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Social Relationships during Isolation

Gopal Guru, in his editorial "COVID-19 and the Question of Taming Social Anxiety" (*EPW*, 4 April 2020), rightly points out the increasing level of anxiety among people by classifying it into rational and irrational anxiety. This anxiety is not only about isolation but also about the whole scenario with respect to the lockdown, wherein an uncertain future awaits everyone. It is a big challenge to maintain mental peace at a time when one is forced to remain confined within one's home with limited resources and, in some cases, even without food. The socio-economic consequences of this will be far-reaching on our society, but there are even harsher social consequences that are going to change our social relationship in a larger way.

COVID-19 has forced many poor people to adopt things which are known and practically possible only among the middle and the upper classes. The anxiety the rural poor are suffering is about following social distancing with minimum resources to sustain their life. Many parts of rural India are still ignorant about common hygiene practices, let alone sanitising their hands.

The term social distancing would never have been used with such a fervour and popularity as it is being used these days. Is this physical distance going to convert into social and emotional distance? The question is bigger than what we are speculating. During this lockdown, most of us are interacting and expressing ourselves on social media. Our busy and hectic lifestyles have already made us accustomed to the virtual world, but, in the present situation, we are trying to remain connected through this virtual world only. The much-maligned realm of social media has suddenly become the biggest support to avoid isolation-related anxiety.

Having distance during interactions will become the norm and may get social sanction in the long term. The fear of getting infected has increased people's insecurity so much that in many cases, people are behaving inhumanly. There were media reports on how many villagers reported those workers who had returned to their villages on foot to the police. Not only this, many were assaulted while trying to enter their own villages. People have also developed insensitivity and apathy towards others in the name of social distancing and taking precautions.

It is also true that over-surveillance by government authorities has increased the anxiety among the people, as mentioned by Guru in the editorial. However, the source of this anxiety is not only limited to public surveillance but also extends to over-surveillance by family members who are confined with each other during this period. Reports and data also reveal that during this lockdown, the number of domestic violence cases has increased considerably. National Commission for Women has received a total of 257 complaints, including 69 domestic violence complaints by women. The commission claims that this number is almost double the complaints of domestic abuse they received earlier in March, before COVID-19 took centre stage and India entered the lockdown and isolation phase. On the one hand, people are sharing happy pictures of their families on social media, and on the other hand, they are struggling to live together peacefully due to the shrinking personal space. This situation of isolation is going to bring about new patterns of social relationships that need to be probed in further research.

Supriya Singh
LUCKNOW

Food Supplies for the Poor

As per the methodology of the Suresh Tendulkar Committee report, the population below the poverty line in India was 269 million (21.9% of the population) in 2011–12. These estimates are based on the current official measures of poverty, following the Tendulkar methodology of the poverty line, fixed at a daily expenditure of ₹27.2 in rural areas and ₹33.3 in urban areas. Currently, the public distribution system (PDS) caters to 81 crore people showing the alarming

estimates of the financially afflicted.

The concept of the poor has to be classified into two segments: (i) who are young but poor, who can be helped by the Mahatma Gandhi National Rural Employment Guarantee Act and by the highly subsidised PDS system, and (ii) those who are both poor and elderly, and lack the physical energy to earn a livelihood to sustain themselves. There are two types of policy initiatives needed for the above two segregated classes: (i) the first strata of the population be provided access to quality food through PDS, and (ii) the elderly urban poor be provided free cooked meals through home delivery from government sponsored parcel points. This scheme could be an extension of the Shiv Bhojan scheme of the Maharashtra government providing a subsidised ₹10 per plate of food.

The elderly urban poor and destitute survive on the roads and in shanties. They may be given a ration card, which identifies them as elderly urban poor. The government has to assume the responsibility of food for all whether they are rich or poor. Withering away of the elderly poor in helplessness could be stopped. Bullet trains and airports are needed but not at the cost of the grave injustice done to the destitute through negligence who, on the other hand, need the prime attention of and provisions by the government.

The PDS has assumed importance as one of the government's most significant anti-poverty programmes. The government has to ensure that the elderly poor get proper food. As we have parcel delivery by private ventures that provide home delivery of food for those who pay, the government should ensure that it provides free food delivery for the aged poor in the cities by establishing government-sponsored parcel points. Disbursing highly subsidised foodgrains at ₹1–₹2–₹3 per kilogram for coarse grains/wheat/rice, respectively will do little to subsume the hunger of the aged poor, as cooking needs a gas connection or firewood and also physical energy, which they lack.

Also, as announced by the government, the NITI Aayog is working on a proposal aimed at improving India's low-nutrition ranking and is centred on the idea that the government should subsidise protein-rich foods, including eggs, fish, chicken and meat, possibly through the PDS. This is likely to be part of NITI Aayog's 15-year Vision Document. The idea is a welcome move so that it will ensure an equitable distribution of access to balanced food for the under-privileged population.

To ensure basic food for the marginalised class, the National Food Security Act (NFSA), 2013 came into force. The allocation to the Ministry of Consumer Affairs, Food and Public Distribution accounted for 4% of the budget of the central government in 2020–21. Thus, 4% of the total central government expenditure (₹1,22,235 crore out of ₹30,42,230 crore in 2020–21) is spent on basic food for the poor population.

If ₹1,22,235 crore is spent each year on food covering 81 crore people, then the per capita expenditure on food for people per year amounts to ₹1,509.07 per poor person. That is, about ₹125.76 is spent per month per poor person for food. The total number of fair price shops (FPSs) in the country as reported by the states/union territories (UTs) upto 30 June 2011 is 5,05,879. Each FPS thus caters to approximately 1,601.17 persons, which does not seem to overburden the shops.

A healthy population ensures better productivity. Hence, the amount allocated for food procurement and distribution to the Food Corporation of India (FCI) needs to be raised by 50%, so that ₹250 per month is spent per poor person for food for the 81-crore population. The total cost for FCI will then claim 8% of the central budget expenditure, with priority given to food granted by the government. Hence, if the government is contemplating procuring and distributing chicken, fish, eggs and meat through FPSs for the marginalised class indisputably, it is a positive move towards a more equitable distribution of economic welfare. Certainly, everyone has the right to proper food in a free democratic country.

Archana Prashant Ghadi
NASIK

Erratum

The article "National Medical Commission Act, 2019" by Rajagopal Devara (*EPW*, 21 March 2020) was co-authored by Sanjay Zodpey, whose name and the following author note did not feature in the article. Sanjay Zodpey (sanjay.zodpey@phfi.org) is associated with the Public Health Foundation of India, New Delhi.

The error has been corrected on the *EPW* website.

The error is regretted by the authors and *EPW*. — *Ed*

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Abrupt Planning, Looming Hunger

Policy short-sightedness makes millions face the trade-off between the pandemic and starvation deaths.

Two weeks into the nationwide lockdown, we are faced with an inescapable trade-off between averting death from the COVID-19 and death from starvation. Photographs and media footages of hundreds and thousands of remigrating labourers walking their way back to their (rural) habitats in the most hazardous conditions or of destitute queuing up at the *rain basera (common shelter)* or community kitchens, speak volumes about the desperation of hunger sweeping across a large swathe of the Indian population. Is it only a matter of time that this widespread hunger will transgress into mass starvation?

The predicament of these millions, however, is not a specific fallout of the lockdown situation. It is a structural malaise that has been perpetually swept under the rugs of denial, political rhetoric and promises. The current systemic freeze has only amplified the manifestation of the plight, not to mention the exacerbation of its rate. While one may argue that the "lockdown" is the only viable means of combating the contagion, especially in urban India with its intense congestion, one cannot miss out the fact that by implementing "social distancing" as a "curfew," the government has actually abetted bringing in more difficulties than it could resolve. For instance, the very mention of the word curfew, and more importantly the adoption of the classical curfew model of keeping essential services open for specific durations in certain states, has entitled the state administrations to take recourse to repressive measures for enforcing the quarantine. In the process, the supply of essentials, has further been disrupted.

The disruption of supply, however, is more pervasive than the often-reported interruptions at the retailing level. But, government measures for ensuring supply seem solely focused on keeping the retail end functional, notwithstanding the role of those back-end operations that keep the retail markets running. In the case of food supply, for example, midstream operations like transportation/logistics, storage and warehousing, grading and sorting, etc, have increasingly assumed importance over time, with about two-thirds or more of the food market share in India accruing to the urban sector. With these operations largely being labour-intensive, barricading the worksites from the workers has unsettled the supply chain from the producers to the consumers. There is no clarity in the government orders and advisories regarding the functioning of these interlinked sectors/services that feed into the distribution of essential items.

On the other hand, the already distressed farm sector is facing a new bout of uncertainty with (potentially) a bumper *rabi* crop waiting to be harvested now. One might argue that the lockdown may not be as binding in the rural areas as in the urban spaces, and hence, the primary agricultural markets are likely to remain operational. However, it cannot be ignored that the operations in the primary markets are contingent upon the marketing conditions prevailing in the secondary markets, which act as the conduit between the rural production sites and the urban consumption centres. With the secondary markets being in the small towns/peri-urban areas, these have come under the lockdown. As a result, when the rural traders are unable to sell their stock in the secondary markets, they do not buy from the farmers in the primary markets. Simultaneously, labour shortage and lack of adequate transportation have hit government's wheat procurement in Punjab, despite procurement-related activities being kept out of the ambit of the lockdown. While, in the other northern states, delaying the procurement process is under government's consideration.

At this juncture, however, one may question whether ensuring food supply alone can automatically resolve the imminent hunger issue, especially when the economy has already evidenced decline in real consumption expenditure for the first time in the last five decades, and that too way before the pandemic had set in. Though the fall is ubiquitous, it has been more drastic for the rural sector at 8.8% over a span of six years from 2011–12 to 2017–18. While the dearth of jobs in the non-farm sector is a recognised fact by now, the fall in consumption demand also indicates a simultaneous slowdown in the farm sector.

Here, let us recall two critical facts. First, a major decline in rural India's consumption expenditure has been on account of food, with the monthly food expenditure falling by almost 10% from 2011–12 to 2017–18. This is suggestive of both increasing poverty and malnutrition. Second, in such a scenario, the rural sector now has to bear the pressure of remigrants, who are moving back in search of their social safety nets. The urban sector, too, has spent drastically less on essential food items between 2011–12 and 2017–18. The prospects of revival are bleak given the dismal scenario in the job markets, among other things. In such a context, a sudden stop of economic activities will have a multiplier effect on the already shrinking demand, and, alongside the disrupted supply, this can make the possibilities of destitution and starvation true for millions of people.

Compared to the enormity of the peril, the government's initiatives—such as, routing the surplus cereals of the Food Corporation of India to community kitchens and public distribution system networks, without exempting transport and logistics from the lockdown, or announcing a ₹1.7 lakh crore fiscal stimulus, instead of conscious and consistent policy efforts towards demand revival—are largely inadequate. But, more worrisome is the government's underestimation of the pervasiveness of the current calamity. This is not a sprint, but a marathon that we are running on a treadmill of policy impasse.

Going Beyond Symbolic Gestures

The government, focused on public relations spins, has fallen short in its response to the COVID-19 crisis.

Since the World Health Organization (WHO) announced the COVID-19 outbreak to be a pandemic, Prime Minister Narendra Modi declared a lockdown, but in his signature style, did not hold any press conferences or take questions. Instead, he addressed the country via a televised live speech. In the first speech, he urged all Indians to participate in a "Janata Curfew," asking citizens to show solidarity by clapping and clanging utensils in their balconies, and then announcing a 21-day lockdown soon after. Half way into this lockdown, he took to yet another televised address, and asked everyone to turn off the lights and step out into their balconies on 5 April, at 9 pm for 9 minutes with a diya or a candle, to show their solidarity once again. The Prime Minister's emotional appeals to display solidarity work only on a public relations scale; they do little to mitigate the grim reality of the pandemic.

When we speak about solidarity building among citizens, we should also ask: How does a government show its solidarity? The economic taskforce, which has been set up to ensure that the financial blow from the pandemic is softened, is a step to address the aftermath of the current crisis. However, the central government's plans for the everyday effects of the pandemic are unclear. In this regard, state governments' responses have been much better. For example, the Kerala government opened more than 4,000 relief camps for migrant workers, and set up community kitchens across the state. Reports indicate that the Maharashtra government has been working towards streamlining supply chains of fruit, vegetables, and dairy products during the outbreak. The Delhi government has also declared that ₹5,000 will be provided to transport service providers and has announced free meals schemes. But, state responses do not speak for the government in charge. The centre must take the lead and provide the states with essentials that are required to tackle this crisis, for example, personal protective equipments (PPEs) for doctors and health workers, ventilators, measures for migrant relief, food supply, and steps to curb vigilantism and communal hatred. It is the centre's responsibility to step up, show solidarity, and level the field for all states, so that they would be in a position to take adequate steps to tackle the pandemic. The central government's communication has been unilateral. It has asked citizens to light candles as a symbolic act to "challenge the darkness spread by the corona crisis," while it maintains strategic silences on pertinent issues.

When we build solidarities, we must build them to be inclusive. That the Prime Minister would make a speech which assumes that his audience does have balconies, or that they have a roof over their head, shows who the government is making its policies for. It is for the upwardly mobile classes who had access to televisions in the 1990s and can now watch the re-telecast of Ramayana, and Mahabharata on Doordarshan in the comfort of their upgraded homes with balconies. It is not for the migrant labourers who have been left stranded in cities with no jobs, no food, and no way to go home in the current lockdown. It is not for the scores of informal labour ers who have been rendered unemployed. The underprivileged, marginalised, and vulnerable have always been collateral damage in this government's policies, be it demonetisation, the Citizenship (Amendment) Act, or the current nationwide lockdown.

What sort of solidarity are we building then? These are unprecedented times of collective anxiety about a dangerous disease that threatens our collective future. This anxiety is compounded for a large majority of the population who are marginalised. Collective action, and solidarity emerge out of crises. For example, in Italy and Spain, the countries that are under a restrictive lockdown, it is the indomitable human spirit that could not be contained. Neighbours gathered on balconies and sang songs and, in that process, reminded themselves and the world that when everything else is on the brink of annihilation, one thing remains: human connection.

Such calls to action by the state leader, to bang utensils, clap, light diyas, only creates symbolic impact rather than real human solidarity. These will remain futile as long as our health workers are not materially supported with the equipment and resources that they need. Taking into account the reports of the Air India crew who were discriminated against by housing societies, or reports about doctors and nurses being evicted from their homes is a grim reminder of the deep rot that no amount of forced solidarity can fix.

While these mandated solidarities are being displayed with abandon, we must continue to ask the uncomfortable and upsetting questions: What are these displays of solidarity obscuring? Maybe the plight of migrant workers who have had to walk hundreds of kilometres, or the lost dignity of those who were sprayed with disinfecting chemicals en masse. Is our utensil clanging and diya lighting dulling the voice, and visuals of those suffering in silence, unable to afford a balcony, or even get a night's shelter during this lockdown? During a pandemic, while we must abide by governments' appeal for social distancing, we must continue to alert the governments in power to their limits and responsibilities in tackling this crisis so that citizens in the country feel safe and secure.

Univocal Political Symbolism

Arguably, public figures in the present Indian context seem to be using symbolic artefacts such as lamps and metal plates as the means to effectively communicate the complex idea of unity or solidarity in a simple fashion. The symbols when used for mass mobilisation have always acquired a political character. Thus, the symbolic use of artefacts, such as khadi or salt by M K Gandhi and symbols of lamps in Buddhism by B R Ambedkar, was aimed at energising the mass struggle for political freedom in the first case and social one in the second. Different modes of symbolism used by both the thinkers, however, projected a unified meaning: freedom. Thus, the symbols in a historical sense had acquired a multivocal character as a successful mode of communication of complex meanings.

Univocal symbolism, on the other hand, involves at least two dimensions. First, in such symbolism, the leaders of the people as well as the state are privileged to frame, for example, the COVID-19 crisis in preferred ways of selecting the symbols (lamps and metal plates) and its timing (at 9 pm for 9 minutes). Second, symbols, in an univocal framework, carry with them a single meaning to be accepted by every member of the community or citizenry. Thus, symbolism, which involved the act of clapping or banging plates adopted by the Prime Minister, was intended to carry the meaning of solidarity with those medical personnel who are actually fighting COVID-19 in the field.

The Prime Minister's appeal to use artefacts, such as lamps, candles, torches, etc, was to symbolically or virtually fight the "darkness" seen as the novel coronavirus. In this regard, it could be argued that the act of cheering up and lighting lamps is desirable for expressing solidarity with those fighting COVID-19. Symbolism for solidarity may carry at least two meanings with it. First, it treats the problem, such as darkness, as external to those who are holding the lamp. Second, it seeks to define darkness in an exclusive symbolic relation to the novel coronavirus.

One may, however, also see the phenomenon of darkness from another perspective, such as the radical symbolism of the lamp that is available particularly in Buddhism. The Buddhist symbolism of the lamp would suggest the act of holding the lamp first to oneself and thereby illuminating oneself. The principle of "Atta Dippo Bhava" (holding the lamp to oneself) is to detect the darkness that resides within oneself. Inner darkness is constitutive of the following properties: ignorance, feeling of hatred, desire to humiliate and suspect others, and, finally, the lack of capacity to question the darkness within. In addition to these, following the dictates of others faithfully also constitutes darkness. The question that has to be raised is, while people lit up lamps on 5 April to dispel the darkness of the novel coronavirus that was external to them, we have no idea whether these people took the initiative to evoke their inner voice and suggest to the government that the latter provide enough testing laboratories and personal protective equipment on priority to attend to the basic needs of helpless people. Univocal political symbolism does not lead people even to simply suspect the lack of astute planning to control the virus and bring the life of people into complete relief. Although, the real darkness of COVID-19 could be removed by fighting it with adequate preparation and active imagination.

In the act of either banging the metal plates or lighting lamps, the common people may not have any immediate interest to achieve an identifiable grand political goal. Such an act may just be to express their "commitment" to the Prime Minister's "passionate" appeal. Even their symbolic support may involve an element of rationality; meaning, their cheer would sustain the moral stamina of those medical personnel who are directly confronting the virus. It is also necessary to note that those who are safe in concrete, multistoried buildings or even small huts in slums have got an opportunity to symbolically stand with the fighters, such as doctors, nurses, food suppliers, and the police. On the other hand are the stranded migrant labourers, workers, and homeless people who have not been fortunate enough to grab the opportunity to optimally use the symbolic resources provided by the Prime Minister. It would be absurd to expect them to find opportunity in their endless suffering. Those who were housed indoors not only grabbed the opportunity, but also added surplus meaning to the official symbolism by shouting slogans and bursting crackers. It is time for the votaries to realise that the univocal mode does not have control over its impact at the level of its public reception. The relevance of symbolism in socially diverse societies such as ours depends on the normative use of artefacts that are laden not just with passionate appeals, but with fundamental values, such as the unconditional attention paid to all human beings.

Gopalpura

FROM 50 YEARS AGO

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Not Enough Power, Not Much Planning

The Prime Minister's 'assurance' to Rajya Sabha that, in view of the power shortage in parts of the country, no power project included in the Fourth PIan would be slashed, creates the misleading impression that Government is fully exercised to meet the growing demand for power. In fact, however, the programme for power in the Fourth Plan has been pruned to fit 'available resources' as the Planning Commission sees them. The Fourth Plan Working Group on power had estimated a peak load incidence of 18.5 million kW by 1973-74. Accordingly it recommended an installed capacity of 20 million kW with an outlay of Rs 3,462 crores — Rs 1,480 crores on generation, Rs 800 crores on transmission and distribution, Rs 632 crores on rural electrification, and Rs 500 'crores for 'advance action on Fifth Plan schemes. The actual outlay, by contrast, is only Rs 2,085 crores — Rs 1,061 crores on generation, Rs 645 crores on transmission and distribution and Rs 363 crores on rural electrification, with no provision for any advance action. The installed capacity of 22 million kW that will thus result would leave a shortfall of 3 million kW by 1973-74.

The Yes Bank Rescue and Its Aftermath

T T RAM MOHAN

Yes Bank, one of the stars of the cohort of new private banks, teetered on the brink of collapse until it was rescued by a consortium of banks led by State of Bank of India (SBI) in March 2020. The bank had a balance sheet size of around ₹3,80,000 crore in March 2019. It was large enough for its failure to have an impact on the broader banking system. It had to be rescued.

There is room for debate, however, over the particular plan for rescue that has been put in place. What is at stake is not just confidence in Yes Bank but confidence in the entire cohort of private banks.

There had been a question mark over Yes Bank's future ever since the Reserve Bank of India (RBI) asked one of its two promoters and Chief Executive Officer (CEO) Rana Kapoor, to step down in September 2018. Kapoor was replaced in January 2019 by another professional banker, Ravneet Gill. The RBI subsequently appointed a former Deputy Governor, R Gandhi, as director on the board. The hope was that the new management would be able to interest investors in infusing capital into the bank.

However, the expected capital infusion did not materialise over nearly 14 months. In the period, Yes Bank faced pressures on both its asset and liability sides. The collapse of the non-banking financial company (NBFC), IL&FS, in September 2018 had led to heightened stress in the financial sector, including banks and in the economy at large.

There was a flight of confidence from the NBFC sector. Real estate was impacted directly by lack of supply of credit as NBFCs lent significantly to the sector. Banks were exposed to both NBFCs and real estate. NBFCs are also providers of consumer finance. The problems in the NBFC sector resulted in a weakening of consumer demand. These developments led to a deterioration in asset quality in banks. Yes Bank had high exposures to groups and companies of relatively lower quality.

Yes Bank's new management kept giving assurances about private investors' interest in picking up stakes in the bank. However, towards the end of 2019, it was becoming clear that no concrete proposals were on the table. Yes Bank shares were plummeting through this period. This was a signal for depositors to flee. In the quarter September–December 2019, the bank lost over 20% of its deposits.

On 5 March 2020, the RBI announced that the Yes Bank board was being superseded. It also announced a draft restructuring plan. The final restructuring plan was approved by the government on 13 March 2020. The restructuring plan was novel in that it involved a partnership between a public sector bank (PSB), SBI, and several private banks.

Was this the best step in the circumstances? Once it was clear that private investors would not save the bank, the two conventional courses open to the government were nationalisation and merger with a PSB. Nationalisation would have meant a significant burden on the exchequer. It would have also meant an addition to the fraternity of PSBs at a time when the government's intention is to consolidate and reduce the number of existing ones. It was, perhaps, ruled out on these grounds.

Why not the time-honoured course, namely, merger with a PSB, in this instance, SBI? A merger would have made substantial demands on SBI's capital. The government would have had to provide some capital support to the SBI. In effect, the burden would be shared by the SBI and the government.

Under the restructuring scheme approved by the government, SBI would acquire an equity stake of up to 49% in Yes Bank. Its initial contribution would be ₹7,250 crore. Seven private banks would contribute a total of ₹3,950 crore, thus making for a total capital infusion of ₹11,200 crore to start with. As part of the restructuring scheme, additional Tier I bonds, which are bonds that count towards Tier I capital under Basel 3 norms, worth ₹8,250 crore were written off. The government announced a moratorium on the withdrawal of deposits in excess of ₹50,000 for a 30-day period. The intention clearly is to stabilise Yes Bank and improve its performance so that private investors could be invited in further down the road.

The scheme, which has been hailed by some as a novel experiment in public–private partnership, raises several issues. One is whether the capital required will be forthcoming in the months ahead. The precise requirement will become clearer once the financial statements for FY 2019–20 become available. The ballpark figure cited by analysts was ₹25,000 crore out of which less than half has been made available so far. This estimate was made before the outbreak of the coronavirus pandemic.

With the general deterioration in economic conditions, the capital requirement can only go up further. It is open to doubt whether the private banks that have contributed to the initial requirement will have the appetite for any further contribution. In the event that they do not, the onus for supporting the bank will fall squarely on SBI. The limit of 49% on SBI's equity stake may then be breached.

A second issue is whether depositors, especially bulk depositors (typically corporate and high net worth individuals who place deposits of over ₹5 crore), would want to stay with the bank after the moratorium was lifted on 18 March. The authorities have gone all out to support the restructured Yes Bank. They have assured depositors that their money is safe. It has been reported that PSBs have been asked to place ₹30,000 crore

of deposits with Yes Bank to deal with any outflow of deposits. It has also been reported that the RBI has committed a substantial line of credit to Yes Bank. Whether these measures stabilise the deposit situation in the months to come remains to be seen.

What is obvious so far is that the events at Yes Bank have dented confidence in private banks in general. The Government of Maharashtra announced that the state government and all government bodies would no longer park their funds with private banks. Other state banks may be expected to follow suit, given that more than one state government had their funds stuck at Yes Bank during the moratorium period. Shares of private banks have fallen considerably since the moratorium on Yes Bank was announced.

Even if the restructuring scheme for Yes Bank succeeds, it would have come at a heavy cost to the cohort of private banks. A merger with SBI would have obviated the need for any moratorium on withdrawals and the associated flight of confidence from the banking system. The restructuring scheme thus appears to be a messy alternative to merger and one whose outcome remains uncertain. Indeed, one should not be surprised if it ends up being a prelude to a merger with SBI.

A third issue has to do with the write-off of Additional Tier-1 (AT-1) bonds. The write-off is legally sound, although Basel 3 provides for alternative ways of dealing with AT-1 bonds when the relevant covenants are breached. For instance, the bonds could have been converted into equity or some portion of the bonds could have been so converted. The RBI's decision to write off the bonds is intended to limit the requirement of additional equity capital. However, the move has certainly damaged the market for such bonds in the near future. It will be a while before the market moves towards a pricing of such bonds that reflects enhanced risk.

There is a fourth issue that seems to have got overlooked in the general debate. Very few believe that the private banks that have joined hands with SBI have done so on a strictly commercial basis. It is more likely that they have been subject to moral suasion. This is not a happy state of affairs. "Social distancing" of the regulator from regulatory entities is essential for the effectiveness of regulation. Where such distancing is blurred, regulation tends to get compromised.

Failures of Regulation

Many commentators say the failure of Yes Bank points to failures of regulation and supervision on the part of the RBI. Yes Bank suffered from excessive exposure to some groups. With effect from 1 April 2019, the RBI has put in place a Large Exposure Framework that limits exposure to individual companies and groups. Perhaps such a policy might have come earlier. It does appear now that risk management in banks is too important to be left to the boards.

The RBI has also been faulted for ignoring excessive loan growth at Yes Bank. It is hard to say what constitutes excessive growth. Loan growth of around 30%–35% per annum at Yes Bank may seem high. However, this growth happened on a low base and at a time when private banks were gaining market share at the expense of PSBs whose own loan growth was tardy. The RBI does comment on asset quality in its annual financial inspection report. However, for the RBI to question loan growth at a given bank would constitute micromanagement of a new order.

There is, however, one aspect of regulation that requires careful consideration. Private banks promoted by professionals—Global Trust Bank, Centurion Bank, Yes Bank—have not fared well. Is it wise to let professionals into banking with a maximum equity stake of 15%? Or should we confine banking licenses to reputed groups (those that do not have interests in industry) and raise the maximum stake to 26% in order to ensure that promoters have enough skin in the game? Perhaps we should allow a higher stake while limiting voting rights to 15%.

It is also interesting that the private banks that dominate—ICICI Bank, HDFC Bank, Axis Bank—are those that had a semi-government parentage. With government parentage goes public trust which is everything in banking. The point is worth remembering whenever there is a clamour for privatisation of PSBs. If industrial groups are to be barred from banking, where are the "fit and proper" promoters who could acquire a controlling stake in PSBs? A large foreign bank presence in Indian banking is as suspect today as it has been in the past. Besides, foreign banks have not shown any keenness to come in through the subsidiary route made available to them by the RBI.

A third alternative is to allow foreign institutional investors acquire majority stakes in PSBs and make these board-managed entities. Our recent experience with Yes Bank and some other private banks does not suggest that this is a promising alternative. It does appear that those who urge privatisation of PSBs have not thought through the details.

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India's Food System in the Time of COVID-19

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India's complete lockdown has caused unnecessary disruptions in the food supply chain, with the scarcity of labour making it even worse. A sharp decline in demand is imminent with the financial sector being in a freeze and incomes having shrunk for everyone, except for the small salaried class. Consumer sentiment and business outlook on recovery are bleak. While ensuring the free movement of essential goods and availability and safety of labour can mitigate the immediate disruptions in the supply chain, unclogging the financial sector and restoring optimism in the market will take time and heroic efforts from the government.

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On 23 March 2020, the Government of India declared a complete lockdown for three weeks in response to the COVID-19 outbreak. All enterprises, except essential ones, have been closed and 1.4 billion people are confined to their homes for 21 days. Even the trains are not running. This is an unprecedented shock to the economy.

How is this lockdown affecting different parts of India's food system right now and what are the prospects over the next few months? We gathered a group of researchers and practitioners from diverse sectors such as development research, banking, fintech, microfinance, international trade, dairy, logistics, and warehousing to discuss these questions and to make sense of arguably the largest economic experiment in human history. The participants shared their understanding of what was happening on the ground in different parts of India's and the world's food system along with the information gleaned from bankers, entrepreneurs, researchers, and policymakers in their individual networks. This article summarises the discussion.

Lockdown and Food Supply Chains

Food is on the essential commodities list and hence exempt from movement restrictions. However, in many places, local police and administration are prohibiting the movement of trucks and carts carrying essential food items. As a result, perishables are not reaching *mandis*, processing units and households. Producers and traders are losing money as are the processors, transporters, and consumers. The disruption in the value chain is further aggravated by instinctive hoarding.

The split chickpea (*chana dal*) market in Bihar is a good illustration of the problems that can arise due to transport restrictions. The wholesale price of chana dal has increased by 20% from ₹52 to ₹65 per kilogram in the last few days in Samastipur, Bihar. This is partly because the trucks bringing new stocks of chickpea from central India are stuck for days at the state border. The artificial scarcity is encouraging hoarding by local traders as well as consumers. The local administration is trying to impose price controls to address this problem. However, experience suggests that price controls seldom work. Letting markets operate by removing or minimising disruptions is a much better solution.

If the supply chain is not restored within a few days, there will be an increase in panic buying by households and more hoarding by traders. The disruption will be more severe for perishable foods like milk, fruits, and vegetables. Whether the central and state governments can restore at least 70%–80% of normal levels of supply, as claimed, in the next few days through better coordination across states and clear messaging to district, state, and local administrations, is yet to be seen.

Disappearing Labourers

Paldaars (load bearers) are often gaunt men and women, who carry loads heavier than themselves on their backs. They are seldom mentioned in academic studies of value chains but are crucial to the smooth functioning of India's overall food system. Be it mandis, processing units or ports, their backbreaking effort is needed everywhere. Paldaars who are migrants have gone home after the Janata Curfew and even local paldaars are unable to show up at their workplaces due to the lockdown and restriction of movement. Even if the flow of goods is restored, workers are urgently needed in markets, factories, warehouses and ports.

Rice mills are closed in Andhra Pradesh and Chhattisgarh. So are other processing units. There are reports that tonnes of fruits and vegetables are rotting in the Azadpur mandi—the largest produce market in India. Millions of tonnes of rice and palm oil are traded through India's ports, but these ports are not currently working. Loading of goods

at ports is labour-intensive work and labourers are missing. Without the paldaars and the clearing house agents, the whole business of export and import of food commodities cannot run. Ships and trucks are waiting at sea and in the harbours. Losses are mounting by the day, and in many places, port authorities have invoked the *force majeure* clause. Traders' losses will be passed on to both producers and consumers.

India of course is not the only country facing these problems. There are similar disruptions in the ports, and further up the supply chain, in countries like Bangladesh, Indonesia, Kenya, and Malaysia. India is less vulnerable to these disruptions in international food trade in comparison to the other nations like Bangladesh, Nepal, Kenya, etc, as India's trade dependence—measured as the ratio of the total value of exports and imports of food items to the agricultural gross domestic product (GDP)—is comparatively smaller. India's large buffer stocks of rice, wheat, and to some extent pulses, will also provide a cushion against trade shocks. However, also India is still heavily dependent on the import of edible oil from Indonesia and Malaysia.

Credit Freeze

The financial sector in India has been under stress for a while now. Credit flow from banks and non-banking financial companies (NBFCs) for new projects was already slow. Now the lockdown and the associated fear of disruptions in cash flows and the collapse of demand have led to a complete credit freeze. Some banks are even rolling back recently sanctioned loans for new projects. All major financial institutions have become overly risk-averse. Everyone is trying to avert losses, and no one is going after profits.

Even as non-performing assets (NPAs) were rising elsewhere, the repayment rates remained high in the microfinance sector. After the Janata Curfew, repayment rates have plummeted in this sector due to: (i) the lenders being unable to reach their clients to collect the outstanding cash; and (ii) people wanting to keep cash at home in this time of crisis. Anticipating higher cash needs and poorer earning prospects in the days to come, all clients have started renegotiating repayment schedules. For these very same reasons, the business activity of fintech companies, that raise deposits from small businesses and poor unbanked households, has also collapsed.

Digital lenders have seen a big jump in the number of queries for loans and new credit lines in the last few days. However, many of them do not have the cash to disburse. Most digital lenders rely on banks/NBFCs for financing and this source has dried up. Lenders who rely on collection-based models are also struggling because either their clients are hoarding cash or because they are unable to reach out to their clients, or both.

Lending against agricultural commodities (warehouse receipts) increases after the harvest, but not this year. The lenders cannot verify the stocks in warehouses because of travel restrictions. Special provisions for essential commodities permit warehouses (and cold stores) to remain open in the lockdown. However, the situation on the ground is quite different. Many warehouses are closed because of the problems created by local law enforcement and the paucity of labour.

Collapsing and Unmet Demand

In rural India 85% of the workforce do not have salaried jobs vis-à-vis 53% in the urban areas. Even among those with salaried jobs, 46% do not get "paid leave" and more than 70% work without any written contracts (NSO 2019). This overwhelming dependence on casual jobs and self-employment means that almost 90% of all Indian households will experience a sharp decline in incomes within a month.

Even farmer incomes are going to be lower than normal. Farmers were looking forward to a bumper harvest in March–April after a good rabi season, but the lockdown has changed the situation for worse. Trains and trucks are not moving and, suddenly, India is fragmented into thousands of small village markets that are sealed off from each other. Trading has stopped in mandis. Price discovery will be difficult for farmers and coordinating supplies from surplus areas to major demand centres will be a huge challenge. The much-maligned middleman will be greatly missed this season.

The Food Corporation of India (FCI) and the state governments may manage to procure wheat at the minimum support prices even during the lockdown in Haryana, Madhya Pradesh, Punjab, and western Uttar Pradesh, but the public procurement system is weak in Bihar and eastern Uttar Pradesh and unlikely to improve this year.

High-value food commodities (HVCs), such as milk, fruits and vegetables, and meat, fish and eggs, account for 56% of the total value of output from agriculture and allied sectors (CSO 2018). Supply chain issues for these perishable products will be more challenging. Apart from the supply issues, there will be a larger decline in their consumption because of their higher income elasticities. Shutting down of hotels, restaurants, and catering (HORECA) is another reason for decline in the demand of HVCs. According to unofficial trade estimates, the HORECA segment accounts for 30% of total milk consumption in North India.

The demand for chicken and eggs had started going down even before the lockdown started because of rumours that poultry products can be vectors for COVID-19. In recent months, many small poultry farmers had to cull their mature broilers because there was no demand. The central and state governments should make public announcements to dispel these rumours. In Delhi, the price of broiler chicken has gone down from ₹55/kilogram in January to ₹24/kilogram in March (Ramkumar 2020).

Pessimistic Market Sentiments

The lockdown has practically shut down India's economy and there is an uncertainty among the citizenry in general

regarding whether it will end on 14 April 2020 or not.[1] The Indian economy was already struggling when the COVID-19 outbreak started in Wuhan, China. Aggregate demand was low, credit flow was slow and fiscal deficit was high and rising.

Farm incomes are going to be lower and rural wages may stagnate or even decline. A decline in rural incomes will have economy-wide impacts and the recovery will be slow. The shutdown has disrupted the cash flows of all kinds of businesses and no one knows how or when it will be restored. As a result, many small enterprises in food and other sectors of the economy will not recover from this shock and eventually go out of business. This will lead to a further increase in unemployment and a decline in aggregate demand. Low demand from world markets will make domestic problems worse.

On 25 March 2020, the Finance Minister Nirmala Sitharaman announced a 1.7 lakh crore stimulus, the Pradhan Mantri Garib Kalyan Yojana (PMGKY), to help businesses and poor families. The stimulus may bring some relief to beneficiary families, but it is too small to change market sentiments—₹1.7 lakh crore is 0.8% of India's annual GDP and around 5% of the central government's annual budget in 2020–21. In comparison, the stimulus approved on 25 March 2020 by the United States Congress is more than 50% of the annual federal budget and nearly 10% of the annual GDP of the country. On the other hand, Brazil has announced a fiscal package adding up to 3.5% of GDP and China has approved fiscal measures equal to 1.2% of GDP (IMF 2020), though neither of these countries have announced a nationwide lockdown like India.

The PMGKY also has a rural bias. Except for the increased allocation of subsidised rice, wheat, and pulses for the next three months, most of the other provisions of this special scheme cover either only the rural households or only the below poverty line households in both rural and urban areas. They leave out millions of urban families that will be pushed into transient poverty by the COVID-19 outbreak and the subsequent lockdown.

Conclusions

As most investors, lenders, and consumers become risk-averse and pessimistic about the future of the economy, this pessimism may become self-fulfilling. An entrepreneur in our discussion added: "I do not know of a single economy in history that has been fully shut down and restarted." This is a widely shared view. Around the world, epidemiologists, economists, and policymakers realise that they are dealing with a problem of unprecedented proportions.

India's food system is only a part of its economy, but we will not be able to control the pandemic if its food system collapses. Enforcing necessary measures like the lockdown will become impossible if people do not have enough food and money to fulfil basic needs. The immediate policy challenge, therefore, is to restore food supplies and the purchasing power of poor households without exposing them to greater risk from the virus (Ravallion 2020). Meeting these challenges requires a bigger stimulus than the PMGKY and better coordination between the districts, state, and the central governments.

NOTE

1 Many in this group called upon their friends and families within their networks who reside in villages across various parts of India. It appears that people in many parts of rural India still do not understand or appreciate the concept of social distancing. This may be one of the reasons why local law enforcement is being excessively strict and indiscriminate in its attempts to enforce a complete lockdown and restrictions on all kinds of movement and assembly. If social distancing remains ineffective in parts of rural India, then the lockdown may not flatten the curve for COVID-19 cases and the government may need to extend the lockdown period.

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COVID-19 and Macroeconomic Uncertainty

Fiscal and Monetary Policy Response

LEKHA CHAKRABORTY, EMMANUEL THOMAS

The macroeconomic uncertainty created by COVID-19 is hard to measure. The situation demands simultaneous policy intervention in terms of public health infrastructure and livelihood. Along with the global community, India too has announced its initial dose of fiscal and monetary policy responses. However, more fiscal–monetary policy coordination is required to scale up the policy response to the emerging crisis. Innovative sources of financing the deficit, including money financing of fiscal programmes, a variant of "helicopter money," need to be explored.

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Macroeconomic uncertainty is hard to measure. The COVID-19 pandemic has created an uncertainty worse than a war in many respects. In fact, many have termed it as World War III. This uncertainty has come as a double whammy for the Indian economy, which was continuously slowing down for a couple of years "structurally" with no evidence of a V-shaped or U-shaped revival.

The nation is now facing a humanitarian crisis. We face a humungous task of saving the "lives" and "livelihood" of people. Rightly, we have given priority to saving lives by taking extreme steps of "social distancing" to flatten the curve. The complete lock down of 21 days in India is aimed at this. As we do this, livelihoods are at peril, and it has triggered an exodus of migrant workers. Unless we minimise the effects of the simultaneous economic disruptions, it will turn into an unimaginable economic pandemic too. Measuring these macroeconomic uncertainties and designing a "COVID-19 policy response" package is a daunting task.

Governments around the world have resorted to unprecedented monetary and fiscal policy measures to limit the adverse impact of COVID-19, both the unparalleled public health crisis and the macroeconomic crisis. The International Monetary Fund (IMF) has launched a policy tracker to help member countries to be informed about the experience of others in fighting the pandemic and the discretionary policies taken to help them combat the pandemic more effectively (IMF 2020). The IMF policy tracker was launched on 24 March 2020. In India, the fiscal–monetary policy response to COVID-19 has come after this. Unlike many countries, including Singapore and South Korea, India has opted for a complete lockdown rather than aggressive testing, likelihood plotting of route maps and scaling up public health infrastructure and services. A complete lockdown means a complete disruption of supply chains, which was already affected by shutdowns in other countries. Now, this has become a supply shock of inconceivable magnitude for an economy, which was reeling under a severe demand shock for a significant amount of time.

Given the gravity of the issue at hand, this is the time the government has to forget about the magnitude of debts and deficits. Identifying the fiscal space is paramount to preventing the pandemic. Breaching the fiscal rules (Fiscal Responsibility and Budget Management [FRBM] Act, 2003) by altering the threshold levels of 3% fiscal deficit to gross domestic product (GDP) is the need of the hour. It is not only the levels of deficits but also a relook into the financing patterns of deficit that is impending here. A huge pressure is mounting from economists to implore the Reserve Bank of India (RBI) to go for an exceptional seigniorage financing of deficits to face this macroeconomic uncertainty. A National Institute of Public Finance and Policy working paper on "Fiscal Seigniorage" explains the ways in which an optimal level of seigniorage can be arrived at, without exploding into high levels of inflation (Chakraborty 2015). The "money financing of fiscal programme" (MFFP) is a variant of helicopter money (Buiter 2014; Bernanke 2016; Aggarwal and Chakraborty 2019).

A new e-book titled *Economics in the Time of COVID-19* edited by *Vox* editor-in-chief Richard Baldwin and Beatrice Weder di Mauro, president of the Centre for Economic Policy Research (CEPR), has analysed the mechanisms of economic contagion and what governments can do about it (Baldwin and di Mauro 2020). A National Bureau of Economic Research paper (2020) has modelled the macroeconomics of the epidemic and revealed that the reduction in consumption and work exacerbate the size of recession caused by the epidemic (Eichenbaum et al 2020). The European Central Bank (ECB) at the onset of the COVID-19 pandemic has waived its restric-

tion on the amount of bonds it can buy from each member state in its Pandemic Emergency Purchase Programme (PEPP). Countries are puzzled about the ways to finance post-COVID-19 macroeconomic stabilisation and economic recovery programme for growth.

Fiscal Policy Response

In India, 36 hours into the lockdown, Finance Minister Nirmala Sitharaman announced a fiscal package that is claimed to be worth ₹1.7 lakh crore, constituting around 5% of the total public spending and around 1% of the GDP. It is aimed at guaranteeing access to food and cash for the poor and vulnerable sections. But, a closer examination of the package raises doubts about the quantum of relief involved. One important component of the package is the free provision of an equal amount of eligible quantity of cereals and pulses for three months. This step is expected to benefit about two-thirds of the population so as to ensure food security during these hard times. But, the cost for the union is negligible given the fact that the Food Corporation of India godowns are overflowing with stock.

Frontloading of the PM-KISAN transfer by about four months is another element of the package. Although it will benefit about eight crore households, it does not involve any additional expenditure. In fact, it involves an expenditure of ₹17,500 crore out of the budgeted ₹75,000 crore in Union Budget 2020–21. Similarly, the announced revision in wages for all the states under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) cannot be counted as a pandemic-related announcement or relief, although the quantum of revision is more this year. The MGNREGA wages were revised for the FY 2019 too, in March 2018, and wages increased by an amount equal to or greater than ₹10 for six states and by an amount equal to or greater than ₹5 for 17 states (MGNREGA–1, 2018; MGNREGA–2, 2019) Moreover, the realisation of the announced gain of ₹2,000 per worker per year would happen over a period of one long year and assumes that the project can resume soon. There was a drastic reduction in the allocation of MGNREGA by ₹9,501 crore from the 2019 revised estimates. In the scenario of a total lockdown, we do not know when this project could resume.

Ex gratia payments to women account holders of Pradhan Mantri Jan Dhan Yojana (PMJDY), poor widows, senior citizens and physically challenged persons are expected to provide much needed relief for the beneficiaries. This is a recognition of the statistically invisible care economy. It is also claimed that transfer under PMJDY will benefit about 20 crore families and the latter will benefit about three crore individuals (Table 1). However the percentage of women in the 15–64 age group who have PMJDY accounts is abysmally low, at 47%. Integrating gender budgeting in energy infrastructure—providing free liquid petroleum gas cylinders for Pradhan Mantri Ujjwala Yojana beneficiaries for next three months

Table 1: COVID-19 Fiscal Package 2020 in India: An Illustrative Mapping with Demand for Grants (₹ crore)

Sl No	Scheme/Programme Beneficiary	Ministry/Deparment/Act	2018 Actual	2019 Budget	2019 Revised	2020 Budget	Relief Package—Illustrative Estimate (crore)	Comments
1	Pradhan Mantri Jan Dhan Yojana (cash transfers to savings account of women)	Ministry of Finance-Department of Financial Services	0	0.01	0	0.01	30,600	
2	Pradhan Mantri Ujjwala Yojana (clean fuel to low income households1-LPG subsidy)	Petroleum and natural gas	3,200	2,724	3,724	1,118	13,000	
3	Cash transfers to senior citizens, widows and physically handicapped	–	–	–	–	–	3,000	
4	Food subsidy	Consumer affairs, food and public distribution	1,01,327	1,84,220	1,08,688	1,15,569	NA	Cost of three months off-take of cereals and pulses
5	PM-KISAN (income support transfer to farmers)	Agriculture and farmers' welfare	1,241	75,000	54,370	75,000	17,500	Only front-loading of expenditure
6	MGNREGA (employment guarantee scheme)	Rural development	61,815	60,000	71,001	61,500	NA	No edditional expenditure now
7	Self Help Group -Loans						NA	Banks expected to lend more
8	Employer's Provident Fund (EPF)	EPF regulation to be amended to allow higher non-refundable withdrawal					NA	No expenditure
9	Organised Sector-PF 24% of salary	Govt will pay 24% of salary to EPF for next three months, of those with salary less than ₹15,000 working in establishments with less than 100 employees					NA	Involves expenditure
10	Health Insurance	Insurance cover of ₹50 lakh for government health workers fighting COVID-19.					NA	Involves expenditure for paying premium
11	Construction workers	Building and construction workers welfare act			31,000		31,000	(max if states spend whole)
12	District Mineral Fund (DMF)	National Mineral Policy/Act			35,925		35,925	(max if states spend whole)
		Total					1,70, 000 (including the missing values)	

Source: Finance minister's announcement and budget documents of various years; NA = breakup not available in COVID-19 relief package announcement.

should also be welcomed. These three components are expected to cost the union government about ₹46,000 crore.

An interesting fact about the package is that about 40% of the announced amount is on account of Building and Construction Workers Welfare Fund and District Mineral Fund (DMF). According to the finance minister, the former is a corpus of about ₹31,000 crore with about 3.5 crore registered workers. Similarly, the DMF has about ₹35,000 crore, which is directed to be used for augmenting the funds for fighting the COVID-19 pandemic. However, as the DMF is based on the mining royalty regime, an urgent policy response is required to scrutinise the royalty rates and base across states. These two programmes—cess and DMF—are designed within the framework of cooperative federalism between the centre and the states. There are ambiguities regarding the centre–state financial relations in arriving at a COVID-19 mitigation strategy and the stimulus package. The COVID-19 policy response in terms of intergovernmental fiscal transfers to the states from the Fifteenth Finance Commission is also awaited.

The raising of the limit of collateral-free lending to self-help groups (SHGs) is expected to benefit about seven crore households. However, this does not entail any additional burden on the union government. The government paying the employer's and employee's share to Employees' Provident Fund (EPF) for those workers with monthly salary less than ₹15,000 in establishments which employ less than 100 workers is a positive step. But, it is not a huge commitment and will not benefit them immediately although it grants the workers succour for the time being and hope in the medium term.

The finance minister has also announced an insurance scheme for health workers fighting COVID-19 in government hospitals and health care centres. This involves an insurance coverage for about 22 lakh health workers to the tune of ₹50 lakh per worker. Although this is a welcome step, lack of coverage for the majority who work in the private sector is a cause for concern. Moreover, the government should consider making additional payment to the health workers who are toiling day and night, risking their lives. The incentive for them should not be limited to risk coverage alone.

The states and union territories, which are fighting the pandemic on the front line, have been demanding relief from the union. A transfer of ₹17,287 crore by the union to the states on 3 April, one day after the video conference of the Prime Minister with the chief ministers is a temporary relief for some states, although it falls short of their demand. Out of this, ₹6,195 crore is on account of revenue deficit grant on the recommendations of the Fifteenth Finance Commission and is available to 14 states. The rest is under the State Disaster Response Mitigation Fund.

In the time of a pandemic, fiscal policy will have a bigger role to play compared to monetary policy. Probably, the government is assessing the situation and waiting before announcing bigger packages. The government's response in this time of crisis can go a long way in building trust, which is crucial in building a vibrant economy and a strong nation.

Table 2: COVID-19 Monetary Policy Response in India, 2020

Policy Response	Policy Change	Effect/Impact
Policy rate	Repo rate reduced to 4.4% by 0.75 bps Reverse repo rate reduced by 0.9 bps	With inflation target at 4%, India is close to a zero interest rate .
Liquidity	(1) Cash reserve ratio (CRR) cut by 100 bps to 3% (2) Targeted Long Term Repo Operations (TLTRO) of three years tenor (3) Marginal standing facility (MSF) increased to 3% of statutory liquidity ratio (SLR)	Infusion of ₹3.74 lakh crore liquidity
Widening of monetary policy rate corridor	The corridor raised to 0.65 from 0.5	Makes it less attractive for banks to park funds with RBI, nudging them to lend more.
Regulatory easing	(1) Moratorium on term loans and working capital loans for three months (2) Implementation of NSFR deferred by six months (3) Deferment of last tranche of capital conservation buffer	Eases the balance sheet of banks while regulatory forbearance provides relief to borrowers.
Review the limits of monetisation	Review the limits of ways and means advances (WMA) limits to state governments and union territories by 30%	To increase fiscal space of subnational governments through alternative modes of "financing" the deficits

Source: RBI (2020), Seventh Monetary Policy Statement of RBI and related documents, 2020.

Monetary Policy Response

Central banks across the world are responding to the COVID-19 pandemic. That the RBI advanced the meeting of the Monetary Policy Committee (MPC) by one week is in itself a sign that it is proactive in the emergency. Through its decision and the announcements made on 27 March, the RBI has succeeded in sending the signal that it is aware of the gravity of the impending crisis, and that it will do "whatever it takes" to overcome the pandemic-induced crisis (RBI 2020). The announced monetary policy has paid attention to ensuring liquidity, reducing cost of loans, encouraging transmission and regulatory easing.

Reduction of the cash reserve ratio (CRR—the average daily balance that banks are required to maintain with the RBI— by 100 basis points (bps) to 3% will infuse liquidity to the tune of ₹1.37 lakh crore into the banking system (Table 2). Similarly, Targeted Long-term Repo Operations (TLTRO) that allows banks to keep funds borrowed at repo rate for a longer period of time at the current rate of three-year tenor will add another ₹1 lakh crore. Accommodation under marginal standing facility (MSF) allows scheduled banks to borrow additional amounts, over and above liquidity adjustment facility (LAF) at a punitive interest rate, which has been raised to 3% of the statutory liquidity ratio (SLR) portfolio from the earlier 2%. This can infuse a liquidity of ₹1.37 lakh crore. Although MSF is not used by banks on a regular basis, these three steps together can infuse a liquidity of ₹3.74 lakh crore.

The LAF involves overnight and term repo auctions. It helps banks to tide over daily liquidity mismatches, mainly to maintain the CRR. If banks are short of

funds, they can borrow at the repo rate. If they have excess funds, they can park the funds at reverse repo rate. Under LAF, repo rate has been reduced by 75 bps, taking it to 4.4%. The reverse repo rate has been reduced by 90 bps to 4%. Given the inflation target of 4%, this brings our real interest rate close to zero.

The RBI has also used a trick to encourage transmission of these rate cuts by widening the monetary policy rate corridor. It is determined by the reverse repo and MSF rates. The difference between these two rates, which was 50 bps is increased to 65 bps. With a reverse repo rate of 4%, it has become less attractive for banks to park their funds with the RBI. This is expected to nudge banks to lend more.

As expected, regulatory forbearance also has been announced in the monetary policy. A moratorium on term loans and working capital loans for three months is expected to provide relief to the borrowers. Similarly, deferment of implementation of the net stable funding ratio and last tranche of capital conservation buffer are expected to provide relief to the banking sector.

The RBI also has done its bit to help the states and union territories. The central bank had already constituted an advisory committee to review the limit ways and means advance (WMA) limits for state governments and union territories. Pending its final recommendations, the RBI, through an announcement on 1 April, has raised the WMA limits for states and union territories by 30% to help them tide over the situation. However, as the calendar for market borrowing for the first quarter of the new fiscal shows, the yield curves in the bond market are likely to face an upward pressure. During this period, union government will borrow ₹3 lakh crore, and all state governments together are expected to borrow about ₹1.27 lakh crore.

Overall, it seems that government and the RBI are adopting a wait and watch policy. But, even if the pandemic is tamed in the next couple of months, the hardship it is going to cause for the vulnerable is going to be unimaginable. Some have even said that more people will die of hunger than the pandemic unless the government wakes up to the situation and addresses the issue on a war footing.

Conclusion

The macroeconomic uncertainty created by COVID-19 is hard to measure. The situation requires simultaneous policy interventions in terms of public health infrastructure, livelihood and humanitarian issues emanating from the interstate migration crisis. Although India has announced iteratively the policy measures, more fiscal–monetary policy coordination is required to scale up the policy responses to "whatever it takes" to respond to this crisis. Innovative sources of financing the deficit, including "money financing of fiscal programme"—a variant of helicopter money—can be a solution. Breaching the FRBM by raising the threshold deficit–GDP ratio from 3% is significant, with a clear "excessive deficit procedure road map" as the post-COVID-19 exit strategy. The government as the employer of last resort with effective rise in the existing wages could be aneffective component of this policy.

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Ideologies and Their Impact on Higher Education

SEERAT KAUR GILL, GURPARKASH SINGH

As universities across the country face tumultuous times, it is pertinent to take note of a new rhetoric around these driven by ideology. Public universities of a good standing and long history are increasingly being targeted as spaces harbouring "seditious activities." Privatisation in higher education is making new inroads, and exacerbating coercive inequality among the youth of the country. It is to be examined if this is a manifestation of the dominant right-wing ideology.

The concepts "left" and "right" can be traced back to the pre-revolutionary France, to the year 1789 to be precise. The group of people who sat on the right side of the president, that is, the nobility and the clergy, supported conservative ideas, whereas the group on the left side of the president, that is, the bourgeoisie, urged and fought for change (Bertolin 2016). Thus, began a dichotomy between the left and the right. This dichotomy is a widespread phenomenon now. World over, political parties are characterised as leftists, right-winged, and several variations in between, such as centrist, centre-left, centre-right, and so on.

Broadly speaking, the left supports socialism, and the right can be said as associated with capitalism. However, left-liberal regimes have been ruling in capitalist nations for years. Hence, this distinction may seem as being too rudimentary to hold true in a complex contemporary society. Nevertheless, the ideological differences between the left and the right are clearly articulated through their policies. For instance, the left is liberal, pushes for change, supports state intervention, and focuses on social problems. On the other hand, the right is conservative, supports hierarchy and private ownership, and dissociates itself from redistributive policies.

Impact of Ideologies

In the light of the recent policy developments such as the draft National Education Policy, 2019 (NEP) and debates about the quality of higher education, it is important to take into account the impact that ideologies may have on higher education policies in the country (Gill and Singh 2019a). Simon Marginson (2018), professor of higher education at the University of Oxford, states that ideologies can have profound effect on transformations in higher education. An ideology dictates whether institutions of learning will be state-supported or privatised, or whether education will be considered as a social good or a commercial service. For education to be considered as a commercial service, it would have to be considered as a business, the trustees as businessmen or entrepreneurs, and students or parents as users of service. Such a notion emphasises on paying for the service—better the service, higher the service fee.

This notion marginalises the emancipatory power of higher education, as well as the developmental needs of students and teachers. It is this school of thought that leads to a severe opportunity cost for students, especially the ones with underprivileged backgrounds. Underprivileged students fail to gain access to private universities. Thus, they remain devoid of experiences that are "sold" to students who can afford them. These experiences include being taught innovative courses by competent faculty facilitated by the latest tools and technology. Hence, this particular section of underprivileged students depends upon either subsidised public universities, or non-elite private institutions for their educational needs.

Current Ideological Atmosphere

There have been many developments in universities across the country, including a sustained assault by declaring a few universities as "anti-national" spaces. This rhetoric paved way for the arrests of several scholars in Jawaharlal Nehru University (JNU), mass protests by students at Jadavpur University, and so on. These institutions, which have consistently attained top National Assessment and Accreditation Council (NAAC) scores and rankings according to the National Institutional Ranking Framework (NIRF), were ironically branded as grounds of seditious activities. Moreover, the implicit eligibility criterion for vice-chancellorship at Indian universities as the ruling party's or its parent body's affiliation has marked a rush of entry of the right-wingers into the intellectual spaces in the country. One such example has been Gajendra Chauhan's appointment as Film and Television Institute of India (FTII) chairman, triggering a 139-day protest by students, questioning Chauhan's qualifications.

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The impacts of right ideology on higher education institutions are there for the nation to witness. The recent protests of Banaras Hindu University (BHU) students against Feroz Khan's appointment as assistant professor of Sanskrit, ultimately led to his resignation. The crux of the matter is why a Muslim was not allowed to teach Sanskrit at BHU? The professor in question has resigned, and is currently rendering his teaching duties at the Arts faculty.

It is also pertinent to note how the right ideology manifests in the form of excessive privatisation in education. Six institutions were given the tag of "institutions of eminence" by the previous government. The eligibility criterion for such a tag was the position of institutions in top 500 universities in the first 10 years of setting up, according to either QS World University Rankings or Shanghai Jiao Tong University rankings. Rightfully, Indian Institute of Technology (IIT) at Delhi and Bombay, Birla Institute of Technology at Pilani, and Manipal Academy of Higher Education were chosen, since they are exemplary institutions that have been imparting quality education since over 50 years. However, Reliance's non-existent "Jio Institute" came as a surprise since it bagged the "institution of eminence" tag without even having set up. Such crony capitalism promoted by the right-wing? goes against the basic tenets of education.

Higher education is moving towards a direction where it is seen as a commercial service, wherein the focus remains on serving the interests of entrepreneurs and economy (Ball and Youdell 2008), especially in the prevalent neo-liberal economy. With privatisation having given a greater push, the public university is being targeted as "anti-national." As pointed out by Guru (2019), the public university has unintentionally become a hub of mostly underprivileged students of the society. This seclusion robs under privileged students of discursive opportunities, which have a potential for transforming them, thus leading to a coercive inequality (Guru 2019).

This coercive inequality has also manifested through sub-standard private higher education institutions, which mushroomed due to the unruly policies of All India Council for Technical Education (AICTE) and University Grants Commission (UGC) in the last two decades. These private institutions (also called as demand absorbers), initially provided access to such students with restricted access to education due to socio-economic factors. However, post-McDonaldisation (Hayes and Wynyard 2002) of these institutions, they are facing a huge loss in student admissions, and subsequent irrelevance today. Seventy-eight percent of higher education institutions are being run by the private sector (MHRD 2017). However, these private unaided institutions are being pushed into penury at the cost of providing inclusiveness, which is further affecting the quality of education being provided.

On the other hand, low admission fees at JNU has been an enabler for students across socio-economic spectrum to pursue higher education. However, a sudden 600% fee hike, citing a severe fund deficit, sparked a series of protests against it. The situation raises the question: Has education ceased to be seen as a public good? Does it qualify as a commercial good? Has economic growth taken precedence over social justice?

Finding the Middle Path

Markets may lead to a productive economy, however, one cannot overlook the negative influences of its dominance in areas of judiciary, health and education (Sandel 2012). The Delhi University Teachers' Association (DUTA) has criticised the NEP 2019 for "blatant(ly) handing over education to the markets" (Press Trust of India 2019). However, recent trends in the private education sector have established the fact that, clearly, the market does not have all the answers. Moreover, a subsidised higher-education system is not a sufficient condition for transformative education. Thus, it is vital to find a middle path, between economic and social poles, between technical and humanistic tendencies, between private and public, and so on, to address the issue of coercive inequality.

This can be done by redefining quality in private higher education through a transformative approach (Gill and Singh 2019b; Harvey and Green 1993). This requires: enabling students to become emotionally stable, increase in self-confidence of students, development of students' critical thinking, increase in self-awareness of students, enabling students to transcend their prejudices, students' acquiring knowledge and skills to perform future jobs, and increase in their knowledge, abilities and skills. This transformative approach focuses on developing the humanistic dimension in education by creating individuals who are reflexive, critical thinkers, and socially responsible. The idea is not only to empower students through transformation, but also to enable a change within the higher education institutions to encourage the process of student transformation (Cheng 2016).

In the path of such a transformation, the right-wing ideology can be a major impediment, and is capable of undoing the very purpose of transformative higher education. One such example is the forced entry of the Delhi police at the Jamia Millia Islamia University campus, where students had been protesting against the Citizenship (Amendment) Act, 2019. Tear gas cannons were fired in closed spaces such as the library, thus leaving several students grievously injured. Similar violence was also reported at the Aligarh Muslim University. These events led to a ripple effect, wherein students across universities in the country, such as JNU, Panjab University, Jadavpur University, IIT Bombay, Central University of Hyderabad and Tata Institute of Social Sciences started protesting against police violence.

The protesting students at several institutions of higher learning are indicative of their ability to think critically, independently, and transcend prejudices (some of the key dimensions of transformative higher education institutions). However, an intriguing aspect of these protests is that the students were mostly affiliated with public universities. Does this mean that transformation, if any, in the private institutions has been superficial? Does privatisation only further the cause of the right-wing ideology? Hypothetically, will the students of the "institution of eminence" as the Jio Institute has been declared, gather at the ITO (Income Tax Office), Delhi and protest against an ideology that corrodes the power of transformation and emancipation of education?

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Deepening Divides
The Caste, Class and Regional Face of Vegetarianism

SURAJ JACOB, BALMURLI NATRAJAN

Changes in the incidence of vegetarianism across time are sought to be analysed by identifying the specific trends at the level of region,caste and class. Divergence in the attitude towards vegetarianism across these axes points towards deepening divides linked to socioeconomic status and cultural-political power inequalities.

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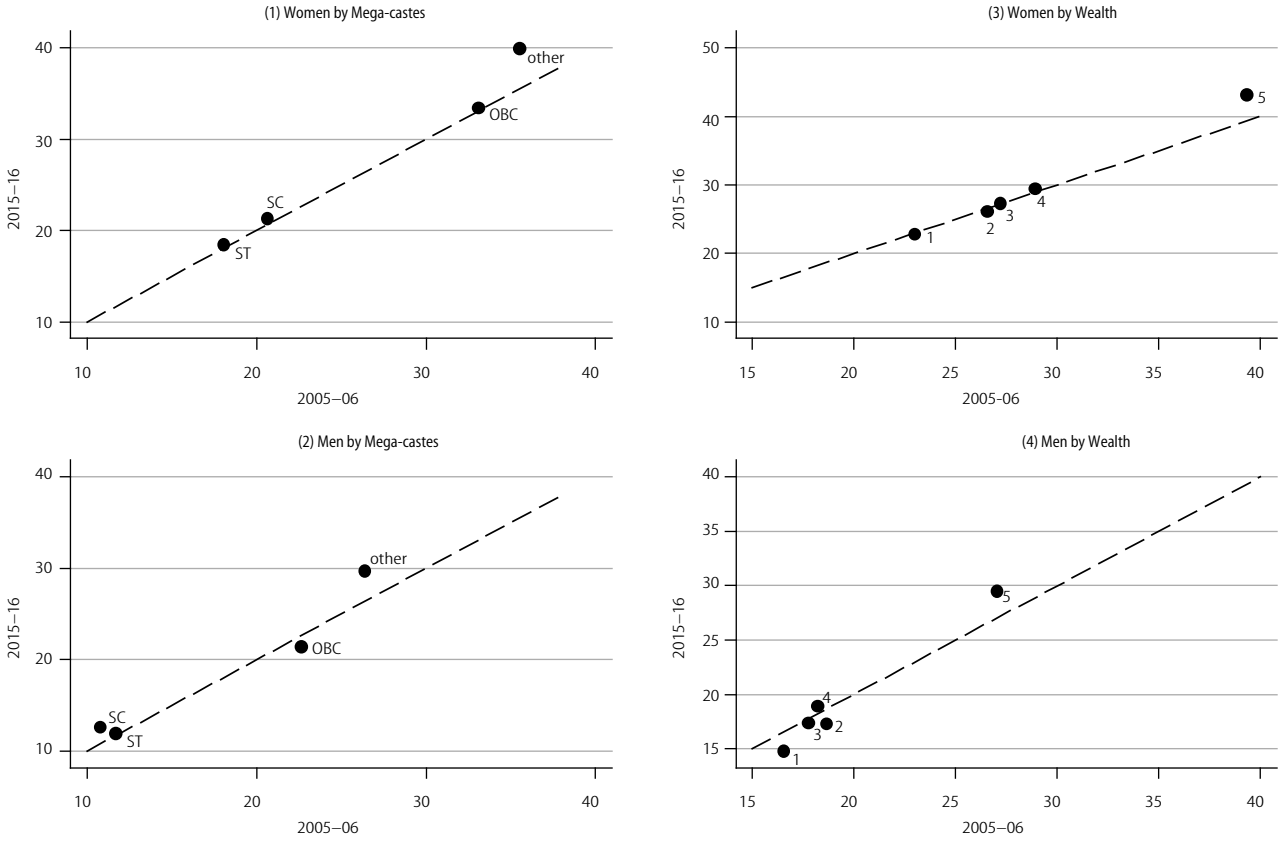
Our earlier article (Natrajan and Jacob 2018) argued that the existence of considerable intra-group variation in almost every social group (caste, religious) makes essentialised group identities based on food practices deeply problematic. We showed that myths of Indians' meat-avoidance (vegetarianism) stand exposed when we unpack India in different ways, through the lens of caste, gender, class, and especially region. We also presented evidence to suggest the influence of cultural-political pressures (valorising vegetarianism and stigmatising meat by proscribing and punishing beef-eating in particular, but also meat-eating more generally) on reported food habits. The present article follows up our earlier work by analysing changes in the incidence of vegetarianism over time.

The earlier article used data from three different large-scale, representative surveys. Of these, the National Family Health Survey (NFHS) released a new data set (round 4) after our earlier analysis was completed. This allows for a comparison of vegetarianism across the two NFHS rounds, bookending a decade of potential change (2005–06 in round 3 to 2015–16 in round 4). The NFHS is analogous to the Demographic and Health Surveys (DHS) conducted in over a hundred countries. Surveys are conducted for separate large samples of women aged 15–49 years and men aged 15–54 years. Data for round 3 are from 1,24,385 women and 74,369 men. Data for round 4 are from 6,99,686 women and 1,12,122 men. NFHS looks at specific items of food consumption, including eggs, fish and "chicken or meat," asking respondents about how often the item was consumed. For our analysis and consistent with our previous article, we consider those who answered "never" to all three (eggs, fish, chicken/meat) as "vegetarian." Appropriate sampling weights were used to construct estimates of vegetarianism within different aggregates (states and social groups).

Decadal Change

From the data, one interesting finding is that there was little change in the overall incidence of vegetarianism in the decade 2005–15 for women and men: while vegetarianism among women changed marginally from 30.22% in 2005–06 to 30.97% in 2015–16, for men it was 20.60% to 20.73%. This amounts to an increase of 0.75 and 0.13 percentage points for women and men, respectively (equivalent to 2.5% and 0.6%, respectively). In our earlier article we showed that there exists a significant gender gap in reported vegetarianism—about 10 percentage points higher among women (equivalent to almost 50% more among women compared to men). This gap of 10 percentage points, we showed, was persistent across location (rural–urban), class and caste categories. One interesting puzzle we raised was the existence of the gap only among Hindus (10 percentage points) and Sikhs (a whopping 34 percentage points), much less among Jains and Buddhists (about 5 percentage points), and almost non-existent among Christians and Muslims. We had submitted that this gap could be

Figure 1: Incidence of Vegetarianism by Mega-caste and Wealth Categories (%)



The dashed line is the line of equality; for wealth, the numbers 1-5 stand for the wealth quintiles from "poorest" (1) to "richest" (5).

shaped by gender ideologies within households and communities that placed undue burden on the woman to uphold a tradition, and gendered practices of eating out (favouring men).

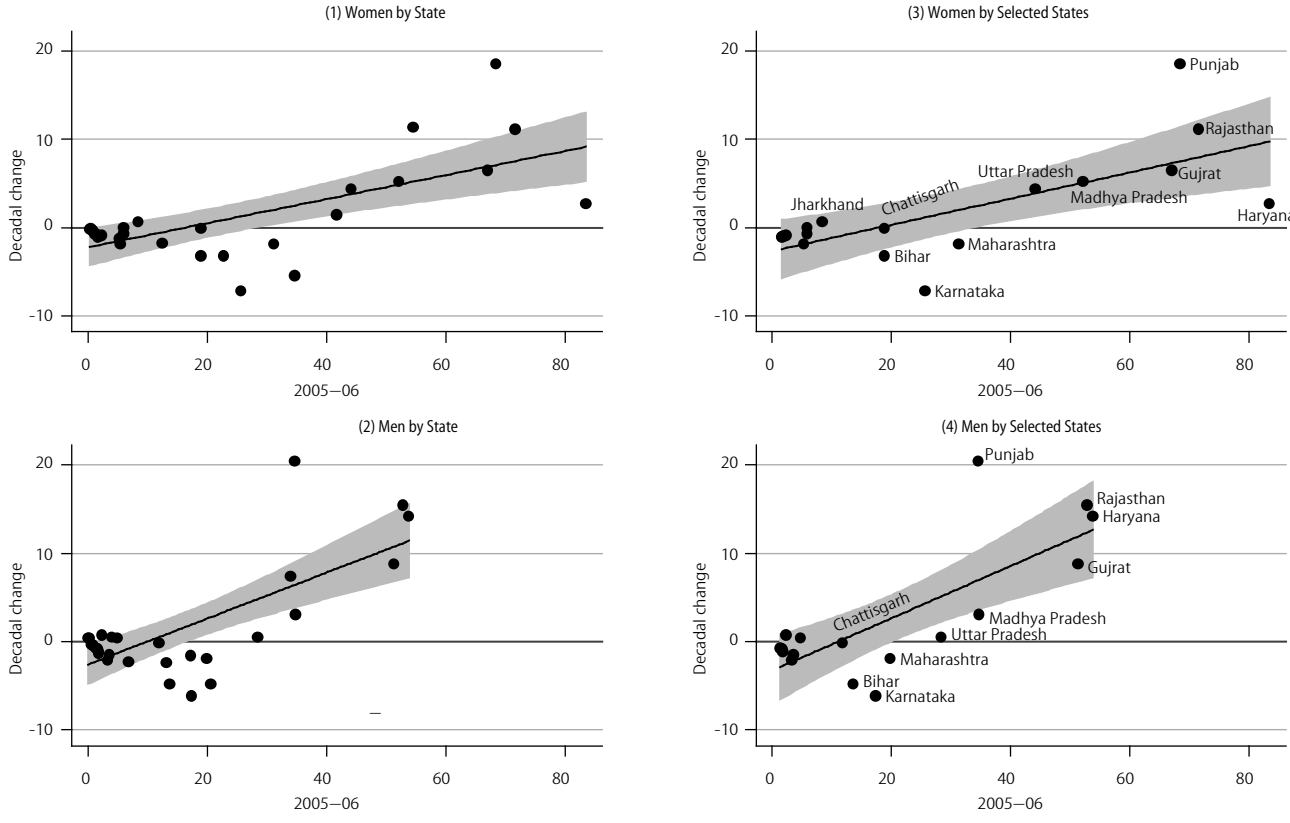
The new data show how this gap is persistent, pointing to the possibility of a rigidification of communitarian ideas shaped by food beliefs and practices, but also the social norms rapidly being put in place (partially by state ideologies, but also partially within society through social actors such as community leaders, ethnic mobilisers who craft community boundaries as markers of distinction). We bring this point up in order to emphasise that this overall result (of no change in gender gap over time) hides interesting temporal dynamics for sub-groups of the population. We now turn to examining the intersectional changes across caste and class categories.

Change across mega-caste and wealth categories: Figure 1 (Graphs 1 and 2) shows vegetarianism for mega-caste categories. For women, there was little change (less than 1 percentage point increase) in the decade 2005–15 for the categories of Scheduled Tribes (STs), Scheduled Castes (SCs) and Other Backward Classes (OBCs). But there was a relatively substantial increase in vegetarianism for the residual ("other") category, broadly including privileged castes (4.4 percentage points increase from 2005, equivalent to 12.4% increase). In the case of men as well, the "other" category of privileged castes saw a substantial increase in vegetarianism (3.3 percentage points increase from 2005, equivalent to 12.6% increase). This points to an increasing assertiveness among privileged castes with respect to vegetarianism.

Figure 1 (Graphs 3 and 4) shows vegetarianism across five wealth quintiles. There was little change in all except the richest quintile which saw a 3.9 percentage points and 2.5 percentage points increase for women and men in that category, respectively (equivalent to 9.8% and 9.1% increase). This confirms our earlier observation (and some other previous studies cited in our earlier article) that vegetarian practices are correlated with socioeconomic status.

Change across states: Figures 2–6 (pp 23–24) turn to reported vegetarianism across states. Figure 2 plots change in 2005–15 against the baseline (2005). It shows that, on average, states with higher incidence of vegetarianism in 2005 experienced greater increase in the following decade, and this is true for both women and men separately. This implies that over the decade there is increasing divergence across states. In Figure 2, the graphs on the right (#2 and #4) focus on the 17 states with population of at least 2.5 crore in the last census (2011). Divergence occurs even in this subset. Further, the size of the divergence is substantial: For Graphs 1 and 3, for every 1 percentage point of vegetarianism incidence in 2005, there is an average increase of 0.14 percentage points over the following decade for women and 0.26 percentage points for men, and this relationship is statistically significant at the 99% confidence level. In fact, the relationship continues

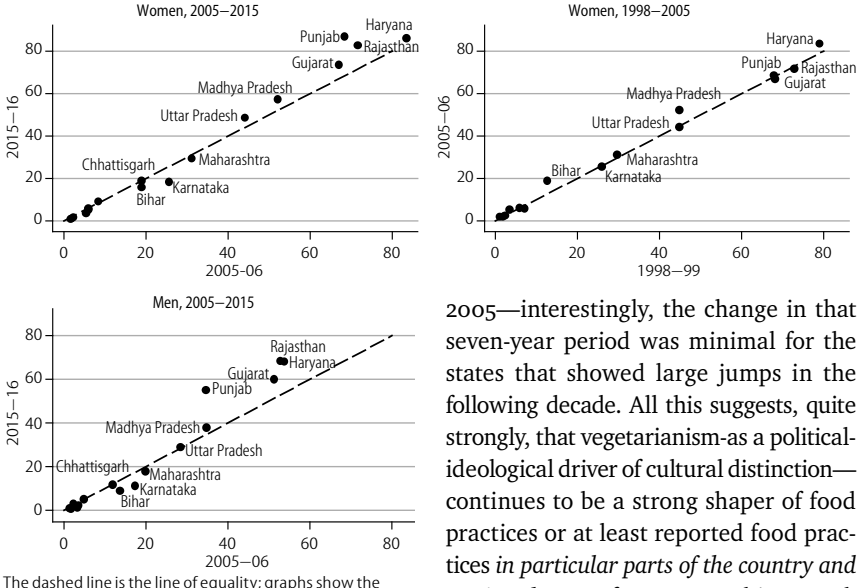
Figure 2: Decadal Change by State



The graphs show the linear regression line with 95% confidence interval (significant for all graphs); graphs on the right (#2 and #4) show the 17 states with population over 2.5 crore in Census 2011.

Figure 3: Differences by State

(%)



The dashed line is the line of equality; graphs show the 17 states with population over 2.5 crore in Census 2011; data for men not available for 1998–99 (NFHS round 2).

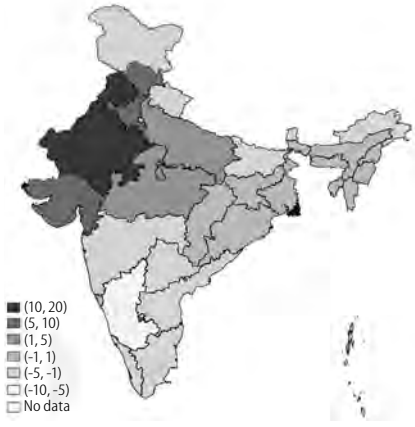
to hold with similar large size and statistical significance for the higher-population states with only 17 observations.

In Figure 3, the left graphs show the same data as scatter plots of 2015 against 2005. The right graph also shows, for women, the change between 1998 and 2005—interestingly, the change in that seven-year period was minimal for the states that showed large jumps in the following decade. All this suggests, quite strongly, that vegetarianism-as a political-ideological driver of cultural distinction—continues to be a strong shaper of food practices or at least reported food practices *in particular parts of the country and not in others*. In fact, we see this at work when we disaggregate the changes below.

Which are the key regions powering the increasing divergence across states over time? There are seven states—all from the west and north of the country—with at least 2 percentage points increase over the decade. Remarkably, these also happen to be the top-six states for vegetarianism in 2005, as confirmed by Figure 2. As shown in the map in Figure 4, they form a contiguous geographic swathe from west to north: Gujarat to Rajasthan to Haryana to Punjab to Himachal Pradesh (HP), then dipping to Uttar Pradesh (UP) and Madhya Pradesh (MP).

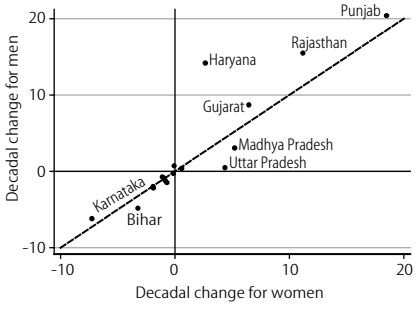
Among the high growth states (where vegetarianism increased substantially over the decade), it is useful to distinguish the west-to-north diagonal swathe (Gujarat, Rajasthan, Haryana and Punjab, all have increases well in excess of five percentage points) from the two others to the east of these (although still contiguous), UP and MP, which show slightly lower increase. All of the east and south have reduced incidence of vegetarianism over the decade (negative growth). We note the curious cases of Karnataka and Bihar, two states with substantial reduction in vegetarianism (average change -6.7 and -4.0 percentage points, respectively). Although it is important to consider why this may be the case, it is difficult to identify causal mechanisms. Nonetheless, as mentioned in our earlier article, states that show a combination of factors such

Figure 4: Decadal Change in Incidence of Vegetarianism



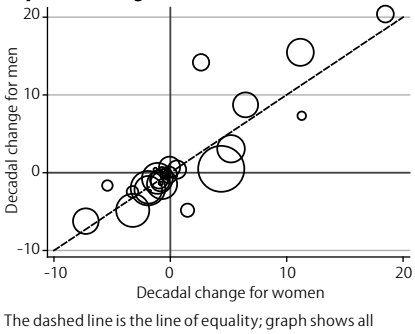
The choropleth map shows decadal change in incidence of vegetarianism (averaging across women and men) in states in different ranges.

Figure 5: Decadal Change by Gender and State



The dashed line is the line of equality; graph shows the 17 states with population over 2.5 crore in Census 2011.

Figure 6: Decadal Change by Gender and State, Population Weights



The dashed line is the line of equality; graph shows all states, marker size weighted by state population.

as a historically strong Dalit movement, a reasonably sizeable Muslim and OBC population, and a moderate but not all-powerful Hindutva movement—may show the most resilience against cultural-political pressures towards vegetarianism.

Figure 5 plots decadal change for women and men across states. There is a broad correlation/consistency in the direction of decadal change for women and for men: either incidence of vegetarianism for both women and men goes up in a state or goes down (all observations in Figure 5 are either in the top-right quadrant or the bottom-left quadrant of the x–y axes). The decadal increase is remarkably high in cases like Punjab and Rajasthan (average increase of 19 and 13 percentage points, respectively). By contrast, among the nine states where vegetarianism decreased among both women and men, there were only three where the average change (across women and men) was at least 2 percentage points, and with only two of them having an average of at least four percentage points (Karnataka and Bihar). The reason that the remarkable increases in vegetarianism among states in the top-right quadrant do not end up tilting the all-India figure upwards, is due to the fact that the many states in the bottom-left quadrant have sufficiently large population between them to balance it out. This can be seen in Figure 6, which is the equivalent of Figure 5 with states weighted by their populations (and with all states now included).

In Conclusion

Our analysis has produced the following key findings. There was little change in incidence of vegetarianism over the decade 2005–15. This non-change or stasis, however, masks a number of changes at the sub national level and across caste, class, regions, and persistent gender gap the socio-economically privileged castes and classes turned increasingly vegetarian. For the country as a whole this was nullified by a (smaller) decrease in overall vegetarianism among the numerically preponderant less socio-economically privileged. A major point to note for regional change is that states in the west and north, which had the highest incidence of vegetarianism at the start of the decade, also had the biggest increase over the decade. Again, for the country as a whole this was nullified by a (smaller) decrease in overall vegetarianism in the rest of the country (east and south). Finally, the size of the changes among states is far greater than the size of the changes among socio-economic groups. This reinforces the point in our previous article that geography (and underlying agro-ecology as well as the cultural norms influenced by it) plays a much bigger role than social group identities and associated cultural norms.

This article is an attempt to identify and describe trends in vegetarianism over the last decade. Although we do not try to explain them here, the trends towards divergence (across regions, castes, classes) nevertheless suggest deepening divides linked to socioeconomic status and cultural–political power inequalities. They therefore suggest a tendency towards divergence in attitudes towards vegetarianism, both for socio-economic groups and for geographical regions. If this emerging divergence is indeed being driven by cultural–political pressures, then it suggests polarisation that has negative implications for pluralism and democracy itself.

NOTES

1 The National Sample Survey (NSS), the National Family Health Survey (NFHS) and the India Human Development Survey (IHDS)–for the years 2011–12, 2005–06 and 2011–12, respectively.

2 Round 2 of the NFHS (1998–99) also had data for vegetarianism, but only for women's data. The present article supplements the analysis of rounds 3 and 4 with some women's data from round 2. The IHDS, although it had two rounds, did not collect data on vegetarianism in round 1.

3 See https://dhsprogram.com/pubs/pdf/FRIND3/FRIND3-Vol1AndVol2.pdf for details.

4 See https://dhsprogram.com/pubs/pdf/FR339/FR339.pdf for details.

5 There was very little difference in reported vegetarianism across age-groups, for women and men, and for 2005–06 and 2015–16 separately. Since the women's and men's data sets are truncated at ages 49 and 54, respectively, the fact that there is little difference in vegetarianism across age-groups suggests that the estimates reported here can be generalised to 49+ and 54+ populations as well.

6 However, for women there was a marginal increase in the incidence of vegetarianism between 1998–99 (NFHS–2) and 2005–06 (NFHS–3). NFHS did not collect men's data for 1998–99.

7 Unlike for caste, class and regions (where there were variations in decadal change in vegetarianism), there was virtually no change across the categories religion, education status and age-group. This paper focuses on caste, class and regions.

8 Incidence of vegetarianism also increased marginally among SC men (1.8 percentage point increase from 10.8% in 2005, equivalent to 16.7% increase).

9 These are results from fitting a simple bivariate linear regression; approximately similar results continue to hold for quadratic fit.

10 P-value 0.002 for women and 0.000 for men.

11 With 17 observations, the size of the bivariate linear relationship increases to 0.15 for women and 0.30 for men, with p-values 0.008 and 0.000, respectively.

12 In fact, Himachal Pradesh also has a relatively high increase and belongs in this group—it was not represented in Figure 4 due to relatively lower population, but it is represented in the map in Figure 6.

13 Strictly speaking, there is one exception: in Odisha incidence went down by 0.06 percentage points for women (practically zero) and went up by 0.71 percentage points for men.

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Dalits and the Environment

RAJ KAITHWAR

BOOK REVIEWS

Caste and Nature: Dalits and Indian Environmental Politics by Mukul Sharma, *New Delhi: Oxford University Press, 2017; pp 296, ₹995.*

The scholarship and practice of environmental politics in India has consistently attributed the decay in the environment to the invasive practices ushered under colonialism and taken forward by the post-colonial state in the name of development. As a standard of critique and a site of alternative, scholars, activists, all have relied upon and produced a romanticised discourse of the pre-colonial past. As a student interested in environmental politics, I had also grown up within this discourse, which had developed the binary opposition of evil modernity and virtuous tradition.

Mukul Sharma's book makes a powerful dent in this line of thought. Two key themes that Sharma addresses are: One, discerning and problematising the homogeneous, romanticised and Brahminical interpretation of environment in the various movements and writings in post-independence India; and two, highlighting the agency, resistance and assertion of Dalits on the question of environment. The intent is to showcase the play of power and caste within the environmental politics and highlight the multiple perspectives on environment that have been neglected. At a time when "going native" and "indigenous lifestyle" is being propagated as a pill of the environmental ills, Sharma brings in a cautionary interjection.

The book contains five chapters with Chapter 1 illuminating the casteist and Brahminical roots of Indian environmental politics. Chapter 2 presents the Dalit reading of environment and the complexity in their relationship with nature that cannot be understood in the binary opposition of nature/culture. Chapter 3 focuses on Ambedkar's thoughts on nature, the criticisms he is often subjected to, and the justification for his stance on the environment. Chapter 4 looks at the resistance and assertion exerted by the Dalits on the issue of water rights. Chapter 5 of the book, through a study of Jitaram Manjhi, discusses the experiential mediations with nature where caste never gets sidelined. Methodologically, the author does not follow a singular approach with each chapter relying on a different method, offering evidence from multiple sources. These range from "songs and narratives of early bonded labourers; writings by leading Dalit ideologues, leaders, and writers; myths, memories and metaphors of Dalits around their nature; their movements, labour and footsteps" (pp xiv–xv).

Brahminical Roots

Sharma contends that the environmentalists in India, both in academia and outside, have been exclusivist in their approach. Their standpoint has been caste-blind and has on numerous occasions, often implicitly but also explicitly, justified caste as logical or "natural." Sharma categorises these practices as eco-casteism, eco-organicism and eco-naturalism. He argues that scholars such as Madhav Dhananjaya Gadgil and Ramachandra Guha have worked in an eco-casteist frame which has provided ecological and functionalist justification of caste. Eco-organicism, on the other hand, has been visible in the ideas that have looked at the construct of the society as natural, based on an "ecological model of nature." This naturalises the "dominant" principles of the society, making them uncontestable and legitimate. From this perspective, the Brahminical idea of society has been treated as natural and authentic and its destruction through the Western incursion has been seen as the cause for environmental troubles.

Scattered throughout the book are instances that show the romantic and hegemonic Brahminical understandings of nature, which determine the contours of Indian environmentalism. The most prominent among them is the belief in the idea of a village society as an environmentally sustainable structure. A corollary of it is the propagation of traditional water-conservation methods. Sharma exhibits how these are not benign concepts but reflect "sustainability" by ignoring the violence these ideas and practices have subjected on Dalits. Unlike M K Gandhi, B R Ambedkar had resisted the idea of a village society because it had been a site of oppression for the Dalits. Ambedkar had also made an assault on the "non-dualistic ontology" of Brahminism, which has many philosophical takers in the contemporary times. He had argued that by aligning the physical nature and moral realm, such a philosophical position rationalised the oppression of Dalits as a result of their past "karmic crimes." Through a case study of Sulabh International, Sharma also highlights as to how Dalits continue to be paternalised. The entire process of Sulabh International functions on the basis of kindness, not rights, charity, not liberty, and reform from above, not radical change from below.

Myths and Traditions

The book provides a rich account of Dalit environmental knowledge and experience, covering illustrations from Bihar to Tamil Nadu and Gujarat to Odisha. Sharma shows how these voices and sounds are "rooted in the soil" and intimately linked with the everyday lives of the Dalits. There has been a conscious attempt by the Dalits to build and preserve an alternate history which is ridden with suffering but, more importantly, asserts their agency beyond suffering. Particular emphasis is placed by Sharma on three Dalit artists, C J Kuttappan, Basudev Sunani, and Dalpatbhai Shrimali and the narratives they have constructed.

Kuttappan's folk songs touch on various aspects of nature and labour of Dalits, all maintaining a visible distance from the Hindu religious texts. Sunani's

writings are particularly interesting as they talk of rituals in which the earth is seen as a powerful body that houses the souls of the Dalit forefathers, the Duma, who are worshipped for discovering the secrets of nature. Sharma then mentions that Sunani writes that the

> Dalit cultural manifestation here is an antithesis of Aryan culture. In the latter, the departed soul goes to heaven, whereas in the former, the departed again come back to the *pidar* [a sacred place inside the house where the souls of the forefathers are worshipped], and are worshipped by the same family members. (p 76)

Shrimali's words provide access to the popular folk song of Mayavel, which, according to Sharma, is a "social document" and not just a folk song. This singular narration helps in grasping the extensive knowledge of the land that the Dalits had, the power dynamics in the society, aspirations of the Dalits for liberation and the caste significance of water.

Dalit agency is also reflected in the gods and goddesses they worship, their relation with animals and their food habits. It reflects a markedly different tradition than what is eulogised in the mainstream writings. One gets to know of deities such as Saatbaheni Jalkaamini, Kattamaisamma, Birs, and many more spanning the forests of Tamil Nadu and Andhra Pradesh to the land of Bihar as well as the mythical roles they play in the lives of the Dalits. Sharma also highlights how Dalit relations with animals have been presented in artworks such as Mithilai/Madhubani paintings, and how the lens of Dalits makes us see pigs, cows, and buffalos differently.

Casteist Waters

In another incisive chapter, Sharma deals with the question of water and its place in the Dalit memories and struggles. Water, particularly the river, has been given meaning through the frames of Hinduism, but more deliberate has been the exclusion or the denial of the relation between caste and water. To counter this, Sharma relies on autobiographical accounts, historical narratives and anthropological studies on water to showcase the injustices meted out through culture, social practices and institutions on the Dalits. Dalit relation with water has been that of "alienation and painful memories of punishment." The autobiographies of Sharankumar Limbale and K A Gunasekaran, proverbs still in use in Rajasthan and historical memories of castes such as Voddas, Arundathiyar and Chakkiliyars, bring home the point that be it the precolonial period or the postcolonial one, water has always been ridden with caste. Dalits have often been denied access and have even been sacrificed in rituals in order to maintain the social order.

Sharma states that in "the past thirty years Dalit assertions on water have accelerated" and in the face of limited state support and overt upper-caste repression, it has been the Dalit cultural myths and symbols that have given strength to these water struggles. These are

> forms of ecological imaginations and promises, which not only unearth their pasts, but also provide critique of caste practices and dominant Hindu mythologies. They are simultaneously negative and positive idioms, with both destructive and constructive functions. (p 184)

Sharma gives an account of various Dalit "eco-symbols" such as Raja Bali, Deena-Bhadri, Ekalavya, Toofani Baba, and Baba Amar which have been taken up by Dalits in Maharashtra, Mallahs, Musahars and Nishads in Bihar. These work as "negative and destructive" as they challenge the Brahminical imaginings and "positive and constructive" because they provide counter cultural language to the Dalits.

The New Commons

The final chapter of the book has a high dose of normative reflection. Speaking of the common spaces, Sharma contends that these are the places where dominance on Dalits is exercised and exclusion and violence get perpetuated. However, it is these very spaces from where resistance and protest can emerge. Through a detailed biographical description of Jitaram Manjhi's life, Sharma shows how his attempt of carving a path through the mountain reflected a silent but powerful attempt at "universalization of space," which shall be accessible to all and shared by all. Manjhi's struggles also showed the specificities of Dalit relations with nature, which is layered and complex because of the social position of the Dalits. Despite raising an important issue, this chapter is the weakest in the book as it is fraught with many discontinuities in argumentation and filled with unnecessary details, which distract the reader from the primary focus of the author.

Despite the book opening various new frontiers on Indian environmentalism, it has its own share of shortcomings. In

an attempt at providing a meta narrative, Sharma jumps to and fro between various historical times and geographical spaces, leaving the reader confused of the specific periods he is referring to in his illustrations. This becomes a particularly serious a limitation because the book relies heavily on descriptive analysis in building its case. In the absence of properly delineated time frames, it appears that the condition of Dalits vis-à-vis the society and nature has remained stagnant across time. This lack of temporal demarcation takes away the nuances that could have emerged in the narrative. Sharma engages with Ambedkar's thoughts and rescues him from the criticism he is subjected to with respect to his thoughts on modernity. However, the book falls short of engaging with the current debates on environment where the excesses of modernity and consequences of it are well known.

There is growing interdependence and intersectionality of issues. Pushing Ambedkar's thoughts and the general tenor of the book in engaging with the contemporary challenges would have further enriched the intellectual contribution of the book. Despite these unfulfilled expectations of the reader, the book heralds a much needed interjection in the environmental literature. It needs to be read for its vast and detailed coverage of the Dalit engagement with environment.

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The Long Sweep of India–China History

NIRMOLA SHARMA

India, China and the World: A Connected History
by Tansen Sen, *New Delhi: Oxford University Press, 2018; pp 560,* ₹*995.*

Tansen Sen in his previous work, *Buddhism, Diplomacy, and Trade: The Realignment of India–China Relations, 600-1400* (2003: 388) had examined the role of Buddhism, diplomacy and commerce in the interactions between India and China from 6th CE to 14th CE.[1] Sen, in this important work, had highlighted the preponderance of Buddhism and examined its role as an instrumental factor in diplomacy as well as a facilitator of trade in Sino–Indian relations. Sen's current book, however, covers a much broader time frame, from 2nd Century BC to recent times and he aptly calls this work a study of India and China's "*longue durée* connections" (p 2). Sen's core argument in the book is that interactions between South Asia[2] and China have been longitudinal, complex, variegated, multidirectional as well as transnational.

Sen draws on the concept of "circulatory history" propounded by Prasenjit Duar to advance his argument of historical connectedness of India and China. Duara had theorised that historical ideas and practices throughout history have often emerged in one corner of the world, and over a period of time, as a result of the interplay of various factors and facilitators, travelled and circulated to another part of the globe "traversing continents and visited by various transformations," while at the same time "retaining recognizable connections" (Duara 2015: 55). It is this concept of the circulatory nature of ideas and practices that Sen employs in this book to study the nature of India–China relations from second century to current times.

Historical Interconnections

The book consists of five chapters in addition to the introduction and concluding chapters and employs a chronological narrative. Chapter 1 is titled "The Circulations of Knowledge." In this chapter, the author details the complex processes through which knowledge traversed between South Asia and China. He analyses by providing suitable examples of how various kind of knowledge such as map making, calendar making, mathematics, astronomy, astrology, medical knowledge, sugar making, paper making, gunpowder manufacture, etc, were "acquired, transmitted, translated, transformed, imagined" and in some cases rejected or lost as it was circulated between South Asia and China" (p 29). Sen demonstrates that circulation of knowledge between South Asia and China was non-linear in character and involved complex "processes and mechanisms" and as well as regions beyond South Asia and China.

The role of different geographical regions in linking South Asia and China are further elaborated in Chapter 2. It focuses on the routes, overland as well as maritime; and the trade networks through which several objects, Buddhist as well as secular rituals, were transported and circulated between South Asia and China, often traversing through different parts of Asia. These routes acted as channels in the exchange of ideas, objects, tributes, gift and the diverse forms of knowledge that were described in Chapter 1. The author shows that "interlocking circuits" of routes facilitated by the complex web of commerce were fundamental to the circulation of objects and ideas (p 122). Trade facilitated by merchant networks such as the Sogdian, Tamil, Muslim, Srivijayan and Chinese played influential roles in the transportation of Buddhist and secular objects through these circuitous routes across Asia and Africa.

Chapter 3 titled "The Imperial Connections" discusses how the advent of imperialism led to further linkages between South Asia and China. The author posits that the famous Ming admiral, Zheng He's seven imperial maritime expeditions in the period between 1405 and 1433 in the Indian Ocean led to more intensive interactions between the

coastal regions of South Asia and China. These expeditions, according to the author, at the same time provided the foundational framework on which European powers such as the Dutch and the British made their forays, both commercial and imperial, into the region. The author further contests the understanding that the period between 16th and 20th centuries was uneventful as far as India–China interactions were concerned. On the contrary, Sen argues and exhibits that, propelled by European imperialism, interactions had been intense and often in unconventional and distant places such as Guyana or in Mauritius in the Indian Ocean. The author further establishes that the beginning of South Asia–China colonial interactions can be traced to this period.

Chapter 4 discusses "renewed connections" between South Asia and China in the first half of the 20th century as part of their collective and unified effort to fight and oppose British and Japanese imperialism, respectively. This period saw the widespread use of the concept of Pan-Asianism and Asian solidarity exemplified by India–China friendship, as a panacea to fight colonialism in Asia. This period was characterised by political cohesion between Indians and Chinese at different international platforms and was predominantly embodied by an attempt to project a common united front to fight imperialism in Asia.

However, this political and ideological bonhomie was short-lived. With the establishment of the nation states of Republic of India (RoI) and People's Republic of China (PRC), assertion of each other's territorial sovereignty became a bone of contention between the two countries. Contentious subjects such as the issue of Tibet, which were sidelined during the time of anti-colonial struggle, now became palpable and permanent due to the compulsions of nation-building. In the post-colonial era, the simultaneous rise of India and China and especially the interplay of their great power ambitions in recent times have severed the centuries old connectedness and has led to a protracted "geopolitical disconnect." This subject has been taken up in the penultimate chapter.

Novel Insights

One of the main ideas that comes across very prominently in the book is the secular role played by Buddhism in the pre-colonial era in India–China connections. By hinging on the transmission of Buddhism from India to China, the author treats it as an important factor and a facilitator for the transmission of knowledge—geographical, technical and medical—and information which went beyond the domain of ecclesiastics. Sen, particularly in Chapters 1 and 2 of the book, deals extensively with the non-ecclesiastical roles played by Buddhism in India–China connections. Sen brilliantly shows that Buddhism and Buddhist activities aided and accelerated the creation and circulation of a comprehensive knowledge system not only about South Asia in China but also about China in South Asia.

Second, the book reveals and examines the role played by distant and different geographical spaces and natives of such distant places in India–China interactions. Such sites of interactions, as Sen shows, were not restricted to the South Asian subcontinent or in China but very often involved different regions of the world, places which had often been considered peripheral to the understanding

of India–China interactions. Thus, the book ably brings out the global character of South Asia-China interactions. The author elucidates that there were several points of intersection, encompassing different geographical centers all over the world in this *"longue durée"* connections between South Asia and China. These sites were located all across Asia, Africa and Europe. The book not only highlights the unconventional geographical sites, but also the role of various local actors and agents such as monks, merchants, political radicals, politicians and intellectuals in these places whose enterprise facilitated interactions between South Asia and China. Sen shows that South Asia–China interactions have been a pot-pourri of interactions, which involved a large part of the world and peoples ranging from the Sogdians, the Africans, the Portuguese, Southeast Asians and Japanese, and makes a case for recognising the contribution of these actors.

Third, Sen presents a critique of studying the history of interactions between South Asia and China through the national history lense. Since connections between India and China span across centuries, he questions and critiques the nation state paradigm for not being able to provide adequate justifications for these interactions. The book contends that India–China connections cannot be suitably explained and studied within the limitations of the framework of nation states and nationalism. Sen's critique of the recent obsession of addressing India and China, through the rubric of nation states, as strategic and economic competitors, presents a novel approach at looking at India–China bilateral relations not as competitors but as a significant aspect of the currents of global history. Hence, a unidirectional linear narrative of India–China relations as posited by the nation state paradigm does not provide a complete understanding of such centuries-old multi-pronged interactions. Demonstrating the centuries-old entanglement of South Asia and China, the book calls for a fresh perspective on the evolution of Indian and Chinese history as one of longitudinal connections.

In recent years, the scholarship on India–China relations has seen an incremental increase, even though the majority of the works focus on contemporary bilateral relations. The number of studies which throw light on the nature of their historical interactions have been few. Sen's meticulously researched book based on detailed and painstaking archival work fills up a huge lacuna and is a welcome relief. Not only has Sen made liberal use of secondary sources to illustrate the connectedness of India and China throughout history but he has also painstakingly ferreted through primary sources in various archives from West Bengal to Beijing and from Taipei to Amsterdam, and on to London and Swarthmore. By unravelling the global nature of India–China long-term historical connections and the complexities of these connections in this long sweep of history, Sen's book has enriched our understanding of the field. The book adeptly shows and articulates that India and China did not exist in silos but there were many levels of interactions that had escaped the notice of scholars and pundits of this field. In the foreword of the book, the eminent scholar, Wang Gungwu had remarked that Sen's work is a "book of many fresh insights." This reviewer could not agree more.

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NOTES

1 The periodisation is important because, in terms of chronology, Sen begins his study where Xinru Liu ends,

2 Sen prefers to call the pre-1947 era Indian subcontinent as South Asia instead of India.

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The Myth of 'Collective Conscience'
Revisiting the Death Penalty in India

ANURAG BHASKAR

India's legal doctrine of "collective conscience" cannot be traced back to the original concept as propagated by French sociologist Emile Durkheim. The consistency with which this concept has been used by the Indian judiciary while imposing the death sentence, compels us to contemplate how it has been applied. An attempt is made in this article to present the flaws in the concept of collective conscience and in its application in India.

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The retentionists of death penalty in India often rely on the "rarest of rare" doctrine propounded in the decision of the Supreme Court in *Bachan Singh v State of Punjab* (1980). However, studies have shown that there has not been a single case of death penalty that has not been justified for the sake of the collective conscience of the society (ACHR 2015). For more than three decades, the Supreme Court has often held that the "the collective conscience of the society will only be satisfied if the capital punishment is awarded to the offender."

The collective conscience doctrine seems to have out-driven all other theories, including the "rarest of rare" doctrine, in the existing debates on the death penalty. We are, therefore, confronted with the question of whether hanging an individual in the name of collective conscience of society is justified. However, before analysing this question, one needs to understand the origin and application of the term collective conscience. For the purpose of this article, those judgments of the Supreme Court and high courts have been heavily relied upon, which evidently reflect the flaws in the concept of collective conscience.

Concept of Collective Conscience

History credits French sociologist Emile Durkheim for the coinage of the term collective conscience (sometimes collective consciousness), in his classical work *Division of Labour in Society* in 1893. It is a fundamental sociological concept that refers to the "totality of beliefs and sentiments common to average citizens of the same society (which) forms a determinate system which has its own life" (Durkheim 1984: 38). To be precise, collective conscience inculcates the sense of belonging, identity, and conduct.

Durkheim was of the view that in earlier societies, every individual carried out basically similar types of tasks, so that people share the type of work they carry out. These societies were characterised by resemblance, in which the members of the society share the same values, based on common tasks and common life circumstances and experiences. He termed this as "mechanical solidarity through likeness." Therefore, it can be stated that where social groups were quite homogeneous (not distinct by race, class, religion and caste), the collective conscience resulted in an instinctive binding together of individuals into a collective through their shared notions. In such societies, Durkheim (1984: 40) viewed crime as an act that "offends strong and defined states of the collective conscience." He stated that

> We must not say that an action shocks the common conscience because it is criminal, but rather that it is criminal because it shocks the common conscience. We do not reprove it because it is a crime, but it is a crime because we reprove it.

Further, Durkheim stated that in the modern societies, an "organic solidarity" developed, where the individuals and groups shared mutual dependence on others in order to allow for a society to function. The entities such as the state (which cultivates authority), mass media (which disseminates all types of notions and practices), education (which shapes us into amenable citizens), and the police and judiciary (which frame our perceptions of right and wrong), are the forces that produce collective conscience in this sophisticated type of solidarity. The "reality of our extreme interdependence in modern society," usually unfamiliar to us, is "brought home to us most sharply when something goes badly wrong" (Smith 2014: 171). This is what collective conscience seems to achieve.

Therefore, according to Durkheim (1984: 38–39), the collective conscience reaches all parts of society and is passed on from one generation to the next, that is, from primitive to modern societies.

It is independent of individual circumstances and therefore is different from particular or individual consciences.

Doctrinal Looseness

Durkheim's (1984: 39) definition of crime that "an act is criminal when it offends the vigorous and well defined states of the collective conscience," though crucial in defining crime in small, identical and homogeneous societies, is less suitable when it comes to determine crime in vast amalgamated, pluralistic, multicultural, and heterogeneous societies. This is because in small societies, it may be plausible to apprehend a state of collective conscience and to find a viable level of consensus regarding social paradigms and notions. However, it may not be feasible in heterogeneous societies that are elucidated by cultural diversity. In these kinds of societies, few incidents would shock the entire community. A certain section of society might find an act to be perverse, but another group might discern it to be quite acceptable. An act might distress a certain class but could be tolerated by another. This lack of consensus can be easily found in discussions "surrounding acts that put an end to human life" (Fattah 1997: 35). Therefore, it can be said that there is no single strand of the collective conscience that can be applied to a heterogeneous society.

Moreover, there are differences in approach of punishments in traditional homogeneous and heterogeneous societies. Vago (2011), while dealing with the sociological aspect of law, has stated that while punishment is a mechanical reaction to a criminal act in a homogeneous society, it "deals with restitution and reparations for harm done to the victim" in a heterogeneous society. He explains:

> In a homogeneous, undifferentiated society, a criminal act offends the collective conscience, and punishment is meant to protect and preserve social solidarity … The wrongdoer is punished as an example to the community that deviance will not be tolerated. There is no concern with the rehabilitation of the offender. [In] heterogeneous societies, repressive law tends to give way to restitutive law with an emphasis on compensation. Punishment deals with restitution and reparations for harm done to the victim—which basically provides the philosophical underpinning of the contemporary restorative justice approach in criminal justice. (Vago 2011)

This can be further emphasised by asserting Durkheim (1984: 44), who stated that "today it is said, punishment has changed its character. Society no longer punishes to avenge, but to defend itself." However, in societies premised upon discrimination, punishment may be used to maintain social hierarchy and perpetrate revenge against a particular group. The discriminatory practices in such scenarios cannot be the collective conscience of the entire society. Furthermore, in modern societies, punishment is often granted as a means of retribution. Therefore, Durkheim's concept must be criticised on the ground that the impact of crimes and type of punishment changes with time and the nature of society, and that there is no fixed standard to measure the collective conscience of a society.

Moreover, the nature and impact of the Indian Penal Code (IPC), 1860 presents a two-layered challenge to the acceptance of the conception of collective conscience in the Indian context. The first challenge lies in the origins of the IPC. Since the drafting of the IPC is a key product of the British colonial rule, it seems to be contrary to Savigny's famous *Volksgeist* theory. Volksgeist, in simple words, means the general or common consciousness or the popular spirit/will of the people. According to Savigny, "[t]he foundation of the law has its existence, its reality in the common consciousness of the people" (Cohen and Cohen 2002: 410). Though the concept of collective conscience is not exactly the same as Savigny's *Volksgeist*, there seems to be a similarity between the two, as both talk about the conscience of the people or society. Commentators have argued that the impact of the IPC on the Indian soil completely drove out the presence of any public conscience in law-making process. In this regard, Pandey (2014: 34) has made the following observation:

> Perfection in a man-made law is as elusive as the Holy Grail but Macaulay's masterpiece bears the testimony that how a law, which did not reflect the volksgeist (popular will of the people) at the time of its making, gradually got entrenched in the psyche of the people so much so that many wrongdoings are referred to by mentioning the relevant section of the Indian Penal Code even by the laymen and illiterates. Savigny's theory of volksgeist comes in clear conflict with the implanting of alien laws on Indian soil, which no one would today call English laws (sic).

The IPC did not represent the collective conscience of Indians at the time of its enactment by the British. Yet, with time, the Indian society adapted itself to the IPC. The second challenge is in the nature of the Penal Code. Even while the British law regulated the conduct of the Indian society, it did not represent the "conscience" of the entire society. For instance, Section 377 of the Penal Code criminalised homosexual conduct, thus targeting, stigmatising and condemning specifically the LGBTQ community. The IPC, therefore, in no way, reflected collectiveness. The IPC was a product of dominant narrative, not collective one. This flaw was corrected in 2018 in the judgment of the Supreme Court in *Navtej Singh Johar v Union of India* (2018), in which Section 377 was declared unconstitutional. As Justice D Y Chandrachud rightly observed in his concurring judgment, "The lesbian, gay, bisexual, transgender, and queer (LGBTQ) community has been a victim of the pre-dominant (Victorian) morality which prevailed at the time when the Indian Penal Code was drafted and enacted." Durkheim's collective conscience therefore does not fit into Indian criminal law jurisprudence.

Origin of Concept

The Supreme Court's five-judge Constitution bench judgment in the Bachan Singh case is the source of contemporary death penalty jurisprudence in India. The major contribution of the judgment was to reduce the infliction of the death sentence to only the rarest of rare crimes, and for laying down that the courts must impose the death sentence on a convict only if the alternative sentence of life imprisonment is certainly precluded. The judgment had upheld the constitutionality of death penalty. Interestingly, the term collective conscience cannot

be traced in this judgment, and neither is Durkheim mentioned in it.

Subsequently after three years, the Supreme Court in *Machhi Singh v State of Punjab* (1983) stated that the death penalty may be imposed in the "rarest of rare cases when collective conscience of the community is so shocked that it will expect the holders of the judicial power centre to inflict death penalty irrespective of their personal opinion as regards desirability or otherwise of retaining death penalty." It further added, "the community may entertain such a sentiment when the crime is viewed from the platform of the motive for, or the manner of commission of the crime, or the anti-social or abhorrent nature of the crime." The concept of collective conscience of the society was thus introduced in the vocabulary of death penalty jurisprudence of India by the Machhi Singh judgment. From then, it has been the major factor in deciding whether to impose death sentence or not.

Since the Machhi Singh case, the Supreme Court has upheld the death penalty by authenticating it to satisfy the collective conscience of the society. A report prepared by the Asian Centre for Human Rights (ACHR 2015: 9) after examining the judgments on death penalty states that "in the post Bachan Singh period, there has not been a single case of death penalty which has not been justified in the name of the 'collective conscience' of the society and/or 'judicial conscience.'"

The Law Commission of India, in its 262nd report, has stated that similar conceptions like "society's cry for justice" and "public abhorrence of the crime" have also been evolved by the Court in subsequent cases (LCI 2015: 115–16). One of the most discussed judgments of the Supreme Court in this aspect is *Dhananjoy Chatterjee v State of West Bengal* (1994),[1] where it was held that

> The measure of punishment in a given case must depend upon the atrocity of the crime; the conduct of the criminal and the defenseless and unprotected state of the victim. Imposition of appropriate punishment is the manner in which the courts respond to the "society's cry for justice" against the criminals.

In 2017, a similar attitude of the apex court was seen in *Mukesh v State for NCT of Delhi* (2017), the Delhi gang rape case, where the Court observed:

> Where a crime is committed with extreme brutality and the collective conscience of the society is shocked, courts must award death penalty, irrespective of their personal opinion as regards desirability of death penalty. By not imposing a death sentence in such cases, the courts may do injustice to the society at large.

A series of judgments following this trend have been mentioned in the Law Commission's report. Taking a cue from the Supreme Court, the high courts have also invoked the concept of collective conscience while deciding imposition of death penalty. For instance, in *Sri Mithu Kalita alias Mitu Kalita v State of Assam* (2006), while dealing with the case of the rape and murder of a five-year-old girl, the Gauhati High Court relied on the collective conscience test on the basis of the judgments of the Supreme Court[2] and held:

> [U]ndue sympathy of the accused may shake public confidence in the efficacy of the justice delivery system and this Court must respond to the situation positively and shall not hesitate to confirm the imposition of penalty of death on the accused.

Flaw in Supreme Court's Stand

In the course of the past three decades, the Supreme Court has consistently and repeatedly invoked the concept of collective conscience to determine when to affirm capital sentences. However, the following questions keep arising: What is this collective conscience? How does the Court determine when it "stands shocked?" Which cases upset our conscience? Does the Court have the capability to find when collective conscience is shocked?

The death penalty jurisprudence in India clearly indicates that the meaning of collective conscience is "neither clear as a matter of legal thought, nor easily ascertainable as a matter of sociological reasoning" (Parthasarathy 2015). The Supreme Court had not provided any explanation of this term even in the Machhi Singh case where this term was first used. This has naturally led to the criticism that the jurisprudence suffers from a judge-centric approach, rather than a principles-centric approach. The Law Commission therefore came to the conclusion that

> Machhi Singh and a subsequent line of cases have focused only on the circumstances, nature, manner and motive of the crime, without taking into account the circumstances of criminal or the possibility of reform as required under the Bachan Singh doctrine. Machhi Singh's progeny include a large number of cases in which the Court has decided whether or not to award the death penalty by only examining whether the crime is so brutal, depraved or diabolic as to shock the collective conscience of the community. (LCI 2015: 113)

This critical observation is evident from several decisions. For instance, in *Gurdev Singh v State of Punjab* (2003), the Supreme Court upheld the sentence of death handed down to two men for their involvement in an incident in which 13 persons were killed. The Court referred to it as an "extremely revolting" incident, which "shocked the collective conscience of the community." The Court though observed that the appellants had no previous criminal record and there was nothing to indicate that they would be a threat to society in the future and yet it awarded the death sentence, stating, that "the acts of murder committed by the appellants are so gruesome, merciless and brutal that the aggravating circumstances far outweigh the mitigating circumstances." Clearly, the apex court made no attempt to discuss reformation of the accused. In another case, *Sudam @ Rahul Kaniram Jadhav v State of Maharashtra* (2011), where the accused was convicted for killing a woman and four children, the Court held that

> The crime has been committed in a beastly, extremely brutal, barbaric and grotesque manner. It has resulted into intense and extreme indignation of the community and shocked the collective conscience of the society. We are of the opinion that the appellant is a menace to the society who cannot be reformed. Lesser punishment in our opinion shall be fraught with danger as it may expose the society to peril once again at the hands of the appellant.

The Court did not mention or discuss any mitigating circumstances. Further, the Supreme Court verdict is more prone to scrutiny and criticism in cases of death penalty, as life once taken, cannot dbe given back even if error is admitted

by the Supreme Court itself (Bhaskar 2016: 19). In *Santosh Kumar Shantibhushan Bariyar v State of Maharashtra* (2009), the following judgments were held to be *per incuriam*: *Ravji @ Ram Chandra v State of Rajasthan* (1996), *Shivaji @ Dadya Shankar Alhat v State of Maharashtra* (2008), M*ohan Anna Chavan v State of Maharashtra* (2008), *Bantu v State of Uttar Pradesh* (2008), *Surja Ram v State of Rajasthan* (1997), *Dayanidhi Bisnoi v State of Orissa* (2003), *State of Uttar Pradesh v Sattan* (2009). It is important to highlight here that "conscience" was one of the considerations in these judgments (ACHR 2015: 20). For instance, in the Ravji case (1996), the Court was of the view that

> It is the nature and gravity of the crime but not the criminal, which are germane for consideration of appropriate punishment in a criminal trial. … The punishment to be awarded for a crime … should conform to and be consistent with the atrocity and brutality with which the crime has been perpetrated, the enormity of the crime warranting public abhorrence and it should respond to the society's cry for justice against the criminal.

This reasoning was also followed in *Ankush Maruti Shinde v State of Maharashtra* (2009), but the decision went unnoticed in the Bariyar case. It should be noted here that the two condemned prisoners namely Ravji @ Ram Chander and Surja Ram who were sentenced to death after judgment in the Ravji case had been executed on 4 May 1996 and 7 April 1997, respectively. The judgment in the Ankush Maruti Shinde sentencing the accused to death, was overturned by a three-judge bench on 5 March 2019. While acquitting the accused, the Court also awarded compensation to them for wrongful conviction (*Live Law* 2019).

The decision in the Bariyar case cross-examined the relevance and desirability of taking into consideration "public opinion" as a factor while analysing the "rarest of rare." The judgment clearly propounded that: (i) It is difficult to precisely define what public opinion on a given matter actually is; (ii) people's perception of crime is "neither an objective circumstance relating to crime nor to the criminal;" (iii) the courts are governed by the constitutional safeguards that "introduce values of institutional propriety, in terms of fairness, reasonableness and equal treatment challenge with respect to procedure to be invoked by the state in its dealings with people in various capacities, including as a convict;" (iv) "the constitutional role of the judiciary also mandates taking a perspective on individual rights at a higher pedestal than majoritarian aspirations" and to that extent, the courts play a counter-majoritarian role; and (v) public opinion may also "run counter to the Rule of law and constitutionalism."

It is therefore stated that a court of law cannot be a court of public opinion. Judges, as observed aptly by Aparna Chandra (2014: 136), "are creatures of society and will be influenced by it, but the encoding of public opinion into the formal framework of capital sentencing gives it a prescriptive weight that is problematic." "If the opinion of the public matters to questions of sentencing," she further observed, "then courts are the wrong institutions to be determining sentence. Parliament or lynch mobs are more apposite." A sentencing court does not have the means to rigorously examine the opinion of the public in a given matter. The Law Commission Report rightly noted that a cohesive, coherent and consistent public opinion is a fiction. It highlighted that the "[t]he opinion of members of the public can be capricious, and dependent upon the (mis)information that the 'public' is provided." In these circumstances, "invoking public opinion instead of focusing on constitutional standards and safeguards would defeat the entire framework elaborated in Bachan Singh" (LCI 2015: 117).

The introduction of the concept of "collective conscience" has also expanded the rarest of rare doctrine beyond what was envisaged in the Bachan Singh judgment. In *Haresh Mohandas Rajput v State of Maharashtra* (2011), the Supreme Court itself acknowledged that the Machhi Singh judgment's invocation of "shock to the collective conscience of the community" as a ground for assessing probability of giving the death sentence extended the conception of "rarest of rare" as compared to what it visualised originally. It would be interesting here to refer to Justice Ganguly's opinion in *Rameshbhai Rathod v State of Gujarat* (2009), which stated that

> The Court cannot afford to prioritise the sentiments of outrage about the nature of the crimes committed over the requirement to carefully consider whether the person committing the crime is a threat to the society. The Court must consider whether there is a possibility of reform or rehabilitation of the man committing the crime and which must be at the heart of the sentencing process. It is only this approach that can keep imposition of death sentence within the "rarest of the rare cases."

Furthermore, it has been found that "in order to satisfy the so-called 'collective conscience' of the nation, the application of the laws had been tweaked consistently" (ACHR 2015). For instance,

> In [the case of] Bhullar, the confessions made to the police officers [were] in violation of the Indian Evidence Act, which does not allow confessions made to police officers as admissible evidence, and the International Covenant on Civil and Political Rights, which prohibits self-incrimination. Had they been tried under the IPC based on the evidence taken under the Indian Evidence Act, [he] would have certainly been acquitted" (ACHR 2015:12).

Later in 2013, the Supreme Court dismissed the petition filed by Bhullar seeking commutation of his death sentence to life imprisonment on the grounds that the President of India delayed in considering his mercy plea. The Court held that "long delay may be one of the grounds for commutation of the sentence of death into life imprisonment cannot be invoked in cases where a person is convicted for offence under TADA or similar statutes" (*Devender Pal Singh Bhullar v State of NCT of Delhi*). However, this judgment was later held to be a bad law. In *Shatrughan Chauhan v Union of India* (2014), the Supreme Court corrected its folly by declaring the judgment in the Devender Pal Singh Bhullar case as *per incuriam* on the basis that there is no provision in law which states that terror convicts cannot be given mercy as per law. Another judgment, *P V Anvar v P K Bashir* (2014), made it clear that *State v Navjot Sandhu* (Parliament attack cases) was decided on the basis of inadmissible evidences.

In *Adambhai Sulemanbhai Ajmeri v State of Gujarat* (2014), while acquitting all six accused in the 2002 Akshardham temple attack in Gujarat, the Court

expressed its anguish about "the incompetence with which the investigating agencies conducted the investigation of the case." The Court noted that "[instead] of booking the real culprits responsible for taking so many precious lives, the police caught innocent people and got imposed the grievous charges against them which resulted in their conviction and subsequent sentencing." The individuals accused in the case were acquitted after spending 11 years in imprisonment. Two individuals were earlier sentenced to death by the high court. In such a scenario, Justice Kurian Jospeh's dissenting opinion in *Chhannu Lal Verma v State of Chhattisgarh* (2019) is important, where he expressed concern on "how public discourse on crimes have an impact on the trial, conviction and sentence in a case." Highlighting that society's perspective is generally formed by emotionally charged narratives, Justice Joseph unequivocally questioned the trend "for the investigating agency to present their version and create a cloud in the collective conscience of the society regarding the crime and the criminal." Such approach by investigating agencies, Justice Joseph noted, "puts mounting pressure on the courts at all the stages of the trial and certainly they have a tendency to interfere with the due course of justice." Moreover, as Surendranath (2019) has aptly remarked, "In a system that routinely relies on investigative and prosecutorial malpractices to achieve convictions, there is always the danger of wrongful convictions."

The most disturbing flaw in the notion of "collective conscience" is that

> [It] is often manufactured through scapegoating of the dispensable i e the poor and socially disadvantaged who are unable to defend themselves in all stages, most notably at the stage of the trial under intense local social pressure, media trial, hostile environment including those accused of terror offences etc. … [S]ome crimes are so gruesome and become politically significant that it almost becomes indispensable for the State to find the guilty, even if it means tweaking justice, to assuage public anger, which is equally directed against the failure of the State and the system as much against the crimes and the criminals. (ACHR 2015: 9-10)

The Death Penalty India Report released by the National Law University, Delhi (NLU 2016), shows that death-row prisoners belong to the poorest and most marginalised sections and cannot afford proper legal representation. These concerns must be addressed.

Justice P N Bhagwati, through his strong dissent in the Bachan Singh judgment, had warned that

> Judges should not take upon themselves the responsibility of becoming oracles or spokesmen of public opinion … When Judges … take upon themselves the responsibility of setting down social norms of conduct, there is every danger, despite their effort to make a rational guess of the notions of right and wrong prevailing in the community at large … that they might write their own peculiar view or personal predilection into the law, sincerely mistaking that changeling for what they perceive to be the Community ethic. The perception of "community" standards or ethics may vary from Judge to Judge … Judges have no divining rod to divine accurately the will of the people. (*Bachan Singh v State of Punjab* 1980)

However, it is stated that different judges have responded in varying ways to crime in general. A couple of studies clearly show that the determination of a crime as "shocking the collective conscience" is ultimately affected by the social perspectives of judges (Amnesty International India and PUCL 2008).

Judges' Conscience?

In most cases where this phrase has been used, it must be read in the background of Justice Douglas Black's opinion in *Goldberg v Kelly* (1970), where he had held:

> [The court's] search for the "collective conscience of mankind"… is only a euphemism for an individual's judgment. Judges are as human as anyone, and as likely as others to see the world through their own eyes and find the "collective conscience" remarkably similar to their own.

Talking about Bhullar's case, he was sentenced to death by a Terrorist and Disruptive Activities (Prevention) Act court. His appeal was heard by a three-judge bench of the Supreme Court. The conviction and death sentence of Bhullar was upheld by a majority, with a ratio of 2:1. The flaw in the conviction has been stated earlier in this article. Justice M B Shah gave the dissenting judgment acquitting Bhullar. The majority judgment had invoked the concept of collective conscience while upholding Bhullar's death sentence, whereas Justice Shah went to the extent of acquitting him. Clearly, the collective conscience, according to Justice Shah, was not "shocked."

A study by the ACHR (2015) analysed 48 cases relating to death penalty adjudicated by two former judges of the Supreme Court, Justice M B Shah and Justice Arijit Pasayat. It clearly reveals the differences in the approach of the two judges of the Supreme Court. The report states that:

> Out of the 33 death penalty cases adjudicated, Justice Arijit Pasayat (i) confirmed death sentence in 16 cases including four cases in which lesser sentences were enhanced to death sentence and two cases in which acquittal by the High Courts were enhanced to death sentence, (ii) upheld acquittal in eight cases, (iii) commuted death sentence in seven cases, and (iv) remitted three cases back to the high courts to once again decide on quantum of sentence as death penalty had not been imposed by the high courts. It is pertinent to mention that out of the 16 cases in which death penalty were confirmed by Justice Pasayat, five cases have since been declared as *per incuriam* by the Supreme Court.
>
> On the other hand, Justice M B Shah did not confirm death penalty in any of 15 cases of death penalty adjudicated by him. He rather commuted death sentence in 12 cases, did not enhance life imprisonment into death penalty in any case, did not alter acquittal by the High Courts into death penalty in any case, did not remit back any case to the high courts on the quantum of sentence and did not deliver a single judgement which was declared as per incuriam. He acquitted convicts in three cases out of which two cases were dissenting judgement against imposition of the death penalty. (ACHR 2015: 24–26)

A similar analysis was carried out by Chaudhry (2012) in *Frontline*, where the judgments delivered by Justices K G Balakrishnan, S B Sinha and Arijit Pasayat, in the cases involving the question of imposing death penalty were analysed. Chaudhry's analysis found that "While Justices K G Balakrishnan and S B Sinha commuted all death sentences for child rape and murder, Justice A Pasayat upheld or imposed the death penalty in every such case even when lower courts had acquitted the accused or commuted the sentences."

The analysis in *Frontline* thus led to the conclusion that the death sentencing

in the Supreme Court had turned into a sort of "lottery" system:

> The death sentence becomes more indefensible when a majority of such cases are assigned to two or three out of the 14 or so benches of the Supreme Court. This creates a lottery, where the mere presence or absence of a particular judge gives the convict a significantly better or worse chance of survival, statistically, regardless of the evidence. A comparison of three judges (derived from judgments reported in Supreme Court Cases) clarifies the importance of a judge's personal predilections in death-penalty adjudication.

The criticism of this judge-centrism is found in several other judgments of the Supreme Court itself. In *Aloke Nath Dutt v State of West Bengal* (2006), after examining judgments in death penalty cases over two decades, the Court admitted the failure on its part "to evolve a uniform sentencing policy in capital punishment cases and conclude as to what amounted to 'rarest of rare.'" The judgment in Bariyar (2008) noted that a "survey of the application of rarest of rare doctrine in various courts will reveal that various courts have given their own meaning to the doctrine" and that such variation in interpretation "may amount to be constitutionally infirm because of apparent arbitrariness on the count of content of the doctrine." Later, the Supreme Court in *Sangeet v State of Haryana* (2013) stated,

> It appears that even though Bachan Singh intended a "principled sentencing", sentencing has now really become judge-centric as highlighted in Swamy Shraddananda and Bariyar. [The] aspect of the sentencing policy … seems to have been lost in transition.

The LCI also, by examining several such cases in its report, has "completely exposed the lack of a principled approach by the Supreme Court when it comes to following its own doctrine" (Tiwari 2015). It highlighted that while some cases have shocked the judges' conscience, few others have not (LCI: 124–27). For example, in *Bantu v State of MP* (2001), the rape and murder of a six-year-old child did not attract the death penalty as it was held that though these crimes were heinous, the offenders were not a danger to society, and that the possibility of reform was not closed. While in *Jumman Khan v State of UP* (1991), also involving the rape and murder of a six-year-old, the Court held that

> [T]he only punishment which the appellant deserves for having committed the reprehensible and gruesome murder of the innocent child to satisfy his lust, is nothing but death as a measure of social necessity and also as a means of deterring other potential offenders.

This inconsistency can also be seen in the judgments of different high courts across the country. For instance, in *State of Tripura v Ashok Debbarma @ Achak Debbarma* (2012), the accused were guilty of brutally murdering 15 people of a particular linguistic community, which included children, teenagers and women. The Gauhati High Court, while relying heavily upon *Machhi Singh v State of Punjab* (1980), held that the inhuman and brutal manner in which the murders were committed "ought to be taken to have vigorously shaken the collective conscience of the society," thereby confirming the death sentence awarded to the accused by the trial court. But, in *State of Bihar v Umesh Choudhary* (2007), where the accused were awarded death sentence by the trial court for the murder of eight persons, including six children, the Patna High Court refused to confirm the death sentence. According to the high court, there was nothing on record which suggests that the accused were menace to the society who cannot be reformed or rehabilitated and shall constitute a continuing threat to the society. The high court had followed the judgment of the Supreme Court in *Prakash Dhawal Khairnar (Patil) v State of Maharashtra* (2002).

Quite clearly, there is a contrary line of cases. The inconsistencies and irregularities in the infliction of the death penalty have made the Supreme Court accept the fact, itself, in *Rameshbhai Rathod (2) v State of Gujara*t (2011), that

> There is a very thin line on facts which separates the award of a capital sentence from a life sentence in the case of rape and murder of a young child by a young man and the subjective opinion of individual Judges as to the morality, efficacy or otherwise of a death sentence cannot entirely be ruled out.

Revisiting Death Penalty

The American jurist, Benjamin N Cardozo, in his classical book *The Nature of the Judicial Process* stated,

> Deep below consciousness are other forces, the likes and the dislikes, the predilections and the prejudices, the complex of instincts and emotions and habits and convictions, which make the man, whether he be litigant or judge … The great tides and currents which engulf the rest of men do not turn aside in their course and pass the judges by. (Benjamin Cardozo 1961: 167–68)

The anatomy of mythical "collective conscience" has only led to repetitive and systematic acts of semantic misappropriation. Judges, as the highest ranks

of the judicial powers in India, have become "both prisoners and jailers of this fiction of conscience, which they have created" (Sengupta 2015).

The application of collective conscience by judges is reflective of the flaw in our criminal justice system, the concern about which increases when the criticism emerges from the judiciary itself, as it smacks of its helplessness. In such cases, it is the judges and the country that are on trial before history. The effect of such frequent criticism only implies that "the very credibility of the court's death penalty decisions is at stake" (Venkatesan 2012).

The Supreme Court had tried to counter "judge-centric approach" in deciding death penalty cases by formulating in *Gurvail Singh @ Gala v State of Punjab* (2013) that three tests have to be satisfied before awarding the death penalty: the crime test, or the aggravating circumstances of the case; the criminal test, meaning that there should be no mitigating circumstances favouring the accused; and if both these tests are satisfied, then, the rarest of rare cases test, "which depends on the perception of the society and not 'judge-centric,' that is whether the society will approve the awarding of death sentence to certain types of crime or not." While applying this test, the Court held that "it has to look into variety of factors like society's abhorrence, extreme indignation and antipathy to certain types of crimes."

In *Mofil Khan v State of Jharkhand* (2015), it was held that the test is to "basically examine whether the society abhors such crimes and whether such crimes shock the conscience of the society and attract intense and extreme indignation of the community." Even if one were to assume that society has determinate, stable and wide shared preferences on these matters, judges have no means of determining these preferences. To quote from Justice Bhagwati's dissenting opinion in *Bachan Singh v State of Punjab* (1980) again:

> When Judges, acting individually or collectively, in their benign anxiety to do what they think is morally good for the people, take upon themselves the responsibility of setting; down social norms of conduct, there is every danger, despite their effort to make a rational guess of the notions of right and wrong prevailing in the community at large and despite their intention to abide by the dictates of mere reason, that they might write their own peculiar view or personal predilection into the law, sincerely mistaking that changeling for what they perceive to be the Community ethic. The perception of "community" standards or ethics may vary from Judge to Judge.

Justice Bhagwati's words have proved to be prophetic in the death penalty debate. After a lengthy and detailed analysis, the LCI (2015) made the assertion that "[t]here exists no principled method to remove such arbitrariness from capital sentencing" and that the "[s]afeguards in the law have failed in providing a constitutionally secure environment for administration of this irrevocable punishment." The only solution to remove this arbitrariness is to abolish the death penalty in totality. The LCI recommended for swift abolition of death penalty, but it also made an exception for terror-related cases. By doing this, the LCI "stepped back from its own conclusions about judicial arbitrariness" (Tiwari 2015), since it is terror-related cases where the manufacturing of the collective conscience has been most evident. Endorsing these concerns, Justice Kurian Joseph, in his last dissenting judgment before his retirement, opined that time has come that we reconsider the "need for death penalty as a punishment, especially its purpose and practice" (*Chhannu Lal Verma v State of Chhattisgarh* 2019).

The public pressure or the collective conscience has also started impacting policy making, the recent example being the Criminal Law Amendment Act 2018, which has introduced the punishment of death sentence for the offence of rape of girls under 12 years of age. The extra-judicial encounters of individuals, like in Hyderabad in December 2019 (Arun 2019), also seem to be a product of satisfying public pressure—a scenario where the public does not seem to be concerned if due process of law was followed. The demand to hang the convicts of Delhi gang rape case (*New Indian Express* 2020) at any cost is the latest moment of the trend, which this article has sought to critique[3] (they have since been hanged).

The task to abolish death penalty thus has many hurdles. It is unlikely that the Parliament will abolish death penalty in the foreseeable future. The flaws in the death penalty jurisprudence, however, provide strong grounds for the Supreme Court to constitute a larger bench to reconsider its majority holding in the Bachan Singh judgment.

The concept of collective conscience is clearly a myth and should not be invoked while deciding cases involving the death penalty. There is no clear-cut formula to measure the collective conscience of a society. Even the original concept by Emile Durkheim has some intrinsic flaws.

NOTES

1 Dhananjoy Chatterjee was hanged in 2004 after the President refused clemency to him.

2 The following judgments were relied upon: *Machhi Singh v State of Punjab* (1983), *Surendra Pal Shivbalakpal v State of Gujarat* (2004), *Dhananjoy Chatterjee v State of West Bengal* (1994).

3 The death warrant to execute the convicts in Delhi gang rape case was issued by court for 20 March 2020 at 6 am.

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Can Payments Banks Succeed?
A Trilemma and a Possible Solution

INDRADEEP GHOSH, AJIT RANADE

Recently, the Reserve Bank of India has begun licensing a new kind of retail bank, called payments banks, for the hitherto financially excluded. The regulator's argument that technological innovation will allow payments banks to achieve a seemingly impossible trilemma of financial inclusion while still being competitive and profitable is examined. The article concludes that amelioration of this trilemma will require the regulatory orientation to fundamentally change, and for the state to provide a kind of public good to all payments banks.

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In a dynamic growth-oriented economy, it is critical that the financial system is flexible and competitive to cope with the multiple demands placed on it by various economic actors. Also, adequate access to finance is thought to be a prerequisite for poverty reduction and social cohesion. Therefore, financial inclusion becomes imperative to achieve inclusive growth.

The vision of "inclusive financial sectors" was first invoked by Kofi Annan during a United Nations General Assembly Greenlights Programme following the adoption of 2005 as the International Year of Microcredit. On 29 December 2003, Annan said:

> The stark reality is that most poor people in the world still lack access to sustainable financial services, whether it is savings, credit or insurance. The great challenge before us is to address the constraints that exclude people from full participation in the financial sector. Together, we can and must build inclusive financial sectors that help people improve their lives. (UN 2003)

More than a decade later, financial exclusion continues to be a major international policy concern. Globally, 1.7 billion adults (approximately 31% of the world adult population) lack or have restricted access to such basic financial services as bank accounts, low-cost credit, remittance and payment services, financial advice, and insurance (Demirguc-Kunt et al 2018). Even modest levels of financial well-being are beyond their reach.

Reasons for this state of affairs are stated as, on the one hand, the lack of money income or (even in the presence of money income) the lack of a desire for a bank account, perhaps because of distrust in the financial system or other sociological, cultural or religious concerns. On the other hand, it is the prohibitive operational costs to banks of opening and maintaining accounts for low-income individuals. Yet, some progress has been made. Around 700 million people are estimated to have gained access to a transaction account between 2011 and 2014 (Demirguc-Kunt et al 2018). The promise of such an account is of more effective management of household finances and therefore a rise in the standard of living and perhaps even an exit from poverty.

Indeed, payment services are often the first and most frequently used financial services by the hitherto financially excluded, and this has motivated the publication of a joint study by the Bank for International Settlements (BIS) and the World Bank Group in 2016, that sets out the guiding principles for countries wishing to achieve financial inclusion through the payments route (BIS and World Bank 2016).

In India, as well, policymakers have begun to pin their hopes for financial inclusion on payments services. In this context, the current article looks at the evolution of a special category of financial institution called payments banks. The promise of such banks is supposedly a highly restricted domain of operations and therefore a simplified structure that will enable the harnessing of technological innovation to deliver financial inclusion. We will argue, however, that the goal of financial inclusion may remain elusive unless the regulatory framework is fundamentally altered to allow for experimentation and even possible failure.

Genesis of Payments Banks

In India, the role of banks and the importance of financial sector development have occupied the minds of policymakers since independence. But the overall picture on financial inclusion remained largely poor and uneven till the 1990s. The 1991 crisis brought home the realisation that little had actually been achieved by way of financial inclusion, and that the banking sector was in a state of disarray for a variety of reasons. The liberalisation programme begun after 1991 therefore accorded a very high importance to rehabilitating the financial health of banks, in the form of appointing two expert committees in 1991 and 1998 under the chairmanship of M Narasimham to suggest wide-ranging reforms for the sector.

Together, the Narasimham I and II Committee reports targeted efficiency and competition, awarding greater autonomy to public sector banks, suggesting ways of resolving loans gone bad, allowing foreign banks to enter the domestic market, and introducing a monetary policy tool, called the liquidity adjustment facility to encourage banks to borrow money from the Reserve Bank of India (RBI) via repurchase agreements (GoI 1992, 1998). As a result of these reforms, the formal financial sector swelled, and cheap credit avenues were instituted.

The focus turned more squarely to financial inclusion only in the 2000s. The phrase itself was first mentioned in 2005, by RBI Governor Y V Reddy (2005), in the RBI's annual policy statement. In the same year, the report of the Internal Group to Examine Issues relating to Rural Credit and Microfinance (Khan Committee) announced that banks were now allowed to open "no frills" accounts for customers that wished to hold zero or very low balances (RBI 2005). This was quickly followed by the appointment of two more committees, the Rangarajan Committee—headed by C Rangarajan, a former RBI governor—to examine the state of financial inclusion in the country, and the Rajan Committee—headed by Raghuram Rajan, a future RBI governor—to suggest comprehensive reforms for financial sector deepening.

The 2008 report by the first of these committees concluded that the poor had been largely excluded from the organised financial sector, and that the government and the banking sector would have to work together to rectify the problem. Financial inclusion was formally defined as "the process of ensuring access to financial services and timely and adequate credit where needed to vulnerable groups such as weaker sections and low-income groups at affordable cost" (GoI 2008). The 2009 report by the second of the above committees included a chapter entitled "Broadening Access to Finance" to underscore the need for developing a financial sector that would be broad-based and inclusive (GoI 2009). Such a financial sector would, in addition to credit, also offer payment services, savings accounts, insurance products, and inflation-protected pension schemes. This would require, according to the committee, a paradigmatic shift away from large, public-sector banks being burdened with the goal of financial inclusion, towards private, well-governed, small-finance banks. This particular recommendation was further elaborated in a report published in 2014 by the committee on Comprehensive Financial Services for Small Businesses and Low-Income Households, headed by Nachiket Mor (RBI 2014).

It is the Mor Committee report that inaugurated for the first time in India, the concept of a "payments bank" as part of a vertically differentiated banking system (VDBS) design that revisits the notion of a full-service bank and forms different types of banks using the three building blocks of payments, deposits and credit. The committee opined that it would be important to have the regulatory flexibility to approach payments, deposits and credit independently and to bring them together when the efficiency gains are high, and other costs low. Payments banks would accept deposits and offer payment services but not credit. Each Indian resident above the age of 18 would thereby have an individual, full-service, safe, and secure electronic bank account. As other examples of VDBS design, the committee cited the South Korean Post Office Bank (only payments and deposits), GE Capital (credit and payments), and MasterCard and Visa (only payments).

Structure and Conduct of Payments Banks

The Mor Committee recommendation of a differentiated banking system is not entirely a novel one. There have been a few attempts to create smaller sized banks in the banking system and help achieve "last-mile connectivity," such as regional rural banks (dating back to the 1970s), urban cooperative banks, agricultural societies, and local area banks.

Prepaid instrument providers (PPIs) or "digital wallets" are another prominent example of a quasi-banking institution that precedes the publication of the Mor Committee's report. Since 2010, PPIs have facilitated a significant expansion of low-value payment services among individuals. PPIs are not without their critics though. The know your customer (KYC) norms are purportedly too lax, the inability to pay interest on balances is argued to be a drawback, and the possibility of contagion risk and therefore the safety of funds is a subject of concern. It is against the backdrop of such vulnerabilities associated with PPIs, that the Mor Committee recommended the formation of payments banks.

In November 2014, the RBI released comprehensive guidelines for the licensing of payments banks. The full list is represented in concise form in the Appendix Table 1 (p 45). Here, we restrict the discussion to only the most important features. A payments bank is allowed to accept demand–deposits (up to a maximum of ₹1,00,000 per individual), and issue debit cards

and other prepaid instruments. It will provide payments and remittance services, and internet banking. The objective of financial inclusion being paramount, the primary beneficiaries of such services will be migrant labourers, low-income households, small businesses and other unorganised sector entities.

A minimum of 75% of the demand-deposits of a payments bank will have to be parked in government securities and treasury bills and a maximum of 25% can be held in the form of current and time/fixed deposits with other scheduled commercial banks for operational purposes and liquidity management. This will ensure that payments banks do not carry any significant credit and market risks, but they will still be subject to operational and liquidity risks, and they will be allowed to manage these risks in an appropriate way (Appendix Table 1 for details).

The business model will therefore be a high volume–low value one, based on fees charged for services rendered rather than returns on assets, and the business environment will be a secured technology-driven one. In addition to adhering to the above guidelines, a prospective payments bank is required to provide the RBI with a detailed business plan. In case of deviation from the stated business plan after the issue of a license, the RBI will consider restricting the payments bank's expansion, effecting change in management and imposing other penal measures.

In August 2015, the RBI provided in-principal license approvals to 11 entities to start up payments banks. These were Aditya Birla Nuvo, Airtel M Commerce Services, Cholamandalam Distribution Services, Department of Posts, Fino PayTech, National Securities Depository, Reliance Industries-SBI, Dilip Sanghvi–IDFC–Telenor JV, Vijay Shekhar Sharma, Tech Mahindra, and Vodafone M-Pesa. Subsequently, in the course of setting up businesses, three of them (Cholamandalam, Sanghvi–IDFC–Telenor, and Tech Mahindra) surrendered their licences in 2016, citing the model to be unviable due to regulatory impositions such as the limits placed on deploying deposits freely so that fee income was the only source of revenue, and the challenges of customer acquisition in the face of stringent KYC norms. These three entities also expressed worries about high compliance costs, competition from other payments banks, and the long gestation period for profitability implicit in the business model.

In November 2016, Airtel launched India's first payments bank by beginning operations in Rajasthan on a pilot basis. In January 2017, India Post Payments Bank (IPPB) became the second entity to start operations. The entry of IPPB into the landscape was greeted with significant anticipation, as the 2016 Independence Day speech by the Prime Minister had already signaled the tremendous advantage that IPPB enjoyed over other players. In Narendra Modi's (2016) words,

> If any government representative gets the affection of a common man in India, it is the postman. Everyone loves the postman and the postman also loves everybody ... We have taken a step to convert our Post Offices into Payments Banks. Starting with this, the Payments Bank will spread the chain of banks in the villages across the country in one go.

As of December 2018, IPPB had opened nearly 19 lakh accounts and facilitated close to a million transactions (*LiveMint* 2018). Following Airtel and IPPB, the other licence recipients have also set up their respective payments banks.

In the meantime, other noteworthy events have also transpired. In March 2018, the RBI imposed a fine of ₹5 crore on Airtel payments bank for violating operational guidelines and KYC norms. The RBI also barred payments banks started by Paytm (owned by Vijay Shekhar Sharma, one of the 11 licensees) and Fino PayTech from enrolling new customers as they were found to be opening accounts without the clear consent of customers. In September 2018, the cost of customer acquisition for payments banks arguably multiplied when the Supreme Court ruled that the Aadhaar number, the government's biometric ID platform that had come to serve as a public good for KYC authorisation, could no longer be demanded of citizens by corporate entities as a matter of routine identity verification.

In October 2018, the RBI released operational guidelines on the interoperability of prepaid instruments. The guidelines stated that mobile wallet users would be able to transfer funds from one wallet to another and from their wallets to bank accounts through the government's unified payments interface (UPI) platform. This development occurred despite the fact that in August 2018, some payments banks had approached the RBI to not grant such interoperability rights to PPIs. There was apparent reason for the payments banks to worry since the new norms have levelled the playing field for payments banks and PPIs in terms of access to a common technological platform, but whereas PPIs are not required to pay interest on the amounts deposited with them, payments banks are. On the other hand, mobile wallets are prohibited from accepting monthly deposits of more than ₹10,000 whereas for payments banks, that limit is ₹1,00,000.

Presently, it is safe to say that payments banks are in uncharted territory. Since their conception, mobile accessibility has become cheaper, rural connectivity has improved under the "Digital India" initiative, and the Pradhan Mantri Jan Dhan Yojana (PMJDY) has pushed for greater and greater numbers of the unbanked to be brought into the ambit of the formal financial system. All of these developments play arguably complementary roles for the purpose that payments banks are looking to serve. But the jury on whether they will succeed is still out.

According to a 2018 RBI report, the total paid-up capital of the seven entities that have set up payments banks is ₹3,346 crore (approximately $478 million), and they accounted for a deposit intake of ₹540 crore (approximately $77 million), which is about 0.005% of overall bank deposits in India (RBI 2018). As expected, profitability is a major concern, with the seven entities reporting combined operating losses of ₹240.7 crore (approximately $34.5 million) and ₹522.1 crore (approximately $74.84 million) for the years 2017 and 2018, respectively (RBI 2018).

For the financial year 2018–19, Paytm payments bank announced profits of ₹19 crore, but did not publish any hard data on whether these profits were mainly sourced from business operations in rural and unbanked parts of India, that is, whether the goal of financial inclusion was being achieved in any real sense. In an interview, the CEO Satish Kumar Gupta remarked that rural and semi-urban customers amounted to (only)

25% of the bank's customer base (Bhalla 2019). In November 2019, the RBI notified that Aditya Birla Payments Bank is headed for voluntary liquidation, owing to "unanticipated developments" that made its business model "unviable." (RBI 2019a)

Financial Inclusion, Competitiveness and Profitability

The institution of payments banks occasions two broad questions. The first is the more primitive one: Are payments banks an appropriate mechanism for achieving financial inclusion? The second follows from the first: Conditional on payments banks being an appropriate mechanism for achieving financial inclusion, how likely are they, as presently conceived in India, to succeed?

We believe that the first question is the subject of a very legitimate debate, but we do not address it in this paper. Indeed, the first question cannot properly be answered without tackling the second one, and so we focus on the latter. We do not feel the need to justify the question that we are tackling, as the surrender of licences signals the possibility that the Mor Committee and the RBI may not have fully thought through the implications of what they were bringing into existence. This is the gap we hope to fill with our analysis. Indeed, we believe that the regulatory structure is key, and so we frame the discussion from that perspective.

To make progress, we recast the second question in the form of an impossible trinity, to clearly identify the trade-offs that regulators must pay attention to. But also, we wish to make an intentional analogy to the Mundell–Fleming trilemma in macroeconomics, because it provides a way forward in thinking about how to mitigate those trade-offs (Fleming 1962; Mundell 1963). Our basic submission is that in the conception of payments banks, financial inclusion, profitability and competition together constitute an impossible trinity of objectives. That is, for example, we can have many competing payments banks that are all profitable to some extent, but then the goal of financial inclusion may not be achievable. Or, we can have many competing payments banks that financially include the majority of the presently excluded, but then those banks will not be profitable, and so on. To understand why such a trilemma occurs, let us first examine the dimension of financial inclusion and its implications for the kind of business model that payments banks are likely to employ.

The mandate of financial inclusion requires payments banks to serve a kind of consumer who is unlikely to generate a significant revenue stream from just the consumption of the services of a deposit account, because that consumer's demand for such services is likely to be much more limited than that of a middle-income urban consumer who is the conventional retail banking customer in India. Yet the bank will need to cover the ongoing operating cost of maintaining and servicing deposit accounts. We note, in passing, that operating cost is the critical metric to consider for inherent financial viability, and not merely the difference between the in-rate (rate earned on government securities) and the out-rate (rate paid to depositors), which indeed is positive. Therefore, for a payments bank's revenue model to make business sense, it becomes necessary for the bank to devise new and interesting ways of creating value from its customer base.

The number and variety of such new and interesting means of value creation have been multiplied considerably by the advent of the internet and mobile telephony, and a new kind of business model is emerging all over the world to take advantage of such opportunities. This is the business model of a platform. A platform business generates value when consumers and producers interact, with the platform essentially performing a matching function and appropriating for itself some part of the value that is created. Platforms have existed for centuries (for example, stock exchanges), but the digital domain has spawned a whole new variant of platforms (for example, Apple, Facebook, Uber, Airbnb) that are reshaping industry dynamics in both traditional and new sectors. Key to the success of these new platforms is the data generated by participants on the platform, because this data is itself a monetisable resource. Payments-based platform businesses such as Paypal and Alibaba have demonstrated how the onboarding of participants on both demand and supply sides of various markets can make available to the platform a wealth of data that can then become sources of value creation.

The point of the above discussion is to recognise that the social good of including within the formal financial system the hitherto excluded cannot, per se, provide sufficient monetary incentive for private sector participants to participate in the financial inclusion project. We think that the evidence for this claim is already before us. Payments banks need to adopt the platform business model in order to be financially viable. This will entail clever and innovative approaches to monetising the data that inclusion will make available to a payments bank. This data will capture the saving and spending behaviours of customers and can be used for credit assessment and the cross-selling of goods and services, including financial services. It could also be made available to software developers—via what are called application programming interfaces or APIs—for building "apps," that is, software applications that use the data to create value-added products or services. These software developers do not need to be employed by the payments banks. They are external to the payments bank, sometimes independent free agents, but they nevertheless create value for the payments bank's customers, and therefore for the payments bank and for themselves.

A simple and entirely hypothetical example would be the use of payments bank data to create a budgeting tool that customers could use to keep track of their expenditure patterns and therefore to incorporate some financial discipline into their spending behaviour. The point is that this tool would not be created by the payments bank, yet it would become an instrumental feature of customer retention and customer acquisition for the payments bank. What we are envisioning here is a business model, where the existence of a customer base will create the ground for layers of innovative revenue-generating opportunities other than the provision of deposit and payment services, and it is those opportunities which will truly drive the payments bank's business model. This does not

mean, however, that the objective of financial inclusion will be bypassed, because financial inclusion will be the enabling condition for financial viability.

Question of Profitability

We can assume, however, that the typical payments bank will not just be content to cover cost, that is, be financially viable, but will want to grow and therefore be profitable. This brings us to the second dimension in the impossible trinity, that of profitability. Yet, how is a platform to assure itself of profits? The answer to this question is by now well known as the ubiquity of such businesses in contemporary times has given rise to a surge of scholarly interest in them and contributed to a growing canon of knowledge about how such businesses operate and succeed or fail (see Parker et al [2017], for a comprehensive survey). The key determinant of profitability is found to be scale. But it is not the traditional supply-side economies of scale that is at issue here. Rather, platform markets—the markets in which platform businesses operate—demonstrate "demand-side economies of scale." It is important to understand that demand-side economies have not always been a feature of platform businesses even if platforms have existed for a long time. They are a more recent phenomenon, made possible by the technological innovation that drives digital or e-commerce, whereby efficiencies in the networks that are always already implicated in any market can be easily exploited. As a result, those networks can be quickly scaled up because larger networks attract more users and become larger still. These dynamics are therefore more appropriately termed "network effects."

Network effects in platform markets are in fact two-sided, meaning that achieving scale on one side of the market automatically leads to the realisation of scale on the other side. A traditional payments settlement company like Visa illustrates this phenomenon well. Visa's ability to attract more merchants into its card network depends on its ability to attract more customers into its network, but more customers can only be persuaded to use Visa if more merchants also accept it. Thus, network effects operate through positive feedback, and this is what makes them so powerful. A platform business that can activate this positive feedback process can quickly scale up, and therein lies the key to profitability. Until it has scaled, however, the business has a difficult problem to solve, because there is no clear rule or principle to be followed in terms of which side of the market is to be scaled up first. In other words, the scaling problem is akin to a chicken-and-egg problem, and this makes platform businesses exciting, but at the same time, subject to high levels of going-concern risk, as a significant amount of capital may need to be burned up before the scale is achieved.

Even as scale is being achieved, the question of how to monetise value remains an independent problem to be solved. This problem, much like the problem of scaling, is best solved via experimentation, so that both scale and value in platforms are emergent properties. In other words, what precisely will be the hook for participants on one of the sides of the market, and how thereafter that hook will translate into monetary value, are both questions that cannot be decided *ex ante* in a strategic sense, but rather their answers must be discovered. This is the conclusion that most case literature on platform businesses arrives at, and we think that there is more than a grain of truth in it because technological innovation in the digital domain offers the arising and testing of contingent possibilities (and therefore also, failure of businesses) at a far greater rate than has ever been possible in the history of commerce. As with scaling and revenue streams, so also, with the architectural design of a platform and its internal governance structure.

Architectural design refers to how the various parts of the platform connect and interrelate to one another and in what manner these parts allow or hinder entry to or exit of network participants. Governance structure refers to how the platform monitors and disciplines activity among participants. The emergent quality of value, in particular, is best illustrated by the example of M-Pesa in Kenya, which started out along the lines of a microfinance corporation but found out, quite by accident, that mobile payments were the real hidden opportunity, and then quickly became the payments platform for much of Kenya's rural population (Harford 2017).

Competition Dimension

This then brings us to the third dimension of the trinity, that of competition. Requiring the market for payments banks to be competitive is equivalent to requiring that each consumer have access to multiple payments banks and can freely choose between them for the delivery of deposit and payments services. A corollary is that if a consumer should want to switch from one service provider to another, they can do so without impediment or discrimination. There are, however, reasons to anticipate that competitive forces are unlikely to manifest in any permanent sense in the payments banks space. This is because platform markets are often seen to be winner-take-all markets, which are markets that start out as competitive but end up, via a process of selection, as monopolistic.

The propensity for monopolising forces to arise in a platform market stems from a variety of factors: supply-side economies of scale, network effects, the absence or diminished possibility of "multihoming," and the presence of niche specialisation (Parker et al 2017). Multihoming refers to a situation where participants in a platform have easy access to other platforms as well. Consider, for instance, the market served by such platforms as Uber and Ola. Because customers looking for a ride can easily switch from one platform to another on their smartphone, this market allows ample possibilities for multihoming and therefore low switching costs. On the other hand, the smartphone on which these two platforms are being accessed is itself a platform, and the market for smartphones is typically not susceptible to multihoming because most users of smartphones will choose one particular brand of smartphone and stick with it for some length of time. By a similar logic, if a platform is not providing access to a very niche product or service, customer acquisition and retention will be more difficult, and winner-take-all forces will be less likely to take hold in such a market.

It is prima facie unclear whether payment platforms in India operate in a winner-takes-all market. While network effects

are an obvious potential feature of the market for payment services, something like the government-issued Bharat Interface For Money (BHIM) app, that allows users to use any bank account to make payments over a mobile phone, opens the space for multihoming. Furthermore, the ability to make payments per se is not a niche service. Still, neither the possibility of multihoming nor the pedestrian nature of the service being provided argue against the possibility of a single payments bank coming to dominate the space. Everything depends on the winner's particular business model—that is, what really is the winner serving as a platform for—which itself is a matter of discovering how best to implicate and exploit network effects. Should such a winner emerge, then the selection mechanism would be one of intense and fierce competition, so that competition is not necessarily ruled out, except in the long-term, which is defined endogenously as the length of time that it would take for a winner to emerge.

Putting the three dimensions together, we can examine how the impossibility of the three objectives asserts itself. If the arena for payments banks is populated by a large number of competing entities, as regulators would like it to be, then it is clear that the financial inclusion objective can be achieved. But the payments banks will compete viciously to acquire and retain customers, and this competition, which will be an unfolding process of building scale, will render profits elusive. If the process of building scale is characterised by winner-take-all forces, then the scaled-up winner will be financially inclusive and will be profitable, but clearly, the arena for payments banks will now be devoid of competition. So, the nature of the impossibility transitions from one kind to another with the passage of time, but the impossibility itself persists through time.

How might the short- to medium-term impossibility be ameliorated? In other words, is there a hope that payments bank licensees will be able to operate profitably, compete with one another, and also achieve financial inclusion? We suggest a particular kind of intervention that could help. Here, a more explicit analogy to the Mundell–Fleming trilemma in macroeconomics is helpful for framing purposes. In that trilemma, a central bank cannot fix the exchange rate, conduct independent monetary policy, and allow free capital mobility, all at the same time. Yet, this seemingly intractable trade-off can indeed be mitigated, provided the central bank has a large stock of foreign exchange reserves. We propose that the role of reserves is played in the payments bank trilemma by the IPPB's network of postal service employees. That is, the proposal is for the IPPB to allow private sector payments banks to piggyback on its network of postal service employees, thereby providing all competitors a level playing field at least in terms of customer acquisition, which as discussed earlier is a formidable scaling problem for platforms in any industry to solve and made even more difficult for payments banks by the Aadhaar verdict of September 2018.

Challenge of Customer Acquisition

This still leaves significant room, and indeed frees up resources for innovation in the customer acquisition domain, in terms of payments banks differentiating themselves along the dimensions of product offerings and user interfaces. Note that acquiring customers is also a matter of creating trust among those that are not accustomed to formal financial practices, and merely creating e-KYC procedures—as the regulators have sought to do, ostensibly to ease the process of signing up customers—will not solve this problem. The network of postal service employees therefore, performs a double function from the perspective of easing the route to customer acquisition and helping payments banks gain a measure of profitability as they compete with one another to build scale.

One possible objection to the above proposal is that it is beside the point, as some of the payments banks licensees that are telecom companies and non-banking financial companies (NBFCs) already have customer bases and so do not require the IPPB network to piggyback on. We would argue, however, that the dual objectives of financial inclusion and profitability require not only that those existing customers be predominantly rural and low-income households, but also that they be very large in size. It is not clear from published data whether either of those conditions is met. Furthermore, selling SIM cards is a fundamentally different business proposition from persuading customers to open deposit accounts. The factor of trust is critical and will require a significant additional investment of time and resources, not to speak of the added expenditures involved in employing core banking solutions to power functionality.

It is also not obvious that the large upfront fixed cost of acquiring customers can be easily paid for by cross-subsidisation even if many of the payments banks' licensees are ostensibly high net-worth companies. The legal constitution of payments banks requires them to be financially separate from parent companies, except in the case of PPIs (which we would argue is probably the reason that Paytm payments bank is able to declare profits). It is against the background of all of these considerations that our proposal should be assessed. That the IPPB has now applied for a small finance bank (SFB) licence does not also invalidate our proposal, as payments banks are allowed by the regulator to piggyback on existing networks of other banks. Rather, the point to be noted is that the regulator has begun to license SFBs, which suggests that the regulator itself believes that the payments banks model is unworkable. It is indeed doubtful that the IPPB is a profitable operation and so, by applying for an SFB licence, the IPPB is perhaps signaling that without credit operations, it will be unable to survive. Such considerations only bolster our case for the presence of a trilemma, but we are also going a step further in suggesting a way forward wherein the payments banks model is tweaked to allow them to avail of the IPPB network. In making this argument, we are in no way constrained by whether or not the IPPB is itself loss-making, since the crux of our argument is that private financial viability is in this case contingent on the provision of a public good.

Turning, therefore, to the implications of our analysis for the regulation of payments banks, we are able to deduce that there is an urgent need for the current regulatory framework to become sensitised to the novel and particular features of platform businesses and platform markets. We have seen, from our examination of the first two dimensions of the

impossible trinity, that even without having to worry about the competition dimension, regulators are faced with a formidable challenge in laying down guidelines for payments banks to follow. The nexus of profitability and financial inclusion is itself a sophisticated tangle of novel issues having to do with honouring the imperative for innovation, search and discovery.

Currently, however, the preference is for licensing, and therefore a detailed framework of ex-ante norms. Even if payments banks are exempt from the prudential norms that usually apply to loans and advances, the ex ante norms are in many instances categorically similar to those that apply to regular retail banks. This is puzzling, since payments banks carry no credit risk. More broadly, preconditions for market access may be the wrong approach where payments banks are concerned. Room for experimentation and innovation calls for light-touch regulation at the point of entry, and a tolerance for ambiguity in respect of "fit and proper" business models. Thus, a more appropriate mode of due diligence would be ex-post transparency, where payments banks are required to document, in detail, their operational decisions and outcomes and submit such records for scrutiny by regulators.

Considerations of data privacy and the proper use of customer data, or more broadly, of customer protection, remain important matters for regulatory oversight, but there is no reason why such considerations cannot be folded into an *ex post* governance framework. At least, such a view appears to accord with the vision of the Nilekani Committee's recommendations for the regulation of digital payments (RBI 2019b). Then, there is also the matter of the trilemma. Regulators may have to consider providing something akin to a public good (as described in the previous paragraph) but need not insist on competition as a constitutive feature of the market for payment services. The case of M-Pesa is once again instructive, because the M-Pesa platform enjoyed a de facto monopoly at the time it started operations, but Kenyan regulators did not actively resist or seek to overturn this status (Heyer and Mas 2011). There is, in other words, such a thing as too much market access, especially if the market for payment service providers is winner-take-all. Seen in this light, the October 2018 decision to provide PPIs the same kind of market access that payments banks enjoy, may well turn out to be counterproductive.

Conclusions

In this paper, we have reviewed the history of payments banks in India and assessed the viability of this new category of financial institution. We have elucidated also the conditions required for payments banks to deliver on the objective for which they have been created. We have argued that the current regulatory framework does not adequately respond to the real challenge of enabling success for payments banks. In the interest of space, we have not addressed the first research question occasioned by the arrival of payments banks on the scene. The implicit assumption behind their conception seems to be that the availability of low-cost easy-to-use mobile money will readily provide a venue for financial inclusion. This is by no means a certainty. Interdisciplinary research on mobile money projects around the world is beginning to demonstrate that the deployment of mobile money often runs against the grain of existing cultural practices and therefore is not always successful (Rea and Nelms 2017). This research questions the very basis for adopting a "financial inclusion" frame for such interventions, since the deployment of mobile money may not necessarily advance developmental goals such as gender equality or the flattening of existing class or caste hierarchies that may be oppressive. Whether payments banks perpetuate such developmental bottlenecks or not remains, therefore, an open question from a "cultural economy" perspective, and we do not address this question in our paper, although we propose to take it up in future research.

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Appendix Table 1—Guidelines for Payments Banks

Eligible promoters	• Existing non-bank PPI issuers, individuals/professionals, NBFCs, corporate BCs, mobile telephone companies, supermarket chains, companies, real sector cooperatives, and public sector entities.
	• A joint venture with an existing scheduled commercial bank is allowed, with restrictions on the permitted equity stake of the bank as per Section 19(2) of the Banking Regulation Act, 1949.
	• Promoters should be "fit and proper" with financial soundness and a successful track record of professional experience for at least a period of five years.
	• A government entity desiring to set up a payments bank should first obtain necessary approvals from the government.
	• Must be set up by the promoter under a separate corporate structure unless it is an existing PPI license holder opting for conversion into a payments bank.
Scope of activities deposits should be	• Acceptance of demand deposits from individuals, small businesses and other entities, as permitted. No non-resident Indian (NRI) accepted. Payments banks will initially be restricted to holding a maximum of ₹1,00,000 per customer.
	• Issuance of ATM/debit cards, but not credit cards.
	• Payments and remittance services through various channels, including branches, ATMs, BCs and mobile banking; cash-outs allowed at POS terminal locations in additional to other channels.
	• Issuance of PPIs as per instructions issued under the PSS Act.
	• Internet banking services, but not a "virtual" or branchless bank.
	• May act as a BC for another bank.
	• May act as a remittance channel via RTGS/NEFT/IMPS.
	• Permission to handle cross-border remittance transactions in the nature of personal payments/remittances on the current account.
	• Undertake other non-risk sharing simple financial services activities, not requiring any fund commitments such as distribution of products (such as mutual fund units, insurance products and pension products), as well as utility bill payments.
Deployment of funds	• No lending activities.
	• Apart from amounts maintained as Cash Reserve Ratio (CRR) with the RBI on demand and time liabilities, a payments bank must invest a minimum of 75% of its "demand deposit balances" in statutory liquidity ratio (SLR)-eligible government securities or treasury bills with maturity up to one year, and hold a maximum of 25% in current and time/fixed deposits with other scheduled commercial banks for operational purposes and liquidity management.
	• The payments bank will participate in the payment and settlement system and will manage short-term liquidity via access to the inter bank uncollateralised call-money market and the collateralised repo and CBLQ markets.
Capital requirement	• A minimum paid-up equity capital of ₹100 crore
	• Maintenance of a minimum CAR of 15% of its risk-weighted assets (RWAs). Tier I capital should be at least 7.5% of RWAs and Tier-II capital should be less than 100% of total Tier-I capital.
	• A payments bank is not expected to deal with sophisticated products; hence, the CAR will be computed under the Basel Committee's standardised approaches.
	• Leverage ratio of not less than 3%, that is, its outside liabilities should not exceed 33.33 times its net worth.
Promoter's contribution	• No maximum shareholding limit for promoters is prescribed.
	• The promoter's minimum initial contribution to the paid-up equity capital shall be at least 40% for the first five years.
	• When a payments bank reaches a net worth of ₹500 crore, and therefore becomes systemically important, diversified ownership and listing will be mandatory within three years of reaching that net worth.
Foreign shareholding	• Foreign shareholding to be as per existing FDI policy for private sector banks.
	• Individual FII/FPI restricted to below 10%. Aggregate FII/FPI and QFI cannot exceed 24%, which can be raised to 49% through a board resolution, followed by special resolution, by the general meeting.
	• Individual NRI holding restricted to 5% and aggregate limit of 10%, which can be allowed to increase up to 24% through a special resolution by general meeting.
	• At least 26% of the paid-up capital will have to be held by residents.
Prudential norms	• The prudential norms applicable to loans and advances of private sector banks will not apply to a payments bank.
Business plan	• The applicants will furnish a realistic and viable business plan that will address how the bank proposes to achieve financial inclusion.
	• Preference will be given to applicants for the underbanked parts of the North East, east and central regions.
	• In case of ex-post deviation from the stated business plan, the RBI may consider restricting the bank's expansion, effecting change in management, and imposing other penal measures.
Channel/geography	• The payments bank will ensure access points in remote areas, either through their own branch network, ATMs, or BCs, or through the networks coverage provided by others.
	• At least 25% of physical access points, including BCs in rural centres.
Corporate structure and governance	• The board should have a majority of independent directors, and the bank should comply with corporate governance guidelines as issued by the RBI from time to time.
	• Private sector banking norms with regard to voting rights and the acquisition of shares will also apply to payments banks.
	• It cannot set up subsidiaries to undertake NBFC activities.
Other conditions	• Operations should be fully networked and technology-driven.
	• The bank should have a high-powered customer grievances cell.

Source: Haria and Shah (2014).

Key Drivers of Indian Greenhouse Gas Emissions

JONAS KARSTENSEN, JOYASHREE ROY, BARUN DEB PAL, GLEN PETERS, ROBBIE ANDREW

The underlying drivers of changes in the greenhouse gas emissions over time in India are investigated using several complementary approaches. Emission projections are developed based on India's Intended Nationally Determined Contributions and compared with a range of emission scenarios. Projections show continued economic growth that leads to rising energy use, with per capita emissions possibly increasing by 40% by 2030, although new technologies may reduce energy consumption and emissions growth. To slow down emissions' growth further will require strong decarbonisation of the energy sector.

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India is the third largest emitter of carbon dioxide (CO_2) in the world (not including the European Union [EU]), emitting 2.3 gigatonnes (gt) CO_2 in 2015. While the two larger emitters, United States (US) and China, had a decrease in emissions in 2015, India increased its emissions by 5.2% (Le Quéré et al 2016). In fact, in 2014 and 2015, the largest increase in global emissions came from India. This large increase comes after more than a decade of rapid growth, which is likely to continue for many years. New plans to install many coal-fired power plants have raised serious concerns about India's new trajectory, which is incompatible with the country's climate goals and may jeopardise the global effort of limiting global warming to 1.5° Celsius (C) (Shearer et al 2017a; Timperley 2017).

Measured in absolute terms, India's emissions have been the third-highest globally since about 2008 (Le Quéré et al 2016). Projections of economic growth, energy use and emissions per energy put India on a path of continuously increasing greenhouse gas (GHG) emissions (Murthy et al 1997; Raghuvanshi et al 2006; Sharma et al 2006). While current per capita emissions are very low, projections by the United Nations (UN) suggest that India's population will continue to increase and surpass China's around 2025. At the same time gross domestic product (GDP) is projected to increase faster than most countries from 2013 to 2040 at an average of 6.5%/year (IEA 2015b), indicating that energy consumption and emissions may see a large increase as more people use more energy. As standards of living improve, climate change impacts pose serious challenges to India's economic growth, agricultural outputs, public health and development (IPCC 2014; Lobell et al 2012).

In the lead-up to the United Nations Framework Convention on Climate Change (UNFCCC) 21st Conference of the Parties (COP21) meeting in Paris (December 2015), India published its Intended Nationally Determined Contributions (INDC) to help address global climate change. India's INDC has several aims (MOEFCC 2015), including to reduce the emissions intensity of its GDP by 33% to 35% by 2030 compared with the 2005 level, and having 40% electric power installed capacity from non-fossil-fuel-based energy sources. Even if these aims are met, this could mean substantial emissions growth in the next decades (Climate Action Tracker 2016). The International Energy Agency (IEA) and other studies indicate that India's INDC is not far from business as usual (Aldy et al 2016; IEA 2015b). In contrast to China, India has not announced when its emissions will peak, allowing India to retain some flexibility in its economic and technological development. However, it is also in India's own interest to mitigate climate change as fast as possible,

as the literature shows large negative impacts on GDP due to the consequences of global warming (Burke et al 2015). Thus, decision-makers will need to understand the underlying drivers of historic and current emissions to help shape future emissions pathways.

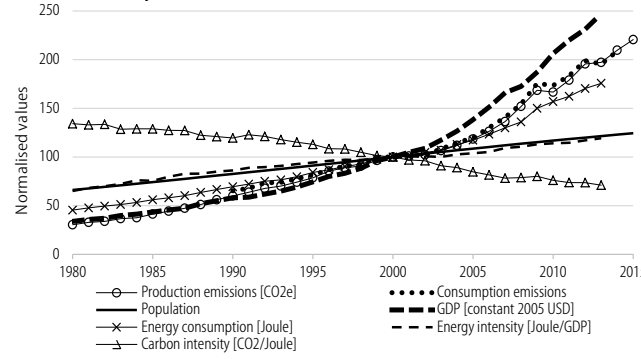
Previous articles have investigated specific historic causalities and drivers, that is, if coal consumption affects emissions (Chandran Govindaraju and Tang 2013), if increased household access to electricity affects India's emissions (Pachauri 2014), what the sources of household emissions are (Das and Paul 2014) and how much trade openness affects energy consumption and emissions (Yang and Zhao 2014). However, there have not been any broad investigations into the recent drivers of Indian emissions now that India is the world's fastest growing major economy and has at the same time promised to help combat climate change through the Paris agreement. India's way forward may cause accelerated emissions and global warming, although signals of decarbonisation have also started to emerge, as several coal-based power projects have been put on hold and investments in renewables have increased (Bhagwat and Tiwari 2017; Shearer et al 2017b).

Given India's importance as a global actor, and its broad possibilities, it is important to map and understand the drivers of the recent historic development in order to understand future development. This article, therefore, aims at identifying the historic and current drivers of GHG emissions and investigating emission projections based on scenarios. We first give an overview of India's historic emissions and economic development in order to discuss the underlying drivers, before we list the data sets and methods used in our study. We use four complementary approaches to analyse the drivers of historic emissions in order to capture different effects: the Kaya identity, structural decomposition, consumption-based emissions accounting and structural path analysis. These methods highlight driving forces of Indian emissions in different parts of the economy (that is, domestic factors versus emissions embodied in trade), thus leading to different leverage points where policy can be focused. This gives an arguable broad overview, from which to highlight and contrast Indian development. Finally, we project emissions and forecast the most important drivers of future emissions, before concluding and discussing policy implications.

Historical Development

India's recent development is characterised by increasing population and GDP (Figure 1). The average annual growth rate (AAGR) of GDP has increased from 3.6%/year (per year) in the 1970s to more than 5.3%/year in the 1980s and 1990s, to 7.3%/year in the 2000s due mostly to expanding service sectors (IEA 2015a). The most recent data shows the Indian GDP expanding 6.2%/year from 2010 to 2014 (World Bank 2015). Panagariya (2004) has argued that the liberalisation of foreign trade, the reduction in industrial licensing and opening to foreign direct investment, resulting from policies adopted since 1990, were responsible for accelerated economic growth in India. The population growth rate has declined from an average of 2.3%/year

Figure 1: Indian Population, Economic, Energy and Emissions Development Data since 1980, Normalised to the Year 2000



Sources: IEA (2015a), Le Quéré et al (2016), United Nations (2015).

in the 1970s to an average of 1.6%/year in the 2000s. India is the second-most populous country after China, with the UN's medium population projection peaking in about the year 2070 (United Nations 2015). In combination, GDP per capita has seen an increase in growth, where the largest was in the 2000s at an annual average of 5.8%/year. While India's GDP per capita was only 26% of the global average GDP in 1970, this has now increased to 62% in 2014.

India's emissions have also increased more than the global average, increasing its share of global CO_2 emissions from 1.3% in 1970 to 6.3% in 2015. For comparison, China was responsible for 5.2% and the US for 29.1% in 1970, and 28.6% and 14.9% in 2015, respectively (Le Quéré et al 2016). The AAGR of Indian emissions has increased from 4.7%/year in the 1970s, to 5.8%/year in the 2000s. Energy consumption has also risen more sharply in the last decade than previously, with an AAGR of 4.4%/year in the 2000s, decreasing from 2010 to 2013 to 3.9%/year (IEA 2015a). Energy intensity of economic production, on the other hand, which illustrates advancements in the economy by technological and structural changes (for example, a shift from agriculture to energy-intensive manufacturing), declined by -2.9%/year in the 2000s, compared with -2% from 2010 to 2013.

Energy intensity has significantly decreased in magnitude since the 1970s, with 95% more GDP generated per unit of energy in 2013 than in 1971. The carbon intensity of energy has increased since the 1970s, although the growth rate has declined. In 1971, the carbon intensity was 29 tonnes (t) CO_2/terajoules (TJ), while this increased to 58 t CO_2/TJ in 2013 (IEA 2015a). This is mostly due to the increase in coal use, which in 2013 accounted for 44% of the primary energy mix, compared to 33% in 2000 (IEA 2015b). Additionally, the relative use of bioenergy has been reduced significantly, although the absolute demand has gone up.

Furthermore, from a per capita perspective, with 1.28 billion people, India's CO_2 emissions are still very low, at 1.7 tCO_2/capita in 2015, well below the world average of about 5 tCO_2/capita. However, since its emissions have been growing faster than its population, India's per capita emissions have doubled between 1996 and 2015. Following projections for emissions according to India's INDC and population projections, per capita emissions will be around 2.4 tCO_2/capita in 2030 (United Nations 2015).

The equivalent numbers for China is 6.8, US is 10.2 and EU28 is 4.9 tCO_2/capita, for 2030 (Peters et al 2015).

The dominant source of CO_2 emissions in India is the combustion of coal, contributing 67% to total fossil CO_2 emissions in 2015. Although there is more coal in the energy mix than other fuels, the proportion of coal in fossil fuel emissions in India has been generally declining since the 1940s, when coal accounted for more than 95% of all fossil CO_2 emissions, until about 2000, when the proportion of coal was 61%. Since 2000, the share of coal has started to increase again (Le Quéré et al 2016). While India is the world's third-largest producer of coal in physical terms (after China and the US), its coal is generally of poor quality, with significantly lower energy content than the coal of both China and Indonesia (BP 2014; IEA 2014). Both natural gas and oil have been gaining share in India's total energy supply—oil particularly between 1940 and 1970, and gas since 1980. Emissions from cement production have also been growing steadily in the last 30 years, now contributing around 6% to India's total CO_2 emissions (Le Quéré et al 2016).

These historical developments are affected by underlying drivers putting upwards and downwards pressure on the economy, consumption, and energy use. To help explain these developments and understand how they may affect future development, we explore these underlying drivers in the next section.

Data Sets and Methods

Our study uses different methods that rely on different data sets with different resolutions. In the first approach, we use the Kaya identity (Edenhofer et al 2014; Raupach et al 2007), which reveals major factors affecting historical CO_2 emissions. The Kaya identity decomposes CO_2 emissions into the product of population, GDP intensity (GDP/capita), energy intensity (energy/GDP), and carbon intensity (CO_2/energy). We use energy, population, GDP and CO_2 data from IEA (2015a) for consistency. We only consider emissions from fossil fuels and industry.

The second way of analysing drivers of change in emissions is using structural decomposition analysis (SDA) between years, which expands on the Kaya identity (formally, Index Decomposition Analysis) to provide sector detail (Hoekstra and Van den Bergh 2003; Su and Ang 2012). By extending the Kaya identity, SDA uses input–output data to additionally decompose the emissions into technology and structure effects, reflecting the changing relationship between industries over time. We decompose changes into three effects. The scale effect represents the impact of increases in the size of the economy measured in terms of GDP growth. The technology effect captures the changing technology reflected through technical coefficients of an input–output table. The structure effect describes structural shifts of demand in the economy, measured as the contribution by each sector to total GDP.

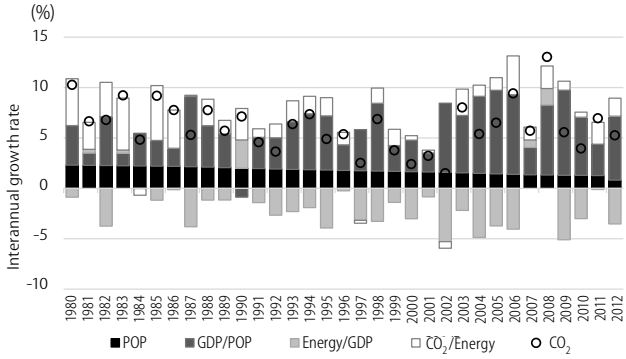
Finally, since the three terms interact leading to non-unique decompositions (Hoekstra and Van den Bergh 2003), we show the interaction between the three terms separated instead of arbitrarily allocating the interactions to each effect. In this section, we cover all GHG emissions (CO_2, methane [CH_4], and nitrous oxide [N_2O]), allowing the explanation of changes in sectors such as agriculture as well as other non-energy intensive industries. We consider trends from 1996 to 2000, from 2000 to 2004, and from 2004 to 2009. We use input–output data from the World Inpu–Output Database (WIOD) because of its annual time-series, and GDP data from Reserve Bank of India (RBI 2013). The mathematical details of the decomposition methods are described in Pal et al (2014).

The third way of investigating drivers of changes in emissions is the allocation of consumption-based emissions, which takes the global supply chain into account using a multi-regional input–output (MRIO) table, allocating emissions to where purchases of final goods and services occur. Countries with more embodied emissions in imported products than in exports, including most developed countries, are allocated more emissions from a consumption perspective. The opposite is true for many developing countries, and in particular for China. We follow previous studies (Karstensen et al 2015; Peters et al 2011), using economic data from GTAP (global trade analysis project) (Narayanan et al 2015) and GHG emissions (CO_2, CH_4, N_2O and fluorinated gases) from GTAP and EDGAR (electronic data gathering, analysis, and retrieval system). This MRIO database has a high level of detail for particular years (the latest being 2011). We additionally use an annual time series of consumption-based CO_2 emissions from 1990 to 2013 at the national level, which is built on the GTAP data, in order to explain historical developments (Figure 1, p 47; Peters et al 2011).

The fourth way of investigating the underlying drivers of emissions in the Indian economy uses the techniques of structural path analysis (SPA) in order to highlight specific high-emissions paths and "hotspots" (Lenzen 2007; Peters and Hertwich 2006). This individually enumerates all sector-level supply chains, as described in the MRIO table, connecting emissions happening in every Indian sector with domestic and international trade. This analysis shows more specific details on where emissions enter the supply chain (hotspots, that is, large direct emissions) and where the largest accumulated supply-chain emissions are (indirect emissions, hereafter "paths"). This method uses the same data set at the previous approach but provides results with higher detail.

We furthermore estimate future emissions that are compatible with the INDCs, which stated a decline in the emissions intensity of GDP by 33% to 35% by 2030. We use the Organisation for Economic Co-operation and Development's (OECD) GDP forecast, which estimates that GDP will increase at 5.9%/year in 2015, declining to 5.6%/year in 2030 (OECD 2014). Combining the pledged decline in CO_2/GDP with the growth in GDP, we estimate emissions will grow at about 3.2%–3.5%/year in 2020 and 3.1%–3.3%/year in 2030, with absolute CO_2 emissions of 3.6 Gt CO_2 to 3.7 Gt CO_2 in 2030 (method based on Peters et al 2015). This is compared to a revised version of the GCAM (global change assessment model) computable general equilibrium (CGE) model (Capellán-Pérez et al 2014), which is additionally used to project Indian CO_2 emissions based on its INDC and GDP projections (Dasgupta 2014). The Indian version of the model has improvements to the structure,

Figure 2: Kaya Identity as the Growth of Factors Affecting Indian Co_2 Emissions



The bars show the annual growth in each component, which adds to the growth in CO_2 emissions and a negligible residual representing interaction terms. The bars are plotted between years, representing the change from one year to the next.
Source: IEA (2015a).

in particular with a more detailed Indian sectoral representation, a producer-behaviour sub-model, and revised parameter estimates (Dasgupta S 2014). Data from the GCE model is also used to extend the Kaya decomposition of the emissions up to 2030.

Drivers of Historical Emissions

We use four different approaches to investigate the drivers of India's emissions: (i) the Kaya identity, (ii) structural decomposition analysis (SDA), (iii) analysis of emissions embodied in trade, and (iv) structural path analysis (SPA). These approaches all have different strengths and limitations, helping to identify different drivers at different levels of the economy, which in turn can point to different policy levers.

Kaya analysis: The individual components together with changes in CO_2 emissions shows that population and GDP/population have put continuous upward pressure on emissions, while energy/GDP and CO_2/energy have driven emissions down. Since the 1977 peak in India's population growth at 2.3%/year, annual growth has started to slow down, from 2%/year in 1990 to 1.2%/year in 2013 (World Bank 2015). Our analysis demonstrates that population increase has put upward pressure on emissions between 1971 and 2013; although this has been reduced in the later years making it one of the smallest effects (Figure 2). India's GDP per capita growth has seen large fluctuations in the last two decades, from a reduction in 1991 of -1.1% to a peak in 2010 of 10.3% (World Bank 2015). Although the financial crisis reduced the GDP growth from nearly 10% in 2007 to 4% in 2008, India has not experienced an economic recession in the last three decades, and GDP has nearly quadrupled since 1990, indicating a shift to a higher standard of living (World Bank 2015). Increasing income usually leads to more energy use, which is closely connected to emissions. Our analysis reveals that India is no different in this regard. Economic growth has pushed emissions upward, with continuous improvements in energy efficiency ensuring that energy consumption and CO_2 emissions grow slower than the economy (Mukhopadhyay 2008).

Energy use in India has been closely connected with emissions over time, as most of India's energy needs are met by using fossil fuels. However, decreasing energy intensities, due to technological advancements and changing production processes, have driven emissions down since the 1970s. Although this has been overshadowed by the increase in GDP/capita, major structural improvements have been made in the Indian economy, such as reducing energy consumption per unit of GDP and expanding the service sectors (Roy et al 2013), but there remains significant scope for further improvement (Khanna and Zilberman 2001).

The carbon intensity of energy is closely linked to the technology being used to produce energy and has a large potential for emission reductions. In India, CO_2/energy has increased over the last three decades, due to the increasing use of coal in the production of electricity. The increase in energy use combined with increasing carbon intensity has thus resulted in CO_2 emissions growing faster than energy consumption. While most economies, over time, experience improvements in energy efficiency (Edenhofer et al 2014), emissions scenarios that lead to temperature stabilisation require large reductions in CO_2/energy (Edenhofer et al 2014).

Structural decomposition analysis: The structural decomposition analysis expands on the Kaya identity, and decomposes changes into three effects: scale effect (economic growth), technology effect (changing technologies in the economies) and structure effect (changes in the structure of economic demand). The SDA shows that the scale effect exerted significant upward pressure on GHG emissions from 1996–2000, while the structure and technology effects simultaneously pulled emissions down (Table 1). However, the scale effect dominates leading to a positive growth rate of GHG emissions of 2.6% during this period. In the other time periods, the different effects have the same sign, but different magnitudes. During 2000–04 the scale effect was larger, but was compensated by a larger technology effect leading to moderate emissions growth. During 2004–09, the scale effect remained large leading to higher growth in emissions.

Table 1: Decomposition of Total Changes in GHGs over Three Periods

(unit: AAGR) (%)

Period	GHG Emissions (per year)	Technology Effect (per year)	Structure Effect (per year)	Scale Effect (per year)	Interaction Effect (per year)	Structure of India's GDP		
						Agri-culture	Industry	Service
1996–2000	2.6	-1.5	-2.2	5.7	0.5	28	21	51
2000–04	2.6	-5.8	-1.3	8.2	1.5	24	20	56
2004–09	5.6	-1.6	-1.1	7.6	-0.6	20	20	60

This table also show the structure of the Indian economy (share of GDP), which is measured in the first year of each period.
Source: Authors' calculation

The structure effects indirectly measure the change in the contribution of each sector to total GDP, and these have changed in the three-time periods. The share of the service sector's GDP was 51% in 1996, but this increased to 65% in 2009. By contrast, the share of the agriculture sector has gradually declined from 28% to 17% in 2009. The secondary industry's share has been stable at around 20%. Since the service sector is less emission-intensive compared to agriculture and industry (Pal et al 2014), the structural shift towards the service sector has helped to reduce the growth in Indian GHG emissions via structural effects.

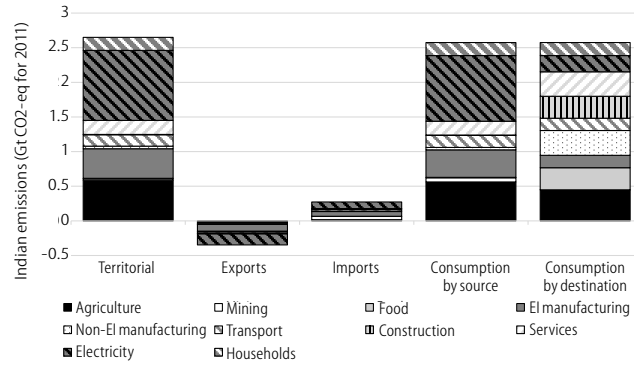
Consumption-based emissions: The annual time series of CO_2 consumption results reveal that emissions generated in India in the production of exported goods have exceeded those generated in other countries in the production of goods imported into India. Therefore, under the consumption perspective, India's emissions are lower than they are under the standard territorial perspective. From 1990 to 2013, the gap between emissions embodied in imports and exports has increased in recent years, due to large increases in exported goods and services. The latest data shows that India emitted 2393 Mt (metric tonne) CO_2 in 2013 (production-based emissions), while the consumption-based emissions were 2125 Mt (Le Quéré et al 2016). India is also shown to be a net exporter of GHGs over time, which is a robust result across data sets or both GHGs and CO_2 (Lenzen et al 2012; Timmer et al 2015).

While total trade (export + import) was only 15% of GDP in India in 1990, it has seen large growth and increased to 49% in 2014 (World Bank 2015), resulting from the removal of trade restrictions and reduced tariff barriers (Jayanthakumaran et al 2012). Time series from 1990 to 2013 reveals an increase in CO_2 emissions from the production of 5.6%/year and from consumption of 5.1%/year. This means that the difference between production and consumption emissions (emission transfers) is increasing, which is because emissions embodied in exports are increasing faster than imports and that India is increasingly producing goods and services destined for other nations. In the 1990s, Indian emissions embodied in exports had an AAGR in emissions of 10%/year while imports increased by 1.1%/year. In the 2000s, exports grew 9%/year and imports 17%/year. From 2010 to 2014, export grew 7%/year while imports changed by -1.9%/year. While exports and imports were relatively similar in 1990 (exports were 7% higher than imports), this changed mostly during the 90s, leading to 95% higher exports than imports in 2014.

India's trading partners have changed over time: while India was exporting mainly to US (6.7 Mt CO_2), Japan (3.7 Mt CO_2) and Germany (3 Mt CO_2) in 1990, emissions in exports have increased from being 7% of production emissions to 19% in 2014. In 2014, US (66 Mt), United Arab Emirates (34 Mt) and China (27 Mt) were the largest importers of emissions embodied in Indian goods. On the Indian import side, Russia (9 Mt CO_2) was the leading region in 1990, while Ukraine (8.6 Mt) and US (3.3 Mt) were the second and third largest, respectively. In 2014, emissions embodied in imports into India had grown from 7% of production emissions to 10%, with export mainly from China (54 Mt), the United Arab Emirates (15 Mt) and South Africa (11 Mt). After the dip in emissions during the financial crisis in 2009–10, the net export of emissions from India has more than doubled to 2013.

A detailed assessment of a single year allows the inclusion of other GHGs (CH_4, N_2O and fluorinated gases), thus capturing large emissions in other sectors such as agriculture. In 2011, the latest year for which detailed MRIO data are available in our model, India's production and consumption-based GHG emissions are similar, being 2650 Mt and 2574 Mt CO_2-equivalent (eq), respectively (Figure 3). Domestic production that is exported is responsible for 13% of India's production emissions. The emissions embodied in imported products that are originally produced elsewhere are equivalent to 10% of Indian production emissions. In a sectoral consumption perspective, emissions are allocated from the source sectors (where emissions occur, plus imports-less exports) to the final sectors via the global supply chains, where purchases are made by final demand (following Karstensen et al 2015).

Figure 3: Production and Consumption Emissions by Sector, including CO_2, CH_4, N_2O and Fluorinated Gases for 2011



The sector Non-E.I. manufacturing is short for non-energy intensive manufacturing, while the sector E.I. manufacturing is short for energy-intensive manufacturing.
Sources: Narayanan et al (2015) and European Commission (2011).

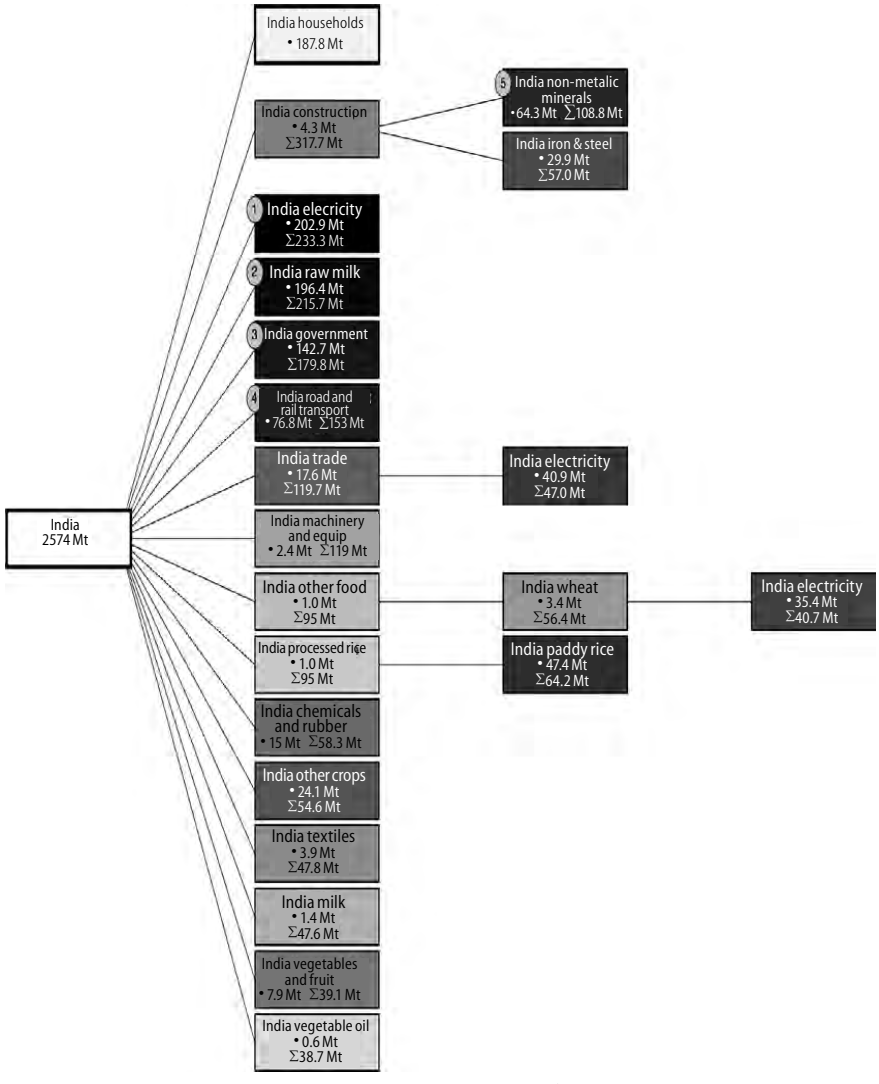
The construction sector itself emits only around 4 Mt CO_2–eq, but as it has significant inputs in its supply chain from electricity, manufacturing and transport sectors, its total contribution from the consumption-by-destination perspective was 318 Mt CO_2–eq. The agriculture sector is a significant contributor from all perspectives, in contrast to many other countries, where most emissions from agriculture are re-allocated to food sectors under this perspective shift. One of the explanations may be that India's markets, and in particular its food markets, are much less developed and formal than other economies, so that many purchases by households of food products are made directly from firms engaged in agriculture, without going through processing and retailing stages in India. However, we cannot rule out that this is due to different definitions between countries of agriculture and food sectors.

Overall, the re-allocation of emissions shows that the agriculture (17% of consumption-based emissions), non-energy intensive manufacturing (14%), services (14%) and construction (12%) sectors are the largest drivers of emissions, as they either emit significantly themselves and/or firms in their supply chains are significant emitters.

Structural path analysis: In this perspective, the five largest hotspots in 2011 were direct purchase of electricity (203 Mt CO_2–eq), raw milk (196 Mt), services from the government (public administration, defence, education and health sectors: 143 Mt), road and rail transport (77 Mt) and non-metallic minerals (64 Mt; Figure 4, p 51). Direct emissions from households (including personal transportation and heating) are an additional hotspot, with 188 Mt or 7% of India's total emissions.

These hotspots have large direct emissions, but other paths have even larger indirect emissions, such as the Indian

Figure 4: Overview of the SPS Analysis of the Top Consumption-based Emission Sectors and Households



Darker boxes indicate higher direct contributions; numbered boxes indicate the five highest direct contributions (hotspots). The leftmost box shows the total consumption-based emissions allocated to India. "Non-Metallic Miner" is short for non-metallic minerals.

construction sector, which emits only small amounts directly but is heavily reliant on large emitting sectors such as electricity, mineral and metal production and transportation. The construction sector can be thought of as an emission "funnel," where the activity in the construction sector induces emissions to occur elsewhere. Further upstream, the largest paths often lead to the electricity sector, as is clear from the right-most tier in Figure 4. The electricity sector is a significant emitter and its contribution to the supply chain is widely dispersed throughout the economy. The four next largest paths are also incidentally the top four hotspots (that is, their own direct emissions are large and they sell directly to consumers).

Outlook

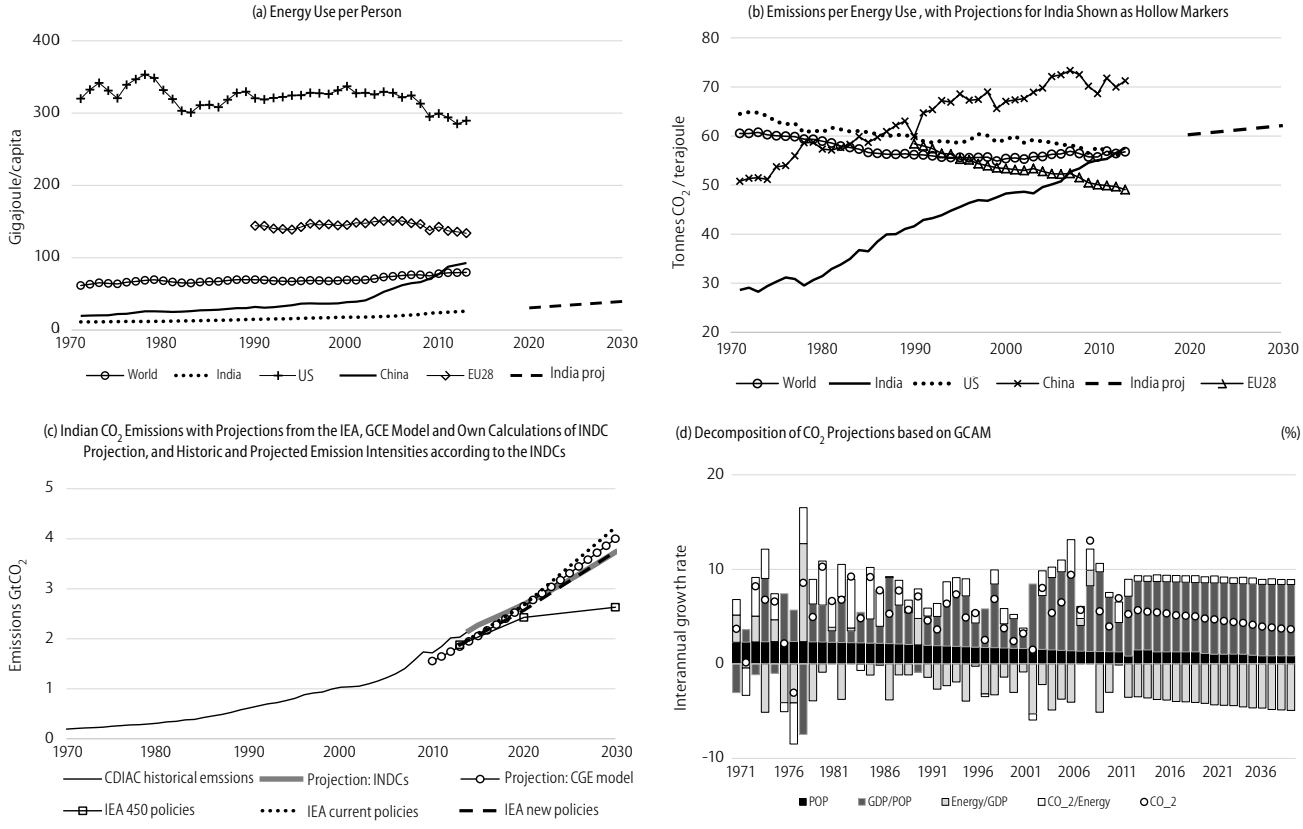
India is expected to have one of the highest rates of economic growth towards 2040 (IEA 2015b; Johansson et al 2013). At the same time, India's population is expected to increase to become the world's largest around the year 2025 (United Nations 2015). India's share of global emissions may rise from today's 7.5% to 14% in 2040 (IEA 2015b). This puts India in a vital position in climate negotiations, and a pivotal position in terms of stabilising global CO_2 emissions (Jackson et al 2015).

Analysis of historical data highlights trends that are highly likely to continue: increasing per capita consumption of energy, increasing total trade and net exports, decreasing energy intensity of GDP and near-term increasing emissions intensity of energy (as coal will still be important in the near future). Energy use per capita will very likely increase, as about 240 million people in India, or 19% of the population, were without access to electricity in 2013 (IEA 2015b). The IEA (2015b) project energy demand per capita to increase by 3.4%/year from 2013 until 2040 (Figure 5a, p 52). India passed the US and the world average in terms of the carbon intensity of energy in 2012 (Figure 5b, p 52), after a growth rate of 1.8%/year from 1980 to 2013 (IEA 2015a), which is projected to increase by 8% by 2030 (IEA 2015b). Together, this will have significant impacts on national emissions as more people use more energy that has higher emissions in the near term.

India's submitted INDC has a goal to reduce CO_2/GDP by -33% to -35% in 2030 compared to 2005 levels. From 2000 to 2014, the CO_2/GDP has decreased -1.3%/year, and under the INDC, GDP is forecasted to decline at -2.3% to -2.5%/year from 2015 to 2030 (thick yellow line in Figure 5c). Combining the pledged decline in CO_2/GDP with the growth in GDP, we estimate emissions will growth at about 3.2%–3.5%/year in 2020 and 3.1%–3.3%/year in 2030, with absolute CO_2 emissions of 3.6 to 3.7 Gt CO_2 in 2030 (thick blue line in Figure 5c; method based on Peters et al 2015). This is consistent with the IEA's new policies scenario (red line in Figure 5c, p 52), which estimates 3.7 Gt CO_2 in 2030. The Indian INDC also aims to increases solar energy from the estimated installed capacity of 4 GW in 2015. This goal does not supersede the CO_2 intensity target, and so we do not analyse the solar target here.

The GCAM CGE model projects Indian CO_2 emissions to be 4.0 Gt in 2030 (Figure 5c), higher than our estimate of 3.6–3.7 Gt CO_2. Using this model, we also show the Kaya components, including the transition from historical to future (Figure 5d, p 52). The model has a strong growth in GDP/capita into the future. Assuming the INDC targets are gradually implemented, energy per GDP is likely to continue to put downward pressure

Figure 5: Historical and projected characteristics of Indian emissions



The India projections in (a) and (b) are based on the new policy projections by IEA, also shown in (c) . IEA historic emissions data are not shown in (c) for clarity, as it partially overlaps with CDIAC data. The difference between IEA and CDIAC is that IEA does not include emissions from cement production.
Source: Capellán-Pérez et al (2014).

on emissions but at a sustained rate. The carbon intensity is likely to continue to push emissions up, reflecting a continual carbonisation of the Indian economy. On balance, the stronger improvements in energy per GDP ensure that the annualzgrowth rate of CO_2 emissions will decrease over time. The modelling, thus, indicates that the extent and scope of current energy efficiency policies will be insufficient for India to achieve the emissions reductions required under a 2°C target, with India's emissions still growing at more than 3%/year in 2030 (Figure 5d).

Conclusions and Policy Implications

Our study uses four different approaches to find the underlying drivers of changes in Indian emissions. They reveal drivers on different levels of the economy, pointing to different policy measures to reduce emissions. While the Kaya and structural decomposition analysis capture the temporal trends of drivers on emissions, the structural path analysis, and consumption-based emissions gives higher sectoral details for single years. The temporal trends show (i) that increasing GDP/capita is a major driver of increasing emissions, and will very likely continue in the near future; (ii) the population increase has put upward pressure on emissions, although this has been decreasing and is expected to continue to decrease; (iii) the emissions intensity of energy has put upward pressure on emissions due to increasing use of coal, particularly in power plants; and (iv) energy intensity of economic production has offset the other effects by putting downward pressure on emissions via decreasing use of energy per economic output primarily related to structural changes in the economy towards more services.

The temporal trends point to different policy measures with different feasibilities: (i) reducing per capita consumption is not desirable due to conflicting goals of economic growth; (ii) reducing population growth has been a controversial issue in India for decades, however, the population growth is projected to slow down and will have a progressively smaller effect on emissions in the next decades; (iii) reductions in the emission intensity of energy consumption are urgently needed, and this requires stronger commitments such as expanding renewable energy capacity and improving the efficiency of coal power plants; (iv) continuous structural changes to the Indian economy, including changes from a focus on manufacturing to service sectors, is already taking place and should be encouraged in the coming years. Interestingly, a recent micro behavioural-based study showed that as Indian industries develop technologically, carbon taxes do not adversely affect industrial productivity, thus becoming an increasingly better policy option (Dasgupta and Roy 2015).

Our detailed analysis of consumption-based emissions at the sector level provides additional granularity to the analysis. From a consumption perspective, emissions are mainly allocated to food and agriculture, non-energy intensive manufacturing, services, and construction. Understanding the supply-chains

stemming from these consuming sectors, such as through structural path analysis, may identify efficiency improvements on the production and consumption side. From the production side, sectors such as electricity generation, energy-intensive manufacturing, and agriculture become important. Since India urgently needs to develop its economy and increase the living standard of its population, measures that reduce consumption in the lower and middle classes are not desired. However, as with other countries, India has a responsibility to reduce emissions, and identifying points for policy intervention in the supply chains linking consumption and production of particular product groups or lifestyles may help India meet its climate objectives.

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Scaling Up Demand-side Management and Solar Pumping Programmes

Use of Multi-stakeholder Cost–Benefit Regulatory Frameworks

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India's energy–irrigation nexus is rooted in issues of multi-stakeholder governance and incentive structures. As such, purely technological or tariff rationalisation strategies will be ineffective at delivering solutions. Possible solutions are analysed using a multi-stakeholder benefit–cost framework that provides regulators and policymakers with a tool to balance the interests of different stakeholders, that is, farmers, utilities, ratepayers, regulators, manufacturers, energy service companies, and society. This framework provides regulators with a systematic approach to rationalise incentives and transfer payments among stakeholders. Using the framework, agricultural programme strategies for energy-efficient pumpsets and grid-connected solar pumpsets are analysed.

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Problems at the intersection of agricultural irrigation and energy in India are longstanding, multidimensional, and multidisciplinary, involving utility economics, energy consumption, agricultural socio-economics, environmental science and engineering, and politics. The challenges associated with reforming agricultural irrigation have been studied and debated for more than two decades (Sant and Dixit 1996, Rodell et al 2009, Shah 2009, Shah and Verma 2014). Subsidised agricultural tariffs contribute to financial losses for the distribution company (discom); electricity service to farmers is unreliable and intermittent, and generally at night, which is inconvenient at best and unsafe at worse; and groundwater resources are depleting to low levels, a condition enabled by subsidised tariffs. Ultimately, farmers require affordable and sufficient irrigation, utilities are concerned with cost recovery, broader societal concerns include impacts on ratepayers, water security and its impact on food security, and greenhouse gas emissions. The problem itself is subject to mischaracterisation as agricultural subsidies may be overestimated, while subsidies to other sectors is a larger contributor to the total subsidy problem, which is only growing. Further, existing data is inadequate, unreliable and inconsistent (Prayas 2018).

Balancing Multiple Interests

Developing sound interventions is complicated. The trifecta of utility, farmer and societal perspectives must be considered in developing solutions, and the problem cannot be solved by factoring out the non-electricity sector considerations. Solving the problems of one stakeholder group might exacerbate the problems of another. For example, an intervention in which solar pumps are distributed for free to replace grid-connected pumps may reduce the burden on utilities but may exacerbate groundwater depletion by enabling irrigation during the daytime and increasing groundwater use (Shah et al 2014, Shah and Kishore 2012). Segregated electricity distribution feeders may help to ration electricity and reduce utilities' financial woes, but may provide limited value to farmers, as night-time irrigation is inconvenient and hazardous (Shah and Verma 2007). Tariff rationalisation, though tempting from a utility perspective, is generally perceived as politically unviable and may have a significant negative impact on farmers' incomes. Thus, as a single solution, it will not solve discom financial problems (Prayas 2018). Although research suggests that farmers are willing to

pay more than they currently do through flat tariffs, tariff design is not included in most agricultural energy-efficiency programmes (Sant and Dixit 1996).

What makes this topic particularly interesting at this point in time is the confluence of a variety of large factors that are shaping the Indian electricity sector: the advent of low-cost renewable energy and technological innovation, the increase in open access electricity procurement, and climate change mitigation goals. These factors render the possibility of new solutions that may help future programmes to surpass those of the past, and those that have greater acceptability by all stakeholders, including the farmer. The proposed solar feeder scheme in Maharashtra, the "Chief Minister's solar agriculture feeder programme" is a solution enabled by these factors (Gambhir and Dixit 2018).

An integrated approach that moves beyond the utility perspective, and through a broader societal perspective, including farmer needs and groundwater regulation is needed (Dubash 2007; Prayas 2018). A programme design that brings together and balances these multiple interests—bringing value to the utility, the farmer, and the overall state economy, while being cognisant of groundwater resources—has a better chance of success. Solutions may range from technical to economic, but those that are grounded in viable business models have a greater potential to be scalable and self-sustaining. Electricity policy is political, and thus, solutions need to be developed with political rewards in mind. The Gujarat feeder separation approach is one such example. It demonstrates that improved power and political rewards can go together (Dubash et al 2018). Since tariff reform alone is insufficient, solutions need to be tested through pilots and after consultation with farmers. Solutions might include 1–2 megawatt (MW) solar plants for agriculture feeders; community-driven regulation of groundwater extraction and recharge; block-level hours of supply or electricity tariffs that are correlated with cropping patterns and groundwater status (Prayas 2018).

Agricultural programmes will likely require public sources of funding, either from ratepayers or taxpayers and will require policy or regulatory approval. In other countries, and particularly in the United States (US), cost–benefit frameworks have been used in the regulatory process to justify the approval of agricultural and other demand-side management (DSM) programmes (CPUC 2001). The analysis is typically embedded in a public stakeholder process to ensure that all stakeholder interests are considered in the programme design and approval and, ultimately in its evaluation.

Cost–benefit analysis is not entirely new in India. For instance, Maharashtra's DSM programme design (MERC 2010) provides an example of cost–benefit analysis in an electricity sector regulatory context. However, cost–benefit analysis has not been widely used for justifying and scaling up programmes that use ratepayer or taxpayer funds. In this paper, we demonstrate how cost–benefit analysis can be used to assess the economic impacts of potential agricultural irrigation programmes and the value to key stakeholders, that is, farmers, utilities, programme managers (electric supply companies), technology providers, and ratepayers (or taxpayers). We analyse two technology interventions: energy-efficient pumps and grid-connected solar pumps. Rather than focusing only on technology, we illustrate how the cost–benefit framework can be used to evaluate programmatic interventions and reconcile competing stakeholder interests. We also highlight programme design elements that are needed to tackle water and energy problems simultaneously. Using this approach, policymakers, utilities and regulators can systematically evaluate the use of ratepayer and taxpayer funds towards agricultural programmes and, more importantly, achieve scale of promising interventions.

Cost–Benefit Framework

The cost–benefit framework used in this paper has its roots in California's Standard Practice Manual, a methodology developed to evaluate ratepayer-funded utility energy efficiency programmes. This framework can be used to assess the economic benefits and costs of different demand-side resources (energy efficiency, demand response, distributed generation including rooftop solar photovoltaic [PV] system), evaluate the appropriateness of expending ratepayer (or taxpayer) funds towards DSM programme implementation, and identify appropriate customer incentives (loans, rebates, subsidies) for these programmes. The framework has been used to ground and rationalise the discussion on contentious regulatory issues. For example, state utility regulatory commissions across the US have used a cost–benefit framework to assess the fairness and efficiency of rooftop solar net energy metering programmes.

In the US, cost–benefit analysis is used throughout the lifecycle of DSM programmes: design phase and stakeholder process, tuning the programme, and evaluating the programme. In the design phase, the framework assesses the appropriateness of expending ratepayer funds on a programme and sets the incentives that are likely to encourage customer adoption of the technology. After the programme is underway, cost-effectiveness analysis can be used to assess if the actual programme is cost-effective based on realised benefits and costs.

An implicit assumption, especially when thinking about customer-based interventions, is that the intervention is "cost-effective" when it is cost-effective for the customer. However, any incentives or change in tariffs for one set of utility customers may have an impact on other customers, on utility finances, and on society writ large. A cost–benefit framework enables rigorous assessment of the impact of ratepayer- or taxpayer-funded DSM programmes on these different stakeholders through the use of "cost tests." Cost tests are metrics that "test" the impact of DSM programmes in terms of their benefit and costs to specific stakeholders, often in the form of a benefit–cost ratio.

Description of Cost Tests

The analysis in this paper uses three cost tests.

Rate or tariff impact cost test: The advantages of this include the benefits of expenditures (generation, transmission, distribution) avoided by the utility through the DSM programme over the lifetime of the programme; costs include any ratepayer-funded

expenditures on incentives, programme administration costs, and the cost to non-participating customers in the form of lost utility revenue and thus higher tariffs. When the benefit–cost ratio is greater than one, average tariffs will fall; when less than one, average tariffs will increase.

Participant cost test: Benefits include electricity or fuel cost savings and incentives over the lifetime of the programme; costs include the incremental cost of new equipment, net of incentives. When the benefit–cost ratio is greater than one, the participating customer has an economic incentive to participate in the programme.

Total resource cost (TRC) test: Advantages include the benefits of expenditures avoided by the utility through the DSM programme over the lifetime of the programme; costs include all incremental equipment costs (including incentives) and programme administration costs. When the benefit–cost ratio is greater than one, it means that the programme will reduce the total average cost of providing electricity services.

There are additional cost tests, namely the "societal" and "programme administrator" cost tests, which provide supplemental information. Given the increasing emphasis on air pollution, it is worth noting that the societal cost test considers non-monetised benefits in its equation, such as the economic value of health benefits from reduced pollution. (In some countries, this is the framework used to assess the benefits of environmental regulations.)

Each test is evaluated on a life cycle basis by annualising costs and benefits using an appropriate discount rate. Selection of discount rates for different participants is often controversial. For utilities, discount rates are typically a weighted average cost of capital (WACC) approved by regulators. For customers, discount rates can range from the utility WACC to commercial consumer borrowing rates (for example, for bank loans or credit cards). The ratio of annualised benefits to costs is the benefit–cost ratio; the difference between annualised benefits and costs is a benefit–cost difference. A ratio greater than one and a difference exceeding zero indicates that benefits exceed costs.

India's agricultural and electricity sectors have unique elements that shape results for all three cost tests. For the tariff impact cost test, because agricultural irrigation customers typically pay a flat demand tariff to utilities irrespective of consumption, DSM programmes do not lead to lost utility revenues, as they would for residential customers participating in energy-efficiency programmes. For the participant cost test, because more efficient pumps and more grid-efficient timing of consumption will have little to no impact on pump owner revenues and costs, the DSM programme has to provide benefits above simply less energy consumed per cubic meter of irrigation water. Examples of such benefits might include availability of daytime electricity for irrigation or revenues from solar power exported to the grid, as examined in the next section. For both the tariff impact and TRC tests, because utility tariffs tend to be lower than the marginal cost of providing electricity, DSM programmes can create benefits for non-participating customers by reducing utility losses. This benefit–cost framework is not a catch-all analysis. It is not a detailed tariff or rate design tool or a financing tool. It is simply a framework that provides regulators and public policymakers with a rational basis for assessing the appropriateness of diverting public funds towards a specific goal or technology investment.

Case Studies and Assumptions

We illustrate the benefit–cost framework and cost tests described in the previous section in an Indian context using two case studies: (i) an energy-efficient pumpset programme where the discom uses funds collected through tariffs to pay a portion of the cost of new energy-efficient irrigation pumps; and (ii) a solar pumpset programme funded through discom tariffs.

These two case studies illustrate different aspects and applications of the benefit–cost framework and cost tests, and how regulators can use them to evaluate customer-funded utility (discom) pumpset programmes. The first case, (energy efficient pumpsets) and second case (grid-connected solar pumpsets) demonstrate the framework and tests for a relatively simple and more complex programme design, respectively. Unless otherwise specified, inputs to the analysis are based on experience in the Surya Raitha programme described below. We use sensitivity analysis to examine the robustness of the results.

In the energy-efficient pumpset case, farmers receive financial assistance from the discom to replace an existing, 5-year-old inefficient 5-horsepower (hp) pump (28% overall efficiency, ₹17,000 original cost) with a more efficient 5 hp pump (56% overall efficiency, ₹35,000 cost). (The discom could either pay the farmer or buy the pump.) The farmer pays a flat tariff of ₹3,600 per hp per year to the discom (₹18,000 per year, non-escalating), which is below the discom's incremental cost of providing electricity service to the customer (₹5.24 per kilowatt-hour [kWh], or ₹21,673 per year). The benefits of improved energy efficiency thus accrue to the discom and its ratepayers, rather than to farmers, reducing the potential for rebound effects. The discom's incremental cost of providing service is based on the annualised marginal cost of delivered coal generation, assuming a coal generation cost of ₹3.20 per kWh, escalated at 3% per year, with 30% transmission and distribution losses. The discom incurs a cost of ₹10,000 per customer to implement the programme. The programme does not provide incentives for water conservation.

The solar pumpset case is modelled on the Surya Raitha programme. The Surya Raitha programme sought to address multiple stakeholder needs and challenges: providing reliable daytime power to farmers for irrigation without adding further financial burden on the state; improving finances of the power sector by reducing farm power subsidies; creating incentives for farmers to migrate to higher efficiency irrigation and regulate groundwater consumption; achieving agricultural energy-efficiency goals by replacing existing irrigation pumps with high-efficiency pumps; reducing transmission and distribution losses by providing locally generated power to intensive loads; and strengthening distribution through localised generation, demand shaping, and tail-end grid strengthening.

The Surya Raitha programme included a broad set of actors, including the Karnataka state government and the Ministry of New and Renewable Energy (MNRE) (project sponsors); the Bangalore Electricity Supply Company (BESCOM) (implementing agency and lending institution); the farmer cooperative (loan guarantor); and farmers (pump owners). Similar to the Surya Raitha programme, in our solar pumpset case, the programme pays for most of the upfront cost of an efficient (56%) solar pumpset to replace a 5-year-old inefficient pump (28%). The farmer makes a down payment (₹50,000) on the pump, the state government pays 30% of total pump costs (₹2,20,500), and the discom makes a zero-interest loan to the farmer cooperative to cover the remainder (₹4,65,000). The benefit–cost analysis accounts for the discom's opportunity cost of this loan.

The solar system earns ₹7.2/kWh for net generation (generation minus consumption) supplied to the grid, 1/kWh of which is given to the farmer as an incentive (made as a transfer payment to the farmers' accounts) and ₹6.2/kWh of which is used to pay back the discom loan. The ₹1/kWh cash payment provides the farmer with a direct incentive for energy and water conservation, as the farmer can sell more energy from the solar system to the discom by reducing energy consumed by the pump. The ₹6.2/kWh is escalated at 3% per year. Once the loan is repaid (year ~19), the farmer is given the full ₹7.2/kWh for net output. We discount cash flows for the utility and total resource cost tests using a discom (13.2%)[1] discount rate. The utility cost test evaluates the tradeoffs among the discom's zero-interest loan, the solar system revenue payments from the discom, and discom's avoided costs. The solar pumpset programme includes a ₹10,000 per unit programme fee, administered by the discom, which is considered a cost to the discom. The total resource cost test compares the solar pumpset costs and avoided cost benefits.

Both the energy efficient and solar pump examples build on prior experiences in the sector, including the elements supported in Dubash (2007); it is politically untenable to fully rationalise tariffs for agricultural consumers; "carrots" work better than "sticks;" farmers are unlikely to finance new pumps or pump retrofits on their own; and technology coupled with behavioural interventions are more successful. In the programme design, both examples attempt to anticipate behavioural responses and incorporate incentives intended to align outcomes with energy and, in the solar pumpset case, water conservation goals.

Grid-connected Solar Pumping Case

Application of the cost-effectiveness framework to the solar pumping case, based on the Surya Raitha programme, generates interesting results. We describe results from each stakeholder's perspective.

As per the Surya Raitha pilot design, the farmer is asked to contribute some amount toward a down payment on the pump (₹50,000). The farmer earns ₹11,122 (present value) from net solar generation over the lifetime of the pump and defers the cost (₹4,579, present value) of replacing the existing pump in five years, leaving the farmer with a net incremental pump cost (present value) of ₹34,216 (equivalent to a benefit–cost ratio of ~0.3). Because the farmer has a positive net cost, the programme is not cost-effective from a participant perspective when considering solar revenue benefits. However, the farmer may be willing to make the upfront investment to receive other benefits, such as reliable day-time solar power, as was the case in practice with the Surya Raitha pilot. Alternatively, one can argue that the cost tests do not adequately consider the value of convenience, and that if the farmer is willing to participate in the programme and pay the ₹50,000 pump cost, the participant cost test is, by definition, positive.

From the discom's (BESCOM's) perspective, the programme has a benefit–cost ratio of 0.7, suggesting that the programme is not cost-effective on the narrower basis of avoided fuel costs. The discom pays ₹53,364 per year (discounted annual) for the pump, ₹1,441 per year in programme costs, and ₹3,379 per year to the farmer for net solar generation, while avoiding ₹40,347 per year in fuel costs and losses, leading to a net cost of ₹19,480 per year for the discom. The breakeven pump cost for the discom is around ₹3,75,000, or 38% lower than the cost assumed in this analysis.

The societal perspective includes government expenditures on the pump and thus the programme has a lower benefit–cost ratio (0.5) from a societal perspective than from a discom perspective, assuming the societal and discom discount rates are identical at 13.2%. At discount rates of 3.5% or lower, however, the programme would be societally cost-effective, with ₹41,913 in annual (discounted annual) costs and ₹43,722 in annual benefits. A societal perspective would also justify the inclusion of a wider set of benefits, particularly water conservation, socio-economic development, and reduced air pollution and greenhouse gas emissions. At a societal discount rate of 5%, these benefits would need to reach just under ₹5,000 per year (discounted annual) for the programme to be societally cost effective.

The results of the grid-connected solar pump example are as expected. In general, using utility (or private sector) borrowing costs to finance reductions in operating expenses will not be cost effective unless the utility (or private sector) has low borrowing costs or unless upfront capital costs, in this case, the cost of the solar pump is low relative to annual savings. The results illustrate the importance of a societal perspective, and likely taxpayer funding, in addressing energy-irrigation challenges. It is worth noting that the above analysis evaluated a specific programme and is not meant to be a general commentary on cost-effectiveness of solar pumps or other solar solutions (such as solar feeders), nor is it meant to preclude other business models, such as a third-party financed programmes.

Energy-efficiency Pumpset Case

Analysis of the energy-efficiency case generates a very different set of results. From the farmer perspective, energy efficiency does not result in any cost savings because the farmer has a flat tariff. However, the farmer is provided a cash incentive to replace the existing pump with a new efficient pump. There is no net benefit or cost to the farmer. From the discom perspective, the programme has a benefit–cost ratio of 2.9, which means

the discom's annual avoided fuel costs (₹21,673 per year, discounted) are about three times higher than its annual programme and pump costs (₹7,514 per year, discounted).

From the societal perspective (or taxpayer/ratepayer), the programme has a benefit–cost ratio of 3.3. This benefit–cost ratio is higher than from the discom perspective because it includes the benefits of early pump replacement to the farmer. Societal costs include annual programme costs of ₹1,858 and annual incremental pump costs of ₹4,803. The efficient pump results in avoided annual fuel costs of ₹21,673.

The energy-efficient pump results are straightforward. The incremental cost of an efficient pump is justified from both the utility and societal perspective. With additional benefits streams, such as demand response, the cost effectiveness would only increase. Energy-efficient pumps could be a valuable source for absorbing excess solar generation, a need which is likely to increase as India installs greater quantities of renewable energy generation. Farmers could be encouraged with financial incentives to provide demand response services using energy-efficient pumps.[2]

Discussion and Conclusions

Cost–benefit analysis insights: The case studies highlight how benefit–cost frameworks can be used to evaluate ratepayer (utility) or taxpayer (government) funding of innovative programmes. Funding need not be rigidly tied to benefit–cost ratios. Benefit–cost analysis can help to evaluate programme impacts and incentives for different participants, as well as overall business models and programme designs. The framework shows promise for expanding solutions by providing a basis for obtaining regulatory or governmental approval for ratepayer or taxpayer funded programmes that achieve policy objectives.

Through the case studies, we demonstrate how a cost-effectiveness framework can be used to evaluate policy options in complex multi-stakeholder contexts, using a systematic and objective approach. Under the set of assumptions made, the solar-pump programme and energy-efficiency programme resulted in the following cost-effectiveness results, respectively: 3.0, 1.0 (participant cost test); 0.7, 2.9 (utility cost test); 0.5, 3.3 (societal cost test). At a lower discount rate, the solar pumping programme was cost-effective from a societal perspective. Discount rates, overall, are a continued source of debate in cost-effectiveness analysis.

A solar pump programme, modelled after the Surya Raitha programme, has the potential to tackle the water resource and utility revenue loss problem while serving the needs of farmers. However, achieving such outcomes where all parties benefit will likely require public funding and a societal perspective. The solarised feeder model, proposed by the Prayas Energy Group, and adopted in Maharashtra, is similar to the solar pump programme with a few important distinctions. By locating the solar upstream and increasing the capacity of the solar, cost savings are likely, which would drive the solar to be more cost-effective; the solar would not be visible to each individual farmer, which might compromise the "community" agreement on irrigation timing, which renders the programme effective for the utility.

In contrast, a programme targeting energy efficiency is likely to be cost-effective from all perspectives. Because the farmer's variable costs do not change, the example programme neither provides an incentive to farmers for conserving groundwater (as the solar pump programme does) or an incentive for higher groundwater use. Grid-connected energy efficient pumps could be exploited for additional services, namely demand response, wherein pumps are operated during excess solar generation periods, a condition that is projected to increase as India increases its solar deployment.

Scalability considerations: Although the Surya Raitha pilot programme was relatively successful, moving beyond a pilot scale will require significant capital and financing. Under the Reserve Bank of India's (RBI) priority-sector lending norms, commercial banks have an annual commitment of lending 18% of their adjusted net bank credit to the agricultural sector, since agriculture is a priority sector. Due to the dearth of lending opportunities in the sector, many commercial banks seldom meet this target, leading to penalties in the form of deposits in lower yielding sovereign funds. Thus, banks are willing to lend at relatively low interest rates to agricultural borrowers, provided the bank is comfortable with the creditworthiness of the borrower.

A programme such as Surya Raitha provides banks with an opportunity to meet their priority sector targets with relatively low risk. Although the beneficiary of the loan is the farmer, the cash flows servicing the loan ultimately originate from the implementing agency (BESCOM), which is a more creditworthy entity. Further assurance of cash flows comes from solar generation due to the PV system oversizing. Banks view this loan not as an asset-financing instrument but as a non-recourse project-financing instrument. Thus, farmers with other loans are still eligible for loans for net-metered solar pumps. In the case of an energy-efficiency programme, administered by either a utility or third party, most designs would not include any loan to the farmer. As such, this programme would not qualify as a priority-lending category.

Alternative programme designs: The Surya Raitha programme is as improvement over off-grid solar pumping business models because it reduces the capital subsidy requirement of the utility and provides a revenue source to the farmer, while mitigating groundwater consumption. However, many challenges were encountered, including the need for a capital subsidy to overcome the gap between the system cost and revenue recovery from energy export, farmers' unwillingness to pay the upfront contribution, interference of local political structures in the implementation phase, issues of land availability, and inability of farmers to maintain the system. Also, the business-model structure does not encourage capital investment from developers.[3]

An alternative model may overcome some of the challenges of the Surya Raitha programme, while retaining the core benefits of daytime power and incentives to the farmers to

regulate groundwater consumption. The developer could implement the project on a design-build-finance-operate (DBFO) model, overcoming the challenge of subsidy intervention, upfront farmer payment, and limitations on state-based financing. The solar assets could be sited upstream rather than at the pumps while retaining the installation of efficient pumps; with controls on the pump and solar, the power flow to individual pumps and export to the grid can be modulated, providing flexible load which supports renewables integration. The Prayas Energy Group proposed solarising agricultural feeders by locating the solar at the substation (Gambhir and Dixit 2015). Similarly, the Gujarat Suryashakti Kisan Yojana (SKY) pilot programme has adopted such a scheme in which the solar panels are cited upstream, commensurate with the farmers' aggregate load. Farmers will have the option to participate and will be paid for solar generation in excess of their load (Prateek 2018).

Future considerations: There is considerable policy interest in solar pumping, including the Government of India's KUSUM programme that intends to solarise off-grid pumps and grid-connected pumps in a manner similar to the Surya Raitha programme. The cost-effectiveness framework presented here is one tool to support policymakers in comparing and selecting from among a complex set of options, using an economic framework that considers all perspectives—the farmer, the utility, and taxpayer/ratepayer. Ultimately, policy choices are made by determining what should be "valued." If economics is prioritised, the analysis presented here suggests that energy efficiency may continue to serve as the dominant DSM approach for some time to come, rather than solar pumps. If farmers' happiness is prioritised, then solar pumps may be more suitable. Moving the solar upstream, as in solarised feeders, may represent a move towards a more cost-effective solar solution. Whether solar pumps (or feeders) or energy-efficient pumps are the main technological intervention, future programmes can leverage the ability of pumps to provide other services to the grid. Because agricultural pumping loads are flexible by nature, the exact timing of the service is not important; pumps can provide grid-balancing services such as frequency regulation and demand response over the long term. In a high renewables future, these services can be valuable to a utility and grid operator and may be cheaper than flexing the thermal generation fleet or running gas generation.

NOTES

1 The discom discount rate is based on the discount factor approved by the Karnataka Electricity Regulatory Commission in its "Determination of Tariff and Other Norms for Solar Rooftop and Small Photovoltaic Power Plants" (Order S/03/1, 2 May 2016).

2 Autogrid, an energy services company, recently demonstrated for the Andhra Pradesh discom how agricultural pumps can provide demand response.

3 The Surya Raitha pilot, in which the state financed the capital expenditure, is not scalable across the entire pump fleet as the Fiscal Responsibility Act limits the debt that a state can incur as a fraction of GDP.

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Appendix 1: Assumptions and Calculations

Illustration of cash flow of the Surya Raitha programme with a 5 hp pump example:

1 Farmer makes a fixed payment for the system based on system size (~₹50,000 for 4.8 kW system) to ensure his commitment to the programme.

2 The Government of Karnataka (GoK) will provide a capital subsidy to the extent of 30% of the capital cost (~₹2,20,000) of which ₹1,62,000 will be contributed by MNRE as viability gap funding.

3 For the balance capital cost (~₹4,65,000), BESCOM will provide an interest-free loan, which will be in the name of the local farmer's cooperative.

4 The farmer will sign a PPA (power purchase agreement) with the implementing agency (that is, BESCOM) for 20 years whereby he is paid for any net metered energy at ₹7.2/kWh escalating at 3% for 20 years of which ₹1/ kWh is directly paid to the farmer as generation based incentive (GBI) and the remaining net metered revenue is used to pay off the interest free loan taken by the farmer (the loan is expected to be repaid within 15 years in this manner). Upon loan repayment, the farmer will retain the entire net metering revenue via the GBI, subject to a maximum net metered tariff of ₹9.5/kWh.

5 The above values correspond to a 5 hp system; for a 7.5 hp system all numbers will be correspondingly higher except for the MNRE contribution which will remain at ₹1,62,000 (the total GoK + MNRE contribution will continue to be 30% of capital cost translating to a higher GoK contribution for 7.5 hp system).

The Surya Raitha pilot programme depended on task implementation by both the implementing agency (BESCOM) and the system supplier as follows:

BESCOM: Enrolment of farmers, coordinate payments to/from the farmer, define the technical specifications of the PV system and empanel an electric supply company.

System supplier: Support BESCOM efforts to enroll farmers, supply materials to the site, install pumpsets and metering at the substation and farm, and maintenance.

Manufacturing Slowdown in India

New Evidence from a Double Deflation Approach

SUTIRTHA BANDOPADHYAY, RAHUL NILAKANTAN

The real value added in the Indian manufacturing sector for the period 2011–12 to 2016–17 is measured using the double deflation approach. It is found that the official figures understate manufacturing real value added during the period 2011–12 to 2013–14, and overstate it thereafter, as well as miss an apparent manufacturing contraction that occurred in 2014–15. The results are corroborated by the movement of high frequency indicators that are correlated with manufacturing activity.

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Nominal value added is the difference between the value of an industry's output and the cost of raw materials or intermediate inputs. Real value added is obtained by deflating nominal value added by suitably chosen price indexes. A proper estimate of real value added is necessary for various reasons such as maintaining the national income accounting identities in real as well as nominal terms, thereby ensuring the equality of the gross domestic product (GDP) when measured by value added, income and expenditure approaches (Sato 1976), as well as performing productivity analyses of an industry by separating out the contribution of primary inputs from economies of scale and technical change, among others (Cassing 1996).

The two basic approaches to deflating nominal value added are the single deflation approach and the double deflation approach. The single deflation approach deflates nominal value added by an output price index, while the double deflation approach deflates outputs and material inputs separately by their respective price indexes. The Central Statistics Office (CSO) uses the single deflation approach to measure manufacturing real valued added in India (CSO 2015). However, for the sake of consistency between GDP figures from the value added and expenditure approaches, the United Nations System of National Accounts (SNA) recommends the use of the double deflation approach to create a Laspeyres-type index of manufacturing real value added (UN 2008). Implementing the latter in the Indian context is complicated by the absence of an official intermediate inputs price index.

Laspeyres-type double deflation indexes of real value added mitigate the unwanted effects of changes in relative prices of material inputs to outputs (terms of trade) on real value added, by deflating material inputs and outputs by their respective price indexes (Hansen 1974). These terms of trade effects are unwanted since they would otherwise get conflated with the effects of changes in physical inputs and outputs, thereby polluting the measurement of physical productivity of primary inputs, one of the main aims of correct measurement of real value added (Sato 1976). The extent of terms of trade bias in a single deflation real value added measure is therefore an important empirical issue, which is investigated in this article.

We measure real value added in the Indian manufacturing sector for the period 2011–12 to 2016–17 using the double deflation approach. We find that the official figures understate manufacturing real value added during the period 2011–12 to 2013–14, and overstate it thereafter, as well as miss an apparent manufacturing contraction that occurred in 2014–15. Our results are corroborated by the movement of high frequency indicators that are correlated with manufacturing activity.

Double Deflation

Balakrishnan and Pushpangadan (1994) measured manufacturing real value added in India using the double deflation approach, as a prelude to measuring total factor productivity growth in manufacturing during the decades of the 1970s and 1980s. The input price deflator was a weighted index of wholesale prices of major input groups, with weights calculated from the 1973–74 input–output transactions table of the CSO. Inputs were sorted into 19 groups according to the availability of wholesale prices that most closely represented them.

Balakrishnan and Pushpangadan (1994) found that the relative prices of inputs rose during the 1970s, and then declined during the 1980s, while value added under double deflation was higher than that under single deflation for most

of the 1970s and 1980s, with the gap between the two reaching 52.6% by the end of the period. The results do not vary much when they use weights from the 1983–84 input–output transactions table as a robustness check. Since the work of Balakrishnan and Pushpangadan (1994), other attempts have been made at generating double deflation value added figures for manufacturing, briefly reviewed in Balakrishnan and Pushpangadan (2002).

In more recent work, Rajakumar and Shetty (2015) generate a manufacturing real value added series for India for 2011–12 to 2013–14 using the double deflation approach. They construct an intermediate input price index using input–output tables for 2007–08 as well as data from the 2004–05 series of the wholesale price index (WPI). The shares of various commodity groups in manufacturing sector's consumption of intermediate inputs from the input flow (absorption) matrix were used as weights for the corresponding commodity groups in the WPI to generate an intermediate input price index as a weighted average of WPI of the corresponding commodity groups. The WPI of individual commodity groups in the 2004–05 series were indexed to 2011–12 using the splicing method. The output price index used was the implicit deflator from the 2011–12 series of manufacturing gross value added (GVA). Rajakumar and Shetty (2015) found that the size as well as growth rate of manufacturing real value added under double deflation is lower in 2012–13 and 2013–14 than that reported by the CSO (which follows the single deflation method).

Their findings were criticised by Dholakia (2015) on the grounds that the intermediate input price index constructed by Rajakumar and Shetty (2015) did not take into account the price of construction and services inputs into the manufacturing sector, although the two accounted for 15.4% and 17.5% of the total inputs respectively. To the extent that construction and services input prices move differently from those of commodity inputs, the intermediate input price index of Rajakumar and Shetty (2015) will be biased. Using the GVA deflator (ratio of value added at current and constant prices) for construction and services as a proxy for their price levels, Dholakia finds that construction and services inflation rates were higher than that of commodity inputs. This implies a negative bias in the intermediate input price index of Rajakumar and Shetty (2015).

A negative bias in the intermediate input price index caused by faster growth in the prices of the omitted inputs, that is, construction and services will translate into a negative bias in the double deflation value added. When taking construction and services inputs into account and deflating them by their associated GVA deflators, Dholakia (2015) therefore finds that manufacturing double deflation value added is greater than that of Rajakumar and Shetty (2015) in levels as well as growth rates.

We extend the work of Dholakia (2015) in two ways. First, we make use of more recent data to generate a longer manufacturing real value added series, spanning 2011–12 to 2016–17. Second, we use the newly created producer price index (PPI) to deflate services inputs into the manufacturing sector, rather than the services GVA deflator.

Data and Methodology

We create and compare two indexes of real value added for India: (1) manufacturing single deflation (MVASD), and (2) manufacturing double deflation (MVADD). The formulas for single and double deflation measures for real value added are displayed in Equations (1a) and (1b),

$$\frac{SL_t}{100} = \frac{\frac{P_tQ_t - W_tX_t}{PO_t}}{P_0Q_0 - W_0X_0} \quad \ldots(1a)$$

$$\frac{DL_t}{100} = \frac{P_0Q_t - W_0X_t}{P_0Q_0 - W_0X_0} \quad \ldots(1b)$$

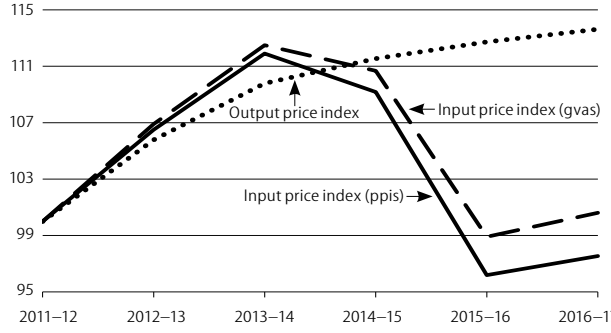
where *SL* refers to a single deflation measure of real value added index, *DL* refers to a double deflation measure of real value added index, *t* refers to the current period, *o* refers to the base period (2011–12 for all indexes), *P* is a vector of gross output prices, *Q* is a vector of gross output levels, *W* is a vector of intermediate input prices, and *X* is a vector of intermediate input levels. A real value added index for period *t* is the ratio of real value added at period *t* to real value added in period *o*. P_tQ_t is gross output at current prices, P_oQ_t is gross output at constant prices, W_tX_t is intermediate inputs at current prices, W_oX_t is intermediate inputs at constant prices, and PO_t is an output price index (which is just the GVA deflator in the single deflation approach).

Data on P_tQ_t, P_oQ_t, W_tX_t, W_oX_t, and the GVA deflator for the manufacturing sector is available for the period 2011–12 to 2016–17 from the National Accounts Statistics 2018 Statement 1.5 (NAS 2018). Note that *SL* is constructed from this data, following the single deflation approach. Since *SL* is constructed using the single deflation approach, it suffers from terms of trade bias since it does not take into account intermediate input prices.

DL is a double deflation real value added index of Laspeyres type. Note that *DL* will equal *SL* if the output and intermediate input price indexes coincide exactly. Measuring the terms of trade bias, defined as the difference between *DL* and *SL*, is one of the objectives of this paper. NAS 2018 does not provide a separate implicit deflator for intermediate inputs since it adopts the single deflation approach to measuring manufacturing real value added (we therefore cannot use W_oX_t from NAS 2018 since it is equal to W_tX_t/PO_t). We must therefore compute a Paasche price index for intermediate inputs $\frac{W_tX_t}{W_0X_t}$, and use it to deflate the nominal value of intermediate inputs W_tX_t to recover the real value of intermediate inputs W_oX_t, which can then be used to compute *DL*.

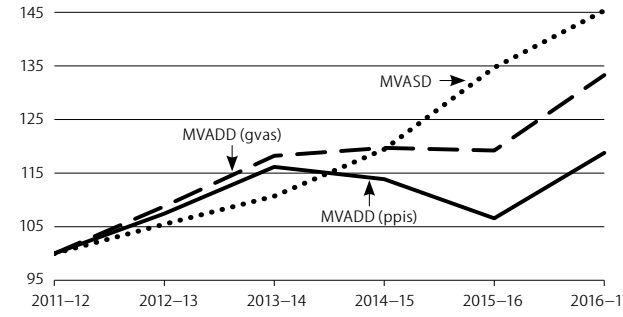
It can be shown that when intermediate input prices are higher than output prices that is $\frac{W_tX_t}{W_0X_t} > PO_t$, we have $DL_t > SL_t$ and vice versa. The logic for this is as follows. When intermediate input prices are higher than output prices, real value of intermediate inputs is lower under double deflation than under single deflation approach, whereas real value of output is the same under both approaches. Therefore, the difference between real value of output and real value of intermediate input, that is, value added is higher under double deflation approach than under single deflation approach when intermediate input prices are higher than output prices. The opposite is true when intermediate input prices are lower than output prices.

Figure 1: Paasche Output and Intermediate Input Price Indexes



The diagram is based on authors' calculation.

Figure 2: MVASD and MVADD



The diagram is based on authors' calculation.

The India KLEMS database provides nominal and real values of the three major intermediate input categories that is energy, materials, and services used in the manufacturing sector for the period 2011–12 to 2016–17, with base year 2011–12. The basic source of data for intermediate input use in manufacturing is the input flow (absorption) matrix for the years 2007–08 and 2013–14, with suitable interpolation to ensure consistency of the intermediate input time series in current prices with the figures from the NAS. Let $W_t^E X_t^E$, $W_t^M X_t^M$ and $W_t^S X_t^S$ be the nominal values of energy, materials and services inputs into the manufacturing sector at time t. Let $W_o^E X_t^E$, $W_o^M X_t^M$, and $W_o^S X_t^S$ be the corresponding real values at time t. Then, the Paasche intermediate input price index for the manufacturing sector is displayed in Equation (2).

$$\frac{W_t X_t}{W_0 X_t} = \frac{W_t^E X_t^E + W_t^M X_t^M + W_t^S X_t^S}{W_0^E X_t^E + W_0^M X_t^M + W_0^S X_t^S} \quad \ldots(2)$$

Note that both construction and services are included in intermediate inputs in the India KLEMS database, thus addressing the criticism of Dholakia (2015). While commodity inputs at current prices are deflated using the appropriate WPI, services inputs at current prices in the India KLEMS database are deflated using the implicit services GVA deflator from the NAS, which is the same treatment of services as in Dholakia (2015). However, this is not consistent with a double deflation approach, since the same deflator is being used to deflate services outputs at current prices. The input producer price index (PPI) can be used as an alternative to the services implicit GVA deflator to deflate services inputs at current prices. The input PPI measures the prices of goods and services as they enter the production process, that is, purchaser's prices, and are suitable for use as deflators in National Accounts (GOI 2017).

For the services sector, the input PPI is constructed on the basis of price data from the CPI as well as the business service price index (BSPI) put out by the Office of the Economic Adviser in the Department for Promotion of Industry and Internal Trade, Government of India. Weights for the input PPI are based on the input structure reflected in the Use Table 2011–12. Choice of CPI price data to generate input PPI is justified by common point of purchase and sale of services, as well as a competitive environment ensuring that rates of change of producer and consumer prices remain close to each other (GOI 2017). As opposed to this, the implied GVA deflator for services (ratio of nominal to real value added of services) is derived using a combination of WPI (despite the fact that it does not cover services), CPI, and quantum indexes to deflate nominal value added to recover real value added.

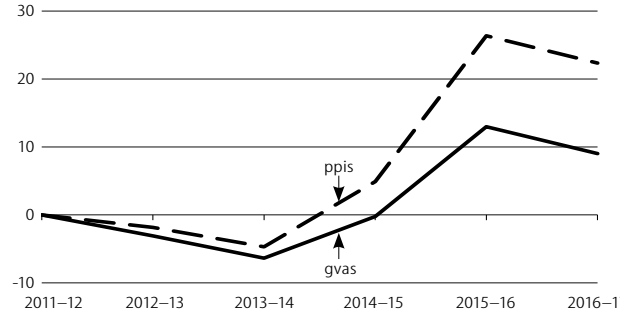
Since we adopt the double deflation approach in this paper, we deflate $W_t^S X_t^S$ by the services input PPI to get an alternate measure of $W_o^S X_t^S$ used in the manufacturing sector. For the sake of comparison, we also deflate $W_t^S X_t^S$ by the implied GVA deflator for services to get an alternate measure of $W_o{}^S X_t^S$ that is analogous to the approach in the Indian KLEMS database as well as Dholakia (2015). Correspondingly, we get three measures of manufacturing real value added index, that is, MVASD, MVADD (gvas), and MVADD (ppis) for single deflation, double deflation using implied GVA deflator for services, and double deflation using services input PPI respectively.

Results and Discussion

The Paasche output and input price indexes for manufacturing are displayed in Figure 1. Clearly, they do not move together, with the input price index (gvas and ppis) exceeding the output price index till 2013–14, and falling below the output price index from 2014–15. Further, the input price index (ppis) is everywhere below the input price index (gvas). We would therefore expect that MVADD (gvas and ppis) will exceed MVASD till 2013–14 (indicating a negative terms of trade bias in MVASD) and thereafter fall below MVASD from 2014–15 (indicating a positive terms of trade bias in MVASD). Further, MVADD (ppis) will lie everywhere below MVADD (gvas). This is exactly what we observe in Figure 2. MVASD thus understates the extent of real value addition in the first half of the period, and subsequently overstates it. The terms of trade bias, defined as the percentage difference between MVASD and MVADD is displayed in Figure 3 (p 63). This bias is quite large, reaching a maximum of 12.98% (gvas) and 26.37% (ppis) in 2015–16.

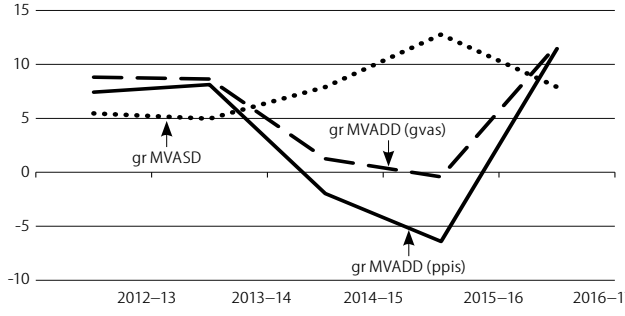
The MVADD (ppis) figures show a contraction in manufacturing value added in 2014–15. This contraction is not captured by the MVASD data, which instead shows an expansion. However, all four high frequency (monthly) indicators in the Mint Macro Tracker that are correlated with industrial sector performance show signs of a contraction in 2014–15, as reflected by the second order polynomial fitted to the data (see Figures 5–8). These indicators are core sector IIP, bank's non-food credit, rail freight traffic, and manufacturing purchasing manager's index (PMI). Data for these indicators were extracted from Kwatra and Bhattacharya (2019). The high frequency indicators

Figure 3: Terms of Trade Bias in Manufacturing



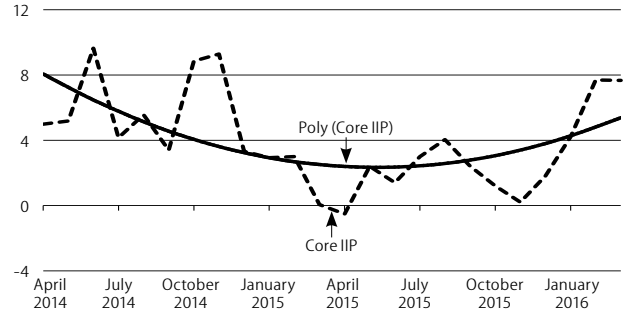
The diagram is based on authors' calculation.

Figure 4: Growth Rate of MVASD and MVADD



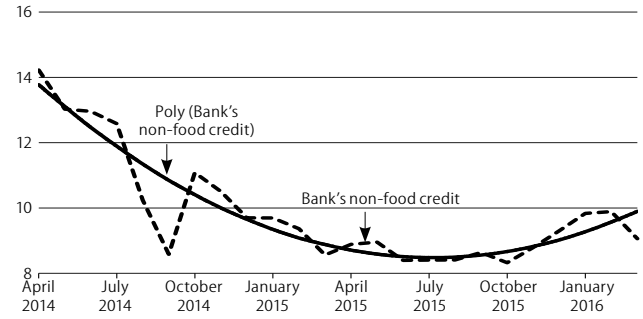
The diagram is based on authors' calculation.

Figure 5: Core Sector IIP Year-on-Year Growth Rate



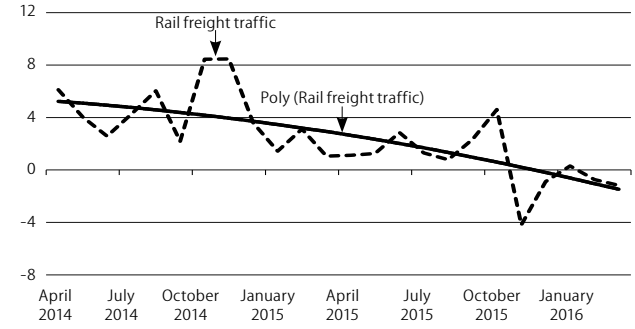
Source: Kwatra and Bhattacharya (2019).

Figure 6: Bank's Non-food Credit Year-on-Year Growth Rate



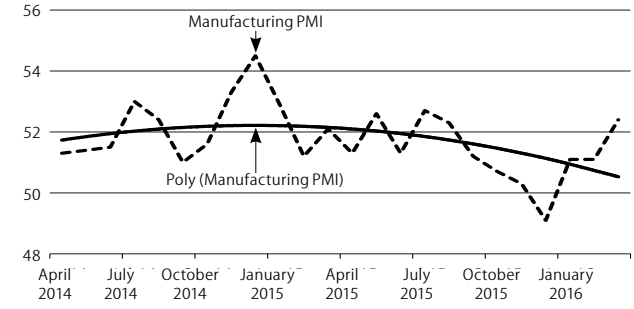
Source: Kwatra and Bhattacharya (2019).

Figure 7: Rail Freight Traffic Year-on-Year Growth Rate



Source: Kwatra and Bhattacharya (2019).

Figure 8: Manufacturing PMI Year-on-Year Growth Rate



Source: Kwatra and Bhattacharya (2019).

support the idea of a manufacturing contraction in 2014–15, as reflected in the MVADD (ppis) figures. Growth rates of MVASD and MVADD are displayed in Figure 4, showing faster growth of MVADD than MVASD till 2013–14, followed by slower growth in 2014–15 and 2015–16.

In conclusion, we find that the double deflation approach to measuring real value added provides significantly different conclusions about the performance of the manufacturing sector both in terms of levels as well as growth rates. These differences are driven by differences in the movement of the corresponding output price indexes and the intermediate input price indexes. The official figures understate manufacturing real value added during the period 2011–12 to 2013–14, and overstate it thereafter, as well as miss an apparent manufacturing contraction that occurred in 2014–15. This contraction is corroborated by the movement of high frequency indicators that are correlated with manufacturing sector performance.

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Wholesale Price Index

The year-on-year (y-o-y) WPI inflation rate decreased to 2.3% in February 2020 from 2.9% reported a year ago and 3.1% a month ago. The index for primary articles increased by 6.7% compared to 4.8% registered a year ago but was lower than 10.0% a month ago. The index for food articles rose by 7.8% compared to 4.2% recorded a year ago but, was lower than 11.5% reported a month ago. The index for fuel and power increased by 3.4% compared to 1.7% recorded a year ago. The index for manufactured products decreased by 0.4% compared to 2.3% reported a year ago.

Consumer Price Index

The CPI Inflation rate increased to 6.6% in February 2020 from 2.6% registered a year ago but eased in comparison to 7.6% reported a month ago. The consumer food price index rose by 10.8% against -0.7% reported a year ago but was lower than 13.6% registered a month ago. The CPI-rural inflation rate increased to 6.7% and the urban inflation rate to 6.6% from 1.8% and 3.4%, respectively, reported a year ago. As per Labour Bureau data, the CPI-inflation rate of agricultural labourers (CPI–AL) increased to 10.1% in February 2020 from 3.1% registered a year ago while that of industrial workers (CPI–IW) decreased to 6.8% from 7.0%.

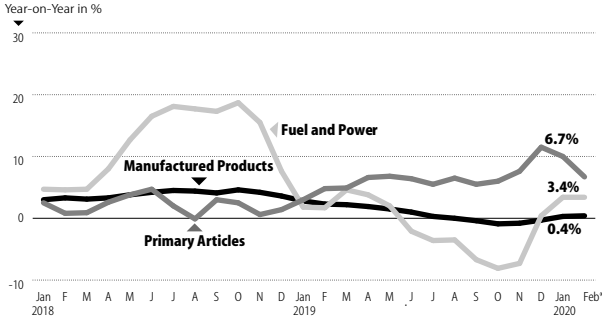
Foreign Trade

The trade deficit widened to $9.9 bn in February 2020 from $9.7 bn reported a year ago. Exports increased by 2.9% to $27.7 bn and imports by 2.5% to $37.5 bn from $26.9 bn and $36.6 bn, respectively, reported a year ago. Oil imports were higher by 14.3% at $10.8 bn while non-oil imports were lower by 1.6% at $26.7 bn from $9.4 bn and $27.2 bn, respectively, registered a year ago. During April–February 2019–20, cumulative exports declined by (-)1.5% to $292.9 bn and imports by (-)7.3% to $436.0 bn from their respective values of $297.4 bn and $470.4 bn reported during the corresponding period of last year.

Index of Industrial Production

The y-o-y growth rate of IIP inched up to 2.0% in January 2020 from 1.6% reported a year ago. The index of eight core industries increased by 5.5% in February 2020 compared to 2.2% registered a year ago. Growth rates of petroleum refinery products rose to 7.4%, coal to 10.3% and electricity generation to 11.0% from -0.8%, 7.4% and 1.2%, respectively. Production of fertilisers increased by 2.9% and cement by 8.6% compared to 2.5% and 8.0%, respectively. Production of crude oil declined by (-)6.4%, natural gas by (-)9.6% and steel by (-)0.4% against -6.1%, 3.8% and 4.9%, respectively.

Movement of WPI Sub-indices January 2018–February 2020



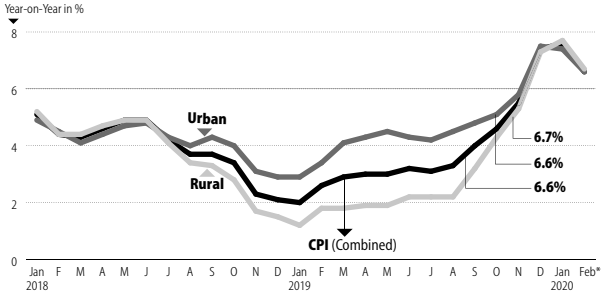
* Data is provisional; Base: 2011–12 = 100.

Trends in WPI and Its Components February 2020* (%)

	Weights	Over Month	Over Year	Financial Year (Averages) 2016–17	2017–18	2018–19
All commodities	100	-0.6	2.3	1.73	2.92	4.28
Primary articles	22.6	-2.8	6.7	3.42	1.38	2.74
Food articles	15.3	-3.7	7.8	4.03	2.05	0.32
Fuel and power	13.2	1.2	3.4	-0.26	8.16	11.50
Manufactured products	64.2	0.2	0.4	1.34	2.75	3.66

*Data is provisional; Base: 2011-12=100; Source: Ministry of Commerce and Industry.

Movement of CPI Inflation January 2018–February 2020



* February 2020 is provisional; Source: National Statistical Office (NSO); Base: 2012=100.

Inflation in CPI and Its Components February 2020* (%)

	Weights	Latest Month Index	Over Month	Over Year	Financial Year (Avgs) 2017–18	2018–19
CPI combined	100	149.1	-0.7	6.6	3.6	3.4
Consumer food	39.1	149.7	-2.4	10.8	1.8	0.1
Miscellaneous	28.3	143.6	0.1	4.5	3.8	5.8
CPI: Occupation-wise						
Industrial workers (2001=100)		328.0	-0.6	6.8	3.1	5.4
Agricultural labourers (1986-87=100)		1010.0	-0.6	10.1	2.2	2.1

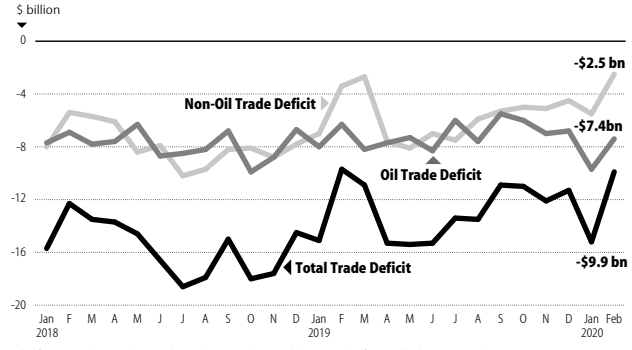
* Provisional; Source: NSO (rural & urban); Labour Bureau (IW and AL).

Merchandise Trade February 2020

	February 2020 ($ bn)	Over Month (%)	Over Year (%)	April–February (2019–20 over 2018–19) (%)
Exports	27.7	6.5	2.9	-1.5
Imports	37.5	-8.8	2.5	-7.3
Trade deficit	9.9	-35.1	1.3	-17.3

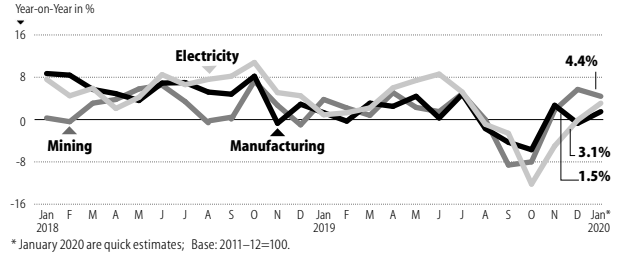
Data is provisional. Source: Ministry of Commerce and Industry.

Trade Deficits January 2018–February 2020



Oil refers to crude petroleum and petroleum products, while Non-Oil refers to all other commodities.

Movement of Components of IIP Growth January 2018–January 2020



* January 2020 are quick estimates; Base: 2011–12=100.

Growth in Eight Core Industries February 2019* (%)

	Weights	Over Month	Over Year	Financial Year (Avgs) 2017–18	2018–19
General index#	100	2.3	2.0	4.4	3.6
Infrastructure industries	40.27@	-2.6	5.5	4.3	4.4
Coal	10.3	4.0	10.3	2.6	7.4
Crude oil	9.0	-11.0	-6.4	-0.9	-4.1
Natural gas	6.9	-10.8	-9.6	2.9	0.8
Petroleum refinery products	28.0	-4.1	7.4	4.6	3.1
Fertilisers	2.6	-7.4	2.9	0.0	0.3
Steel	17.9	-1.9	-0.4	5.6	5.1
Cement	5.4	-1.4	8.6	6.3	13.3
Electricity	19.9	-1.7	11.0	5.3	5.2

(Base: 2011–12=100); # January 2020; *Data is provisional; @- The revised eight core industries have a combined weight of 40.27% in the IIP. Source: NSO and Ministry of Commerce and Industry.

Comprehensive current economic statistics with regular weekly updates are available at: http://www.epwrf.in/currentstat.aspx.

India's Quarterly Estimates of Final Expenditures on GDP

₹ crore | at 2011–12 Prices	2017–18 Q1	2017–18 Q2	2017–18 Q3	2017–18 Q4	2018–19 Q1	2018–19 Q2	2018–19 Q3	2018–19 Q4	2019–20 Q1	2019–20 Q2	2019–20 Q3
Private final consumption expenditure	1769688 (9.3)	1750056 (5.5)	1911901 (5.3)	1948174 (7.7)	1889008 (6.7)	1903853 (8.8)	2046415 (7.0)	2068781 (6.2)	1983491 (5.0)	2010993 (5.6)	2166235 (5.9)
Government final consumption expenditure	362769 (21.6)	367882 (7.4)	319547 (10.5)	293024 (8.9)	393709 (8.5)	407780 (10.8)	341988 (7.0)	335088 (14.4)	428390 (8.8)	461585 (13.2)	382338 (11.8)
Gross fixed capital formation	958859 (0.7)	967190 (5.9)	1014300 (8.8)	1120846 (13.7)	1082670 (12.9)	1077942 (11.5)	1130201 (11.4)	1170154 (4.4)	1129470 (4.3)	1033344 (-4.1)	1071887 (-5.2)
Change in stocks	49996 (61.7)	54050 (75.8)	52497 (78.3)	59252 (79.6)	64131 (28.3)	66159 (22.4)	63999 (21.9)	70126 (18.4)	66411 (3.6)	66732 (0.9)	64668 (1.0)
Valuables	62905 (80.1)	46317 (25.0)	39512 (11.2)	43927 (1.5)	41080 (-34.7)	44629 (-3.6)	39252 (-0.7)	44773 (1.9)	49519 (20.5)	49919 (11.9)	41824 (6.6)
Net trade (Export–import)	-137041	-85422	-128661	-125231	-122238	-141491	-104580	-51925	-117247	-76415	-50489
Exports	627176 (3.9)	639543 (4.5)	646620 (4.4)	688438 (5.0)	686695 (9.5)	719352 (12.5)	748505 (15.8)	767991 (11.6)	708771 (3.2)	703973 (-2.1)	707407 (-5.5)
Less imports	764217 (21.8)	724965 (10.5)	775281 (14.1)	813669 (23.6)	808933 (5.9)	860843 (18.7)	853085 (10.0)	819916 (0.8)	826018 (2.1)	780388 (-9.3)	757896 (-11.2)
Discrepancies	69397	132000	105705	151721	10803	73679	-17242	52683	7482	61000	-11460
Gross domestic product (GDP)	3136572 (5.1)	3232072 (7.3)	3314801 (8.7)	3491715 (7.4)	3359162 (7.1)	3432553 (6.2)	3500033 (5.6)	3689678 (5.7)	3547516 (5.6)	3607157 (5.1)	3665003 (4.7)

India's Overall Balance of Payments (Net): Quarterly

	2018–19 ($ mn) Q1	Q2	Q3	Q4	2019–20 ($ mn) Q1	Q2	Q3	2018–19 (₹ bn) Q1	Q2	Q3	Q4	2019–20 (₹ bn) Q1	Q2	Q3
Current account	-15803	-19054	-17752	-4647	-14417	-6512	-1417	-1059 [-2.3]	-1337 [-2.9]	-1279 [-2.7]	-328 [-0.7]	-1003 [-2.0]	-459 [-0.9]	-101 [-0.2]
Merchandise	-45751	-50037	-49281	-35214	-46182	-38085	-34625	-3065	-3510	-3552	-2482	-3212	-2682	-2466
Invisibles	29947	30984	31529	30567	31765	31573	33208	2006	2174	2272	2154	2209	2224	2365
Services	18676	20256	21678	21331	20076	20444	21880	1251	1421	1562	1503	1396	1440	1558
of which: Software services	18605	19286	19895	19868	20998	21064	21455	1246	1353	1434	1400	1460	1484	1528
Transfers	17031	19331	17424	16160	17964	19952	18693	1141	1356	1256	1139	1249	1405	1331
of which: Private	17216	19511	17558	16317	18224	20188	18932	1153	1369	1265	1150	1267	1422	1349
Income	-5760	-8603	-7573	-6925	-6275	-8822	-7364	-386	-604	-546	-488	-436	-621	-525
Capital account	4787	16604	13770	19241	28208	12283	22355	321 [0.7]	1165 [2.5]	992 [12.1]	1356 [2.7]	1962 [4.0]	865 [1.7]	1592 [3.1]
of which: Foreign investment	1427	7612	5199	15856	19041	10389	17802	96	534	375	1117	1324	732	1268
Overall balance	-11338	-1868	-4296	14162	13984	5118	21601	-760 [-1.7]	-131 [-0.3]	-310 [-0.6]	998 [2.0]	973 [2.0]	360 [0.7]	1539 [3.0]

Figures in square brackets are percentage to GDP.

Foreign Exchange Reserves

Excluding gold but including revaluation effects	27 March 2020	29 March 2019	31 March 2019	Variation Over Month	Variation Over Year	Financial Year So Far 2018–19	Financial Year So Far 2019–20	Financial Year 2014–15	2015–16	2016–17	2017–18	2018–19
₹ crore	3299710	2666630	2675640	72107	633080	59040	624071	322660	218620	25300	353270	68050
$ mn	441086	385510	386814	-6169	55576	-15472	54272	40486	16297	10160	53217	-14168

Monetary Aggregates

₹ crore	Outstanding 2020	Variation Over Month	Variation Over Year	Financial Year So Far 2018–19	Financial Year So Far 2019–20	Financial Year 2016–17	Financial Year 2017–18	Financial Year 2018–19
Money supply (M_3) as on 13 March	16526566	156543 (1.0)	1439478 (9.5)	1124501 (8.1)	1094499 (7.1)	1174310 (10.1)	1170657 (9.2)	1469480 (10.5)
Components								
Currency with public	2308312	50040 (2.2)	244523 (11.8)	304076 (17.3)	256102 (12.5)	-333130 (-20.9)	495583 (39.2)	292497 (16.6)
Demand deposits	1576035	94830 (6.4)	171171 (12.2)	-78849 (-5.3)	-50478 (-3.1)	406920 (41.1)	86963 (6.2)	142800 (9.6)
Time deposits	12606045	8926 (0.1)	1015371 (8.8)	895418 (8.4)	884441 (7.5)	1094920 (12.1)	585266 (5.8)	1026348 (9.6)
Other deposits with RBI	36175	2748 (8.2)	8412 (30.3)	3856 (16.1)	4433 (14.0)	5640 (36.5)	2817 (13.4)	7835 (32.8)
Sources								
Net bank credit to government	5038798	38532 (0.8)	516780 (11.4)	520618 (13.0)	650308 (14.8)	618120 (19.1)	144800 (3.8)	387090 (9.7)
Bank credit to commercial sector	10796486	102365 (1.0)	639641 (6.3)	943129 (10.2)	413767 (4.0)	608420 (7.8)	802226 (9.5)	1169003 (12.7)
Net foreign exchange assets	3761465	147097 (4.1)	824940 (28.1)	14229 (0.5)	690625 (22.5)	24510 (1.0)	364066 (14.2)	148544 (5.1)
Banking sector's net non-monetary liabilities	3096498	131486 (4.4)	542357 (21.2)	353665 (16.1)	660627 (27.1)	79910 (4.0)	140996 (6.8)	235395 (10.7)
Reserve money as on 27 March	3057360	83094 (2.8)	271886 (9.8)	366694 (15.2)	286878 (10.4)	-280260 (-12.9)	518300 (27.3)	351702 (14.5)
Components								
Currency in circulation	2439308	91104 (3.9)	299702 (14.0)	310258 (17.0)	302537 (14.2)	-328193 (-19.7)	494078 (37.0)	307423 (16.8)
Bankers' deposits with RBI	579875	-11629 (-2.0)	-25559 (-4.2)	39909 (7.1)	-22094 (-3.7)	42290 (8.4)	21405 (3.9)	36444 (6.4)
Other deposits with RBI	38177	3619 (10.5)	-2257 (-5.6)	16527 (69.1)	6435 (20.3)	5640 (36.5)	2817 (13.4)	7835 (32.8)
Sources								
Net RBI credit to Government	1094134	103595 (10.5)	248392 (29.4)	369778 (77.7)	292183 (36.4)	195810 (46.1)	-144836 (-23.3)	325987 (68.5)
of which: Centre	1092210	104511 (10.6)	246435 (29.1)	371489 (78.3)	291737 (36.4)	195030 (45.9)	-145304 (-23.5)	326187 (68.8)
RBI credit to banks & commercial sector	-264351	36492 (-12.1)	-382208 (-324.3)	54484 (86.0)	-417202 (-272.9)	-613810 (-201.6)	372643 (0.0)	89478 (0.0)
Net foreign exchange assets of RBI	3545933	72764 (2.1)	699297 (24.6)	85855 (3.1)	697346 (24.5)	13730 (0.6)	363571 (15.2)	87806 (3.2)
Govt's currency liabilities to the public	26315	35 (0.1)	473 (1.7)	190 (0.7)	427 (1.6)	3170 (14.5)	572 (2.3)	236 (0.9)
Net non-monetary liabilities of RBI	1344671	129792 (10.7)	294068 (28.0)	143613 (15.8)	285876 (27.0)	-120840 (-12.7)	73650 (8.8)	151805 (16.7)

Scheduled Commercial Banks' Indicators *(₹ crore)*

(As on 13 March)	Outstanding 2020	Variation Over Month	Variation Over Year	Financial Year So Far 2018–19	Financial Year So Far 2019–20	Financial Year 2016–17	Financial Year 2017–18	Financial Year 2018–19
Aggregate deposits	13339089	103551 (0.8)	1111634 (9.1)	801405 (7.0)	765317 (6.1)	1430370 (15.3)	668390 (6.2)	1147722 (10.0)
Demand	1457507	94471 (6.9)	166539 (12.9)	-79314 (-5.8)	-53780 (-3.6)	392440 (44.1)	88842 (6.9)	141005 (10.3)
Time	11881582	9081 (0.1)	945095 (8.6)	880720 (8.8)	819098 (7.4)	1037920 (12.3)	579547 (6.1)	1006717 (10.0)
Cash in hand	81526	3346 (4.3)	13438 (19.7)	8023 (13.4)	6649 (8.9)	3920 (6.8)	-1295 (-2.1)	14812 (24.7)
Balance with RBI	551020	-5162 (-0.9)	-8966 (-1.6)	34300 (6.5)	-14687 (-2.6)	121330 (31.3)	16906 (3.3)	40021 (7.6)
Investments	3795013	9241 (0.2)	400870 (11.8)	75690 (2.3)	413957 (12.2)	405440 (15.4)	287493 (9.5)	62603 (1.9)
of which: Government securities	3787016	9071 (0.2)	393881 (11.6)	75729 (2.3)	408014 (12.1)	405820 (15.5)	287656 (9.5)	61596 (1.9)
Bank credit	10140493	98804 (1.0)	584251 (6.1)	930817 (10.8)	368771 (3.8)	591840 (8.2)	783965 (10.0)	1146297 (13.3)
of which: Non-food credit	10080101	111736 (1.1)	576533 (6.1)	920132 (10.7)	349989 (3.6)	643170 (9.0)	795906 (10.2)	1146676 (13.4)

Capital Markets

	3 April 2020	Month Ago	Year Ago	Financial Year So Far Trough	Financial Year So Far Peak	2018–19 Trough	2018–19 Peak	End of Financial Year 2017–18	2018–19	2019–20
S&P BSE SENSEX (Base: 1978–79=100)	27591 (-29.0)	38624	38877 (16.5)	27591	28265	25981	41953	32969 (12.1)	39714.20 (12.4)	29816 (-21.8)
S&P BSE-100 (Base: 1983–84=100)	8180 (-30.8)	11421	11824 (11.0)	8180	8347	7683	12456	10503 (11.5)	12044.07 (9.1)	8693 (-25.2)
S&P BSE-200 (1989–90=100)	3416 (-30.5)	4771	4912 (9.0)	3416	3484	3209	5185	4433 (12.0)	4986.55 (7.1)	3614 (-25.1)
CNX Nifty-50 (Base: 3 Nov 1995=1000)	8084 (-30.6)	11303	11644 (13.7)	8084	8254	7610	12362	10114 (11.1)	11922.80 (11.1)	8660 (-24.3)
CNX Nifty-500	6638 (-31.3)	9324	9658 (6.4)	6638	6762	6243	10119	8912 (12.6)	9805.05 (5.3)	7003 (-26.3)

Figures in brackets are percentage variations over the specified or over the comparable period of the previous year. | (-) = not relevant | - = not available | NS = new series | PE = provisional estimates

■ Comprehensive current economic statistics with regular weekly updates are available at: http://www.epwrf.in/currentstat.aspx.

Secondary Market Transactions in Government Securities, Forex Market and Money Market—March 2020

1 Settlement Volume of Government Securities Transactions

Settlement Period	Outright		Repo		Daily Average (Outright)		Daily Average (Repo)	
	Number of Trades	Volume (₹ Cr)	Number of Trades	Volume (₹ Cr)	Number of Trades	Volume (₹ Cr)	Number of Trades	Volume (₹ Cr)
March 2020	85844	1306083	22615	3096901	4292	65304	1028	140768
March 2019	59384	736113	16515	1854059	3125	38743	751	84275
2019–20^	963622	13308365	240106	29576007	3982	54993	899	110772
2018–19^	806004	9355007	216207	27124989	3331	38657	804	100836

2 Netting Factor

a Securities			b Funds		
Gross (₹ Cr)	Net (₹ Cr)	Netting Factor (%)	Gross (₹ Cr)	Net (₹ Cr)	Netting Factor (%)
4402894	1622902	63.14	4604470	630273	86.31
2590172	1064304	58.91	2620238	413775	84.21
42885776	15281923	64.37	44378602	5481050	87.65
36480096	14799980	59.43	36498789	6194358	83.03

3 Instrument-wise Break-up of Securities Transactions (₹ Cr)

a Outright Trades			b Repo		
Central Govt Dated	Treasury Bills	State Govt	Central Govt Dated	Treasury Bills	State Govt
1112475	133899	59709	1135450	92810	317202
587243	80373	68496	635709	145584	137718
11265755	1356141	686469	10447710	1412792	2939209
7907618	938339	509050	9212117	2513999	1840027

4 Tenor-wise Settlement Volume of Central Government Dated Securities

Year	March 2020	2019–20^		2018–19^	
2020	16694	272541	(2.42)	246539	(3.17)
2021	16892	142918	(1.27)	94229	(1.21)
2022	23817	230885	(2.05)	503758	(6.48)
2023	38715	353405	(3.14)	373961	(4.81)
2024	144455	1344200	(11.95)	105811	(1.36)
2025	13461	83244	(0.74)	26085	(0.34)
2026	95495	679292	(6.04)	306883	(3.95)
2027	23535	134548	(1.20)	195455	(2.51)
2028	30548	1233103	(10.97)	4993345	(64.23)
2029	576254	5679773	(50.51)	147498	(1.90)
2030	10347	65786	(0.59)	31983	(0.41)
2031	4216	78549	(0.70)	524274	(6.74)
2032	4053	126234	(1.12)	56045	(0.72)
2033	91962	553931	(4.93)	26208	(0.34)
2034	4068	30560	(0.27)	24512	(0.32)
2035	1352	29283	(0.26)	50182	(0.65)
2036	149	4029	(0.04)	4326	(0.06)
2037	31	550	(0.00)	96	(0.00)
2038	31	550	(0.00)	96	(0.00)
2039	1659	34787	(0.31)	565	(0.01)
2040	450	9558	(0.08)	3375	(0.04)
2041	1762	11054	(0.10)	5255	(0.07)
2042	1983	12172	(0.11)	5069	(0.07)
2043	842	25069	(0.22)	2822	(0.04)
2044	1717	14014	(0.12)	5607	(0.07)
2045	1184	8830	(0.08)	7426	(0.10)
2046	1301	17150	(0.15)	14624	(0.19)
2047	31	515	(0.00)	82	(0.00)
2048	30	514	(0.00)	82	(0.00)
2049	1133	22402	(0.20)	82	(0.00)
2050	30	503	(0.00)	82	(0.00)
2051	2111	8614	(0.08)	1991.5	(0.03)
2052	30	503	(0.00)	82	(0.00)
2053	30	503	(0.00)	82	(0.00)
2054	30	503	(0.00)	82	(0.00)
2055	367	3260	(0.03)	15379	(0.20)
2056	30	490	(0.00)	0	(0.00)
2057	31	492	(0.00)	0	(0.00)
2058	31	492	(0.00)	0	(0.00)
2059	1618	29929	(0.27)	0	(0.00)
Total	1112475	11244735	(100)	7773974	(100)

5 Deal Size Analysis (%)

Settlement Period	< 5 Cr		5 Deal Size Analysis (%)		> 5 Cr <=10 Cr		>10 Cr<=20 Cr		> 20 Cr	
	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value
March 2020	3.45	0.38	50.01	16.43	21.91	14.37	8.25	9.49	16.38	59.32
March 2019	5.95	0.67	55.85	22.53	18.79	15.07	6.30	8.63	13.11	53.10
2019–20^	3.33	0.37	52.92	19.16	21.01	15.18	7.89	9.93	14.85	55.37
2018–19^	3.57	0.44	59.89	25.80	18.60	15.97	6.48	9.50	11.47	48.28

6 Market Share of Top 'n' Securities (%)

Period	March 2020	March 2019	2019–20^	2018–19^
Top 5	73.41	77.79	75.04	81.46
Top 10	83.56	86.97	84.71	87.56
Top 15	87.45	89.84	87.82	90.50
Top 20	90.28	91.84	90.25	92.82

7 Intercategory Member Turnover Activity for All Category

Category	Buy					Sell				
	Outright	Reverse Repo (Funds Lending)	TREP Lending@	Uncollateralised Money Market Lending*	Forex	Outright	Repo	TREP Borrowing@	Uncollateralised Money Market Borrowing*	Forex
Cooperative Banks	3.17	0.56	0.51	53.56	0.20	2.64	0.84	0.64	0.98	0.20
Financial Institutions	1.10	0.96	0.46	-	0.00	0.71	1.10	5.26	-	0.00
Foreign Banks	20.45	33.81	0.57	4.32	50.96	24.34	24.73	12.05	2.50	50.30
Insurance Companies	1.67	3.81	18.69	-	-	1.41	0.00	0.01	-	-
Mutual Funds	8.30	50.44	72.09	-	-	12.78	0.13	4.41	-	-
Others	4.49	1.30	6.84	-	-	2.84	2.86	4.12	-	-
Primary Dealers	11.06	2.16	0.01	0.02	-	12.91	39.91	5.41	35.04	-
Private Sector Banks	27.09	3.66	0.53	17.53	25.66	24.49	24.39	37.21	35.08	26.24
Public Sector Banks	22.66	3.32	0.30	24.58	23.17	17.88	6.04	30.89	26.40	23.25
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

8 Market Share of Top Five Members (Category-wise) (%)

Categories	March 2020	March 2019	2019–20^
Cooperative Banks	52.76	47.51	50.53
Foreign Banks	71.57	73.17	69.99
Public Sector Banks	52.19	56.60	53.73
Private Sector Banks	84.96	86.33	83.96
Mutual Funds	61.18	59.71	55.53
Primary Dealers	87.80	89.60	90.49

9 Market Share of Top 'n' Members (%)

Period	March 2020	March 2019	2019–20^	2018–19^
Top 5	29.05	26.09	28.92	30.65
Top 10	42.06	43.18	43.40	47.00
Top 15	52.36	55.79	54.07	57.78
Top 20	61.24	64.63	62.64	65.68

10 Trading Platform Analysis of Outright Trades

Period	OTC				NDS-OM			
	Trades	% Share	Value (₹ Cr)	% Share	Trades	% Share	Value (₹ Cr)	% Share
March 2020	6008	7.18	323004	24.46	77671	92.82	997701	75.54
March 2019	6069	10.38	171190	23.63	52403	89.62	553361	76.37
2019–20^	67688	7.03	2986806	22.38	895697	92.97	10359039	77.62
2018–19^	54653	6.80	1865656	19.97	749493	93.20	7475388	80.03

11 Type-wise Settlement Volume of Government Securities Transactions (₹ crore)

Period	Outright				Repo			
	Proprietary		Constituent		Proprietary		Constituent	
	Trades	Volume	Trades	Volume	Trades	Volume	Trades	Volume
March 2020	69725	1054902	16119	251181	10166	1211372	1070	334090
March 2019	49133	612628	10251	123485	7800	832333	409	86678
2019–20^	802428	11059177	161194	2249188	113044	12984423	7031	1815290
2018–19^	690795	7884817	115209	1470190	103887	12657844	4187	908298

12 Trep Trading @

Period	Total		Daily Average	
	Trades	Value	Trades	Value
March 2020	22127	4486719	885	179469
March 2019	20149	3226889	806	129076
2019–20^	183648	33063855	820	147606
2018–19^	52931	8595862	814	132244

13 Top 5 Securities—Basket Repo

Security	Trades	Value	Rate
7.80% GS 2020	137	52850	4.42
7.32% GS 2024	147	46432	4.09
6.17% GS 2021	154	37720	3.56
8.12% GS 2020	80	27932	4.74
8.27% GS 2020	53	21482	4.25

14 Top 5 Securities—Special Repo

Security	Trades	Value	Rate
6.45% GS 2029	980	119750	1.99
7.32% GS 2024	266	36925	3.40
6.18% GS 2024	224	22657	3.18
8.83% GS 2023	58	22170	2.67
8.20% GS15FEB2022P	50	20715	4.27

15 Forex Settlement

Settlement Period	Cash			Tom			Spot			Forward			Total			Average			Netting Factor: Forex		
	Trades	Value		Trades	Value		Trades	Value		Trades	Value		Trades	Value		Trades	Value		Gross	Net	Netting
		(₹ Cr)	($Mn)		(₹ Cr)	($ Mn)		(₹ Cr)	($ Mn)		(₹ Cr)	($ Mn)		(₹ Cr)	($ Mn)		(₹ Cr)	($ Mn)	($ Mn)	($ Mn)	Factor (%)
March 2020	2938	710943	95778	4759	931337	125706	164049	2265087	307093	10437	1127123	155607	182183	5034489	684184	9109	251724	34209	684184	30725	95.51
2019–20^	34785	7074990	998427	54383	8940196	1262165	1935194	23610405	3333363	101556	9960696	1393962	2125918	49586287	6987915	9085	211907	29863	6987917	320967	95.41

16 Category-wise Forex Activity—Deal Type

Category	Cash	Tom	Spot	Forward
Foreign Banks	42.98	50.78	46.47	51.41
Public Sector Banks	20.79	13.20	30.37	24.07
Private Sector Banks	36.02	35.86	22.82	24.43
Cooperative Banks	0.21	0.16	0.34	0.08
Financial Institutions	0.01	0.00	0.00	0.00

17 Forex Deal Size Analysis (%)

Settlement Period	< 1 mn		1 mn		> 1 mn <= 5 mn		> 5 mn <= 10 mn		> 10 mn <= 20 mn		> 20 mn	
	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value
March 2020	25.51	2.77	50.76	13.52	13.72	11.78	3.96	10.21	1.93	8.88	4.12	52.85
2019–20^	27.93	3.58	50.43	15.34	12.51	12.34	3.91	11.50	1.88	10.09	3.35	47.15

18 Market Share—Forex (%)

Period	January 2020	January 2019	2019–20^	2018–19^
Top 5	33.37	34.73	31.44	32.30
Top 10	57.75	53.49	53.36	53.36
Top 15	74.21	68.78	69.51	68.34
Top 20	83.62	79.73	80.50	78.74

19 Tenor-wise Forward Trade Analysis (%)

Settlement Period	< 30 Days		> 30 Days & <= 90 Days		> 90 Days & <= 180 Days		> 180 Days & <= 365 Days		> 1 Year	
	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value	% to Total Trades	% to Total Value
March 2020	15.89	24.72	22.85	27.60	19.76	20.35	38.19	24.19	3.32	3.14
March 2019	17.70	26.60	25.99	31.14	14.85	14.51	37.73	25.31	3.73	2.43
2019–20^	16.53	25.13	25.59	30.56	16.34	14.63	34.84	25.28	6.70	4.40

20 Forex Trading Platform: FX Clear (Amount in $)

Period	Spot		Daily Average	
	Trades	Value	Trades	Value
March 2020	28809	17283	1440	864
March 2019	35857	21535	1887	1133
2019–20^	429159	266970	1773	1103
2018–19^	544497	354278	2250	1464

^ data pertains to April–March * Call and Term Money Segment; ** Includes Small Finance and Payment Banks; @ 5 November 2018 onwards (i) Figures in brackets are percentage to total, (ii) Tables 1 to 11 relate to Government Securities Market, (iii) Tables 12 to 14 relate to Money Market, and (iv) Tables 15 to 20 relate to Forex Market. Source: Clearing Corporation of India Limited (CCIL).

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