environment of increases in the same. However, policymakers need to double down on reducing domestic economic policy uncertainty.

6.24 We outline a few steps in this regard:

1. First, top-level policymakers must ensure that their policy actions are predictable, provide forward guidance on the stance of policy, maintain broad consistency in actual policy with the forward guidance, and reduce ambiguity/arbitrariness in policy implementation. To ensure predictability, the horizon over which policies will not be changed must be mandatorily specified so that investor can be provided the assurance about future policy certainty. While this will generate some constraints in policy making, such voluntary tying of policymakers' hands is undertaken in several cases including the Fiscal Responsibility and Budget Management Act, the Monetary Policy Framework of the Reserve Bank of India. A similar constraint placed on ensuring no changes in policy for a specified horizon would go a long way to ensuring policy certainty. The Government could also use labels such as "Standstill" versus "Ratchet up" to categorize various categories of policies according to the level of commitment about future certainty that it can provide.

2. Second, following the adage that "what gets measured gets acted upon", economic policy uncertainty index must become an important index that policymakers at the highest level monitor on a quarterly basis. Relatedly, following the evolved academic literature in this area, government must encourage construction of economic policy uncertainty sub-indices to capture economic policy uncertainty stemming from fiscal policy, tax policy, monetary policy, trade policy, and banking policy. Tracking these sub-indices would enable monitoring and control over economic policy uncertainty.

3. Quality assurance of processes in policy making, which reflect the adage of "Document what you do, but more critically do what you document!" must be implemented in the government. The actual implementation of policy occurs at the lower levels, where ambiguity gets created and exacerbates economic policy uncertainty. As organizations in the private sector compete and seek the highest level of quality certifications, Government departments must be mandated to similarly seek quality certifications. This process of certification will require training of personnel in following quality assurance processes and will significantly reduce economic policy uncertainty.

CHAPTER AT A GLANCE
➢ Economic Policy Uncertainty has reduced significantly in India over the last decade.
➢ Continued decline in economic policy uncertainty in India post 2015 is exceptional because it contrasts sharply with the increase during this period in economic policy uncertainty in major countries, especially the U.S.
➢ An increase in economic policy uncertainty dampens investment growth in India for about five quarters.
➢ Unlike generic economic uncertainty, which cannot be controlled, policymakers can reduce economic policy uncertainty to foster a salutary investment climate in the country.
➢ Forward guidance, consistency of actual policy with forward guidance, and quality assurance certification of processes in Government departments can help to reduce economic policy uncertainty.

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ANNEX

Figure A1: Investment growth and repo rate

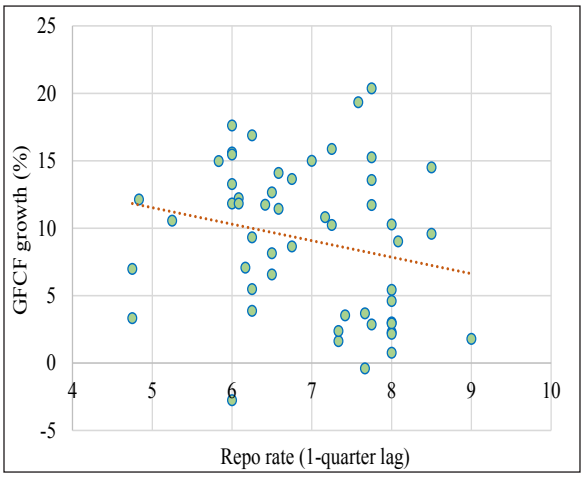


Figure A2: Investment growth and WPI inflation

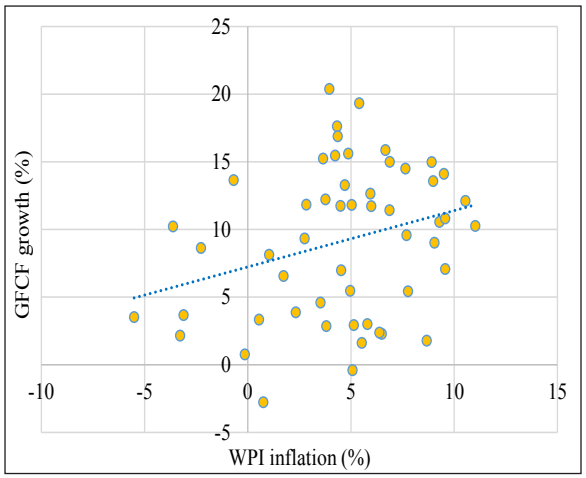


Figure A3: Investment growth and capacity utilization

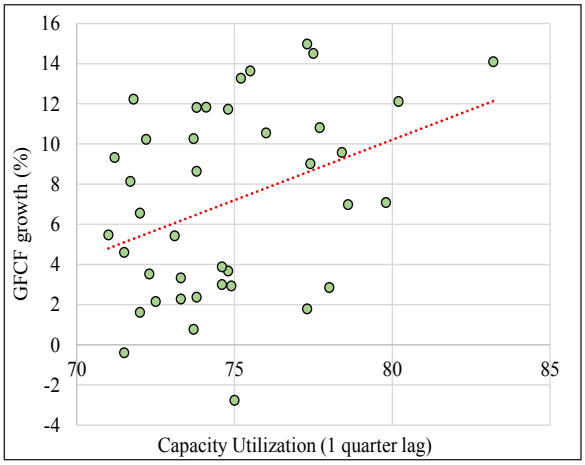


Figure A4 : FDI growth and exchange rate volatility

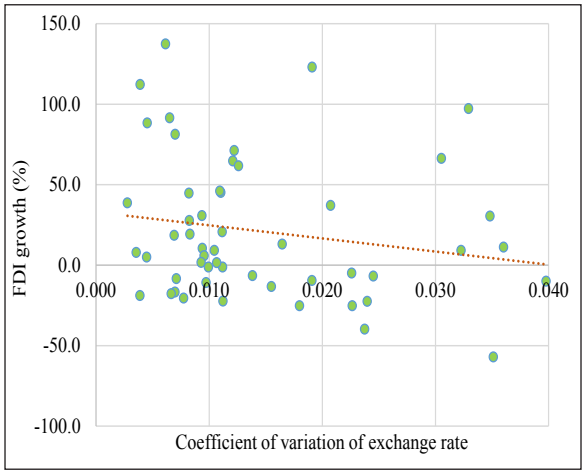
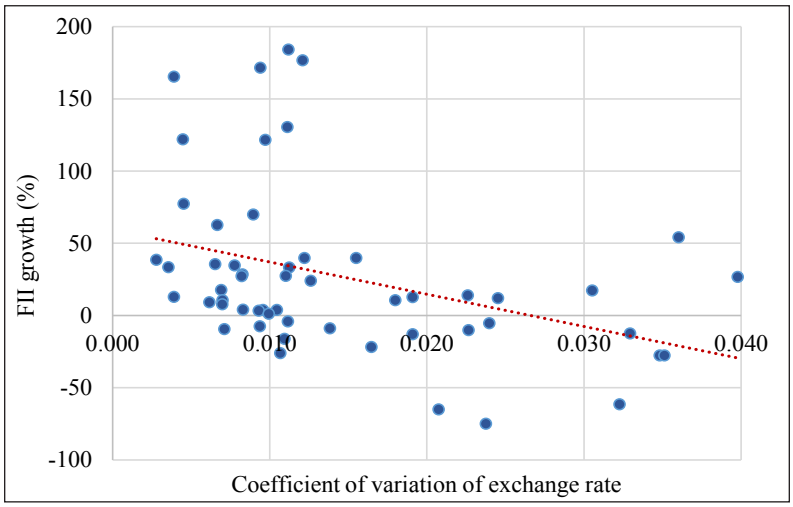


Figure A5: FII growth and exchange rate volatility



Source: RBI, CSO, Note: Capacity Utilization data is available only from 2008-09 onwards

India's Demography at 2040: Planning Public Good Provision for the 21st Century

07
CHAPTER

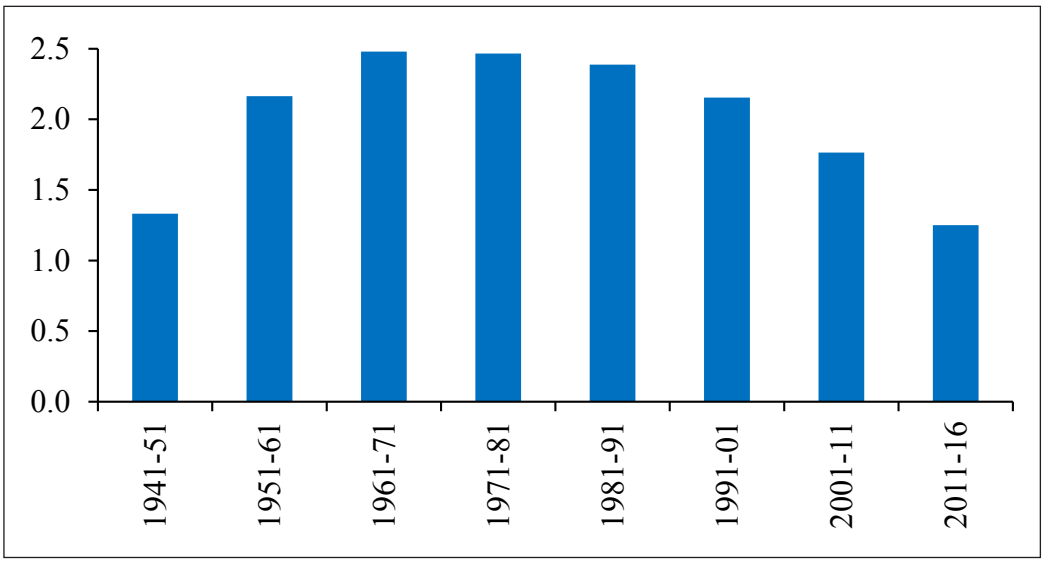
India is set to witness a sharp slowdown in population growth in the next two decades. Although the country as a whole will enjoy the "demographic dividend" phase, some states will start transitioning to an ageing society by the 2030s. It will surprise many readers to learn that population in the 0-19 age bracket has already peaked due to sharp declines in total fertility rates (TFR) across the country. The southern states, Himachal Pradesh, Punjab, West Bengal and Maharashtra now have fertility rates well below the replacement rate. TFR in Bihar, Uttar Pradesh, Jharkhand, Chhattisgarh, Rajasthan and Madhya Pradesh are above the replacement rate but are also experiencing significant declines. As a result, the national TFR is expected to be below replacement level by 2021 (adjusted for the skewed gender ratio, it may already be there). The age distribution, however, implies that India's working-age population will grow by roughly 9.7mn per year during 2021-31 and 4.2mn per year in 2031-41. Meanwhile, the proportion of elementary school-going children, i.e. 5-14 age group, will witness significant declines. Contrary to popular perception, many states need to pay greater attention to consolidating/merging schools to make them viable rather than building new ones. At the other end of the age scale, policy makers need to prepare for ageing. This will need investments in health care as well as a plan for increasing the retirement age in a phased manner.

I. RECENT DEMOGRAPHIC TRENDS

7.1 Population growth in India has been slowing in recent decades from an annual growth rate of 2.5 per cent during 1971-81 to an estimated 1.3 per cent as of 2011-16 (Figure 1). All major states have witnessed a marked deceleration in population growth during this period; the slowdown in states with historically high population growth such as Bihar, Uttar Pradesh, Rajasthan and Haryana is particularly noteworthy. Population is now growing below 1 per cent in the southern states as well as West Bengal, Punjab, Maharashtra, Odisha, Assam and Himachal Pradesh[1] (Figure 2).

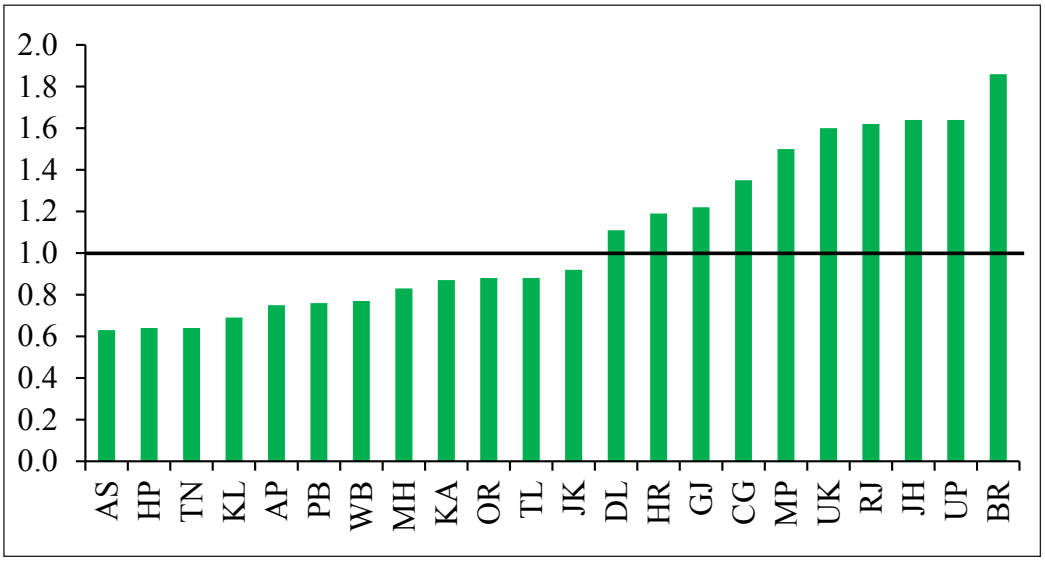
[1] In the figures, abbreviations used for states are as follows. AP: Andhra Pradesh, AS: Assam, BR: Bihar, CG: Chhattisgarh, DL: Delhi, GJ: Gujarat, HP: Himachal Pradesh, HR: Haryana, JH: Jharkhand, JK: Jammu & Kashmir, KA: Karnataka, KL: Kerala, MH: Maharashtra, MP: Madhya Pradesh, OR: Odisha, PB: Punjab, RJ: Rajasthan, TL: Telangana, TN: Tamil Nadu, UK: Uttarakhand, UP: Uttar Pradesh, WB: West Bengal.

Figure 1: Annual Population Growth Rate in India (per cent)



Source: Census 2011, International Institute for Population Sciences (IIPS) estimates.

Figure 2: Annual Population Growth Rate by State during 2011-16 (per cent)



Source: Census 2011, IIPS estimates.

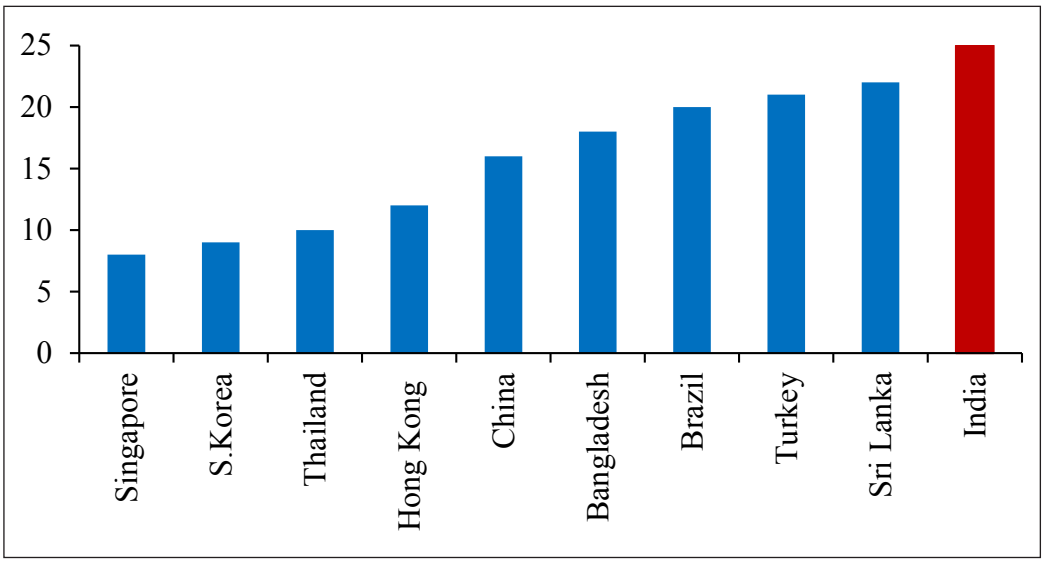
7.2 A key driver of this trend has been the steady decline in India's total fertility rate[2] (TFR) since the mid-1980s. Though the decline in India's TFR has been more gradual when compared to the experience of other emerging economies, it has nonetheless halved from 4.5 in 1984 to 2.3 as of 2016 (Figure 3 and Figure 4).

7.3 The replacement level fertility[3] is usually marked at 2.1 but, as discussed in the next section, India's TFR may already

[2] Total fertility rate refers to the total number of children born or likely to be born to a woman of child-bearing age in her lifetime.

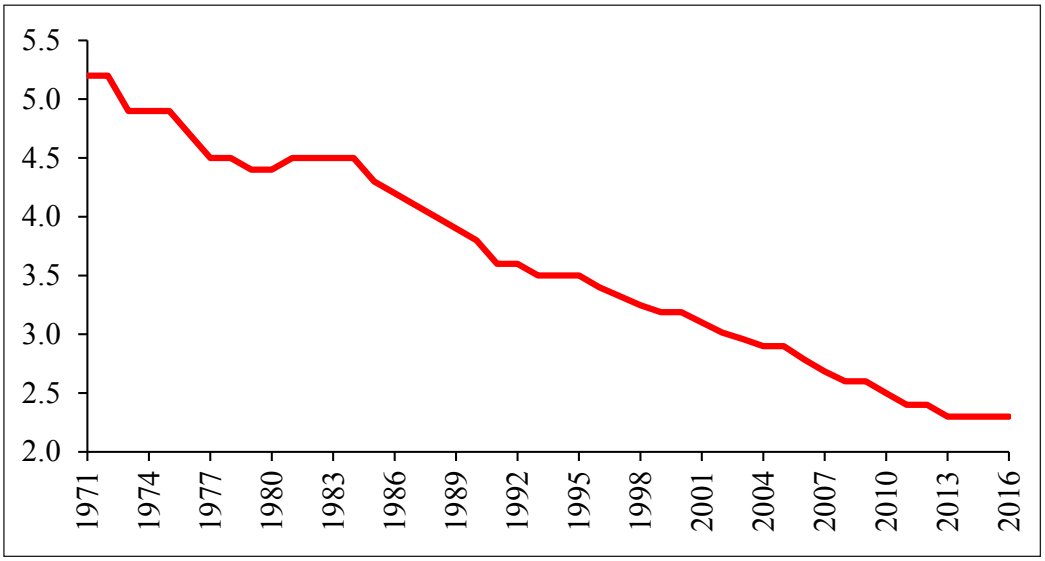
[3] TFR of 2.1 children per woman is called the replacement level fertility, which is the average number of children a woman would need to have in order for the population to replace itself

Figure 3: Number of Years Taken for TFR to Decline from over 4.0 to India's TFR of 2.3



Source: World Bank, Sample Registration System.

Figure 4: TFR in India

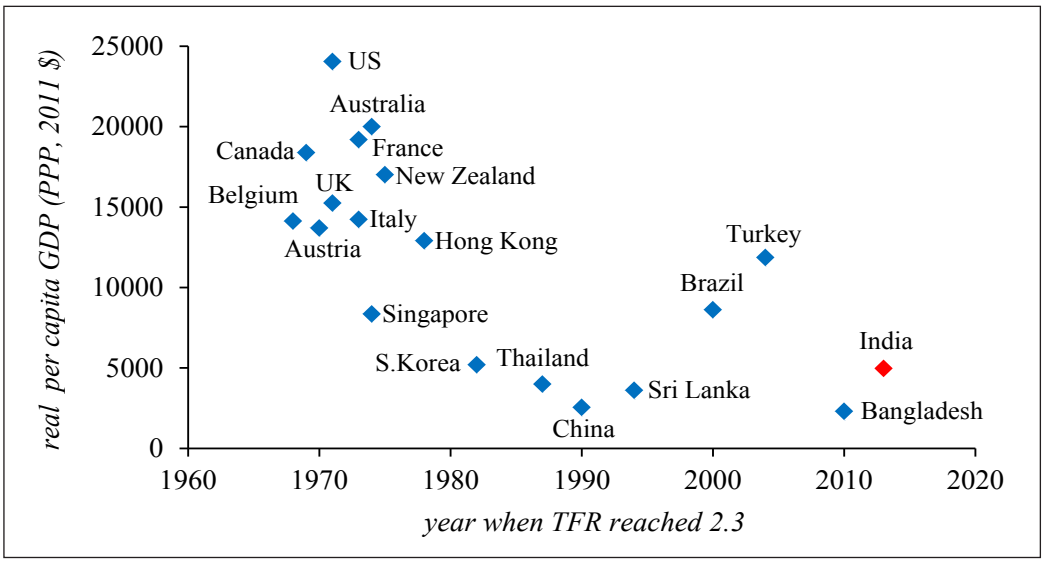


Source: Sample Registration System.

be close to the *effective* replacement level fertility after accounting for its skewed sex ratio. Interestingly, India has reached the current TFR of 2.3 at a relatively low per capita income when compared to the experience of major developed economies but similar to that of other Asian countries (Figure 5).

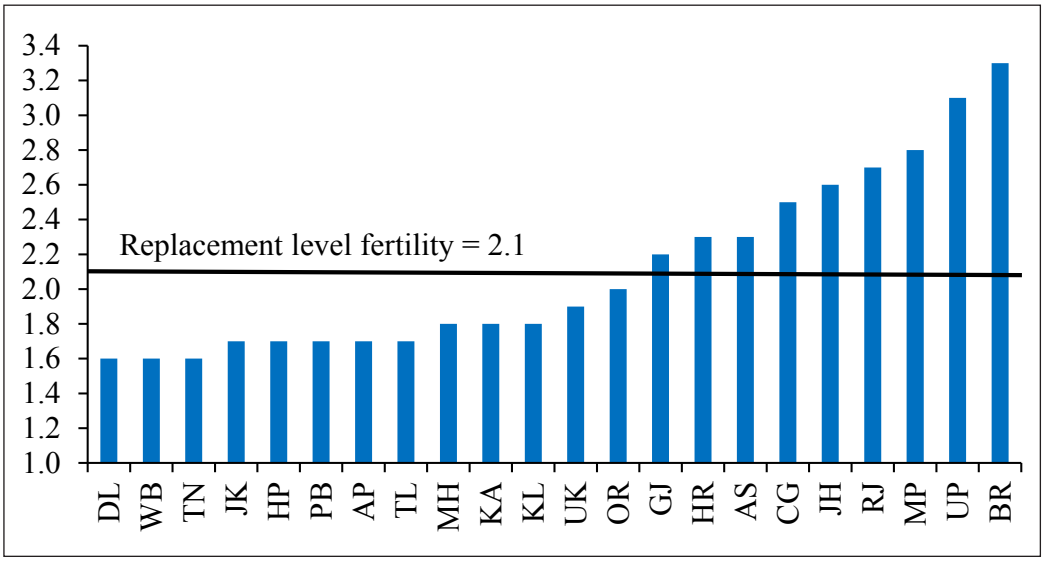
7.4 Note that there is a wide variation in the experience of different Indian states. TFR is now below replacement level fertility in 13 out of the 22 major states (Figure 6). In fact, TFR has reached as low as 1.6-1.7 in states such as Delhi, West Bengal, Tamil Nadu, Andhra Pradesh, Telangana, Punjab and Himachal Pradesh. Even high fertility states such as Bihar, Jharkhand, Rajasthan, Madhya Pradesh, Chhattisgarh, Uttar Pradesh and Uttarakhand have seen a sharp decline in TFR over the years.

Figure 5: Real Per Capita GDP when TFR Reached 2.3



Source: World Bank, Penn World Table.

Figure 6: TFR by State in 2016



Source: Sample Registration System.

7.5 These developments suggest that India has entered the next stage of demographic transition with population growth set to slow markedly in the next two decades along with a significant increase in the share of working-age population (the so-called "demographic dividend" phase).

7.6 However, national-level population trends mask the significant heterogeneity across states in terms of fertility, mortality, age-structure, and the ageing phenomenon already underway in some states. The southern states, Himachal Pradesh, Punjab, West Bengal and Maharashtra are already quite advanced in the demographic transition, with (i) TFR already well below replacement level fertility; (ii) population growth mainly due to momentum; (iii) more than 10 per cent of the population over the age of 59; and (iv) at most one-third of the population below the

age of 20. In contrast, states such as Bihar, Uttar Pradesh, Jharkhand, Chhattisgarh, Rajasthan and Madhya Pradesh are still in the early stages of demographic transition.

7.7 In light of continued urbanization, improvements in health care, increase in female education, and other socio-economic drivers of demographic change, Section II forecasts demographic metrics at the national and state level up to 2041. Such an exercise would enable us to understand the pace of demographic transition at the national and state level and assess which states are likely to experience significant ageing. The projected population and age-structure over the next two decades has several implications for policy, *inter-alia* for the (i) provision of health care, (ii) provision of old-age care, (iii) provision of school facilities, (iv) access to retirement-related financial services, (v) public pension funding, (vi) income tax revenues, (vii) labour force and labour participation rates, and (viii) retirement age. Detailed analysis of these issues is beyond the scope of this chapter. However, as an illustrative exercise, Section III looks at some policy implications for health care provision, elementary school facilities and retirement age.

II. PROJECTING NATIONAL AND STATE LEVEL POPULATION

7.8 Population and its age structure are projected at the national and state level up to 2041 following the methodology outlined in Box 1. For the purpose of analysis, Section II and III focus on 22 major states, which account for 98.4 per cent of India's population as per Census 2011.

(i) Declining Fertility Rates

7.9 Projected values for 2021-41 suggest that TFR at the national level will continue to decline rapidly and will lie below replacement level fertility at 1.8 as early as 2021 (Table 1). In line with the fertility patterns witnessed in other countries, TFR is expected to stabilize thereafter for some time around 1.7. Such fertility levels would be close to the TFR

Table 1: TFR for India and Major States, 2001-2041

States	2001	2011	2016	2021	2031	2041
INDIA	3.1	2.4	2.3	1.8	1.7	1.7
Andhra Pradesh	2.3	1.8	1.7	1.5	1.5	1.5
Assam	3.0	2.4	2.3	1.8	1.8	1.8
Bihar	4.4	3.6	3.3	2.5	2.0	1.8
Chhattisgarh	3.9	2.7	2.5	1.8	1.8	1.8
Delhi	2.1	1.9	1.6	1.5	1.5	1.5
Gujarat	2.9	2.4	2.2	1.9	1.8	1.8
Haryana	3.1	2.3	2.3	1.8	1.8	1.8
Himachal Pradesh	2.2	1.8	1.7	1.6	1.6	1.6
Jammu & Kashmir	2.5	1.9	1.7	1.5	1.5	1.5
Jharkhand	4.4	2.9	2.6	1.8	1.8	1.8
Karnataka	2.4	1.9	1.8	1.5	1.5	1.5

Kerala	1.8	1.8	1.8	1.8	1.8	1.8
Madhya Pradesh	3.9	3.1	2.8	2.0	1.8	1.8
Maharashtra	2.4	1.8	1.8	1.5	1.5	1.5
Odisha	2.6	2.2	2.0	1.8	1.8	1.8
Punjab	2.4	1.8	1.7	1.6	1.6	1.6
Rajasthan	4.0	3.0	2.7	1.9	1.8	1.8
Tamil Nadu	2.0	1.7	1.6	1.5	1.5	1.5
Telangana	2.3	1.8	1.7	1.6	1.6	1.6
Uttar Pradesh	4.5	3.4	3.1	2.0	1.8	1.8
Uttarakhand	4.5	3.4	1.9	1.6	1.6	1.6
West Bengal	2.4	1.7	1.6	1.5	1.5	1.5

Source: Census, Sample Registration System, IIPS projections.

Note: Projected values for 2021-41 are based on fitted model values from 20-year trends of TFR based on estimates from Sample Registration System. Before 2016, the values of Andhra Pradesh are assigned to Telangana.

Box 1: Methodology for Population Projections

Using the 2011 Census data as baseline, population is projected by age-structure up to 2041. These projections are undertaken both at the national level and for 36 states and Union Territories (UTs). The *cohort-component* methodology (Cannan, 1895 and George et al, 2004) is followed for population projections at the national level and for 22 major states that account for 98.4 per cent of India's population using assumptions for fertility, mortality, life expectancy and sex ratio at birth. These assumptions at the national level are derived using the assumptions for states weighted by their share in national population. No inter-state migration is assumed since the Census 2011 data on net inter-state migration by age-structure has not been published. International migration is not taken into consideration. The age-sex population is smoothened and adjusted for the population category of "age not stated" using a point formula similar to the methodology used in government's official projections (Office of Registrar General of India, 2006).

Population Projections for Smaller States and UTs:

The eight smaller states (Arunachal Pradesh, Goa, Manipur, Meghalaya, Mizoram, Sikkim, Nagaland and Tripura) and six UTs (Chandigarh, Puducherry, Daman & Diu, Dadra & Nagar Haveli, Lakshadweep and Andaman & Nicobar) account only 1.6 per cent of India's population. Due to constraints in obtaining reliable estimates for long-term trends in mortality and fertility, the *ratio method* (Pittenger, 1976 and U.S. Census Bureau, 1952) is used for population projection. The ratio of the small area (say a small state) to the larger area (say India) is calculated and assumed to remain constant up to 2041. For each year, this ratio is multiplied by the projected population of the larger area, as derived using the *cohort-component* methodology, to obtain the population projections for these states and UTs.

Mortality Rate:

A *log-linear model* is used to project mortality using life expectancy at birth (e_0^0) for 1970-2016 from the Sample Registration System's Life Tables, fitted separately for male and female[4]:

$$\ln\left(80 - e_0^0\right) = a + bt \text{, for females}$$

$$\ln\left(76 - e_0^0\right) = a + bt \text{, for males}$$

Life expectancy is projected to continue to rise during the projection period from 67.2 years in 2016 to 71.4 years in 2041 for males, and more significantly, from 70.3 years in 2016 to 75.3 years in 2041 for females[5].

Fertility Rate:

TFR is projected up to 2041 using the *Gompertz method* (Gompertz, 1825) based on the lower (L) and upper (U) limits of TFR and the base period TFR, where the latest available TFR is inserted:

$$\frac{(TFR - L)}{(U - L)} = (a)^{b^t} \quad i.e.,$$

$$ln\left(-\left(\frac{ln(TFR - L)}{(U - L)}\right)\right) = ln(-ln.a) + t.ln.b$$

The lower limit (L) of TFR is taken between 1.2-1.8 for different states, and the upper limit (U) of TFR is taken to be the value of TFR in the base period, given that TFR across states is on a downward trend currently. TFR for time period *t* is projected using the estimated parameters *a* and *b* using the Ordinary Least Squares (OLS) regression.

Sex Ratio:

Both sex ratio at birth and sex differentials in survival probability are taken into consideration to determine the sex ratio of the population. Sex ratio at birth is assumed to remain constant at the 2014-16 levels since it already stands below 1.10 in 12 out of the 22 major states and is not expected to decline significantly in the next two decades in the remaining 10 states.

currently seen in countries such as China, Belgium, Netherlands and Brazil.

7.10 At the state level, those already below replacement level fertility, including the southern states, West Bengal, Punjab, Maharashtra and Himachal Pradesh, are expected to see TFR decline further by 2021, reaching as low as 1.5-1.6 and stabilizing thereafter. Even states lagging behind in the fertility transition are expected to see TFR fall significantly below replacement level

[4] Since Life Tables for Delhi and Himachal Pradesh are not available for longer periods, appropriate increment in life expectancy at birth for male and female are applied to the UN (2017) forecasts to project life expectancy at birth up to 2041.

[5] Since Kerala already has high life expectancy at birth, the maximum life expectancy at birth is assumed to be equal to the current life expectancy at birth of Japan.

to 1.8. This would be as early as 2021 in Jharkhand, Haryana and Chhattisgarh, and by 2031 in Uttar Pradesh, Rajasthan and Madhya Pradesh. In fact, by 2031, all states would see below replacement level fertility.

7.11 This is in line with expectations of further decline in fertility for females in the 20-30 age-group, driven by rising female education, postponement of marriage, access to family planning methods, and continued decline in infant mortality. While family planning programs have played a major role in reducing fertility in India in the past decades, these socio-economic changes have manifested over the last 10-15 years.

7.12 The projections for TFR in Table 1 are based on the assumption that sex ratio at birth will remain at current levels over the next two decades. As of 2014-16, sex ratio at birth remains higher than the normal range of 1.02-1.07[6] at the national level and in 17 out of 22 major states. Thus, there are more men than women in the population when compared to the natural level. This implies that the required replacement level fertility at the national and state level is higher than the usual benchmark of 2.1, i.e., due to the skewed sex ratio, a woman would have to give birth to more than 2.1 children in order for the population to replace itself. Our estimates suggest that the *effective* replacement level fertility after taking into account the skewed sex ratio could be around 2.15-2.2 for India with a sex ratio of 1.11; around 2.2-2.25 for states such as Haryana, Uttarakhand and Gujarat with the sex ratio as high as 1.15-1.20; and between 2.1-2.2 for the remaining states with the sex ratio around 1.07-1.14. Interestingly, the current TFR in 14 out of the 22 major states is already below the *effective* replacement level fertility.

(ii) Population Growth Trajectory

7.13 Demographic projections show that India's population growth will continue to slow rapidly over the next two decades, growing less than 1 percent during 2021-31 and under 0.5 per cent during 2031-41 (Table 2). Such population growth rates would be close to the trend currently seen in countries such as Germany and France. In fact, with TFR projected to fall well below replacement level fertility by 2021, positive population growth in the next two decades will be due to population momentum and the continued rise in life expectancy.

7.14 Given state-level differences in initial fertility levels, mortality and age composition, both the trajectory of population and population growth will continue to vary across states. States ahead in the demographic transition will see a continued deceleration in population growth and reach near-zero growth rates by 2031-41. With population peaking by 2031, Tamil Nadu's population growth will start declining during 2031-41 unless offset by inward migration. Population growth will be close to zero in Andhra Pradesh and as low as 0.1-0.2 per cent in Karnataka, Kerala, Telangana, Himachal Pradesh, West Bengal, Punjab and Maharashtra.

7.15 States lagging behind in the demographic transition will also witness a marked slowdown in population growth during 2021-41. Population growth will halve over the next two decades in Chhattisgarh, Uttar Pradesh, Rajasthan and Madhya Pradesh. Bihar alone will have a population growth rate of 1 per cent. Nonetheless, together with Jharkhand, these states will account for nearly two-thirds of the increase in India's population during 2021-41, with

[6] The average value of sex ratio at birth is around 1.05, i.e. 105 boys born per every 100 girls.

Table 2: Annual Population Growth Rate (in per cent) for India and Major States

States	2001-11	2011-21	2021-31	2031-41
INDIA	1.77	1.12	0.72	0.46
Andhra Pradesh	1.10	0.65	0.31	0.02
Assam	1.71	0.74	0.77	0.48
Bihar	2.54	1.82	1.34	1.00
Chhattisgarh	2.26	1.17	0.76	0.57
Delhi	2.12	1.00	0.62	0.30
Gujarat	1.93	1.12	0.71	0.44
Haryana	1.99	1.08	0.70	0.44
Himachal Pradesh	1.29	0.64	0.57	0.24
Jammu & Kashmir	2.36	0.88	0.82	0.49
Jharkhand	2.24	1.39	0.97	0.82
Karnataka	1.56	0.75	0.36	0.10
Kerala	0.49	0.66	0.45	0.18
Madhya Pradesh	2.03	1.36	0.81	0.64
Maharashtra	1.60	0.73	0.42	0.15
Odisha	1.40	0.82	0.63	0.38
Punjab	1.39	0.71	0.42	0.11
Rajasthan	2.13	1.47	0.96	0.75
Tamil Nadu	1.56	0.56	0.25	-0.05
Telangana	N/A	0.80	0.53	0.21
Uttar Pradesh	2.02	1.48	0.93	0.73
Uttarakhand	1.88	1.30	0.70	0.50
West Bengal	1.38	0.71	0.50	0.14

Source: Census, IIPS projections.

just Uttar Pradesh and Bihar accounting for over 40 per cent of the increase (Table 3).

(iii) Changing Age Composition

7.16 With TFR reaching low levels and longevity continuing to increase, India's population at the national level and in several states will begin ageing significantly in just a decade from now. The share of India's young, i.e. 0-19 years, population has already started to decline and is projected to drop from as high as 41 per cent in 2011 to 25 per cent by 2041 (Table 4). On the other hand, the share of elderly, 60 years and above, population will continue to rise steadily, nearly doubling from 8.6 per cent in 2011 to 16 per cent by 2041. India's demographic dividend will peak around 2041, when the share of working-age, i.e. 20-59 years, population is expected to hit 59 per cent. With changing demographic

Table 3: Population (in millions) for India and Major States, 2011- 2041

States	2011	2016	2021	2031	2041	Projected growth during 2021-41 (%)
INDIA	1210.6	1286.1	1346.9	1443.2	1510.2	12.1
Andhra Pradesh	49.4	51.2	52.6	54.2	54.3	3.4
Assam	31.2	32.2	33.5	36.1	37.9	12.9
Bihar	104.1	113.8	123.0	139.5	153.4	24.7
Chhattisgarh	25.5	27.3	28.5	30.7	32.4	13.8
Delhi	16.8	17.7	18.5	19.6	20.2	9.4
Gujarat	60.4	64.1	67.2	72.0	75.2	11.8
Haryana	25.4	26.9	28.1	30.0	31.4	11.7
Himachal Pradesh	6.9	7.1	7.3	7.7	7.9	8.2
Jammu & Kashmir	12.5	13.1	13.6	14.8	15.5	13.4
Jharkhand	33.0	35.7	37.6	41.2	44.6	18.8
Karnataka	61.1	63.7	65.7	68.1	68.7	4.7
Kerala	33.4	34.6	35.6	37.2	37.9	6.4
Madhya Pradesh	72.6	78.1	82.5	89.2	94.9	15.0
Maharashtra	112.4	117.0	120.6	125.7	127.6	5.8
Odisha	42.0	43.8	45.4	48.2	50.1	10.3
Punjab	27.7	28.8	29.7	31.0	31.3	5.3
Rajasthan	68.5	74.1	78.6	86.1	92.6	17.8
Tamil Nadu	72.1	74.5	76.2	78.1	77.7	2.0
Telangana	35.2	36.7	38.0	40.0	40.9	7.4
Uttar Pradesh	199.8	216.2	229.3	250.7	269.0	17.3
Uttarakhand	10.1	10.9	11.4	12.2	12.8	12.3
West Bengal	91.3	94.8	97.8	102.7	104.2	6.5

Source: Census, Sample Registration System, IIPS projections.

composition, India's age-structure by 2041 will resemble that of China and Thailand as seen during the current decade.

7.17 All major states are projected to witness a decline in the share of young population and an increase in the share of elderly population over the next two decades. States ahead in the demographic transition, such as Himachal Pradesh, West Bengal, Maharashtra, Punjab and most of the southern states, would have less than one-fourth of the population under the age of 20 but about one-fifth or more population over the age of 59 by 2041.

7.18 Even states in earlier stages of demographic transition, such as Bihar, Uttar Pradesh, Jharkhand, Chhattisgarh, Madhya Pradesh and Rajasthan, will see a significant decline in the share of young population, though these shares will remain relatively

Table 4: Population by Age Structure (per cent share of population) for India and Major States, 2011-2041

	0-19 years				20-59 years				60 years and above			
States	**2011**	**2021**	**2031**	**2041**	**2011**	**2021**	**2031**	**2041**	**2011**	**2021**	**2031**	**2041**
INDIA	40.9	34.5	28.8	25.2	50.5	55.8	58.8	58.9	8.6	9.7	12.4	15.9
Andhra Pradesh	34.8	28.4	24.4	21.4	55.1	59.6	60.2	58.6	10.1	12.0	15.4	20.0
Assam	42.7	35.4	29.1	26.8	50.6	56.7	60.1	58.8	6.7	7.9	10.9	14.4
Bihar	49.4	43.5	35.1	30.1	43.2	48.9	55.9	58.3	7.4	7.7	9.1	11.6
Chhattisgarh	42.3	36.0	30.5	27.2	49.9	55.0	58.0	58.5	7.9	8.9	11.6	14.4
Delhi	37.2	29.2	23.5	20.2	56.0	61.1	61.9	58.5	6.8	9.7	14.6	21.2
Gujarat	38.7	33.2	28.6	25.1	53.3	56.8	58.2	57.9	8.0	9.9	13.2	17.0
Haryana	40.3	33.5	28.4	24.9	51.0	57.1	59.5	59.3	8.7	9.5	12.1	15.8
Himachal Pradesh	35.3	29.0	24.5	22.0	54.5	58.8	59.3	56.9	10.3	12.2	16.1	21.1
Jammu & Kashmir	43.7	33.8	24.5	23.0	48.9	57.1	62.9	59.8	7.4	9.1	12.6	17.2
Jharkhand	45.9	38.8	31.0	28.0	46.9	52.8	58.5	58.7	7.2	8.4	10.6	13.4
Karnataka	35.8	29.8	25.0	21.7	54.7	59.0	60.5	59.3	9.5	11.1	14.5	19.0
Kerala	31.3	27.6	24.9	23.3	56.2	56.2	54.7	52.8	12.6	16.2	20.5	23.9
Madhya Pradesh	43.8	38.0	31.8	27.3	48.4	53.7	57.6	59.3	7.9	8.3	10.6	13.4
Maharashtra	36.2	29.5	24.1	21.2	53.9	59.0	60.9	59.0	9.9	11.5	14.9	19.7
Odisha	38.2	32.6	28.3	26.1	52.3	56.7	58.2	57.3	9.5	10.8	13.4	16.6
Punjab	35.8	28.2	23.8	21.0	53.9	59.5	60.2	58.4	10.4	12.3	16.0	20.6
Rajasthan	45.5	38.3	31.5	27.3	47.1	53.4	58.0	59.5	7.5	8.2	10.4	13.3
Tamil Nadu	32.3	27.0	23.2	20.6	57.3	59.7	59.2	56.9	10.4	13.3	17.6	22.6
Telangana	37.0	30.0	26.0	23.0	53.8	59.4	60.5	58.8	9.2	10.6	13.5	18.2
Uttar Pradesh	47.6	39.4	32.6	27.7	44.6	52.7	57.9	60.3	7.8	7.9	9.5	12.0
Uttarakhand	42.2	35.2	29.4	24.1	48.8	55.1	58.6	60.6	9.0	9.7	12.1	15.3
West Bengal	37.1	29.1	24.2	21.9	54.4	59.8	60.6	58.4	8.5	11.1	15.2	19.7

Source: Census, IIPS projections.

high and as large as 30 per cent in Bihar by 2041. Meanwhile, the share of elderly population in these states will still be below 15 per cent through 2041.

(iv) Implications for Working-Age Population

7.19 While most of the discussion on demographic dividend revolves around the *share* of working-age population, changes in the *size* of working-age population plays a key role in determining the size of labour force and direction of inter-state labour migration.

7.20 Given changing age composition, India's working-age population will continue to increase through 2041, rising by 96.5 million during 2021-31 and by 41.5 million during 2031-41 (Table 5). This will have implications for the required rate of job creation in the economy. As per the NSSO Periodic Labour Force Survey 2017-18, India's labour force participation rate for the age-group 15-59 years is around 53 per cent (80 per cent for males, 25 per cent for females). Depending on the trajectory of labour force participation during 2021-41, additional jobs will need to be created to keep pace with the projected annual increase in working-age population of 9.7 million during 2021-31 and 4.2 million during 2031-41. Projecting labour force participation is beyond the scope of this study, but this will be impacted by changes in schooling years, age distribution and female labour force participation.

7.21 The evolution of working-age population, moreover, will vary across states. The size of working-age population will start to decline in 11 out of the 22 major states during 2031-41, including in the southern states, Punjab, Maharashtra, West Bengal and Himachal Pradesh. On the other hand, working-age population will continue to rise through 2041 in states lagging behind in the demographic transition, particularly Bihar, Uttar Pradesh, Madhya Pradesh and Rajasthan. In principle, the latter states with rising working-age population could meet the labour deficit in many of the former ageing states. Current migration trends broadly follow this pattern, and a study of this phenomenon will be the subject of a future Economic Survey.

III. POLICY IMPLICATIONS OF AGEING

(i) Elementary Schools

7.22 As of 2016, population in the 5-14 age-group, which roughly corresponds to the number of elementary school-going children, has already begun declining in India and across all major states except Jammu & Kashmir. Population projections suggest that this trend will continue through 2041 (Table 6). The size of the 5-14 years population will drop sharply in Himachal Pradesh, Uttarakhand, Tamil Nadu, Maharashtra, Punjab, Andhra Pradesh and Karnataka by 2041. Note that it will decline even in the laggard states such as Bihar, Uttar Pradesh, Rajasthan and Madhya Pradesh. Overall, the number of school-going children in India will decline by 18.4 per cent between 2021 and 2041. This will have very important social and economic consequences.

7.23 To understand the implications for the provision of elementary schools, we examine the number of government and private schools per capita of 5-14 years population and school enrolment at the national and state level. In light of the projected decline in elementary school-going children, the number of schools per capita will rise significantly in India across all major states even if no more schools are added (Figure 7 and Figure 8).

Table 5: Population by Age Structure (in millions) for India and Major States, 2011-2041

	0-19 years				20-59 years				60 years and above			
States	**2011**	**2021**	**2031**	**2041**	**2011**	**2021**	**2031**	**2041**	**2011**	**2021**	**2031**	**2041**
INDIA	494.7	464.2	415.8	381.0	611.7	751.6	848.2	889.7	104.2	131.1	179.3	239.4
Andhra Pradesh	17.2	14.9	13.3	11.6	27.2	31.3	32.6	31.9	5.0	6.3	8.3	10.9
Assam	13.3	11.9	10.5	10.2	15.8	19.0	21.7	22.2	2.1	2.6	3.9	5.5
Bihar	51.4	53.5	48.9	46.2	45.0	60.1	77.9	89.4	7.7	9.4	12.7	17.8
Chhattisgarh	10.8	10.3	9.4	8.8	12.7	15.7	17.8	19.0	2.0	2.6	3.5	4.7
Delhi	6.2	5.4	4.6	4.1	9.4	11.3	12.1	11.8	1.1	1.8	2.9	4.3
Gujarat	23.4	22.3	20.6	18.9	32.2	38.2	41.9	43.5	4.8	6.7	9.5	12.8
Haryana	10.2	9.4	8.5	7.8	12.9	16.0	17.9	18.6	2.2	2.7	3.6	5.0
Himachal Pradesh	2.4	2.1	1.9	1.7	3.7	4.3	4.6	4.5	0.7	0.9	1.2	1.7
Jammu & Kashmir	5.5	4.6	3.6	3.6	6.1	7.8	9.3	9.3	0.9	1.2	1.9	2.7
Jharkhand	15.2	14.6	12.8	12.5	15.5	19.8	24.1	26.2	2.4	3.2	4.4	6.0
Karnataka	21.9	19.6	17.0	14.9	33.4	38.8	41.2	40.8	5.8	7.3	9.9	13.0
Kerala	10.5	9.8	9.3	8.8	18.8	20.0	20.3	20.0	4.2	5.8	7.6	9.0
Madhya Pradesh	31.8	31.3	28.4	25.9	35.1	44.3	51.4	56.2	5.7	6.9	9.4	12.7
Maharashtra	40.7	35.6	30.4	27.1	60.5	71.2	76.6	75.4	11.1	13.9	18.8	25.2
Odisha	16.0	14.8	13.7	13.1	21.9	25.7	28.1	28.7	4.0	4.9	6.5	8.3
Punjab	9.9	8.4	7.4	6.6	15.0	17.7	18.6	18.3	2.9	3.7	4.9	6.4
Rajasthan	31.2	30.1	27.2	25.3	32.3	42.0	50.0	55.1	5.1	6.5	9.0	12.3
Tamil Nadu	23.3	20.6	18.1	16.0	41.3	45.5	46.3	44.2	7.5	10.1	13.7	17.5
Telangana	13.0	11.4	10.4	9.4	18.9	22.6	24.2	24.0	3.2	4.0	5.4	7.4
Uttar Pradesh	95.1	90.3	81.8	74.5	89.1	120.9	145.0	162.2	15.6	18.1	23.8	32.3
Uttarakhand	4.3	4.0	3.6	3.1	4.9	6.3	7.1	7.7	0.9	1.1	1.5	2.0
West Bengal	33.8	28.5	24.9	22.8	49.7	58.5	62.2	60.9	7.8	10.8	15.6	20.5

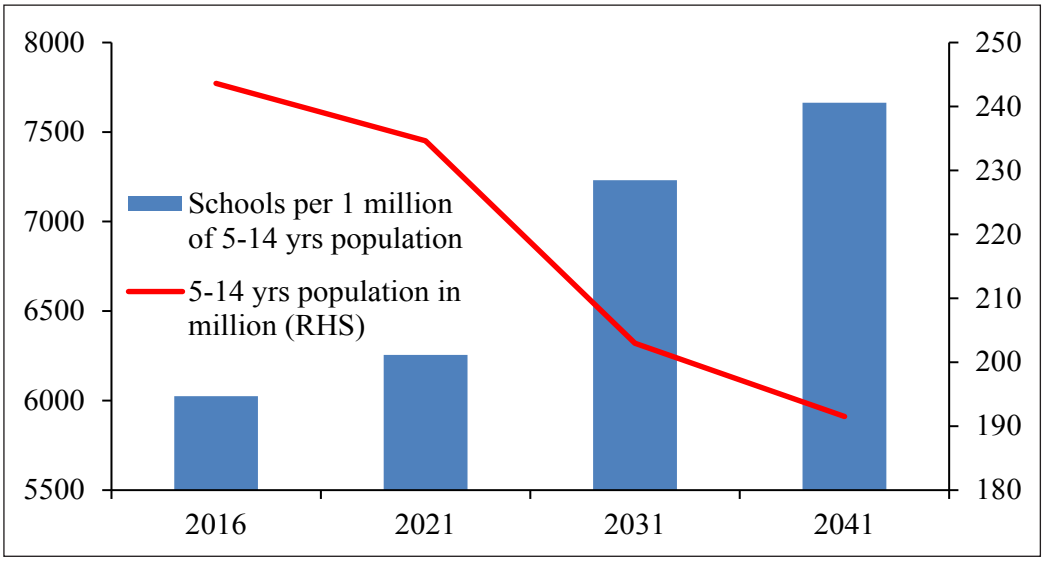
Source: Census, IIPS projections.

Table 6: Population for 5-14 years (in millions) for India and Major States, 2011-41

States	2011	2016	2021	2031	2041	Projected change during 2021-41 (%)
INDIA	260.54	243.60	234.64	202.96	191.51	-18.38
Andhra Pradesh	8.72	7.88	7.44	6.52	5.82	-21.78
Assam	7.04	6.60	5.90	5.14	5.22	-11.47
Bihar	29.07	28.25	26.95	24.46	23.10	-14.28
Chhattisgarh	5.65	5.33	5.28	4.45	4.46	-15.60
Delhi	3.19	2.94	2.71	2.26	2.06	-24.07
Gujarat	12.03	11.41	11.29	10.11	9.42	-16.57
Haryana	5.17	4.88	4.76	4.16	3.91	-17.87
Himachal Pradesh	1.23	1.14	1.05	0.95	0.88	-16.59
Jammu & Kashmir	2.83	2.86	2.35	1.77	1.86	-20.65
Jharkhand	8.27	7.92	7.63	5.90	6.44	-15.60
Karnataka	10.99	10.34	9.95	8.32	7.46	-25.00
Kerala	5.38	5.12	4.89	4.64	4.42	-9.56
Madhya Pradesh	16.85	15.87	15.99	13.74	12.90	-19.34
Maharashtra	20.63	19.43	17.99	14.85	13.67	-24.02
Odisha	8.45	7.83	7.37	6.75	6.60	-10.43
Punjab	4.96	4.49	4.11	3.69	3.27	-20.35
Rajasthan	16.49	15.59	15.41	13.09	12.70	-17.57
Tamil Nadu	11.74	10.94	10.31	8.98	8.00	-22.40
Telangana	6.64	6.01	5.64	5.17	4.70	-16.57
Uttar Pradesh	51.35	46.06	45.62	39.36	37.45	-17.91
Uttarakhand	2.21	2.00	2.11	1.65	1.54	-26.98
West Bengal	17.43	15.78	14.05	12.38	11.55	-17.79

Source: Census, Sample Registration System, IIPS projections.

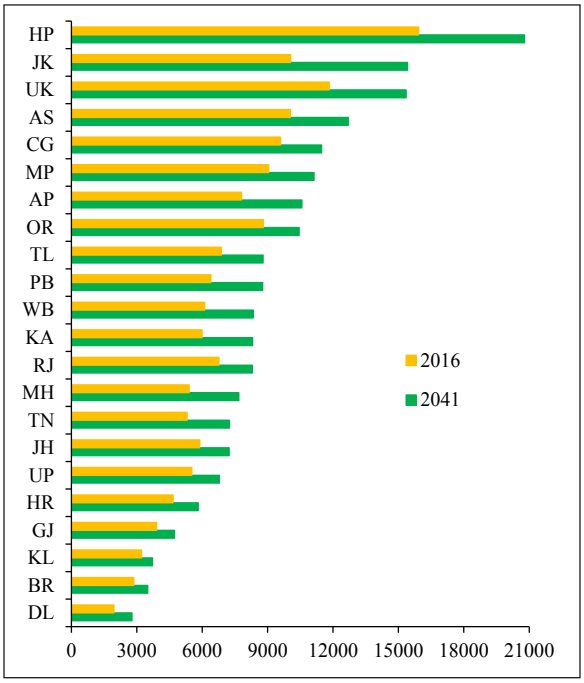
Figure 7: Number of Elementary Schools in India per 1 million of 5-14 Years Population under Status Quo



Source: Unified District Information on School Education, Sample Registration System, IIPS.

Note: Calculations are based on projected 5-14 years population for 2021-41 from IIPS and number of elementary schools at 2016 levels.

Figure 8: Number of Elementary Schools per 1 million of 5-14 Years Population under Status Quo

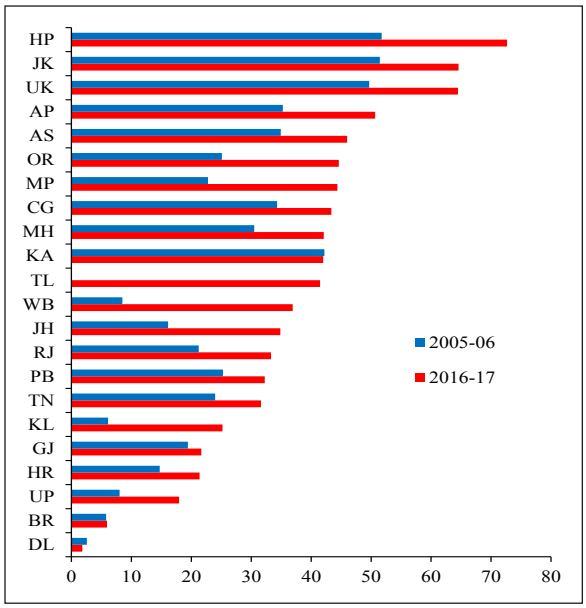


Source: Unified District Information on School Education, Sample Registration System, IIPS.

Note: Calculations are based on projected 5-14 years population for 2041 from IIPS and number of elementary schools at 2016 levels.

7.24 States such as Himachal Pradesh, Uttarakhand, Andhra Pradesh and Madhya Pradesh have more than 40 per cent of elementary schools with fewer than 50 students enrolled (Figure 9). Similar trends

Figure 9: Per cent of Elementary Schools with Less Than 50 Students Enrolled



Source: Unified District Information on School Education.

exist in Chhattisgarh, Assam and Odisha with large number of schools per capita and small school size. In fact, the number of elementary schools with less than 50 students has increased over the past decade across all major states except Delhi.

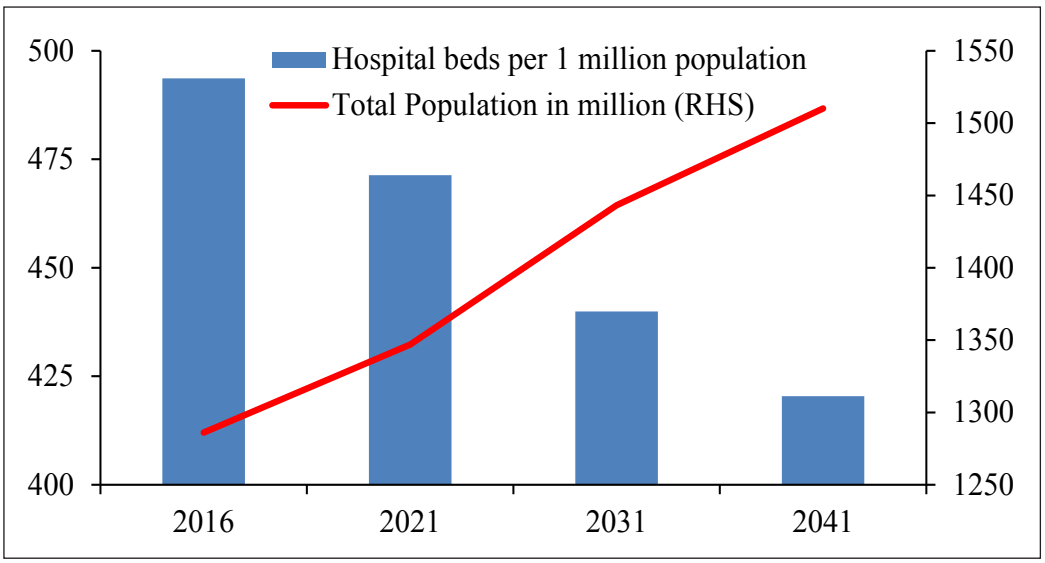
7.25 The "optimal" school size varies widely according to terrain and urban clustering, but this sharp increase in number of elementary schools per capita needs to be carefully studied. The time may soon come in many states to consolidate/merge elementary schools in order to keep them viable. Schools located within 1-3 kms radius of each other can be chosen for this purpose to ensure no significant change in access. This would also be in line with the experience of other major economies witnessing a decline in elementary school-going population, such as Japan, China, South Korea, Singapore and Canada, which have implemented policies to merge or close down schools. Note that this is not about reducing investment in elementary education, but an argument for shifting policy emphasis from quantity towards quality and efficiency of education.

(ii) Health Care Facilities

7.26 Access to health care is still a major challenge in India. If India's hospital facilities remain at current levels, rising population over the next two decades (even with slowing population growth rates) will sharply reduce the per capita availability of hospital beds in India across all major states (Figure 10). India already fares poorly relative to other emerging and developed economies in terms of per capita availability of hospital beds (Figure 11).

7.27 States with high population growth (Table 2) are also the ones with the lowest per capita availability of hospital beds (Figure 12). Hence, there is a straightforward case for expanding medical facilities in these states. For states in the advanced stage of demographic transition, however, the rapidly changing age structure (Table 5) will mean that the type of health care services will have

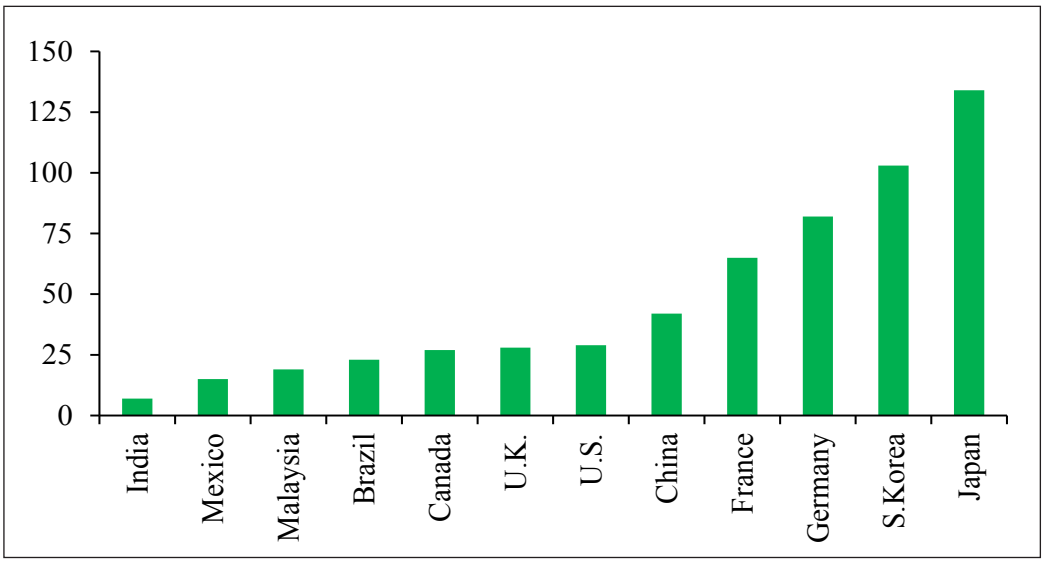
Figure 10: Number of Government Hospital Beds in India per 1 million Population under Status Quo



Source: Central Bureau of Health Intelligence, Sample Registration System, IIPS.

Note: Calculations are based on projected population for 2021-41 from IIPS and number of government hospital beds at 2016 levels.

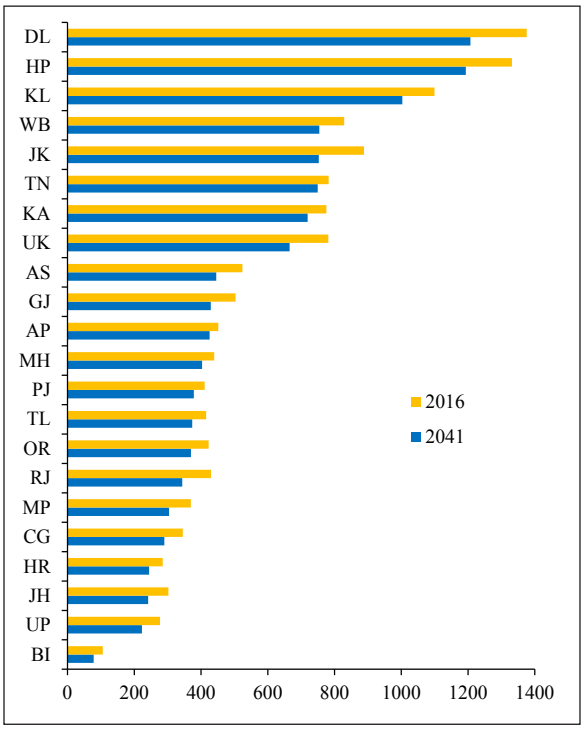
Figure 11: Number of Hospital Beds per 10,000 Population



Source: WHO.

Note: Data is as of 2011 for India, 2012 for other countries.

Figure 12: Number of Government Hospital Beds per 1 million Population under Status Quo



Source: Central Bureau of Health Intelligence, Sample Registration System, IIPS.

Note: Calculations are based on projected population for 2041 from IIPS and number of government hospital beds at 2016 levels.

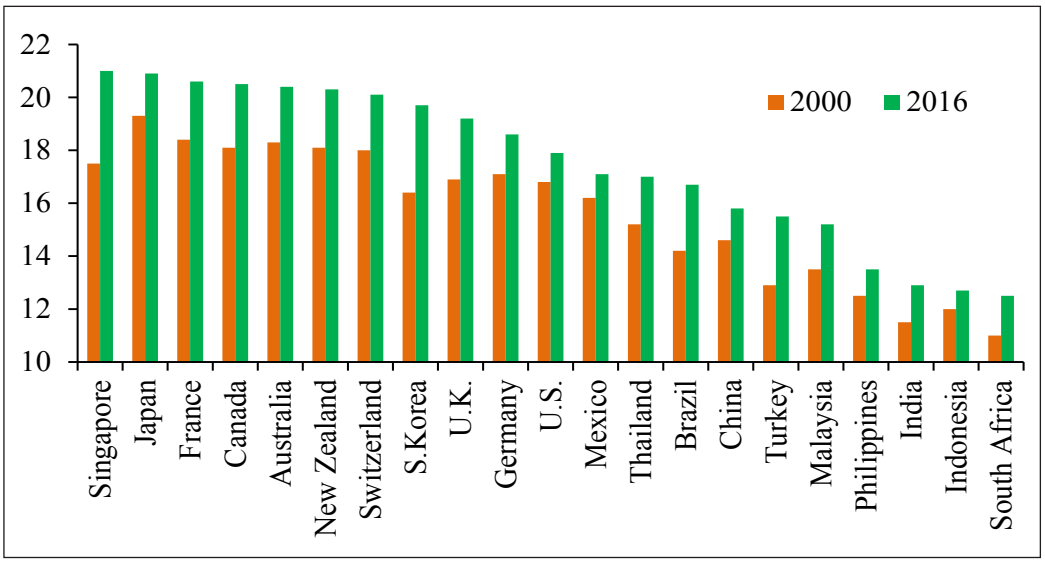
to adapt towards greater provision of geriatric care. A major problem with planning for the provision of medical facilities is the paucity of specific data, especially on private hospitals. Available data on government hospitals have been used here but it is clear even from basic research that it does not provide a true picture of the quality or quantity of health care in the country.

(iii) Retirement Age

7.28 India's *healthy* life expectancy at the age of 60, which is the average number of years a 60-year old person is expected to live in full health taking into account the impact of diseases and injuries, has continually increased over the years for both men and women. Healthy life expectancy at the age of 60 now stands at 12.9 years (12.5 years for males; 13.3 years for females), though it is still much lower than that for other major developed and emerging economies (Figure 13).

7.29 Due to ageing population and increasing pressure on pension funding, many countries have begun raising the pensionable retirement

Figure 13: Healthy Life Expectancy at Age of 60 (years)



Source: WHO.

age. Countries such as Germany, France and U.S. have increased the retirement age. Some countries such as Australia and U.K. used to allow women to retire earlier than men but have changed the rules to bring them at par. Many countries such as Germany, U.K. and U.S. have signalled that they will keep increasing the retirement age according to a pre-set timeline (Table 7). In the U.K., for example, the state pension age will increase for both men and women to 66 by October 2020. The U.K. government is planning further increases in the retirement age to 67 spanning the years 2026-28 and to 68 during 2044-46.

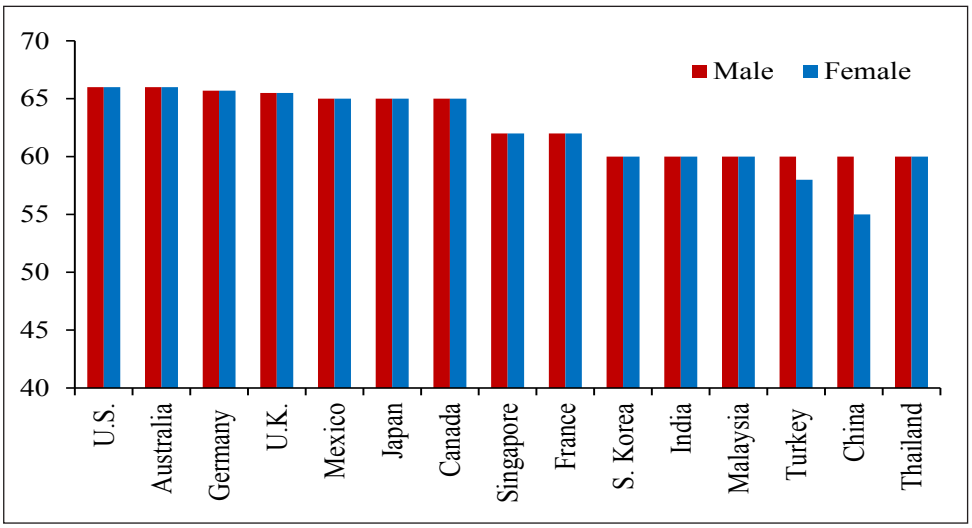
7.30 Given that life expectancy for both males and females in India is likely to continue rising, increasing the retirement age for both men and women going forward could be considered in line with the experience of other countries (Figure 14). This will be key to the viability of pension systems and would also help increase female labour force participation in the older age-groups. Since an increase in the retirement age is perhaps inevitable, it may be worthwhile signalling this change well in advance – perhaps a

Table 7: Retirement Age Reforms Being Implemented or Under Consideration in Major Economies

Country	Retirement Age Reforms
Germany	Retirement age to increase gradually to 66 by 2023 and to 67 by 2029
U.S.	Pension benefit age to rise gradually to reach 67 for those born in 1960 or later
U.K.	State pension age to increase for both men and women to 66 by October 2020, and further to 67 between 2026-28 and to 68 between 2044-46
Australia	Pensionable age scheduled to increase gradually to 67 by 2023
China	Under consideration to raise the retirement age for women by 1 year every three years and for men by 1 year every six years so that by 2045, the retirement age for both men and women would be 65
Japan	Under consideration to raise the retirement age to 70

Source: Country-specific pension documents and government press releases.

Figure 14: Retirement Age (years)



Source: Country-specific pension documents, OECD.

decade before the anticipated shift – so that the workforce can be prepared for it. This will also help plan in advance for pensions and other retirement provisions.

IV. CONCLUSION

7.31 This chapter is not merely an attempt to look at the changing population dynamics of the country but is meant as an illustration of how several of the common working assumptions of economists and policy-makers need to be revisited from time to time. This is even true for a commonly discussed topic such as the demographic dividend. It is important, therefore, that working assumptions and projections are constantly revised in light of new evidence (especially in the age of big data) for areas such as urbanization, energy requirements, forest cover, water availability, climate change and other long-term factors that have a large impact on the socio-economic context in which government policy interventions play out.

CHAPTER AT A GLANCE
➢ India is set to witness a sharp slowdown in population growth in the next two decades. Although the country as a whole will enjoy the "demographic dividend" phase, some states will start transitioning to an ageing society by the 2030s.
➢ A surprizing fact is that population in the 0-19 age bracket has already peaked due to sharp declines in total fertility rates (TFR) across the country. The national TFR is expected to be below replacement rate by 2021.
➢ Working-age population will grow by roughly 9.7mn per year during 2021-31 and 4.2mn per year in 2031-41.
➢ The proportion of elementary school-going children, i.e. 5-14 age group, will witness significant declines. Contrary to popular perception, many states need to pay greater attention to consolidating/merging schools to make them viable rather than building new ones.
➢ At the other end of the age scale, policy makers need to prepare for ageing. This will need investments in health care as well as a plan for increasing the retirement age in a phased manner.

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From *Swachh* Bharat to *Sundar* Bharat via *Swasth* Bharat : An Analysis of the Swachh Bharat Mission

08
CHAPTER

वसुधाकीटसर्पाखुमलसंदूषितोदकाः।
क्रिमिलं क्लिन्नं पर्णशैवालकदमैं। विवर्ण विरसं सान्द्रं दुर्गन्धं न हितं जलम्।। च.सू.

"The river having water polluted with soil and faeces, insects, snakes and rats and carrying rainwater will aggravate all doshas. Slimy, having insects, impure, full of leaves, moss and mud, having abnormal color and taste, viscous and foul smelling water is not wholesome."

— Charaka Samhita

Aligning with the ideals of Mahatma Gandhi, the Swachh Bharat Mission (SBM) was initiated in 2014 to achieve universal sanitation coverage by 2 October 2019. This flagship programme is, perhaps, the largest cleanliness drive as well as an attempt to effect behavioural change in the world ever. Even 67 years after India's independence, in 2014, around 100 million rural and about 10 million urban households in India were without a sanitary toilet; over 564 million, i.e. close to half the population, still practiced open defecation. Through SBM, 99.2 per cent of rural India has been covered in the last four years. Since October 2014, over 9.5 crore toilets have been built all over the country and 564,658 villages have been declared Open Defecation Free (ODF). As on 14 June 2019, 30 States/UTs are 100 per cent covered with Individual Household Latrine (IHHL). SBM has significantly improved health outcomes. To highlight the impact of SBM on health, new evidence is provided that SBM has helped reduce diarrhoea and malaria among children below five years, still birth and low birth weight (new born with weight less than 2.5 kgs). This effect is particularly, pronounced in districts where IHHL coverage was lower is 2015. Financial savings from a household toilet exceed the financial costs to the household by 1.7 times, on average and 2.4 times for poorest households. As sanitation gained over the last four years contributes to Sustainable Development Goals (SDGs), especially the SDG 6.2, the momentum must be sustained to make cleanliness an integral part of India's consciousness.

INTRODUCTION

8.1 Mahatma Gandhi once said, "Sanitation is more important than independence." Proper sanitation and hygiene are essential inputs not only for healthy and disease free living but also for a dignified life as a human being. The ancient Indus valley civilisation accorded prime importance to sanitation by meticulously integrating sanitation systems into town planning. Although sanitation and hygiene are considered to be virtues in all cultures and religions of the world, prevalence of unsanitary conditions have been a problem faced by most of the countries at some point of time in the process of their economic development. Many have alluded to the unhygienic conditions that prevailed in the industrial towns of 19th century Europe.

8.2 Lack of access to basic sanitation services continues to be a major problem in many parts of the world. In 2015, 2.3 billion people, globally, lacked basic sanitation services (JMP, 2017). Lack of sanitation has been recognised as a major problem in India. Even after 67 years of India's independence, in 2014, around 10 crore rural and about one crore urban households in India were without a sanitary toilet and over 55 crore – about half the country's population – still practiced open defecation. In fact, an unflattering national fact was that open defecation in India represented 60 per cent of open defecation globally. Poor sanitation costs India around 5.2 per cent of its GDP (LIXIL, Water Aid and Oxford Economics, 2016).

8.3 The Government's emphasis on working towards a clean India in mission mode was reflected in the speech of the Prime Minister, Narendra Modi from Rajghat at the Swachh Bharat Mission launch on 2 October, 2014, when he declared: "If people of India can reach Mars with minimal expenditure, why can they not keep their streets and colonies clean." The Swachh Bharat Mission (SBM) was launched as a multi-pronged approach to enhance the level of sanitation in the country. The focus under this mission has not just been on construction of toilets but also on effecting a behavioural change in the communities. The result has been substantial gains in health parameters as shown by various studies. The gains from a cleaner India are important inputs, directly as well as indirectly, for achieving broader economic development objectives.

SWACHH BHARAT MISSION-GRAMIN (SBM)

8.4 Recognising the need for urgent action on the sanitation front, on 2 October, 2014, the birth anniversary of Mahatma Gandhi, Prime Minister, Narendra Modi announced India's Swachh Bharat (Clean India) Mission to enhance the quality of life by promoting cleanliness, hygiene and eliminating open defecation. The targets of the mission are to be met by 2 October, 2019, coinciding with the 150th birth anniversary of the Father of the Nation.

8.5 SBM adopts a multi-faceted approach including:

- *Community participation*: Ensuring appropriate participation of the beneficiary/communities, financially or otherwise, in the setting up of the toilets to promote ownership and sustained use.
- *Flexibility in Choice*: SBM offers flexibility by building in a menu of options so that the poor/disadvantaged families can subsequently upgrade their toilets depending upon their requirements and their financial position. This is done to ensure that sanitary toilets are constructed, which ensures safe confinement and disposal of faeces. An illustrative list of technology options, with cost implications is provided to meet the user preferences and location-specific needs.
- *Capacity Building*: SBM augments the institutional capacity of districts to change behaviour at the grassroots level and strengthen the capacities of implementing agencies so that the programme could be rolled in a time-bound manner and collective outcomes could be measured.
- *Instil Behaviour change*: Incentivizing the performance of State-level institutions to implement activities for behavioural change among communities. Emphasising on awareness generation, triggering mind-set changes, leading to community behaviour change and demand generation for sanitary facilities in houses, schools, anganwadis, places of community congregation and for solid and liquid waste management activities.

- *Broad-based Engagement*: SBM set up the Swachh Bharat Kosh to encourage Corporate Social Responsibility and accept contributions from private organizations, individuals and philanthropists.
- *Use of Technology:* Information technology and social media is imperative to this program as it allows citizens to keep a check on the availability of toilets for every rural household in India. Nearly 90 per cent of all SBM toilets have already been geo-tagged. Many mobile applications have been launched by not only the government but also by few citizens, which direct the municipal corporations' attention towards unclean areas.

8.6 Under SBM, an incentive of ₹12,000 is provided for construction of Individual Household Latrines (IHHL) to eligible beneficiaries in rural areas and covers for provision of water storage. The central share for the incentive provided for IHHLs is 60 per cent and the State share is 40 per cent. For North Eastern States, Jammu and Kashmir and Special Category States, the central share is 90 per cent and the State share is 10 per cent. Additional contributions from other sources are also permitted. A total of ₹51,314.3 crore has been allocated since 2014-15 for SBM, out of which, ₹48,909.2 crore has been released (95.3 per cent). Additionally, a provision was made for Extra Budgetary Resources of ₹15,000 crore of which ₹8,698.20 crore has already been drawn. Details of the funds allocated for SBM and the funds released to the States/UTs since 2014-15 are given in Table 1.

Table 1: Details of funds allocated and the funds released for SBM (2015-19)

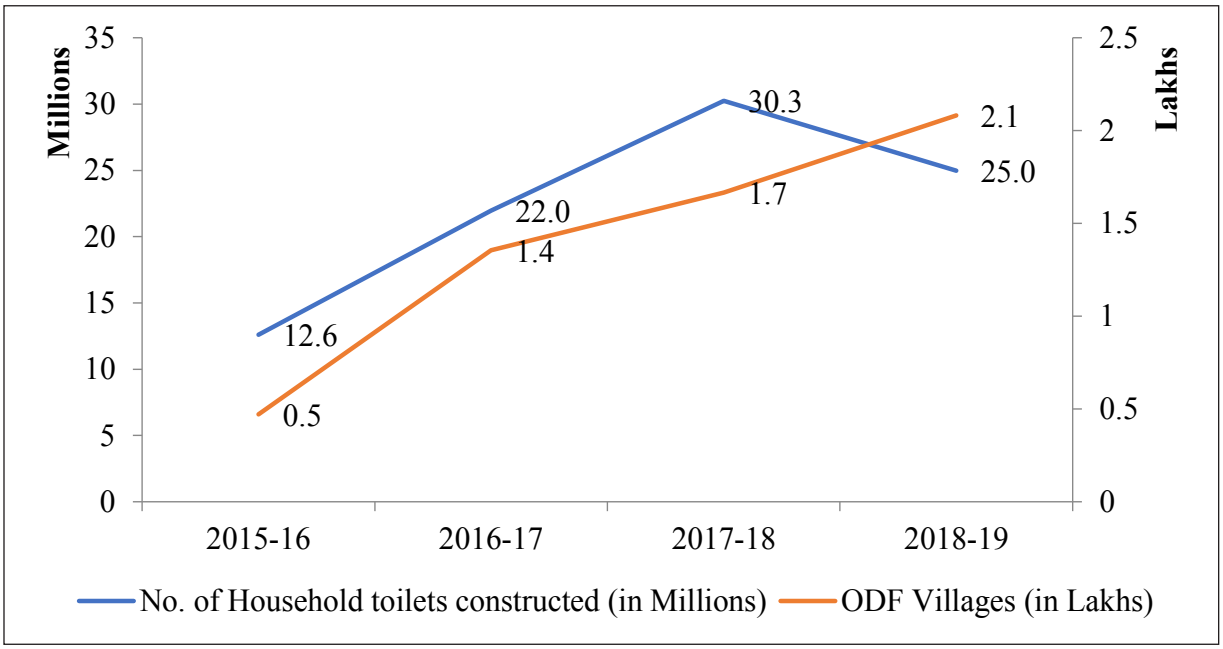
Years	₹ (in Crore)		
	Funds Allocated	Funds Released	Fund Utilization (per cent)
2014-15	2850.0	2730.3	95.8
2015-16	6525.0	6363.0	97.51
2016-17	10513.0	10272.0	97.70
2017-18	16948.27	16610.9	98.0
2018-19 (RE) *	14478.1	12932.96	89.3

* (up to 31.03.2019)

Source: Ministry of Drinking Water and Sanitation

8.7 As a result of the efforts of the Government, as on date, 98.9 per cent of India has been covered under SBM. Since October 2014, over 9.5 crore toilets have been built all over the country (till 14.06.2019). The total number of household toilets constructed from 2014 till 2018 shows a rapid progress over the last few years starting from less than 50 lakh household toilets per year and reaching up to over 3 crore toilets per year. A major focus of SBM has been on making villages Open Defecation Free (ODF). ODF would mean the termination of faecal-oral transmission, defined by a) no visible faeces found in the environment/village and b) every household as well as public/community institution(s) using safe technology option for disposal of faeces. The number of ODF villages have significantly increased since 2015 (Figure 1). As on 29.05.2019, 5,61,014 villages (93.41 per cent), 2,48,847 gram panchayats (96.20 per cent)- 6,091 blocks (88.60 per cent) and 618 districts (88.41 per cent) have been declared ODF.

Figure 1: Number of household toilets constructed and ODF villages (2015-19)

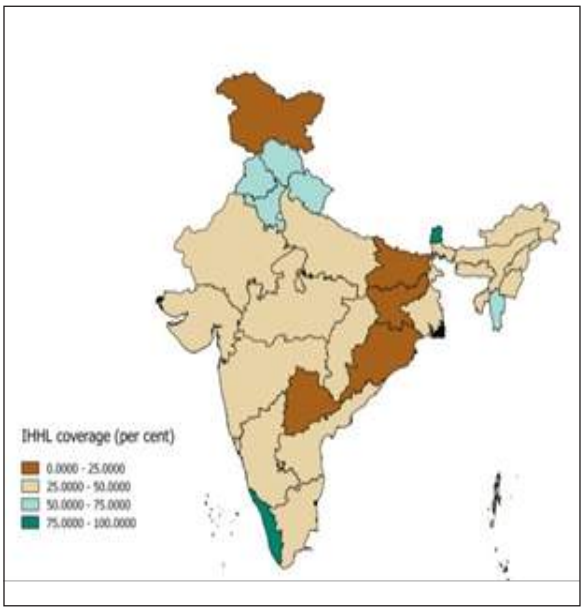


Source: Ministry of Drinking Water and Sanitation

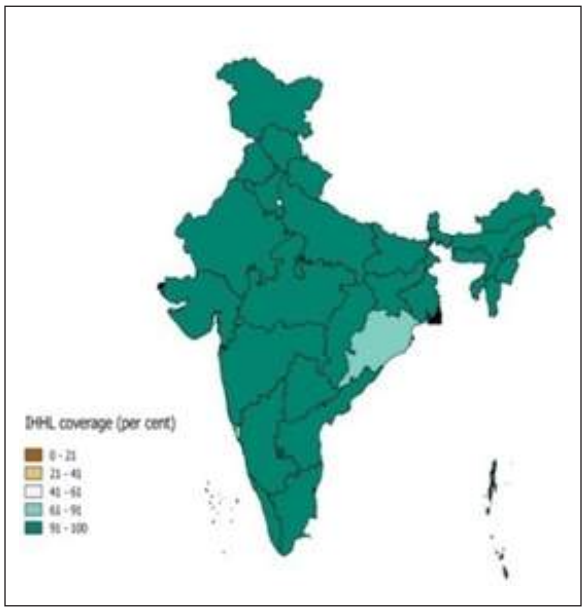
8.8 Most of the states showed significantly greater access to IHHL in 2018-19 as compared to 2014-15 (Figure 2). Most of the states have achieved the status of 100 per cent IHHL coverage and only few states are yet to achieve their targets (Figure 2). Goa has the lowest IHHL coverage followed by Odisha and Telangana. Karnataka and Arunachal Pradesh are very close to achieving 100 per cent IHHL coverage.

Figure 2: Individual Household Latrines in 2014-15 and 2018-19 (in per cent)

Individual Household Latrines (IHHL) 2014-15 (in per cent)



Individual Household Latrines (IHHL) 2018-19 (in per cent)

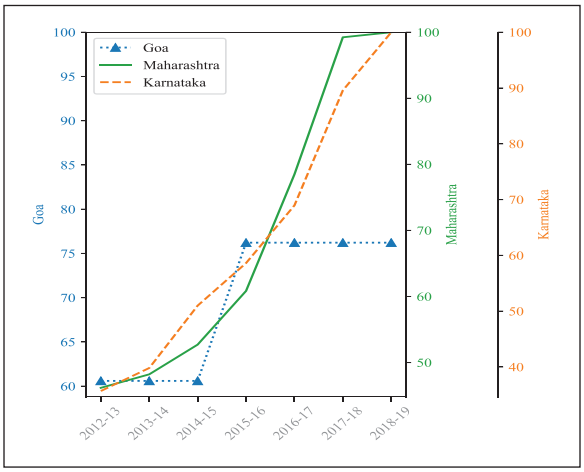


Source: Ministry of Drinking Water and Sanitation

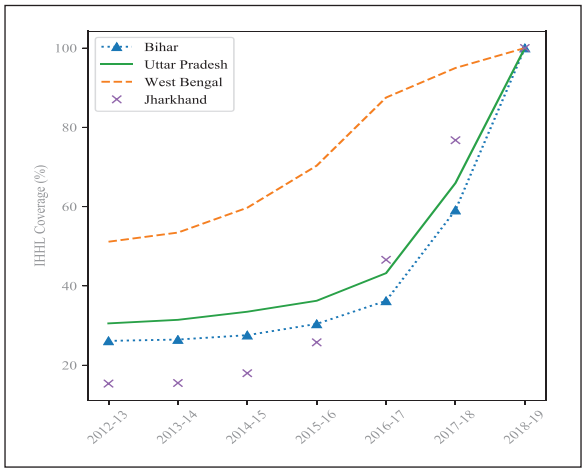
8.9 A comparison of some of the states in IHHL coverage and their neighbouring states has been depicted in Figure 3. Goa, in spite of starting from a very high baseline has shown a saturation of IHHL coverage to around 70 per cent only, whereas the neighbouring states of Maharashtra and Karnataka have shown significant improvements. In Odisha, coverage is yet to achieve 90 per cent level, whereas the neighbouring states of Andhra Pradesh, Jharkhand and Chhattisgarh have shown significant improvements. West Bengal continues to increase the coverage from its high base in 2012-13, whereas the neighbouring States of Bihar and UP have also shown momentum since 2015-16.

Figure 3: IHHL Coverage of some States in comparison to its neighbouring States

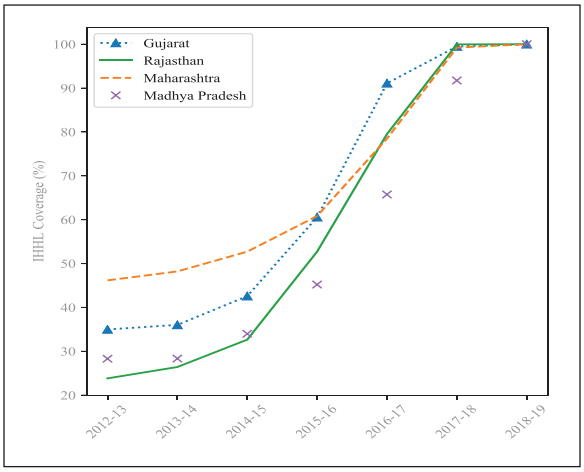
IHHL Coverage (%) in Goa & nearby States



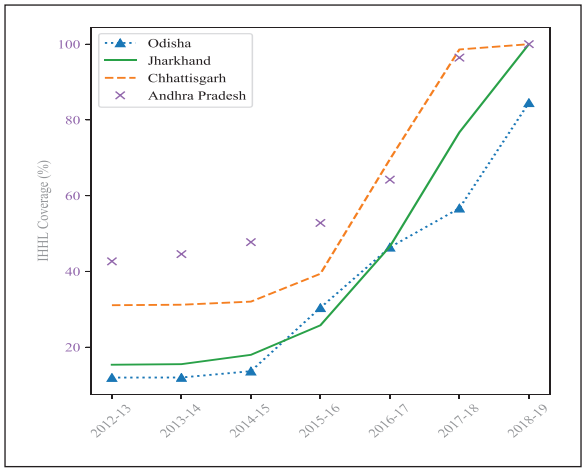
IHHL Coverage (%) in Bihar & nearby States



IHHL Coverage (%) in Gujarat & nearby States



IHHL Coverage (%) in Odisha & nearby States

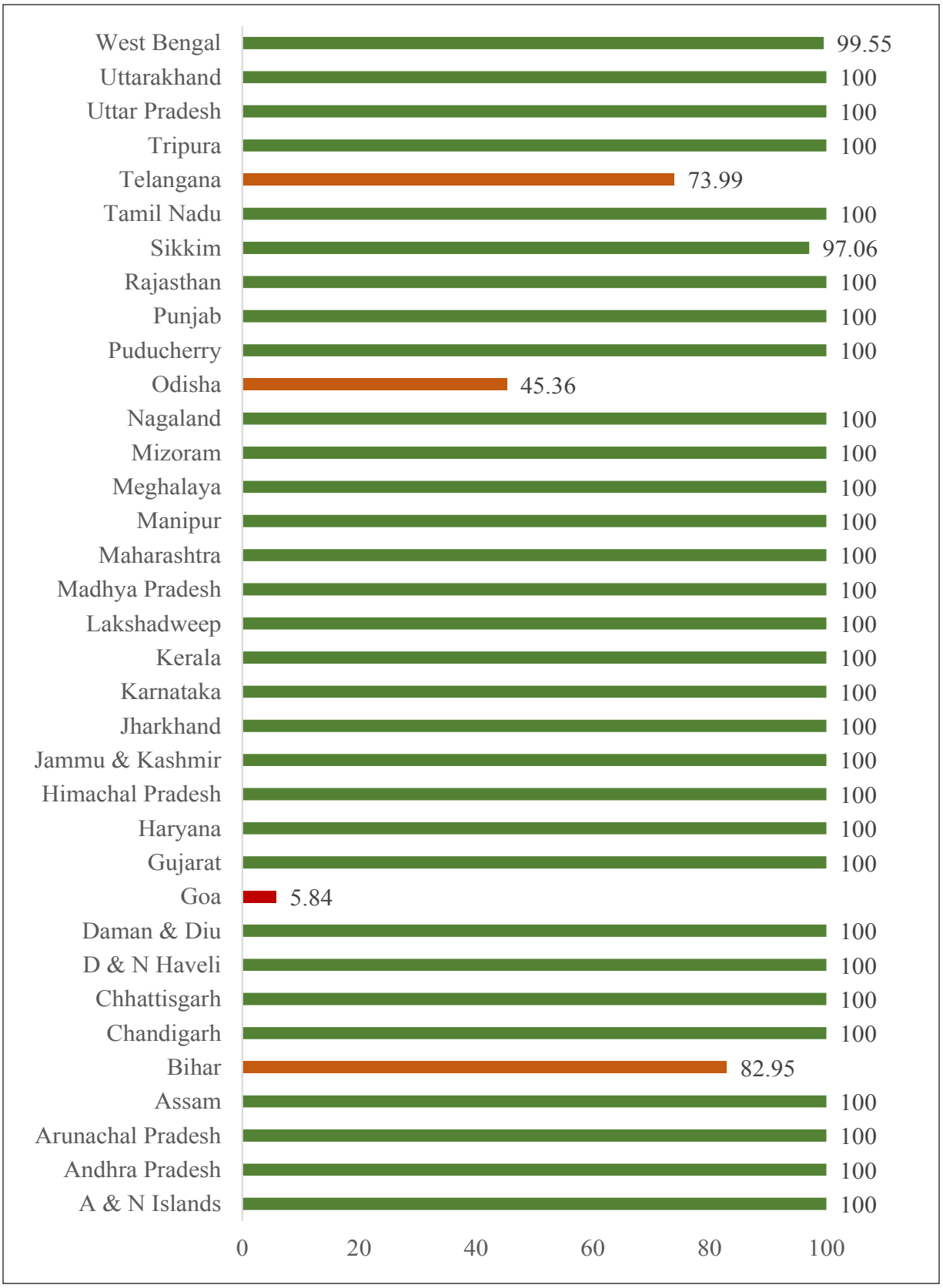


Source: Ministry of Drinking Water and Sanitation

COMPARISON ACROSS STATES FOR ODF STATUS (IN PER CENT)

8.10 Most of the states have achieved the status of 100 per cent ODF coverage and only few states are yet to achieve their targets (Figure 4). Goa has the lowest ODF coverage declared followed by Odisha, Telangana and Bihar. West Bengal and Sikkim are very close to achieving 100 per cent ODF coverage.

Figure 4: ODF status across States (in per cent)



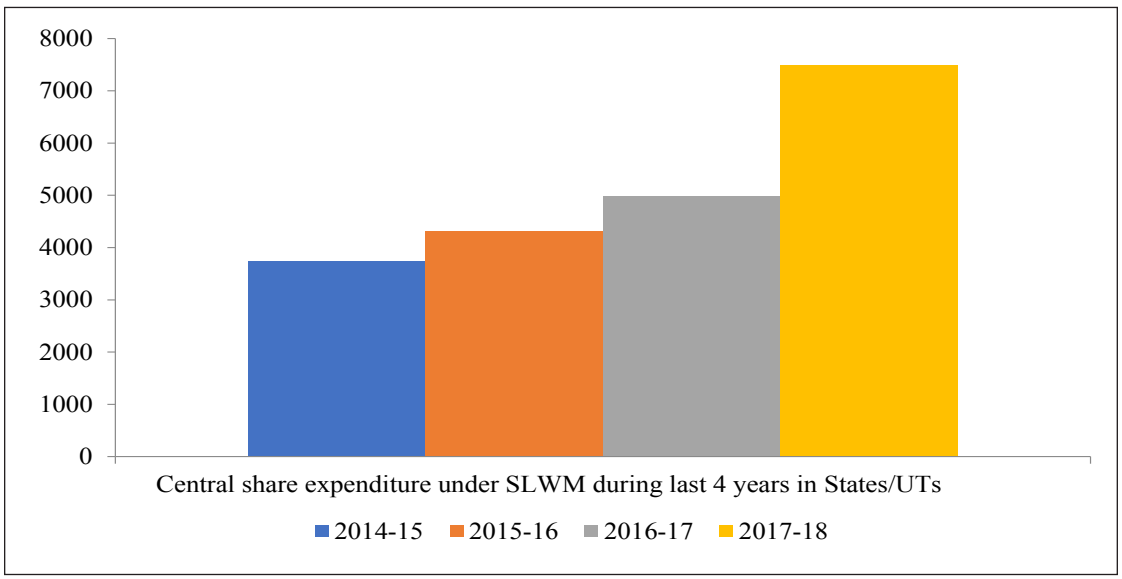
Source: SBM Dashboard as on 14th June 2019

8.11 The success of a scheme like the SBM depends not only on the infrastructure created but also on the resultant behavioural change and the associated changes in the patterns of toilet usage by individuals. The National Annual Rural Sanitation Survey (NARSS) 2018-19, conducted by an Independent Verification Agency (IVA) has found that 93.1 per cent of households had access to toilets during the survey period. Further, 96.5 per cent of the households in rural India that had access to a toilet, used them. The NARSS also re-confirmed the ODF status of 90.7 per cent of villages, which were previously declared and verified as ODF by various districts/ States. It is also interesting to note that 95.4 per cent of the villages surveyed were found to have minimal litter and minimal stagnant water.

SOLID AND LIQUID WASTE MANAGEMENT

8.12 Solid and Liquid Waste Management (SLWM) is another major component of SBM Mission. As scientific disposal of waste has a noticeable impact on social development, there is an urgent need for setting up the system for the efficient disposal of waste in various states, especially rural villages. In light of this, many states have undertaken various activities such as construction of waste collection centres, menstrual hygiene management activities, installation of bio-gas plants, construction of compost pits, installation of dustbins, system for collection, segregation and disposal of garbage, construction of drainage facility and leach pits and construction of soak pits and stabilization ponds. These activities require huge disbursement of funds from Central and State governments. Figure 5 highlights the Central share expenditure under SLWM during last four years in States/ UTs.

Figure 5: Central share expenditure under SLWM during last 4 years in States/UTs (₹ Lakh)



Source: Ministry of Drinking Water and Sanitation

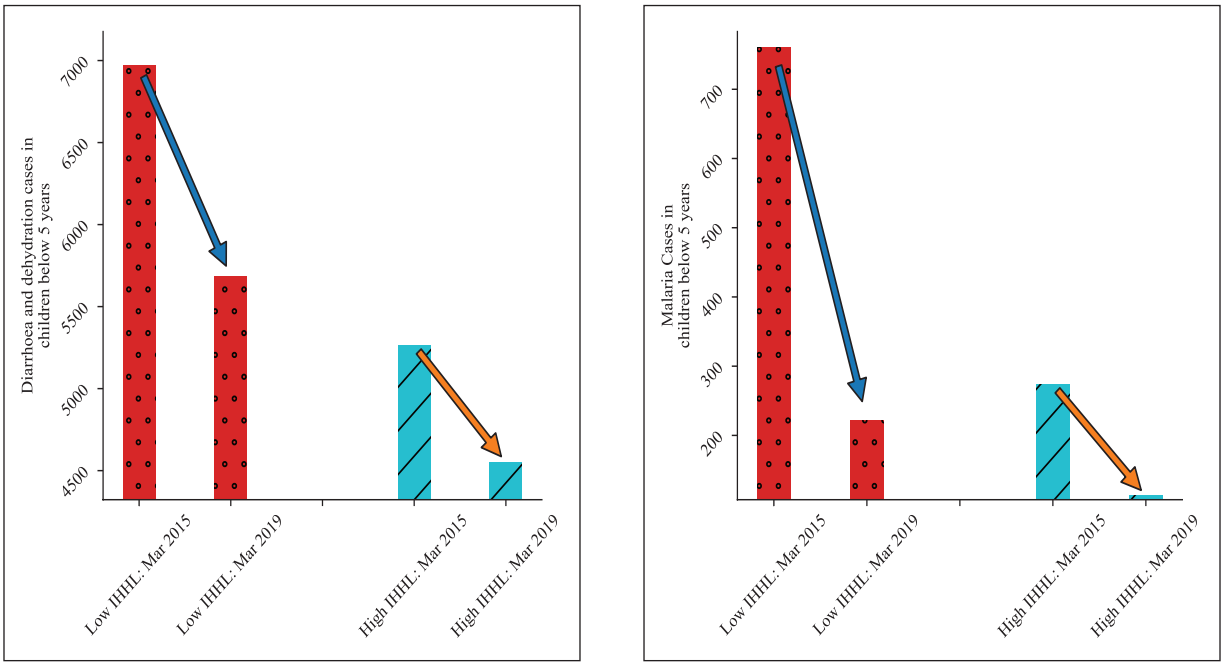
ANALYSIS OF SBM ON HEALTH ISSUES

8.13 The success of SBM can be assessed from the gains that the actions under the scheme had on the various socio-economic outcomes of the rural populace. A direct impact of improved sanitation should manifest on the health indicators. Diarrhoea,

a leading cause of death among the under-five children in India, accounted for around 11 per cent of deaths in 2013. Diarrhoea cases among children below 5 years in India have reduced significantly over the past 4 years.

8.14 As of March 2014, 50 per cent of the districts in India had IHHL Coverage less than 33.5 per cent (median value). In order to gauge the impact of SBM on health indicators, we estimated a Difference-in-Difference. For this purpose, we separate districts into two groups- the first group where IHHL coverage was low (below medium) and the second group where IHHL coverage was high (above medium) as of 2015. Because IHHL coverage become almost universal as of 2019 (Figure 2), the increase in IHHL coverage was significantly more in the first group of districts than in second group. Therefore, it is expected the impact on health to be larger for the first group than for the second group. To examine this thesis, we tracked the number of diarrhoea and malaria cases in children below 5 years, still birth and low birth weight cases in these two groups between March 2015, when SBM begin its implementation and March 2019, when most districts in India had IHHL coverage of 100 per cent. The first group i.e. districts with low IHHL coverage suffered more from diarrhoea, malaria, still births and low birth weight than the second group i.e. districts with high IHHL coverage–indicating that sanitation and hygiene is the primary reason for these health problems in the country. This finding points to the fact that adequate sanitation plays a key role in reducing diarrhoea, malaria, still births and low birth weight cases (Figures 6 & 7). The major finding of this analysis was that all these health indicators including diarrhoea and malaria cases improved significantly in both groups after the implementation of SBM.

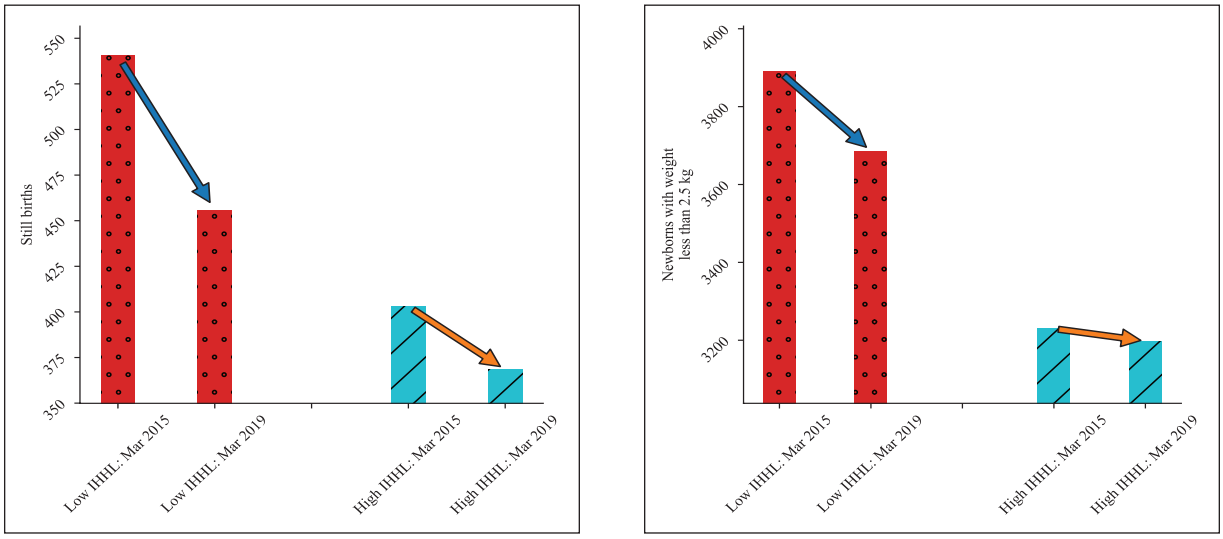
Figure 6: Impact of IHHL Coverage on Diarrhoea and Malaria cases in children below 5 years



Source: Health Management Information System, Ministry of Health & Family Welfare; IHHL data from SBM Dashboard-Swachh Bharat Mission – Gramin, Ministry of Drinking Water and Sanitation

Note: Total of 500 districts of India are divided into two parts: first that had IHHL coverage below 33.5 per cent in March 2014 and second that had IHHL coverage above 33.5 per cent in March 2014.

Figure 7: Impact of IHHL Coverage on Still Births and New-borns with weight less than 2.5 kg



Source: Health Management Information System, Ministry of Health & Family Welfare; IHHL data from SBM Dashboard-Swachh Bharat Mission – Gramin, Ministry of Drinking Water and Sanitation

8.15 Diarrhoea cases reduced from around 6,968 and 5,262 in 2015 to 5,683 and 4,550 in 2019 in the first and second group respectively. Malaria cases also dropped from around 761 and 273 in 2015 to 222 and 113 in 2019 in the first and second group respectively. Still births came down from 540 and 403 in 2015 to 456 and 368 in 2019 in the first and second group respectively. Low birth-weight cases declined from 3,890 and 3,230 in 2015 to 3,686 and 3,198 in 2019 in the first and second group respectively. While this study shows that sanitation has an important role to play in reducing diarrhoea and malaria, there may be other factors like distribution of mosquito nets, fogging machines and construction of Gambusia fish hatcheries under the National Vector Borne Disease

Figure 8: Diarrhoea in Indian States

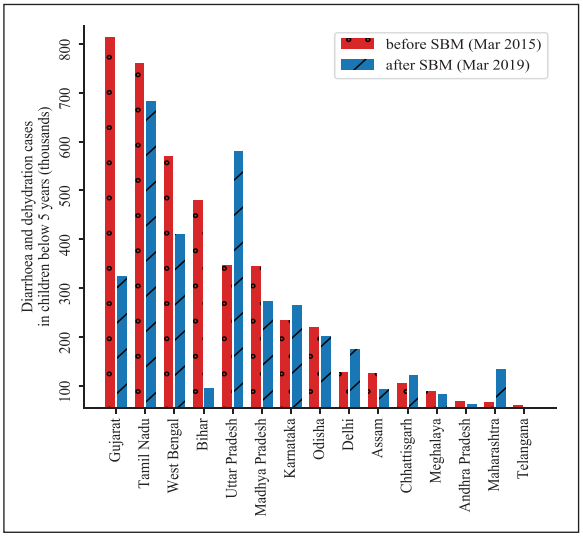
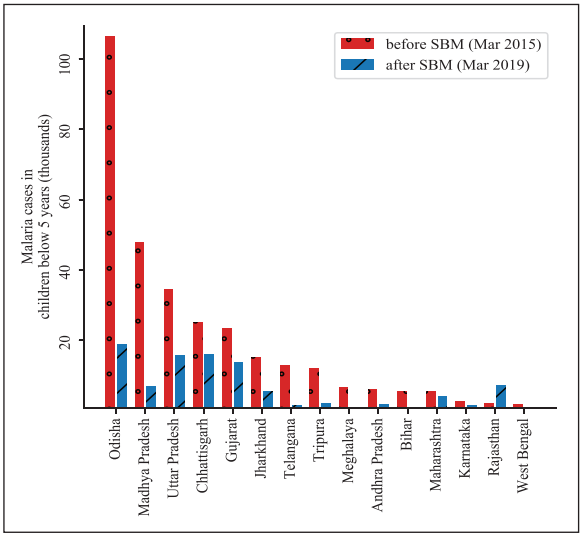


Figure 9: Malaria in Indian States



Source: Health Management Information System, Ministry of Health & Family Welfare

Figure 10: Still Births in Indian States

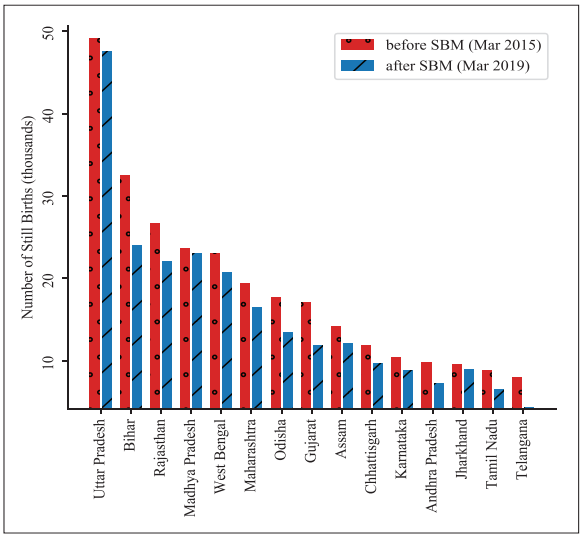
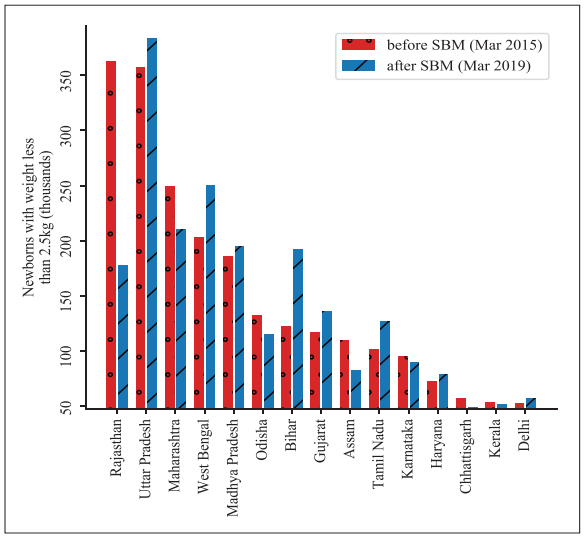


Figure 11: Low Birth Weight Cases in Indian States



Source: Health Management Information System, Ministry of Health & Family Welfare

Note: Low birth weight cases indicate new borns with weight less than 2.5 kgs.

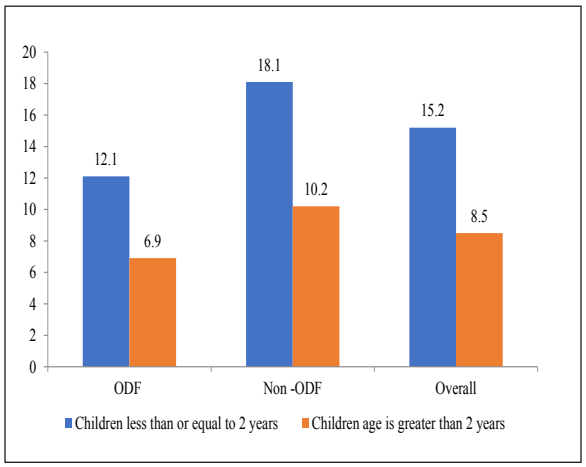
Control Programme and provision of safe drinking water, Oral rehydration solutions (ORS) and zinc, hand washing and personal hygiene under Integrated Action Plan for Prevention and Control of Pneumonia and Diarrhoea that have also played an important role in reduction of malaria and diarrhoea, but are not in the scope of this study.

8.16 With improved sanitation and 100 per cent ODF, diarrhoea cases reduced significantly in many states like Gujarat, Tamil Nadu, West Bengal & Bihar (Figure 8). Similarly, improvements are evident in malaria, still births and low birth weight cases (Figures 9, 10 & 11).

IMPACT OF SBM: FEW INDEPENDENT STUDIES

8.17 The Sanitation Health Impact Assessment study was conducted by Ministry of Drinking Water and Sanitation (MoDWS), to understand the impact of ODF status on the key child health and nutritional indicators in five states- Karnataka, Madhya Pradesh, Rajasthan, Uttar Pradesh and West Bengal. Non-ODF districts were selected to ensure socio-cultural and regional similarity across geographies within the state. Becoming ODF had a positive impact on the child health and nutrition, evident from the fact that the health and nutritional indicators of the children and mothers belonging to the ODF areas were comparatively better than their non-ODF counterparts (Figure 12).

Figure 12: Prevalence of diarrhoea in ODF and Non –ODF areas in 2017 (in per cent)

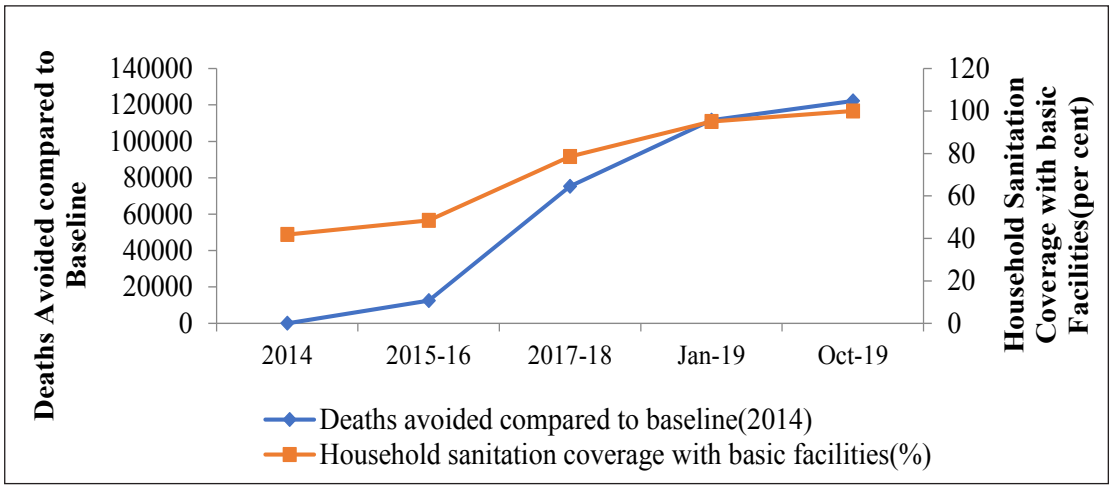


Base (All children): 4985

Source: Ministry of Drinking Water and Sanitation

8.18 Another study, "Swachh Bharat Mission – Preliminary estimations of potential health impacts from increased sanitation coverage" conducted by World Health Organization (WHO) to estimate health gains based on the latest available evidence linking sanitation and mortality from diarrhoeal disease, showcased initial estimates of expected health gains from reduced diarrhoeal disease due to increased sanitation coverage with the SBM initiative. The study results show that in 2014, i.e. before the start of the SBM, there were an estimated 140,000 deaths from diarrhoeal disease attributable to unsafe sanitation; about 39,000 of those attributable deaths occurred in children younger than five years. Since the start of the SBM, mortality from unsafe sanitation is estimated to have declined to about 50,000 deaths in 2017-2018. The study shows that there is a clear relation between progress on sanitation coverage and health gains (Figure 13).

Figure 13: The Assessed and Projected Progress on Sanitation Coverage and Health Gains



Source: World Health Organization (WHO)

8.19 Prior studies have shown how important sanitation and hygiene are in economic terms in India, as well as what it would cost India to implement. For example, the World Bank estimated the economic impacts of inadequate sanitation in India in the year 2006 – showing an annual economic impact of ₹2.4 trillion (US$ 53 billion), implying a per capita annual loss of ₹2,180 (US$ 48) or 6.4 per cent of the GDP in the same year (World Bank 2011). Hence, the costs of inadequate sanitation and the expected gains from improved sanitation, are considerable. The majority of SBM interventions and their associated costs occur at community and household level. Approximately 8 per cent of the national government's overall contribution is allocated to social and behaviour change communication costs associated with programme delivery, while the remaining 92 per cent is required to be spent on incentivising household toilets and hand washing stations.

8.20 A recent study conducted by UNICEF on behalf of MoDWS assessed the economic impacts (benefits) of SBM. The study focused on the household and community financial and economic benefits as well as costs of improved sanitation and hygiene.The study found that on an average, every household in an open defecation free village saved about ₹50,000 per year on account of financial savings due to lower likelihood of disease from using a toilet and practicing hand washing and the value of time saved due to a closer toilet. Cost-

benefit ratios were presented under different perspectives, thus allowing conclusions to be drawn about the impact of the intervention on households, each with different policy conclusions. On the other hand, costs included investment and operational costs for toilet and hand washing station, including subsidies or resources provided by government or non-state actors, as well as financial and non-financial costs to households.

8.21 The findings of the study suggest that when costs and benefits are compared over a 10-year time period and when 100 per cent of households in a community use a toilet, the financial savings exceed the financial costs to the household by 1.7 times, on average. For the poorest households, the value is higher at 2.4 times. When household time savings (from closer toilet access and less sickness) and the time for cleaning and maintaining the toilet are valued, the benefits exceed costs by 3.0 times. When benefits of lives saved are included, the benefits exceed costs by 4.7 times. If the government contribution to the toilet cost is included, reflecting a broader societal perspective, the benefits exceed costs by 4.3 times (Table 2).

Table 2: Benefit-cost ratios from different perspectives at rate of toilet use of 100 per cent

	Household Financial Perspective	Household financial perspective + time impacts	Household financial perspective + time impacts+ lives saved	Social perspective(includes government subsidy)
All	1.7	3	4.7	4.3
Poorest	2.4	4	7	5.8
Q2	1.4	3.3	5.4	4.7
Q3	1.6	2.9	4.5	4
Q4	1.7	2.9	4.3	3.9
Richest	2.1	2.8	4	3.7

Source: Financial and Economic Impacts of Swachh Bharat Mission in India- UNICEF

8.22 In terms of the impact of SBM on the physical environment, a very recent study by UNICEF, in association with MoDWS indicates considerable impact on combating contamination of water, soil and food. The study was conducted on the basis of a list of ten ODF and ten non-ODF villages each in the states of Odisha, Bihar and West Bengal (total of 20*3=60 villages). Four villages of each classification (ODF versus non-ODF) were randomly selected from the shortlisted villages in each of these states (total of 8*3=24 villages). Overall, in terms of faecal contamination, ODF villages were, on average:

- 11.25 times less likely to have their groundwater sources contaminated (12.7 times less from contaminants traceable to humans alone).
- 1.13 times less likely to have their soil contaminated, 1.48 times less likely to have food contaminated and 2.68 times less likely to have household drinking water contaminated.

8.23 The findings from the study indicate that these substantial reductions may potentially be attributed to the improvement in sanitation and hygiene practices, as well as supportive systems such as regular monitoring.

WAY FORWARD

8.24 SBM has brought in a remarkable transformation and traceable benefits to the society as a whole. It is one of the largest cleanliness drives in the world. Many States have achieved the status of 100 per cent ODF and IHHL coverage, thereby has led to a sea change in the dignity of people, especially women. This mission acts as a driver for eliminating the gender disparity through the construction of gender-specific latrines in public areas such as schools, roads and parks. This public movement will have indirect positive impact on society by increasing the enrolment ratio of girls in schools and improving health standards.

8.25 Through SBM, 99.2 per cent of the rural India has been covered. Since October 2, 2014 over 9.5 crore toilets have been built all over the country and 564,658 villages have been declared ODF. India's phenomenal journey towards sanitation for all has ensured the social, environmental and economic gains by ensuring that the behavioural change gets rooted in people's consciousness. The Mission has brought one of the largest behavioural changes in its citizenry. The mission mirrors the National Developmental priorities by focusing on the gender equality and women empowerment. Importantly, it is also aligned with the 2030 global sustainable development agenda and SDGs especially the SDG 6.2 – "By 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations".

8.26 Yet, India's challenge is an enormous one. Construction of toilets is one part of the solution for a clean India. There are various facets for a clean India. The dream of clean India can only be realized by addressing these multiple facets – maintaining a culture of *swachhata* at public places beyond individual houses, cleaning water bodies, scientific waste management, dealing with plastic menace, controlling air pollution, etc.

8.27 To sustain the momentum created and behavioural change, a number of actions would have to be taken on a continuous basis such as motivation of "agents of change" at the ground level, impart training to field agents, appointment of sanitation Ambassadors to campaign and create awareness especially on health benefits, obtain systematic feedback from users. Attention must also be accorded to the sewer construction and water availability.

8.28 Going forward, SBM should focus on achieving 100 per cent disposal of solid and liquid waste. Currently, many states are not concentrating enough on this aspect which could pull us back to where we were a few years back. Scientific techniques for the safe and effective disposal of waste should be the next on the agenda for this mission. As Indian economy grows, people are also on the move for various activities- for better education, for accessing better health, transport, hospitals, and tourism purposes- imparting strongly the culture of *swachhata* at public places and maintaining it should be an important part of clean India.

8.29 The cleaning of rivers should be an integral part of clean India, along with coordinated activities between Centre and States such as treatment of industrial effluence, drain bio-remediation, river surface cleaning, rural sanitation, river front development, afforestation and biodiversity conservation etc.

8.30 To continue the momentum created by SBM, the availability of financial resources intermixed with changing mind-sets have to be ensured. Annual monitoring of the various rural villages of different states has to be guaranteed for the effective formulation of different policies and their implementation. As the resource requirements are large, there

is a need to facilitate and sustain innovative financing mechanisms by exploring the suitability of various financial instruments in specific contexts and interventions. For example, micro-financing, concessional loans, corporate social responsibility and crowd funding align with local government financing. Private Partnership and Corporate Social Responsibility can ensure, in specific contexts, a smooth flow of funds for the procurement of various scientific technologies for waste disposal and awakening masses. However, Governments must assign significant weight to the allocation of adequate resources as improvement in sanitation is one of the key determinants for the wider economic development of the economy.

8.31 A clean India should also lead to environment friendly green India. Keeping the surroundings clean and maintaining hygiene would have tremendous environmental benefits. SBM needs to incorporate environmental and water management issues for long term sustainability and improvements. The issues relating to water availability are expected to be exacerbated by the effects of climate change and incidence of extreme weather events. Investment in the toilet and sanitation infrastructure in future, therefore, demands incorporation of principles of sustainability, circular economy, and adoption of eco-friendly sanitation technologies. Finally, all these efforts together endeavour into culminating a *Swachh* (Clean), *Swasth* (Healthy) and *Sundar* (Beautiful) Bharat that we dreamt for us and future generations to inherit which will be a real tribute to the 'Father of the Nation'.

CHAPTER AT A GLANCE

- SBM, one of the largest cleanliness drives in the world, has brought in a remarkable transformation and traceable health benefits.
- Even 67 years after India's independence, in 2014, around 10 crore rural and about 1 crore urban households in India were without a sanitary toilet; over 56.4 crore, i.e. close to half the population, still practiced open defecation. Through SBM, 99.2 per cent of the rural India has been covered. Since October 2, 2014 over 9.5 crore toilets have been built all over the country and 564,658 villages have been declared ODF.
- Becoming ODF has reduced deaths due to diarrhoea, malaria especially in under-five children, still births and new-borns with weight less than 2.5 kg and thereby improved child health and nutrition. This effect is particularly pronounced in districts where IHHL coverage was lower.
- Financial savings from a household toilet exceed the financial costs to the household by 1.7 times, on average and 2.4 times for poorest households.
- Going forward, SBM needs to incorporate environmental and water management issues for sustainable improvements in the long-term.

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Enabling Inclusive Growth through Affordable, Reliable and Sustainable Energy

09
CHAPTER

"सूर्यआत्माजगतस्तस्थुषश्च"
Sun is the soul of all animate and inanimate
-Rig Veda

Energy is vital for development and prosperity of any economy. India, however, lags behind significantly in energy usage: despite accounting for 18 per cent of world's population, India uses only around 6 per cent of the world's primary energy. Energy poverty has been more pervasive in India than income poverty: 53 per cent of our population could not access clean cooking in 2017 when compared to 30 per cent for China, four per cent for Brazil and less than one per cent for Malaysia. With an increase of per capita energy consumption by 2.5 times, India will be able to increase its real per capita GDP by US$ 5000 (in 2010 prices). Additionally, if India has to reach the HDI level of 0.8, it has to increase its per capita energy consumption by four times. India's emphasis on energy efficiency over the decades has helped significantly in serving the country's energy needs. Energy efficiency programmes have generated cost savings worth more than ₹50,000 crores and a reduction of about 110 million tons of CO_2 emission in 2017-18. While the share of renewables in total generation has increased from 6 per cent in 2014-15 to 10 per cent in 2018-19, India still needs investment in renewable energy of more than US$ 250 billion over the next decade. As electric vehicles represent the next generation in sustainable mobility, India must emphasize on them. Currently, the market share of electric cars is only 0.06 per cent when compared to 2 per cent in China and 39 per cent in Norway. Access to fast charging facilities must be fostered to increase the market share of electric vehicles.

INTRODUCTION

9.1 As witnessed over the past two centuries, energy has been the driving force behind the process of economic development: greater access to energy has fostered economic growth as well as other indicators of human development. India has a per-capita energy consumption of only about one-third of the global average. Within this consumption, access to clean fuel is unevenly distributed spatially in rural vis-à-vis urban areas and socio-economically when seen across income groups. India, therefore, needs to quadruple its per-capita energy consumption to meet the rising aspirations of its citizens. This will also enable India to achieve the human development status of an upper-middle-income country.

9.2 India's energy needs have been complemented by efforts to use energy

efficiently in the last three decades. The overall electricity savings due to adoption of these energy efficiency measures is estimated at 7.21 per cent of the net electricity consumption in 2017-18. Total thermal energy saved is 2.7 per cent of the net thermal energy consumption and 2.0 per cent of the net energy supply during the same period.

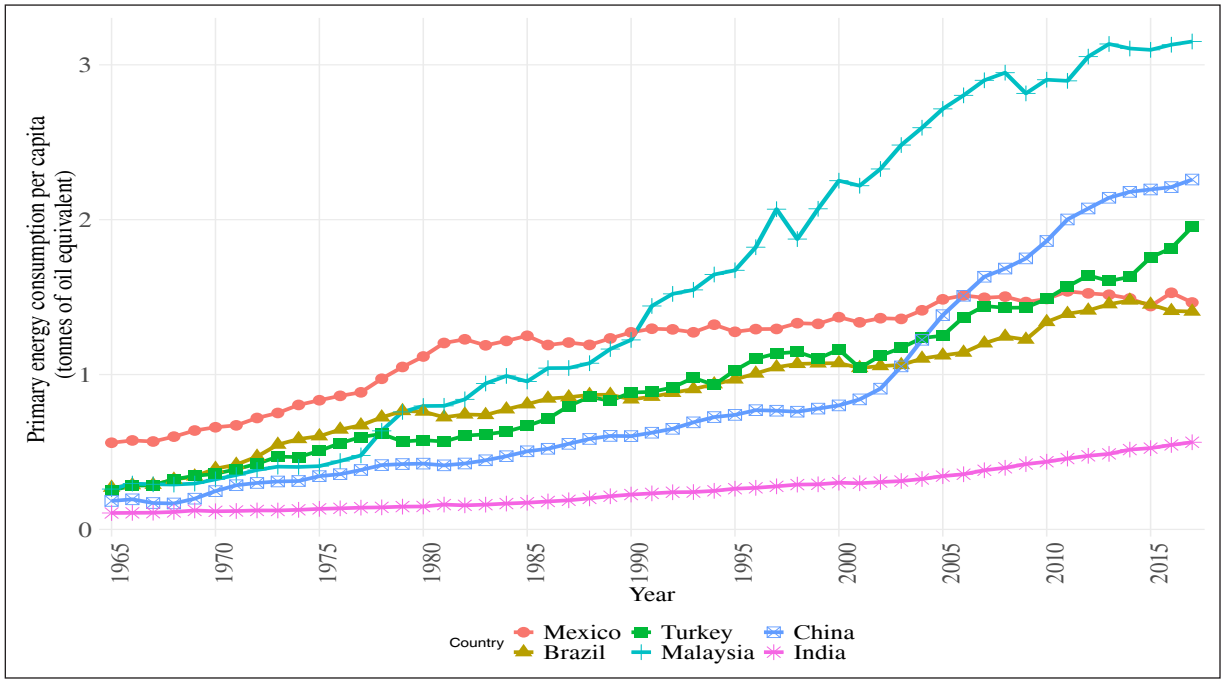
9.3 Further, India has also strived to increase the share of energy from sustainable sources. The share of renewables in total generation has increased from 6 per cent in 2014-15 to 10 per cent in 2018-19. Electric vehicles (EVs) represent the next generation in sustainable mobility and need to be encouraged. The adoption rate of electric vehicles has been slow, largely due to the lack of charging infrastructure in the country and the time taken for completely charging the EVs. A policy push is therefore required to devise universal charging standards for the country as a whole and to provide adequate charging infrastructure.

ENERGY FOR PROSPERITY

9.4 Energy is an integral component of the growth process for any economy. The present day developed countries pursued a path of energy-intensive industrial growth to reach the standards of living witnessed by them today. The upper-middle-income countries have also seen per capita energy consumption rise with their rise in per capita incomes. Though India accounts for around 18 per cent of world's population, it uses only around 6 per cent of the world's primary energy. India's per capita energy consumption equals 0.6 tonnes of oil equivalent (toe) as compared to the global per capita average of 1.8 toe. India's per capita primary energy consumption lags that of the upper-middle-income countries by a considerable margin (Figure 1).

9.5 Historical experience across countries

Figure 1: Per Capita Primary Energy Consumption (1965-2017)

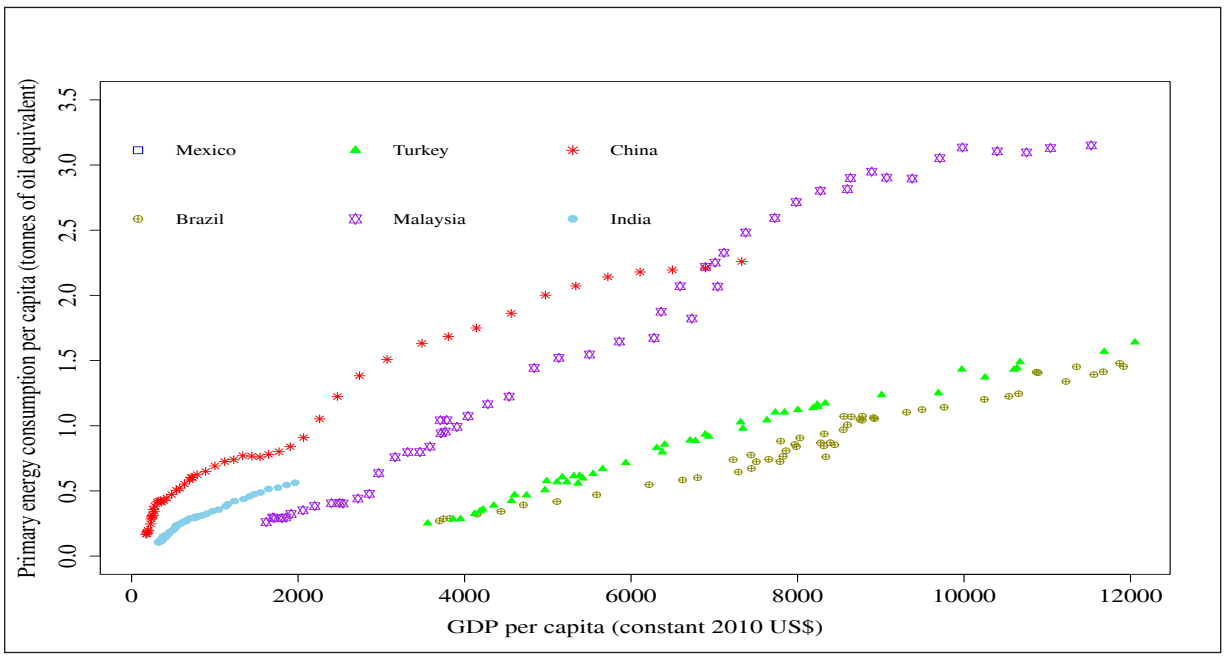


Source: Data on primary energy consumption from BP Energy Statistics, Population and Per-capita real GDP from World Bank Data

shows that in the initial years of economic development, increase in per capita GDP requires a large increase in primary energy per capita. A comparison can be made between India and China, both of which started from low levels of per capita primary energy consumption as well as per capita GDP. However, we can see that China was able to quickly increase its energy consumption and grew rapidly (Figure 2). In the medium-term, for India to achieve per capita GDP comparable to that of the upper-middle-income countries, we require greater energy resources and that too at a rapidly increasing rate. Energy intensity of India's GDP has been declining in the recent past, which is reflective of increases in the efficiency of energy use. However, India cannot become an upper-middle-income country without (i) rapidly raising its share of the global energy consumption commensurate with its share of the global population, and (ii) ensuring universal access to adequate modern commercial energy at affordable prices. It is also important to note that India's energy intensity of GDP started declining at a much lower level of per capita GDP as compared to the developed world. India's primary energy intensity of GDP started declining since 1991 at per capita GDP of around US$ 578 whereas US primary energy intensity of GDP started declining since 1970 at per capita GDP of around US$ 23,309 (at constant 2010 US$).

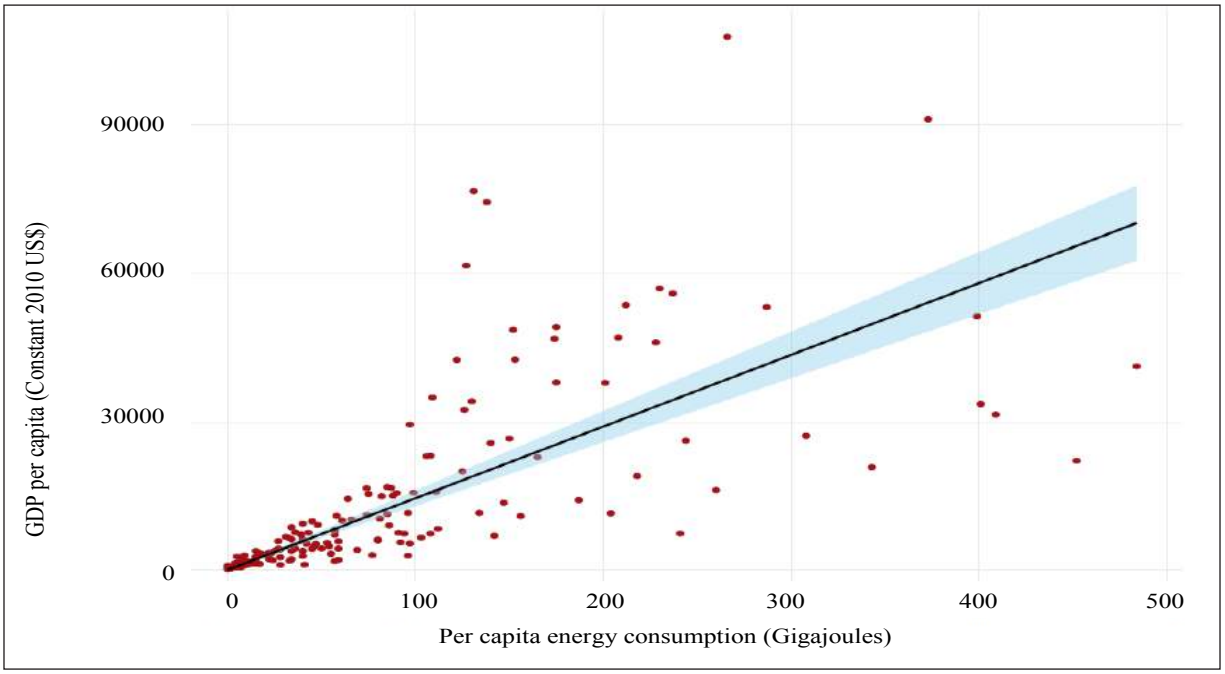
9.6 Figure 3 shows the relationship between per capita energy consumption and corresponding real per capita GDP for around 170 countries for the year 2017. A simple linear regression between the two variables indicates that one Gigajoule increase in energy consumption per capita corresponds to an increase of US$ 145 per capita in 2010 prices. Thus, India will have to increase its per capita consumption from the current 24 Gigajoules by 2.5 times to increase its real per capita GDP by US$ 5000 in 2010 prices, which will also enable it to enter the upper-middle income group. This will require huge energy resources that would also need to increase with time.

Figure 2: Per Capita Primary Energy Consumption and Per Capita GDP (1965-2017)



Source: Data on primary energy consumption from BP Energy Statistics, Population and Per-capita real GDP from World Bank Data

Figure 3: Per capita energy consumption and per capita GDP for various countries (2017)



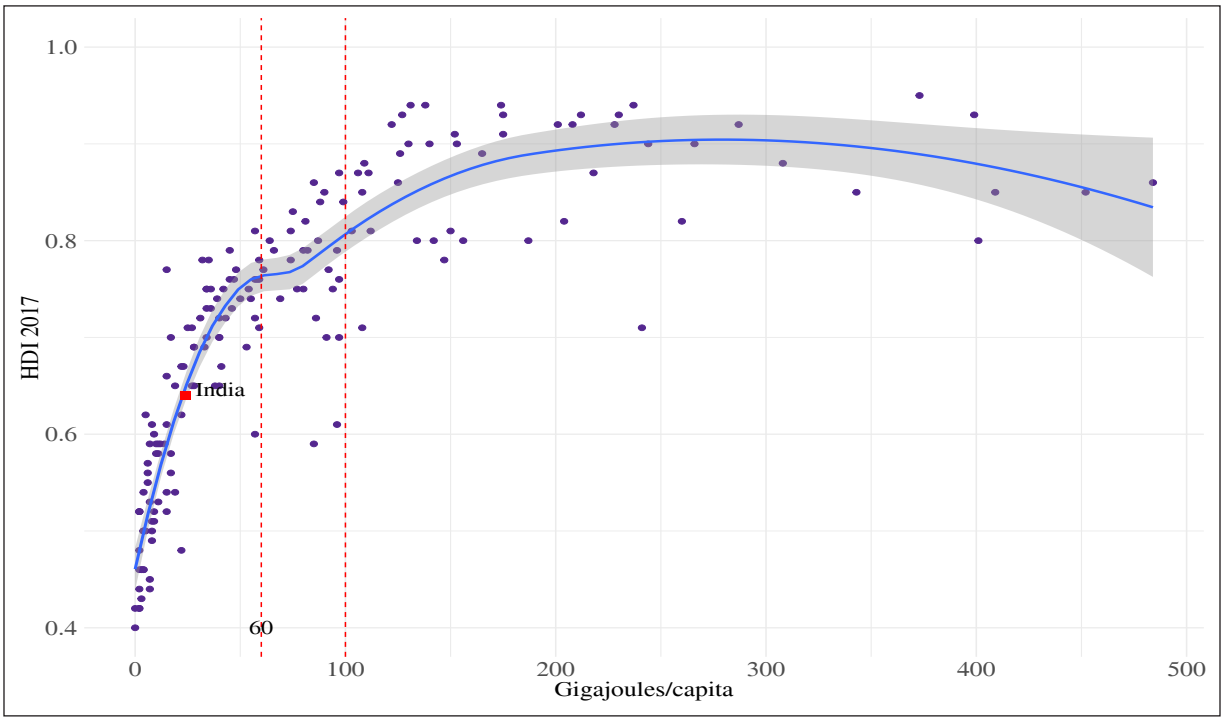
Source: Data on Per capita energy consumption from BP Energy Outlook 2019 and per capita GDP at constant 2010 US$ from World Bank Data.

9.7 Access to energy is important not just in its own right but also due to its linkages with other social indicators. The Sustainable Development Goal (SDG) No.7 on Affordable and Clean Energy is closely related to all other SDGs. This is highlighted by the strong relationship between Human Development Index (HDI) and Per capita energy consumption (Figure 4). At low levels of energy consumption, increases in per capita energy consumption leads to considerable increases in human development. The curve fitted to the data indicates that for countries in the sub 100 Gigajoules per capita energy consumption region, small increases in energy consumption correspond to large increases in HDI. A country with 100 Gigajoules of per capita energy consumption has, on an average, HDI of around 0.8 which is considered to be very high human development (http://hdr.undp.org/en/composite/HDI). India had a per capita energy consumption of 24 Gigajoules and a HDI of 0.64 in 2017 i.e., medium human development. India would have to quadruple its per capita energy consumption to reach a HDI of 0.8 and enter the group of countries with high human development.

ACCESS TO ENERGY – ENERGY POVERTY

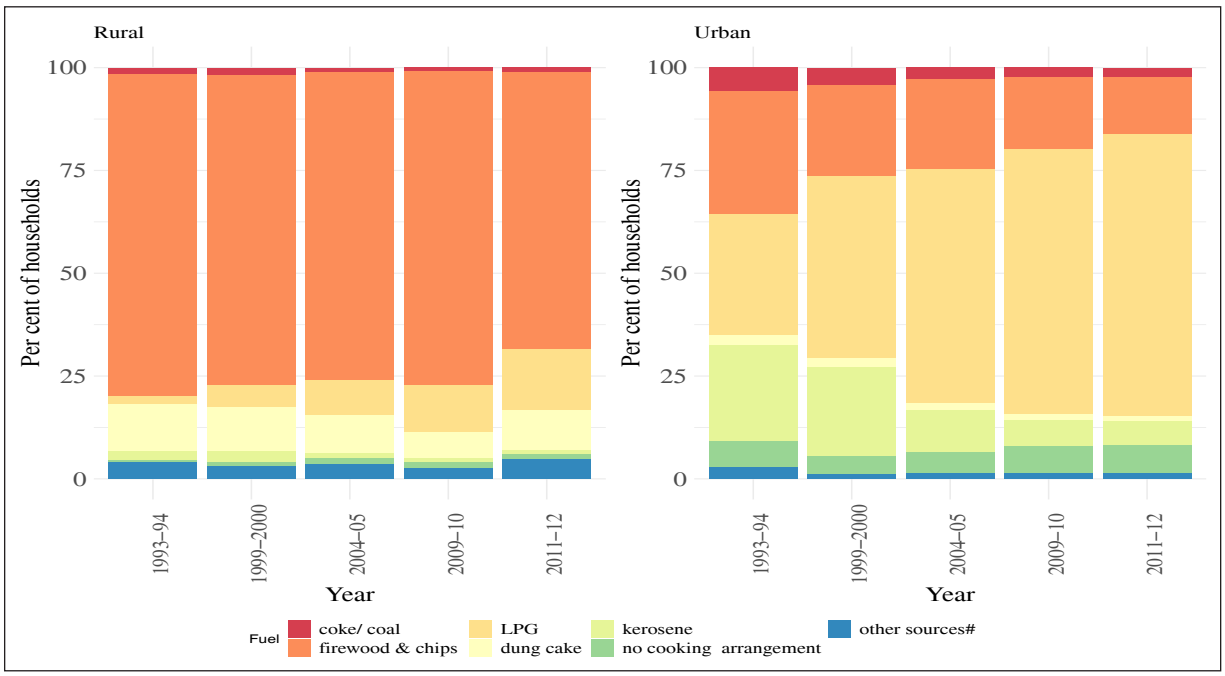
9.8 There is wide disparity between urban and rural areas in access to energy. A large proportion of the population especially in rural areas relies on non-commercial biomass such as firewood and dung cakes for their cooking/heating needs, thereby exacerbating health concerns due to poor indoor air quality. While the share of Liquefied Petroleum Gas (LPG) as a cooking fuel has increased over the years, the share of households reporting it to be as the primary source of energy for cooking has been low in the rural areas when compared with the urban areas (Figure 5). It is heartening to see a wide acceptance of LPG as the cooking fuel in urban areas.

Figure 4: Human Development and Per Capita Energy Consumption for a cross-section of countries (2017)



Source: Data from BP Energy Outlook 2019

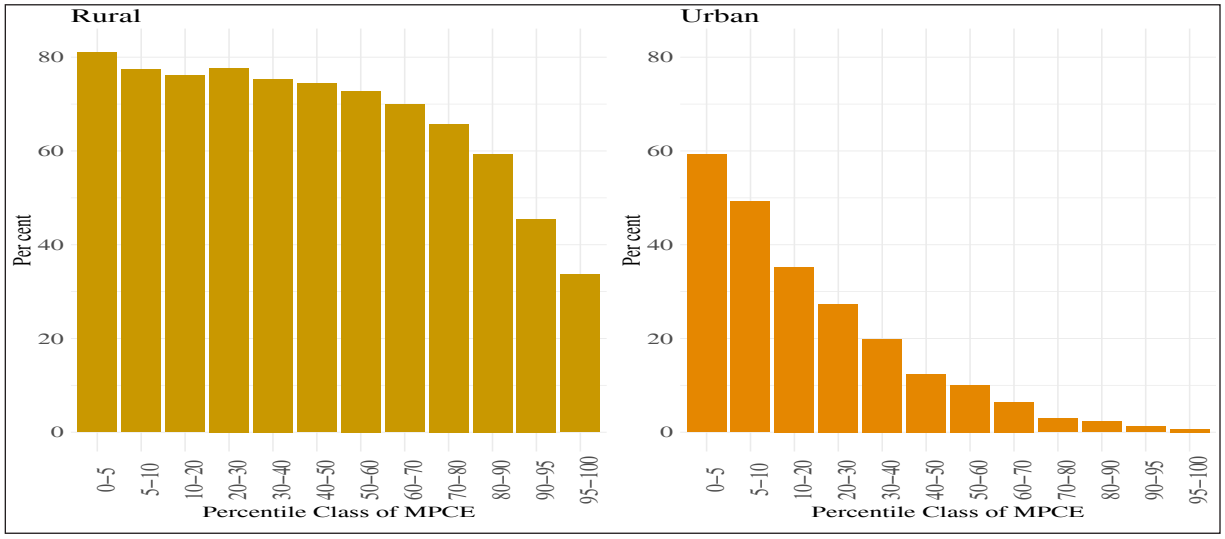
Figure 5: Distribution of households by primary source of energy used for cooking: all-India, 1993-94 to 2011-12



Source: Data from NSSO Report No.567: Energy Sources of Indian Households for Cooking and Lighting, 2011-12

Note: # includes gobar gas, charcoal, electricity, others

Figure 6: Percentage of households reporting 'firewood and chips' as primary source of energy for cooking (2011-12)



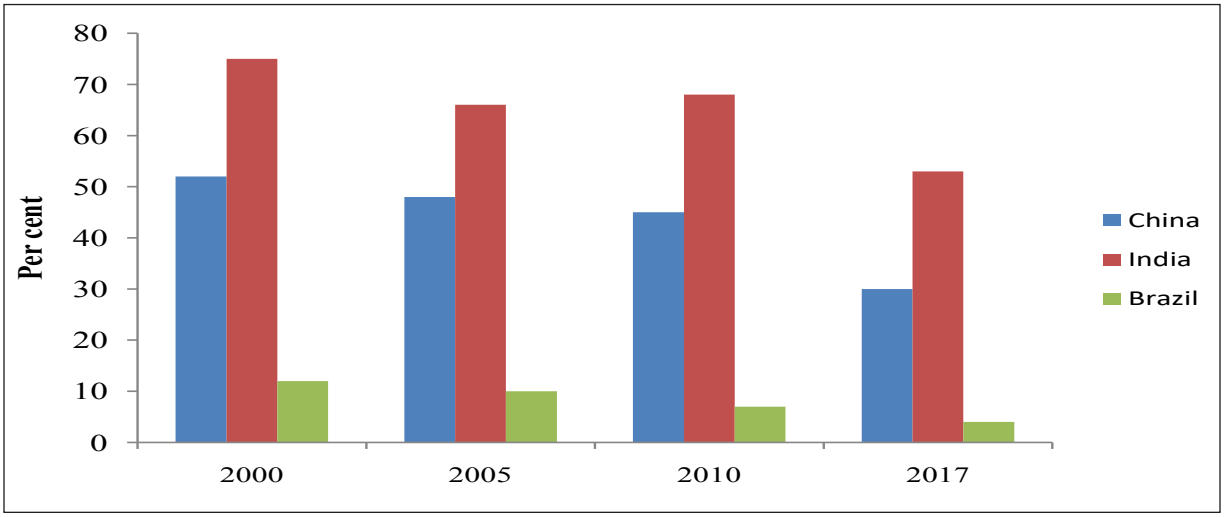
Source: Data from NSSO Report No.567: Energy Sources of Indian Households for Cooking and Lighting, 2011-12

Note: # includes gobar gas, charcoal, electricity, others MPCE=Monthly Per Capita Expenditure

9.9 While there is a large gap in energy access between the rural and urban areas, there remains a wide variation in the energy access between the households at various economic strata. Using the data from latest available consumer expenditure round of National Sample Survey, i.e. 2011-12, we find that around 81 per cent of rural households and 59 per cent of urban households in lowest five percentile classes of expenditure reported firewood & chips as their primary source of energy for cooking (Figure 6). As we move up the expenditure classes, we find that the reliance on firewood and dung cakes keeps falling and the use of LPG gains importance. However, even at the top five percentile classes in the rural areas, around 34 per cent of households in 2011-12, which is the latest year for which this data is available, reported firewood and chips to be the primary source of energy for cooking while only around 50 per cent of these households reported LPG as their primary energy source for cooking. This indicated that the problem of energy poverty has been more pervasive than income poverty. The access to clean cooking fuel has increased considerably in the recent years, especially through the efforts of the Government of India such as the Ujjwala scheme (Figure 7). As per IEA-1(2018), in 2017, 53 per cent of the population in India did not have access to clean cooking when compared with 68 per cent in 2010. However, this remains low when compared with other upper-middle-income countries such as 30 per cent for China, 4 per cent for Brazil and less than 1 per cent for Malaysia.

9.10 Government has been taking conscious efforts to make clean cooking fuel available to households. Pradhan Mantri Ujjwala Yojna was launched in 2016, with the aim to safeguard the health of women and children by providing them with clean cooking fuel. Around 7 crore LPG connections have been provided till April 2019 under the Scheme. Direct Benefit Transfer for LPG consumer (DBTL) scheme namely, 'PAHAL', in 54 districts of the country on 15 November, 2014 has also been launched to rationalize subsidies based on approach to cut subsidy leakages. As on 5 March, 2019, 24.39 crore LPG consumers have joined the scheme. LPG consumers, who join the PAHAL scheme, will get the LPG cylinders at non-

Figure 7: Percentage of population without access to clean cooking



Source: Data from IEA World Energy Outlook 2018

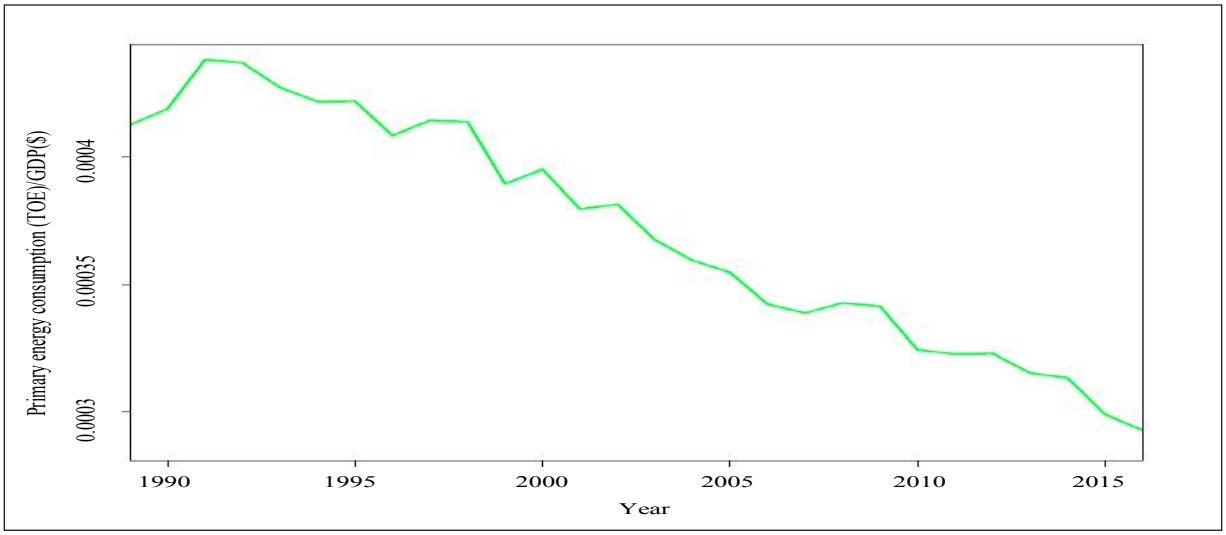
subsidized price and receive LPG subsidy (as per their entitlement) directly into their bank accounts. PAHAL has been recognized by the "Guinness Book of World Record" as the World's Largest Direct Benefit Scheme.

ENERGY EFFICIENCY

9.11 While India focuses in increasing its energy production and consumption, ensuring access to electricity for all and improving living standards, it also strives to ensure that it follows a growth path that delivers sustainable development and protect the environment. A large part of India's energy story also comes from the various energy efficiency measures that the country has implemented over the years.

9.12 The primary energy intensity of India's GDP has followed a falling trend over the years (Figure 8). India's primary energy intensity of GDP has fallen from 0.0004 toe in 1990 to 0.0002 toe in 2017. India understood the importance of energy efficiency measures

Figure 8: India's Primary Energy Intensity of GDP (1990-2017)



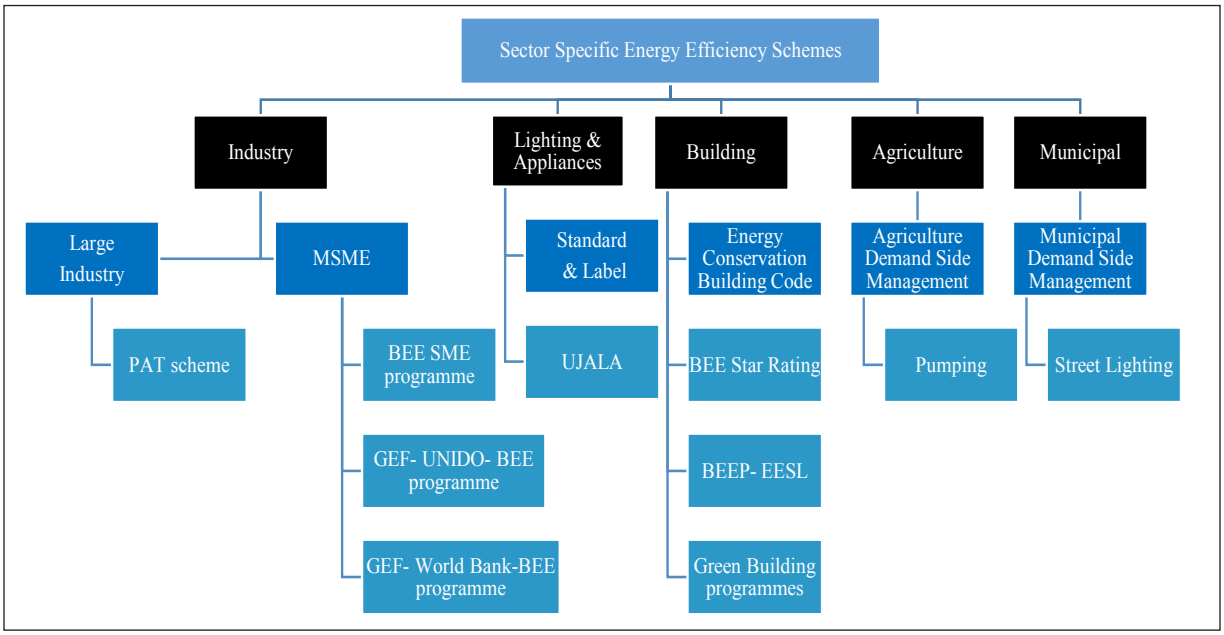
Source: Data on primary energy consumption from BP Energy Statistics, real GDP from World Bank Data

reasonably early in its economic development path and has embraced a number of energy efficiency measures in the last three decades. The aim of this section is to provide the reader an analysis of the impact of energy efficiency measures in terms of energy saved, emissions avoided, cost savings realized.

9.13 The term energy efficiency broadly means using lesser amount of energy to produce a given amount of output. For example, a light-emitting diode (LED) light bulb requires less energy than an incandescent light bulb to produce the same amount of light i.e., it is more energy efficient.

9.14 The institutional and legal framework in the country for energy efficiency has been strengthened through the Energy Conservation Act in 2001, which created the Bureau of Energy Efficiency (BEE). The overall size of the energy efficiency market in India is estimated to be US$ 22.81 billion (Energy Efficiency Services Limited (EESL's Business Plan, 2016-2021). Realizing the potential, Government of India with BEE in the lead undertook a number of schemes for promoting energy efficiency in various sectors across India (Figure 9 and Box 1).

Figure 9: Sector Specific Energy Efficiency Schemes



Box 1: Energy Efficiency Programmes: A Brief

Standards & Labelling Programme was launched in May, 2006 with an objective of providing the consumer an informed choice about the energy and cost saving potential of the labelled appliances/ equipment being sold commercially. This scheme entails laying down minimum energy performance norms for appliances/equipment, rating the energy performance on a scale of 1 to 5 with 5 being the most energy efficient one. The programme covers 23 appliances out of which 10 appliances are under the mandatory regime while the remaining 13 appliances are under the voluntary regime.

Buildings: The Energy Conservation Building Code (ECBC), which sets minimum energy standards for new commercial buildings having a connected load of 100 KW or contract demand of 120 KVA or more, has been updated by BEE in 2017. BEE has also launched the Eco-Niwas Samhita (Part 1: Building Envelope) for residential buildings in December, 2018. Hotels have also been assigned mandatory targets for reducing their energy consumption.

Small & Medium Scale Industries: BEE has implemented various energy efficiency demonstration projects in Textile, Bricks and Food Clusters. Post implementation energy audits have also been conducted in these clusters to measure the savings achieved by implementation of Energy Efficient Technologies.

Transport: Corporate Average Fuel Efficiency (CAFE) norms for passenger cars have been notified in April, 2015 and the fuel efficiency norms for Heavy Duty Vehicles for Gross Vehicle Weight greater than 12 tonnes were notified in August, 2017. Further, the fuel efficiency norms for light and medium commercial vehicles are under finalization and are being developed for tractors. BEE is also working towards faster adoption of electric vehicles and labelling program for vehicles.

Demand Side Management (DSM) Programmes: BEE had launched its demand side management schemes covering the areas on Agriculture, Municipal, and Distribution Companies (DISCOMs). Under the Agriculture DSM (AgDSM), MoU has been signed between Indian Council of Agricultural Research (ICAR) and BEE to create awareness for energy efficient pump sets and its operational practices. In order to tap the energy savings potential of municipalities, BEE undertook nation-wide awareness programmes to address energy efficiency in water pumping, sewage pumping, street lighting and public buildings across Urban Local Bodies (ULBs) in the country. BEE is carrying out preparation of DSM Action Plan, load research study of DISCOMs and capacity building of DISCOM officials across the country.

Industries: Perform Achieve and Trade (PAT) scheme has been launched for industries, in which mandatory targets are assigned to energy intensive industries for reducing the energy consumption. This is followed by conversion of excess energy savings into tradable instruments called Energy Saving Certificates (ESCerts). PAT cycle-I was completed in 2015 with a saving of 8.67 Million Tonne of Oil Equivalent (MTOE) and mitigation of about 30 million tonne of CO_2 emission. Platform for trading of ESCerts was launched in September, 2017. In total, about 12.98 lakh ESCerts were traded at a cost of about ₹100 crore. PAT Cycle II commenced from April, 2016 in which 621 Designated Consumers (DC) were notified. PAT scheme is being implemented on a rolling cycle basis i.e. inclusion of new sectors/DCs every year. PAT cycle-III was notified with effect from April, 2017 and PAT cycle — IV was notified with effect from 1 April 2018 and PAT cycle -V has commenced from April 2019. Presently under PAT scheme, there are over 800 units participating and by 2020 it is expected that they will be able to achieve energy savings of about 20 MTOE and mitigation of about 70 million tonnes of CO_2 emission.

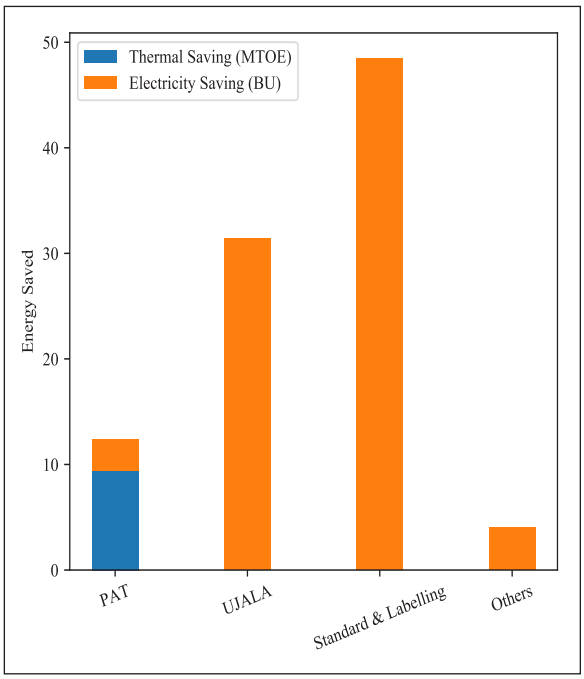
Lighting: With a view to tap the immense potential of LED lamps in reducing the energy requirement the Unnati Jyoti by Affordable LEDs for All (UJALA) programme was launched on 5th January, 2015 with a target to replace 770 million incandescent bulbs with LED bulbs. It was estimated that this would lead to annual energy savings of 100 billion kWh by March, 2019. Energy Efficiency Services Limited (EESL) has been designated as the implementing agency for this programme. LED bulbs under UJALA are distributed at subsidized rates through special counters set up at designated places in different cities across the country. For domestic lights, EESL service model enables domestic households to procure LED lights at an affordable price, with the option of paying the cost of procurement through easy instalments from their electricity bill.

Outreach: The partnership and involvement of consumers is equally important, through behavioural change, in sustaining efficient use of energy and avoidance of wastage. A campaign has been initiated to educate people for conserving energy in air-conditioning application by maintaining optimum temperature settings. BEE has already issued guidelines to large commercial establishment recommending temperature setting between 24° C-26° C without compromising comfort levels. These simple actions have the potential to save energy up to 20 per cent apart from rendering associated health and environment benefits.

Impact of Energy Efficiency Programmes

9.15 The implementation of various energy efficiency programmes has witnessed exceptional performance in terms of reducing energy consumption thereby leading to lower greenhouse gas (GHG) emissions and cost savings. According to a BEE study, overall, this saving has resulted in total cost savings worth ₹53,000 crore (approximately) in 2017-18 and contributed in reducing 108.28 Million Tonnes of CO_2 emission. The contribution is largely from three major programmes – PAT, UJALA and Standard & Labelling (Figures 10 and 11). The overall electricity savings due to energy efficiency measures is 7.21 per cent of the net electricity consumption in 2017-18, total thermal energy saved is 2.7 per cent of the net thermal energy consumption and 2.0 per cent of the net energy supply.

Figure 10: Energy Saved in 2017-18

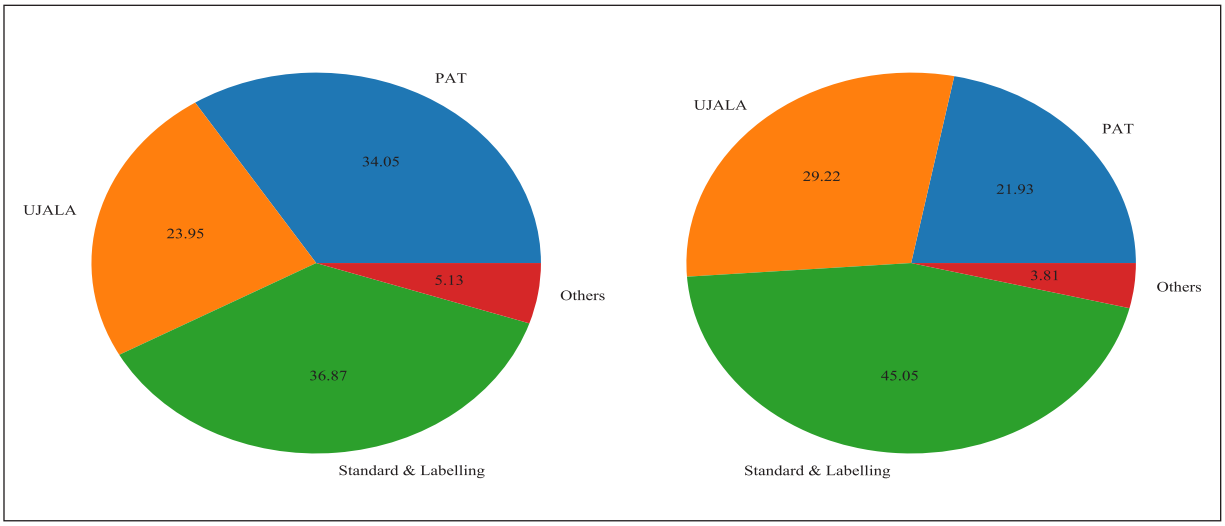


Source: Bureau of Energy Efficiency

Note: BU-Billion Units

Figure 11: Impact of Energy Savings in 2017-18

Reduction in CO_2 emission ($MtCO_2$) | **Monetary Savings (₹Crore)**



Source: Bureau of Energy Efficiency

Energy Saving Potential of Various Sectors

9.16 Going forward, the sectors with possible energy savings need to be identified and estimated for effective policy and programme interventions to realize the potential savings. The energy saving potential in various demand sectors has been estimated by BEE using three scenarios (Table 1).

Table 1: Three Scenarios for estimating energy saving potential

Assumptions by 2031	Technological Improvement & penetration	Policy/program/ scheme initiatives	Change in Fuel mix
Scenario 1: Least effort	No technological change and no new technology penetration	No further implementation of Programs	Current fuel mix
Scenario 2: Moderate effort	Moderate/Business as Usual (BAU) technological improvements and technology penetration as per govt./other agencies target	Successful achievement of program targets	Moderate/BAU fuel mix shift from fossil fuel to Renewable Energy(RE)/electricity based consumption
Scenario 3: Aggressive effort	Aggressive technological improvements and penetration over govt./ other agencies target	Over achievement of program targets	Aggressive fuel mix shift towards RE based consumption in sector (if applicable)

9.17 In light of the above scenarios, the table below shows India's energy saving potential in various demand sectors in 2031. Industrial sector stands out with maximum energy saving potential (Table 2).

Table 2: India's energy saving potential in various demand sectors in 2031.

Sector	Energy Consumption – 2031 (Least Effort)	Moderate Savings-2031		Aspirational Savings - 2031	
	Mtoe	Mtoe	per cent	Mtoe	per cent
Agriculture	64.4	5.7	9	9.9	15
Transport	232.9	15.8	7	23.8	10
Domestic	98.6	12.1	12	15.1	15
Commercial	29.5	4.9	17	6.4	22
Municipal	8.0	0.9	12	1.5	19
Industries	443.4	47.5	11	72.3	16
Total (mtoe)	**876.8**	**86.9**	**10**	**129.0**	**15**
Total (TWh)	**10198**	**1010**	**10**	**1500**	**15**

Source: Bureau of Energy Efficiency

Note: TWh=Terawatt-hour

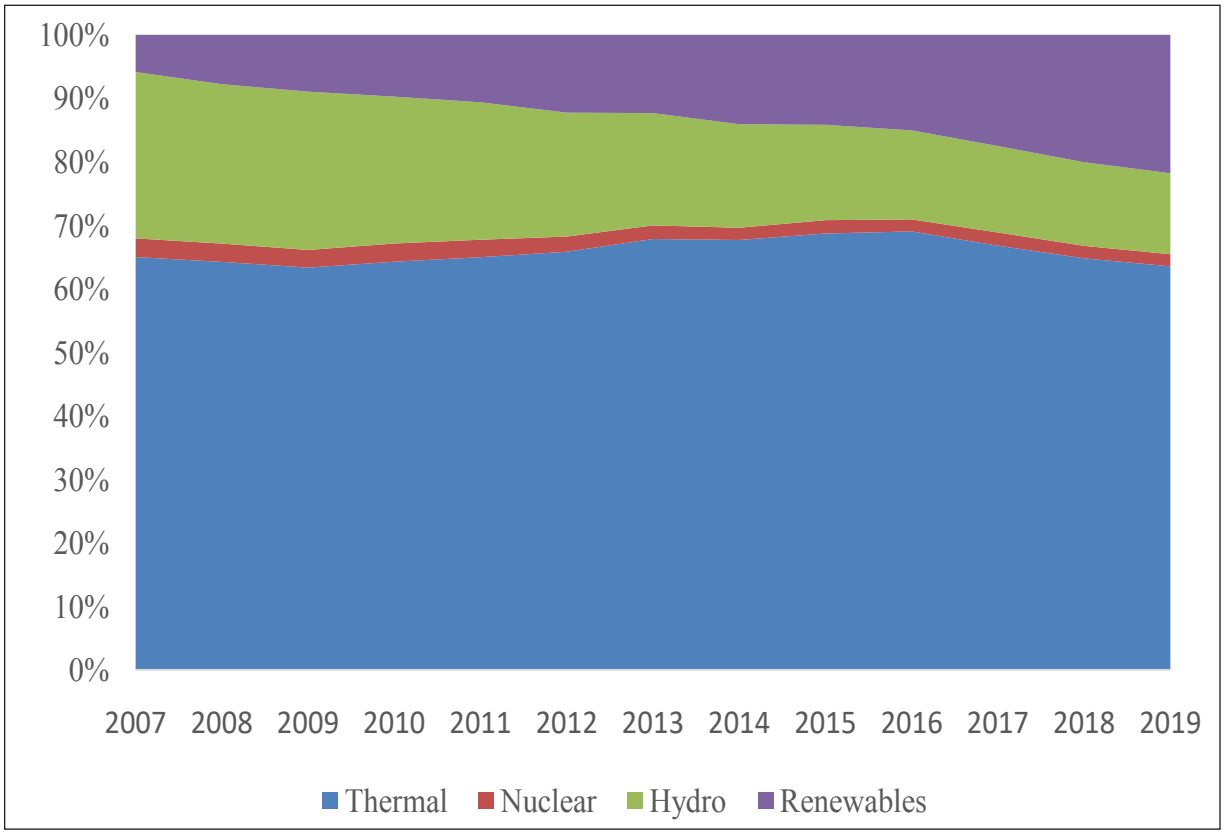
It is vividly clear that there is still great potential to be realized in terms of energy efficiency in various demand sectors. As a country committed to implement the Paris Agreement on Climate Change and SDGs, it is necessary to prepare and plan strategies to unlock the potential to achieve the energy efficiency potential, which should include favourable regulatory structures, strengthened institutional framework, innovative financial structures for affordable financing, use of technology, and increased stakeholder engagement. The existing approaches must be reviewed and a new portfolio of strategies planned to strengthen energy efficiency across all sectors in the country.

SUSTAINABILITY OF ENERGY GENERATION

9.18 Globally, focus has been gradually shifting to non-fossil fuel sources for electricity generation. Despite this, coal remains the largest source of electricity generation mix globally, with 38 per cent market share in 2018 (IEA, 2019). In terms of generation capacity, at the end of 2018, global renewable generation capacity amounted to 2351 GW that constituted around a third of total installed electricity capacity (IRENA, 2019). A look at India's installed capacity for the last decade can tell us the importance that thermal energy has played in meeting India's electricity needs (Figure 12).

9.19 Almost 60 per cent of India's installed capacity is in thermal power out of which the main component is the coal based thermal power plants. India's Nationally Determined Contribution (NDC) under the Paris Agreement states that India will

Figure 12: Share of various energy sources in total Installed capacity in India



Source: Central Electricity Authority

achieve 40 per cent installed capacity of power from non-fossil fuels by 2030. While there has been tremendous increase in the renewable energy capacity, fossil fuels, especially coal, would continue to remain an important source of energy. Further, it may not be advisable to effect a sudden abandonment of coal based power plants without complete utilisation of their useful lifetimes as it would lead to stranding of assets that can have further adverse impact on the banking sector. Further, considering the intermittency of renewable power supply, unless sufficient technological breakthrough in energy storage happens in the near future, it is unlikely that thermal power can be easily replaced as the main source of energy for a growing economy such as India. As such, base load power would have to be continued to be provided by the thermal power plants. Given the sustainable energy objectives of the country and the importance that coal based power plants entail, there is a need for building capacity for cleaner and more efficient coal technologies. Also important is the economy's ability to generate greater output from available energy resources and its resource endowments.

9.20 A comprehensive energy policy should take into consideration the economies of both coal and renewables as they are interdependent. They are substitutes for each other as a source of energy but are complementary in keeping the flow to the grid stable as coal generation represents a stable source of power while renewable energy may be variable.

POTENTIAL OF RENEWABLE ENERGY

9.21 While increasing access to energy is important, it is also imperative that this comes at much lower costs to the environment than it has happened historically in advanced economies. As observed above, there has been arguably a transformation in the energy mix in India. Renewable energy sources are a strategic national resource. Harnessing these resources is a part of India's vision to achieve social equity and energy transition with energy security, a stronger economy, and climate change mitigation. Union Budget 2018-19 announced zero import duty on components used in making solar panels to give a boost to domestic solar panel manufacturers. Government has also offered various financial incentives for off-grid and decentralized renewable energy systems and devices for meeting energy needs for cooking, lighting and productive purposes. Thus, progressively declining costs, improved efficiency and reliability have made renewable energy an attractive option for meeting the energy needs in a sustainable manner and helping India pursue its low carbon development pathway.

9.22 In this regard, India has been undertaking one of the world's largest renewable energy expansion programmes in the world. The share of renewable energy is progressively increasing in the Indian electricity mix. The share of renewables (excluding hydro above 25 MW) in total generation was around 10 per cent in the year 2018-19 compared to around 6 per cent in 2014-15. Now globally India stands 4th in wind power, 5th in solar power and 5th in renewable power installed capacity. The cumulative renewable power installed capacity (excluding hydro above 25 MW) has more than doubled from 35 GW on 31 March 2014 to 78 GW on 31 March 2019. In addition, around 27 GW renewable power capacity is under installation and over 38 GW under bidding. The target is to achieve an installed capacity of renewable based power of 175 GW by the year 2022.

9.23 Government has been taking a slew of measures for the renewable energy sector. Traditionally, renewable energy has been

supported through various fiscal and financial incentives. As the viability of renewable energy has improved drastically in the recent times, tariff discovery is made through reverse auctioning process. The solar tariff has come down from around ₹18/kWh in 2010 to ₹2.44/kWh in bids conducted in 2018. Similarly for wind power, the tariff has declined from an average of ₹4.2/kWh in 2013-14 to ₹2.43/kWh in December 2017. Therefore, the wind power cumulative capacity has exceeded 35.6 GW.

9.24 Recent years have seen rapid growth in installed solar generating capacity along with significant improvements in technology, price, and performance. Moreover, creative business models have spurred investment in this sector. The initial target of the National Solar Mission upto the year 2022, was to install 20 GW solar power, which was further enhanced to 100 GW in early 2015. The solar power installed capacity has increased around 1000 times from 25 MW as on 31 March, 2011 to 28.18 GW as on 31 March, 2019.

9.25 Priority has been accorded to seamless integration of renewables into the grid and better grid stability. In order to facilitate smooth integration of increasing share of renewables into the national grid, Green Energy Corridor project continues to be in operation. Eleven Renewable Energy Management Centres are already at different stages of installation.

9.26 Kisan Urja Suraksha Evam Utthaan Mahabhiyan (KUSUM) scheme has been launched for providing financial and water security to farmers and for de-dieselization of the farm sector. The scheme envisages around 2.75 million solar pumps and, on a pilot basis, 1 GW decentralized solar power plants in uncultivable lands of farmers to enhance income of farmers.

9.27 Broad estimates suggest that additional investment in renewable plants for upto the year 2022 (without transmission lines) would be about US$ 80 billion at today's prices and an investment of around US$ 250 billion would be required for the period 2023-2030. Thus, on an annualized basis, investment opportunity for over US$ 30 billion per year is expected to come up for the next decade and beyond.

9.28 India has great potential for hydro power generation. However, the utilisation of hydro power for meeting the power generation needs have been limited. India has a hydro potential of around 145320 MW, out of which 45400 MW have been utilised. As we move towards greater energy requirements in future, this source of energy, which is climate friendly compared to traditional sources of power, can play a major role. However, high tariffs have been a major obstacle. To encourage the hydro sector, a new Hydro Policy has been approved which includes recognising large hydropower projects as a renewable energy source. Further, tariff rationalization measures have been undertaken, including providing flexibility to the developers to determine tariff by back loading of tariff after increasing project life to 40 years, increasing debt repayment period to 18 years and introducing escalating tariff of 2 per cent, budgetary support for funding flood moderation component of hydropower projects on a case-to-case basis, and budgetary support for funding cost of enabling infrastructure i.e. roads and bridges on a case-to-case basis.

9.29 While access to greater and cleaner energy resources and increasing the efficiency of energy resources are important, another area that has tremendous potential is electric mobility.

ELECTRIC VEHICLES (EVs) IN INDIA

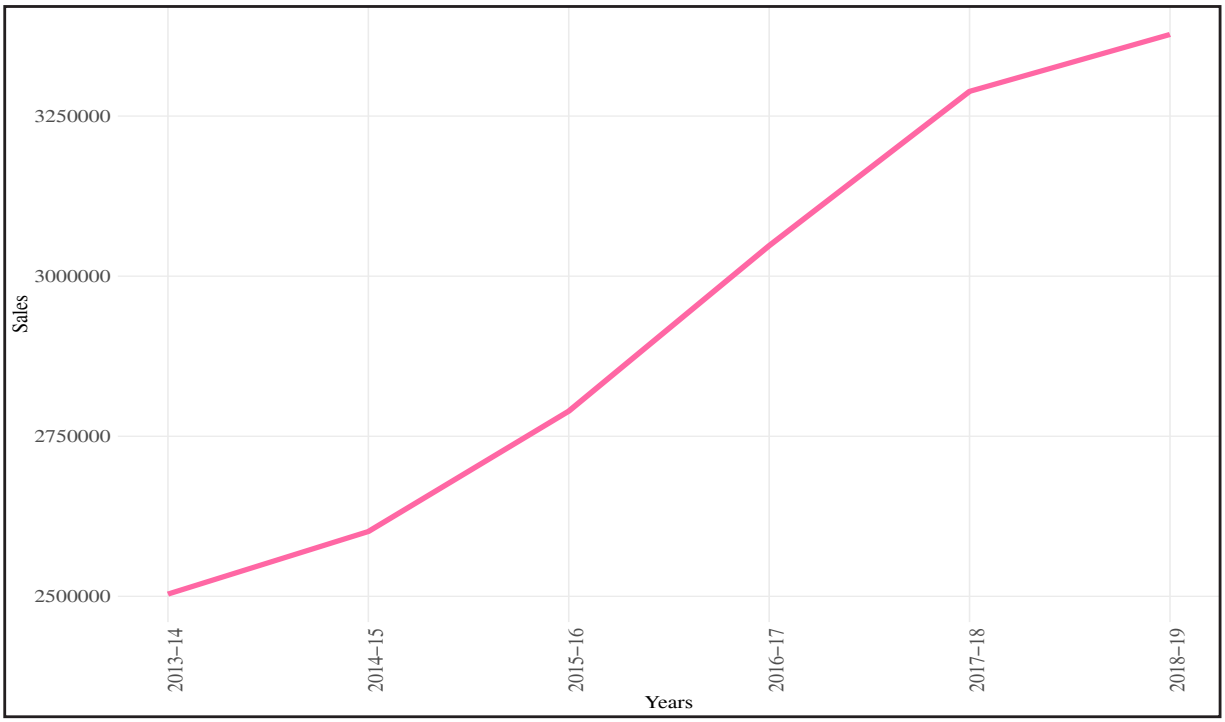
9.30 With the world's second largest

population and an area of 3.3 million square kilometers, it is not difficult to understand how important the transport sector is for the Indian economy. In India, transport sector is the second largest contributor to CO_2 emissions after the industrial sector. Road transport accounts for around 90 per cent of the total emissions in the transport sector in India (MOEF&CC, 2018). Increasing vehicle ownership, as is evident from Figure 13, has also meant that the demand for the fossil fuels for these vehicles has also increased. Given the large import dependence of the country for petroleum products, it is imperative that there be a shift of focus to alternative fuels to support our mobility in a sustainable manner.

9.31 While the government has given an impetus to the promotion of quality public transport, especially through the introduction of metro projects in various major cities, a shift to electric mobility in road transport can lead to beneficial results. India could also emerge as a hub for manufacturing of such vehicles. With this view, a "National Electric Mobility Mission Plan 2020 (NEMMP)" was conceived with an objective to achieve sales of 60-70 lakh units of total EVs by 2020. In 2015, the Faster Adoption and Manufacturing of Electric vehicles (FAME) scheme was launched to fast-track the goals of NEMMP with an outlay of ₹795 crore. The initial outlay was for a period of 2 years, commencing from 1 April 2015, which was extended up to 31 March, 2019. FAME India Phase II has been launched, with effect from 1 April 2019, with a total outlay of ₹10,000 Crore over the period of three years. Emphasis in this phase is on electrification of public transportation.

9.32 In addition to the initiatives of the Government of India, several states, including Karnataka, Kerala, Telangana, Maharashtra and Andhra Pradesh, Uttar Pradesh, Uttarakhand, have drafted EV policies to complement the national policy

Figure 13: Domestic passenger vehicle sales in India



Source: Data from SIAM

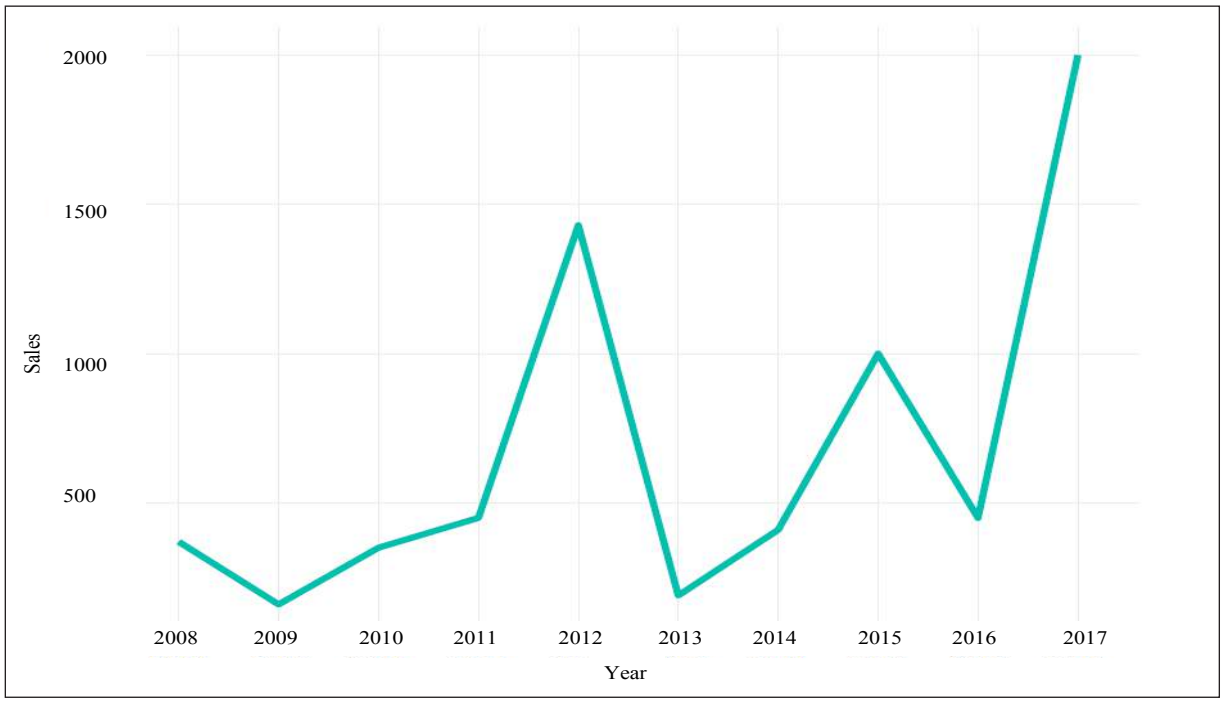
Note: Only Aug 2018 -March 2019 data is available for 2018-19

and address state-specific needs. Andhra Pradesh has set a target of 10 lakh EVs by 2024 while Kerala has set a target of 10 lakh EVs by 2022. Maharashtra has announced its draft EV Policy, 2018 to increase the number of registered EVs in the state to 5 lakh. Telangana has targeted 100 per cent electric buses for intracity, intercity and interstate transport for its state transport corporation. Uttarakhand's EV policy has focused on the manufacturing of EVs in the state with incentives for manufacturers of EVs in the MSME sector (NITI Aayog, 2019).

9.33 Globally, the sales of electric cars have been rising at a fast pace from just over 2000 units being sold in 2008 to over 10 lakh in 2017. More than half of the sales were in China (IEA-2, 2018). The market share of electric cars is around 2 per cent in China while it is around 39 per cent in Norway. Electrification of two-wheelers and buses has also picked up pace in the recent years. In 2017, global sales of electric buses were about 1 lakh and sales of two-wheelers are estimated at 3 crore. China accounted for a major part of these sales. Charging infrastructure has also kept pace with almost 30 lakh chargers at homes and workplaces and about 430,151 publicly accessible chargers worldwide in 2017. However, only around 25 per cent of these were fast chargers (IEA-2, 2018).

9.34 In India, electric two wheelers have been the major part of EV sales with sales of around 54,800 in 2018 (NITI Aayog, 2019). Compared to this, sales of electric cars have been only around 2000 in 2017 (IEA-2, 2018). Indian market share of electric cars is a meagre 0.06 per cent. According to the Society of Manufacturers of Electric Vehicles (SMEV), Uttar Pradesh topped the list of the states with highest EV sales of around 6878 units in 2017-18, followed by Haryana at 6,307 units and Gujarat at 6,010 electric vehicles. Maharashtra reported sales of around 4,865 EV units, while West Bengal came in fifth with sales of 4,706 units. Figure 14 showcases the sales of electric cars which includes Battery Electric Vehicles (BEVs) and

Figure 14: Electric Car (BEV and PHEV) sales in India



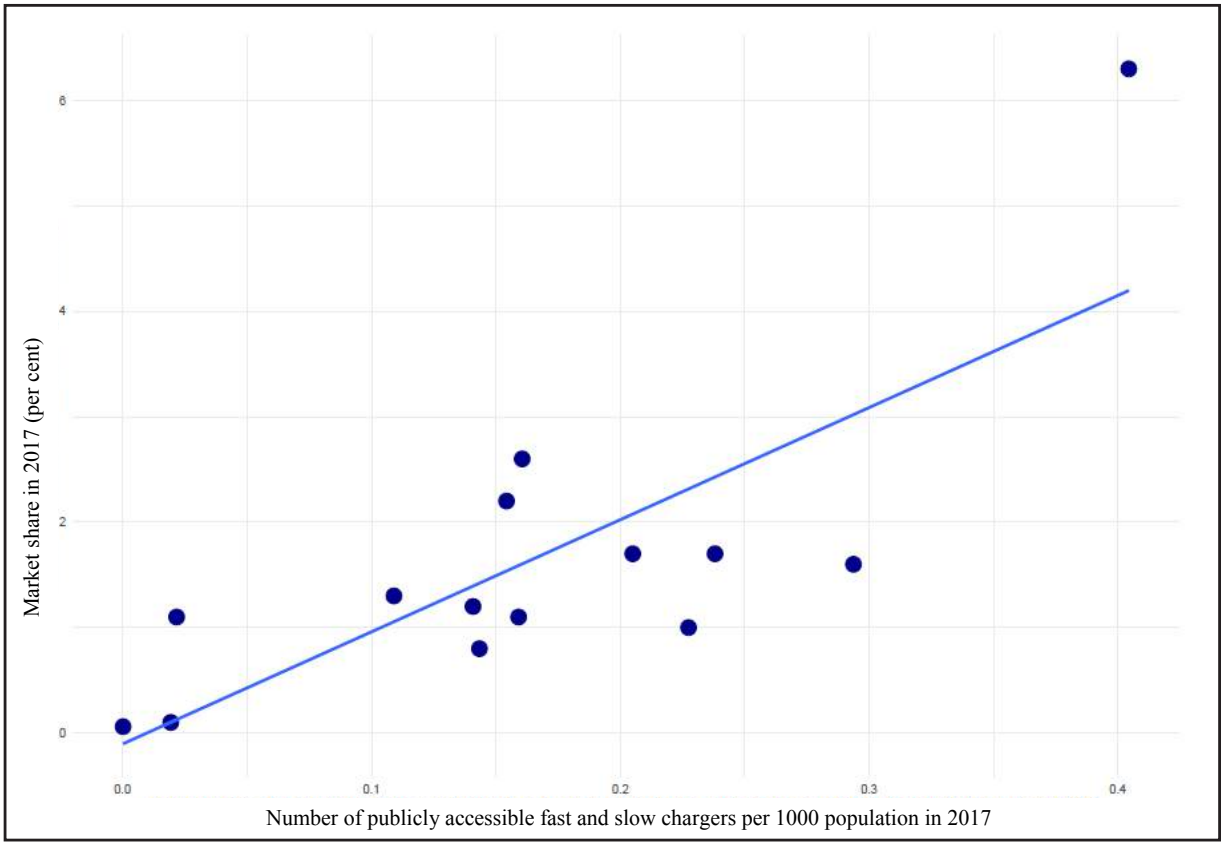
Source: Data from Global EV Outlook 2018

Plug-in Hybrid Electric Vehicles (PHEVs) in India.

9.35 Various incentives have been provided to the buyers and users of electric vehicles in different countries to encourage their uptake. Norway, which has the highest share of electric cars has provided generous incentives to EV buyers and disincentives to the use of conventional vehicles. These include exemption from VAT, tax incentives on import and purchase of EVs, waiver of toll and ferry fees, free parking, etc. Closer home, Chinese government has issued a new energy vehicle (NEV) credit mandate that sets a minimum requirement regarding the production of new energy vehicles (PHEVs, BEVs and FCEVs), with some flexibility offered through a credit trading mechanism in the car industry. Every manufacturer is required to earn minimum NEV credits either through producing or importing NEVs or through the purchase of NEV credits from other manufacturers who have excess credits. Additionally, the subsidy program- with a consistent focus on the investment intensity of the charging and battery infrastructure - seems to have driven the increasing Chinese market share in EVs.

9.36 Given the various incentives given in the different countries, it is only natural to ask whether these incentives have had any impact on the uptake of electric vehicles. While a number of studies seem to indicate that incentives have been effective, some studies have indicated their ineffectiveness and have shown that charging infrastructure is a more important determinant of EV uptake (Hardman et al., 2017). Figure 15 presents the density of publicly accessible chargers and the corresponding market shares of electric

Figure 15: Market share of electric cars and charger density in selected countries in 2017



Source: Data from Global EV Outlook 2018

cars for some countries for which the data was available. Fitting a line through the scatter, we find that the market share of EVs is positively related to the availability of chargers and a larger availability of chargers corresponds to a greater adoption of EVs. The market share of EVs increases with increasing availability of charging infrastructure. This is primarily due to the limited driving range of batteries in the EVs. It, therefore, becomes important that adequate charging stations are made available throughout the road networks. In India, the limited availability of charging infrastructure seems to be a major impediment to increased adoption of EVs.

9.37 Another major impediment is that of time taken for completely charging EVs, compared to conventional vehicles. Even fast chargers can take around half an hour to charge an electric car while slow chargers could take even 8 hours. It is, therefore, an important policy issue to come up with universal charging standards for the country as a whole to enable increased investment in creation of such infrastructure. It is equally important to provide information on public chargers to the users of EVs through online maps and other means such as physical signage. This will encourage increased ease of adoption of EVs. Also, since the battery is the heart of any EV, development of appropriate battery technologies that can function efficiently in the high temperature conditions in India need to be given utmost importance (NITI Aayog, 2018).

9.38 The country's economy is growing and would continue to grow at a rapid pace in the coming years. This presents a great opportunity for the automobile industry as the demand for automobiles would only increase. Given the commitments that India has made on the climate front as a nation and the increasing awareness of the consumers on environmental aspects, it is likely that larger and larger share of automobile sector would be in the form of electric vehicles. According to NITI Aayog (2019), if India reaches an EV sales penetration of 30 per cent for private cars, 70 per cent for commercial cars, 40 per cent for buses, and 80 per cent for 2 and 3 wheelers by 2030, a saving of 846 million tons of net CO_2 emissions and oil savings of 474 MTOE can be achieved. It also provides us an opportunity to grow as a manufacturing hub for EVs, provided policies are supportive. While various incentives have been provided by the government and new policies are being implemented, it is important that these policies not only focus on reducing the upfront costs of owning an EV but also reduce the overall lifetime costs of ownership.

WAY FORWARD

9.39 Energy is the mainstay of the development process of any economy. The priority for the government is ensuring access to sustainable and clean energy sources. Given the close link between energy consumption and various social indicators, this attains even greater importance. Compared to the income dimension of poverty, its energy dimension is even more severe. Government of India initiated a big step in the form of the Pradhan Mantri Ujjwala Yojana, providing access to around 7 crore households under the scheme. The task now is to ensure that households with LPG continue to use the clean fuel for cooking purposes through continued refilling. In terms of household electrification, India has achieved almost 100 per cent with electrification of 21.44 crore households. Not only does India have to meet the energy needs of the future, it has to do so in a more sustainable manner. While renewable energy capacity has been expanded manifold, fossil fuel based energy is likely to continue to be an important source of power.

9.40 Overall, energy efficiency is a strategy that can lead to a win-win situation through better utilisation of energy resources. Future policy direction should orient itself to

enhanced energy efficiency programmes in different sectors of the economy as well as technological solutions to better utilise the natural resource endowments of the country for greater prosperity. EVs hold enormous potential for India not only because it is environment friendly but also because India can emerge as a hub of manufacturing of EVs generating employment and growth opportunities. It may not be unrealistic to visualise one of the Indian cities emerging as the Detroit of EVs in the future. Appropriate policy measures are needed to lower the overall lifetime ownership costs of EVs and make them an attractive alternative to conventional vehicles for all consumers.

9.41 To conclude, India's economic future and prosperity is dependent on her ability to provide affordable, reliable and sustainable energy to all her citizens.

CHAPTER AT A GLANCE

- India with a per-capita energy consumption of about one-third of the global average will have to increase its per capita energy consumption at least 2.5 times to increase its real per capita GDP by $5000 per capita, in 2010 prices, to enter the upper-middle income group.
- Additionally, if India has to reach the HDI level of 0.8, which corresponds to high human development, it has to quadruple its per capita energy consumption.
- India has set ambitious targets for renewable energy and has been undertaking one of the world's largest renewable energy expansion programmes in the world. Now, globally India stands 4th in wind power, 5th in solar power and 5th in renewable power installed capacity.
- Energy efficiency programmes in India have generated cost savings worth more than ₹50,000 crore and a reduction in about 11 crore tonnes of CO_2 emission.
- The share of renewables in total electricity generation has increased from 6 per cent in 2014-15 to 10 per cent in 2018-19 but thermal power still plays a dominant role at 60 per cent share.
- The market share of electric vehicles is only 0.06 per cent in India when compared to 2 per cent in China and 39 per cent in Norway. Access to fast charging facilities must be fostered to increase the market share of electric vehicles.

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Effective Use of Technology for Welfare Schemes – Case of MGNREGS

10
CHAPTER

उद्यमेन हि सिध्यन्ति कार्याणि न मनोरथैः।
Work gets accomplished by putting in effort,
and certainly not by mere wishful thinking

While MGNREGS was made effective from 2006, the streamlining of the programme occurred in 2015 when the government harnessed the benefits of technology. This, inter alia, included the implementation of Direct Benefit Transfer (DBT) and linking it Aadhar linked Payments (ALP). It leveraged the Jan Dhan, Aadhaar and Mobile (JAM) trinity to credit wages directly into MGNREGS workers' bank accounts, thereby reducing scope for delays in payment. This chapter highlights the benefits of careful and effective targeting of government programmes by demonstrating that DBT-enabled MGNREGS has indeed helped to alleviate distress of workers. Post DBT payment delays in the payment of wages, under MGNREGS, has reduced significantly thereby providing livelihood security to people in distress. Both demand and supply of work under MGNREGS increased, especially in districts suffering from distress. The increase in the number of filled muster rolls also implies that distressed workers indeed turn up more frequently for work. The importance of ALP-enabled MGNREGS in alleviating distress is particularly pronounced for the vulnerable sections of society, including women, persons with disability, Scheduled Castes and Scheduled Tribes. As data on demand for work under MGNREGS is available almost real-time, it can be developed into a real-time measure to track distress at the level of a district/panchayat. This evidence highlights that skilful use of technology when combined with an unwavering commitment to monitoring effectiveness of government schemes can make a substantial difference on the ground.

INTRODUCTION

10.1 Today's workforce programs, which are popularly used across the world to alleviate distress and poverty, owe their intellectual origins to "food for work" programs during the rule of Chandragupta Maurya (320 BC to 298 BC). In fact, as acknowledged by Drekmeier (1962), "food for work" is first referred in Kautilya's *Arthashastra*. Much later in 1784, but more than a century before Keynes (1909), Nawab Asaf-ud-Daula started a "food for work" programme to help the famine-stricken people of Lucknow. Some workers were employed during daytime to construct the *Imambara*. Others were hired at night to demolish part of what was constructed during the day time. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), which was enacted through an Act of Parliament in 2005, represents the modern version of such "food for work" programmes in India.

10.2 The programme was operationalized through the Mahatma Gandhi National Rural Employment Guarantee Scheme

(MGNREGS) with effect from February 2, 2006. The programme was initiated to ameliorate rural distress by providing at least 100 days of manual labour at minimum wages to anyone who seeks employment under the program. Creation of productive assets for prescribed quality and durability, social inclusion, gender parity, social security and equitable growth form the founding pillars of the programme.

10.3 The Act states that "the objective of the legislation is to enhance the livelihood security of poor households in rural areas". For the rural poor, even slightest economic distress can be a threat to their livelihood. The programme was, therefore, designed such that rural poor could turn to it in times of need and that it could mitigate distress by providing adequate work in times of distress. This chapter shows that the effective use of technology enhanced the effectiveness, design and targeting of the programme.

10.4 In the first decade of its existence, MGNREGS had been saddled with several inefficiencies, including widespread corruption, political interference, leakage, and significant delay in wage payments (Niehaus and Sukhtankar, 2013a,b; Ravallion, 2012; Agarwal et al., 2016). The programme was reviewed in 2015 and the government initiated major reforms using technology and emphasised on bringing in more transparency and accountability, robust planning and creation of durable productive assets. The scheme was also integrated with the Aadhaar Linked Payments (ALP) system. The ALP leveraged the Jan Dhan, Aadhaar and Mobile (JAM) trinity to provide Direct Benefit Transfers (DBT) to the beneficiary accounts. As a result, the wage payment system underlying MGNREGS was streamlined, thereby reducing the scope for delays in payment (Agarwal et al., 2019).

10.5 For a workforce programme to effectively alleviate distress, timely payment of wages is critical. To conceptually understand the importance of the same, consider two farmers, *A* and *B*. Suppose for the purpose of the illustration, MGNREGS wages are fixed at ₹100 per day of work. Due to bad monsoon, *A*'s crop failed and in order to survive, he seeks work for 100 days under MGNREGS and receives ₹10,000 but after a delay of several months. Thus, *A*'s cash inflow, during his time of economic adversity, is actually zero. Anticipating such delay, farmer *A* would prefer to work in a place where the wages might be lower than MGNREGS but are disbursed on time. This choice enables him to generate the liquidity that he desperately needs in distress. But it is evident that the programme did not meet his needs as the wage payments were not timely. In contrast to farmer *A*, say farmer *B* had a normal harvest. To earn extra money, *B* also enrols for 100 days of work under MGNREGS. He also receives ₹10,000 MGNREGS wages after a delay of several months. However, as farmer *B* is not under duress, he would choose to avail the higher wages under the programme.

10.6 In contrast, in a regime where the MGNREGS payments are made on time, the distressed farmer *A* will definitely choose to enrol for work under MGNREGS instead of seeking alternative avenues to alleviate his distress. If farmers *A* and *B* work under MGNREGS, both receive their wages in a timely and systematic manner. Working for MGNREGS becomes beneficial for farmer *A* as it provides him with the necessary liquidity for survival when he needs it most. Thus, under efficient targeting, incremental demand for MGNREGS work would be greater from distressed workers than from non-distressed workers.

10.7 The simple example above illustrates how: (i) delays in payments can materially drive genuinely distressed farmers away from MGNREGS; and (ii) improvements

in the targeting of MGNREGS to genuine beneficiaries can increase the demand for work from distressed workers, thereby effectively realising the objective of the programme. A person undergoing economic distress needs immediate and certain liquidity. Working for uncertain promised wages, which are likely to be realised with a substantial lag, presents an unattractive proposition for a person in distress as delayed payments effectively imply zero wages in adverse times. Consistent with this thesis, this chapter highlights the benefits of careful targeting of Government programmes by use of technology.

USE OF TECHNOLOGY IN IMPLEMENTATION OF MGNREGS

10.8 Before the implementation of DBT, MGNREGS wages were transferred to the panchayat bank accounts and a significant number of workers had to collect wages in cash from the gram panchayat office. Though attempts were made to implement a system of DBT, two structural constraints limited these attempts. As per a World Bank report[1], until 2015, close to 50 per cent of the country's population did not have bank accounts. The proportion of unbanked population was significantly higher for rural people who are the target group for MGNREGS. In rural India, banking penetration was extremely low. According to the Reserve Bank of India (RBI)[2] ,total banking outlets in villages as of March, 2014 was 1,15,350. This has increased by around five times since then with total banking outlets in villages at 5,69,547 as of March, 2018. Second, verifying the identity of genuine beneficiaries and transferring wages directly into their bank accounts posed problems.

10.9 Various government initiatives have facilitated overcoming these structural constraints. By December, 2015, the total number of Aadhaar enrolments in the country exceeded 100 crore, thereby covering a major portion of the adult population. Linking the Aadhaar Number to an active bank account was the key to implementing income transfers. In 2015, the Pradhan Mantri Jan DhanYojana (PMJDY) was launched to ensure universal access to banking facilities with at least one basic banking account for every household. PMJDY addressed the issue of banking the unbanked population in the country and Aadhaar provided a credible identity source to whoever wanted to open a bank account. The bank accounts of people, including those opened under PMJDY, were linked to their unique Aadhaar numbers, which facilitated cross verification of identities. By expanding the mobile payment options, the Government was able to ease the connectivity issue as people could get access to banking facilities using their mobile phones. So, the JAM trinity enabled the roll-out of DBT by streamlining the validation/verification of beneficiaries as well as the process for release of funds. This ensured timely transfer of funds to the right beneficiary and enabled effective targeting under welfare schemes.

National electronic Fund Management System (NeFMS)

10.10 In order to streamline the system of fund flow and to ensure timely payment of wages, NeFMS was implemented in the year 2016 (Figure 1). Under the system, the Central Government directly credits the wages of the MGNREGS workers, on a real time basis, to a specific bank account opened by the State Governments. All the Programme Officers debit this state-level single account for authorization of wage payment. Currently,

[1] http://datatopics.worldbank.org/financialinclusion/country/india

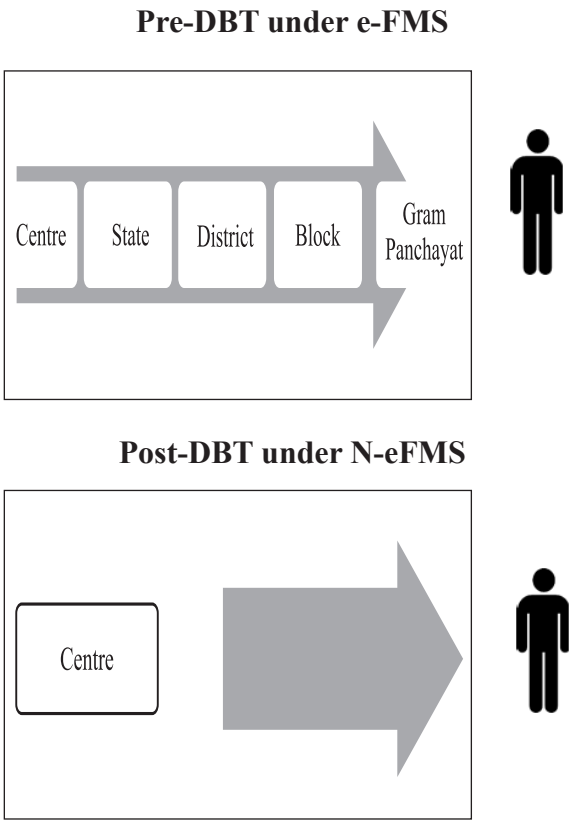
[2] RBI annual reports for years 2014 and 2018

NeFMS is implemented in 24 States and 1 Union Territory wherein payment of wages is being credited directly to the bank/post office accounts of MGNREGS workers by the Central Government. This initiated the implementation of DBT in the Scheme. As a result of this initiative, the e-payment under MGNREGS has increased from 77.34 per cent in FY 2014-15 to 99 per cent in FY 2018-19.

Aadhar Linked Payments (ALP)

10.11 In 2015, the Government introduced ALP in MGNREGS in 300 districts that had a high banking penetration. Remaining districts were covered under ALP in 2016. Conceptually, ALP could speed up the wage payment cycle in the following two ways. First, due to stringent biometric requirements, an Aadhaar linked account is unlikely to belong to a 'ghost' beneficiary. Hence, Government officials require less time to verify and audit claims from such accounts. Second, the Central Government, which ultimately foots the bill for the program, can transfer wages directly to the bank accounts of the beneficiaries, thereby cutting the bureaucratic red tape. Out of the 11.61 crore active workers under MGNREGS, Aadhaar numbers of 10.16 crore workers (87.51 per cent) have been collected and seeded. Almost 55.05 per cent of all the payments under MGNREGS are through Aadhaar Based Payment Systems (ABPS). As shown

Figure 1: Fund flow Pre-DBT and Post DBT

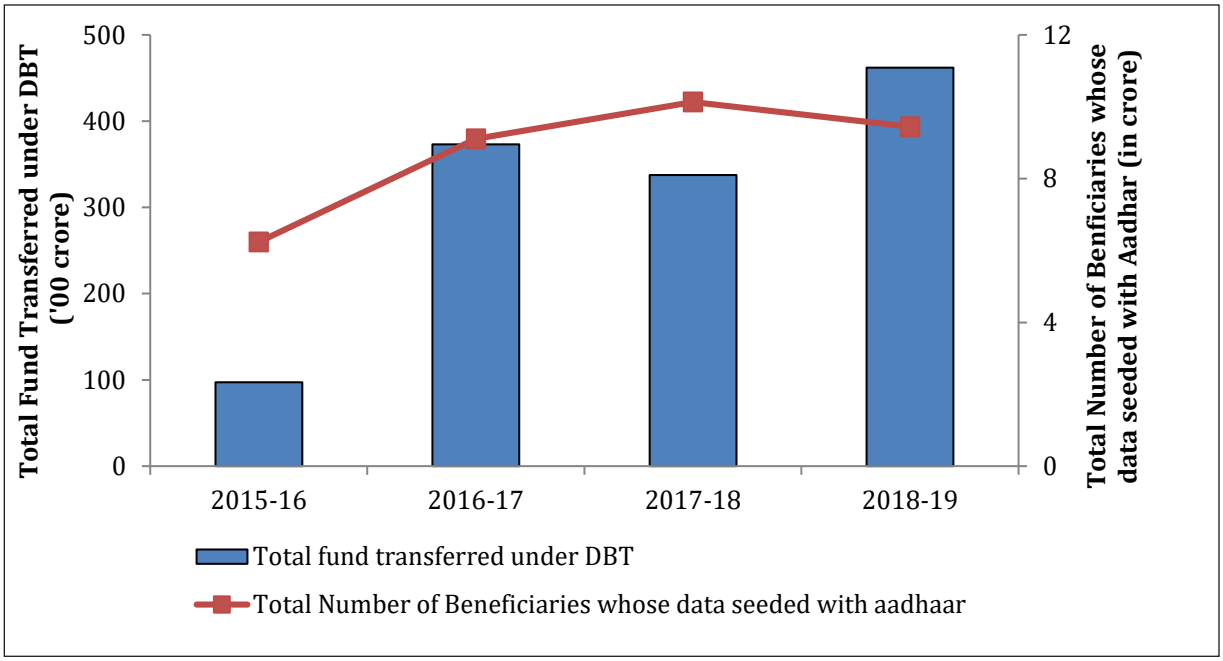


Source: Ministry of Rural Development

Box 1: Perceived Benefits of DBT

- Providing timely release of payments.
- Ensuring correct funds are transferred to correct beneficiaries, reducing corruption & leakages in system.
- Reduction in delays in system for funds transfer (improving programme performance and instilling trust and confidence in system by beneficiaries).
- Strong focus on security, tracking and monitoring of funds (through use of digital sign/signatures and convergence/interoperability),
- Reconciliation process during payments between intermediate agencies involved in funds transfer (near real time tracking, accountability and transparency).
- Streamline the verification process and end to end funds release process in all the beneficiary oriented schemes

Figure 2: Coverage of MGNREGS by DBT



Source: DBT Bharat portal

Box 2: Some Initiatives to streamline MGNREGS

NREGAsoft is a local language enabled work flow based e-Governance system to capture all the activities under MGNREGS at Center/State/District/Block and Panchayat level. It makes available all the documents like Muster Rolls, registration application register, job card/employment register/ muster roll issue register, muster roll receipt register that are inaccessible to the public otherwise.

GeoMGNREGA uses space technology to develop a database of assets created under MGNREGS using technological interventions like mobile based photo geo-tagging and a GIS based information system for online recording and monitoring. As on 10th June 2019, it has been implemented in 31 States and UTs. A total of 3.58 crore projects out of 4.44 crore completed projects are already geo-tagged. The entire data is in public domain and ensures transparency and public disclosure.

Annual Master Circular: A master circular was issued in 2016, which consolidated 1039 advisories that had been issued since the inception of the programme. This Master Circular is amended and issued every year subsequently. This has helped to streamline the implementation of the programme and bringing in clarity.

***Tweaking the wage & material ratio*:** Durable and productive assets are essential for the sustainable livelihood of the poor people in rural areas. The 60:40 wage and material ratio was mandated at Gram Panchayat (GP) level. This often leads to non-productive assets being created simply because 60 per cent has to be spent on unskilled wage in a GP. To address this without diluting 60:40 principles, the wage and material ratio of 60:40 was allowed at the district level rather the GP level.

Emphasis on Individual Beneficiary Schemes: A very large number of Individual Beneficiary Schemes (IBS) like goat sheds, dairy sheds, 90-95 days' work in Pradhan Mantri Awaas Yojana-Gramin (PMAY-G), wells, farm ponds, vermi-compost pits, water soak pits etc have been taken up over the last five years. The emphasis on IBS has resulted in enhanced incomes of the beneficiaries

and also improved the quality of assets as the beneficiaries often put in their savings to supplement the contribution of MGNREGS. The share of IBS has increased from 21.4 per cent in 2014-15 to 66.1 per cent in 2018-19.

Natural Resource Management (NRM) – Mission Water Conservation (MWC): Planned and systematic development of land to improve its productivity and harnessing of water through development of watersheds have become the central focus of MGNREGS work across the country. Guidelines were drawn up in partnership with the Ministry of Water Resources, River Development & Ganga Rejuvenation and Department of Land Resources to focus on the dark and grey regions where the ground water was falling rapidly. It was made mandatory to spend 65 per cent of total MGNREGS expenditure on NRM works identified in 2129 water stressed blocks. Technological support from National Remote Sensing Centre, ISRO using GIS Technology (BHUVAN Portal)has enabled systematic planning, monitoring and execution of structures impacting surface and ground water resources. The major works taken up under NRM include check dams, trenches, ponds, renovation of traditional water bodies/tanks, dug wells etc. During the last five years, 150 lakh hectares of land has benefitted through these interventions.

Support for Drought Proofing: In 2015-16, provision of additional employment of 50 days in drought affected areas over and above 100 days per household under MGNREGS was approved. The major drought proofing works undertaken under MGNREGS are plantations, afforestation, land development, check dams, wells, trenches, bunds and ponds, percolation tanks. During the last five years, expenditure on such projects has more than doubled from ₹1753 crore to ₹4089 crore.

Increased accountability: Various citizen centric mobile Apps like Gram Samvaad Mobile App and JanMnREGA (an asset tracking and feedback app for MGNREGS assets) have been developed, which aim to empower the rural citizens by providing direct access to information and improve accountability to the people.

in Figure 2, the number of beneficiaries and the funds transferred under DBT under the Scheme has jumped manifold from 2015-16 to 2018-19.

IMPACT OF DBT ON EFFECTIVENESS OF MGNREGS

Coverage

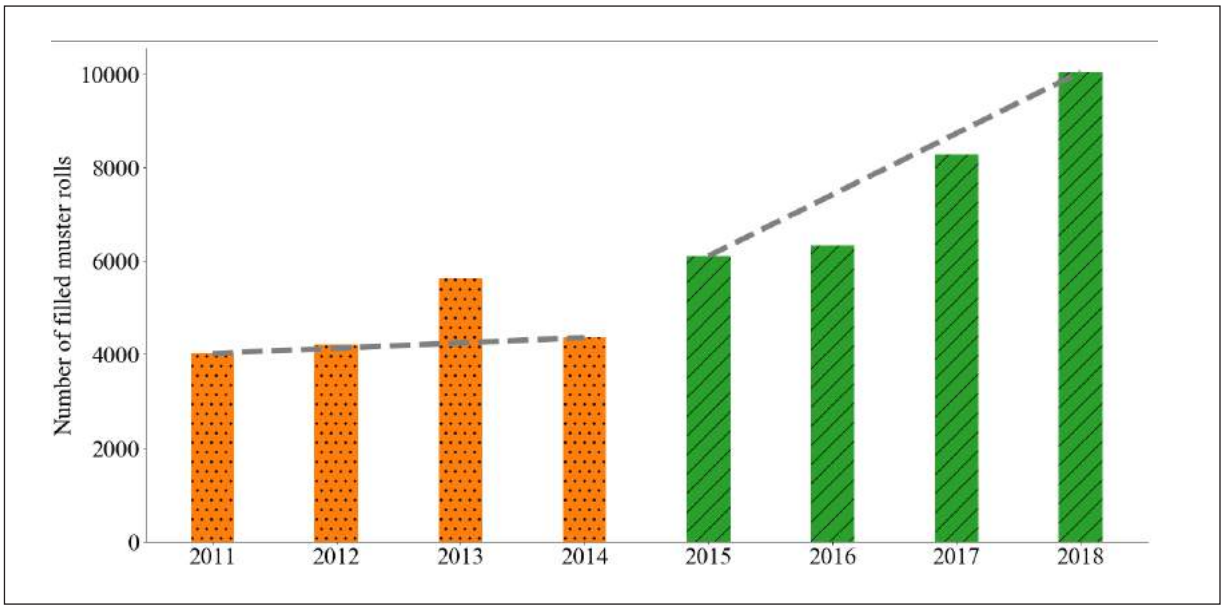
10.12. Muster rolls are a form of an attendance register. Higher number of filled muster rolls represent higher worker turnout on site. Figure 3 shows that the filled muster rolls have shown a significant increase after implementation of DBT indicating that more people are reporting for work. Figure 4 shows that total person days and total person days of vulnerable sections (women, SCs and STs)[3] is also higher in the post DBT years as compared to pre-DBT years indicating that employment generated is higher post implementation of DBT. It is also heartening to note that more than 90 per cent of the person days benefit the vulnerable sections.

Timely Payment of Wages

10.13 DBT focused on directly transferring funds into the beneficiary bank account. The NREGASoft monitors generation of payment of wages within 15 days. Sustained efforts and intensive engagement with all stakeholders has enabled vast improvements in the timely payment of wages. In 2014-15, 26.9 per cent of the payments were generated within 15 days, which has now risen to 90.4 per cent in 2018-19 (Figure 5).

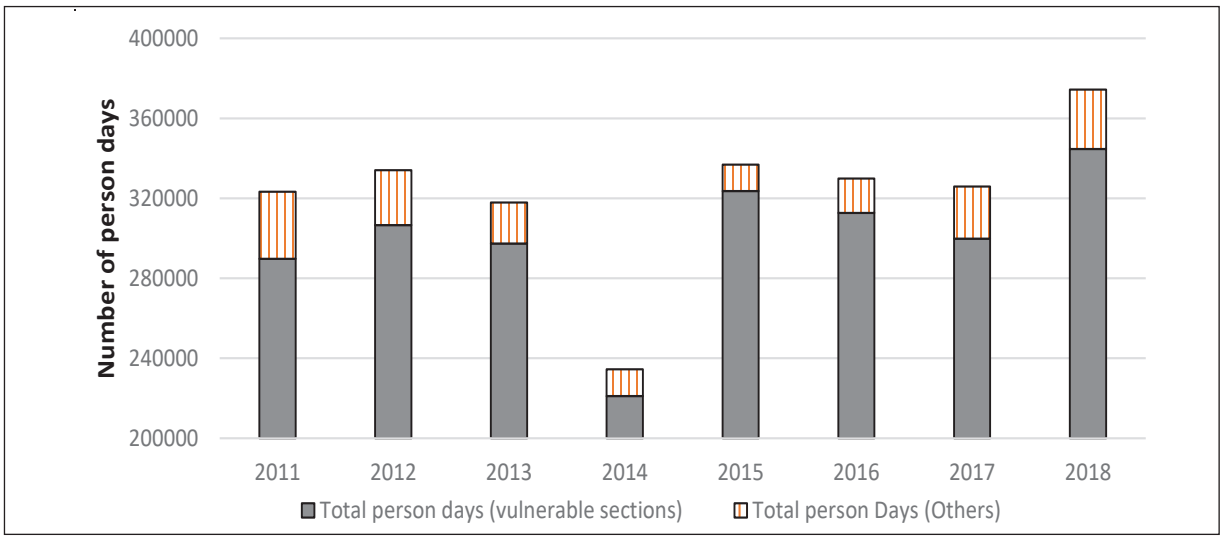
[3] These groups are not mutually exclusive and therefore, double counting is possible.

Figure 3: Filled muster rolls under MGNREGS



Source: Adapted from data from MGNREGA portal

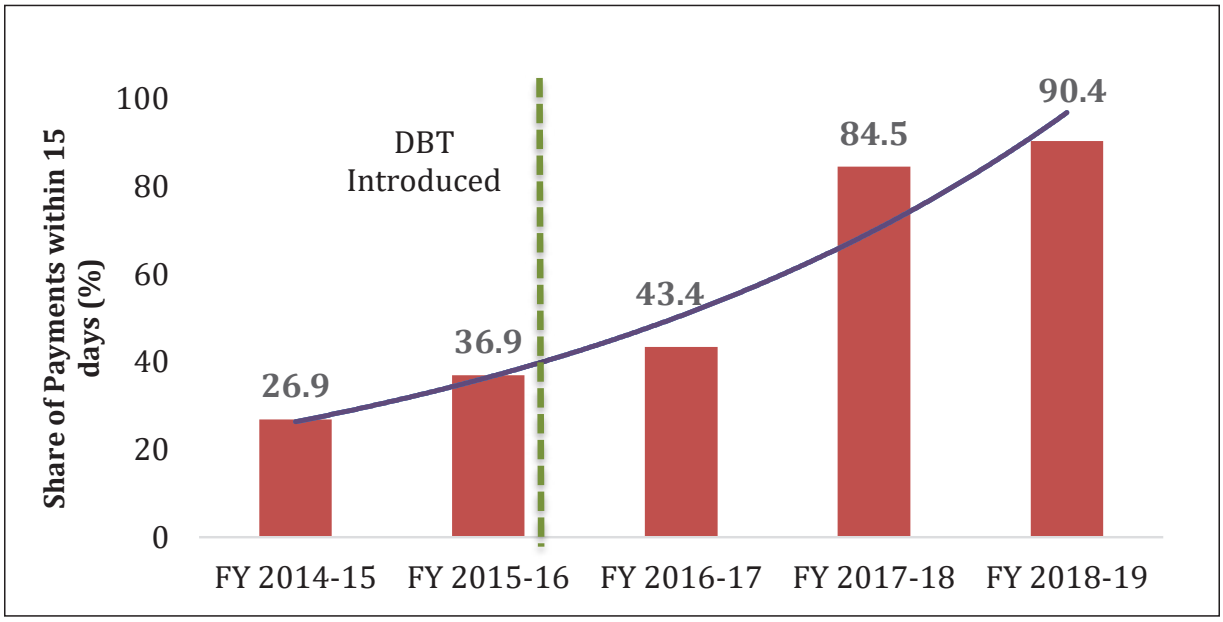
Figure 4: Share of Vulnerable Sections in Person Days under MGNREGS



Source: Adapted from data from MGNREGA portal

10.14. In the pre-ALP period, the average amount disbursed to bank accounts almost doubles from ₹1.82 crore per block per year in pre-ALP period to ₹3.98 crore per block per year. This indicates that more funds flowed through DBT after ALP was instituted. If ALP improves the efficiency of the programme, then there should be a significant reduction in the delay in wage payments. When a comparison is made between the proportion of total amount of wage payments that were received with a lag of more than 90 days before and after the implementation of ALP, it is found that the delay in payments reduced by almost one-third from 35 per cent to less than 10 per cent in the post-ALP period (Figure 6). Thus, implementation of ALP has positively impacted the flow of payments under the scheme.

Figure 5: Share of Payments done within 15 days under MGNREGS



Source: Ministry of Rural Development

Box 3: Data and variables used

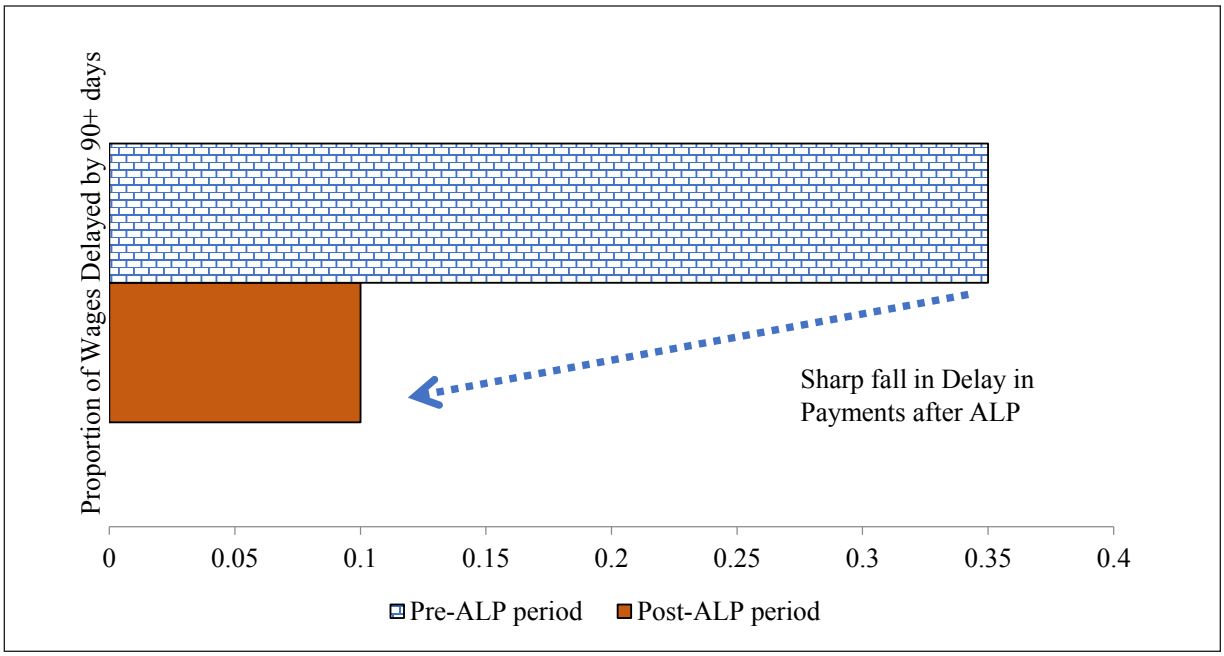
The data for MGNREGS is collected from the MGNREGS Public Data Portal for the period FY2012 to FY2017. Public data portal provides information on all the scheme's variables from FY2012 onwards at various administrative subdivision levels. Delayed payments are available at a district level from FY2015 onwards. This data provides information on the number of transactions delayed at various intervals.

As MGNREGS targets rural poor, whose primary occupation is agriculture, drought is used as a proxy for economic distress. The precipitation data is collected from the Climatic Research Unit, University of East Anglia. As the eastern-most longitudes in India span beyond the scope of the data, the blocks in the study are limited at 90°E. The data is extracted and mapped to the blocks in the country. Since the climate data is available only till FY2017, the time period of the sample is restricted to FY2017. Thus, the sample examining drought as a proxy for distress uses data where both MGNREGS and precipitation data are simultaneously available. The Schedule 1.5 of NSSO survey on Household Expenditure on Services and Durable Goods, Round 72, has been used to obtain data on consumption expenditure at the district level. To define blocks affected by drought, the definition provided by Indian Meteorological Department (IMD) is used: IMD defines an area to be affected by drought if it receives less than 75 per cent of its normal precipitation. A panel that contains weather and MGNREGS information of each block for every year from FY2012 to FY2017 is constructed. It takes value 1 if annual rainfall in a block is less than 75 per cent of normal rainfall, otherwise it takes value 0. For the purpose of the analysis, a post ALP period is also defined as per the staggered implementation of ALP – 300 districts from FY2015 and remaining districts from FY2016. The summary statistics of the analysis undertaken is given in the appendix.

Demand for MGNREGS Work

10.15 Given that there has been an increase in amount disbursed to bank accounts post implementation of ALP and a decline in delayed payments, it is expected that there will be an increase in demand for work under the programme in distressed areas (Agarwal et al., 2019).

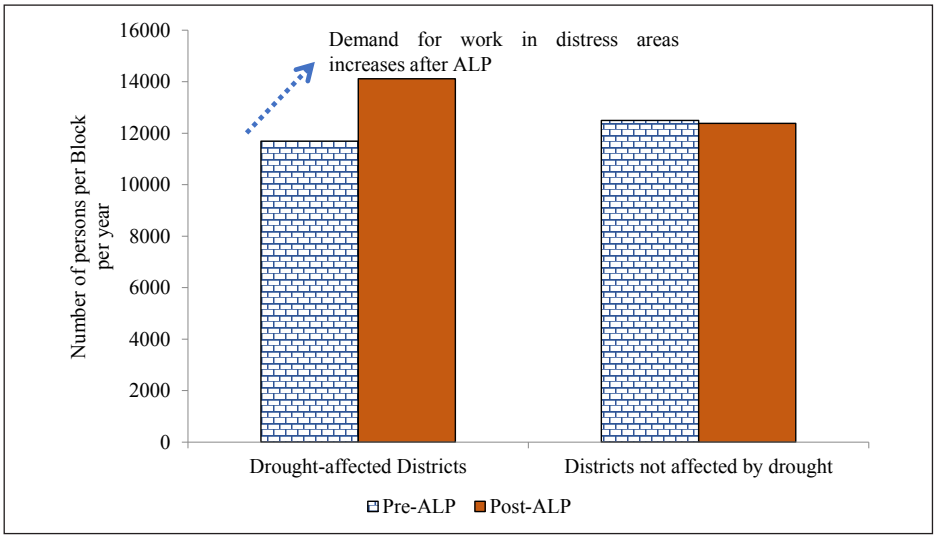
Figure 6: Delay in Payment of Wages under MGNREGS



Source: Survey Calculations.

10.16 Figure 7 displays the difference -in -difference estimate of the effect of ALP on persons demanding work. In the blocks not affected by drought, there is no effect of ALP on the number of persons demanding work. Crucially, however, in blocks that are affected by drought, the persons demanding work increases by 20.7%. As we argued above that effective implementation of MGNREGS should increase demand for work in the distressed areas, this finding is consistent with the thesis. The difference -in -difference estimate, i.e. the before- after difference in the blocks affected by drought versus the same difference in blocks not affected by drought, equals 21.8% and is statistically significant.

Figure 7: Demand for work under MGNREGS



Source: Survey Calculations.

10.17 It appears, therefore, that before the implementation of ALP, the rural poor treated MGNREGS as an option to earn additional income during good times rather than a shock absorber during bad times. This actually defeated the purpose of the programme. Post implementation of ALP, there is a reversal of trend, wherein an increase in demand for work under MGNREGS is observed in drought affected areas. The change post ALP implementation suggests that reduction in the delay of payments has an immediate positive effect on the demand for work in distressed times.

Supply of MGNREGS work

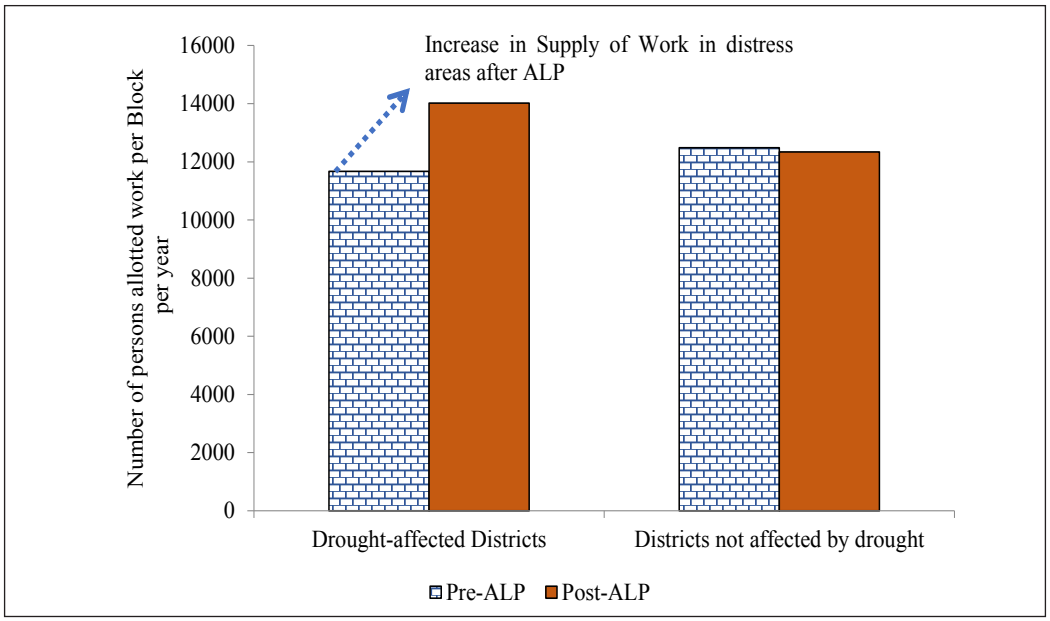
10.18 Figure 8 similarly displays the difference-in-difference estimate for the effect of ALP on the supply of work under MGNREGS. As in Figure 7, we observe very little change due to the implementation of ALP on supply of work in the blocks not affected by drought. In contrast, we observe a 20% increase in the supply of work in blocks that are affected by drought. This suggests that the supply of work under MGNREGS also responds to the increase in demand in the blocks affected by drought.

10.19 It can be inferred that the increased state capacity to implement anti-poverty programmes brought about by ALP can potentially bridge the demand supply gap in MGNREGS (Dutta et al., (2012)). With reliable data, it is possible that the Central and State governments will be able to effectively monitor the implementation of MGNREGS and nudge the officials to provide jobs wherever and whenever they are needed the most.

Work Done under MGNREGS

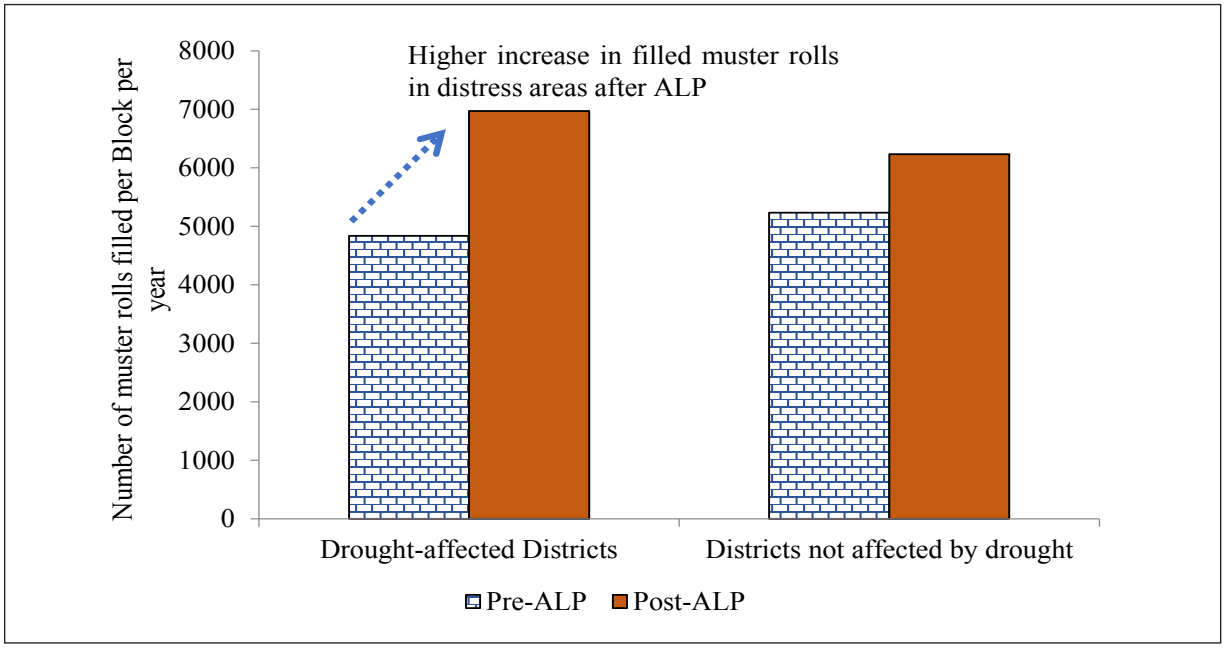
10.20 Muster rolls are a form of attendance register signed by workers. It acts as a preliminary check in the sense that, if demand and supply of work increases, but there is no change in muster rolls filled, then it means that there may be a false reporting of numbers. Figure 9 shows that the muster rolls increased by 19% in the blocks that were not affected by drought, In contrast, muster rolls increased by an enormous 44% in the blocks that were affected by drought. Thus, the evidence in Figure 9 shows that

Figure 8: Supply of Work under MGNREGS



Source: Survey Calculations.

Figure 9: Amount of work done in MGNREGS: Total muster rolls filled



Source: Survey Calculations.

the actual work done under MGNREGS also increased significantly in blocks affected by drought due to the use of ALP. This increase was more than double the increase in blocks that were unaffected by drought.

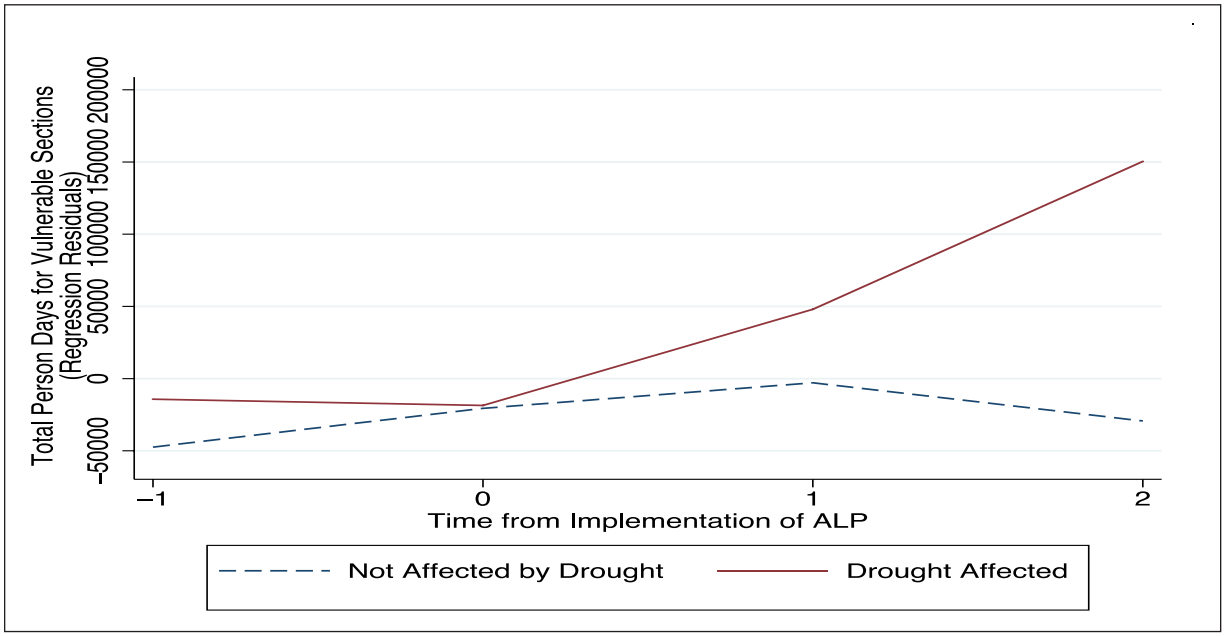
Impact on Vulnerable Sections of the Society

10.21 As economic shocks affect vulnerable sections of society (women, persons with disability, SCs and STs) the most, there are concerns that they might not be able to adapt easily to the use of technology under DBT and hence may get excluded (Khera (2011)). There is also reason to believe that such people are more likely to be unaware of technological changes that occur in implementation of social welfare programs. If that is true, then there should not be any change in MGNREGS work by these individuals in distressed areas post implementation of ALP (Agarwal et al., 2019). Figure 10 shows the differential effects of ALP for vulnerable sections of the society and others. The residuals after controlling for other determinants using a regression are plotted on the y-axis. The x-axis shows the year before and after the implementation of ALP with 0 corresponding to the year of implementation. We observe that absent ALP, there is either no change or a decline in total person days worked by vulnerable sections of the society. In the pre-ALP period, represented to the left of year zero, the gap between person days worked by vulnerable sections of the society was insignificant. In the post ALP period, represented to the right of zero, there has been a large increase in person days worked by the vulnerable sections of the society in blocks affected by drought. This means that after implementation of ALP, women, SC and ST workforce increased under MGNREGS during times of economic distress (Figure 10).

USE OF DATA ON CONSUMPTION TO PROXY DISTRESS

10.22 While drought is the primary source of rural distress, there is a possibility of some extremely local unobserved distress which is not related to drought such as pest

Figure 10: Total person days worked by vulnerable sections of the society in drought and non-drought affected areas before and after the implementation of ALP



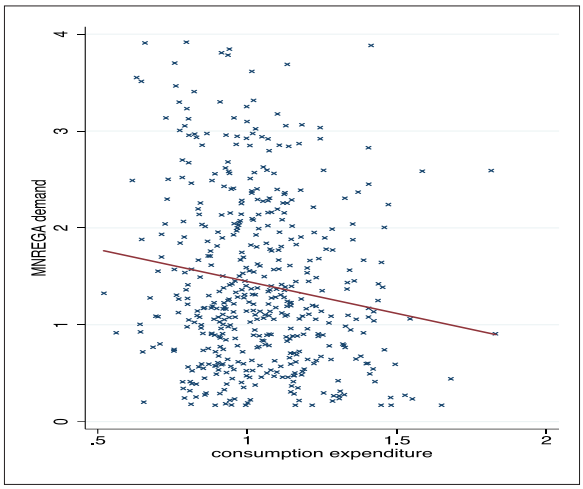
Source: Survey Calculations.

attacks, disease outbreak, sale of land for infrastructure development etc. Such distress should reduce consumption expenditure of the local areas affected by it. Therefore, monthly consumption expenditure from NSS round 72 survey data can be used as a proxy for distress. The hypothesis is that there should be an increase in demand for MGNREGS work in areas with decline in consumption expenditure. Using NSS data to identify unobservable distress, this test is performed to see if improvements in MGNREGS extend to all kinds of distress that may or may not be as easily observable as drought.

10.23 NSSO does not include block level identification, so the data is aggregated at the district level. Since the survey data is available only for FY2015, the sample is restricted to one year. To perform this test, geographical neighbours of each district are identified first. Then, the district neighbour pairs are divided such that ALP districts are matched with their ALP neighbours and non-ALP districts are matched with their non-ALP neighbours in FY2015. This also helps to distinguish localized distress from large crises because large-scale distress will be common across neighbouring regions. Once ALP district-neighbour pairs and non-ALP district neighbour pairs have been identified, the ratio of MGNREGS demand for each pair is calculated. This ratio is called MGNREGS demand factor. Similarly, the ratio of consumption expenditure for each pair is calculated. This ratio is called consumption factor. A negative relationship exists between MGNREGS demand factor and monthly consumption factor for each district neighbour pair (Figure 11). This means that areas with low consumption expenditure have higher MGNREGS demand as compared to areas with higher consumption expenditure.

10.24 Therefore, for the purpose of this test, consumption factor of less than one is used to identify distressed areas. It is evident from Table 1 that the MGNREGS demand factor is 1.45 for non-distressed districts and 1.56 in distressed districts in the pre ALP period. Even though there is an

Figure 11: Relationship between MGNREGS demand and consumption expenditure



Source: NSS, Round 72, MGNREGA portal

increase in MGNREGS demand in districts with less consumption expenditure, the increase is marginal. After implementation of ALP, in non-distressed districts, the MGNREGS demand factor is 1.18 i.e., the MGNREGS demand for these districts is like their neighbours'. In distressed districts it increases to 1.76. For distressed districts, demand for MGNREGS work is almost twice of their neighbours' in the post ALP period. It is interesting to see that not only has the gap between MGNREGS demand of distressed and non-distressed areas widened but also there is greater increase in the demand for MGNREGS in distressed areas in the post ALP period.

Table 1: Proportionate change in demand in areas with high consumption expenditure v/s areas with low consumption expenditure in ALP and non-ALP districts

	High Consumption factor	Low Consumption factor
No ALP	**1.45**	**1.56**
ALP	**1.18**	**1.76**

WAY FORWARD

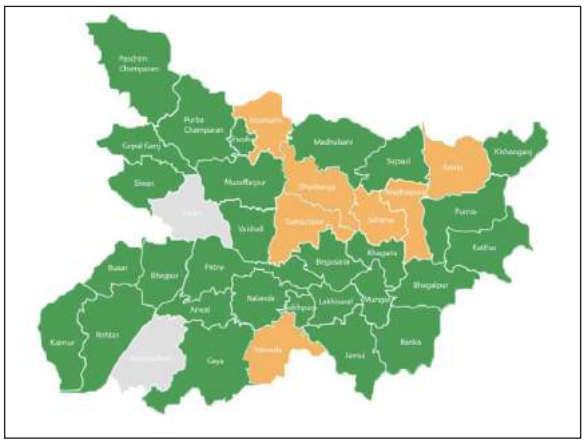
10.25 This chapter highlights the benefits of using technology in welfare schemes to improve end to end governance, create a robust evidence based implementation framework in partnership with the States, streamline the processes, timely transfer of funds to implementing agencies and beneficiaries, plugging of leakages, optimum utilization of public funds and improving overall performance (outputs/outcomes) of the programmes. It also significantly improves transparency and accountability and above all, ensuring that right benefits reach the right beneficiary at the right time.

10.26 DBT through Electronic Fund Management Systems in MGNREGS has streamlined the fund flow process and helped in better targeting, reduction in delay in payments to beneficiaries, minimized leakages and above all led to substantial saving of funds. More importantly, it has enabled MGNREGS to be effective in alleviating distress of workers. Both demand and supply of work under the Scheme increased, especially in blocks suffering from distress and from the vulnerable sections of society, including women, persons with disability, SCs and STs. The increase in the number of muster rolls that were filled also implies that distressed workers indeed turn up more frequently for work. The positive outcomes in MGNREGS are based on the *revealed preference* of the ultimate beneficiaries who are not only at the bottom of the pyramid, i.e. the rural poor, but are also distressed. As enrolment in the Scheme is voluntary, beneficiaries have strong incentives to reveal their preference by "voting with their feet" when programme delivery is inefficient or efficient.

10.27 The above analysis has the following policy implications:

Probable Indicator of distress: Demand for work under MGNREGS may be used to develop a real-time indicator of distress at the granular district/ panchayat level. Distress at the level of a district or panchayat is difficult to identify in real-time using the current datasets. While employment related NSS surveys are carried out once in 5-6 years, district-level GDP is released irregularly. Both these datasets are released with lags. The NSSO surveys, though they are available at the household level, are released after a gap of almost two years from the date of the surveys. As an adverse economic shock significantly reduces consumption expenditure of the household, it is important to provide assistance to the household at the right time. By utilizing information on demand for work under MGNREGS and correlating it with other real-time measures of weather etc., that lead to rural distress, a dashboard (Figure 12) can be created which flashes 'alerts' from areas under local distress to enable policymakers to act in a timely manner to alleviate such distress. As demand for MGNREGS work is also affected by the governance capacity in the state, this indicator of real-time distress can be constructed after accounting for the effect of the same.

Figure 12: Distress map of Bihar



Source: Generated as a sample
Note: Orange areas indicate distress areas

Expansion of 'works' under MGNREGS: To further increase the effectiveness of the Scheme, the definition of 'works' under the Scheme should be regularly reviewed and amended in light of the requirements. Inclusion of de-silting of canals and water bodies in the Water Conservation Mission would enhance their storage capacity and mitigate the frequency of floods.

Up-skilling the MGNREGS Workers: The objective of the scheme to enhance livelihoods for households can be reinforced by enabling them to acquire suitable skills, which in turn will help them increase incomes and provide horizontal and vertical mobility to them. The convergence of MGNREGS with Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) and involvement with women Self-Help Groups needs to be strengthened so that supply for skilled wage labour increases. The focus needs to be on the diversification of the livelihoods with multiple sources of income for them to come out of poverty.

Expanding use of JAM to other Welfare Schemes: The experience of increasing the effectiveness of MGNREGS by using DBT and ALP lends immense credibility to adoption of this strategy in other programmes. The adoption of DBT in programmes which involve transfer of cash benefits (scholarships or pensions) and price subsidies (such as those given for kerosene, liquefied petroleum gas (LPG), public distribution system (PDS), fertilisers and other input subsidies needs to be strengthened to minimise exclusion and inclusion errors. This will make public spending more efficient and effectively targeted.

Use of Digital Infrastructure for micro-benefits: A huge digital infrastructure, linking Aadhaar, bank accounts and mobiles has been created and effectively used for MGNREGS - the largest welfare programme. This can be used to expand the reach of the programmes

through provision of micro-insurance, micro-pensions and micro-credit to people in every corner of the country. Its wide use can lead to financial and economic inclusion benefitting the vulnerable and marginalized sections of the society.

CHAPTER AT A GLANCE

- Use of technology in streamlining MGNREGS has helped increase its efficacy.
- Adoption of NeFMS and DBT in MGNREGS helped to reduce delays in the payment of wages significantly.
- Both demand and supply of work under MGNREGS increased, especially in districts suffering from distress.
- The vulnerable sections of the society viz., women, SC and ST workforce increased under MGNREGS during times of economic distress.
- Skilful use of technology when combined with an unwavering commitment to monitoring effectiveness of government schemes can make a substantial difference on the ground.

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Appendix : Summary Statistics of the Analysis					
Variables	**Observations**	**Mean**	**SD**	**Min**	**Max**
Total person days	23022	326019.3	367448.3	0	4724609
Total households reached 100 days	23022	620.95	1122.978	0	22877
Total households demanded work	23022	7593.07	7526.75	0	67951
Total persons demanded work	23022	12630.9	13699.18	0	150125
Total households allotted work	23022	7578.99	7522.68	0	67951
Total persons allotted work	23022	12596.87	13668.93	0	149927
Total muster rolls filled	23022	5727.20	6342.09	0	85312
Total households worked	23022	7248.92	7043.5	0	66490
Total persons worked	23022	11726.19	12273.58	0	147080
Amount disbursed to bank account (Rs crore)	23022	27.3	41.9	0	672
Total pers on days worked by SCs	23022	71673.49	105123.4	0	1405991
Total person days worked by STs	23022	56170.62	154782.9	0	3566409
Total person days worked by women	23022	169081.5	247204.3	0	3296483

Redesigning a Minimum Wage System in India for Inclusive Growth

11
CHAPTER

Despite India's outstanding growth in the last two decades, low pay and wage inequality remain serious obstacles towards achieving inclusive growth. An effective minimum wage policy that targets the vulnerable bottom rung of wage earners can help in driving up aggregate demand and building and strengthening the middle class, and thus spur a phase of sustainable and inclusive growth. However, the present minimum wage system in India is extremely complex with 1,915 minimum wages defined for various scheduled job categories for unskilled workers across various states. Despite its complex structure and proliferation of scheduled employments over time, the Minimum Wages Act,1948 does not cover all wage workers. One in every three wage workers in India has fallen through the crack and is not protected by the minimum wage law. Given this situation, this chapter reviews the situation pertaining to minimum wages in India and suggests the way forward for rationalising and streamlining the policy for minimum wages.

INTRODUCTION

11.1 Minimum wages for labour rendered has been a feature of society since ancient times. For instance, the famous Indian treatise from 2nd Century BCE, *Arthashastra*, ordained "the lowest wages for state employees was 60 panas per year for unskilled workers such as servants, guards, valets, palanquin bearers, and labourers." Similarly, the minimum wages for agricultural labourers, watchmen, cowherds and other unskilled workers in the private sector was effectively set at 60 panas a year[1] (Chapter-3, Book V:"The Conduct of Courtiers"). Similarly, the Code of Hammurabi, which is often cited as the oldest written laws on record, mentions minimum wages: "If a man hires a workman, then from the beginning of the year until the fifth month he shall give six grains of silver per diem. From the sixth month until the end of the year he shall give five grains of silver per diem."

11.2 In recent years, minimum wage systems have been strengthened by many countries to lift workers out of poverty and to reduce levels of inequality. The renewed interest in minimum wage arises as recent literature and evidence suggests that minimum wages can promote social justice without any major negative implication for employment if wages are set at an adequate level.

11.3 In the last five years, during a period of global economic slowdown, sluggish global trade and export growth, India's growth story has been powered by private consumption. Therefore, with 93 per cent

[1] One pana was a punch-marked silver/copper coin of the Maurya period.

workers in the informal economy, a well designed minimum wage system can reduce inequalities in incomes, bridge gender gaps in wages and alleviate poverty.

11.4 Wage levels and distribution of wages are, to a large extent, influenced not only by skills and productivity levels, but also by the role of labour market institutions, particularly minimum wages and collective bargaining. But for the minimum wage system to play a meaningful role in aligning protection with the promotion of sustainable growth, it must be properly designed, its goals clarified, and its enforcement made effective. However, the minimum wage system in India is extremely complex with a plethora of minimum wages. Given this situation, this chapter reviews the situation pertaining to minimum wages in India and suggests the way forward for rationalising and streamlining the policy for minimum wages.

MINIMUM WAGE SYSTEM IN INDIA

11.5 The Indian Minimum Wage System has been quite a debated and dynamic issue.

- India was one of the first developing countries to introduce minimum wages with the enactment of the Minimum Wages Act way back in 1948. The Act protects both regular and casual workers. Minimum wage rates are set both by the Central and the State governments for employees working in selected 'scheduled' employment[2]. Minimum wages have been set for different categories of workers according to skill levels, location and occupations. The Act did not prescribe norms for fixing the level of the minimum wage. However, it provided for tripartite advisory boards consisting of employers, employees of scheduled employments, and independent persons to advise the Government in fixing minimum wages.
- The Indian Labour Conference (ILC) of 1957 recommended determining the minimum wage based on the principle of a household's needs.
- In 1988, the Labour Minister's Conference made recommendations for linking minimum wage with the cost of living index, which became mandatory in 1991.
- In 1992, the Supreme Court of India ruled that minimum wage should also be linked with aspects such as children's education, medical requirements etc.

NATIONAL LEVEL MINIMUM WAGE

11.6 The idea of a national level minimum wage has been debated since the enactment of the Minimum Wages Act in India. The main argument against a national minimum wage has been the existence of wide disparities in economic development and large variations in cost of living between regions and states. Box 1 portrays the time-line involved in arriving at a National Floor Level Minimum Wage (NFLMW) in India.

COMPLEX MINIMUM WAGE SYSTEM IN INDIA

11.7 Over the last 70 years, the minimum wage system in India has expanded and has become complex. The *first set of complexities* arises from issues relating to its coverage. Today, there are nearly 429 scheduled employments and 1,915 scheduled job categories for unskilled workers. This massive expansion in job categories and wage rates has led to major variations not only across states but also within states.

11.8 A *second set of complexities* arises

[2] Employments notified under the Minimum Wages Act by the Centre and States.

Box 1: Timeline of adoption of National Minimum Wage

1969

- First National Commission on Labour.
- Recommendation: National Mimimum Wage is neither 'feasible nor desirable'.

1978

- Bhoothalingam Committee
- Argued for adoption of National Floor Level Minimum Wage to ensure a uniform wage for all workers and enhance protection of the most vulnerable workers and eliminate arbitariness in the determination of level of minimum wages for different States and occupations. Recommendations were mainly for the organized sector.
- Unorganized sector and agriculture were left out.

1991

- National Commision on Rural Labour
- Recommended for a National Floor Level Minimum Wage as wide disparites were prevalent in minimum wages across States.

1996

- Central Government adopted non-statutory National Floor Level Minimum (NFLMW)- ₹ 35 per day was notified.
- This NFLMW is updated regularly as per CPI.
- NFLMW is ₹176 per day w.e.f. 01.06.2017

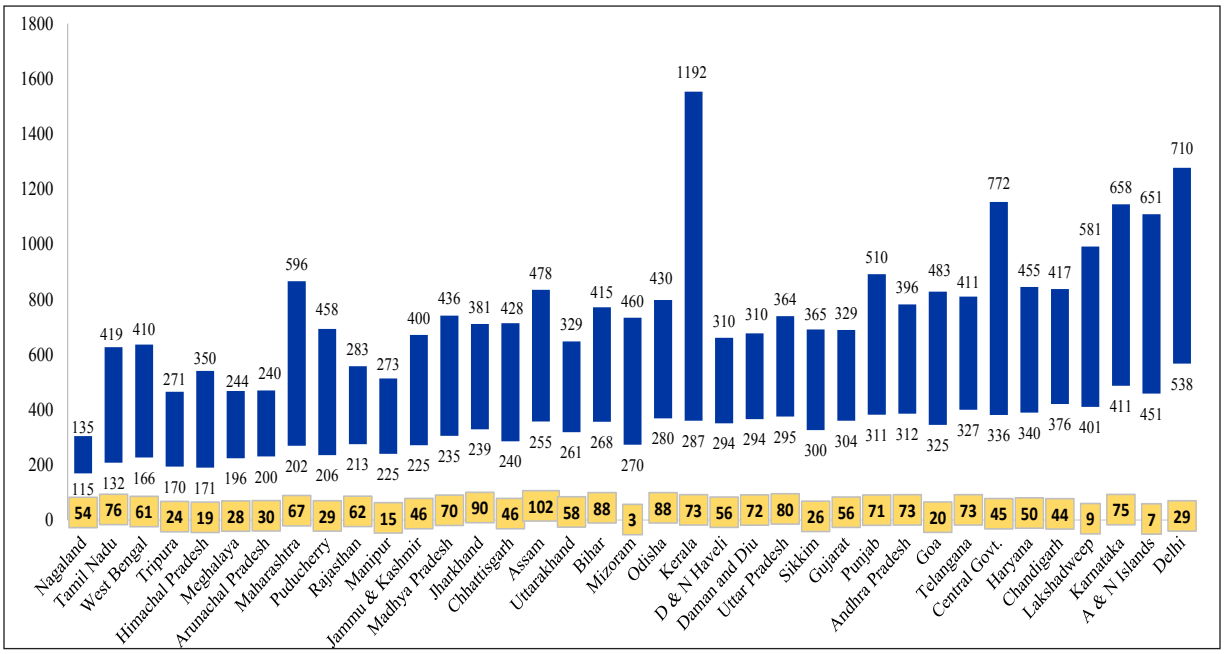
from the lack of uniform criteria for fixing the minimum wage rate. In some states or in specific scheduled employments, minimum wages are linked to the cost of living, through a variable dearness allowance (VDA) whereas other states do not include the VDA component. All this affects the level and variation of wage rates that can be observed across and within States.

11.9 The variation of scheduled employments and minimum wage rates within and across states is shown in Figure 1. The number of scheduled employments varies from 3 in Mizoram to 102 in Assam with the number of scheduled employments being in the high double digits in most states. Similarly, the notified lowest minimum wage rate (per day) varies from ₹115 in Nagaland to ₹ 538 in Delhi. The range (difference between highest and lowest minimum wages) in each state varies from ₹ 16 in Nagaland to ₹ 905 in Kerala.

11.10 The *third set of complexities* arises from the fact that Minimum Wages Act does not cover all wage workers. One in every three wage workers in India has fallen through the crack and is not protected by the minimum wage law (ILO, 2018). Some major vulnerable categories – such as domestic workers – are presently covered only in 18 States and Union Territories. Further, the revision of minimum wage rates has often been delayed (Anant and Sundaram, 1998).

11.11 India has taken a number of steps to improve overall coherence, for example, by declaring a national minimum wage floor

Figure 1: Range of Minimum Wages in India (Rs. per day)



Note: Figures on the horizontal axis indicates the number of scheduled employments notified under the Minimum Wage Act by the Central Government and all the States/Union Territories.

Source: The data pertaining to the scheduled employments and minimum wage rates notified by the State/Central Government have been collated from the latest minimum wage notifications issued by the respective Governments. These notifications have been issued at different points of time ranging from December 2014 to April 2019.

and strengthening the coordination of the Central Advisory Board with State Advisory Boards, and by promoting states to determine minimum wage rates through consultations within five broader regional committees. However, a simple system covering as many workers as possible, understood by all, and easily enforceable is the key to improve the effectiveness of minimum wage.

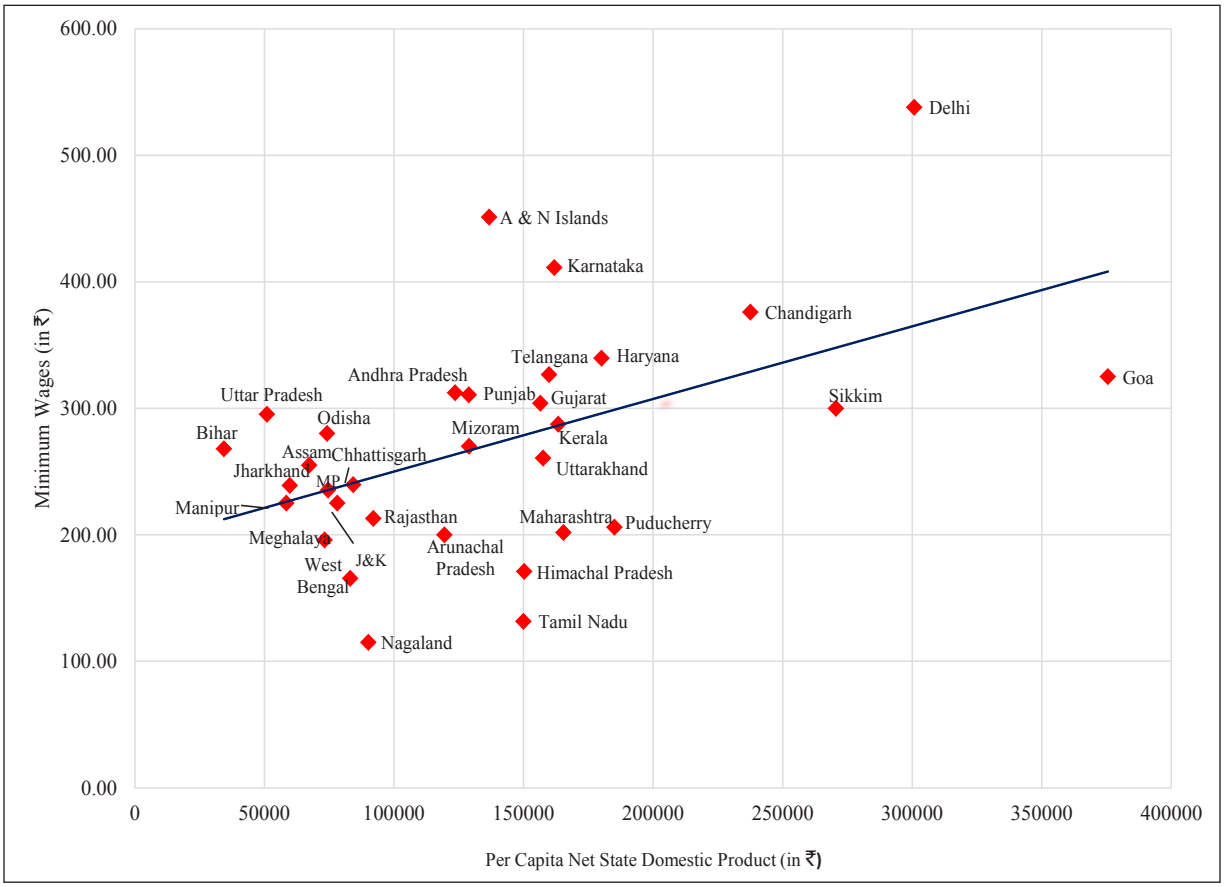
DIFFERENT MINIMUM WAGE ACROSS STATES: IS IT JUSTIFIED?

11.12 The main justification for persisting with different levels of minimum wages across states is that they reflect different levels of economic development. In Figure 2, the per capita Net State Domestic Product (NSDP) for 2016-17 is plotted against the most recently notified lowest minimum wage rates. Several states are significant outliers with some of the lowest minimum wages for unskilled workers notified by the more advanced and industrialised states and vice versa.

REFLECTION OF GENDER DISCRIMINATION THROUGH MINIMUM WAGE PROVISIONS

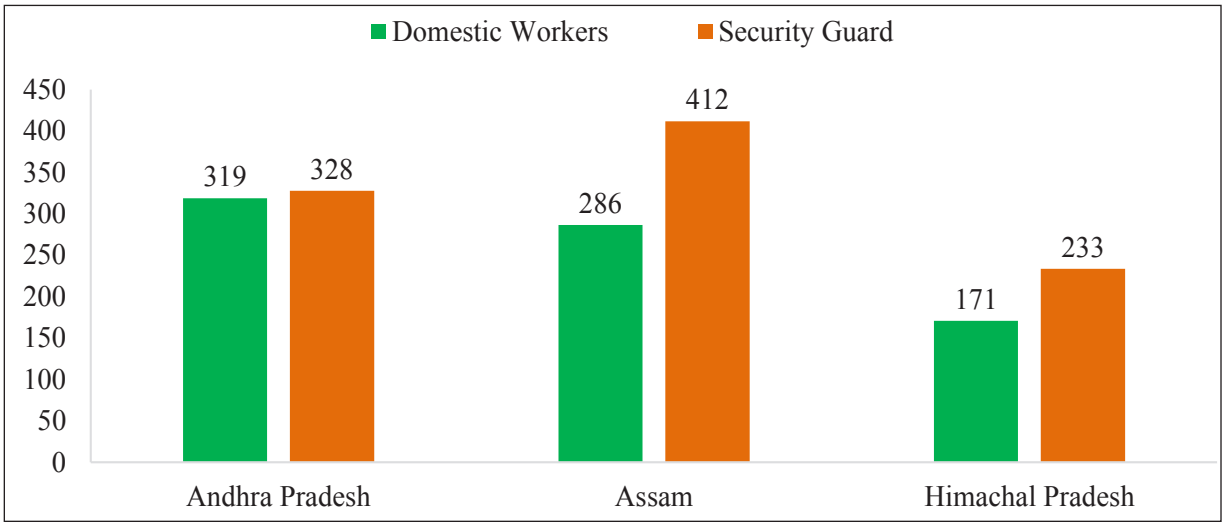
11.13 While the Minimum Wages Act does not discriminate between women and men, an analysis of minimum wages for different occupations shows persistence of systematic bias. For instance, women dominate in the category of domestic workers while men dominate in the category of security guards. While both these occupations fall within the category of unskilled workers, the minimum wage rate for domestic workers within a state is consistently lower than that for the minimum wage rates for security guards (Figure 3). Furthermore, the differences in their minimum wage rates are quite large with the minimum wage rates for security guards

Figure 2: Per Capita Net State Domestic Product 2016-17 (at current prices) and Latest Notified Lowest Minimum Wage Rates in India



Source: Per Capita NSDP 2016-17 from CSO. Data pertaining to the lowest minimum wage rates notified by the State/Central Government have been collated from the latest minimum wage notifications issued by the respective Governments. These notifications have been issued at different points of time ranging from December 2014 to April 2019.

Figure 3: Comparison of Minimum Wages for Domestic Workers (Female Dominated) and Security Guards (Male Dominated)



Source: Based on the latest minimum wage notifications issued by the respective state governments.

in Assam being 44 per cent higher than that for domestic workers. Such large differences can only be attributed to gender bias as is obvious from the disparity across states.

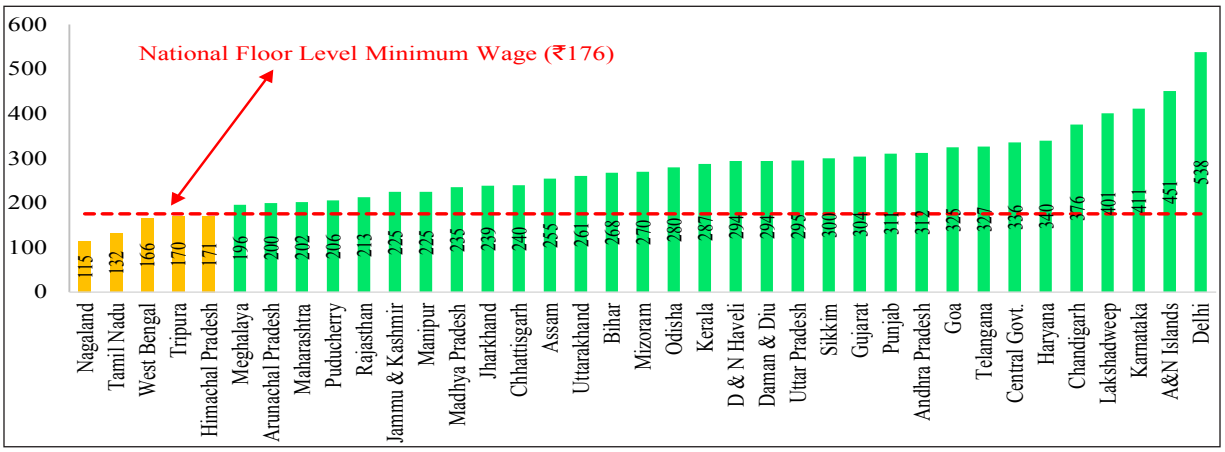
COMPLIANCE WITH THE MINIMUM WAGE ACT

11.14 The proliferation of minimum wage rates and scheduled employments is a strong deterrent for compliance. Different statutory minimum wage rates for the same occupation between states combined with the wide range between the lowest and highest minimum wages can trigger migration of the industry to lower wage regions/state. As the impact of minimum wage levels on employment and poverty depends on the level of compliance and enforcement (Soundararajan, 2014), it is of paramount importance to rationalise the minimum wage policy.

11.15 Currently NFLMW is non-statutory. Yet, the NFLMW can provide a useful benchmark for assessing the spread of the range of minimum wages fixed for unskilled workers across states. Over the years, most of the notified minimum wage rates in different states have moved above the NFLMW rate, though there are still a few states and occupations/job categories for which the prevailing minimum wage rates are below the NFLMW as of 2018-19 (Figure 4).

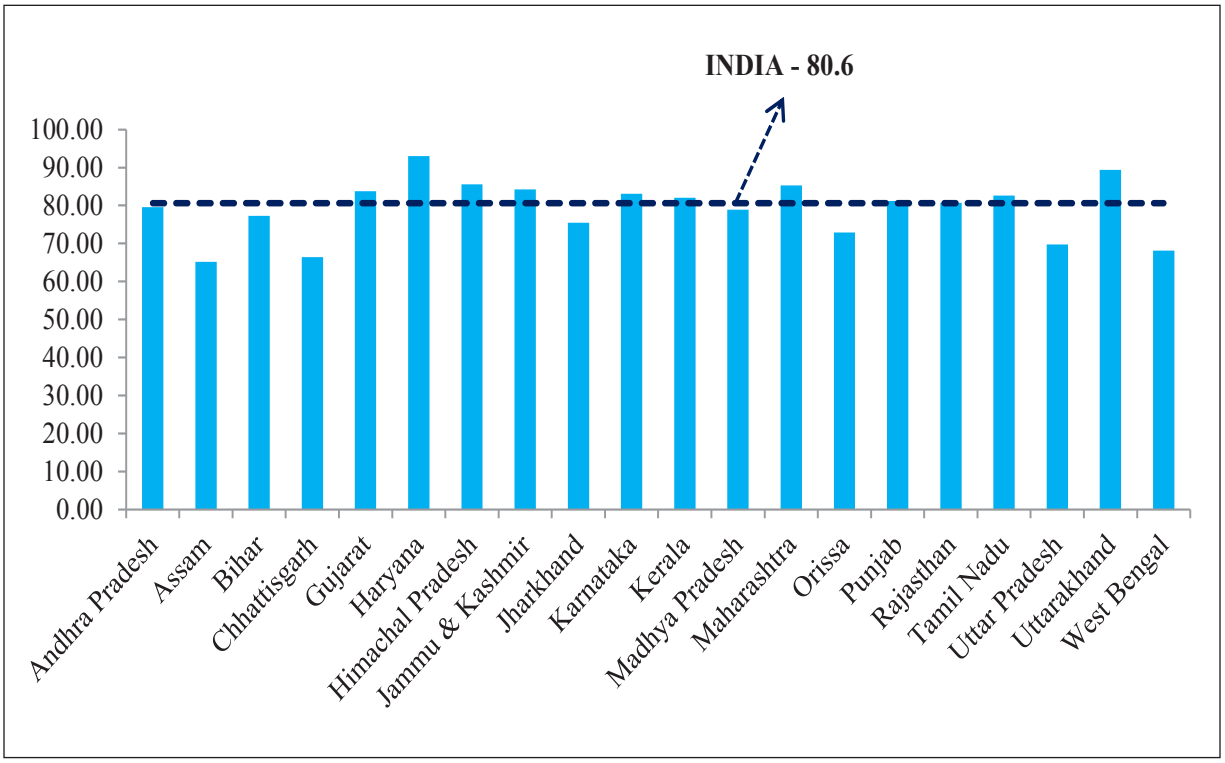
11.16 A second measure of compliance could be to compare actual wages received by various categories of workers with the notified minimum wage. To get an aggregate picture, the NFLMW is used as the notified minimum wage. By this measure, the proportion of vulnerable workers receiving wages below the NFLMW can be an index of non-compliance. Using this measure, Kannan and Papola (2017) show that 39 per cent of the male casual workers and 56 per cent of women casual workers in rural areas, and 28 per cent of male casual workers and 59 per cent of women casual workers in urban areas received wages below the NFLMW in 2012. In 2004, the same figures were 78 per cent (male rural), 96 per cent (female rural) and 49 per cent (male urban) and 88 per cent (female urban). This indicates a trend towards increasing compliance and that there is a gender gap in compliance similar to the gender gap in level of minimum wages. Using the NSSO Employment-Unemployment Survey (EUS) data, a comparison was made between the wages of regular and casual workers with NFLMW. It was observed that compliance levels were significantly higher

Figure 4: Lowest Minimum Wages for Unskilled Workers and NFLMW (INR per day)



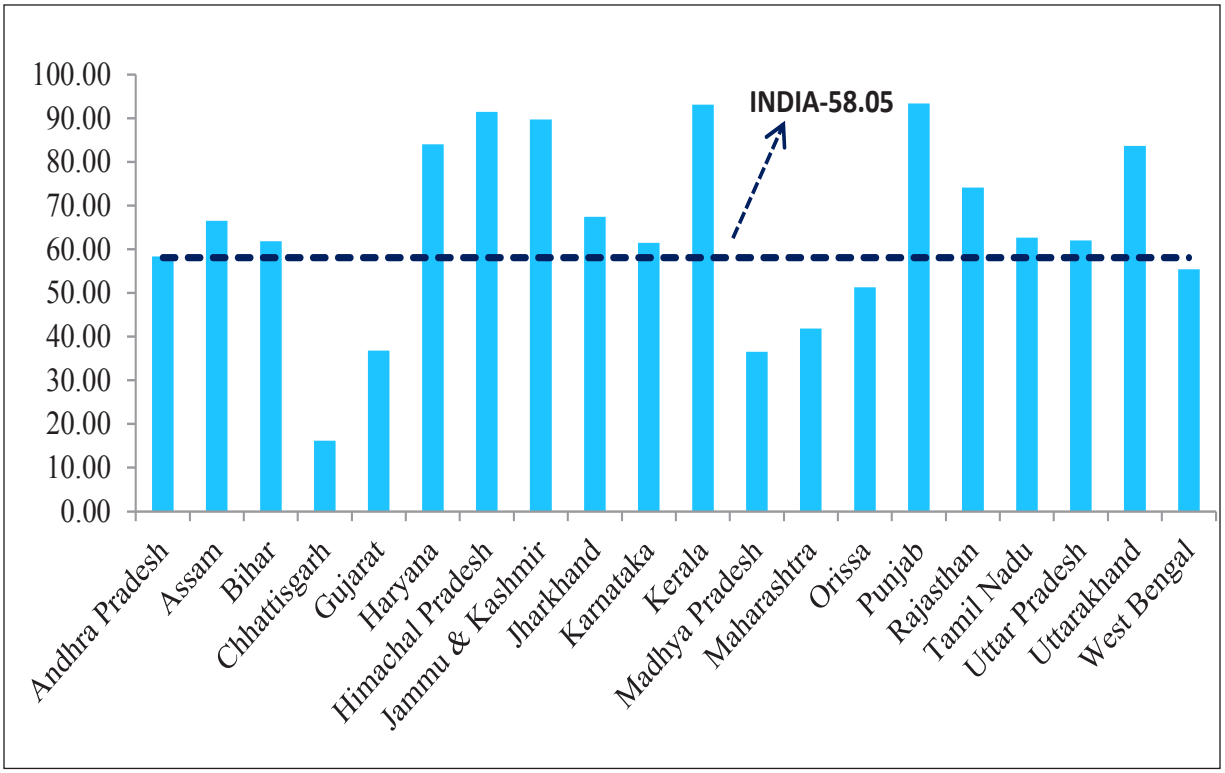
Source: The data pertaining to lowest level of minimum wage rates for unskilled workers notified by the State/ Central Government and NFLMW notified by the Central Government have been collated from the latest minimum wage notifications issued by the respective governments. These notifications have been issued at different points of time ranging from December 2014 to April 2019.

Figure 5: Percentage of Regular Workers Receiving Wages over the NFLMW, 2012



Source: Based on unit level data of the NSS Employment-Unemployment Survey, 2011-12.

Figure 6: Percentage of Casual Workers Receiving Wages over the NFLMW, 2012



Source: Based on unit level data of the NSS Employment –Unemployment Survey, 2011-12

for regular wage workers when compared to casual wage earners, as indicated in Figures 5 & 6.

IMPACT OF MINIMUM WAGES

11.17 What has been the impact of minimum wage on the labour market in India? To what extent has it been successful in fulfilling the goal of protecting the vulnerable workers, improving general wage levels, and reducing inequality and poverty? In this context, it must be remembered that a well-designed minimum wage system is only one of the several institutional mechanisms necessary for a meaningful impact on all these factors.

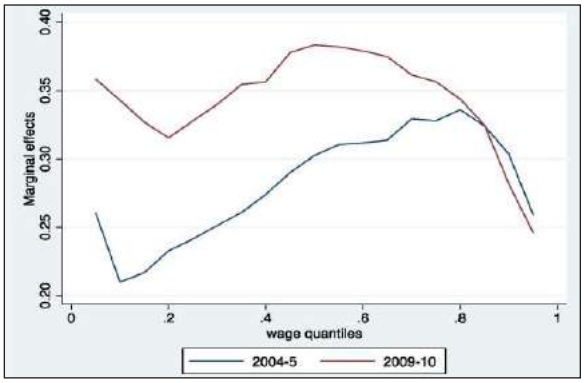
Impact on wage levels

11.18 Rani, Belser and Ranjbar (2013) demonstrate that minimum wage in India does not operate as a conventional floor wage to protect the lowest paid workers. Nevertheless, the study shows the presence of a "lighthouse effect", i.e., the minimum wage acts as a benchmark that pulls up wages in the low-paid and informal sector by enhancing the bargaining power of vulnerable workers.

11.19 Menon and Rodgers (2017) use household survey data from 1982-83 and 2008 to show a marked increase in compliance between these two periods with a stronger impact on male wages compared to female wages and on regular wages compared to casual wages during this period. Using data for workers in the construction industry, Soundararajan (2018) shows the presence of the "lighthouse effect" of minimum wage. Specifically, minimum wage seems to have shaped wage bargaining, thereby leading to rise in actual wages.

11.20 Rani and Ranjbar (2015) show that the minimum wage does impact the distribution of actual wages, with the impact depending on wage quantile. They show that for 2009-10, the marginal effects of the effective minimum wage increases gradually as we move towards the 80th quantile, i.e., the marginal wage pushes up the wages disproportionately more on the lower side of the wage distribution. This is quite different from the marginal effects observed in 2004-05, when the marginal effects of an increase in the minimum wage were greater at the higher levels of the income distribution than at lower levels (Figure 7).

Figure 7: Effect of minimum wages on wage distribution in India



Source: Rani and Ranjbar (2015)

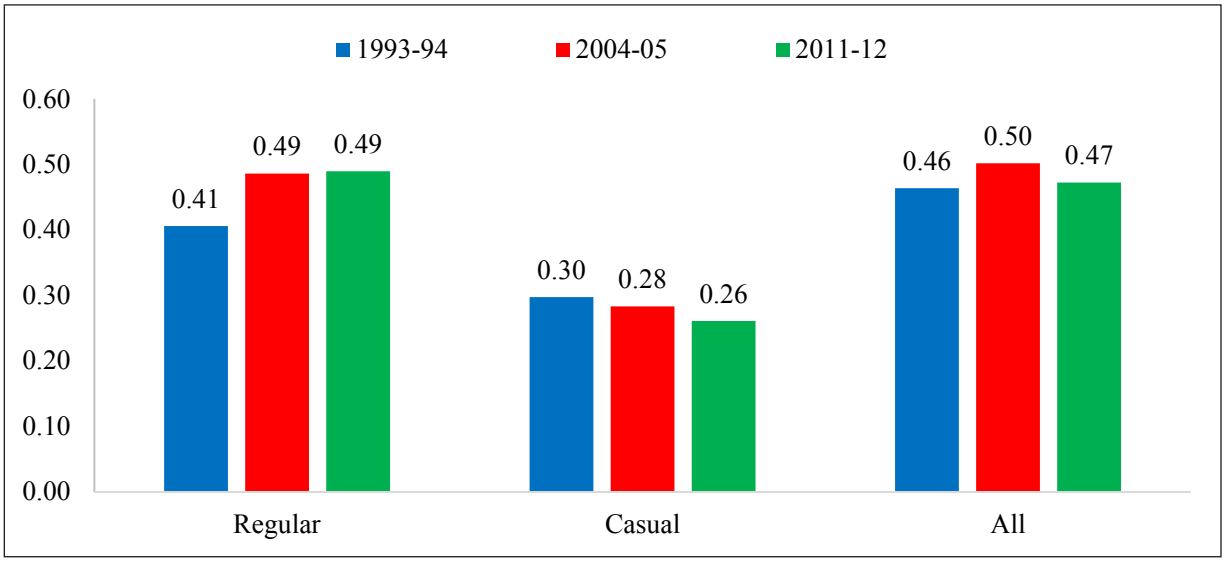
Impact on Wage Inequality

11.21 International experience suggests that greater compliance with minimum wages has led to reduction in wage inequality. India's experience regarding the impact of minimum wages on wage inequality needs to be evaluated keeping in mind the segmentation in the labour market and variations across various categories of workers.

11.22 Between 1993 and 2011, the average real wages increased in India, with the fastest growth recorded for casual labour, women's labour, and rural/agricultural labour (ILO 2018). Despite these increases, the existing wage inequality measured by the Gini coefficient remains very high by international standards (Figure 8) [3]. Going deeper, it is seen

[3] The Gini coefficient is a commonly-used measure of income inequality that condenses the entire income distribution for a country into a single number between 0 and 1: the higher the number, the greater the degree of income inequality.

Figure 8: Gini Coefficient for Regular and Casual Workers: 1993-94 to 2011-12



Source: ILO, 2018.

that this inequality has increased amongst regular workers while it has decreased among casual workers.

11.23 A similar trend is visible when we measure wage inequality through wage dispersion ratios (Tables 1 and 2). The ratio of the average wage rate of the top 10 per cent compared to the wage rate of the bottom 10 per cent of wage earners (P90/P10) declined among casual workers and increased among regular workers, except regular male rural workers. The ratio of the wage rate of the middle 10 per cent of wage earners (50th decile or P50) to the bottom 10 per cent declined consistently during 1993-2011 for

Table 1: Rural Wage Inequality Dispersion Ratios: 1993-94 to 2011-12

			1993-94			2004-05			2011-12		
			(P90/P10)	(P90/P50)	(P50/P10)	(P90/P10)	(P90/P50)	(P50/P10)	(P90/P10)	(P90/P50)	(P50/P10)
Rural	Regular	Male	7.6	2.3	3.3	9	3.5	2.6	7.1	3.6	2.0
		Female	12	4.3	2.8	15	5.8	2.6	12.5	5.0	2.5
	Casual	Male	3.3	2.0	1.7	2.9	1.7	1.7	2.9	1.7	1.7
		Female	3.1	1.7	1.8	2.8	1.8	1.5	2.5	1.5	1.7

Table 2: Urban Wage Inequality Dispersion Ratios 1993-94 to 2011-12

			1993-94			2004-05			2011-12		
			(P90/P10)	(P90/P50)	(P50/P10)	(P90/P10)	(P90/P50)	(P50/P10)	(P90/P10)	(P90/P50)	(P50/P10)
Urban	Regular	Male	7.0	2.3	3.0	8.6	3.2	2.7	8.9	3.5	2.5
		Female	12.9	2.6	5.0	18.7	5.6	3.3	15.6	5.0	3.1
	Casual	Male	3.7	1.8	2.0	3.1	1.8	1.8	3.0	1.9	1.6
		Female	3.8	1.8	2.1	3.5	1.8	2.0	4.0	2.0	2.0

Source: ILO, 2018.

regular and casual workers, both for males and females in urban and rural areas. Thus, there is a 'catching up' process because of the faster increase of wages of casual workers, which substantiates the 'lighthouse effect' of minimum wages.

11.24 This mixed trend of wage inequality – increasing amongst regular workers and declining amongst the bottom and middle level of all workers – can perhaps be explained by the rise of average minimum wages, in consonance with the increase in Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) wages, which were benchmarked to minimum wages (Berg et al., 2018). It is, therefore, established that well-designed and effective implementation of minimum wages will strengthen the trend towards decreasing wage inequality especially at lower levels. This becomes all the more significant as women constitute the majority of the bottom rungs of the wage distribution. This also shows how compliance of the statute is imperative for increasing welfare.

Impact on Employment

11.25 Broecke (2017) finds in a meta-study on employment across Brazil, Chile, China, Colombia, India, Indonesia, Mexico, the Russian Federation, South Africa and Turkey that minimum wages have only a minimal (or no) impact on employment in emerging economies.

11.26 Rani, Belser and Ranjbar (2013), in a study of 70 districts of India, find that there was no impact of minimum wages on employment between 2005 and 2010.

BOX 2: MINIMUM WAGE SYSTEM IN BRICS

BRICS countries have varied systems in terms of coverage, degree of tripartite consultation, criteria for setting the minimum wage and adjustment procedure. However, in all these countries, minimum wages are explicitly embedded within a larger wage policy aimed at balancing needs of the workers with overall economic factors.

Table 3: Minimum Wage System in BRICS countries

	Brazil	China	Russia	South Africa	India
Coverage	National minimum wage, covering all workers. Regions can also define minimum wages above the national level.	Minimum wage rates are established by province.	Regional minimum wages that coexist with a national minimum wage. The regional minimum wages are fixed above the federal rate.	A national minimum wage was approved in 2018, covering all groups of wage earners.	Minimum wages are limited to Scheduled Employments, diff. skills & occupations.

Consultation	'Quadripartite commission' in 2005, composed of federal government, state government, employers and unions, formulates a long-term minimum wage policy - until 2019.	Administrative authorities, in charge of labour issues prepare a programme to fix and adjust minimum wages.	Russian Tripartite Committee- the Employers' association, trade unions and the Government of the Russian Federation decides.	The tripartite Employment Conditions Commission (ECC) advises the Minister of Labour on the determination of the minimum wage.	Minimum Wages are set through Notification or Consultation, based on the tripartite Advisory Board and Committees set for this purpose.
Criteria	Minimum wage is increased by the sum of inflation in the previous year plus the GDP growth of 2 years before (if >0)	Cost of living of workers and their dependents; the consumption price index; the average wages of workers; labour productivity; the urban economic situation; and the level of economic development.	Regions choose different criteria for their minimum wages but the subsistence minimum is a need-based income level that is the benchmark that guarantees minimum consumption requirements.	Cost of living and minimum living levels, poverty alleviation, wage differentials & inequality, OSH, conditions and level of employment, inflation, GDP, productivity, collective bargaining.	Adopted need-based norms from the 1957, 15th ILC Session and 1992 Supreme Court Judgment
Adjustment	Adjusted on an annual basis	At least every two years, and whenever appropriate when the indicators change.	No specific periodicity	Regular annual adjustment.	Adjusted at least every five years.

Source: ILO, 2018

However, Menon and Rogers (2017) report a positive effect of minimum wages on employment levels for both men and women. They find that a 10 per cent rise in minimum wages raised the employment level by 6.34 percentage points in rural areas while it had a statistically insignificant impact on urban employment levels for both men and women.

WAY FORWARD

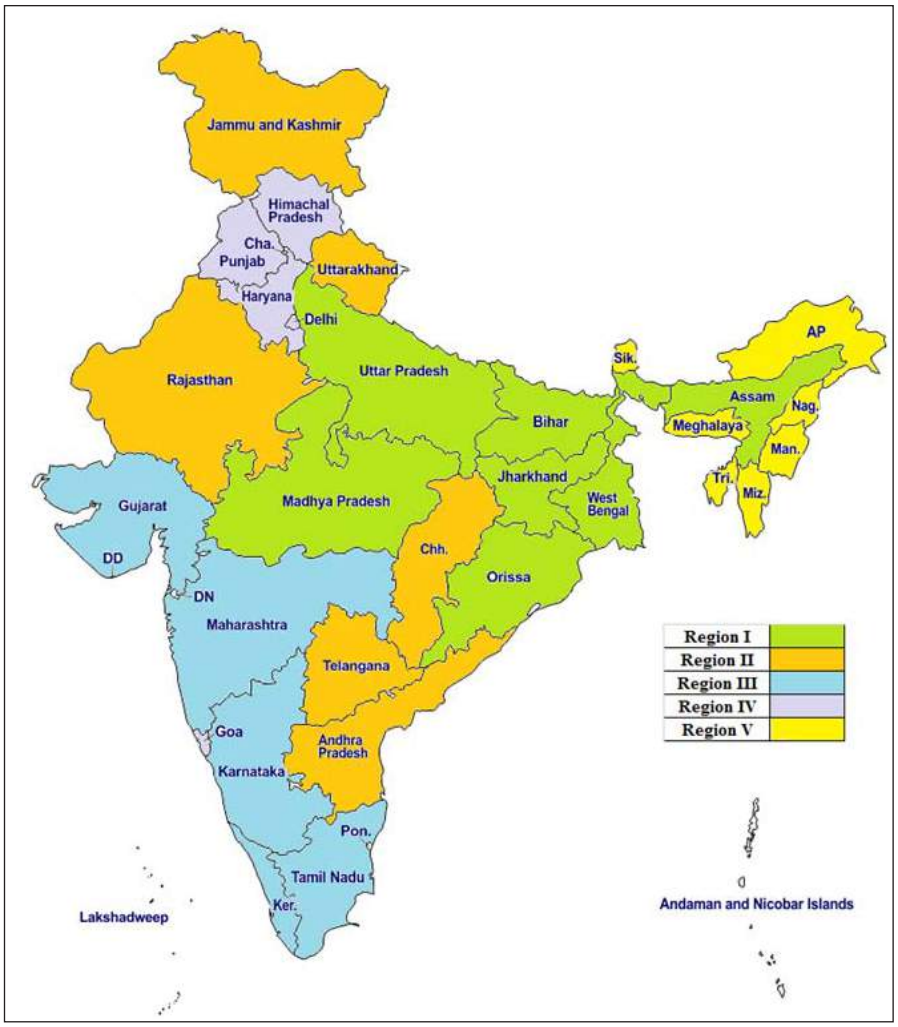
11.27 It is evident from above that a well-designed minimum wage system can be a potent tool for protecting workers and alleviating poverty, if set at an appropriate level that ensures compliance. International experience has shown that relatively simple systems are more effective and usually complex systems are least effective. Cunningham (2007) and Ghose (1997) show that a complex system of minimum wages shows lack of coherence about wage levels and wages being set in an arbitrary fashion. United Kingdom, for example, abolished its system of industry-wide trade boards in the

1980s and replaced it with a simple national minimum wage. This trend is reflected in evolution of ILO standards as well, which earlier encouraged the adoption of a select system of minimum wages to groups of workers who are in a weak bargaining position in the labour market, but later promoted a comprehensive approach that covers as many workers as possible.

11.28 Multiple minimum wages usually exist to take care of the needs of a heterogeneous labour force. For example, this is the case in India and the Latin American Countries that have a high diversity of labourers. Some policy recommendations for an effective design of minimum wages system are as follows:

- **Simplification and Rationalisation:** Rationalisation of minimum wages as proposed under the Code on Wages Bill needs to be supported. This code amalgamates the Minimum Wages Act, 1948, the Payment of Wages Act, 1936, the Payment of Bonus Act, 1965 and the Equal Remuneration Act, 1976 into a single piece of legislation. The definition of wage in the new legislation should subsume the present situation of 12 different definitions of wages in different Labour Acts.

Figure 9: Geographical regions as determined by the Expert Committee on determining the methodology for fixing the National Minimum Wage, 2019



Source: Expert Committee on determining the methodology for fixing the National Minimum Wage, 2019

- **Setting a National Floor Level Minimum Wage:** Central Government should notify a "national floor minimum wage" that can vary across the five geographical regions (Figure 9). Thereafter, states can fix the minimum wages, which shall not be less than the "floor wage." This would bring some uniformity in the minimum wages across country and would make all states almost equally attractive from the point of view of labour cost for investment as well as reduce distress migration.
- **Criteria for setting minimum wage:** Further, the Code on Wages Bill should consider fixing minimum wages based on either of the two factors viz; (i) the skill category i.e unskilled, semi-skilled, skilled and highly skilled; and (ii) the geographical region, or else both. This key change would substantially reduce the number of minimum wages in the country. For instance, Madhya Pradesh has notified minimum wages based on just four skill levels of unskilled, semi-skilled, skilled and highly skilled across occupations and regions. The state has just four basic minimum wages for the four skill categories.
- **Coverage:** The proposed Code on Wages Bill should extend applicability of minimum wages to all employments/ workers in all sectors and should cover both the organized as well as the unorganized sector.
- **Regular adjustment:** A mechanism should be developed to adjust minimum wages regularly and more frequently, similar to countries like Montenegro, Nicaragua, Netherlands, Uruguay, and Costa Rica, where the minimum wage adjustment takes place every six months (ILO, 2014). A dashboard needs to be set up by the Ministry of Labour & Employment, which shows the date of the last revision in the minimum wage adjunct to the mandated period. This would enable dissemination of information and increased transparency in the system.
- **Role of Technology:** The concept of 'bounded rationality' in behavioural economics is that there are restrictions to human information processing, due to limits in knowledge (or information) and computational capacities (Kahneman, 2003). A complex system with multiplicity of wages across states and across occupations sets limits on how workers process the information available and use it to their benefit. Technology can help in overcoming this behavioural bias by making information available in a simple and clear manner. Use of a variety of online, mobile phone and networking technologies have the potential to facilitate the collection and analysis of labour statistics, assist with the dissemination of information about labour laws and policies, reduce costs and improve transparency. A national level dashboard can be created at the Centre with access to the state governments whereby the states can regularly update the notifications regarding minimum wages. This portal must be made available at Common Service Centres (CSCs), rural haats etc., with the required mass media coverage so that the workers are well-informed and their bargaining skills and decision-making power are strengthened. Uniformity in minimum wages would also encourage industries to move towards interior areas and thereby reduce labour migration. Information on various combinations of wages, occupations/skills and states can be made available so that workers can get easy access to whatever combination of minimum wages they want to know. The system should be built in a way that

Box 3 : Use of Technology for Minimum Wage Enforcement- Cross Country Experiences

- In UAE, all enterprises have been legally required to pay wages for both national and migrant workers through banks and other financial service providers. This system allows the Ministry of Labour to have a comprehensive wage database and an electronic wage payment monitoring mechanism for enterprises within the country.
- In South Africa a system, called 'Impimpi Alive', enables workers to send anonymous SMS messages to the Department of Labour (DOL) after which an inspector is dispatched to the employer's place of business within 48 hours.
- In U.S. an app – The Wage & Hour Guide for Employers App – puts federal and state wage and hour laws at the fingertips of employers as well as law makers for better transparency.
- U.S. also has an app – GovDocs Minimum Wage app that provides the most up-to-date minimum wage rate data for all company locations.

flashes 'red' alerts if the statute is not being followed in any state or occupation in the notified area.

- **Grievance redressal:** There should be an easy to remember toll-free number for anybody to register his grievance on non-payments of the statutory minimum wages. This number should be given wide publicity to make people aware of this avenue for grievance redressal. Swift action should be taken against the offenders and this action should be flashed on the dashboard without going into specific details. The impression of action being taken would act as a deterrent to employers to flout the statute.

11.29 To sum up, the world of work is in a churn as technology is heralding major transformations both in the workplace as well as in work and employment relations. The impact is being felt both in the developed and developing countries. For India, undergoing a delayed structural and demographic transition, the challenges posed by the technology driven changes are enormous. Expanding decent employment to young aspirants in the labour markets is a major concern. Establishing an effective minimum wage system that will lead to inclusive growth is therefore an urgent necessity.

CHAPTER AT A GLANCE

- The present minimum wage system in India is complex with 1,915 minimum wages defined for various scheduled job categories across various states.
- One in every three wage workers in India is not protected by the minimum wage law.
- Minimum wages should be fixed for four categories namely, unskilled, semi-skilled, skilled and highly skilled based on the geographical region and should cover all workers, irrespective of any wage ceilings.
- A simple, coherent and enforceable Minimum Wage System should be designed with the aid of technology as minimum wages push wages up and reduce wage inequality without significantly affecting employment.
- An effective minimum wage policy is a potential tool not only for the protection of low-paid workers but is also an inclusive mechanism for more resilient and sustainable economic development.

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