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Economic & Political WEEKLY

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Money, Banking and Finance

A set of five articles analyses issues relating to monetary policy and financial regulation from the standpoint of emerging markets and developing economies, the interdependence of global equity markets from a heterogeneous investor perspective, the structural malaise affecting India's growth process, regime changes in India's monetary policy, and the impact of financial misconduct on bank behaviour. pages 26–71

Re-imagining the World Order

While societies may be more inter-connected than ever the absence of genuine multilateral cooperation has been exposed by the COVID-19 outbreak. page 10

Participatory Rehabilitation

The involvement of persons with disabilities in planning and implementing of rehabilitating programmes is essential to realise the actual goals of rehabilitation. page 12

The Precariat Non-citizen

The worst-off sections of society find little meaning in the concept of citizenship, as the citizenship ideal remains a mirage by not challenging social inequalities and class exploitation. page 18

Transforming Villages. Ensuring Prosperity.

Climate Action

Rural Infrastructure

Watershed Development

Farmer Collectives

Women Empowerment

Tribal Development

Financial Inclusion

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Economic&PoliticalWEEKLY

COVID-19 Should Make Us Re-imagine the World Order

10 As a biosecurity crisis brings the world to a brink, a humane globalism and institutions that actually supply public goods are in need. *— Zorawar Daulet Singh*

Excluded in Rehabilitation: Disability in the Neo-liberal Era

12 The experience of disability is explored within the growing impact of neo-liberal globalisation utilising an ethnographic approach. *— Deepika Sharma, Kumar Ravi Priya*

Majoritarian Politics and the Ayodhya Verdict

16 The Ayodhya verdict favours politics over history and the religion of the majority over principles of equality and justice. *— Nayakara Veeresha*

Waiting for Citizenship

18 Social groups that are forced to live in precarious and vulnerable conditions are effectively reduced to being non-citizens, despite being recognised as formal citizens. *— Harish Wankhede*

What Drives Transitions in Milk Productivity?

72 The trend in milk productivity and its association with breed improvement, feeding and animal husbandry practices, and efficiency in dairy farming at the household level are examined in Punjab. *— S K Srivastava, Ramesh Chand, Anjani Kumar & N P Singh*

Money, Banking and Finance

In the context of the global recession and deepening economic slowdown in India, a set of five articles discusses topical issues pertaining to the global financial markets in general and Indian financial markets per se.

Finance and Monetary Policy beyond Neo-liberalism

28 The emerging economies need to practise enhanced and active surveillance of their financial sector in their quest for maintaining high growth along with financial stability. *— Rakesh Mohan*

Indian Monetary Policy and Tenures of RBI Governors

37 The regime shifts in Indian monetary policy during the period 1998–2017 are examined using a multivariate Markov-switching Vector Autoregression (MS-VAR) model. *— Utso Pal Mustafi, Rajeswari Sengupta*

Economic Slowdown and Financial Fragility

46 The dual phenomenon of an unprecedented slowdown as well as financial fragility in the Indian economy is addressed in the context of India's overall growth trajectory and policy regime in the last two decades. *— Zico Dasgupta*

Financial Misconduct, Fear of Prosecution and Bank Lending

54 In the presence of financial misconduct, state-owned banks typically cut back on credit creation and instead increase their quantum of risk-free investment. *— Abhiman Das, Avijit Bansal & Saibal Ghosh*

Time-varying Nature of Stock Market Interdependence

62 Employing novel time-frequency based wavelet techniques, the interdependence of global equity markets is analysed from a heterogeneous investor perspective, with a special focus on the Indian stock market. *— Avishek Bhandari, Kamaiah Bandi*

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The Economics of a Plate of Food in India

"Thalinomics," the 11th chapter in the *Economic Survey* 2020, has quantified what a commoner pays for a plate of food in India and therefore relates economics to their everyday lives. *Thali* prices are computed using average monthly price data, used for the Consumer Price Index for Industrial Workers (CPI-IW), from April 2006 to October 2019, and the nominal gains that a consumer has achieved in the last five years are estimated as a difference between the inflation-based projected prices and the actual prices of food commodities forming a thali. The estimates reveal that after 2015–16, an average household gained ₹10,887 and ₹11,787 per year on average from the moderation in vegetarian and non-vegetarian thali prices respectively.

While the chapter talks about improving affordability of food, especially since 2015–16, the results must be taken with some caution. In measuring the affordability of a thali, the estimates have considered only about 3.3% of the total workforce of the country. This is just a subset of the workforce associated with the organised manufacturing sector. It must be noted here that households who depend on agriculture are both producers and consumers at the same time, and any decline in prices of food implies a decline in their income.

Again, while the chapter claims that the affordability in prices is because of a series of reforms that the central government has taken in the last five years, like the Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), Pradhan Mantri Fasal Bima Yojana (PMFBY), the Electronic-National Agricultural Market (e-NAM), etc, there is no mention of the impact of such schemes on Indian agriculture and the channels through which these might work.

Take, for example, the case of PM-AASHA, which is an umbrella scheme of three sub-schemes, namely price support, price deficiency, and private procurement and stockist schemes. Under price support, which happens to be the oldest of these sub-schemes, the procurement of pulses and oilseeds in the last three years through 2016–17 has been as meagre as 0.02 million metric tonne (MMT), 0.1 MMT and 2.7 MMT respectively. Less than 10% of total pulse production was procured in 2018–19, which happened to be the highest procurement year. To the best of my knowledge, the price deficiency scheme was piloted in Madhya Pradesh as the Bhavantar Bhugtan Yojana only to yield mixed results and later be rolled back. Therefore, any claim of significant impact of this particular scheme is questionable. The private procurement and stockist scheme is yet to be launched.

PMKSY is another scheme that they claim to be responsible for the decline in thali prices. The 2004 Task Force on Micro-rrigation had estimated a potential of 69.5 million hectare under micro-irrigation. A NITI Aayog report finds that only 10% of the total potential area has been brought under micro-irrigation till date. Once again, claiming its responsibility in lowering prices might be too premature.

With regards to PMFBY, during 2018–19, about 5.64 crore farmers were enrolled with PMFBY for an insured sum of ₹2,35,277 crore, and 30% of the gross cropped area was insured. The fact that the scheme underwent a massive revamp days after the publication of the *Economic Survey* raises questions about its efficiency in the first place. The central government has now made it voluntary and restricted its share in premium to 30%. However, when it was launched four years ago, there was no upper limit to the central government's share in the premium amount. The rise in premium now might reduce the number of insured farmers and increase the rate of premium for some crops in certain areas. Also, now the scheme has been made voluntary, and the states and union territories can decide the number of additional risk covers, making it further less attractive for the farmers.

e-NAM was launched in 2016 with an objective of spatial integration of all markets across the country. However, there is hardly any evidence of intra-mandi or interstate trade. It is therefore

premature to make a claim on its behalf. So, any contribution of these schemes in lowering prices is neither well-researched, nor backed by substantial evidence.

One of the reasons why prices did not go up during this time period can be credited to the Reserve Bank of India's inflation targeting since 2016. However, the *economic survey* makes no mention of it. Further, there is absolute silence on the plausible impact of demonetisation on falling prices of the agri-commodities.

One thing that the chapter must be given due credit for is its acknowledgement off arm distress. With food prices not going up, farmer income is also not going up. The Organisation of Economic Cooperation and Development (2018) finds that despite all the schemes and subsidies given to the farming sector, we tax agriculture. The report finds that between 2000–01 and 2016–17, farmers lost `45 lakh crore (at 2017–18 prices), or around `2.6 lakh crore per year due to such taxation. By claiming that plummeting dal and vegetable prices are one of the reasons for cheap thalis, the *Economic Survey* indirectly brings out the inefficiencies in value chains of both these commodities. Low prices are because of inefficient marketing systems, abrupt and consumer-biased trade policies, and poor marketing infrastructure, among other things. These are the reasons why, despite bumper harvests, distress of pulse farmers has increased over the last few years.

In this context, if one goes with the leaked findings from the National Statistical Office consumption survey report that rural consumption, including expenditure on staples, fell by 9% between 2011–12 and 2017–18, then the poor are evidently consuming less than they did a decade back. This raises questions such as, Why is consumption falling if food is cheaper? It also makes us think whether cheaper food is always the most efficient solution for the market.

The chapter has, in a way, brought into public domain the bias that the agriculture sector as a whole has been facing in India. There is an inherent consumer bias in policymaking in India. A fall in prices is not considered as a fall in farm income, while a rise in agricultural commodity prices is turned into a crisis. What gets overlooked here is the welfare status of the farmer and their income.

Tirtha Chatterjee
THIRUVANANTHAPURAM

Ramifications of Tax Reductions

This is in response to the article "Corporate Tax Reductions: Weak Analytical Foundation" by J Dennis Rajakumar and S L Shetty (*EPW*, 7 March 2020). Its aim is to investigate the "nature of corporate tax reform and its potential to achieve the objectives of promoting growth and investment" (p 62). The article is timely in the context of economic growth slowdown in major sectors, including the rural agrarian crisis. The main research question that is explored is whether the reduction in corporate taxes really promotes a conducive environment for the increased investments in the domestic market. In simple terms, it explored the fiscal feasibility of the reduction in corporate taxes and its implications on the growth stimulus. With the help of time-series data, the authors find that the "vast reduction in corporate taxes does not possess the potential to produce the desired outcome in so far as reviving corporate investment is concerned" (p 65). The findings are policy-relevant and serve as an eye-opener for the government to restructure taxation priorities.

The authors have rendered justice to the title with the help of data and its subsequent critical analysis to arrive at certain crucial implications for fiscal policy with emphasis on the revenue base of the government. It is observed that the reduction of corporate taxes has skewed the revenue receipts of the government from the corporate sector, which is a revealing aspect. This happens in two ways: (i) The reduction in the share of percentage of corporate tax in direct taxes, and (ii) the benefits of tax reduction are accrued by the non-manufacturing companies. One of the critical findings is that "the financial burden associated with corporate tax rate reduction is falling on the contraction in government tax revenue, and simultaneously, the relative burden of direct taxes is falling on individuals" (p 64).

The conclusions and some inferences have severe ramifications in the context of social sector expenditure in India; to illustrate, it is noted that the corporate tax reduction cuts down social sector spending. Some data or figures pertaining to education and health expenditure would have added the necessary substantiveness to this claim and pattern. Similarly, it brought out the inability of the budget as a fiscal instrument to contain widening inequalities. One of the missing links is that while bringing forth the corporate tax reductions as a weak foundation to increase corporate investment, the authors could have explained a little more about the consequences of such regressive taxation measures on corporate governance and the growth of the economy.

This is essential to draw the attention of policymakers whose interests are inclined towards fulfilling the agenda of the neo-liberal economic regime, where only a few big companies are making profits out of these measures. The "heroic tax reform measurescosts" (p 62) cost heavily on the distributive justice aspects, especially in containing the increasing income inequality in society. The fiscal unsustainability of the reduction of corporate tax exerts financial burden on household income. The authors deserve appreciation in exploring the "misplaced priorities" (p 66) of the government in matters of tax reduction as fiscal instruments to bring more investments in the corporate sector. The article is educative and informative and is useful in understanding the nuances of public finance to explore plausible alternatives to overcome the existing fiscal policy paralysis.

Nayakara Veeresha
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Regulating the Private Health Sector to Eliminate COVID-19

Both public and private medical services must follow the same pricing standards to treat COVID-19 patients.

The current COVID-19 crisis that India is battling has brought into sharp focus the public health system's inadequacy to cope with it. At the time of writing, the media has reported that private laboratories and private hospitals have been permitted to manufacture testing kits and provide treatment, respectively. However, what happened in Maharashtra's Jalgaon district a couple of weeks ago is strongly illustrative as well as cautionary. A sick doctor suffering from high fever was turned away from four private hospitals. On a social activist's appeal to the district collector and with the latter's intervention, the doctor was admitted to the district hospital where, his health having severely deteriorated in the meanwhile, he had to be put on a ventilator.

The strikingly contradictory scenario of healthcare delivery in the country has been unfolding rapidly over the years. Hospitals with state-of-the-art equipment rivalling five-star hotels in their facilities are mushrooming mostly in cities even as the overburdened public hospitals are valiantly fighting to cope. As far as the rural areas are concerned, the community health centres and primary health centres and sub-centres present an even more dismal picture in terms of availability of medicine stock, trained para-medical staff, and doctors and nurses. However, it is not as if the urban hospitals offer patients excellent care. A common and widely held general misperception is that the private healthcare system is better than the public one. But, complaints of non-transparent billing, demanding exorbitant sums in advance even in a medical emergency, and cutting corners in services are all too familiar, as are cases of the denial of services of which the Jalgaon case is a prime example. In semi-rural areas and towns, the private sector is not necessarily similar to hospitals in cities. The private hospitals in these areas are small, and have basic infrastructure and limited medical and non-medical staff. Unlike the cities, the power and water supply in these areas also constitutes a problem to the functioning of these hospitals.

Within the public sector health system, there are a number of trends again that add to this dismal picture. Doctors in the public hospitals deal with an overwhelming number of patients majorly from the poor and marginalised sections. Health activists have also pointed out that the growing trend of contractual hiring of para medical and allied staff leads to insecurity among them, and thus affects overall caregiving to patients. Consequently the poor patients' families, frustrated by the lack of infrastructure and services, turn their anger upon the doctors and nurses. The constant vilification of the public hospital staff coupled with starving these hospitals of resources has led to the view that the private hospitals are "much better" despite their exorbitant rates.

Health is a state subject, and it is well known that the health delivery systems are not uniform across states. Kerala is often held up as a role model generally, and even now in the manner in which it has dealt with the COVID-19 crisis. As it is, certain states in North India have abysmal healthcare systems, and a couple do not have any testing facilities, the media has reported.

Undoubtedly, at present, the private sector must be involved in screening, tests and treatment for COVID-19. The highly trained professionals in this sector can contribute enormously by helping scale up the testing efforts. In South Korea too, it was large-scale testing that was instrumental in reducing mortality rates. However, services across sectors must not be priced differently at a time like this. The media has reported that there is a difference of opinion between the government and private sector on the price of COVID-19 tests flowing from the prices of test kits. A clear and non-negotiable protocol for the private sector must be established regarding the present crisis and how the government is going to help financially and otherwise in dealing with it.

The experience with the government offering subsidies to hospitals, especially in urban areas in terms of land and other concessions, has not borne out desired objectives such as better care for the poor. Many of the corporate hospitals—and more and more big investment groups are homing in on healthcare and health insurance—have frustrated these

objectives. Taking a cue from this, the testing, screening, and treatment facilities must be regulated in terms of pricing and quality.

The Supreme Court has held healthcare to be a fundamental right under Article 21. The biggest lesson of the current crisis is that political will must focus on strengthening the public health system. It is clear now that the private sector must step in for handling of the COVID-19 emergency since the public sector alone cannot manage to do so. But, it is imperative that the monitoring and regulating of the prices for every phase of the management and treatment of the disease must be rigorously applied. The finance minister has announced a package of ₹1.7 lakh crore to deal with this catastrophic situation. This is welcome, but long-term resource allocation to invigorate the public health system must be a continual and parallel process.

Challenges before Independent Judiciary

Subjective interests of individuals and partisan politics undermine the judiciary's independence.

Former Chief Justice of India (CJI) Ranjan Gogoi burnished his credentials as the worst CJI this country has ever seen when he accepted the nomination by the President to the Rajya Sabha. At a time when the Supreme Court is being increasingly seen as compromised and beholden to the union government, the way in which Gogoi's nomination was done stinks of quid pro quo.

Defenders of the move have pointed to past instances of appointments of Supreme Court judges to the Rajya Sabha. The examples of Justices Baharul Islam and Ranganath Misra have been raised. There have also been instances in the past where the Supreme Court has functioned as a helpful adjunct of the union government, covering up for its misdeeds. The Court under CJIs A N Ray and M H Beg during the Emergency is a prime example. What we have not seen, however, are instances of the government brazenly rewarding a CJI who has surrendered the Court to it as Gogoi did.

That the union government has used the carrot of post-retirement appointments to obtain favourable judgments in the past cannot be disputed. While we cannot assume every single judge who was appointed to some post after retirement was necessarily being rewarded for a favour, the numbers are disconcerting to say the least. As a study by the Vidhi Centre for Legal Policy has shown, 70% of all judges who ended their tenures between 2014 and 2016 took up a posting, and 36% of these were central government appointments. Scholars Madhav S Aney, Shubhankar Dam, and Giovanni Ko have, through rigorous empirical analysis of Supreme Court judgments, shown how the union government gets favourable judgments from judges who are closer to retirement during the government's term.

In almost every important and significant case that Gogoi heard since becoming the CJI, the union government got almost exactly what it wanted. The case of Central Bureau of Investigation (CBI) Director Alok Verma, the Rafale Papers case, the Electoral Bonds case, the Babri Masjid case, the challenge to the removal of Article 370, the internet shutdown in Kashmir, the detention of prominent politicians in Kashmir—the list is long. In some cases, a dubious verdict based on "sealed covers" was handed down by Gogoi-led benches, in others, the matter was simply delayed beyond all reason. If the Court's function was to hold the union government accountable for its actions, one simply saw no trace of that function being carried out in the Gogoi-led court.

At a personal level, Gogoi's suitability for the Rajya Sabha nomination is also questionable, especially given his misdeeds on the bench. He stood accused by a court staffer of sexually harassing her and then victimising her and her family when she refused his advances. When the matter became public, Gogoi interfered in the course of the proceedings and made a mockery of any notion of fair hearing and impartiality that the victim could expect.

What, perhaps, makes all of this much more intolerable is that Gogoi was part of the group of four judges who held a press conference against the then CJI Dipak Misra, alleging against him the misdeeds that Gogoi himself would go on to commit from the bench. The most ironic perhaps being the allocation of sensitive cases concerning the union government to Justice Arun Mishra, about which Gogoi complained but would go on to do the same multiple times in his own tenure. It prompts one to ask: Did he have such a dramatic change of heart? Or did he conceal his true intentions so effectively? Having raised hopes that his tenure as CJI would remedy the worst failings of Misra, Gogoi went on to make a complete mockery of such expectations and, having accepted the Rajya Sabha nomination, went one step further than Misra in ignominy.

And yet, even after the nationwide storm of criticism over the acceptance of the Rajya Sabha seat, Gogoi has continued in his unapologetic ways. He has, in softball interviews on pro-government channels, parroted his own self-serving defences in his sexual harassment case and his wholesale handover of the Supreme Court to the union government. He has hurled baseless accusations against all and sundry for his own misdemeanours and faults. He has not shown the slightest remorse for the pain and suffering his cruel and callous orders in the Assam NRC (National Register of Citizens) case have caused.

All of this prompts us to repurpose what American lawyer Joseph N Welch asked Senator Joseph McCarthy at the height of the latter's anti-communist witch-hunt:

> Have you no sense of decency, sir? At long last, have you left no sense of decency?

Reason of the State and COVID-19

It is needless to mention that COVID-19 has, by now, become a global calamity that has engulfed in its destructive logic many countries, including India. Given the highly infectious nature of the disease, the unruly nature of the virus is likely to create a shocking degree of devastating impact that may endanger the life of many. Hence, the governments, both at the centre as well as in the states, in order to quarantine people within their houses have been using both moral appeals and also have clamped prohibitory orders. Thus, governments are trying to reach out to the people with both moral appeals as well as punitive measures that have been adopted by police forces against the "transgressors" in many parts of the country. In the event of repeated "transgressions" by tormented sections of people, some state authorities have gone to the extent of suggesting extremely repressive measures, such as shoot at sight.

However, there seem to be two sides to the governments' line of reasoning that has been used to lend support to its action, both its appeals and prohibitory orders and the resultant punitive actions particularly by the police. First, the governments do have a sound universal reason to suggest that staying indoors does guarantee people protection from the menace COVID-19. The governments' line of reasoning that people who stay inside their houses are likely to remain safe is understandable. Second, the governments assume that people have adequate stocks of essentials and hence have no reason to cross the "Laxman Rekha" or the thresholds of their houses. According to the logic of the official reasoning, those who are stepping out from their houses, therefore, lack adequate reason and hence are liable to be put back into their houses by the use of punitive power.

However, such reasoning of the governments looks flat inasmuch as they clamped these prohibitory orders without considering the fact that it is the uneven capacity that make people respond differently to the appeal and orders of the governments. Those who have the capacity and adequate resources to store essential items for several days can respond to the appeal and orders by staying indoors. Staying at home, therefore, is dependent not on the desire to do so, but on the capacity to stay at home.

However, the governments' reasoning, apart from it being flat, also looks skewed. It does not take into consideration the factual questions such as: Who can stay indoors? Many people have been stepping out of their houses and are seen to be accessing the markets despite the governments' appeal and police action. These people who do not have adequate resources to stock the essentials for days together are bound to step out of their houses. Thus, the "Laxman Rekha" gets primarily defined in relation to those people who are likely to transgress both the appeal and prohibitory orders of the governments.

The governments' reasoning did not reach the most helpless lot of the disadvantaged until the central government's announcement of the ₹1.7 lakh crore package for such people. Lakhs of people feel not only helpless but also abandoned by the governments as well as the civil society. Tribal families that were working in brick kilns near Mumbai, Maharashtra, in the event of their closure and the suspension of transport systems had to walk several kilometres back to their villages with their kids crying for water and food. Lakhs of migrant workers from North India met the same fate. Thanks to the philanthropic efforts made by a charitable initiative, these workers were taken care of in a community shelter. The Government of Tamil Nadu, we are told, have taken over the responsibility to take care of these helpless and abandoned labourers in the state. We can see several philanthropic efforts all around the country helping these people. In the initial phase of the pandemic, as it were, governments were putting more responsibility on the people by reasoning out with the latter about the need to maintain social isolation. But, now the central government seems to be gradually awakening to the adequate or egalitarian thrust of reason. This is evident in the central government's announcement on 26 March 2020 to reach out to the poor with the welfare package.

Gopalpur

FROM 50 YEARS AGO

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Computer's Real Enemy

Some results of a national survey on the use of computers by corporate bodies were presented at the recent alumni conference in Bombay of the Indian Institute of Management, Ahmedabad. The study, restricted to 35 out of the total of more than 100 computer users, was an attempt to analyse the decisions that led to computerisation and its subsequent effects on profitability and managerial efficiency. Seven of the 35 bodies studied were "universities, non-profit bodies, etc" and so the results would be pertinent to only the remaining 28.

More than 50 per cent of the sampled computer users have had their installations running for over four years, and about 90 per cent for over two years. Of the 35, 27 had experience of unit record equipment before the introduction of computers. Thus one may assume that the process of computerisation had reached some stability for most of the users, so that generalisations regarding their experiences would be valid.

The reasons for deciding to computerise and the impact of computerisation are naturally not independent factors. Most of the corporate bodies had decided — at the highest level — to go in for computerisation in order to handle the increasingly large volume of data to be processed.

COVID-19 Should Make Us Re-imagine the World Order

ZORAWAR DAULET SINGH

As a bio-security crisis brings the world to a brink, the dominant neo-liberal vision of world order must be displaced by a humane globalism and institutions that actually supply public goods.

The COVID-19 or the novel coronavirus could not have broken out at a worse time. A slowing global economy, a fraying international order, social discontent and political apathy across countries, and then topped off with a global pandemic threatening peoples and communities across 120 countries. Worse case scenarios paint a frightening spectre. If we assume 30%–70% infection rate of the world's population and a fatality rate of 3%, the result would be nearly 70–165 million fatalities. The previous such virus, severe acute respiratory syndrome (SARS) killed fewer than 800 people at a fatality rate of 10% of those it infected. SARS appears a mild episode compared to what we have witnessed so far this year. The ease of transmission between humans and the mildness or undetectability of its early symptoms, particularly in the young, makes COVID-19 deadly and unprecedented.

Across the world, authorities are grappling to contain the virus with degraded or underfunded public health systems. It is a race against time, with containment the only option before a viable cure is invented and made available on a large scale. But, it is also the spillover of this pandemic on to global politics and geo-economics that could upset calculations of strategists everywhere.

Even without this global health crisis, the world was confronting simmering problems on several fronts. For one, the post-Cold War unipolar order has broken down and the United States (US) and its allies cannot put it back together again. Yet, great power challengers like Russia and China and several regional powers do not possess the power and nor are they inclined to rule the world. This impasse is not producing the conversations we need to imagine a more sustainable and collaborative order. For another, commerce and economic life in general has been tepid for the past decade. Despite fits and starts driven by clever manipulations of interest rates and the role of the banking system, major economies deluded themselves into believing the 2008 economic crisis was behind them. India's own experience—a microcosm of the ineffectiveness of neo-liberal economics—shows that even potentially high-growth regions have not succeeded in shrugging off the imbalances and distortions in the economic system.

If it were a question of business cycles and geopolitical disagreements, the international order could stutter along for some years. What we see instead is a dystopian reality in the West and the East, an age where the fundamental premises of what ought to constitute order and policy is being shocked by disruptions within and between political communities. Is it about the decline of the West, which held sway over the fate of the planet for nearly five centuries, and the rise of an impatient rest? Is it about a civilisational struggle between Asian or Eurasian nationalisms and a dominant neo-liberal image that seeks to eviscerate culture and identity from politics and society? Is it about a clash between international capital and weak non-Western states on the periphery, a contest where the US and China might have more common material interests than their elites admit to? Is it a revolt against globalism by local and national communities in the north and south that got left behind in the neo-liberal age? All these binaries have much truth in them, and yet, none dominates the narrative or pulse of the street. The complexity of disruptions makes previous ideological and power contests appear innocent and utterly detached from the biggest questions of our time.

All these contestations, however, do have a common strand: the interdependence of our contemporary international life. Aided by digital and transport technologies and further propelled by capital and the innate desire for a better life, societies are more inter-connected than

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at any time in world history. No major power is really trying to roll the clock back on this feature of our age. They are each bringing their values and interests and, of course, power to shape all these inter-connections in ways that benefit their domestic politics and vested interests at the helm. Yet, for all the technological and financial resources at their disposal, the absence of genuine multilateral cooperation has been exposed by the COVID-19 outbreak.

Just like the trivial event that the G-20 summits have become for managing the world economy or the United Nations Security Council is for conflict management and diplomacy, the void of meaningful inter-state cooperation on biosecurity should make us rethink the very concept of world order. To some extent, climate change and the inescapable reality of a common ecological fate for all mankind should have prompted major powers to craft new norms and institutions that could transcend intra-mural suspicions and national interests. But it did not. A bio-crisis like a phantom pandemic that spreads in the shadows is the ultimate foil for those who resisted supporting the material and social interdependence of our epoch with progressive norms and effective institutions. It is now one world, and leaving that world to its own devices is fraught with dangerous consequences, perhaps even more so than the spectre of a nuclear holocaust that kept major powers on the edge during the Cold War.

An Inflexion Point

For the moment, countries are retreating into their national shells to maintain sheer survival. As the dust settles and health systems across the world come to terms with their fallibility to safeguard their own people, the opportunity for radical shifts in the discourse on world order must not be lost. We are at an inflexion point.

The utter human destruction caused during World War II brought the idea of one world into the lexicon of international politics. The world could no longer be left to the patterns of the past, where national communities ravaged each other in endless quests for wealth and power. Although the superpowers did carve up much of the world into exclusive blocs with their own rules, the nuclear revolution made it apparent to anybody with common sense that the planet could not be managed merely through rivalries and balance of power, the legacy of European statecraft.

The unusual geopolitical stability from the Cold War age paved the way for a resumption of inter-connections between societies. Technology and the incessant quest for profit and new markets made capital and big business the vanguard to break out of national shells and globalise the planet. What emerged was a heady neo-liberal age where past contradictions between different forces and interests in a political economy were swept aside in favour of the smallest but most powerful groups who mobilised political power to create the so-called rules-based order. For the most part, these were exceptions made for the privileged sections of national communities to enjoy the advantages of a "one world" economy.

This neo-liberal age exhausted itself for the same reason that capital exhausted its growth cycle in national economies. It never truly sought accommodation with other stakeholders, and therefore never designed international institutions and norms that would provide fair play to other actors in the game—the periphery in the global South, the middle classes, the vast unskilled labour or semi-skilled workforce, and proud non-Western civilisations in Eurasia. All these were merely forces in the way—of a dynamic production and consumption system, not necessarily the most efficient in managing the planet's scarce natural resources or safeguarding its fragile biosphere. Neither did it seek to empower people, despite all the false pretentions of liberty and freedom that neoliberalism packaged itself with in its crusade. The assault on neo-liberal globalism from multiple directions including from within the most advanced and prosperous societies in the West is an opportunity for real change.

We have created an inter-connected world, but without sophisticated modes of inter-state coordination and cooperation. We now have a balance of power but without real multilateralism. To borrow from Karl Polanyi, the present order has subordinated "the substance of society to the laws of the market." And, dominant rules or laws today are ambivalent towards or, in many instances, work against human security. A biosecurity crisis had laid bare the futility of distorted globalism that is increasingly reviled everywhere. Ad hoc national responses reveal "the gaps in the multilateral system's current ability to manage fast-moving, complex, and interlinked chains of cause and effect" (Cliff and Openheim 2020).

Yet, these gaps are not an oversight. They reflect the narrow perspectives of the progenitors of the neo-liberal order who never invested in capacities or endorsed ideas that buttressed human security. It cannot be one world only for finance capital or one world only for super elites accessing tax-free havens or one world only for international security and nuclear stability. All this becomes meaningless without human security, a concept that has been mocked and trivialised even by elites in the global south who were all too eager to plug into the sparkling neo-liberal "one world" for the few. But, as Mike Davis (2020) observes, "capitalist globalisation now appears to be biologically unsustainable in the absence of a truly international public health infrastructure." If there is a cruel irony and lesson of COVID-19, it is that selective visions of world order have exposed people everywhere.

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Excluded in Rehabilitation
Disability in the Neo-liberal Era

DEEPIKA SHARMA, KUMAR RAVI PRIYA

The experience of disability is explored within the growing impact of neo-liberal globalisation utilising an ethnographic approach. Findings indicate how its implicit "commodifying" impact on persons with disabilities aggravates their physical and psychological wounds by amplifying their identity as the "unproductive" or "less productive" other. A need for dialogical partnership, where the marginalised voices are acknowledged and listened to, is accentuated for meaningful participatory rehabilitation.

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The disability experience for most persons with disabilities (PWDs) is that of being perceived as the "deficient," "economically unproductive or less productive," and "dependent or needy" other. They often internalise these perceptions. Such perceptions have been sustained by the discourse of the medical model of health (where the standards of a healthy body or "ableism" makes bodily impairment a "deficiency") and cultural discourses comprising norms or stereotypes about having an impairment. With poverty aggravating the condition of impairment, and PWDs frequently denied income-generation opportunities, especially in the global South, they find themselves trapped in this vicious cycle of poverty and disability (Dalal 2010; Ghai 2001).

Neo-liberal globalisation is a doctrine of radical marketisation that insists on expanding the market logic and principles (for example, self-interest, calculability, competition, efficiency and profit) to all areas of life (Mladenov 2015). It embodies the recommodification of labour by focusing on market participation as essential for an individual to meet their needs and be considered as a citizen (Mladenov 2015; Owen and Harris 2012). Thus, neo-liberal globalisation that is founded on this implicit "economic model" may further deepen their physical and psychological wounds of being unproductive or less productive. James I Charlton (1998), in his book *Nothing About Us Without Us: Disability Oppression and Empowerment,* had hopes for a more participatory rehabilitation process of PWDs as he envisaged that their voice and dignity could be better cared for through their direct involvement in the planning and implementation of rehabilitation programmes.

In this article, we will explore the extent to which government institutions as well as disability rights organisations have been effective in reaching out to the problems and issues of PWDs in order to facilitate inclusive rehabilitation in the era of neo-liberal globalisation. In addressing these questions, we will utilise the research findings of prominent researchers in the domain of disability, besides the field notes and narratives from an ethnographic study conducted by the first author in Kanpur and New Delhi.

The first author conducted an ethnographic study from November 2015 to April 2017 to explore the policies and programmes for the rehabilitation of PWDs by the government that can prove to be an antidote to their miseries. Her ethnographic fieldwork focused on locomotor disability, particularly on accident survivors (persons with amputation and spinal cord injury), who are based in Kanpur and Delhi. The sample included persons with amputation (lower and upper limb amputation) and persons with spinal cord injury (paraplegia and quadriplegia). She collected data from an assistive aids manufacturing unit and a vocational rehabilitation centre (VRC), and through home visits in Kanpur. In Delhi, she collected data from a hospital, a VRC, and a non-governmental organisation (NGO) based in the urban slums, besides home visits. In addition to this, she also visited the prosthetics distribution camps, other significant events, and government hospitals where disability certification takes place.[1] She utilised a semi-structured interview schedule to conduct in-depth interviews, together with participant observation and informal interactions. She further engaged in informal interactions and discussions with stakeholders, such as service providers, physicians, physiotherapists, and heads of various institutions. We analysed the ethnographic data using the process of grounded theorising as per the guidelines of Hammersley and Atkinson (2007).

The ethnographic findings point out the state of affairs of PWDs in Delhi and Kanpur and their role in the various participatory rehabilitation programs at (i) medical assessment and rehabilitation centres, (ii) distribution of disability certificates, (iii) vocational rehabilitation

centres, and (iv) periodical events, such as, awareness camps, prosthetics distribution camps and conferences. We also discuss the heterogeneity of issues and problems of the PWDs that has been grossly ignored by these rehabilitation programmes.

Assessment and Rehabilitation

Kanpur does not have a single holistic rehabilitation centre, where recovery can be enhanced by services like physiotherapy, yoga, and peer motivation. The lack of awareness about rehabilitation and low follow-up rates increase the chances of disability (Kumar et al 2012). Usually, participants were able to access proper medical surgeries, but the much-needed post-surgery medical care like physiotherapy was seldom available and accessed by them. Besides, most of the PWDs did not have enough awareness about artificial limbs and other adhesives required as aids to persons with amputation. One of the participants, a male with quadriplegia from Delhi, spoke about how lack of awareness intensified his condition:

> I was in the hospital for 25 days and then they discharged me without giving us any information about the illness. They did not even say that physiotherapy is so important for me. They just said that I would recover in 18 months. For three years, I was on my bed, in between I used to go for a check-up, but they never mentioned anything about the life ahead. We are villagers and not very educated and hence did not realise the importance of physiotherapy for such an injury.

Interactions with medical doctors revealed that there is a lack of good physiotherapy centres even in reputed hospitals in Kanpur. In hospitals, where there was provisions of physiotherapy units, their efficiency was not up to the desired standards. Clearly, physiotherapy and its importance was not a matter of concern in such hospitals. The lack of a good rehabilitation centre increases the risk for further immobility problems that may lead to lesser scope for complete recovery, thereby lowering the quality of life of PWDs. This is worse for persons with spinal cord injury, as immediate post-surgery care is vital for their successful rehabilitation. In addition to this, proper counselling, which can help them better adjust with their disability, is an important aspect that is often ignored.

Disability certificate centres: The only centre for the distribution of disability certificates in Kanpur was located in the government hospital, and revealed the gloomy state of affairs of this marginalised section. Weekly visits to this centre showed the reality that PWDs face and gross negligence on the part of the system. The PWDs were harassed by the corrupt and inefficient system, the apathy of the service providers, and problems of inaccessibility. Many were not even aware of the disability certification process, or about the use of prosthetics.

Within the government hospital, there was a small wing with two rooms for the service providers and a rather small hall for people to sit as they waited for their turn. As it was a weekly arrangement, at least 200–300 people would gather at once and the hall could not accommodate all. Those who reached hours before the office opened could get a seat, while others stood outside. For submitting forms, there was a tiny window and access to it was a challenge for most PWDs. Many of them had to crawl their way inside because of the crowds. The entry to the main chamber, where a team of doctors evaluated and declared the eligibility for a disability certificate, was impeded by a "group of staff" who would really decide who makes it first to the room, irrespective of the token system. The application forms were in English, and since many of the PWDs were from nearby villages, from socio-economically disadvantaged backgrounds, and were uneducated, they were unable to read or write, were confused, and utterly helpless. Due to the unavailability of any help, each one was trying the best to help the other. For those who were accompanied by a family member or a friend, things were a little easier than those who came all by themselves. As one male with amputation from Kanpur exclaimed,

> I came all the way from so far away, and people who could bribe the officers got their certificates so easily. I do not have money to bribe them, all I can do is come again next week and wait for my turn. The little money I had was spent in my fare, and I do not know how I will manage it in the next week.

Interactions with PWDs showed that they had not been involved in the planning and implementation of any such facilities for them, and were instead treated as secondary citizens and with disrespect. They were clueless and apprehensive about asserting their right to dignity and just treatment, having been on the receiving end and having no say about the issues that affected them. When enquired about their experiences of and inputs towards rehabilitation services, they reported being treated as docile recipients of the schemes. In many cases, especially, in rural areas, they were not aware of the general schemes of the government.

In addition to this, one could see many agents at such centres, often referred to as "dalal," who acted as the mediators between PWDs and service providers. They would often charge from the PWDs for their services in assisting them with the paperwork and availing schemes. The agents would often portray themselves as social workers, helping those in need. They would often charge unnecessarily high rates for their assistance, and the uneducated and poor PWDs from rural areas would have to oblige. The PWDs would often say that they were helpless, and atleast with the help of these agents, they were able to avail services and complete the necessary paperwork. In the absence of proper coordination between service providers and beneficiaries, and the failure of the system to reach out to the neediest, these expensive agents acted as a major "support system" for the poor PWDs.

Vocational Rehabilitation Centres

The vocational rehabilitation of PWDs aims to enhance skill development for gainful employment among them. However, the work sector is based on ableist assumptions and the wider neo-liberal mindset that dominates the economic and social sectors. Consequently, economic rehabilitation in the real sense is not possible as the job sector is predominantly profit-oriented and consumeristic. Many of the PWDs seemed satisfied with the training programmes, yet their future was uncertain on the completion of the training. This calls for attention to the vast gap between (i) the aims of skill

development and employment opportunities as promised, and (ii) the ground realities of such rehabilitation. A male with amputation from Kanpur shared:

> I have completed both the computer training and typing programmes, but I am still waiting for a good job avenue so that I can start earning. I have extended my stay at the centre, and I plan to learn some other skill as its better than sitting idle at home. It is not easy for us to find jobs and these training programmes or the centre do not guarantee a job. It is frustrating, but we are helpless and can only wait.

During the fieldwork in Kanpur, similar instances came to the fore at job fairs organised by the government. While there was a bulk of companies floating in to "recruit" PWDs, very few got meaningful jobs. Interviewing participants who had also applied for the same showed how ableist connotations guided the job market. Some of the PWDs had humiliating experiences as the focus was on their disability and not their ability. Further, the jobs were not feasible for many as they would have to move to different cities and manage their transport with limited salary. A male with amputation from Kanpur, narrated,

> I should not have appeared in the interview. All they kept asking was questions regarding my ability since I am a disabled person. They should not have called us if their motive was not to recruit us but to insult us and remind us of our disability.

The worst impact is on the poor PWDs as they are unaware of their rights, the availability of different schemes, and of the Disability Rights Movement. This renders them more vulnerable as they internalise the societal attitudes and live with perpetual marginalisation and victimhood. They are defined largely by their disability and are rendered unfit for independent living and formal employment. Exclusion of persons with disabilities can be seen through the employment situation in India, as the gap between the employment of PWDs and that of the non-disabled people has been widening (Dalal 2010). The employment rate in 2002 for PWDs was 37.6%, as against the employment rate of the overall population at 62.5% (WHO 2011).

Free prosthetics distribution: Under the Scheme of Assistance to Disabled Persons for Purchase/Fitting of Aids and Appliance (ADIP Scheme), the government organises prosthetics distribution camps. There were some harsh realities about the accessibility and efficiency of such facilities. The free distribution certainly helped the PWDs avail themselves of assistive devices free of cost and provided relief to some of them. The quality of such devices and the way the camps were organised and managed raised a series of questions about the state of rehabilitation services in India. The camps modelled the "welfare/charity" attitudes in their functioning and delivery of services. The sites chosen for such camps were often inaccessible. Interaction with PWDs at such camps in both Kanpur and Delhi highlighted the difficulties faced by them in reaching such places. Waiting in long queues, they had to often deal with the apathy of the service providers, who were themselves bogged down by the surplus number of beneficiaries and lack of workforce. The delivery system was inefficient; there was a lack of planning and coordination. The imbalanced ratio of service providers and beneficiaries was another problem, and it led to service providers rushing and working in haste, often leading to ill-treatment of PWDs.

Of all the hurdles, the most significant was the attitudes of arrogance of some of the service providers and disrespect towards PWDs. A PWD is treated like a defective body, which needs to be fixed, with the service providers being the ones who have the power and authority to do so. The PWDs were looked down upon as incapable, helpless, and as if their opinions did not matter. It seemed to be a charity event where the power play further marginalised the PWDs. Many PWDs complained about low quality and ill-fitting prosthetics that led to discomfort in using them. In fact, these factors often created hurdles for persons with amputation to adjust to the prosthetic. In addition to this, lack of training in getting used to the prosthetics made persons with amputation switch to a tricycle, thereby losing out on the option of walking on their own.

Periodic Events and Conferences

An event was organised in Kanpur on World Disability Day (3 December 2015), based on the themes of accessibility and inclusion. However, the irony was that the venue was highly inaccessible. The road leading to it was bumpy, as was the ground on which it was organised. The grass was not properly cut, nor was the ground levelled. The uneven ground with the loose carpet over it caused great difficulty for many PWDs as they would stumble upon it. The physical barriers inherent there were shocking and showed the apathy of the organisers. The programme gathered many PWDs with the promise that it is their day and they will be given some benefits as per the new government insurance scheme. The whole programme focused on felicitating the "organisers and coordinators" with media hovering around them. It was only towards the end of all the showbiz that the PWDs were entertained, none of them having been involved in the proceedings, except passively waiting for their turn to be attended to. The whole event appeared as a gimmick for the publicity and profit of the organisers and people in power. A female with amputation in Kanpur narrated,

> I reached here just on time, and we are supposed to get some benefits as they promised today, but it's been a long day, and it looks like as if it is nothing close to "Disability Day." I am tired of waiting and seeing the award felicitation ceremonies of the officers and organisers.

Effective accessibility can be an outcome of meaningful dialogues around disability at conferences (Friedner and Osborne 2015). However, a conference on disability that I attended in Chennai (January 2018) in between my fieldwork was an amalgamation of scholars, activists, and service providers, but only a handful of PWDs. While many spoke about the importance of inclusion and empowerment for PWDs with their suggestions and recommendations, the conference failed to be an example of the same. The presence of a lesser number of PWDs among the audience and a handful of disabled speakers went against the very theme of the conference, which highlighted facilitating inclusion. While the slogan "Nothing about us, without us" repeatedly resonated in the proceedings of the conference, the lack of concern for PWDs and their voice was quite telling.

Rights-based Approach

An NGO running a community-based rehabilitation (CBR) programme in the urban slums of Delhi did show some

positive outcomes, as local communities and resources were used to reach out to the masses and facilitate community participation. However, they were more involved in medical and vocational rehabilitation, without involving the PWDs in activities towards changing societal attitudes. The PWDs did not feel like being a part of it and its affairs. They were remotely aware of its workings and considered themselves as beneficiaries rather than active agents of change and decision-making. Dalal et al (2000) found that community participation was less when the programme was perceived as imposed from outside (qtd in Dalal 2010). The programmes sustained a culture of dependency by repackaging them with charity and welfare mindsets (Dalal 2010).

Interviews with the participants from the urban slums of Delhi showed that disability was not the most critical life issue for them, as on a daily basis they faced the more pressing problems of poverty, finding a place to live, or feeding oneself and one's children. They seem far more detached from the disability culture that prevailed in the main city, which made them even less aware of their rights and facilities. A vast majority of urban PWDs consists of tricycle users who stay near temples and flyovers in big cities. In Delhi, interaction with some of them showed how they were completely unaware of their rights, and, in many cases, the primary government schemes for them. Many of the spinal cord injury persons "rot to death," as they do not have the medical resources to deal with their chronic condition. This shows the discrepancy even in the capital city of India, which is more "accessible" than many other places in the country. The accessibility in Delhi Metro is no doubt a vital development, and yet it leaves out many people who do not have the bare minimum to survive their condition. Interactions with educated PWDs in Delhi indicated that they considered themselves a part of the broader disability community. They seemed more aware of their rights and facilities because of their stable economic background and education. In Kanpur, however, very few were aware of their rights as most of them were still unaware of the rights-based approach and considered themselves as being at the mercy of the state. All of this points to the fact that different sections of society have different rehabilitation needs and the rights-based approach as propagated by the Disability Rights Movement might not hold much significance to those who are grappling with medical and survival needs.

In Conclusion

The activities at most of the government-run institutions and programmes were marked by apathy towards and non-participation of the PWDs. Often the discourse of the PWDs being "needy" of receiving charity served the interests of the service-providers (enhancing their self-esteem). Particularly at the VRC, the PWDs' experience of being unproductive or less productive enhances their alienation with the rehabilitation system. Even at the rights-based organisations, slum-dweller PWDs in Delhi experience a sense of apathy towards their basic needs for survival.

Thus, the PWDs who reside in rural settings or urban slum settings with no access to resources and opportunities are the worst affected. Both the government as well as the rights-based organisations are directly or indirectly catering to the neoliberal agenda of favouring those who can pose a threat (by raising a voice against the rehabilitation system) to the smooth functioning of the economic system. Neo-liberal globalisation has shaped the experience of disability by focusing on the inability of PWDs in a fast-growing economy where consumerist culture and profit rule. It is salient to examine the gap between urban, educated, and aware PWDs who are moving towards a rights-based approach, and the rural, uneducated and poor who are left behind and still grapple with their medical needs and obtaining a decent living. The challenge here is not just the fact that we are unable to keep pace with the developed nations in terms of rehabilitation and rights, but also the need to realise and bridge the structural divide between the two sections. Acknowledging and listening to the marginalised voices is essential to realise the actual goals of rehabilitation. A shift in thinking, where the gap between service providers and "beneficiaries" is called into question and the power hierarchy is diffused, is the need of the hour.

Exclusion can be challenged when the social institutions, government agencies, and service providers are aware of and sensitive towards the basic survival as well as rehabilitation needs of poor PWDs. Engaging with them in a sensitive and dignified manner is essential. The atmosphere of inequalities created by neoliberal globalisation needs to be questioned and rectified by aligning it with goals of social justice and equal opportunities for all, as one of the participants (a male with amputation in Kanpur) remarked,

> Disability and work can go hand in hand if the focus is on our ability. We are working hard towards nourishing our skills and expertise. If government and policymakers design jobs according to our capabilities and skills, we can certainly find a place in the economic workplace. We do not need charity or concessions, we need accessible workplace environments and the right opportunities to contribute as productive members of society.

NOTE

1 The exact names of the various centres that the first author visited during the fieldwork have been avoided to maintain confidentiality/ethics in research. Our aim is to foreground the issue rather than critique a particular centre.

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Majoritarian Politics and the Ayodhya Verdict

NAYAKARA VEERESHA

The Ayodhya verdict favours politics over history. It bypasses the settled principles of legal scrutiny in adjudicating the land conflicts and legitimises majoritarian politics. Such a verdict has detrimental ramifications for democracy and constitutional values.

On 9 November 2019, the Supreme Court delivered the final judgment in the much awaited Ayodhya–Babri Masjid land dispute case. The citizens by and large have welcomed the verdict. The Court's judgment has succeeded in settling the inordinately delayed land dispute by providing the right of possession of land to one party over another. The order, however, has wider implications for the culture, society, economy and polity of the country. This judgment will become a reference document for the future generations to understand and reflect upon how the law intersects with historicity, religion, and crucially, the political economy of the country.

Contrary to the general understanding that the court judgments are beyond the purview of politics, this order of the apex court gave an impression that it is amenable to the political circumstances and factors, especially in dealing with sensitive land dispute cases. It is true that the Constitution provides a governing framework for the country. However, it is the politics that determines the form, shape and direction of the governance. The judiciary is a constituent part of the whole institutional arrangement of governance. To understand the verdict from the perspective of politics in particular, it is important to understand the majoritarian regime of the contemporary times, and get a comprehensive picture of the interface between the law, polity and society.

Majoritarian politics is a process where the majority of the population belonging to one community having better access to the resources and power positions, takes important decisions without heeding the voices of the minority population. The Ayodhya judgment is a case in point for understanding how the binary classification of majority and minority negates the natural principles of justice, as well as the settled principles of legal scrutiny in adjudicating the land conflicts.

Creating a Political Narrative

By adjudicating the disputed land in favour of the deity "Ram Lalla Virajman" and related parties, the Court in a way legitimised the political demand of Hindu organisations, and what is popularly called as "Mandir politics." The construction of Ram Mandir at the disputed site has been a political project of the Vishwa Hindu Parishad, the Rashtriya Swayamsevak Sangh and the Bharatiya Janata Party (BJP). The location of the Babri Masjid in Ayodhya remained a hindrance to pursue such a political project of cultural hegemony. The demand for the construction of a temple at Ayodhya emerged rigourously only in late 1985 and reached a peak in the early 1990s. From then onwards, a systematic narrative was created and slowly established in the minds of the people. The BJP repeatedly mentioned the construction of the Ram temple in Ayodhya in its election manifestos since 1996.

This political discourse succeeded in providing a kind of social legitimacy to the project of temple construction, aided by the mediation of religious organisations. The biggest gainer of this project is the BJP in terms of its emergence in the arena of national politics by reaping the electoral dividends. The Court in its verdict has told that the judgment was arrived at on the basis of evidences produced, but not on the basis of faith and beliefs of the parties. However, the detailed reading of the verdict does not substantiate this assertion, in particular the addendum section. For example, for the question of "Whether disputed structure is the holy birth place of Lord Ram as per the faith, belief and trust of the Hindus?" the Court has answered as follows,

> It is thus concluded that faith and belief of Hindus since prior to construction of Mosque and subsequent thereto has always been that Janmaasthan of Lord Ram is the place where Babri Mosque has been constructed which faith and belief is proved by documentary and oral evidence discussed above. (*M Siddiq [D] Thr Lrs v Mahant Suresh Das & Ors* 2019)

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The Court mostly relied on the Archaeological Survey of India (ASI) report of 2003 to give the land right of possession to the Ram Lalla. It is important to understand that some of the eminent historians have refuted the findings of ASI in "Ram Janmabhoomi–Babri Masjid: A Historians' Report to the Nation." It is sad that the Court has not taken into cognisance the historians' report and sidelined it by saying the report is an "opinion." In this context, it is worth recollecting the following,

> The ASI's controversial report which claimed otherwise on the basis of "pillar bases" was manifestly fraudulent in its assertions since no pillars were found, and the alleged existence of "pillar bases" has been debated by archaeologists. (Thapar et al 2010: 4)

On a number of occasions the noted historian D N Jha has expressed the true picture about the findings of ASI and the argument about the existence of a Hindu temple beneath the Babri mosque. In one of the interviews, he opined,

> Even the ASI's findings are awful. It takes help from Tojo Vikas International, which has no archaeological expertise. It uses the GPR (Ground Penetration Radar), which has nothing to do with archaeology. (Mahaprashasta 2009)

By recognising the primacy of worship rights and contemporary political religiosity of the site over historical facts, the Court avoided the logical questions, analytical rigour and robustness of method of investigation and modalities of questioning, procedures for induction and deduction of knowledge production, and the established norms and practices regarding evidence in the matters of immovable property.

The crucial yet unanswered question in this case is: On the basis of what evidences did the Court award the land to the deity party, when neither the Hindu nor Muslim parties have produced the necessary and satisfactory documentary evidence to prove their claims of exclusive rights over the disputed land?

Implications of the Verdict

In the context of this verdict, it will be useful to again raise this question asked by Barak (2002–03) and Dorf (2010): Are courts that roughly follow public opinion capable of performing what is generally understood as their core counter-majoritarian function—protecting minority rights against majoritarian excesses? The verdict, the tone and tenor used in resolving the land conflict, as well as the silence practised by the Court will have serious ramifications.

Such an influence of politics on the judiciary and its functioning set forth a declining trend for constitutional liberty and democracy. This democratic decline, including the decline in the efficacy of the judiciary, is coincided with the rise of majoritarian politics ably spearheaded by the BJP from the late 1980s. The elements of majoritarian politics influencing Court decisions also reflect in the application of Article 142. Earlier this article was applied by the Court to deliver justice to the disadvantaged sections of the society (for instance, victims to Union Carbide case) or to protect the environment (for instance, cleaning of the Ganga river and the Taj Mahal) and in the cases of dissolution of marriage.

That the Court has broken this tradition in the Ayodhya case is an indicator of changing values of the judiciary. One of the main contradictions of the verdict is that the Court has not reasonably justified the invocation of Article 142 in this case, that is, a civil dispute case. It is important to note that the Court did not see its relevance and application in the suit filed by Nirmohi Akhara, while it applied the same in compensating the land. As also observed by Saifudheen (2019),

> The Supreme Court of India has failed to uphold its constitutional values, while rendering the verdict of Ayodhya. The failure on the prism to analyse the judgement through constitutional values is the result of the institution plunging into the majoritarian forces.

Paragraph 801 of the verdict states:

> The area of the composite site admeasures about 1500 square yards. While determining the area of land to be allotted, it is necessary to provide restitution to the Muslim community for the unlawful destruction of their place of worship. (*M Siddiq [D] Thr Lrs v Mahant Suresh Das & Ors* 2019)

This particular stance is contrary to the principles of natural justice. Here, the Court has rested upon the theory of restitutive justice rather than exploring the options of substantive justice. It must be understood that the case was about a disputed land, but not a criminal case which precludes the application of the provisions of the restitutive or restorative justice. In invoking this restitutive compensation of alternative land, the Court has nullified the probative value of the evidences and the fact of rights of possession over the disputed land by the Muslim community, defying the logic of evidence.

The Ayodhya verdict remains a judgment where the propositions of the majoritarian community got validated by the highest court of the land.

The Way Forward

There should be an attempt to resolve the land disputes locally and possibly at the district and sub-district courts. However, the growing pressure on the land certainly exerts more pressure on the lower courts. It must be noted that more than two-thirds of civil cases in the district courts of India are related to matters of land.

Moving ahead after the judgment, there is a need to leave aside the retrogressive politics of identity and religion. The politics of religion is one of the main reasons for the rise of communal conflicts in the country. There is a need to put an end to the use of religious identity for electoral gains. This can be done best by investing energies on the substantive national issues, such as poverty, hunger, malnutrition, unemployment and climate change. This is applicable even more to the Faizabad district where Ayodhya is located. As per the Human Development Report 2008 of Uttar Pradesh, the Faizabad district is one of the most backward districts in the state. It stands at the 39th place among 70 districts with 49.22% of its rural population living below the poverty line. There is a need to push for the development of the district and the region through transformative politics in order to usher positive social change.

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Waiting for Citizenship

HARISH WANKHEDE

Social groups that are forced to live in precarious and vulnerable conditions are effectively reduced to being non-citizens, despite being recognised as formal citizens. Th promise of the idea of citizenship as a social ideal cannot be realised as long as that this disjunct is not addressed.

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The government at the centre has recently added new amendments to the Citizenship Act. The ruling elites valued the Citizenship (Amendment) Act (CAA) for its intent, as many subjugated people, mainly the non-Muslim refugees from Pakistan, Bangladesh and Afghanistan, would now be integrated as formal Indian citizens. However, the act has also drawn considerable criticism for evoking communal nationalist sentiments to define citizenship. The idea of citizenship shall be based on the ethical principle of "equality before law," and therefore, it is suggested that such communal criterion would only damage the secular and liberatory potentials of citizenship (Mustafa 2020). Further, the simplistic idea of "becoming a citizen" is flawed and deficient, as the government has not suggested how the CAA would positively address the acute social and economic deprivation of the new entrants. The fear is that the "persecuted citizens" would eventually be entering into the precarious socio-economic fold in which a large section of India's population already survives.

Any critical scrutiny of the qualifications of the citizens in India portends that it is blind towards multiple forms of inequalities. Citizenship has remained just an evocative popular label, but its actual value is meaningless for most of India's inhabitants. In a society operating under the excessive diktat of private capital and Brahminical caste order, it is evident that the poor and socially deprived classes are vulnerable and subjected to brutal harassment and social repulsions. The poor migrants, the Dalits and tribals, and sexual minorities are a substantial part of the formal citizenship rubric, however, they survive in isolation, away from the associated civil or national life available to modern citizens. For these communities, the idea of citizenship is farcical as the dominant social and economic order hardly allows them to operate as a free beings.

In this article, I have argued that the current debate on citizenship mainly highlights the terrible condition of persecuted and exploited religious minorities in neighbouring countries, however, it remains a mute spectator of the brutal exclusions and ostracism faced by its own poor citizens. The economically worst-off and the socially marginalised groups are barely nominal citizens as the rights and dignities meant for free citizens are perpetually absent in these cases.

Citizenship and the Servile Class

Within the liberal discourse, the individual body is treated as a citizen: a full member of the national community, a civilised person bestowed with natural and fundamental entitlements like social dignity, legal security and freedom from the exploitative economic order. Citizenship connects large heterogeneous

sections into one bond as equal citizens bestowed with ideals of liberty, equality and fraternity. A citizen is assumed to be an equal participant in the democratic processes, economic development and mainstream civil life. Because one was born in the given national territory, the liberal democratic welfare state is obliged to offer them fundamental human rights as a citizen (Marshall 1950).

During the making of the Constitution, the statesmen dearly upheld such liberal principles and espoused to transform the mutilated Indian society into a civilised modern nation state. However, the transformative liberal promises of citizenship never materialised substantively in India's case. Citizenship with universal fundamental rights is available mainly in the abstract space of constitutional documents, speeches of great leaders and often considered synonyms for voting rights or universal suffrage. In the actual socio-economic conditions, because of poverty, social stigma, alienation and conservative cultural norms, scores of people survive as silent non citizens, suffering a traumatic and torturous existence. The facility to be called citizen is available only to a few privileged, well off, urban-educated middle-class groups, whereas a vast population, especially the socially marginalised groups, survives without basic human rights. The constitutional directives or the legal provisions for the security and empowerment of each citizen appear non-applicable when it comes to the servile social classes.

Take the example of the yogis. A yogi is a nomad, always unsettled as he realises his current location is just a temporary station and his body has to move beyond boundaries. The *Naga Sadhus* or the *Aghoris* wander from one location to another to quench their spiritual thirst. Their relationship with the almighty liberates them from banal material attractions or social values. They are solitarily committed to their lord and live in groups in mysterious ascetic conditions. To such a group, probably the idea of citizenship is a misnomer as they choose to survive as borderless, stateless entities. Such adopted social isolation is considered a free individual choice, however, there are a lot many others, especially within the socially marginalised groups, who are counted as citizens, but due to their wretched social and economic locations, it is impossible for them to avail the benefits of modern citizenship. The society and the state has perpetually neglected their claims for justice and forced them to survive in brutal and hazardous conditions.

Across India, many classes and communities are away from the sight of the state, civil society, and the public sphere. In the post-liberalisation period, especially with the rise of the right-wing domination, the Muslims have increasingly been identified as the new entrants into the category of the second-class citizens. Muslims face open discrimination in institutional policies, subtle exclusion in the market, and Islamophobia in social life. Sumeet Mhaskar (2013), in his fieldwork on the Muslim working class in Mumbai, noted that there is a growing feeling of *karahiyat* (disgust and hate) that looks down on the Muslims with suspicion and disallows them to function as a normal, working-class persons. Earlier, multiple state-sponsored commission reports have also highlighted the unfavorable exclusions that the Muslims experience in the labour market.

With national policies like the CAA and the National Register of Citizens (NRC) taking final steps towards execution, there is an increased fear that the Muslims would be compartmentalised as foreigners, anti-nationals or as refugees in their own motherland. Hindutva politics has created conditions in which the binary between Hindus and Muslims can be expanded towards permanent rupture, forcing the Muslims to survive as a new subjugated class under the aggressive authority of the privileged Hindus. Further, the Muslims are not the only community worried about losing their rights as citizens. There are several communities and classes that may have been numerated as citizens in the national register, however, their socio-economic conditions showcase that they are perpetually divorced and distanced from basic equality, social dignity and freedom available for general citizens. The presence of people suffering under inequalities, oppression and violence disturbs the idealism of citizenship and makes it rhetorical.

The Precariat

There is an overwhelming population, around 120 million, that migrates from rural areas, mainly to escape poverty and the feudal social order. Such a vast number is not only a disgrace, but also showcases the social calamity and failure of our economic planning. Often, these dislocated migrants lack any legal document to prove their identity. Many may have official records proving their birth locations at their native place, but due to long distances, poverty and illiteracy, accessing such documents to prove their citizenship might be difficult. Though, the population register may count them as citizens, it would be an injustice as the general attitude of the state–society combine is exploitative and aggressively repulsive towards them.

The poor migrant labourers can be called "the proletarians of the proletariats" because they are distinct from the formal working class. Standing suggests that it is a heterogeneous class and not counted as the part of proletariat working class, but identified as informal labour or the precariats. Their nature is distinct from the elites, middle classes or the salaried labour force, as they lack basic securities meant for formal industrial citizens like adequate income, insurance and the rights to form unions (Standing 2011: 11). They survive in deep poverty, face extreme competition in the labour market and due to lack of professional skills face occasional unemployment.

The migrant labourers reach the metropolis in search of better livelihood, however, they become victims of contractors. They are employed on very low daily wages in inhumane and unethical working conditions (mainly at construction sites, etc) without any legal security. Further, the threat of eviction and deportation perpetually hangs over their heads. Millions of working-class poor, especially the worst offs amongst the migrant labourers, lack social security and medical insurance. These daily wage earners survive with stressful insecurities as they live in the poorest habitats, as squatters or in unhygienic locations and

cannot afford a good education for their children or a life of leisure and happiness.

Alongside the habitats of the poor migrant labourers, one can find shanties or *jhuggis* of people who are often termed as beggars, paupers and the homeless. Article 23 prohibits human trafficking, begging and similar forms of forced labour. However, the 2011 Census found around half a million beggars and 1.8 million homeless people across India. These people are often associated with precarious menial jobs such as scavenging and rag picking. One can see them surviving in wretched conditions in dirty shanties near railways stations, bus stands or around any traffic signals. The children and women folk bear the brunt. These people survive in extreme poverty, wander around the city in search of physical relief, accommodation, or food, and account for most of the people in the slums or the temporary shelters provided by the government.

The participation of the migrant person or a homeless person in civil and political affairs is often scrutinised with contempt and hatred. The general attitude towards this section is contaminated with prejudices. They are often treated with contempt and termed lazy, criminals and illegal parasites (Mander 2007). The civil society sometimes throws a pitiful gaze over their existence and the state offers little to help these classes. On certain occasions, with the help of non-governmental organisations, the state showers philanthropy and prescribes policies for housing and resettlement. However, a survey conducted in four cities of Uttar Pradesh (namely, Allahabad, Varanasi, Lucknow and Agra), spanning a sample of 426 shelter inmates, showed that the condition of these shelters is appalling as they lacks basic amenities needed for human survival (Goel 2017). Such visible neglect by the state and society towards its worse poor makes them economically more exploited and alienated from basic human rights. Therefore, the constitutional assurance that every Indian is entitled to equal rights is a false hope for the precariat citizens.

The Differentiated Citizens

Though Article 15 of the Constitution promises equal rights to all citizens irrespective of caste and other ascriptive identities, and Article 17 promises to abolish untouchability and makes it illegal, the Dalits, especially in the rural spaces, have to perform their conventional social duties as untouchables under the disciplinary gaze of the social elites. Any challenge by the Dalits to the traditional social rules only invites brutal and violent reactions by the dominant elites.

The Dalits have been categorised as differentiated citizens in population registers and other legislative documents, with a concern that it will provide them constitutional safeguards and legal protections against social injustices. The Dalits are also building resistances and have been democratically challenging the Brahminical caste order. While the positive changes due to progressive legislations, affirmative action policies and social reforms has brought former untouchables closer to citizenship status, they remain "citizens in making" as the legacy of a brutal past haunts them even in contemporary times (Thorat 2019: 256). The social perception has remained contaminated by conservative values and Dalits are hardly acknowledged as dignified social persons with equal rights. They are persistently engulfed into social tragedies such as facing everyday casteist slurs, discrimination in schools and government institutions, harassment and rape of Dalit women, social boycott by the upper-caste elites, non-payment of wages, social prejudices and exploitative customs and not allowing the victim to lodge an first information report against caste-based violence (Wankhede 2019). Though the state is equipped with powerful constitutional directives to protect the Dalits from caste atrocities, it has often been a complacent accomplice in the crime.

Alongside the Dalits, there are around 60 million De-notified and Nomadic Tribes (DNTs) in India. These are the people without fixed domicile. According to government reports, these groups are constantly on the move for earning their livelihood, have no place or shelter to settle down, and largely depend on hunting and gathering as livelihood support (Mosje 2008). During the British regime, these communities were even condemned as criminal tribes, though such legal appendage is not applicable today; these communities face alienation and degraded stereotyping by the society. Most nomadic groups are also categorised as lower castes and often face public humiliation, violence and negligence by the state.

The Nomadic Tribes have been counted in the population register and the state on occasions consoles these communities with welfare doles, however, these groups remain excluded from any democratic participation and economic development. Today, the DNT reside both in urban and rural locations and survive by offering various kinds of wage labour, menial services or sometimes even as craftsmen or as traders of forest products. Some may have a fixed abode for a particular season but remain itinerant for rest of the year. For such unsettled lives, the legal domicile status required to enjoy the facilities as a socially engaged citizens are unavailable. Without a proven history of a settled life, these communities survive as non-citizens, around the poor peripheries of cities and towns.

Individuals cannot enjoy freedom in the absence of social dignity and a fraternal social life. The very idea of citizenship is a misnomer here as the enshrined constitutional safeguards like freedom and basic security are often unavailable to the poor Dalits and Nomadic Tribes. The idea of citizenship hovers in an abstract space as most of the DNT survive in a terrible anarchic condition of statelessness and economic depravity. Because, the Dalits have conventionally been identified as "wretched and impure," condemned by the religious order to perform only the most menial jobs, the sense that they can equally enjoy the civil virtues and democratic rights as modern citizens has not entered the general social psyche. Because of their social identities, the Dalits and the tribes face discrimination, humiliation and social violence across the nation. In general, they survive as differentiated citizens even in social relations.

The Invisible Citizens

The National Legal Services Authority judgment was a landmark decision in judicial history, as it not only recognised equal rights for transgender persons,

but also the right to a self-defined gender identity. The ongoing legal battles demanding equal recognition, as "self defined gender identity" (UNDP 2017) alongside civil society's claims for special treatment for the sexual minorities are promising, however, it is yet to reach to its destination. The conventional norms of citizenship are firmly based on institutionalised heterosexuality and patriarchal values. It is therefore difficult for the third gender communities to perform as equal citizens as they lack legal protection against social discrimination or daily harassment (Augustine 2016). The third gender has been struggling to emerge as a rights-bearing community as the general attitude of the state institutions and civil society is visibly discriminatory towards them.

The *Hijras* (transgender) live in ghettos outside the purview of the mainstream society. Because society does not recognise them as an equal part of the social fraternity, Hijras are excluded from social gatherings, public places, welfare schemes and mainstream democratic processes. Their access to education, health and other state resources continues to be severely limited. They face extreme discrimination, physical violence and cultural prejudices on a daily basis, and often, there is no effective institutional mechanism that can address their concerns. For survival, the third gender community are often engaged in "indecent jobs" like dance performances at ceremonies, begging or sex work.

Therefore, the general societal or institutional claims about providing universal justice to all its members are irrelevant, especially for the *H*ijras, as their community has been alienated from many such claims. Often, the respective families of the transgender persons ostracise them, and therefore, they do not even have a family name or support to claim any kinship. Further, due to the discriminatory attitude of the state officials, many do not have legal residential documents like voting cards, passports or ration cards. The *dera* (hijra settlement) with whom they forge bonds become their immediate family. However, these ties are not legally recognised by the state.

The presence of transgender persons in the civil society milieu is unwanted and these groups face open hatred and repulsive gazes. They survive in ghettos, in isolation, away from the direct institutional premise of the state and of the society's moral network. The transgender sexual minority has to oblige the social conventions and patriarchal directives of the state and any attempts to claim equal rights invites gushy laughs and sarcastic taunts.

Conclusions

It is evident that the ideals of citizenship and the actual social conditions of the poor are at loggerheads. Most servile social classes operate as powerless beings outside the purview of governance and social ethics. Without an anchor of stability or basic security, the majority of these groups has been converted into a new class of precariat non-citizens. The non-citizens are scattered, isolated and segregated into distinct corners of the cities and they do not have any common location or public sphere where they can gather and deliberate for a unified struggle in order to challenge their exploitative indignity. The characteristics that bring these scattered communities and classes together are their perpetual non-sociability and exteriority to the legal apparatus.

The recent call for the addition of new citizens from neighboring countries may have a moral appeal, however it may only aggravate the existing problems, as the state has no remedy or policy framework against poverty, unemployment, indignity and social discrimination. The worst-off sections find little meaning in the concept of citizenship as it merely allows them to gain a legal status to participate in procedural democracy. The universal claim of equality associated with the citizenship ideal has remained a mirage because it has not posed much of a challenge to the hitherto social and cultural inequalities and visible class exploitation.

The migrant poor working classes, paupers, worst-off sections within the Dalits, the Nomadic Tribes, the Transgender communities and increasingly the Muslims are the nuanced precarious social bodies that often found recognition in the national citizenship registers. However, citizenship status is merely a legal status, and it is not a guarantee for economic freedom and social equality. The embedded social and economic order perpetually alienates the poor classes from mainstream democratic life and exploits them as people without rights. In the current context of the CAA, it is visible that the state is non-committal to assure that the new citizens would not fall into such precarious conditions and that they would enjoy social, civil and political rights without discrimination. Unless the state defines a substantive strategy that can end the shared sufferings of its existing citizens, any extension of citizenship to the poor victims of other nations would be nothing but a mirage.

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Outline of a Prolific Academic Endeavour

SREEDEEP BHATTACHARYA

BOOK REVIEWS

Talking Sociology: Dipankar Gupta in Conversation with Ramin Jahanbegloo by Dipankar Gupta and Ramin Jahanbegloo, *New Delhi: Oxford University Press, 2019; pp 192, ₹750.*

The *Talking* series of the Oxford University Press is a unique window. It offers a quick view of a wide spectrum of scholarly work by some of the most reputed social scientists in India. The *Talking* series is an excellent starting point to get introduced to some of the central themes that these scholars have investigated, or to familiarise oneself with some of their key ideas. You get to hear it from the horse's mouth as these scholars revisit, introspect, and reaffirm some of their major claims in a lucid conversational mode.

In the book under review, the series editor and Gandhian scholar Ramin Jahanbegloo talks to Dipankar Gupta—an eminent sociologist, a public intellectual, an articulate liberal voice, and one of the most well-published scholars of his generation. For those who are unfamiliar with Gupta's body of work, this book provides a grand yet nuanced overview of some of his major argumentative preoccupations. And, for those who have followed his works closely, this is a reassuring bouquet that wonderfully collects all the major threads of his academic works. It brings together an array of interconnected thoughts on "modernity," "democracy," "rationality," "universalism," "intersubjectivity," "ethics," and most importantly "citizenship"—while simultaneously mapping Gupta's intellectual trajectory. His upbringing and his experience in Delhi School of Economics and Jawaharlal Nehru University also get the space it deserves.

Core Concerns

Several themes that form the core of Gupta's intellectual formulations are highlighted here, and they keep recurring in the interview. To begin with: the strong distinction between ethics and morality—the former being built around the premise of universality and directed towards the other ("when we can see other people as we see ourselves"), and the latter centering around the self or its patronising outputs. This has relevance in the context of India's communitarian politics where zealots might believe they are morally correct in banning temple entry or preserving triple talaq or killing in the name of the cow. Ethics, on the other hand, cannot stand for this kind of behaviour.

Much of his intellectual sensibility is steered by "human–univsersalism" and is heavily influenced by Levis-Strauss and his notion of the fundamental unity of human beings. Time and again, Gupta has wholeheartedly acknowledged the influence of the French structuralist in his works, and "in seeking uniformities through many differences." As a reader, the moment one understands the essence of this "seeking," Gupta's shift in focus from caste, ethnicity, and modernity to "citizenship," "universal social welfare" and "security" through quality health and education appears apt and logical.

The outline of Gupta's reflections on modernity has remained poignant and original. And, that is sufficiently reiterated in this book as well. Access to technology, possession of commodities, English-speaking abilities, fast cars, foreign trips, or display of riches—are not the parameters of being modern. Rather, consideration of the other, which is informed by sound reasoning and is devoid of discrimination and traditional patronage, are the inseparable hallmarks of democracy and modernity. And, both are "difficult to practice," as they constitute respecting others as equals. This "difficulty" that too in a supremely hierarchal society like ours, arguably makes "citizenship" all the more imperative.

The idea of citizenship is not a romantic ideal for Gupta, but a democratic essential and is inescapable. It can only be realised through "ethics" (not morals) and "rationality" (not faith). The functional role of citizenship is to unite. And, the role of a "citizen-elite" is to take the initiative and make that happen through their risk-taking abilities, as the masses are often hostile to ideals of citizenship because it unsettles existing inequalities. In this equalising project, the empathetic vision of wanting "to be able to see 'us' in 'them'" is the glue that ties modernity, democracy, citizenship, and social science. Gupta rightly observes:

> Social science thrives only when there is democracy and shrivels in societies, even rich ones, when there is no democracy. (p 101)

And, one is incomplete without the other, or either one of them (modernity, democracy, citizenship, social science) is unfulfilled without the other.

He repeatedly warns us about the futility of making policies that are targeted at the poor and argues how it leads to poor policymaking. Such policies may keep the poor alive, but they do not uplift their condition eventually, because the idea behind such policymaking is antithetical to notions of universality, citizenship, and equality. Targeted policies for the poor, conceives them as "others" and makes them clients seeking state patronage, and not as citizens asserting their rights. In comparison, policies aimed at a universal audience, invariably result in better quality and service of the deliverables.

> I am convinced now that targeted policies are not effective … in fact, unless social arrangements change, unless measures are taken whose impact is felt society-wide, poverty will remain, only the poor will live longer … We think of the housing for the poor, but what we construct in this case is so deplorable that nobody wants to live there. (p 99)

The changing nature of caste alliances also features in the discussion. Throughout his academic career, Gupta had lent his argumentative energies for establishing a few original ideas on caste and its contemporary ramifications. Those are adequately echoed here:

(i) Multilayered, ambiguous and competitive layering of castes makes it fundamentally different from "race." Because caste is not bipolar, there could be contrary claims of belonging and status across time and space.

(ii) No caste thinks poorly of themselves or "willingly accepts subjugation," and no lower caste accepts their inferior position in the hierarchy, or believes that "they deserve to be at the bottom." Lower castes have always disregarded Brahminical myths, and voiced contrary claims of purity, and taken social measures to correct their lowly status. Reservation, urbanisation, and literacy have further facilitated such social mobility through secular means.

(iii) The character of Indian villages has been fundamentally altered. The acceleration of rural–urban transactions has ensured the demise of closed village economies, old patronages and servitude, inter-dinning habits, occupational restrictions, and also led to the downfall of typical rural oligarchy. As a consequence, caste continues to exist more as an identity:

> The system has loosened up, those castes that were once deprived and terrified of being punished by the more powerful castes are speaking up and carving their own identity. (p 120)

(iv) Endogamy is the last bastion of caste rigidity. The end of caste as a desirable wish is expressed beautifully in a one-liner "when you cannot determine who your son-in-law is going to be."

(v) No caste is numerically dominant enough to consistently convert their numerical strength into electoral victories—a point that Gupta has made vehemently in his book *Interrogating Caste: Understanding Hierarchy and Difference in Indian Society,* and also reiterated several times in media, particularly during election analysis.

The book does justice in tracing the interconnections between theoretical and empirical preoccupations of Gupta and seamlessly moves from one idea to another. While Jahanbegloo has to be credited for vivid sequencing of fitting questions, Gupta is sincere and forthright in his admissions. He insists on staying away from the temptations and practices of exotic renditions of Indian culture, and often returns to the idea of "seeing similarities between people and not just differences." Unlike most university puritans who disregard writing for the popular press, Gupta's intellectual commitment towards knowledge dissemination is well articulated, when he says,

> I had to discipline myself to put ideas across in ways that would make sense to lay people … break up concepts and formulations in small bit sizes for the general reader to metabolise. (p 64)

Clutter-free writing and argumentative clarity have been the benchmarks of Gupta's writing. The same can be said about all his lectures and interviews, and this book is of no exception either. Gupta never needed to depend on convoluted gibberish either to cover up for the absence of content or to support the density of thoughts. His work is far from fetishising the field, or overtly romanticising the relationship between the self and the other. One wishes to hear more of his opinion on pedagogy, but his advice to students should form a benchmark of original research and engaged reading. He encourages us:

> To play with ideas that are your own and use other scholars and received literature to further your thinking instead of devoting yourself to interpreting established gurus and masters. In other words, one must read, but for oneself. (p 48)

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Questioning the Orthodoxies

PARTHA RAY

Statements like "money, finance and banking are at the crossroads at this juncture" have become a much-used cliché, but tend to be true for most of the recent past. This year, too, is no exception. At home we have seen that credit growth both from banks and non-banks continue to suffer. Notwithstanding some initial green-shoots in the banking sector's non-performing assets front, we have faced trouble in a major co-operative bank and more recently in a private sector bank in India. We continue to hear about mergers of major private and public sector banks, but without necessarily having any clarity about a strategic vision for the future of the public sector banks in India. Even after 50 years of bank nationalisation, concerns on financial inclusion still continue to haunt us. At a global level, we are not yet sure whether the regulatory oversight had been reformed in the right direction after the financial crisis of 2008–09. The model of hyper-globalisation continues to be questioned in the aftermath of the Sino-US trade war. This special issue of the *Economic & Political Weekly* is devoted to some of these issues and beyond.

Against the backdrop of what has been termed as the North Atlantic financial crisis (NAFC) of 2007–08, Rakesh Mohan (p 28), in the first paper, "Finance and Monetary Policy Beyond Neo-Liberalism: The Way Ahead for Emerging Markets," probes into issues relating to monetary policy and financial regulation from the standpoint of emerging market and developing economies (EMDEs). The post-NAFC world is seen to have had three key implications for the financial sector: (i) the mandate of central banks got extended to include both price and financial stability objectives; (ii) financial markets turned out to be inherently unstable yielding at times inefficient outcomes; and (iii) it was realised that sustained efficient operation of financial markets required continuous oversight and management from the concerned authorities.

Pointing out to the miracle that no financial institution of the EMDEs went into a crisis during the 2007–08 NAFC—despite a flood of capital flows during the 2000s—Mohan finds that EMDEs have managed to operate with intermediate solutions in resolving the tensions of the impossible trinity. Thus, some of the countries retained a few restrictions on capital flows, thereby sacrificing some bit of exchange rate flexibility and monetary policy independence. Going ahead, Mohan concludes, "the approach to financial sector development for EM economies must essentially be seen as a middle path between free market imperatives tempered by appropriate and necessary public policy intervention by governments, financial regulators, and central banks alike."

Central banks are often seen as top-heavy institutions, where the personality of the central bank governor could have an important bearing on monetary policy. Using a Markov-switching vector auto regression model to estimate the regime changes in India's monetary policy, Utso Pal Mustafi and Rajeswari Sengupta (p 37) focus their attention on the regimes of four governors of the Reserve Bank of India (RBI), namely, Bimal Jalan (1997–2003), Y V Reddy (2003–08), D Subbarao (2008–13) and Raghuram Rajan (2013–16). In terms of the historical path of interest rates, while governor Jalan's regime was characterised by an initial phase of high interest rates followed by a prolonged phase of monetary expansion and a downward movement of interest rates, governor Reddy's tenure, on an average, witnessed a near doubling of the interest rates.

When governor Subbarao came to office in the wake of the 2008 global financial crisis, he changed the course of the monetary policy cycle in order to provide the required monetary stimulus. While interest rates during 2008–09 reached the lowest levels in the sample period, consumer price index inflation continued to rise and by January 2010, it had reached 16%. Governor Rajan's entry to the RBI, in the summer of 2013, coincided with the peak of the taper tantrum shocks. In response, he increased the interest rates sharply. Subsequently, he adopted the inflation targeting framework, the initial success of which had much to do with the rapid moderation in the global oil prices. The article indicates that while the tenures of Jalan and Rajan belonged to two distinct regimes, there were similarities across the tenures of Reddy and Rajan in that the same regime seems to have characterised their time in office. Of course, how much of the outcome is to do with the personalities of the central bank governors, and how much of it reflects the "zeitgeist" is altogether a different matter.

The current slowdown of the Indian economy has haunted general public, commentators, policymakers and politicians alike. Zico Dasgupta (p 46) traces the current slowdown of the Indian economy to the brewing up of the financial fragility during the 2010s, with the emergence of a new policy regime that is primarily associated with three distinct mechanisms: (i) allowing loan default, (ii) reducing corporate debt stock through debt write-offs by public sector banks, and (iii) facilitating

This special issue has been put together by Partha Ray who oversaw the commissioning, refereeing and the final selection of the articles. EPW is grateful to him for being the Advisory Editor for this issue. —*Ed.*

Ponzi financing. Insofar as the current slowdown since 2017–18 is concerned, a key factor has been the phenomenon of repayment crisis of the non-financial corporate sector that adversely affected the interest income and profitability of the creditors, constituting both the banks and the non-banking financial corporations. Curiously, Dasgupta's proposed solution to the current slowdown, running in terms of relaxing the demand constraint via bringing back government expenditures as a policy instrument for boosting demand, does not seem to have received much support in the current budget.

The downswing of the credit cycle often gets associated with the ultra-conservative behaviour of commercial bankers who fear becoming the target of the so-called "4 Cs," namely, the courts, the Central Vigilance Commission (CVC), the Central Bureau of Investigation and the Comptroller and Auditor General (*Economic Survey* 2016–17). It is in this context that Saibal Ghosh, Avijit Bansal and Abhiman Das (p 54) use a unique dataset on bank-level financial misconduct from the Lok Sabha questionnaire and the fear of prosecution data from CVC Annual Reports for the period 2008–18 to probe into the impact of financial misconduct on bank behaviour. Using a panel data regression framework, they arrive at some interesting results: (i) a 10% increase in financial misconduct is accompanied by a reduction in lending by 0.2%, and (ii) a 10% increase due to fear of prosecution lowers lendings of state-owned banks by 0.2%.

A key theme of the hyper-globalised world has been the intimate interlinkage between the stock markets across the world. With seamless flow of information, there seems to be a death of distance in financial markets, and stock prices all over the world tend to move together. Avishek Bhandari and Bandi Kamaiah (p 62) probe into the relationship of stock market interdependence in a global perspective, looking into the behaviour of 24 major stock indices from both developed and emerging markets from 1997 through 2014. Using multiple and wavelet-based pairwise correlation analysis, they try to identify interrelations between pairs of various stock price indices, at different time horizons. In general, wavelet correlation among equity markets seems to increase from shorter time horizons to longer time horizons. Insofar as the possibility of the portfolio diversification benefits of Indian investors is concerned, their results tend to point towards beneficial effects of diversification in the United States, the developed European markets, and China, while Indian investors need to be cautious when diversifying to the Brazilian and the East Asian stock markets.

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Finance and Monetary Policy beyond Neo-liberalism

The Way Ahead for Emerging Markets

RAKESH MOHAN

Against the backdrop of the North Atlantic financial crisis that erupted in 2007–08, this article looks into the changing role of central banks and the monetary and financial sector policies and the challenges of managing the tensions of this impossible trinity, especially from the standpoint of the emerging market economies. Lessons derived from the crises observed in the past three to four decades, whether in the emerging markets or the advanced economies, suggest that financial markets are inherently unstable. Hence, the article concludes that the emerging economies need to practice enhanced and active surveillance of their financial sector in their quest for maintaining of high growth along with financial stability.

This article has benefitted from comments by Homi Kharas on earlier draft.

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Broad consensus had been achieved around the dominant neo-liberal thinking in relation to financial sector regulation and monetary policy in the two decades leading up to the North Atlantic financial crisis (NAFC) that erupted in 2007-08. Whereas this thinking was essentially developed and applied in the advanced economies (AEs), similar policy prescriptions were advocated for emerging market economies (henceforth, emerging markets [EMs]). The general view was based on two theoretical propositions: the efficient markets hypothesis (EMH) and the rational expectations hypothesis (REH).

"The EMH defines an efficient financial market as one in which securities prices fully and rationally reflect all available information" (Turner 2016: 37). The REH "proposed that individual agents in the economy—be they individuals or businesses—operate on the basis of rational assessments of how the future economy will develop" (Turner 2016: 38). Based on the belief that financial markets operate efficiently, it was assumed that free competition in financial markets would result in the efficient allocation of capital across the economy, and hence promote growth. And belief in the REH suggested that both individuals and financial institutions are capable of managing risks. The corollary was that regulation should be "light touch" only (Group of Thirty 2015: 9).

Continued development of financial markets should therefore be encouraged. Increasing financial depth and intensity is good for promoting economic growth along with financial inclusion, and continued financial innovation helps price discovery, which promotes efficiency in the allocation of financial resources. "The pre-crisis orthodoxy was built on the idea that even if financial markets were in some ways imperfect, market liberalisation and competition would at least bring us closer to perfection" (Turner 2016: 37). Such a theoretical view saw the economy and financial markets as being inherently self-stabilising and efficient in allocating resources. A process of financial deregulation and deepening was therefore the order of the day, starting in the 1980s and lasting till the NAFC. Policy advisers to the EMs and policymakers in the EMs themselves were not immune to this dominant strand of thinking.

Although this period was characterised as the Great Moderation, since the AEs experienced relatively consistent growth and low inflation, significant financial instability was experienced in different jurisdictions. More than 100 financial crises

occurred during the 30 years before the NAFC, during which financial liberalisation policies were dominant (Stiglitz 2014: 335). Over this period, the financial sector grew much faster than the real economy in the AEs. Private sector debt grew from around 50% of the gross domestic product (GDP) in 1952 to 170% by 2006; trading in foreign exchange markets grew much faster than exports and imports; trading in commodities exceeded growth in commodity production; gross cross border capital flows grew far in excess of investment; and financial innovation flourished with the introduction of widespread securitisation and derivatives (Turner 2016: 1). The financial sector began to serve itself much more than the needs of the real economy. This relative explosion in financial sector development across the world was clearly not reflected in the real economy.

The excessive growth in overall debt and leverage in financial institutions, explosive growth in cross-border capital flows, along with the development of global macro and financial imbalances, finally led to the outbreak of the NAFC. This shock, the worst financial crisis since the Great Depression, has been instrumental in raising fundamental questions with respect to the basic tenets of the neo-liberal financial order outlined above. The key lesson from this crisis has to be that financial markets on their own are not necessarily efficient, stable, or self-correcting: "serious economic and financial crises can happen, even in low inflation advanced market economies" (Group of Thirty 2015: xii).

Thus governments, central banks and financial regulators have a crucial role to play in overall economic and financial sector regulation and management. Light financial regulation can no longer be sustained.

Changing Contours of Received Wisdom

Prior to inflation targeting in the 1990s, central banks, over the centuries, aimed to support sustainable economic growth through the pursuit of price and financial stability (Group of Thirty 2015: xi). However, in line with efficient financial market theory, monetary policy in the decades prior to the NAFC was exclusively focused on inflation targeting in the pursuit of price stability, along with the use of a single instrument—the short-term policy interest rate. The EMH suggested that the short-run policy rate would be transmitted seamlessly along the yield curve and across financial markets. While it was always understood that price stability was a necessary condition for the maintenance of growth and financial stability, the inflation targeting approach assumed that price stability was actually "sufficient" for maintaining macro and financial stability. As a consequence, with inflation remaining low in the period before the NAFC, central banks in the AEs focused narrowly on low inflation and price stability. They then largely ignored the signals that might have indicated the dangers that emerging imbalances and financial sector excesses could pose. This explains in part why so few predicted the NAFC of 2007–08.

There is also an emerging debate on the future of monetary policy 10 years after the NAFC. Despite the continuation of near zero policy rates in North America and Europe over the whole period since the NAFC, achievement of the 2% inflation target is nowhere in sight. Furthermore, despite this unprecedented and unconventionally extended monetary accommodation, economic growth has also been hesitant in its recovery, particularly in Europe. There is a growing apprehension with regard to the efficacy of monetary policy, especially in the event of the advent of a new recession. There simply is not enough space for further accommodation that would be needed to address the next downturn.

There is a concern that with almost all tools of unconventional monetary policy having been used, central banks may have little left in their armory. Hence, new pressures are emerging for the use of "helicopter money" through coordinated fiscal and monetary policy to address the ongoing economic slowdown and the possibility of an oncoming downturn.[1] Given the predicaments that AEs are facing with regard to overall macroeconomic management in their current situation, it is surprising if they indeed resort to fiscal stimuli financed by monetisation, in the presence of near zero interest rates and low inflation. If this happens it would not be surprising if policy advice to EMs goes in a similar direction. Just as EMs resisted the EMH and REH based policy advice in the past they would do well to chart their own course in light of their own economic circumstances and continue to practise greater prudence in their pursuit of appropriate monetary policy.

In any case, as a consequence of the NAFC, a new consensus is emerging that takes into account three key issues. First, that the mandate of central banks needs to include both price and financial stability objectives. Consequently, they need to be given adequate authority and policy tools to achieve these objectives. There is also a growing consensus that central banks should have an active role in banking regulation and supervision. Second, that financial markets are inherently unstable and can be inefficient. Hence, there is a need for intrusive monitoring and regulation of banks, shadow banks, and other financial market participants to foster economic growth with financial stability. The perimeter of financial regulation has to be widened considerably and vigilance must be maintained to avoid financial market excesses. Third, that sustained efficient operation of the financial markets requires continuous oversight and management from the government, central banks, and financial regulators. They should not hesitate to intervene as and when necessary.

While there is a broad consensus on these basic propositions, debate persists, as might be expected, regarding the various institutions and instruments required for such central bank operations. Likewise, agreement regarding the ways and means by which governments and financial regulators should intervene in banking and financial markets remains elusive. Nonetheless, regulation and supervision of banks have been tightened considerably. Such oversight has been undertaken through (i) the provision of much higher capital and liquidity requirements; (ii) the return of regulatory and supervision responsibilities under the umbrella of central banks in various jurisdictions; and (iii) by the establishment of new oversight institutions. Examples of such institutions include the Financial

Stability and Development Council (FSDC) in India and the Financial Stability Oversight Council (FSOC) in the US, which have been set up to extend the regulatory perimeter. Those developments aside, consensus around the extent of regulation of shadow banks continues to elude regulators.

It is therefore clear that the days of freewheeling financial markets and lightly regulated financial institutions are over and the erstwhile theoretical belief in efficient markets and rational expectations has been severely dented. However, as might be expected with the passage of time since the NAFC, there is now considerable push back from the financial sector and, over time, we can expect some loosening of the tighter oversight that has been implemented over the past decade. But what does this portend for the emerging market countries?

Financial Sector Policies in EMs

What was the advice being given to emerging market countries during the neo-liberal order period? Otherwise known as the Washington consensus, the advice with respect to financial sector development broadly consisted of (i) liberalising financial markets; (ii) developing competitive private commercial banks—eschewing government ownership of commercial banks; (iii) making interest rates market-determined; and (iv) developing bond markets to diversify sources of long-term financing for the corporate sector and for infrastructure. The approach to the external sector consisted of opening the capital account and allowing capital inflows and outflows; and making the exchange rate market determined through a free float. For monetary policy the approach consisted of making the central banks independent and practising inflation targeting monetary policy.

Such advice was of course broadly consistent with the EMH and REH that were the basis of financial sector policy within the AEs. It is interesting that consideration was seldom given to the specific conditions that characterised financial markets and the stage of economic development in the developing countries and EMs. What were the key characteristics of emerging market financial sectors?

First, they were mostly bank-dominated with varying degrees of government and private ownership in different countries, and with a relatively smaller role for direct financing through capital markets (Shim 2019). Interest rates have been increasingly market determined in the EMs; the equity markets have been generally more developed than bond markets; and most EMs have used development finance institutions (DFIs) to fund longer-term investment needs with varying degrees of success and failure. On the external side, many EMs manage exchange rates while allowing for significant market related flexibility, and simultaneously maintain substantial monetary policy independence along with financial integration through managed capital flows (Aizenmann and Ito 2019). Monetary policymakers have increasingly practised flexible inflation targeting in the presence of different degrees of central bank independence.

Second, one of the most important developments in the EMs since the 1990s has been the dramatic fall in inflation rates in almost all countries barring Zimbabwe, Venezuela, and Argentina. This development was most marked in Latin America, which had suffered from very high rates of inflation on a pretty consistent basis until the 1990s. The push towards inflation targeting and central bank independence has certainly been among the key factors that have led to low inflation in Latin America. The acceptance of this framework by most governments meant that they generally accepted the idea that fiscal excesses should not be funded through monetisation by their respective central banks and it is therefore desirable to provide relative independence to them. In countries such as Argentina, where this practice was violated, the subsequent increase in inflation was, then, not a surprise.

That said, in most EMs the central banks have, in reality, practised flexible inflation targeting. Inflation targets have generally been specified in a range; foreign exchange intervention has been the rule rather than an exception; capital account management has been practised to reduce the volatility from capital flows; monetary policy instruments have included the use of reserve ratios and other quantitative measures along with the use of short-term interest rate; and financial stability concerns have been kept in view through financial regulation and supervision. In countries where financial markets still have a long way to go for monetary policy transmission to take place, the use of the policy interest rate is naturally limited.

Since inflation was generally low in Asia, it is Latin America that has probably benefited the most from the advocacy and practice of inflation targeting and central bank independence. Overall, the special focus on inflation has certainly been beneficial for macroeconomic management in the EMs, but policymakers have had to adapt their policy tools in line with the existing circumstances in their respective countries.

Third, there is naturally a large variance in financial sector policies among the EMs. It is perhaps correct to say that Latin American countries attempted to follow the Washington Consensus in the 1980s and 1990s, particularly with respect to the external account, which led to recurring banking and debt crises over those two decades. Asian countries were generally more conservative over the period but they did suffer from the Asian financial crisis in 1996–97 (Shim 2019).

So, whereas there was a general understanding of the tenets of the neo-liberal order and its benefits among the EMs, by the late 1990s there was a better appreciation of the constraints that their own particular circumstances and stages of development posed in terms of achieving the policy frameworks that were the order of the day. While being guided by the desirability of using market processes in the financial sector, they were perhaps more cognisant of the need for policy and process guidance by the public authorities.

After the Asian crisis, for example, the financial authorities in Asia strengthened capital requirements for their banks, tightened other financial regulations, improved systems for managing capital flows while increasing market flexibility and exchange rates, and strengthened both micro and macro prudential regulations. Such prudence helped most of the Asian banking systems withstand the shocks emanating from the NAFC (Shim 2019). Thus, the actual practice in the EMs was somewhat

different from a strict application of both the EMH and REH, or from a narrow application of inflation targeting monetary policy. Though the EMs demonstrated much more respect and understanding of the benefits of market-oriented policy than they had in previous decades, yet their experience of crises made them more conscious of the need for active financial policy and regulation.

Consequently, one of the miracles of the 2007–08 NAFC was that no financial institution went into crisis in any EM or developing economy, despite a flood of capital flows during the Great Moderation period, especially in the 2000s.[2] What did those EM economies do to avoid full contagion?

Managing the Impossible Trinity

Having had the experience of financial crises in different forms over the 1980s and 1990s, the EMs had perhaps learned their lessons well and were not hesitant in going against the then conventional wisdom arising from the tenets of the EMH. They practised relatively intrusive financial regulation, pursued heterogeneous monetary policy while nominally observing the basics of inflation targeting, and managed the impossible trinity, particularly as it related to capital account policies and exchange-rate management. They understood that there was no need to be at any of the policy corners of the so-called impossible trinity.

First, with regard to exchange rate management, the experiences of the 1980s and 1990s had already demonstrated the virtues of flexible exchange rates: pegging was clearly a bad idea. There was a clear understanding that exchange rates needed to be essentially market determined reflecting fundamentals, but the effect of volatile capital flows had to be tempered through managed floats. Completely free-floating exchange rates were not seen as the best option. So there has been an increase in intermediate regimes reflecting different kinds of managed floats.

Second, high growth evidenced in many Asian countries, including China and India, and in spurts in Latin America, along with increasing global trade openness, demonstrated the need for a relatively open capital account. Once again, an essentially open capital account did not mean a completely open one with no management with regard to different kinds of flows. This can be done by managing the capital account through a vector of measures. There is a quality hierarchy in the nature of different types of capital flows, with some more stable and others less so. Foreign direct investment is clearly seen as the most beneficial to recipient economies and also the most stable, followed in turn by portfolio equity flows, long-term debt, short-term debt portfolio flows, and external borrowing by financial intermediaries like banks.

Different kinds of measures can be taken to temper these flows to reflect this hierarchy. So, as may be seen from the balance of payments accounts of the EM countries—which are seen to have fairly managed capital accounts—the actual magnitude of flows in both directions has been quite large and has generally been increasing over time. In fact, there is often little difference in the magnitude of gross capital flows relative to GDP between managed capital accounts and fully open ones. This suggests that the capital accounts of EMs have indeed been quite open, but of course not fully open. They are able to reap the benefits of cross-border capital flows, while avoiding the costs of their volatility.

Third, in view of both the large magnitude and volatility of capital flows in the 1990s and 2000s, most EM economies intervened actively in forex markets to build up precautionary reserves in line with a managed floating exchange rate policy.

Fourth, volatility in AE monetary policies in the 1990s and 2000s, perhaps reflecting global financial cycles, also suggested that EMs and developing economies need to adapt to practise independent monetary policies. If AEs have to resort to unconventional monetary policies to preserve their growth and financial stability, so do the EMs, from their viewpoint.

As a consequence of these intermediate exchange rate and capital account regimes, they could also practise independent monetary policy despite managed floats and capital accounts. The proof of the pudding being that, during the Great Moderation period many EMs exhibited high growth and price stability along with financial stability.

Looking to the Future

Capital flows to the EMs are caused by both push and pull factors. To the extent that the EMs grow faster economically than the AEs, and are expected to do so for an extended period while maintaining price and financial stability, capital will continue to flow to these countries as investors search for higher yields.

Persistent need for capital account management: Capital account management should no longer be called unconventional. The "unconventional" should be seen as part of the conventional toolkit just as unconventional monetary policy and practice today in the AEs are rapidly becoming conventional.

Experience shows that a persistent inflation differential exists between EMs and AEs, leading to higher nominal interest rates, even if real interest rates get equilibrated. Thus, there is a constant incentive for global capital to flow to EMs for arbitrage purposes. With real interest rates being zero or negative in AEs today—a trend likely to persist through the medium term—we can expect capital flows to EMs to continue in a search for better yields. However, with the expectation of growth prospects of EMs suffering a downward trend in the immediate future, the changed risk reward expectation for yield searching capital flows may get tempered, but their volatility could continue.

If such capital flows are not managed in some form, they lead to appreciation of exchange rates, consequent widening of the current account deficit, and loss of competitiveness, ending in the typical sudden stop, disorderly adjustment, financial instability, and eventual onset of crisis. This was amply demonstrated by the experience of the so-called fragile five[3] at the time of the taper tantrum in 2013. These countries had undertaken minimal intervention in the forex market in previous years to be applauded by the International Monetay Fund (IMF) and other policy observers. The real exchange rates had appreciated significantly; the current account deficits had

widened relative to GDP so the mere announcement of a potential tightening in US monetary policy suddenly resulted in capital outflows that had to be then countered by a range of emergency measures.

Forex intervention and reserve accumulation: The experience of the Asian crisis and capital flow volatility in the 2000s had necessitated accumulation of forex reserves for precautionary reasons. Such reserves came in use during the turbulence of 2008 and 2009. This is well understood and much discussed. There is, however, another reason for accumulating foreign exchange reserves that has received much less attention and discussion.

Experience suggests that the EMs can grow at sustained annual growth rates in the region of 10% to 15% in nominal terms, reflecting real growth rates in the range of 5% to 10%.[4] That suggests that, other things being equal, central bank balance sheets also have to expand by similar magnitudes to enable a commensurate degree of financial deepening and growth. Assuming that these countries do practise prudent fiscal policy, and also need to develop deep financial markets for government securities, the availability of such domestic securities could be limited for central bank balance sheet purposes. Thus, EM central banks need to accumulate forex reserves just for the purpose of normal expansion of base money and hence of their balance sheets. Note that forex reserve accumulation to this extent would not need any sterilisation.

This was not an issue in terms of the availability of reserve currency securities, as long as the EM economies did not form a significant weight relative to the AEs. Even then, the inflow of EM forex reserves into AE safe assets was mistakenly seen as a sign of a global savings glut. As the magnitude of the EMs' collective GDP is now approaching that of reserve currency economies, and it will exceed their GDP in the near future, I believe that this issue will start assuming even greater importance in the discussion on international financial architecture. Will we have a shortage of safe assets for central bank balance sheets and what solutions will we find?

This kind of intermediate approach in external sector management went against the advice emanating from the neo-liberal order and multilateral institutions. Now, however, in the light of developments in macroeconomic thinking and recognition of relatively successful practice in EMs, both before and after the NAFC, such approaches are receiving increasing acceptance and are beginning to be seen as constituting elements of conventional macro toolkits. The adoption of the new institutional view with respect to capital flow measures by the IMF in 2012 has helped to make such practices "respectable" in the eyes of international observers (IMF 2012). However, they are still not seen as intrinsic components of a standard macroeconomic management toolkit, as they should.

The (New) Middle Path

While there has been considerable discussion with regard to new directions for monetary policy and external management in the wake of the NAFC, the path ahead for policies to foster financial sector development in the interest of achieving economic growth and financial inclusion, with consistent financial stability, has received little attention. Here also, in the light of lessons from the excessive financial expansion in the AEs in the 1990s and 2000s, the way ahead can essentially be characterised as the middle (market-oriented) path.

Ownership and governance of banks: First, it is important to recognise the importance of commercial banks in the financial sectors of EMs. The share of banks in financial sector assets in EMs is usually in the range of 60% to 80%, with the share generally decreasing as countries grow towards upper middle income or AE status. Even in Korea, which has achieved an AE status, the share of banks in the total financial sector assets is around 60%. It was almost 75% in 2006 (Hong and Lee 2019).

Thus, in a large majority of the EMs, which are in the middle-income range, commercial banks will continue to be the most important actors in the financial sector. Indirect financing through commercial banks will remain the order of the day in these countries for quite some time to come. Direct financing through bond markets has been a dominant feature of debt financing only in the US and the UK, while much of Europe still remains bank-dominated.

It is therefore of utmost importance that the banking sector is induced to be efficient and competitive, while also being restrained from excesses. Most EMs have experienced periods during which much of the commercial banking sector has been government-owned or dominated, giving rise to a whole host of governance issues. Similarly, issues of governance often arise when such banks are privatised. During periods of external or internal shocks, government ownership or guarantees have been important in preventing bank runs and thereby provide stability within the banking sector. Thus, it may be worth considering what would be an appropriate mix of public and private ownership of banks in the EMs. Complete private ownership of commercial banks may not be the panacea as has often been advocated.

Bank ownership and governance have posed significant problems in AEs and EMs alike. Ownership by business groups and private entrepreneurs raises obvious conflict of interest issues, and state ownership can give rise to the obvious dangers of behest lending. A bank licence empowers the licensee to access public savings, which can then be diverted to the owner's own firms or the connected ones. For this reason, dispersed ownership is normally the preferred form of bank ownership. In the US, for example, non-financial companies are not permitted to own banks.

In AEs it is usually institutional investors who own such shares in a dispersed manner. Even in relatively advanced EMs, however, there is a scarcity of institutional investors. It is therefore not uncommon for dominant business groups to end up owning banks in the EMs. It is for the same reason that it is also not unusual to see significant government ownership of commercial banks in the EMs. It is also observed that when private bank ownership is preferred, or when bank privatisation takes place, such banks are often owned by foreign investors.

In India, for example, where dispersed ownership has been enforced in private-sector Indian banks, ownership of these banks has ended up in the hands of foreign institutional investors. Thus, the largest Indian private banks have foreign ownership of over 70%, but such ownership is dispersed.

The main solution to this conundrum lies in some combination of state and private ownership of banks, along with certain degrees of foreign ownership and presence of some foreign banks, which would then provide a certain degree of competitive discipline in the banking system. Such competition will not be enough, so robust banking regulation and supervision is a necessity for both state-owned and private sector banks. There would then be a possibility of conflicts of interest to be regulated and supervised. Regulatory capture certainly poses problems in such circumstances, thereby placing a premium on the appointment and maintenance of competent technocratic banking regulators and supervisors.

There are no magic solutions. Once again, a middle path is the only way out, along with constant oversight by the government, the central bank, and other financial regulators as the case may be.

Bond market development and efficiency: Second, the conventional wisdom that had emerged was that commercial banks would essentially do short-term lending whereas bond markets need to be developed to provide direct financing for long-term financing needs. There has therefore been a constant refrain from financial sector advisors and international financial institutions (IFIs) urging the development of bond markets in the EMs.

Consequently, the development of local currency bond markets became a policy priority for many Asian economies after the Asian financial crisis. Even after more than a decade and a half of such efforts, bond market financing of the corporate sector in Asia has barely reached 10% of the total needs, while around 50% percent continues to be from bank lending and about 40% comes from equity financing. Moreover, the majority of corporate bond issuance is originated from government-owned corporations, banks, shadow banks, energy and transport utilities (Park 2019). Furthermore, an average of about 60% of corporate bonds in Asia have maturities of less than five years, thus belying the expectation of long-term financing from bond markets.

The issue, perhaps, is that even in mature bond markets most of the investment is sourced from institutional investors, which take considerable time to develop. The expectation that EMs will rapidly become a source of long-term financing for industry and infrastructure will therefore remain a mirage until there is intensive development of contractual savings through pension and insurance institutions. Once again, a middle path is called for: keep developing bond markets but keep realistic expectations on their efficacy in the short to medium-term.

There is, however, a corollary to the development of bond markets. While it will take considerable time for corporate bond markets to develop, it is essential that the EMs pay special attention to the development of government securities markets. The efficient price discovery of market interest rates and benchmarks for overall functioning of financial markets needs the operation of relatively efficient government securities markets. They are also necessary for central bank operations with respect to monetary policy implementation. Given the safety that government securities imply, it is much easier to develop government securities markets. As they become more liquid and efficient, they also help in the eventual development of corporate bond markets.

DFI development: Third, it may therefore be desirable to reinitiate discussion on the need for DFIs once again in the EMs. Most EM countries had initiated DFIs since the 1950s to the 1970s. These DFIs were largely government-owned or dominated, including frequent participation by multilateral financial institutions. They were established in recognition of various market failures that inhibited long-term financing by commercial banks. Mostly, industrialisation required long-term financing.

In the absence of well-functioning bond markets, DFIs were seen as the solution. Because of increasing governance issues, usually due to excessive government interference in these institutions, they went out of fashion by the 1990s, and were increasingly frowned upon by the denizens of the neo-liberal order. Such DFIs were promoted heavily by IFIs in a host of developing countries from the 1950s to the 1970s. They did indeed experience a great deal of political interference, often suffered from low-quality management and staff, and lacked the capacity to adequately evaluate projects, among other shortcomings. Hence, many ended up with significant non-performing assets and erosion of their capital.

However, most EMs still have active DFIs and the remaining ones appear to be profitable.[5] There is little difference in their profitability in comparison with commercial banks. As infrastructure investment is increasingly being done through private participation, a new need has arisen for DFIs in the EMs. In view of the limited success in setting up corporate debt markets, there is a revival of interest in scaling up development finance through such institutions, both those that already exist and by creating new ones.[6] "DFIs across the world hold roughly $6 trillion in total assets, with G-20 members as shareholders of $4.3 trillion of that total. The largest amount of DFI capital is held in national development banks, which are $4.8 trillion of the total, and MDBs at $1.8 trillion" (Gallagher et al 2018: 4).

It is certainly the case that the most fast-growing EMs such as Japan and Brazil during the 1950s–1970s, Korea, China and others, have successfully used the DFIs to fund their industrial and infrastructure investment needs, even though they certainly have their own share of financing failures. The new challenge therefore is to develop new thinking on how such institutions can be resuscitated or newly established to serve the emerging needs for long-term finance.

Perhaps some lessons can be taken from the running of institutions such as the European Investment Bank in Europe or the Nordic Investment Bank, along with other similar

successful institutions. Whereas AEs and IFIs generally frown on the setting up of DFIs, the existence of these institutions in the most developed parts of the world suggests that there is indeed a significant role for such institutions in financing long-term industrial and infrastructure development. The establishment of the Asian Infrastructure Investment Bank (AIIB) by China and the New Development Bank (NDB) by the BRICS countries are prime examples.

How to ensure that new DFIs avoid meeting the same fate as many of those that are now defunct is an important issue. First, there is now greater availability of financial sector and banking expertise in EMs to staff such institutions with adequate experience and competence. Second, just as MDBs have been structured in such a way that they have technocratic management subject to political oversight, similar ways can be found to structure both multilateral and national DFIs. As has been done in certain cases, national DFIs can invite partial but significant ownership by multinational DFIs and private-sector institutional investors who have long-term horizons like insurance and pension funds, in addition to national governments. Such structuring could help in curbing harmful government interference that had been the bane of former DFIs. Third, there needs to be some understanding that such institutions do take higher risk than commercial banks and hence some degree of loss provision should be anticipated.

Regulatory prudence: Fourth, in view of the importance of commercial banks there must be recognition that governments, central banks and financial regulators need to understand their responsibilities with respect to adequate regulation covering the whole financial sector. Commercial banks are usually subject to greater regulation than other financial institutions in view of their deposit taking role and stewardship over public money. This can lead to regulatory arbitrage and increasing expansion of non-banks or shadow banks, creating greater risk in the financial sector. At the minimum, all institutions permitted to take public deposits should be subject to similar regulations. These issues assume somewhat greater importance in the EMs, given their typically higher growth and continuing need for financial expansion.

Fifth, countries experiencing high growth also naturally experience a high rate of credit growth, which is often helped along by desirable large capital flows. There is equal need to temper the transmission of external capital flow volatility into the internal credit and financial markets, along with possible domestic excesses in terms of over leveraging. Otherwise, we know the consequences—excessive credit growth, low risk perceptions, irresponsible borrowing and lending, along with asset market booms followed by busts—as happened in the NAFC. To the extent that domestic financial markets are open to portfolio flows there is an even greater likelihood of the transmission of external volatility to domestic financial markets.

In real time it is difficult to know what is excess and what is normal and desirable. So, a good deal of judgment has to be used by the regulatory authorities and central banks in how they address these issues. There are many instruments that are potentially available: use of cash reserve ratios, calibration of risk weights by sector or instrument or overall, margin requirements, loan to value ratios, and the like. In addition, a close watch should be kept on external borrowing by banks. It is indeed possible to design macro prudential regulations that are market related and self-administering.

Much of what has been said here suggests a greater role for central banks and financial regulators. Should such unelected technocrats be given such policy powers and freedom? Why should we have confidence that they will operate in the public interest? Paul Tucker has addressed this question in some detail in his recent book in the context of the AE central bank independence (Tucker 2018). What is important is that governments attempt to provide relatively clear policy mandates to these institutions along with reasonably high degrees of autonomy and legal powers to perform their functions efficiently. This is helped by the increasing acceptance of the need for transparency and accountability in their functioning.

Once again, there are no magic solutions. Typically, senior officials in central banks and financial regulatory authorities in the EMs, as in the AEs, have longer and more stable tenures than those in the government. They are, no doubt, subject to nudges and pushes from political and government authorities on a relatively continuous basis. It is probably correct to say that the technocratic quality of these officials has improved over time significantly. There is now a great deal of communication between central bankers and financial regulators across the world, among the EMs and between the EMs and the AEs. This is facilitated by a range of regional groupings that have emerged along with the IMF, namely, the Bank for International Settlements (BIS), the Financial Stability Board (FSB), the G-20 and others. This kind of exposure and discussion has helped in the functioning of these institutions.

However, there is also a downside since such continuous communication also leads to a certain degree of group-think, particularly the advocacy of policies that that are more suited to conditions in the AEs. The EM officials need to guard against this tendency and continuously adapt the so-called best practices to their own conditions. That the EMs did not suffer from their own financial crises as a consequence of the NAFC suggests that they had indeed been relatively successful in starting their own monetary policy and regulatory paths.

Conclusions

Central banks and financial regulators in the EM economies have to keep their basic aims in mind: achievement of growth with price and financial stability, and the need to "do whatever it takes to achieve them." In a world of relatively open capital accounts and globalised finance, they do need to expand their arsenal of macroeconomic, monetary, exchange rate, and financial policies that encompass some of the policy and institutional instruments that have been discussed.

As we adapt to a post neoliberal order, the approach to financial sector development for the EM economies must essentially be seen as a middle path between free market imperatives tempered by appropriate and necessary public policy intervention by governments, financial regulators, and central banks alike. Their focus must be to incentivise and manage their financial sectors, so that they serve the financing needs of the real economy, rather than themselves.

The lessons derived from the crises observed in the past three to four decades in both the EMs and the AEs suggest that financial markets are inherently unstable and hence need different kinds of public policy controls in the quest for maintaining high growth with financial stability.

NOTES

1 See, for example, Bartsch, Boivin, Fischer and Hildebrand (2019); Blanchard and Summers (2017); Bernanke (2017).

2 New problems have, however, begun to emerge in a number of EMs over the last few years, for example, the significant increase in non-performing assets (NPAs) in state-owned banks in India.

3 Brazil, India, Indonesia, South Africa and Turkey

4 With the ongoing global economic slowdown including, in particular, reduced expectations for China's growth over the next decade or so, along with lower than historical inflation even in EMs, nominal GDP growth in EMs may be lower than that experienced in the last couple of decades.

5 Sixty-three in Asia in 2016, down from 121 in 1998 (Nehru 2019).

6 See Gallagher et al (2018) for an excellent review of the current literature on this issue.

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Regime shifts in Indian Monetary Policy and Tenures of RBI Governors

UTSO PAL MUSTAFI, RAJESWARI SENGUPTA

We estimate regime shifts in Indian monetary policy during the period 1998–2017. Applying a multivariate Markov-switching Vector Autoregression (MS-VAR) model we find that in general Indian monetary policy during this period could be roughly divided into two main phases, one that prevailed from 1998 to 2011 and the other from 2011 to 2016. The tenure of governor Jalan closely corresponds to one regime which also sporadically appears when governor Reddy is in office. The other regime overlaps with the tenure of governor Rajan. In contrast, governor Subbarao's tenure does not correspond to any specific regime.

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In advanced countries, monetary policy can mostly be described by a rule that relates the short-term interest rates to expected inflation and output gap.[1] This may not be the case in a large emerging economy such as India which until recently did not follow any rule-based framework. Monetary policy was instead conducted in an ad hoc and discretionary manner. Given the absence of any well-defined framework, it is unlikely that during this period monetary policy even implicitly followed a linear, time invariant rule. Rather, it is possible that monetary policy experienced multiple regime shifts as a consequence of overall macroeconomic developments as well as the discretionary setting of the policy rate.

In this paper, we attempt to uncover the regime dependent nature of a system of variables characterising monetary policy in India. We estimate a multivariate Markov-switching Vector Autoregression (MS-VAR) model that endogenously separates out distinct regimes identified by regime-specific parameter sets. The model allows shifts in the intercept of the system of variables as well as in the variance-covariance matrices.

India formally adopted inflation targeting in 2016. For the first time the Reserve Bank of India (RBI) was given a specific objective to pursue in its conduct of monetary policy, that of price stability.[2] From 1998 to 2015, the RBI followed a multiple indicator approach in which the policy rate was determined on the basis of a multitude of macroeconomic indicators (such as credit growth, trade deficit, unemployment, etc) and not just inflation and output.[3]

Unlike the inflation targeting regime where monetary policy gets decided by a six-member monetary policy committee, in the pre-inflation targeting era, the RBI governor was the sole decision-making authority. This period saw the governorship of Bimal Jalan (1997–2003), Y V Reddy (2003–08), D Subbarao (2008–13), and Raghuram Rajan (2013–16) at the RBI. In the absence of any systematic rule, it is possible that successive governors responded to macroeconomic conditions in a discretionary and flexible manner. A former deputy governor of the RBI described this approach as follows,

> Thus the overall objective has had to be approached in a flexible and time variant manner with a *continuous rebalancing of priority between growth and price stability*, depending on underlying macroeconomic and financial conditions. (Mohan 2006b; italics our own)[4]

It would be interesting to analyse the extent to which the regimes uncovered in the data may have corresponded to the tenures of specific governors. Substantial changes in the way monetary policy was conducted could have translated into

regime shifts in interest rates and other associated variables. The tenure of a governor may have been part of a distinct regime driven by the way certain macroeconomic variables behaved during his time in office or by the way he responded to the macroeconomic conditions through his policy decisions.

During the 20-year period from 1998 to 2019 India underwent significant structural changes in the macroeconomic landscape and witnessed substantial developments in financial markets and institutions (Shah 2008). These changes were triggered by the liberalisation, privatisation and globalisation reforms of the early 1990s.

On the external side, the trade to gross domestic product (GDP) ratio increased dramatically during this period as India became progressively more integrated with the global economy. While capital controls were largely relaxed in a gradual manner over the years, there still exist significant amount of restrictions on foreign investment unlike many other emerging economies.[5]

India moved towards a market determined exchange rate system in the mid-1990s. However, the RBI continued to actively intervene in the foreign exchange markets in order to stabilise the currency. The INR/USD exchange rate depreciated from about 31 to 66 during this two-decade period. The exchange rate itself underwent multiple regime changes.[6]

The economy experienced one major business cycle expansion from roughly 2003 to 2009, one recession from 1999 to 2002 and one prolonged phase of growth slowdown from 2010 onwards (Pandey et al 2017). There were a couple of periods of high inflation such as 1998–99, and 2007–10 as well as intermittent phases of relatively low inflation such as 2000–04, and 2014–17. Since the 1990s, there has been greater flexibility in the money market interest rates in contrast to the pre-1990s when the money market was largely regulated and interest rates were essentially fixed.

These developments potentially altered the macro-financial environment as well as the external constraints facing the RBI, and may have influenced its operating procedures as well as policy tradeoffs. These considerations, in turn, may have impacted the conduct of monetary policy in India. Hence it is plausible that during this 20-year period, monetary policy conduct may have gone through multiple regimes as opposed to following a single, stable rule with fixed weights assigned to various targets.[7]

Several studies have looked into regime switches in monetary policy especially in advanced countries such as the United States (US). The pioneer work in this field was by Hamilton (1988, 1989). The MS-VAR procedure that we apply in the paper essentially extends Hamilton's Markov-switching regime framework to VAR systems (Krolzig 1997).

Among the studies that have applied the MS-VAR technology to various research questions in monetary policy and related fields, Ehrmann et al (2001) estimate regime dependent impulse responses for the MS-VAR. Using the obtained impulse response functions, they conclude that oil price shocks that are more recent tend to have a less contractionary and less inflationary effect on the economy. Tillmann (2007) uses an MS-VECM model to see whether the term structure of interest rates in the US underwent regime changes corresponding to changes in monetary policy. They find significant shifts in the risk premia and interest rate volatility across regimes.[8]

A paper related to ours is Valente (2003) who uses an MS-VAR model to estimate regime switches in the monetary policy of six advanced countries namely France, Germany, Italy, Japan, United Kingdom (UK) and US. He identifies significant and persistent shifts in monetary policy that affect the dynamics of the central banks' policy rates and concludes that the shifts are driven by changes in inflation targets. However, the baseline monetary reaction function he estimates assumes that domestic monetary policy does not respond to external shocks. This may not be a realistic assumption especially for a country like India where the central bank actively responds to movements in the exchange rate either through foreign exchange interventions which are bound to have an impact on inflation and hence monetary policy or through the policy rate itself.

Estimating a non-linear, stochastic, dynamic, simultaneous equation model to estimate regime changes in the US monetary policy, Sims and Zha (2006) find that in the model that uncovers four regimes, three of the regimes roughly coincide with the years of Federal Reserve chairmanship of Paul Volcker, Alan Greenspan, and Arthur Burns. Their thorough and detailed study motivated our analysis of whether the regimes endogenously uncovered by the model correspond to the years in office of specific RBI governors.

Several studies have documented the history and evolution of monetary policy in India and also estimated the monetary policy reaction function of the RBI.[9] To the best of our knowledge, only two papers estimate regime changes in the RBI's monetary policy reaction function. Hutchison, Sengupta and Singh (2013) use a time varying Taylor rule to study regime changes based on the focus RBI puts on inflation, vis-à-vis output gap and exchange rate. They find that for the period 1987–2008, the "Dove" regime was predominant with the RBI being relatively less responsive towards inflation and more focused on the output gap and the exchange rate. Kumawat and Bhanumurthy (2016) use a smooth transition autoregressive (STAR) model to study changes in the monetary policy response function. They find that regime shifts are driven mostly by changes in the inflation gap and the exchange rate for the period 1996–2015.

Analysing shifts in the monetary policy reaction function conveys only one part of the picture. In reality it is plausible that the policy rate is set in response to multiple factors which, in turn, interact with each other in complex ways and the processes generating this system of variables itself could be undergoing shifts over a period of time. Estimating regime switches in a simple rule-based reaction function generally does not capture these complexities; especially multiple shifts in variance and identification of such functions are also usually weak (Sims and Zha 2006).

To this end, our objective in this paper is to improve upon the existing studies and contribute to the literature by exploring

the possibility of there being multiple regimes in a system of macroeconomic variables that describe the monetary policy stance and strategy of the RBI. Apart from adopting a more generalised and dynamic approach, the other contribution of our work is that we do not impose the number of regimes while doing the estimation. We let the data and the model endogenously determine the optimal number of regimes for our sample period.

We find that the optimal number of regimes is 3. The tenure of governor Jalan matches with the entire duration of a regime which also reappears sporadically during governor Reddy's tenure. Another specific regime occurs with high probability during governor Rajan's tenure, and that the same regime seems to characterise the years when governors Reddy and Rajan were in office.

These imply that there was something about Jalan's and Rajan's tenures which separate these periods out as specific regimes, and that there were similarities across the tenures of governors Jalan, Reddy and Rajan either in their conduct of monetary or currency policies or in the behaviour of the underlying macroeconomic variables or both. Governor Subbarao's tenure on the other hand does not correspond to any specific regime and is in fact a mix of two or more regimes.

In terms of macroeconomic variables, Jalan's tenure saw both the highest and lowest levels of (Consumer Price Index) CPI inflation. Subbarao lowered interest rates to the lowest levels in our sample period. Rajan's tenure witnessed the highest interest rates even though inflation was not very high during this time.

A Markov-switching VAR

We use a Markov Switching Vector Auto Regression (MS-VAR) model to estimate the regime changes in India's monetary policy. The Markov switch is a certain class of switching regressions, introduced to econometrics in Goldfeld and Quandt (1973) and subsequently popularised by Hamilton (1989) who proposed the application of unobservable Markov chains as regime generating processes.[10]

The Markov switch became popular after there arose a need to identify regime shifts endogenously from the data. We use the discrete first order Markov process, where the model assumes that for a given number *(k)* of states, the probability of the economy being in a particular state only depends on the state it was in the previous period. More formally, if we have $P(s_t = j)$ as the probability of the economy being in an unobserved state *j* in period *t*, the Markov process states that

$$P(s_t = j|s_{t-1} = i) = p_{ij} \text{ with } \sum_{j=1}^{k} p_{ij} = 1, \text{for } i = 1, \ldots, k$$

where s_t is the unobserved state variable in time *t*.

In a single equation Markov switch process, one could accordingly define the coefficients such that they differ between the regimes. Instead of a single equation estimation, we use a VAR framework. This is a generalisation of the single equation model since the VAR would incorporate all the equations with the variables as dependent variables.[11]

If we have the vector of sample observations $Y = (Y1, Y2, \ldots Y_T)$, $Y_t \varepsilon R^n$,
where *n* is the number of variables in the VAR model, then the most general form of the MSVAR model would be:

$Y_t = 1_n.\alpha_{S_t} + (Y_{t-1} Y_{t-2} \ldots Y_{t-p})\, \beta_{S_t} + \epsilon_t$ where,

$\beta_k = (\beta_1\, \beta_2 \ldots\, \beta_p)'$,

$\epsilon_t \sim N(0, \Omega_{S_t})$,

where *p* is the number of lags in the VAR model, and *k* is the number of regimes in the economy, that is $S_t = (1, 2, \ldots k)$. It is assumed that the probability of the economy being in a state follows a first order Markov process, that is:

$$P(s_t = j|s_{t-1} = i) = p_{ij} \text{ with } \sum_{j=1}^{k} p_{ij} = 1, \text{for } i = 1, \ldots, k$$

These probabilities are called the transition probabilities. For *k* states, there are k^2 transition probabilities given by the transition matrix:

$$\begin{bmatrix} p_{11} & \cdots & p_{1k} \\ \vdots & \ddots & \vdots \\ p_{k1} & \cdots & p_{kk} \end{bmatrix}$$

The MS-VAR specified above is the most general form, where the intercept, the autoregressive (AR) coefficients and the variance-covariance matrix are all dependent on the state of the economy.

Krolzig (1997) broadly defines three types of MS-VAR models namely the MSI-VAR, the MSH-VAR and the MSA-VAR. In the MSI-VAR class of models, a change in only the intercept vector drives a change in regimes. For the MSH-VAR models, only the exogenous changes in the error term of the equations drive regime changes. For the MSA models, a change in all the AR parameters drives the regime changes. Including their combinations, there are 7 distinct possibilities that decide what drives regime shifts. For our analysis, we have relied on Droumaguet (2012) which uses 6 model types—MSI, MSH, MSIA, MSIH, MSAH and MSIAH. To decide the optimal model specification, as discussed in the next section, we have used the AIC, BIC and HQ criteria set by Droumaguet (2012).

It is important to mention that in this paper we primarily concern ourselves with the transition probability matrix and the smoothed probabilities, that is, the probability of the economy being in a certain regime given all our sample observations. However, we also want to find the estimated parameters of the MS-VAR in order to suitably characterise the regimes. Hamilton (1989) proposes a filter to obtain the smoothed probabilities. It accepts as input

$$P(S_{t-1} = s_{t-1}, S_{t-2} = s_{t-2}, \ldots, S_{t-r} = s_{t-r}|y_{t-1}, \ldots, y_{-r+1})$$

and through some algebra, we get

$$P(S_t = s_t, S_{t-1} = s_{t-1}, \ldots, S_{t-r+1} = s_{t-r+1}|y_t, y_{t-1}, \ldots, y_{-r+1})$$

From the last expression we get the filtered probability

$$P(S_t = s_t|y_t, y_{t-1}, \ldots, y_{-r+1}) = \sum_{s_{t-1}=0}^{1} \sum_{s_{t-2}=0}^{1} \ldots \sum_{s_{t-r+1}=0}^{1} P(S_t = s_t, S_{t-1} = s_t, S_{t-1} = s_{t-1}, \ldots, S_{t-r+1} = s_{t-r+1}|y_t, y_{t-1}, \ldots, y_{-r+1})$$

and the smoothed probability

$$P(S_{t-r} = s_{t-r}|y_t, y_{t-1}, \dots, y_{-r+1}) = \sum_{s_t=0}^{1} \sum_{s_{t-1}=0}^{1} \dots \sum_{s_{t-r+1}=0}^{1} P(S_t = s_t, S_{t-1} = s_{t-1}, \dots, S_{t-r} = s_{t-r}|y_t, y_{t-1}, \dots, y_{-r+1})$$

As a by product, we also obtain the conditional log likelihood

$$\log f\,(y_T, y_{T-1}, \dots, y_1 \mid y_0, y_{-1}, \dots, y_{-r+1})$$

For a single equation case, the conditional log likelihood could be maximised with respect to the all the parameters (that is, intercept terms, AR coefficients, variance-covariance matrices and the transition probabilities) to obtain the estimated value of the parameters. For the vector case, this exercise becomes difficult due to the computational difficulty of an ill-behaved likelihood surface. Moreover, analytically computing the derivatives becomes a tedious job. Hence we use the expectation-maximisation algorithm (EM) for maximum likelihood estimation to obtain the parameter estimates (Hamilton 1990; Kim and Nelson 1999). Instead of calculating the derivatives recursively, the EM algorithm makes use of the following three equations:-

$$p_{ij}^{l+1} = \frac{\sum_{t=m+1}^{T} p(s_t = j, s_{t-1} = i\,|Y; \lambda_l)}{\sum_{t=m+1}^{T} p(s_{t-1} = i|Y; \lambda_l)}, \quad i, j = 1, \dots, K \qquad \dots(1)$$

$$\sum_{t=m+1}^{T} \sum_{s_t=1}^{K} \dots \sum_{s_{t-m}=1}^{K} \frac{\partial \log p(y_t|z_t; \theta)}{\partial \theta} . p(s_t, \dots, s_{t-m}|Y; \lambda_l) = 0 \qquad \dots(2)$$

$$\rho_{i_m, i_{m-1}, \dots, i_1}^{l+1} = p\,(s_m = i_m, s_{m-1} = i_{m-1}, \dots, s_1 = i_1|Y;\ \lambda_l), \quad i_1, \dots, i_m = 1, \dots, K \qquad \dots(3)$$

where p_{ij}^{l+1} is an element in the transition matrix at stage $l+1$. λ_l parameter set (p_l, θ_l, ρ_l).

θ_l contains all other parameters apart form the transition probabilities. ρ_l contains the probabilities of the initial unobserved states, that is, before the EM algorithm starts. These probabilities do not follow the Markov process. Instead they follow an entirely separate distribution which does not have any of the parameters from the original system of equations.

It is to be noted that we do not actually calculate the derivative of the log-likelihood in equation (2). Instead equation (2) usually boils down to a simple weighted average of the sample observations. Thus instead of analytically calculating the derivatives, we first calculate the smoothed probabilities based on an initial arbitrary λ_0. Then equations (1)–(3) are solved to get λ_1. We then calculate the smoothed probabilities and update λ_1 each time till we reach a convergence criterion. Other than its computational simplicity, the EM algorithm always finds an interior solution and does not get stuck on local maxima due to the irregular surface of the likelihood function.

Data and Preliminary Analysis

We use monthly data from January 1998 to March 2017 for 5 variables that are of key interest in Indian monetary policy. These include a measure of inflation, a proxy for domestic demand, nominal exchange rate, nominal interest rate and the price of oil.[12] [13] [14] We use data on the year on year Consumer Price Index (CPI) inflation. Nominal CPI is the anchor which is used for the purpose of inflation targeting and being a retail measure of inflation this is also what matters for the average Indian consumer.[15] This differs from Hutchison et al (2013) who use the Wholesale Price Index (WPI) as the metric for inflation.

As a proxy of domestic demand, we use the Index of Industrial Production (IIP), due to its availability at a monthly level.[16] For the interest rate, we have used the 91-day Treasury Bill yields since this captures any changes in the monetary policy stance and strategy of the RBI which may not be limited to changes in the policy rate.[17] We use data on the nominal rupee dollar bilateral exchange rate.[18]

India is an important importer of oil and oil price has been known to be a critical driver of domestic inflation. We use the West Texas Intermediate price sourced from the US Energy Information Administration with the units in dollars per barrel. We checked for seasonality and deseasonalised the necessary variables using Census X-13 ARIMA.[19]

Figures 1–4 (p 41) respectively show the evolution of the 91-day T-bill yields, the CPI inflation, the INR/USD nominal exchange rate and the IIP during our sample period, across the tenures of 4 RBI governors.[20] Governor Jalan's time in office was characterised by an initial phase of high interest rates followed by a prolonged phase of monetary expansion during which interest rates came down dramatically. His tenure witnessed the highest as well as the lowest levels of CPI inflation in our sample period.

In contrast, governor Reddy's tenure on average witnessed a near doubling of interest rates (from 4.5% to about 9%). While inflation remained low and more or less stable during the initial years of his tenure, towards the end however inflation started rising well above the average level of 5%. By the time he left office in August 2008, CPI inflation was as high as 9%.

When governor Subbarao came to office in the wake of the 2008 global financial crisis, he embarked on a brief period of monetary expansion in order to provide stimulus to the economy. Interest rates during this time (2008–09) are seen to have reached the lowest levels in our sample period. However, CPI inflation continued to rise and by January 2010, it had reached 16%, the second highest level in our sample period. During the latter part of his tenure, the global economy got embroiled in the European debt crisis and financial market turbulence post taper tantrum, which had a significant impact on India.

He initiated monetary tightening from early 2010 onwards, as seen in Figure 1. Inflation gradually started coming down. Towards the end of his tenure he put an end to the monetary tightening and started lowering the rates from April 2012 onwards.

In the summer of 2013, in response to the taper tantrum shock governor Raghuram Rajan increased the interest rate sharply. Subsequently, he ushered in the inflation targeting framework, the initial success of which had much to do with the rapid moderation in global oil prices. During his tenure CPI inflation came down further from 10.7% in September 2013 to 5.3% in August 2016, amidst low global oil prices. If we look at the overall 20-year period, it appears that inflation was on an upward trajectory from governor Reddy's tenure onwards, peaking in 2010.

Governor Jalan's tenure coincided with the unravelling of the Asian financial crisis of 1997 and the international sanctions

Figure 1: Time Path of the Interest Rate

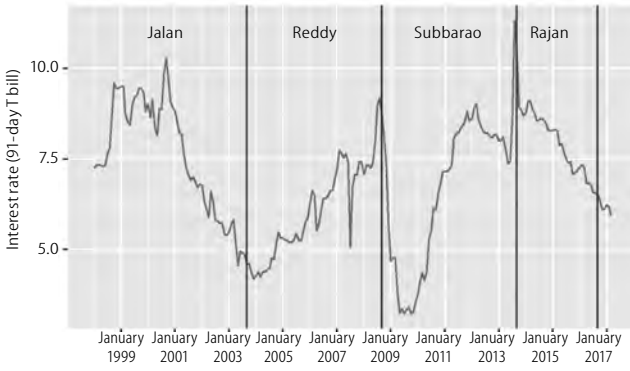


Figure 2: Time Path of CPI Inflation

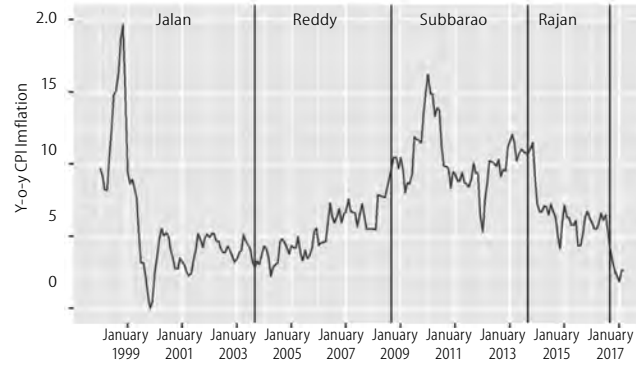


Figure 3: Time Path of the Exchange Rate

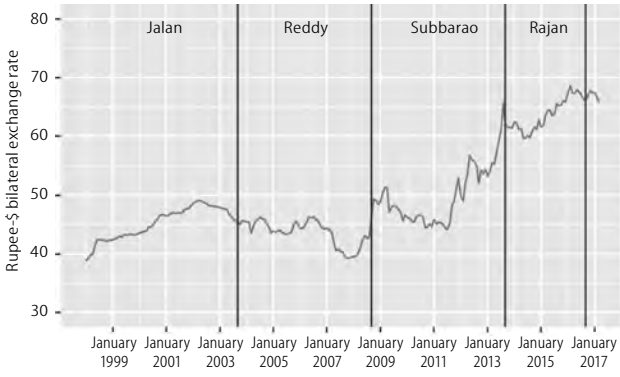
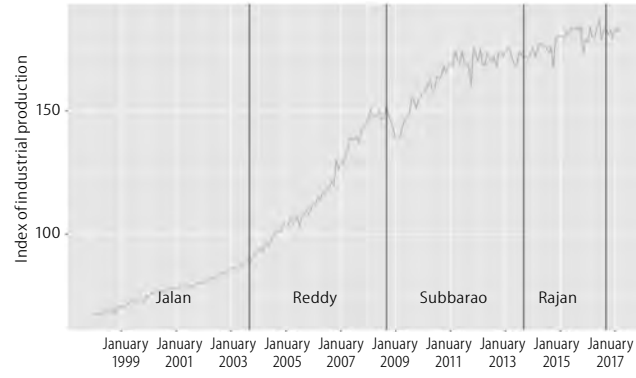


Figure 4: Time Path of the Index of Industrial Production



imposed on India in the aftermath of the Pokhran nuclear tests. Consequently, a major focus of his tenure seems to have been on managing the external sector and its fallout on the domestic economy, which included managing the exchange rate. Reddy, on the other hand assumed office amidst stable and strengthening macroeconomic fundamentals which also attracted substantial foreign capital inflows. In a bid to stabilise the exchange rate in the face of growing currency appreciation pressures, the RBI during this time intervened actively in the foreign exchange market and accumulated a large amount of reserves.

Thus, we see from Figure 3 that the nominal exchange rate was more or less stable during the time that governors Jalan and Reddy were in office. The stability was maintained by active interventions in the foreign exchange market which in turn would have impacted domestic inflation depending upon the extent to which the interventions were sterilised. This is consistent with the findings in Hutchison et al (2013) that the exchange rate potentially played an important role in influencing monetary policy during this period.

During Subbarao's tenure the exchange rate steadily depreciated in the aftermath of the global crisis. It was mostly in a flexible regime with very limited foreign exchange interventions by the RBI. During governor Rajan's time in office the rupee depreciated within a narrow band, from 65 to 67 implying that the RBI once again intervened heavily in the foreign exchange market. Figure 4 shows that the IIP steadily increased from 1998 till about 2011 and thereafter its growth rate slowed down significantly. This was the start of a general economic slowdown which continued almost till the end of our sample period.

Since our underlying time series model is a VAR, it is necessary that all the variables included are stationary. We conduct the Dickey-Fuller test to check for stationarity and find that except for the CPI inflation term, all the variables are non-stationary and integrated of the order 1. Accordingly, we take the log difference of these variables.[21] Other than making the variables stationary, the log difference of the variables has an added interpretation as their growth rate.

In order to select the optimal model, we relied on the criteria function defined in Droumaguet (2012). Table 1 reports the results from the model selection exercise.

Table 1: Optimal Number of Lags and Regimes in the MSVAR

No of	M=2			M=3			M=4		
Regimes	AIC	BIC	HQC	AIC	BIC	HQC	AIC	BIC	HQC
MSH	-13.06231	-12.06485#	-12.62625†	-13.22375*	-11.96911#	-12.70256†	-14.12076*	-11.81299#	-13.18933†
p	4	1	1	3	1	1	3	3	3
MSI	-12.30236	-11.466584	-11.93744	-12.46050	-11.372040	-11.93351	-12.51857	-11.228953	-11.92418
p	2	1	1	2	1	2	2	1	2
MSIAH	-12.83007	-11.429710	-12.26276	-13.04029	-10.899533	-12.17627	-13.03384	-10.057189	-11.795726
p	2	1	1	1	1	1	2	1	1
MSIA	-12.60613	-11.298022	-11.99525	-12.27216	-10.586880	-11.591971	-12.43122	-10.199364	-11.530431
p	3	1	1	1	1	1	1	1	1
MSIH	-12.80896	-11.76389	-12.37057	-13.25995*	-11.78217#	-12.60616†	-13.15797*	-11.381602	-12.44102
p	3	1	1	3	1	1	1	1	1

The 4 most optimal models according to the AIC criterion are marked with a *. The 4 most optimal models according to the BIC criterion are marked with a #. The 4 most optimal models according to the HQC criterion are marked with a †.

Figure 5: Regime Switches for the MSIH(3)-VAR(1) Model

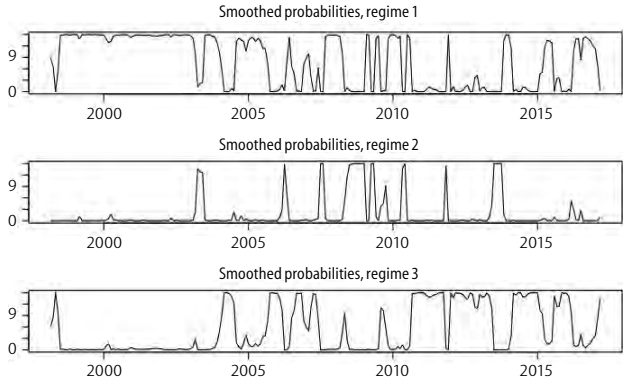
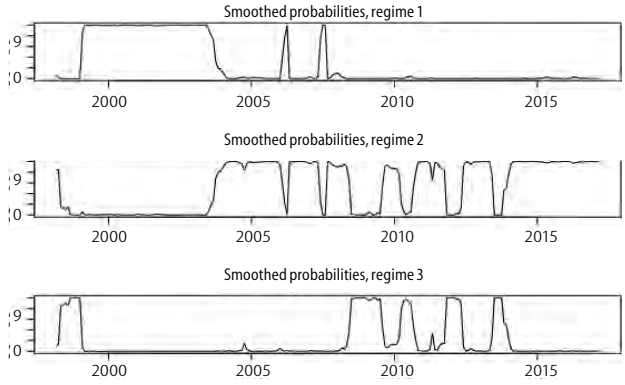


Figure 6: Regime Switches for the MSH(3)-VAR(1) Model



We report the optimal model using the AIC, BIC and HQ criteria. Checks have been run for M=2,3,4 regimes. For each run, the algorithm returns the most optimal lag length 'p' as defined by each of the 3 criteria.[22] The optimal number of lags is listed below the criteria values in the Table 1.

There are three potential models: these are MSH with M=3,4 regimes and MSIH with M=3 regimes. While the MSH models are optimal, the only element that distinguishes these models from one another is the state varying variance-covariance matrix and hence it is potentially not very interesting. We instead analyse the MSIH model with M=3 regimes as our baseline case. In the MSIH, the intercepts also vary across regimes over and above the error terms. The optimal number of lags is 3 by the AIC criterion and 1 by the BIC and HQC criteria. We take the optimal number of lags here as 1. Thus our optimal model is MSIH(3)-VAR(1). We have also reported results from the MSH(3) model.

In terms of variables, our MS-VAR model is of the form:-

$$\begin{pmatrix} \Delta\ln(\text{Oil Price}_t) \\ \Delta\ln(\text{IIP}_t) \\ \Delta\ln(\text{Exch Rate}_t) \\ \text{CPI Inflation}_t \\ \Delta\ln(\text{Int Rate}_t) \end{pmatrix} = \begin{pmatrix} \alpha_{1_{S_t}} \\ \alpha_{2_{S_t}} \\ \alpha_{3_{S_t}} \\ \alpha_{4_{S_t}} \\ \alpha_{5_{S_t}} \end{pmatrix} + \begin{bmatrix} \beta_{11} & \cdots & \beta_{15} \\ \vdots & \ddots & \vdots \\ \beta_{51} & \cdots & \beta_{55} \end{bmatrix} \begin{pmatrix} \Delta\ln(\text{Oil Price}_{t-1}) \\ \Delta\ln(\text{IIP}_{t-1}) \\ \Delta\ln(\text{Exch Rate}_{t-1}) \\ \text{CPI Inflation}_{t-1} \\ \Delta\ln(\text{Int Rate}_{t-1}) \end{pmatrix} + \begin{pmatrix} \epsilon_{1_{S_t}} \\ \epsilon_{2_{S_t}} \\ \epsilon_{3_{S_t}} \\ \epsilon_{4_{S_t}} \\ \epsilon_{5_{S_t}} \end{pmatrix}$$

where $\text{Var}\left(\begin{bmatrix} \epsilon_{1_{S_t}} & \epsilon_{2_{S_t}} & \epsilon_{3_{S_t}} & \epsilon_{4_{S_t}} & \epsilon_{5_{S_t}} \end{bmatrix}'\right) = \Omega^{S_t}_{5\,x\,5}$

Results

We defined the transition probability matrix earlier in the article. Since there are 3 states in our MSIH model, the matrix will be of dimension (3 × 3) and is given in Table 2.

Table 2: $\Pr(s_t|s_{t-1})$

	$s_t=1$	$s_t=2$	$s_t=3$
$s_{t-1}=1$	0.849	0.039	0.112
$s_{t-1}=2$	0.377	0.623	0.000
$s_{t-1}=3$	0.089	0.069	0.841

Each row of the transition probability matrix sums to 1. We see from row 1 that the first regime is the most persistent. The probability that given the economy was in regime 1 in the previous period, it is likely to stay in the same regime in the current period is 0.849. Regime 3 is almost equally persistent with a corresponding probability of 0.841. Regime 2 on the other hand is least persistent.

Figure 5 presents the conditional (smoothed) probabilities of all three regimes for our MSIH(3)-VAR(1).[23] We see that regime 2 exists only for a few sporadic intervals and there appears to be a gradual shift over time from regime 1 to regime 3. The probability of the economy being in regime 1 is the highest for the years 1999–2003, a period which almost entirely corresponds to governor Jalan's tenure. Regime 1 also reappears sporadically between 2004 and 2011, with longer duration during governor Reddy's tenure (2003–08). This implies that most likely there were similarities in the way governors Jalan and Reddy conducted monetary and exchange rate policies or in the underlying behaviour of the macroeconomic variables or both.

Regime 3 on the other hand occurs most frequently from 2011 onwards. It is relatively more sporadic between 2011 and 2013 and is the more dominant regime from 2013 to 2016. This mostly coincides with governor Rajan's tenure.

From this model where we are allowing both the intercept and the error term to vary across regimes, it appears that monetary policy in India roughly went through two main regimes, during the period when the RBI was following a multiple indicator approach. One regime lasted from 1999 to 2003 and then off and on from 2004 to 2011, while the other regime mostly prevailed from 2011 to 2016.

We also report the results for the MSH(3) model with the optimal number of lags selected as 1 (Table 3).

Table 3: $\Pr(s_t|s_{t-1})$: MSH(3)—V AR(1)

	$s_t=1$	$s_t=2$	$s_t=3$
$s_{t-1}=1$	0.942	0.058	0.000
$s_{t-1}=2$	0.020	0.931	0.049
$s_{t-1}=3$	0.025	0.119	0.856

Figure 6, here, regimes 1 and 2 are seen to be fairly persistent and regime 3 less, so. Once again regime 1 coincides almost entirely with governor Jalan's time in office (1998–2003). Regime 2 on the other hand overlaps somewhat with the tenure of governor Reddy (2003–08), appears sporadically during the time governor Subbarao was in office and almost fully matches with the tenure of governor Rajan (2013–16).

Thus it appears that the tenures of governors Jalan and Rajan belonged to two distinct regimes, and there were similarities across the tenures of governors Reddy and Rajan in that the same regime seems to have characterised their time in office.

We conduct a series of robustness checks using WPI inflation instead of CPI inflation, dropping the oil price from the model and incorporating the Federal Funds rate as a proxy for foreign interest rate. We find that the results of estimating a 3 regime model (both in MSH and MSIH specifications) are similar to what we get in our baseline case.

Conclusions

Using a multivariate MS-VAR model we estimate regime switches in monetary policy during the period 1998–2017 and also comment on the extent to which specific regimes correspond to the tenures of successive RBI governors. The optimal number of regimes identified by our baseline model is three, of which one is essentially a transitory regime. Thus, by and large, the period under study witnessed two main regimes, one of which had a very close correspondence with the tenure of governor Jalan and the other more or less matched the tenure of governor Rajan.

We also find that while under one model, the regime that overlaps with Jalan's tenure reappears sporadically during Reddy's time in office, under another model, the same regime roughly characterises the tenures of governors Reddy and Rajan. This hints at similarities across the governorships of Jalan, Reddy and Rajan in the way monetary policy was conducted or in the behaviour of underlying macro-financial variables or both. Governor Subbarao's tenure corresponds the least to any specific regime.

Our results may help understand the kind of discretionary approach applied by successive RBI governors in their pursuit of monetary policy, in the run-up to a more rule-bound, inflation targeting framework.

NOTES

1 Taylor (1993) formulated a policy rule by which the US. Federal Reserve adjusts the policy rate in response to past inflation and the output gap (actual less potential output). He showed that this rule described Federal Reserve policy performance quite well from 1987 to 1992. Using a quadratic loss function for the welfare objective of the central bank, Woodford (2001) provided a formal normative justification for following a Taylor-type rule under certain conditions. Many studies subsequently applied and developed this class of policy rules to examine the behavior of central banks in industrialised countries (eg, Clarida et al 2000).

2 The legal mandate from then on has been to achieve the target consumer price index (CPI) inflation of 4% with a band of 2% around it.

3 Prior to that the RBI appears to have loosely targeted the growth rate of money supply for a few years. In the pre-liberalisation era, monetary policy was mostly dominated by fiscal deficit financing and interest rates were tightly regulated.

4 Specifically, before the introduction of inflation targeting in 2016, monetary policy had roughly three objectives, viz, (i) price stability, (ii) growth, and (iii) financial stability. These objectives gained precedence in the hierarchy of policy objectives according to phases of the business cycle. After the introduction of inflation targeting, price stability was accorded primacy as the sole objective of monetary policy.

5 See for example Patnaik and Shah (2006), Sen Gupta and Sengupta (2014, 2019), Pandey et al (2019).

6 See for example Patnaik (2007), Patnaik and Shah (2009) and Zeileis et al (2010).

7 There is a sizeable literature by now that shows that the RBI has indeed switched across different policy objectives in the post-liberalisation period. Several studies have analysed these changes in context of the impossible trilemma objectives and related policy trade-offs (Aizenman and Sengupta 2013; Hutchison et al 2012; Sen Gupta and Sengupta 2014, 2019). Hutchison et al (2013) have explicitly estimated regime switches

in the Taylor Rule so as to uncover changes in the underlying policy preferences.

8 Also Lo and Piger (2005); Debortoli and Nunes (2014); Hubert and Creel (2008) among others.

9 See for example Hutchison, Sengupta and Singh (2010), Mohanty (2010a, 2010b, 2011), Mohanty and Klau (2005), Mohan and Ray (2017), Bhattacharyya and Ray (2007) among others.

10 Other kinds of switching regressions include the mixture of normal distributions model, the self-exciting threshold autoregressive model and the smooth transition autoregressive model, etc.

11 If we constrained the number of regimes to be one, then the system would collapse to the single equation model which in our case would be some version of the monetary policy reaction function as defined by the Taylor Rule.

12 The RBI used to follow monetary targeting which was abandoned in April 1998. Thus, for our sample period, we do not consider monetary aggregate and start the sample from the time when the multiple indicator approach was formally adopted. This also reduces one equation in the VAR as well as the number of coefficients to estimate. In April 1998, the RBI released its monetary and credit policy for the first half of 1998–99. In the report, they said that financial innovations had increased in India and worldwide and that there was a need for monetary policy to step up and hence made the case for adoption of the MIA approach.

13 We do not include any measure of unemployment rate since the labour market in India is highly fragmented and it is relatively difficult to find an accurate measure for unemployment.

14 All the studies that have used MS-VAR and that we have cited in this paper use some metric of domestic inflation, aggregate demand and interest rate in their VAR. Extensions if any usually include exchange rate, a monetary aggregate, unemployment rate or an additional variable for commodity prices.

15 We have also done a robustness check replacing CPI with wholesale price index inflation.

16 As a robustness check, we use monthly imports growth instead of IIP, as an indicator of domestic demand. The data has been sourced from the RBI's *Handbook of Statistics* on the Indian economy. The results are the same for the 3 regime case.

17 Unlike some studies, we do not use the weighted average call money rate since it is highly volatile. As Kumawat and Bhanumurthy (2016) point out, the correlation between the time series of the call money rate and the 91-day T-bill is fairly high and the treasury bill rate is much less volatile, thus justifying its use. As a robustness check, we also carry out our analysis using the Weighted Average Call Money Rate instead of the 91-day T-bill rate. For the MSIH(3)-VAR(2) model, results are the same.

18 In 1993 India transitioned to a market determined exchange rate regime from the pegged regime of the previous years. However, from time to time the RBI has actively intervened in the foreign exchange market to either stabilise currency fluctuations or to maintain the exchange rate within a particular range (Patnaik 2007; Patnaik and Shah 2009; Shah 2008).

19 We also checked for seasonality based on a periodogram derived from the Fast fourier transform of each individual time series.

20 It helps to use the governor tenures as distinct sub-periods to understand the movement of these variables because it throws light on the factors that may have played a critical role in their conduct of monetary policy while in office and also the effects thereof on the relevant macro indicators that we look at.

21 These variables are also non-stationary when taken in logs

22 The check runs as follows: If we run it for the MSH model and for M=2 say, the information criteria mentions the optimal number of lags that the VAR should have. In this case, the optimal number of lags is 4 for the AIC criterion, 1 for the BIC and 1 for HQC.

23 This means a 3 regime model and a VAR system with 2 lags.

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Economic Slowdown and Financial Fragility

The Structural Malaise of India's Growth Process

ZICO DASGUPTA

The Indian economy is presently gripped by the dual phenomenon of an unprecedented slowdown as well as financial fragility. What has triggered this? Is this simply a random exogenous shock to an otherwise well-functioning economy? Or, is there anything structural about the present slowdown? What are the binding constraints for recovery? These questions are addressed in the context of India's overall growth trajectory and policy regime in the last two decades.

Discussions with Arjun Jayadev, Rohit Azad and Partha Ray greatly helped in writing this article.

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This is certainly not the first time that the Indian economy has witnessed economic slowdown in the recent past. Ever since the implementation of economic liberalisation, the economy has gone through several slowdowns, followed by many recoveries. And, yet, this time it is different. There are at least two distinguishing features of the present episode of slowdown which suggests so.

The first feature refers to the longevity of the present slowdown. Both in terms of annual and quarterly gross domestic product (GDP) growth rates, the present slowdown has been more prolonged than any other previous episodes of slowdown during the liberalisation period. As evident from Table 1, which describes this phenomenon, the longevity of the present slowdown has already surpassed not only that of the 1990s or early 2000s, but even that of the immediate post-crisis period of 2008–09 and the one witnessed during 2011–12 and 2012–13.[1] While the previous episode of slowdown between 2011–12 and 2012–13 comes close to the present one in terms of its longevity, the latter is qualitatively distinct for its second feature.

The second feature involves worsening of the balance sheet of the non-financial private corporate sector, the intensity of which is presently much greater than the previous episode of slowdown. If the financially stressed firms are defined as those whose profit income (profit before depreciation, interest, tax and amortisation) is less than the interest payments (interest coverage ratio is less than 1), then the share of such stressed firms in the corporate sector firms has increased sharply in the recent period (Figure 1, p 47).

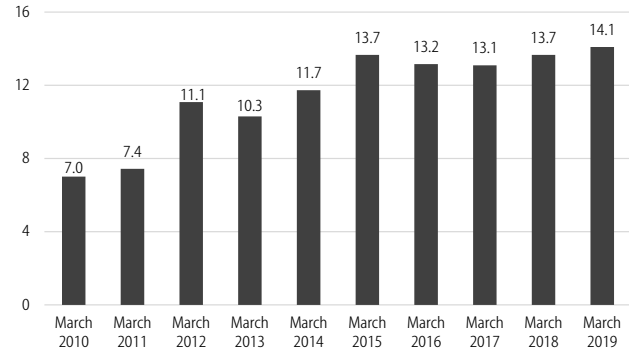
In short, the present episode of slowdown is not only unprecedented in the recent period in terms of its longevity, but in contrast to the previous episodes of slowdown, it has set in when the economy was already gripped by financial fragility. It is this prolonged period of slowdown, along with high financial fragility that remains to be the defining feature of the present

Table 1: Episodes of Slowdown, 1994–95 to 2019–20

Episodes of Slowdown	Number of years Of Slowdown	Total Number of Quarters of Slowdown	Number of Quarters When Growth Slowed Down for Consecutive Periods
1997–98	1	3	2
2000–01	1	2	1
2002–03	1	2	0
2008–09	1	4	4
2011–12 to 2012–13	2	6	5
2017–18 to 2019–20*	3	7	6

Slowdown in period "t" is defined as a phenomenon where GDP growth rate at period "t" is less than that of period "t-1." *Figures till second quarter of 2019-20
Source: Calculated from Linked GDP Series, National Statistical Commission; GDP Quarterly Estimates, CSO.

Figure 1: Share of Stressed (ICR<1) Firms in Private Non-financial Corporate Sector



Source: Calculated from CMIE Prowess Database.

slowdown. What triggered them? Is this simply a random exogenous shock to an otherwise well-functioning economy? Or is there anything structural about the present slowdown? What are the binding constraints for recovery? This article aims to address these questions in the context of India's overall growth trajectory and policy regime since the 2000s.

External Dependence and Financial Fragility

The defining feature of any capitalist economy is the analytical separation of *ex ante* investment decisions from the savings decisions, as investment decisions are formed on the basis of expectations around future profit in the midst of "fundamental uncertainty" (Keynes 2006; Dow 2015). While investment decisions and profit expectations are formed on the basis of expected demand conditions, the latter, in turn, can be argued to be affected by, inter alia, the present demand conditions and, hence, the autonomous components of aggregate demand. The steady state growth rate and profit rate of a typical capitalist economy accordingly is determined by expectations and autonomous components of demand (Dutt 1990; Hein 2014). These stylised facts open up the possibility of at least two forms of instability in the growth process of a capitalist economy as follows.

First, in the midst of inherited payment commitments, there exists no a priori reason in a capitalist economy why the exogenous components of demand would be necessarily such so that the solvency condition of firms is met. If the solvency condition of a firm is defined by profits being greater than or equal to its interest payments (interest coverage ratio greater than or equal to 1), then for a given level of interest rate and accumulated stock of debt, the solvency condition will only be satisfied if profits do not fall below the given level of interest payments. But, at any given profit share, profits would be determined by the level of output, which, in turn, are determined by the exogenous components of demand. In case the autonomous components of demand are weak, such that profits fall below interest payments, then firms become insolvent. Such insolvency can itself be associated with a fall in private investments and aggregate output and can further trigger a sequence of negative shocks across the economy.

Second, even if the economy starts off from a profit rate which satisfies the solvency condition, adverse shocks in expectations or autonomous components of demand may bring about an exogenous fall in the investments and profits rate. And, even if profits settle to a level that initially satisfies the solvency condition, the economy can eventually start acting as a "ball lying on a grassy slope" (Harrod 1973: 32), where expectations of further decline in sales lead to a cumulative decline in investment, profit rate, expectations, and so on, till the solvency condition is breached.

In a nutshell, by its very nature, a spontaneous capitalist economy is typically susceptible to volatility and dynamic instability, and its growth rate, investments, and profits are affected by factors that are exogenous to its output. Thus, within the institutional framework of capitalism, the relevant question boils down to: How to stabilise such an unstable economy? Despite its limitation within the existing institutional framework prevalent in a dual economy like India, one policy instrument that often played such a stabilising and stimulating role in the growth process during the *dirigiste* period was government expenditures.

The introduction of new economic policies (NEP) in the Indian economy during the early 1990s, however, marked a sea change in the policy regime from what it was in the pre-liberalisation period. In sharp contrast to the dirigiste period of the decade of the 1980s or earlier, and except in a few odd instances, the period of economic liberalisation has been typically characterised by the reduced role of the public sector and government expenditures in providing stimulus to India's growth process. By making fiscal deficit the function of output, the implementation of the Fiscal Responsibility and Budget Management Act in the early 2000s endogenised an otherwise autonomous component of demand that was earlier used as a policy instrument.

The institutional constraint in using government expenditures as an effective policy instrument, as we shall argue, had at least two implications. First, the economy acquired external dependence to keep up the growth rate; the trend in profits and investments became largely dependent on exogenous external market conditions. Second, the very objective of stabilising profits and investments in an otherwise unstable system eventually opened up the ground for a new policy regime in which financial fragility was an intrinsic component.

External Dependence since the 2000s

Despite the withdrawal of fiscal stimulus in the early 2000s, the Indian economy did not witness any major challenge in keeping up its profits during the entire decade as it witnessed a high output growth rate (Azad et al 2017). The booms of the 2000s, however, were triggered primarily by factors that were exogenous to India's domestic policymaking (Dasgupta 2020). The global economy was characterised by two booms during this period: one before the emergence of the global financial crisis, and the other during the brief recovery period in the immediate aftermath of the global financial crisis (2009–10 and 2010–11) due to implementation of synchronised fiscal stimulus packages all across the world. In the midst of such a global upswing, India's export growth rate registered a sharp increase and, consequently, brought about a sequence of expansion of aggregate demand through at least three routes.

First, it provided stimulus to private investments as catering to a larger external market itself required incurring additional

investment expenditures at a given capacity utilisation rate. Such a phenomenon was reflected by the fact that while investments were driven by the registered manufacturing sector, as noted in Dasgupta (2020), such investments showed a positive and statistically significant relationship with the lagged value of exports, after controlling for the changes in the capacity utilisation rate. Second, the consequent rise in aggregate demand involved further rise in housing demand and demand for construction-related materials, which, in turn, provided further stimulus to private investments in a manner described by Ghosh and Chandrasekhar (2009) and Nagaraj (2013). Third, implementation of synchronised fiscal stimulus packages all across the world in the immediate aftermath of the global economic crisis not only boosted global demand and India's exports, but also created room to increase India's own fiscal deficit during this brief period (Sen and Dasgupta 2014). With IMF providing the directive to cut back deficits and the synchronised fiscal stimulus packages being withdrawn across the world, India withdrew its own fiscal stimulus and initiated a process of deficit reduction which more or less continues uninterrupted till date.

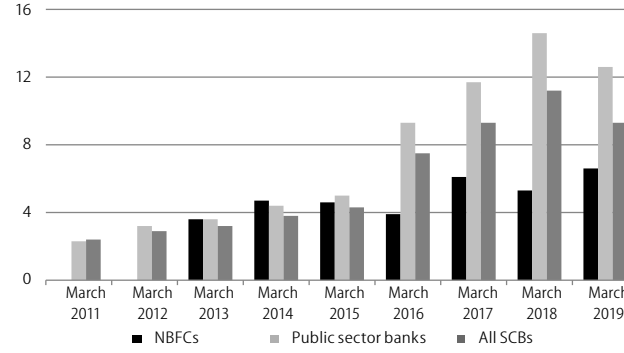
India's growth process during this period has been characteried by external dependence, such that the domestic economy primarily remained dependent on favourable, but exogenous external economic conditions for maintaining a high growth rate in domestic investment and output. Thus, as the global boom came to an end after 2010–11 following the withdrawal of synchronised fiscal stimulus packages across the world, the Indian economy started showing signs of slowdown (as we shall see later). This slowdown marked the beginning of the new policy regime during the 2010s.

Financial Fragility during the 2010s

The slowdown at the beginning of the last decade unleashed a process that involved a greater number of corporate firms becoming insolvent as their profits declined below their interest payment commitments, a phenomenon that was reflected by the rise in the share of ICR<1 firms (Figure 1). In the absence of any significant presence of the public sector in the real economy that could otherwise compensate for such adverse shocks, such insolvency of the non-financial corporate sector opened up the possibility of further reduction in output and investments for the economy as a whole. But, any government that aims at keeping such firms afloat despite their insolvency, either to maintain private investments and output at the given level or otherwise, would confront three distinct policy choices in such a situation: (i) reduce the gap between interest payment payments and profits, (ii) allow firms to operate despite loan default, or (iii) facilitate ponzi-financing where borrowings are increased in order to pay off the gap between interest payments and profits.

In the wake of a self-imposed institutional constraint of reducing deficit target, increasing demand and private profit through fiscal expansion remained outside the scope of the government policy. With the monetary transmission mechanism being broken (Anand and Azad 2019; Subramanian and Felman 2019) and monetary policy being exclusively aimed at inflation targeting (Sen and Dasgupta 2014), reducing the effective interest rate of the corporate sector through repo rate operations also became untenable. Despite the prevalence of significant amount of corporate tax concessions, which possibly would have relaxed the solvency condition compared to its earlier level, the adverse impact of output slowdown dominated, as reflected by the rise in the share of stressed firms during this period.

Figure 2: Share of NPAs in Gross Advance (%)



Source: Statistical Tables Relating to Banks in India, RBI; Financial Stability Repost, RBI, various years.

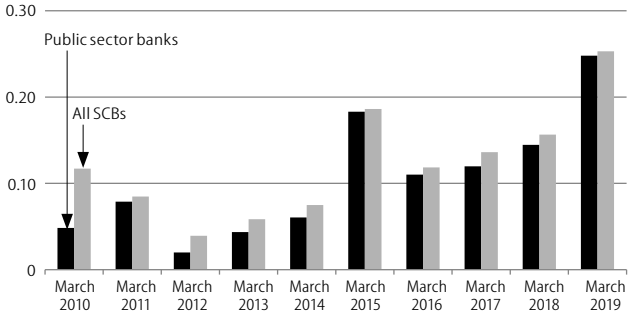
This prevalence of institutional and structural constraint to boost demand, along with the need to keep insolvent corporate firms afloat, played a central role in pushing the Indian economy at the beginning of this decade to a qualitatively new policy regime that was primarily associated with three distinct mechanisms: (i) allowing loan default, (ii) reducing corporate debt stock through debt-write-offs by public sector banks, and (iii) facilitating Ponzi financing. These mechanisms together implied, as pointed out by Rajan (2014), that the "bank's debt becomes junior debt and the promoter's equity becomes super equity. The promoter enjoys riskless capitalism."[2] How does this new policy regime operate?

First mechanism: The first mechanism involves tolerating loan defaults of the non-financial corporate sector without penalising the defaulters to any significant extent. Since, by hypothesis, the default of loan payments or non performing assets (NPAs) indicates that firms are not making interest payments at the given level of debt, by implication, it is a de facto reduction in the effective interest rate of firms. The mirror image of such loan defaults of the non-financial sector is the burgeoning NPAs of the financial sector along with the reduction in their net profits.

Such deterioration of the balance sheet of the financial sector is reflected in Figure 2 by a sharp rise in the share of NPAs in gross advances of scheduled commercial banks and non-banking financial companies (NBFCs) during 2011–19. While the public sector banks registered such a rise right from 2011, what was noteworthy in the recent period from 2016 onwards was the sharp rise in NPAs of the NBFCs. By March 2019, while the NPA ratio of the public sector banks and all scheduled commercial banks (SCBs) stood at 9.3% and 12.6%, respectively, that of the NBFCs stood at 6.6%.

Second mechanism: The second mechanism involving debt write-offs opens up the possibility of reducing interest payment commitments of the non-financial sector at any given effective interest rate.[3] While the banks' NPAs increased significantly during the last decade, the debt write-offs of NPAs increased at a far greater

Figure 3: Ratio between NPA Write-Offs and Gross NPAs, 2010–19



Source: Statistical Tables Relating to Banks in India, RBI.

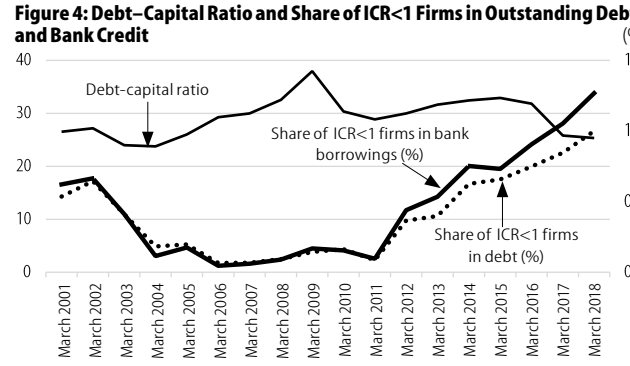
pace during this period. Figure 3 shows the ratios between NPA write-offs and gross NPAs for both public sector banks and all SCBs, both of which increased phenomenally in the last decade.

Third mechanism: In the midst of higher credit demand of the non-financial corporate sector to maintain its own viability, the credit supply was allowed to increase through an increase in the risk-appetite (reduction in the risk premium) of the financial sector. If the credit supply of the financial sector is perceived to be a negative function of its risk premium, whereas the risk premium is affected, inter alia, by the intensity of the financial stress of the borrower, then the new policy framework facilitated a de facto reduction in risk premium, where the financial sector was willing to provide additional credit to the financially stressed firms (Azad et al 2017).

The above phenomenon is reflected in Figure 4, which shows the share of financially stressed firms in outstanding corporate debt and bank credit, where the financially stressed firms are defined as those firms whose interest coverage ratio is less than 1. As evident from Figure 4, while the share of stressed firms in outstanding debt and credit either declined or remained stable during the 2000s, it marked a sharp rise in the last decade since 2010–11. Such a phenomenon of increase in debt of stressed firms was associated with a rise in the overall debt–capital ratio of the corporate sector during the first half of the last decade (Figure 4). In sharp contrast to the 2000s, when higher debt ratio was driven by non-stressed firms, as indicated by the declining share of stressed firms in debt during this period, the rise in the debt–capital ratio during the first half of the 2010s was driven by the higher debt of stressed firms. This was also the period when the share of stressed firms increased in annual credit flow (Azad et al 2017). While the debt–capital ratio declined during the present episode of slowdown, such a decline was hardly driven by the stressed firms as their share in debt and bank borrowings continued to rise.

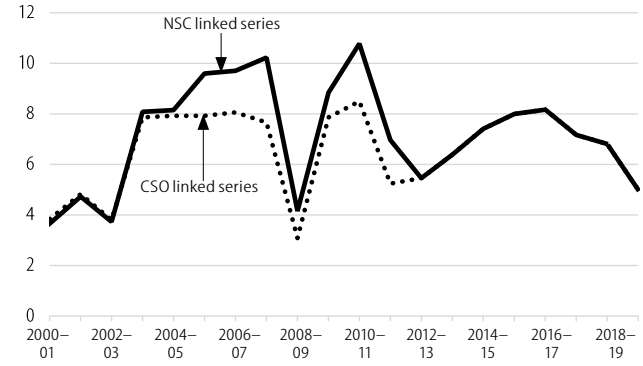
Such an experience of prolonged rise in the share of stressed firms in debt (encompassing almost a decade), along with the consistent rise in the share of stressed firms in total firms, cannot be explained simply as a cyclical phenomenon. Rather, the phenomenon of financial fragility can be attributed to a policy regime which tolerates greater balance sheet stress and loan default of the non-financial sector by transferring the risk from the debtors to the creditors. In the absence of any effective policy instrument which can boost demand, credit supply becomes a

Figure 4: Debt–Capital Ratio and Share of ICR<1 Firms in Outstanding Debt and Bank Credit



Debt–capital ratio of a given period is calculated as a ratio between stock of debt and net fixed assets of the previous period. It is measured in the secondary axis. Sample comprises of 1,198 firms.
Source: Prowess Database, CMIE

Figure 5: Annual GDP Growth Rate



Source: Linked GDP series, NSC and National Accounts Statistics, CSO.

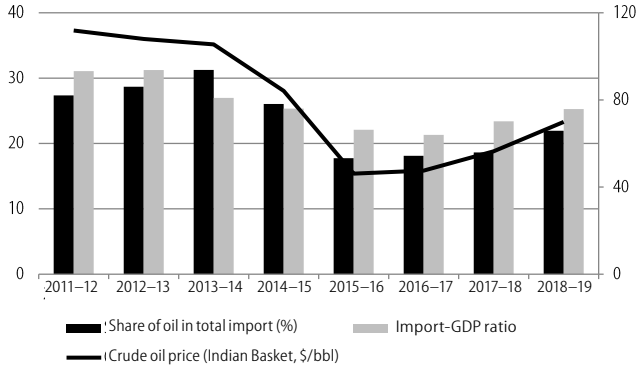
policy lever to keep firms afloat despite being insolvent or retain private investments by increasing leverage ratios.[4] Instead of any anomaly, here, financial fragility becomes a logical necessity.

There were two implications of this financial fragility. First, despite debt write-offs, interest payments of the corporate sector increased on account of higher accumulated debt by the first half of this decade as compared to the 2000s. Since the solvency condition would be reflected by the difference between profits and interest payments, by implication, the minimum level of profit that would be required to maintain this solvency condition also increased. Second, the financial sector registered a decline in profits and far greater stress on their balance sheet during this period as compared to the 2000s. It is against the backdrop of this inherited financial fragility, along with the structural and institutional constraints in implementing demand boosting policies, that the emergence of the present slowdown is analysed in the next section.

The Immediate Causes of Slowdown

The slowdown of 2011–12 and 2012–13, as evident from Figure 5, was interrupted by a brief recovery period between 2013–14 and 2016–17. Such a recovery, similar to the growth trajectory of the 2000s, was triggered by favourable external market conditions that were exogenous to India's policymaking as international crude oil prices registered a sharp decline during this period. However, the period of brief recovery was soon followed by the present episode of slowdown since 2017–18. What explains the present episode of slowdown? There are at least three immediate factors that can be attributed to this phenomenon.

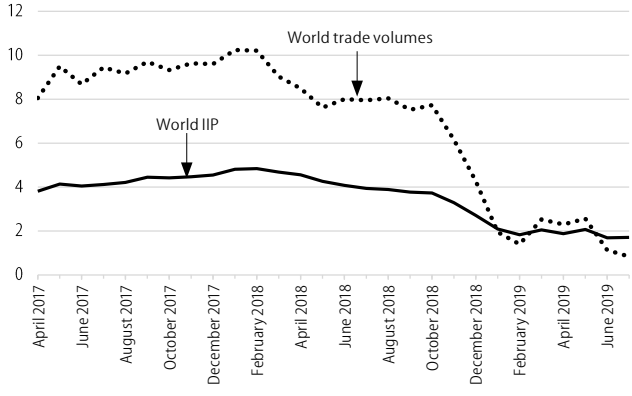
Figure 6: Crude Oil Price (Indian basket, $/bbl), Import–GDP Ratio (%) and Share of Oil in Import (%)



Crude oil price is measured in the right axis.

Source: National Account Statistics, CSO; Database of Indian Economy, RBI and Petroleum, Planning and Analysis Cell, Ministry of Petroleum and Natural Gas, GoI.

Figure 8: Monthly Growth Rate of World Trade Volume and World Index of Industrial Production (IIP)

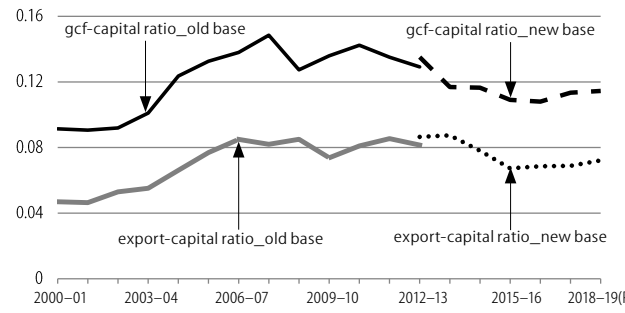


Source: *World Economic Outlook*, October 2019.

First, after an initial decline between 2013–14 and 2016–17, which otherwise played a key role in triggering the brief recovery, the import–GDP ratio started rising once again from 2017–18 onwards (Figure 6). Such a rise in the import–GDP ratio was driven by a sharp rise in oil imports and higher international crude oil prices, as reflected in Figure 6 by a similar rise in the share of oil in total imports during this period. While the brief decline in crude oil prices and the import–GDP ratio between 2013–14 and 2016–17 acted as a countervailing force in reviving India's output growth rate despite weak global demand, the recovery of crude oil prices in the recent period has reversed this trend. The rise in import ratio, along with weak global demand, pushed the Indian economy into the present phase of slowdown in 2017–18.

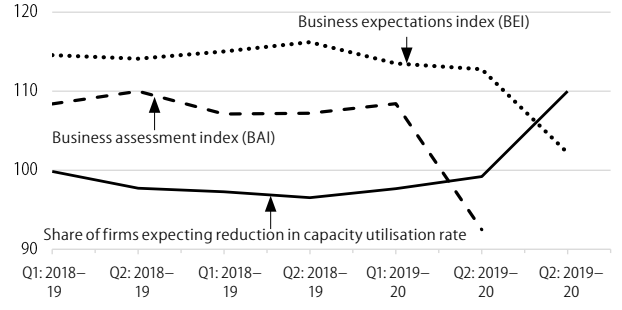
Second, while a buoyant export market during the 2000s had provided stimulus to private investments, the subsequent global slowdown was associated with a lower investment–capital ratio as it adversely affected aggregate demand and expectations of future profitability.[5] The close relationship between the investment–capital ratio and export–capital ratio is depicted in Figure 7. The levels of both the investment–capital ratio and export–capital ratio remained far lower in 2018–19 as compared to 2011–12. Despite the rise in oil prices, the export market remained subdued. In fact, India's export growth rate has registered a further decline since March 2019 when it

Figure 7: Investment–Capital Ratio and Export–Capital Ratio, 2000–01 to 2018–19



Source: National Accounts Statistics, CSO, various years.

Figure 9: Business Expectations and Assessments of Manufacturing Sector



Source: *Quarterly Industrial Outlook Survey*, RBI.

registered a growth rate of 12.2%, as the nominal monthly merchandise export growth rate turned to be negative since June 2019 (-7.8%) and stood at -1.1% in October 2019.

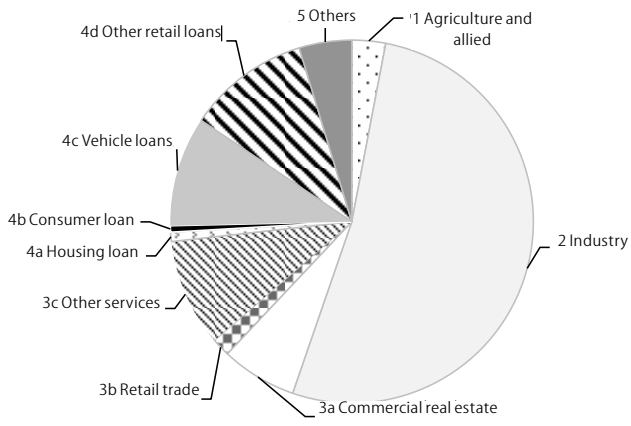
Despite the rise in oil prices, the export market remained subdued for the entire decade. Further, the world output growth rate declined since 2017 for three consecutive years and has been associated with increasing instances of protectionist and retaliation measures by the United States (US) and its trading partners (IMF 2019). These recent developments have been reflected by the sharp decline in the growth rate of the volume of world trade and industrial production, particularly from January 2018 onwards (Figure 8). Reflecting the trend of global demand, India's export growth rate registered a sharp decline.

Such a fall in demand would adversely affect expectations regarding future sales and profitability and, hence, would push the producers to cut back investments leading to further reduction in demand and so on. The fact that the Indian economy went through such a process in the last one year is evident from Figure 9, which shows the trend in business assessment and expectations of selected manufacturing companies from RBI's Industrial Outlook Survey.

The survey assesses the business sentiment for the current quarter and expectations for the ensuing quarter, based on qualitative responses on a set of indicators reflecting the perceptions of responding companies on various functional aspects. Figure 9 depicts the trend in three indicators: Business Assessment Index (BAI), Business Expectation Index (BEI), and the share of firms which expect a reduction in capacity utilisation rate for the relevant period. The fall in BEI since 2018–19 Q4 and that of BAI since 2019–20 Q1 indicates a deterioration of business expectations and assessment. Such a deterioration of

Figure 10: Sectoral Composition of NBFC Loans and Advances in September 2018

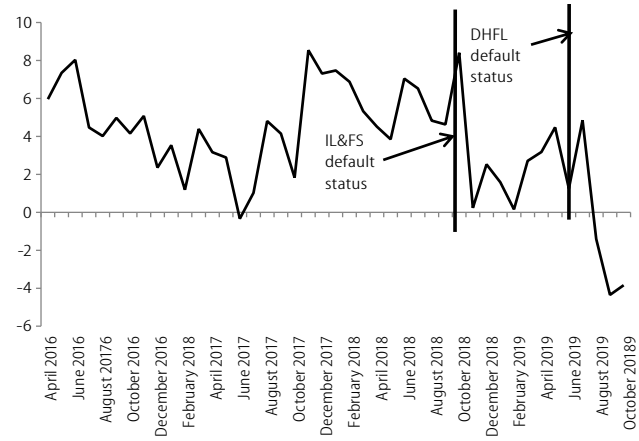
(%)



The aggregate figures for deposit taking (NBFC-D) and systematically important non-deposit taking (NBFC-ND-SI) companies are provided. The housing loan, consumer loan, vehicle loan and "other retail loans" together constitute the aggregate retail loans.
Source: Calculated from *Report on Trend and Progress of Banking in India*, RBI.

Figure 11: Monthly Growth Rate of Index of Industrial Production

(%)



Source: *Database of Indian Economy*, RBI.

business expectations and assessment was associated with a sharp increase in number of firms that expected a fall in their capacity utilisation rate for the ensuing quarter.

The third factor pertained to the interaction between demand slowdown and financial fragility of the economy, which the latter inherited since the turn of the present decade. What was specific about the present phase of slowdown was the high debt-repayment commitment that the corporate sector inherited through its accumulated debt stock since 2011–12. At the high level of interest payments that firms inherited, decline in profit rate in the latter half of the last decade due to lower demand brought about a sharp rise in the share of stressed firms in the corporate sector as profits fell below their interest payments (Figure 1).

The consequent repayment crisis of the non-financial corporate sector adversely affected the interest income and profitability of the creditors, constituting the banks and the NBFCs. Though loan defaults and debt write-offs have otherwise been a central feature for the public sector banks in the past, what was specific during this episode of loan default was the exposure of the NBFCs to the corporate sector. By March 2018, the NBFCs had emerged as one of the important sources of credit supply for the corporate sector, with loan disbursement of more than 11.5% of the GDP.[6] In sharp contrast to the commercial banks where deposits constitute the bulk of the liabilities, most of the NBFCs are non-deposit-taking and the largest components of their liabilities are the debt instruments. In other words, they lent long and borrowed short. The dwindling profitability of the NBFC sector with respect to their high level of debt repayment commitments pushed many NBFCs to default. The first big firm to have been labelled with the "default" status by credit rating agencies was the IL&FS in September 2018, followed by Reliance Home Finance and Reliance Commercial Finance in April 2019, DHFL in June 2019, and Altico Capital in September 2019.

The collapse of the IL&FS initiated a severe contagion effect as lenders increasingly reduced their exposure to the NBFC sector in the midst of greater uncertainty and financial fragility. As is evident from Table 2, the growth rate of total liabilities for the NBFCs sharply declined between March 2018 and September 2019. As is evident from the decline in their shares in total liabilities during this period, the decline in the liabilities growth rate was primarily driven by a sharp fall in debentures and commercial papers (Table 2, Item 3a). The squeeze in the NBFCs' balance sheet from the liability side led to a sharp fall in the asset side through a reduction in the growth rate of disbursed loans and advances. By September 2019, the growth rate of loans and advances by NBFCs reduced to 9.9% as compared to 31.8% in March 2018.

The sharp fall in loans and advances of the NBFCs had an immediate impact on the output of those sectors that were primarily dependent on NBFC credit. Figure 10 shows the sectoral composition of NBFC credit disbursement by September 2018. The industrial sector with 52% credit share was the largest recipient of NBFC credit, followed by retail loans (22.1%) and commercial real estate (6.7%). Within retail loans, the single biggest component was the vehicle loans with a credit share of 9.8%. The credit squeeze that engulfed the entire NBFC sector had an immediate adverse impact on the industrial sector at least through three distinct routes: (i) a reduction in industrial credit, (ii) fall in automobile demand through a squeeze in vehicle loans, and (iii) reduction in demand of infra-construction-related goods through sudden squeeze in credit disbursement to the real estate sector.

The trend in the growth rate of index of industrial production (IIP) is shown in Figure 11. The industrial growth rate registered

Table 2: Selected Balance Sheet Items of NBFCs

	March 2018	March 2019	September 2019
Growth rates (%)			
Total liabilities	26.8	17.9	13.2
Loans and advances disbursed by NBFCs	31.8	16	9.9
Share in total liabilities (%)			
1 Share of reserves and share capital	23.3	22.6	23.7
2 Share of deposits and other liabilities	7.5	9	9.1
3 Share of borrowing	69.2	68.5	67.2
3a Share of debentures and commercial papers	39.6	34.4	32.3
3b Share of other borrowings	29.6	34.1	34.9

The above balance sheet of NBFCs provides the aggregate figures for deposit taking (NBFC-D) and systematically important non-deposit taking (NBFC-ND-SI) companies. Growth rate is calculated on y-o-y basis.
Source: Calculated from Report on Trend and Progress of Banking in India, RBI.

a sharp decline particularly in two phases: (i) during November 2018, and (ii) since August 2019. The decline during the first phase was in the immediate aftermath of the IL&FL crisis where the credit squeeze would have an immediate impact. The second phase of sharp decline came about in the midst of weak global demand, when the collapse of DHFL acted as an additional negative shock to output growth rate. With negative export growth rate and credit shocks, the IIP growth rate has continued to be negative in three consecutive months from August to October 2019.

In a nutshell, the present episode of slowdown was triggered both by demand-side factors and the existing financial fragility of the economy, with each feeding on the other. What can be the policy-level response in the midst of such an unprecedented slowdown?

Immediate Binding Constraint and Policy Objective

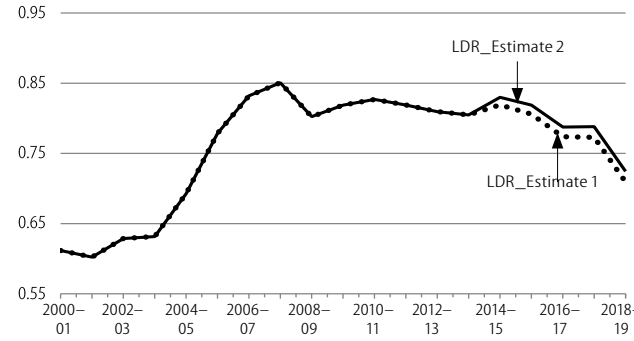
The precise nature of policy measure, inter alia, would be dependent on the diagnosis of what constitutes the immediate binding constraint on output. Given the specificity of the present slowdown, where both the output growth rate and credit growth rate registered a sharp decline, there are two possible candidates that can act as the immediate binding constraint: (i) the finance constraint, or (ii) the demand constraint. In the case of the former, higher availability of credit at a given level of the borrower's risk revives the output growth rate by relaxing finance constraint, whereas in the case of the latter, higher demand revives the output growth rate by relaxing demand constraint.

The possibility of demand constraint emerges from the squeeze in the aggregate demand and the consequent fall in expected profitability of investment projects and actual investments. The possibility of finance constraint emerges from the stressed balance sheet of the financial sector, which may lead them to reduce credit supply at a given level of economic activity due to a squeeze in its lending capacity and, thereby, impose an immediate constraint on investment and output at a given profit rate. Which of the above constraints is immediately binding on the economy is an empirical question that we now attempt to address.

The possibility of a binding finance constraint from the creditor side would emerge if the financial sector as a whole reduces its credit supply due to a squeeze in its lending capacity at a given level of economic activity. Precisely because a credit squeeze from one sub-sector can be mitigated by higher credit supply from another sub-sector; the necessary condition for such a finance constraint to operate is that the credit supply of the entire financial sector should be constrained by its lending capacity. In the midst of a squeeze in the NBFC credit, the question which therefore needs to be addressed is whether the banking sector is also constrained by a squeeze in its lending capacity.

The lending capacity of a bank, or the maximum amount of loans that the banks can potentially disburse (say L*), can be defined as the difference between their total financial assets (A) and that part of the liquid assets which the banks are statutorily required to hold in the form of reserves and securities (S). The financial assets are calculated by deducting fixed assets and "other assets" from total assets, and include financial investments, cash balances, and loans and advances. The statutory part of the liquid asset (S) is determined, inter alia, through the cash reserve ratio (CRR), statutory liquidity ratio (SLR), and, after January 2015, through the liquidity coverage ratio (LCR) as per Basel III norms. Any rise in the NPAs, as the banks have witnessed in the recent past, can adversely affect their lending capacity in two ways: (i) the banks can reduce the size of their balance sheet and assets (A) to maintain a given level of capital adequacy ratio, and (ii) the external cost of borrowing of banks can rise as their balance sheet deteriorates, which, in turn, may lead the banks to hold the higher statutory part of the liquid asset (S) in order to maintain a given liquidity coverage ratio (LCR).[7]

Figure 12: Loan Disbursement Rate (LDR) of Scheduled Commercial Banks



Estimates 1 and 2 only diverges from 2014–15 onwards with the implementation of Liquidity Coverage Ratio norms in India.
Source: Database of Indian Economy, RBI.

While the lending capacity (L*) provides the upper bound or the maximum amount of loan that banks can potentially disburse, the actual loans (say, L) is determined by effective demand of the economy and, hence, can be less than or equal to the lending capacity. In order to demarcate the demand-side effect on actual loans from the supply-side effect on lending capacity, we construct a ratio between actual loans and lending capacity. For the sake of convenience, this ratio is termed as the loan disbursement rate (LDR, henceforth). Any fall in LDR would indicate lower credit demand for a given lending capacity, whereas any rise in this rate would indicate the opposite. By definition, LDR is less than or equal to 1. We construct two estimates of LDR. In the first estimate, the statutory part of the liquid asset (S) comprises the amount determined by CRR and SLR, whereas, in the second estimate, it comprises the amount determined by CRR, SLR, and the stipulated LCR.

After registering a sharp rise during the boom period of the 2000s and maintaining a high level till 2014–15, the LDR witnessed a sharp fall particularly from 2015–16 onwards for both the estimates (Figure 12). Not only does the actual loan disbursement of commercial banks presently continue to be far lower than the lending capacity, as reflected by its relatively low value, but it also happens to be far lower than the peak value of 0.85 that it earlier attained during 2007–08. The fact that the banks are characterised by idle lending capacity and are holding liquid assets far higher than what is statutory, rather indicates a situation of a binding demand

constraint in the credit market. This conclusion is similar to that of Anand and Azad (2019).

There are primarily three reasons for the fall in LDR in the recent years. First, it can be attributed to the change in the demand pattern of the borrowers in favour of the NBFCs and away from commercial banks during the latter half of the 2010s. One plausible reason for the latter phenomenon can be greater risk exposure of the NBFCs during this period, because of which their effective interest rate, net of risk premium, would be lower as compared to the commercial banks. Second, the fall in LDR during the last two years reflects the overall demand squeeze in the aggregate economy following the fall in export demand and rise in import propensity. Third, due to massive liquidity infusion by the government in the recent period, the fall in the lending capacity has been less than proportionate to the fall in aggregate demand.

Therefore, for any policy response to be effective, it needs to be aimed at relaxing the demand constraint and stabilising the unstable economy. Notwithstanding the scepticism around "crowding out"—a proposition that otherwise remains rather unfounded either theoretically or empirically (Anand and Azad 2019)—one sufficient condition to do that is to bring back government expenditures at the centre of India's growth process to be used as a policy instrument for boosting demand.

Concluding Remarks

What remains at the heart of the present slowdown is a growth regime where financial fragility is an intrinsic component and one which is largely dependent on favourable external market conditions for its recovery and boom. Both these features follow from the lack of any effective policy instrument of boosting aggregate demand. The government expenditures, which once played this stimulating role, have now been withdrawn without being replaced by any alternative effective policy instrument.

Rather, the broad strategy of the existing policy regime is to try relaxing the solvency condition through corporate tax cuts, tolerating greater financial fragility through greater liquidity infusion or maintaining a lax resolution mechanism for loan defaults and, in the meanwhile, "wait out the storm" till the global economy recovers or oil prices start falling. In the midst of a binding demand constraint, there are at least three problems with this strategy.

First, while such measures can play a role in resisting further decline in the output growth rate by stopping a spiralling of demand reduction, credit crunch, and balance sheet crisis, it can hardly have any impact of increasing output. Since investment decisions are affected by present output, whereas output remains constrained by demand, relaxing balance sheet constraints or finance constraints hardly increases investment or output. Second, in the midst of external dependence, when exactly would the recovery set in is exogenous to domestic policymaking and, hence, its timing is uncertain. And, in between this long haul, livelihoods get destroyed. Third, since the present strategy has de facto involved a deterioration of interest coverage ratio of firms during the downswing, while exhibiting a somewhat downward rigidity during the upswing, continuing with this strategy makes the economy more vulnerable to negative external shocks in the future.

The Indian economy needs a change in its policy regime and growth trajectory, because what presently remains operational is a regime of financial fragility and vulnerability.

NOTES

1 Table 1 shows figures till 2019–20 Q2. According to the CSO's latest press release, the GDP growth rate has fallen to 4.7% in Q3 as compared to 5.1% in Q2.

2 This is not to argue that maintaining viability of firms has to be necessarily the only objective of such a regime; a firm which is otherwise solvent can still receive loans more than their "normal" line of credit and be a beneficiary of debt-write offs through sheer cronyism. However, in the context of the topic at hand, our emphasis remains on the former and not the latter.

3 The reduction in interest payment commitment here does not necessarily imply reduction in actual expenditure on interest payments during the given period, since firms may not be making such payments to start with (which is why the asset was categorised as an NPA in the first place); rather, it absolves firms from the commitment of making interest payments even in the future.

4 It can be noted, that private investments can not only fall when firms go out of business, but decline even when they remain afloat once firms start deleveraging to repair their balance sheet. Koo (2011) has adopted the latter route to explain Japan's slowdown in the post-1990s period through what he termed as the balance sheet crisis.

5 See Dasgupta (2020) for a detailed analysis.

6 The loan disbursement data is only for deposit taking (NBFC-D) and systematically important non-deposit taking (NBFC-ND-SI) companies. figure for March 2018 is derived by deflating outstanding loans of these NBFCs by the GDP for 2017–18.

7 The liquidity coverage ratio (LCR) is the ratio between high quality liquid asset (HQLA) and expected net cash outflow. Any rise in expected net cash outflow, say due to actual rise in external cost of borrowing, can lead the banks to hold higher HQLA in order to maintain a given LCR. This may increase the statutory part of the liquid assets (S) held by banks.

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Financial Misconduct, Fear of Prosecution and Bank Lending

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The issue and relevance of financial misconduct and fear of prosecution on the lending behaviour of Indian banks is investigated by combining bank-level financial and prudential variables during 2008–18 with a unique hand-collected data set on financial misconduct and fear of prosecution. The findings indicate that, in the presence of financial misconduct, state-owned banks typically cut back on credit creation and instead increase their quantum of risk-free investment. In terms of magnitude, a 10% increase in financial misconduct lowers lending by 0.2% along with a roughly commensurate increase in investment. In terms of the channels, it is found that private banks increase provisioning to maintain their credit growth, although the evidence for state-owned banks is less persuasive.

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> ... Banks have gone through a slightly worrying period wherein decision making was getting difficult because of fear of 3Cs (Central Bureau of Investigation, Central Vigilance Commission, Comptroller and Auditor General). There was concern and bona fide decisions are not being made by banks because of what they would say undue harassment, uncalled for harassment happens because of these agencies pursuing on cases.
>
> —Finance Minister, Government of India, 28 December 2019.

No other issue has generated so much debate and discussion on India's financial sector in recent times as financial misconduct. Several instances of loan defrauding at state-owned banks over the past several years reached a crescendo when a significant loan irregularity amounting to nearly $2 billion was detected at a leading state-owned bank in 2018. Between April 2014 and March 2018, there were nearly 25,000 instances of financial misconduct by Indian lenders, aggregating to $16 billion, according to data published by the Indian central bank (Reserve Bank of India 2018). As Rajan (2018a) has remarked, frauds are different from loan delinquencies in that the loss is the outcome of a patently illegal action, either by the borrower or the banker. He further goes on to observe that, without any precedence of retrieval or legal actions against the culprits, the classification of an account as fraud further aggravates the severity of the issue.

The costs of such financial misconduct can be substantial. First, misconduct can damage confidence in the banking sector, which might lead depositors to explore other non-banking sources to entrust their savings (Knell and Stix 2015). Second, financial misconduct can aggravate financial fragility and exacerbate systemic risks as it inflicts costs to the overall financial system (European Systemic Risk Board 2015). Consistent with this argument, Koster and Pelster (2018) find that an increase in financial penalties on European banks led to a significant increase in bank systemic risk exposure. Finally, bank misconduct costs can erode capital and dampen lending capacity. According to estimates, the misconduct costs on global banks have impaired their lending capacity by nearly $5 trillion (Carney 2017).

In this paper, we examine the third aspect, that is, bank lending. To be more specific, we try to address three issues. First, does financial misconduct affect bank behaviour? In this regard, we focus on bank lending (quantity) as well as its funding cost (price). Second, what role does fear of prosecution play in this regard? Finally, what are the channels through which misconduct affects bank lending?

Notwithstanding the compelling evidence, few studies have carefully analysed the impact of financial misconduct on bank lending and relatedly, on funding costs. From an analytical standpoint, utilising a sample of global banks, Sakalauskaite (2018) shows that in addition to bank size, chief executive officer compensation plays a vital role in driving such behaviour. As recently as 2017, the Financial Stability Board (FSB) published a progress report for group of twenty leaders detailing the work plan to reduce misconduct in the financial sector. In parallel, countries have also responded proactively in addressing financial misconduct by setting up new institutions. For example, in the United States (US), the Consumer Financial Protection Bureau (CFPB) was created in 2011 to protect consumers against financial misconduct specifically.

The Indian banking sector provides a reasonable case study to analyse this issue for several reasons. First, during 2008–18, the total amount involved in bank misconduct has been quite significant, equalling close to $20 billion, or 0.09% of gross domestic product (GDP) on an annual average basis. Within overall misconduct, the amount related to loans accounted for an average of around 80% of the total across all categories, necessitating the increased focus on this issue. Second, even within this sector, it is the state-owned banks (SOBs) that have been most susceptible to such misconduct: the share of the amount involved in financial misconduct for these banks has averaged close to 80% during this period. Third, state-owned banks are subject to manifold oversight.[1]

As a result, any such misconduct can be subject to vigilance and regulatory scrutiny with potential fear of prosecution. This has direct and adverse implications for the career prospects of bankers, which in turn impedes their lending decisions. For example, Banerjee et al (2004) have noted that such fear of prosecution has the effect of lowering bank lending and that this effect is quite persistent around the vigilance activity.[2]

A careful analysis on this issue has, however, not been forthcoming primarily due to paucity of consistent data on financial misconduct. To address this concern, we exploit a unique data set. In particular, our data consists of hand-coded information on financial misconduct cases collected from the Lok Sabha questionnaire. We employ the data from 2008–18, which is the maximum period for which data on key variables are reported consistently. We integrate this data with bank characteristics, including proxies for the actual number of prosecutions as well as fear of prosecution measures and control for the other business cycles and unobservable bank-specific factors. The analysis suggests that financial misconduct exerts a statistically significant impact on bank behaviour. To further investigate, the influence on fear of prosecution on bank lending, we hand-collect the data on Stage I and Stage II advice by CVC (Central Vigilance Commission) to respective state-owned banks, from the annual reports of CVC.[3] To the best of our knowledge, there is no prior study, most definitely for India, which has empirically examined the influence of financial misconduct and fear of prosecution using this data set.

Our main findings can be summarised as follows. First, financial misconduct exerts a statistically significant and negative impact on lending by SOBs: a 10% increase in financial misconduct lowers lending by roughly 0.2%. Not only is there under lending, there is also an increase in deposit cost as also increased investment. Finally, a 10% increase in fear of prosecution dampens lending of SOBs by 0.15%.

More broadly, our analysis highlights three points. First, it emphasises the relevance of financial misconduct in influencing bank behaviour. Second, the evidence suggests that fear of prosecution is an essential driver of bank lending. Third, the effect is manifest more starkly in the case of SOBs, indicating that weaknesses in internal controls and governance mechanisms are more of a concern for these banks as compared to their private peers.

Background and Literature

Following the global financial crisis, a significant number of cases of financial misconduct hogged headlines in both financial and academic debates. The manipulation of the London Interbank Offered Rate by some United Kingdom (UK) banks in 2010, prosecution over insider trading by a US-based investment bank in 2012 and more recently, unlawful and fraudulent conduct by a leading US commercial bank, have madeheadlines. The total misconduct costs for top global banks are estimated to be $320 billion in the last decade (Financial Stability Board 2018).

Our analysis connects several important streams of literature. First, the analysis provides evidence regarding the role of incentive contracts in shaping bank financial behaviour. For example, Agarwal and Wang (2009) show that a suitably designed incentive scheme encourages loan officers to increase both the quality and quantity of lending. Also, evidence in the case of UK banks finds that misconduct provisions lead to a statistically significant decline in bank capital (Tracey and Sowerbutts 2018). Unlike these studies, our analysis utilises data on domestic banks for an extended period and examines its effect with financial misconduct, holding constant the institutional and macroeconomic environment. The analysis highlights the fact that bank-level factors play an essential role in driving such behaviour.

Second, the literature explores the relevance of bank ownership for financial misconduct. Cross-country studies provide evidence that higher government ownership is detrimental to bank stability (La Porta et al 2002), although the balance of evidence differs across advanced and emerging economies (Das and Ghosh 2006; Laeven and Levine 2009; Barry et al 2011; Iannotta et al 2013; Ferri et al 2014; Zhu and Yang 2016; Pak 2019). On the other hand, some studies analyse the issue of financial misconduct from the regulatory perspective. In the Indian case, Ghosh and Bagheri (2006) undertake a critical analysis of the lapse in the banking regulatory framework that led to significant financial misconduct with severe systemic consequences. In contrast, we link financial misconduct and fear of prosecution to bank ownership in order to discern possible systemic patterns and find that it is primarily SOBs that are typically

susceptible to financial misconduct, which in turn impinges on their lending behaviour.

Finally, the paper contributes to the broader literature that highlights the relevance of governance issues in driving bank behaviour. Studies on the association between governance and bank performance are mixed: while some studies report a positive relationship (Bhagat and Black 2002; Gompers et al 2003; Laeven and Levine 2009), others report the relationship to be negative (Jensen 1993; Yermack 1996; Hermalin and Weisbach 2003; Adams and Mehran 2003; Cheng 2008). However, policy discussions of bank behaviour in recent times have focused primarily on bank lending behaviour, given its significance in fostering economic activity (Kumar 2019). Few studies analyse the impact of governance on bank lending. Prior studies (Saunders et al 1990; Pathan 2009; Minton et al 2014) have focused primarily on aggregated measures of bank riskiness. Using data on US banks, Faleye and Krishnan (2017) document that better-governed banks cut back lending to risky borrowers, especially during times when their credit requirements are more compelling. Viewed from this perspective, we contribute to the debate by quantifying the impact of financial misconduct on bank behaviour and the importance of fear as a factor in influencing such behaviour.

Fear of Prosecution and Financial Misconduct

Traditionally India has a bank-based financial system. However, the importance of non-banks has been increasing over time. The share of bank assets to GDP, which was around 50% of GDP in 1992, increased to over 90% in 2018. The commercial banking segment comprises SOBs (in which the government is the majority shareholder), private sector banks—both old (which are in operation before the economic reforms) and new (established after the economic reforms) and a multitude of foreign banks. Since the onset of economic reforms, the share of SOBs in overall banking asset has gradually declined from 90% in 1991 to about 65% in 2018, at an annual average of roughly 1% per annum.

Over the reform period post 1992, (real) bank assets have expanded at a compound annual rate of 10% till 2018; the growth rate of deposits and credit during the same period has been 10% and 11%, respectively. However, this growth has been uneven across bank groups: deposit and credit expansion of private banks has been much higher, of the order of 16% and 19%, respectively; the same for SOBs has been of the order of 9%–10%. Foreign banks have registered deposit and credit growth, which is, in percentage terms, broadly similar to that for SOBs, although their share in overall (on-balance sheet) bank assets has hovered around 6%–8% during the entire period.

In terms of balance sheet variables, the global financial crisis had little impact on the Indian banking system.[4] The total balance sheet expanded annually by an average of 14% during this period, which was supported by robust credit expansion. Across bank groups, however, while SOBs registered positive growth of both deposit and credit, private and foreign banks recorded declines in terms of both deposit and credit. Illustratively, in 2010, the balance sheet of private banks contracted by close to 8%, driven by a sharp contraction in credit (-11%), and likewise, the balance sheet of foreign banks also registered declines, although with smaller magnitude.

The post-crisis recovery has, at best, been tepid. Overall asset expansion has been around 8% during 2011–18, with private banks growing at a pace faster than other banks. However, the expansion in balance sheet variables of old private banks has been the weakest. Their asset share had shrunk from a peak of 6.7% in 2000 to 4.4% in 2018. New private banks have emerged as the biggest gainers: their share in the asset has jumped from a meagre 1.4% in 1995 to nearly 24% in 2018, primarily driven by an expansion in credit.

The shrinking balance sheet size of SOBs in the post-crisis era can be traced to a multitude of factors. Perhaps the most significant of these is the problem of non-performing loans. It has increased from 1.2% of GDP (₹979 billion) in 2011 to 6.2% of GDP (₹10,397 billion) in 2018, registering a compound growth of over 20% during this period. This high and rising non-performing loans have been the subject of inquiry of investigative agencies, particularly the CVC, which has subjected bankers to questioning regarding the genuineness of their decisions, even in case of collective decisions.[5] During the period 2008–11, complaints against as many as 372 senior bank officers were referred to the CVC (Ministry of Finance 2011). More importantly, during 2015–17, action was initiated against nearly 10,000 staff in the SOBs and 4,000 odd in other banks and financial institutions (Ministry of Finance 2019). Not surprisingly, therefore, this Damocles sword of prosecution has meant lending virtually coming to a standstill: overall real lending in SOBs has grown at a compound rate of 4.7% during 2011–18, the lowest among the bank groups.

Another equally disconcerting aspect of the Indian banking system has been the incidence of financial misconduct. In his treatise on Indian currency and finance, Keynes had remarked that:

> In a country so dangerous for banking as India, it should be conducted on the safest possible principles. (Royal Economic Society 2013)

The Indian central bank came into existence in 1935, partly as a response to the bank failures in the earlier period. However, the lack of an appropriate regulatory framework posed a problem of effective regulation of the banking system. Large-scale loan losses driven by unbridled credit excesses led to the failure of a major commercial bank in August 1960 and several more in the intervening period during 1955–65 (Reserve Bank of India 2008).

After the bank nationalisation, the government aggressively focused on strengthening the regulatory framework and gradual improvements in credit extension practices. Notwithstanding these improvements, weaknesses resurfaced when unscrupulous speculators gamed the stock market by financially abusing the banking system. Subsequently, several SOBs fell prey to dubious credit policies, including those in 1996 and after that in 2001.

The number of misconduct cases and the amount involved in such cases has increased significantly during the last

five years (Table 1). What is of interest is to note that those related to credit, account for around two-fifths by number. However, in value terms, they overwhelm other misconduct categories.

Table 1: Frauds in Indian Banks
(Amount Involved ≥ ₹1 lakh)

Year	Number	Amount (₹Billion)	% of Credit-related Frauds	
			Number	Amount
2013–14	4,306	10.2	46.2	82.7
2014–15	4,639	19.5	48.5	88.0
2015–16	4,693	18.7	45.3	92.9
2016–17	5,076	23.9	45.7	85.9
2017–18	5,917	41.2	42.7	54.8

Source: Financial Stability Report, December 2018, RBI.

Recognising the need for proactive response, several policy measures have been undertaken over the past several years. From the financial angle, the Reserve Bank operationalised the Central Fraud Registry (CFR) in January 2016. Banks can exploit this database to analyse critical information relating to misconduct cases above ₹1 lakh, including the modus operandi and related issues. After that, in July 2016, the Indian central bank issued the *Master Direction on Fraud* documenting the details and actions to be taken by banks in case of any misconduct.

At a broader level, for the enforcement of auditing standards and ensuring audit quality, the government has established the National Financial Reporting Authority as an independent regulator. Moreover, an Advisory Board for Banking Frauds (ABBF) has been constituted by the CVC, after consultation with the Reserve Bank, to examine and recommend action for bank fraud above ₹500 million.

Database and Empirical Strategy

The sample: To analyse misconduct, we construct a data set for publicly listed domestic banks covering the period 2008–18. The period is chosen based on the availability of data, as bank-level information on financial misconduct before 2008 is not reported consistently. The sample covers a total of 39 banks, including 24 state-owned, six *de novo* private (established after the economic reforms) and nine old private (which are in operation before the economic reforms) banks. These banks on average, account for 85%–90% of total commercial banking sector assets during the period.

Table 2: Variable Definition and Summary Statistics

Variable	Definition	N Obs	Mean (SD)	p 25 (p.75)
Dependent				
Credit	Log (total credit/CPI)	364	9.87 (1.03)	9.21 (10.56)
Deposit cost	Interest paid on deposits/(total deposits—demand deposits)	364	0.06 (0.01)	0.06 (0.07)
Investment	Log (investment/CPI)	364	9.04 (1.00)	8.38 (9.75)
Independent				
LTA	Log (total asset)	364	16.33 (1.11)	15.63 (17.03)
CAR	Capital adequacy ratio of the bank	364	13.05 (2.16)	11.63 (13.94)
Equity	Capital plus reserves to total assets	364	0.066 (0.02)	0.052 0.071
Expn	Operating expense/income	364	0.19 (0.04)	0.16 (0.21)
NONINT	Non-interest income/total asset	364	0.01 (0.004)	0.01 (0.01)
Financial misconduct (FMC)	Log(1+(total amount involved in financial misconduct/ number of misconduct))	364	2.27 (1.44)	1.15 (3.38)
Prosecution	Log(1+(number of prosecution during a year/number of bank officers)	261	-8.61 (0.79)	-9.11 (-8.19)
Fear of prosecution (FOP)	Log(1+(total no. of stage I and II advice to the bank)/no of bank officers)	261	-7.74 (1.15)	-8.61 (-6.84)
Channels				
Z-score	Ln(1+Z), where Z=[(equity/asset)+(RoA)]/SD (RoA), where SD (RoA) is based on periods t-2, t-1 and t	325	4.014 (1.05)	3.405 (4.666)
LLP	Provision for non-performing loans/total asset	364	0.011 (0.004)	0.008 (0.013)
Merger	Dummy=1 for the acquirer bank in the year of the merger, else zero SBI in 2017, Kotak Mahindra in 2014 and ICICI in 2010			
Bank ownership (F_OWN)				
SOB	Dummy=1 if a bank is state-owned, else zero	24 banks		
PVT	Dummy=1 if a firm is domestic private, else zero	15 banks		
Fraud				
Number of frauds	Number of frauds in bank-year	364	231 (1,242)	21 (119)
Fraud amount	Fraud amount (₹million) in bank-year	364	6,961 (79,767)	98 (2,719)

The data: The disaggregated data on the bank balance sheet and profit and loss accounts are culled out from multiple issues of *Statistical Tables Relating to Banks in India*, a yearly publication of the Indian central bank. The financial year for banks starts from the first day of April of a particular year and ends on the last day of March of the subsequent year. Accordingly, the year 2008, the first year of the sample, corresponds to the period 2007–08 (April–March) and so on.

The key variables of interest are those related to financial misconduct and prosecution.[6] Under the provisions of the Indian Penal Code Act of 1860, financial misconduct can include the following: misappropriation of funds, fraudulent encashment through forged instruments or manipulation of books of accounts, unauthorised credit facilities extended for reward or illegal gratification, cheating and forgery, irregularities in foreign exchange transactions or any other misconduct not categorised under the earlier headings. It involves a total number of misconduct cases with a monetary value of ₹1,00,000 and above as well as the monetary loss to the bank owing to the financial misconduct (that is, the amount involved). The bank-wise information is periodically reported in

the Lok Sabha (lower house of Indian Parliament) when such relevant issues are raised by members. The information is hand-coded from the various Lok Sabha questionnaires.

The other relevant variable is the fear of prosecution. We capture this in terms of the number of Stage I and Stage II advice by the CVC to the bank.[7] It can be argued that any such advice opens up the possibility of further scrutiny, with adverse consequences for the career growth of the officer.

It needs to be recognised that the banking industry witnessed consolidation activity during this period. We control for this by using a dummy, which equals one for the acquirer bank in the year of the merger, else zero. As a result, the number of bank-years varies: with an average of 9.9 years of observations per bank, and we have a maximum of 386 bank-years.

Table 2 (p 57) provides the variable definitions and summary statistics. Across bank-years, the average number of misconduct across bank years was 231, involving an average amount of ₹6.96 billion per bank year. However, this masks the vast differences across ownership: while the average amount is ₹10.2 billion for SOBs per bank year, it is ₹900 million for private banks. These differences across bank ownership are statistically significant at conventional levels. About 62% of the sample banks are state-owned and the rest are private.

Empirical strategy: To analyse the impact of financial misconduct on bank behaviour, for bank *i* in year *t*, we estimate empirical specifications of the following form:

$$y_{it} = \alpha + \theta_i + \eta_t + \beta_1 BS_{it-1} + \beta_2 FMC_{it-1} + \beta_3 SOB_{it} + \gamma_1 (FMC_{it-1} * SOB_{it}) + \varepsilon_{it} \quad \ldots (1)$$

In Equation (1), γ_{it} is the outcome variable of interest, which is alternately defined as either real lending, deposit cost or real investment. The independent variables comprise specific bank–(*BS*) variables as well as a proxy for financial misconduct (*FMC*) defined as the natural log of one plus fraud amount per fraud in a bank-year. Independent variables are lagged one period to avoid endogeneity concerns. The lagged also accounts for persistence effect (Banerjee et al 2004).[8] SOB is an indicator variable that takes a value of 1 if the bank is state-owned bank, otherwise 0.[9] γ_1 is the coefficient of interaction between *FMC* and bank ownership which captures the influence of financial misconduct on the outcome of SOBs. θ_i represents unobserved bank-specific heterogeneity, and η_t captures time-variant factors, such as the business cycle or changes in interest rates; ε_{it} denotes the random error term.

The included bank characteristics are both stock and flow variables. On the stock side, variables include size (log of total assets—*LTA*) and capital adequacy ratio (*CAR*) as a control for funding structure. Provided bigger banks can achieve scale economies in lending, this would entail a positive coefficient on LTA. On the one hand, banks having higher equity levels might be less inclined to engage in risky activities, implying lowering the likelihood of financial misconduct. Also, competitive pressures and search for higher yields could lead banks supported by a better equity position to engage in riskier activities so that the sign on this variable could be decisive. On the flow side, we include operating expense scaled by total income (*Expn*) as a control for cost efficiency and non-interest income ratio (*NONIT*), defined as non-interest income scaled by total assets, as a control for income structure. As more efficient banks are likely to exhibit improved lending activity, the coefficient on *Expn* is likely to be negative, and likewise, if banks with higher fee income can tolerate lower interest income (and consequently, lower lending), the coefficient on *NONIT* would be negative.

Our coefficient of interest is γ_1: it identifies the impact of lending by SOBs in the presence of financial misconduct. Provided financial misconduct dampens lending (resp., raises deposit cost), the coefficient γ_1 would be negative (resp, positive). Estimated standard errors in all regressions are clustered at the bank level.

In a similar vein, in the next regression, we examine the influence of prosecution-related variables on bank lending as well as investment and also on the cost, as below.

$$y_{it} = \alpha + \theta_i + \eta_t + \alpha_1 BS_{it-1} + \alpha_2 Prosecution_{it-1} + \gamma_2 (FOP_{it-1} + + \varepsilon_{it} \quad \ldots (2)$$

The bank-specific variables (*BS*) are the same as defined earlier. is defined as the natural log of one plus number of prosecutions per bank officer in a bank year. Our variable of interest is fear of prosecution (FOP) and it captures the fear of prosecution. It is defined as the natural log of one plus the number of Stage I and Stage II advice by CVC per bank officer. is the coefficient of interest capturing the influence of fear of prosecution on bank lending. Since this data is reported only for SOBs, the total number of observations is lower. As earlier, estimated standard errors are clustered at the bank level.

Finally, we also examine the channels through which financial misconduct can affect bank lending. To do this, we estimate the following specification, separately for state-owned and private banks, as given by (3):

$$y_{it} = \alpha + \theta_i + \eta_t + \gamma_1 BS_{it-1} + \gamma_2 FMC_{it-1} + \gamma_3 Channel_{it-1} + \lambda_1 (FMC_{it-1} * Channel_{it-1}) + \varepsilon_{it} \quad \ldots (3)$$

where, the notations are as earlier and the coefficient of interest is λ_1. This coefficient examines the importance of a particular channel on bank lending in the presence of financial misconduct.

From an economic standpoint, there are two channels through which financial misconduct can affect credit creation. First, misconduct can dampen bank risk taking and thereby slow down credit growth. Following prior literature (Agoraki et al 2011; Lepetit and Strobel 2015), we proxy the risk-taking channel by the bank's Z-score. Since the Z-score is positively skewed, akin to Laeven and Levine (2009), we employ the natural logarithm of one plus Z-score.[10] Secondly, financial misconduct and the resultant loan delinquencies might necessitate higher provisioning, which, in turn, can impede

the ability of the bank to extend credit. We capture this channel by the ratio of loan loss provisioning to total asset.

Results and Discussion

The regression results are presented in Table 3. In Column 1, the coefficient on the interaction term between FMC and SOB is negative and statistically significant with a point estimate equal to -0.045. Taken together with the coefficient of FMC, the net effect works out to be -0.022. Therefore, for SOBs, a 10% increase in financial misconduct lowers bank lending by roughly 0.2%.

We find that on average, financial misconduct leads to higher lending in the following year by private banks. Although it runs contrary to intuition, there are several ways to rationalise this outcome. First, private banks might be making higher provisioning, enabling them to expand lending even in the face of misconduct. Second, several big projects, particularly in infrastructure and related sectors, require a continuous flow of credit, which is often difficult to cut back. Third, the twin forces of competition and lending relationship demands that banks provide credit to corporates, irrespective of the challenges faced by the lender. It is also a fact that private banks are more proactive in initiating legal action against fraudsters. The suit value (as a percentage of non-performing loans) is higher for private sector banks as compared to their state-owned peers (Shrivastava and Katakam 2018). Additionally, a major source of growth in private sector lending comes from the retail sector where the non-performing asset ratio is lower. Hence, higher exposure to the retail sector and greater proclivity to recognise and take legal action against fraudsters may lower the influence of financial misconduct on the lending activity of the private sector banks. All of these factors could be relevant in explaining such behaviour.

Next, we explore the impact on deposit cost and find that the coefficient is positive and statistically significant at the 0.01 level. The magnitudes are not very high though: a 100% increase in financial misconduct leads to an increase in deposit cost by 0.08%. Overall, therefore, financial misconduct not only dampens lending, but it also raises deposit cost.

What is, however, of interest is to note that financial misconduct not only leads to under-lending, but it also leads to over-investment. To see this, note that the coefficient on the interaction term in Column 3 is positive and statistically significant. A 10% increase in financial misconduct increases investment by SOBs by roughly 0.15%. Faced with financial misconduct and the associated challenges, banks choose to lower lending and increase investment. This is consistent with the fact that in real terms, investment by SOBs during 2011–18 has grown at a pace that is roughly double that of credit. Our findings, therefore, add to the literature that documents how financial misconduct dampens lending and raises borrowing costs.

Among the controls, size bears a positive and statistically significant coefficient under the balance sheet items, so that bigger banks can expand credit at a faster pace. Relatedly, they also experience lower deposit costs, possibly reflecting their extensive branch network. Larger banks, at the same time, have higher investments. Similarly, well-capitalised banks can extend more significant quantum of credit since they are less affected by credit constraints, and at the same time, they incur lower deposit costs. The magnitudes are equally important as well: one percent increase in capital raises lending by roughly 2.5%, on average and reduces deposit cost by 0.001%. Banks with higher fee income (non-interest income) experience higher deposit costs, possibly reflecting their lack of opportunities to access cheap funding. The fit of the model is good, accounting for anywhere between 66%–99% of the variation in the dependent variable.

We next turn towards analysing the impact of fear of prosecution. As discussed earlier, the multiple oversight on state-owned bankers, often with significant overlaps, subjects them to intense scrutiny. To the extent that such scrutiny impedes bank lending, the coefficient on the relevant variable would be expected to be negative and statistically significant.

Table 3: Financial Misconduct, Fear of Prosecution and Bank Lending—Estimation Results

Dep var	Credit	Deposit Cost	Investment	Credit		Deposit Cost	Investment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SOB	0.108**	-0.003	-0.088				
	(0.046)	(0.002)	(0.065)				
FMC * SOB	-0.045***	0.001***	0.040***				
	(0.015)	(0.0004)	(0.012)				
FMC	0.023*	-0.0002	-0.025**				
	(0.012)	(0.0003)	(0.010)				
FOP				-0.015**	-0.006	0.00003	-0.002
				(0.007)	(0.011)	(0.0003)	(0.009)
FOP*crisis					0.071***		
					(0.021)		
Crisis					0.424**		
					(0.147)		
Controls							
LTA	0.988***	-0.004***	0.955***	0.859***	0.171***	0.014***	0.765***
	(0.013)	(0.001)	(0.024)	(0.121)	(0.038)	(0.005)	(0.188)
CAR	0.024**	-0.001***	-0.005	0.003	0.010*	-0.0001	-0.005**
	(0.009)	(0.0004)	(0.012)	(0.002)	(0.004)	(0.001)	(0.002)
Expn	0.094	-0.043***	-0.1590	0.063	-1.150*	-0.005	-0.802*
	(0.274)	(0.015)	(0.363)	(0.563)	(0.504)	(0.019)	(0.422)
Equity	-1.284	0.106*	1.148	-0.918	-5.180	0.017	1.292
	(1.089)	(0.044)	(1.492)	(1.416)	(1.444)	(0.052)	(2.150)
NONINT	5.361	0.413***	5.272	-7.288	-28.2	-0.153	8.077
	(4.446)	(0.197)	(5.689)	(5.165)	(5.73)	(0.191)	(6.270)
Prosecution				0.002	0.019	-0.001**	-0.0002
				(0.011)	(0.013)	(0.0005)	(0.009)
Merger	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period	2008–18	2008–18	2008–18	2008–18	2008–18	2008–18	2008–18
Bank FE	No	No	No	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	No	Yes	Yes
N Obs	364	364	364	261	261	261	261
Adj. R^2	0.98	0.661	0.981	0.992	0.986	0.836	0.986

Standard errors (clustered by bank) in brackets.

***, ** and * denote statistical significance at 1%, 5% and 10%, respectively.

The results remain almost identical for credit and deposit cost after incorporating bank-level fixed effects in Model (1) and (2).

In Column 4 of the table, we find this exactly to be the case. More specifically, the coefficient on the FOP variable is negative and statistically significant. The point estimates suggest that a 10% increase in fear of prosecution would lower lending by roughly 0.15%, on average. This under lending phenomenon is consistent with Banerjee et al (2004), who report similar evidence in the case of mid-sized SOBs, although their magnitudes were higher. The table also shows that the global financial crisis overwhelmed the fear of prosecution so much so that there was an increase in bank lending during the period (Column 5). Interestingly, there appears to be no discernible impact of prosecution fear on either investment or the cost of deposit.

To sum up, the evidence shows that in the presence of financial misconduct, SOBs typically engage in under lending and instead deploy the resources by expanding their relatively risk-free portfolio (that is, investments).

Table 4: Financial Misconduct and Bank Lending—Channels

	State-owned Banks		Private Banks	
Dep var	Credit (1)	Credit (2)	Credit (3)	Credit (4)
FMC	-0.018	0.011	-0.029	-0.054*
	(0.028)	(0.018)	(0.037)	(0.030)
Z-score	-0.01		-0.015	
	(0.021)		(0.023)	
LLP		-2.102		-21.823**
		(5.350)		(8.671)
FMC*Z-score	0.005		0.007	
	(0.008)		(0.08)	
FMC * LLP		-0.570		4.589**
		(1.447)		(2.288)
Controls	Yes	Yes	Yes	Yes
Merger	Yes	Yes	Yes	Yes
Period	2008–18	2008–18	2008–18	2008–18
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N Obs	213	237	112	127
Adj R^2	0.989	0.989	0.992	0.993

Standard Errors (clustered by bank) in brackets.
***, ** and * denote statistical significance at 1, 5 and 10%, respectively.

Finally, we explore the channels through which financial misconduct can affect credit creation in Table 4. Based on our previous discussion, Column (1) of Table 4 reports the findings for risk-taking channel, while Column (2) looks at the provisioning channel. A similar analysis is also done for private banks as well (Columns 3 and 4).

For SOBs, the interaction terms in Columns (1) and (2) are not statistically significant, suggesting that these factors do not appear to be relevant in explaining their lending behaviour. As compared to this, in Column (4), the coefficient is positive and statistically significant for private banks, so that notwithstanding financial misconduct, private banks continue to expand lending, driven by the fact that their loan loss provisioning is also high. This, to an extent, explains the positive loan growth for private banks despite financial misconduct, as observed earlier.

Concluding Remarks

Several studies have explored the factors driving financial misconduct by banks, primarily in an advanced economy context. However, these studies are typically based on thin samples or small periods, substantially limiting their empirical appeal.

To address this deficiency, using information on an extended sample of banks during 2008–18, we investigate the relevance of financial misconduct for bank behaviour. The findings indicate that in the presence of financial misconduct, banks typically seek to under lend and, instead, shore up their investment portfolio, which is relatively risk-free. This effect is predominantly observed in SOBs. A 10% increase in financial misconduct is accompanied by a reduction in lending by 0.2%. The decline in credit is simultaneously accompanied by an increase in investments of roughly similar magnitude (in percentage terms).

The financial misconduct also puts pressure on bank deposit costs, raising it to some extent. Contextually, we also explore the importance of fear of prosecution and find that there is a dampening impact on lending. A 10% increase in fear of prosecution lowers lending of SOBs by 0.2%. Taken together, these results highlight the importance of financial misconduct more broadly in driving bank-lending behaviour. The fact that the factors affecting financial misconduct differ across bank ownership suggests an essential role for policy in addressing this challenge.

The analysis raises a couple of essential concerns. First and more generally, there is often a concern that bank lending has not been gathering pace in recent years. One factor that has perhaps bypassed the attention of policymakers could be financial misconduct. Second and relatedly, the inadequacy of monetary transmission can also be, to an extent, traced to misconduct costs since these entail a deadweight loss, and needs to be taken on board by the bank. Finally, the fact that financial misconduct is more of a challenge for SOBs highlights the need for revisiting their governance structures (Patel 2019).

NOTES

1 This is popularly referred to as the 3Cs – Central Bureau of Investigation (CBI), Central Vigilance Commission (CVC) and the Comptroller and Auditor General of India (CAG). Each of these institutions have their own remit and responsibilities. The functions of the CBI and the CVC are broadly complementary in that they deal with anti-corruption activities. Within this, the CVC's domain is more limited: it exercises original jurisdictions over senior government functionaries. As compared to these, the CAG focuses on a much broader role of ensuring financial propriety; the control of corruption is subsumed within this mandate.

2 Rajan (2018b) also makes the point that

> Today, a variety of authorities … monitor the performance of public sector banks … It is important that we streamline and reduce the overlaps between the jurisdictions of the authorities, and specify clear triggers or situations where one authority's oversight is invoked.

3 In its judgment in 2016, the Supreme Court held that employees of private sector banks can also be held as public servants for the purpose of the Prevention of Corruption Act, 1883. Following this judgment, the CBI has been investigating financial misconduct in private banks as well. However, there is limited availability of public information on financial misconduct in these banks. As a result, this could not be examined in the analysis.

4 Following Eichengreen and Gupta (2013), the period 2008–10 is taken as the financial crisis period.

5 Typically, the decision on a large loan is made by a consortium of banks and is subsequently endorsed by their respective boards.

6 Misconduct cost refers to the deliberate act of omission or commission by any person, carried out in the course of a banking transaction or in the books of accounts or under computer system in banks, resulting in a wrongful gain to any person for a temporary period or otherwise, with a monetary loss to the bank (Reserve Bank of India 2010).

7 Whenever cases are investigated against officers, such investigation reports are sent to the CVC through appropriate channels along with the tentative action to be taken by the Disciplinary Authorities. Depending upon the circumstances and facts of the case, CVC advises (a) initiation of criminal and/or Departmental proceedings against the concerned person; or (b) issuance of Administrative warning; or (c) closure of the case. This is referred to as Stage I advice. Upon receipt of enquiry report from the Officer, the responsible person forwards the same to the Board along with the views. The Board subsequently forwards the same to CVC along with its comments. The advice given by the CVC at this stage is known as Stage II advice. Since we do not have information on the *extent* of adverseness of the advice at either stage, we choose to club them together as a proxy for *fear of prosecution*.

8 We experimented with additional lags of FMC, but they were observed to be insignificant.

9 In the model for bank-level fixed effects, we dropped the SOB indicator variable.

10 Given the computation of the Z-score, two years of observations are lost from the sample.

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Time-varying Nature of Stock Market Interdependence

A Global Perspective

AVISHEK BHANDARI, KAMAIAH BANDI

In the literature on global market integration, the strength of interdependence has been measured in different ways. However, only an accurate measure of strength of interdependence helps in understanding the nature of integration among markets. This article, by employing novel time-frequency based wavelet techniques, analyses the interdependence of global equity markets from a heterogeneous investor perspective, with a special focus on the Indian stock market. With the wavelet framework effectively capturing the heterogeneity of market participants' space of operation, an analysis grounded in this framework allows one to capture information from a different dimension than the traditional time domain analyses, where the multiscale structures of financial markets are clearly extracted.

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This article attempts to explore into the structure and features of interdependence among the global equity markets from a time frequency perspective. An analysis grounded on this framework allows one to capture information from a different dimension, as opposed to the traditional time domain analyses, where multiscale structures of financial markets are clearly extracted. In financial time series, multiscale features manifest themselves due to the presence of multiple time horizons. The existence of multiple time horizons necessitates a careful investigation of each time horizon separately, as the market structures are not homogenous across different time horizons. The presence of multiple time horizons, with varying levels of complexity, requires one to investigate financial time series from a heterogeneous market perspective where market players are said to operate at different investment horizons.

The existence of investment heterogeneity is first explored in Müller et al (1997) where the theory of heterogeneous market hypothesis is expounded. This hypothesis is motivated by the presence of multiple scales, or fractals, in financial time series, which is argued to be induced by the behaviour of a group of market participants or investors. These groups are not homogenous with regard to their investment decisions, inasmuch as market participants differ from one another based on their investment holding period. Therefore, markets can be broken down, particularly owing to the diversity of participants' investment holding periods, into several investment horizons, trading horizons or timescales.

A particular investment horizon or timescale has a group of investors operating in it who share similar time perspective. For example, investors who operate on shorter timescale or investment horizon of one or a few days are primarily interested in speculative activity as opposed to the investors with longer time horizons, say agents indulged in investment decision making of large institutions. This inherent diversity of market players and their investment decisions, which is a function of the respective timescales, leads to the formation of multiple layers of investment time horizons, ranging from seconds to years. The dissemination of information at dissimilar timescales, which traditional time domain econometric methods cannot capture, calls for an alternative method that can accurately capture information from multiple investment horizons.

Wavelet methods of the time frequency class, for instance, provide powerful tools that can disentangle information from

multiple timescales (Percival and Walden 2000; Gencay et al 2002). It is this property of wavelets that allows one to carefully investigate global equity markets within the theoretical framework of heterogeneous market hypothesis. This article extends the application of time frequency-based wavelet techniques to analyse the interdependence of global equity markets from a heterogeneous investor's perspective, with a special focus on the Indian stock market.

Literature Review

Since Grubel's (1968) pivotal work on portfolio diversification—where diversification is demonstrated to reduce risks—there has been a colossal amount of literature concerning global market interrelations. Portfolios that are strategically spread out carries less risk compared to those that comprise of less diverse combinations (Dacjman 2012). This branching out of portfolios among diverse stocks from different global markets can be advantageous, only if correlations among the selected global markets are lower (Grubel and Fadner 1971). Thus, it logically follows that high degree of co-movement among global markets curtails any benefit arising from branched out assortment of portfolios (Ling and Dhesi 2010). However, as theoretically demonstrated by Kenneth and Poterba (1991), most investors are engulfed by home-bias when composing their portfolios, as they expect returns in home market to be higher than in the markets abroad.

The empirical literature presents mixed evidences regarding the benefits of diversifying the portfolios, with some demonstrating favourable investment scenarios as opposed to others that report fewer gains from diversified portfolios due to significant correlation between markets (Agmon 1972; Lessard 1973; Solnik 1974; Jorion and Schwartz 1986; Bertero and Mayer 1990; Harvey 1995; Pretorius 2002). Moreover, divergent results regarding the economic linkages, which drive interdependence and synchronicity between markets, are also present in the literature. For example, a variety of factors,[1] ranging from trade and regional proximity to financial market similarities, determine the strength of interdependence among markets (Roll 1992; Flavin et al 2002; Pretorius 2002).

The existence of long-run interdependence among developed markets is evidenced by a number of studies using cointegration methods (Kasa 1992; Arshanapalli and Doukas 1993; Agarwal and Park 1994; Laopodis 2005; Click and Plummer 2005; Awokuse et al 2009). Similarly, studies dealing with international portfolio diversification permeate the literature on global market integration (Driessen and Laeven 2007; Goetzmann and Kumar 2008; Chiou 2008; Middleton et al 2008; Flavin and Panopoulu 2009; Mukherjee and Mishra 2010).

Majority of the studies on equity market integration and interdependence, however, use traditional time domain econometric and statistical methodologies to investigate the relationship between equity markets. However, such analyses fail to capture the investors' decision encompassing heterogeneous time horizons, simultaneously. Nevertheless, few recent studies have attempted to uncover both the short and long run dynamics using wavelets and related time frequency techniques, thereby capturing information about heterogeneous investors' choices and investment decisions.

Earlier studies using wavelet-based time frequency techniques find an increase in co-movement between developed equity markets at lower frequencies associated with the long-run investment holding periods, thereby diminishing diversification benefits for investors who operate in long-run investment horizons (Rua and Nunes 2009; Ranta 2010). Similarly, Dajcman et al (2012), using wavelet methods, document the existence of scale dependent co-movements among markets of select developed economies.

In a similar vein, Graham et al (2012) investigated the interdependence among twenty global equity markets using continuous wavelet methods, to identify investors' diversification opportunities at varying time horizons, and the dynamic evolution and time varying nature of equity market co-movements. In their study of co-movement between emerging markets and the United States (US), lower co-movement is documented at short-run investment horizons, thereby providing diversification opportunities for investors with short-run horizons. Likewise, several recent studies attempt to capture interdependence among global markets in heterogeneous time horizons (Graham and Nikkinen 2011; Tiwari et al 2013; Lehkonen and Heimonen 2014; Aloui et al 2015; Najeeb et al 2015; Tiwari et al 2016).

However, none of the aforementioned studies on market interdependence and integration explore the portfolio diversification implications for the Indian investors. The existence of heterogeneous Indian investors and their related investment holding periods, calls for an investigation of both the heterogeneity and timescale dependency of inter market correlation structures, especially by using the wavelet based multi-resolution methods that can suitably capture such heterogeneities. But there is a dearth of studies on these lines of investigation of equity market integration in India. The present article intends to fill in this gap.

Methodology

A wavelet is a function $\Psi(.)$ defined on $\mathbb{R}$ such that $\int_{\mathbb{R}} \psi(t)dt = 0$ and $\int_{-\infty}^{\infty} |\psi(t)|^2 dt = 1$.

A signal can be decomposed into its finer detail and smoother components by projecting the signal onto mother and father wavelets given by ψ and ϕ respectively. Dilation and translation operation are performed on both mother and father wavelets to form a basis for the space of squared integrable function, $L^2(\mathbb{R})$. Therefore, any function $x(t)$ in $L^2(\mathbb{R})$can be represented as linear combinations of these basis functions. The dilated and translated versions of mother and father wavelets are denoted by $\psi_{b,s}(t)$ and $\phi_{b,s}(t)$ respectively, where

$$\psi_{b,s}(t) = \frac{1}{\sqrt{s}}\psi\left(\frac{t-b}{s}\right) \quad \ldots (1)$$

$$\phi_{b,s}(t) = \frac{1}{\sqrt{s}}\phi\left(\frac{t-b}{s}\right) \quad \ldots (2)$$

where, s and b represent the scaling (dilation) and translation parameter, respectively. Here $s=1.....S$, controls the number of multiresolution elements. Formally, a function $x(t)$ can be represented in the wavelet space as

$$x(t) = \sum_b a_{S,b}\,\phi_{S,b}(t) + \sum_b d_{S,b}\,\psi_{S,b}(t) + \sum_b d_{S-1,b}\,\psi_{S-1,b}(t) + \ldots + \sum_b d_{1,b}\,\psi_{1,b}(t) \quad \ldots (3)$$

where $a_{s,b}$ are coefficients describing coarser features of $x(t)$, and $d_{s,b}$ are detail coefficients that captures information from multiple resolutions or time horizons.

Wavelet-Based and Cross Correlations

Let $X_t=(x_{1,t}, x_{2,t})$ be a "bivariate stochastic process with univariate spectra" (auto spectra), $S_1(f)$ and $S_2(f)$ respectively, and let $W_{s,b} = (W_{1,s,b}, W_{2,s,b})$ be the scale s wavelet coefficients computed from X_t. These wavelet coefficients are obtained by applying the wavelet transform to all elements of X_t. The obtained wavelet coefficient contains both $a_{s,b}$ (coarser approximations) and $d_{s,b}$ (wavelet details). For a given scale s, the wavelet covariance between $x_{1,t}$ and $x_{2,t}$ is given by

$$\gamma_X(s) = \frac{1}{2\pi}\mathrm{Cov}(w_{1,s,b}, w_{2,s,b}) \quad \ldots (4)$$

The wavelet covariance "decomposes the covariance of a bivariate process on a scale-by-scale basis," that is

$$\sum_{s=1}^{\infty}\gamma_X(s) = \mathrm{Cov}(x_{1,t}, x_{2,t}) \quad \ldots (5)$$

By introducing an integer lag τ between $w_{1,s,b}$ and $w_{2,s,b}$, the notion of wavelet cross-covariance can be introduced, and is given by

$$\gamma_{X,\tau}(s) = \frac{1}{2\pi}\mathrm{Cov}(w_{1,s,b}, w_{2,s,b+\tau}) \quad \ldots (6)$$

In some situations it may be beneficial to normalise the wavelet covariance by wavelet variance, which gives us wavelet correlation:

$$\rho_X(s) = \frac{\gamma_X(s)}{\sigma_1(s)\sigma_2(s)} \quad \ldots (7)$$

where $\sigma_1^2(s)$ and $\sigma_2^2(s)$ are the wavelet variances of $x_{1,t}$ and $x_{2,t}$ (at scale s), respectively. Just like the usual correlation coefficient between two random variables, $|\rho_x(s)|<1$.

However, wavelet correlation gives correlation among variables from a multiscale dimension. Also, by allowing the two processes $x_{1,t}$ and $x_{2,t}$ to differ by an integer lag τ, we can define wavelet cross-correlation, which gives us the lead-lag relationship between two processes, on a scale by scale basis. The approximate confidence bands for the estimates of wavelet correlation and cross-correlation is given in Percival and Walden (2000) and Gençay et al (2002). Moreover, the reader is referred to Polanco-Martinez and Macho (2014) for the technique of wavelet multiple correlation (WMC) and multiple cross-correlation (WMCC).

Empirical Analysis of Interdependence

The empirical data consists of 24 major stock indices comprising both developed and emerging markets. The stock indices considered are Bombay Stock Exchange (BSE) 30 (India), National Association of Securities Dealers Automated Quotations (Nasdaq), Standard and Poor's (S&P) 500 and Dow Jones Industrial Average (DJIA) (US), Financial Times Stock Exchange (FTSE) 100 (United Kingdoms), Cotation Assistée en Continu (CAC) 40 (France), Deutscher Aktienindex (DAX) 30 (Germany), NIKKEI 225 (Japan), Korea Stock Exchange Composite (KOSPI) (Korea), Bursa Malaysia or the Kuala Lumpur Stock Exchange (KLSE) (Malaysia), Jakarta Stock Exchange (JKSE) (Indonesia), Taiwan Capitalization Weighted Stock Index (TAIEX) (Taiwan), Shanghai Stock Exchange (SSE) (China), Straits Times Index (STI) (Singapore), Hang Seng Index (HSI) (Hong Kong), Brussels Stock Exchange or Euronext Brussels (BEL) 20 (Belgium), Austrian Traded Index (ATX) (Austria), Amsterdam Exchange Index (AEX) (Netherlands), Índice Bursátil Español (IBEX) 35 (Spain), Swiss Market Index (SMI) (Switzerland), STOXX50 (Eurozone), Australian Securities Exchange (ASX) 200 (Australia), Karachi Stock Exchange (KSE) 100 (Pakistan), and Índice Bovespa (IBOV) (Brazil).

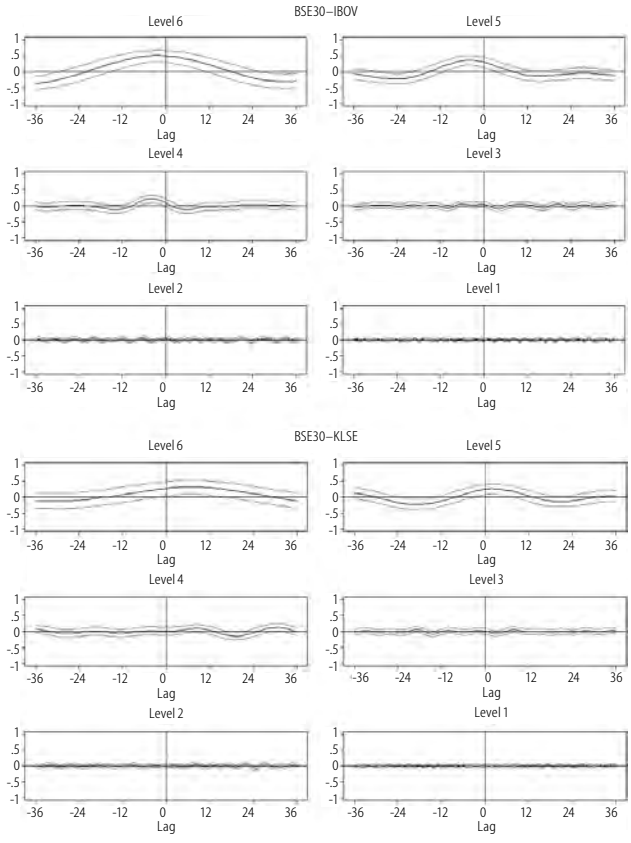
The period of study ranges from 1 July 1997 to 20 January 2014 consisting of 4,096 dyadic length observations[2] making it suitable for various wavelet methods. Returns of all the stock indices are calculated by taking first order logarithmic differences. The following section proceeds with the "classical analysis of wavelet correlation and wavelet cross-correlation" for select market pairs.

Classical wavelet correlation analysis: The empirical analysis begins with the classical wavelet correlation and cross-correlation analysis of the sample stock market pairs. The returns of all markets are decomposed using the maximal overlap discrete wavelet transform (MODWT) method into six levels of resolution, corresponding to the first six details. The extracted MODWT detail coefficients d1, d2, d3, d4, d5, d6 correspond to the time-scale, or investment-horizon, of one to two days, two to four days, four to eight days, eight to sixteen days, 16 to 32 days, and 32 to 64 days, respectively. The filter used in the wavelet multiresolution decomposition is the "Daubechies least asymmetric" with length eight (LA8). This filter is said to be the most appropriate filter in decomposing financial time-series (see Percival and Walden 2000; Gencay et al 2002, among others).

Moreover, edge effects are taken care of by implementing the brick-wall[3] boundary condition on the decomposed MODWT series. In the next step, the estimates of wavelet correlation and cross-correlation are calculated from the MODWT decomposed returns. The wavelet correlation plots with the lower and upper confidence bands, indexed as L and U, are given along with six levels of wavelet decomposition. The highest number of levels that a series of length N can be decomposed into is given by $log_2(N)$. The horizontal axis shows the level of decomposition whereas the vertical axis gives correlation values ranging from -1 to 1. All wavelet correlation computations are performed with the LA 8 wavelet filter after tackling the boundary effects using the brick-wall condition.

Figure 1 (p 65) demonstrates the wavelet cross-correlations for BSE30–IBOV and BSE30–KLSE pairs. The correlations seem to increase as the timescale increases. BSE30 and IBOV show signs of some cross-correlation at level 2, corresponding to the two to four-day timescale, at a lead (negative six lag) of around

Figure 1: Wavelet Cross-correlation of BSE30–IBOV and BSE30–KLSE



six day. This means that the present day returns of IBOV is related to the returns of BSE30 six days later. Moreover, some signs of left asymmetry show that BSE30 leads IBOV at the time-horizon of two–four days, implying that changes in BSE30 are followed by changes in IBOV two to four days later. Furthermore, some strong correlations between BSE30 and IBOV beyond four levels of wavelet decomposition can be evidenced from the plot. At levels four and five, since the cross-correlation plot is skewed to the left, BSE30 leads IBOV at both fortnightly and monthly time horizons. This skewness is not very pronounced at the sixth level, corresponding to the investment horizon of 32–64 days, thereby making it difficult to interpret the lead-lag behaviour at this level. However, the contemporaneous correlation at this timescale seems to be strong between the returns of BSE30 and IBOV.

Some signs of cross-correlation between BSE30 and KLSE are observed at two to four days' timescale around 22- and 26-days lag. The leading behaviour of KLSE is also apparent owing to right skewness of the plot. However, no statistically significant cross-correlations at levels three and four, corresponding to the investment horizons of four to eight and eight to sixteen days, can be observed as the lower confidence band is homogeneously distributed below the zero axis. However, both contemporaneous correlation and cross-correlations up to lag of six days are found to be statistically significant at the time horizon of 16 to 32 days. The cross-correlation at and above level six to six days lag is also significant where KLSE leads BSE30.

The leading behaviour of KLSE over BSE30 at time horizons of 16–32 and 32–64 days makes it clear that changes in KLSE are followed by changes in BSE30 up to the time-horizon of two months. Therefore, Indian investors who operate at these time horizons need to be careful while considering Malaysian assets in their portfolios. The results from both the classical wavelet correlation and wavelet cross-correlation, for all market pairs, are available upon request. However, only important and significant results for illustration purposes are reported here.

Furthermore, results from classical wavelet correlation analyses involves colossal amount of output, which entails cumbersome graphical plots. For example, the incorporation of all possible data pairs, from the sample of markets considered in this study in the bivariate wavelet correlation analysis, leads to the generation of $(N(N-1))/2$ graphical plots, which equals to $(24\times(24-1))/2=276$ correlation plots! Moreover, the cross-correlation plots generated would be even larger in number as the levels of wavelet decomposition (say, J) need to be considered too, thereby generating plots to the tune of $J \times N(N-1)/2$. Therefore, a much newer technique of "wavelet-multiple correlation and wavelet multiple cross-correlation" (Polanco-Martinez and Macho [2014]), which can handle multivariate time-series, as opposed to the bivariate classical wavelet correlation methods, is implemented for the analysis of market interdependence among select groups of markets.

In essence, wavelet multiple correlation (WMCOR) allows multivariate time-series as inputs and generates significant correlation information in a single plot. This is achieved due to the fact that the output of WMCOR contains a single list of wavelet correlation[4] coefficients obtained from maximum values of the square root of R^2. Similarly, wavelet multiple cross-correlations (WMCCOR) give cross-correlation output in a single plot by implementing the same algorithm as above and allowing for lags. The examination of equity market interdependence and lead-lag analysis among markets carried out in the subsequent section is based on WMCOR and WMCCOR.

Wavelet multiple correlation analysis: The analysis of interdependence, in this section, among several groups of equity markets begins by (i) pair wise computation of wavelet correlation between several pairs of equity markets and then implementing the improved graphical method of Polanco–Martinez and Macho (2014) to generate the wavelet correlation heat map, (ii) using WMCOR methods to study the co-movement among select pairs of equity market returns, and (iii) inferring from the results the direction of returns spill over.

Markets are grouped into six different sets (Set 1–Set 6). The equity market contained in each set is given in Table 1 where

Table 1: Grouping of Stock Indices in Six Sets

Grouping	Equity Indices						
	C1	C2	C3	C4	C5	C6	C7
Set1	SP500	CAC40	DAX	NIKKEI	KOSPI	JKSE	BSE30
Set2	KOSPI	KLSE	TAIEX	SSE	STI	HSI	BSE30
Set3	FTSE	CAC40	DAX	BEL20	ATX	AEX	IBEX
Set4	IBOV	KSE100	BSE30	SSE	JKSE	–	–
Set5	BSE30	STOXX50	SMI	BEL20	ATX	–	–
Set6	NIKKEI	ASX200	HSI	STI	TAIEX	JKSE	KLSE

Figure 2: Pair-wise Wavelet Correlation among Markets in Set 1

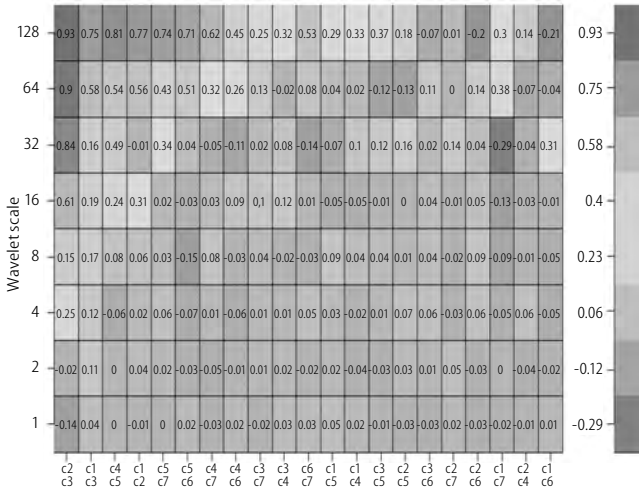
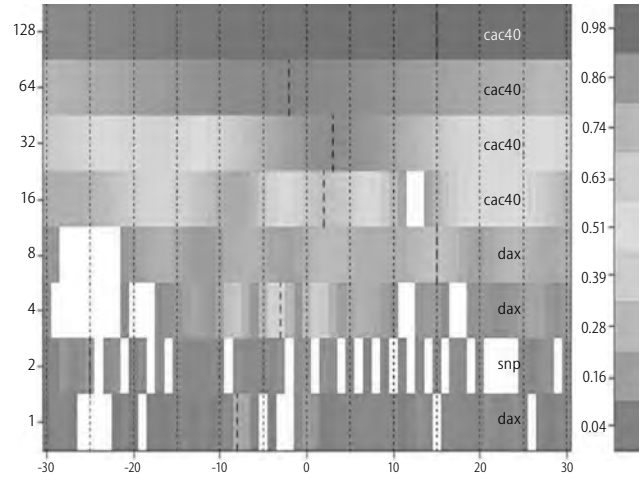


Figure 3: Wavelet Multiple Cross-correlation among Markets in Set 1

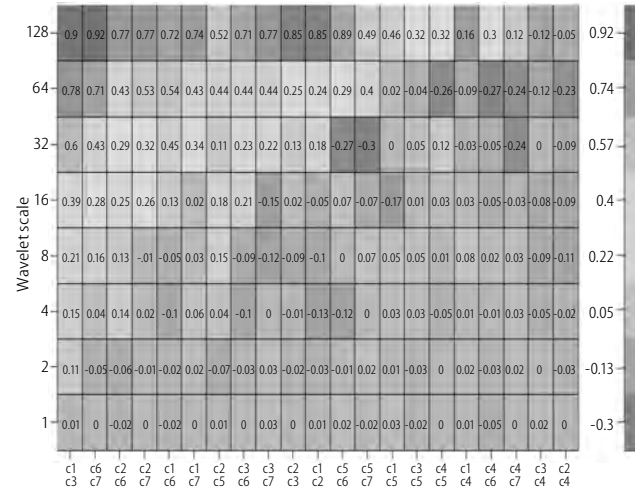


the header c1 through c7 represents the seven equity market indices contained in all seven sets.

Figure 2 shows pair-wise wavelet correlations among several combinations of equity returns of markets included in Set 1, that is, markets from the US, France, Germany, Japan, South Korea, Indonesia and India. The improved graphical method of Polanco-Martinez and Macho (2014) is used to plot the pair-wise wavelet correlation within a heat map framework. Wavelet correlation is computed for eight levels of decomposition associated with the first eight wavelet details "d1,d2, d3, d4, d5, d6, d7, and d8" which correspond to the time scale, or investment horizon, of one–two days, two–four days, four–eight days, eight–sixteen days, 16-32 days, 32–64 days, 64–128 days, and 128–256 days, respectively. The vertical axis displays the wavelet level along with the legend displaying correlation strength on the right, whereas in the horizontal axis pairwise combinations are displayed.

In the figure, the indices SP500, CAC40, DAX, NIKKEI, KOSPI, JKSE, and BSE30 are labelled by "C1, C2, C3, C4, C5, C6 *and* C7", respectively. The degree of wavelet correlation is given by the colour-coded heat-map where the strength of correlation rises from blue (weak) to pink (strong). It is worthwhile to note that classical wavelet correlation analysis would have entailed 7×(7-1)/2=21 correlation plots as opposed to the improved heat-map method which gives the same information in a single plot. It is evident from the plot that multiscale correlation between BSE30 (India) and all other Western developed markets (in Set 1) are very weak, indicating very weak stock market integration between India and markets of the US, France and Germany (see Labels C1–C7, C2–C7 and C3–C7 in the horizontal axis).

Figure 4: Pair-wise Wavelet Correlation among Markets in Set 2



However, some significant correlation between NIKKEI-BSE30 (C4–C7) and JKSE–BSE30 (C6–C7) can be evidenced for the yearly time-horizon (128 to 256 days). Moreover, strong correlation between KOSPI and BSE30 (C5–C7 pair) is present for both half yearly and yearly scales. In the next step, the improved version of wavelet multiple cross-correlation analysis is performed using markets from Set 1. Figure 3 gives both improved (top panel) and classical (bottom panel) plots of wavelet multiple cross-correlation among equity returns of markets included in set 1. In the improved WMCCOR plot, vertical dashed lines in bold indicate lags where cross-correlation values are the strongest. The index that maximises wavelet correlation against a linear combination of other indices in the set is the one that leads all other markets in the set. Therefore, the lead-lag behaviour can be deduced, for each wavelet scale, from the variable names that are listed on the right.

Furthermore, white areas in the colour-coded box plot indicate regions where the confidence band includes zero. As is evident from Figure 3, the developed markets of Germany, France and the US lead all other markets in set 1. For example, returns of SP500 (labelled "SNP") lead all others at level two implying that an increase (decrease) in the returns SP500 will lead to an increase (decrease) in the returns of all other markets in the set, two to four days later. At level five, where CAC40 leads all other markets in the set, correlation peaks around the lag of two days, which is evident from the peak in the classical plot (bottom panel) around this lag. This information is also given in the improved plot where, around the lag of two days, dashed vertical lines in bold can be seen. Moreover, scale dependent strength of correlation, where wavelet correlation increases with wavelet scale, can be observed from the plot.

Figure 4 shows pair-wise wavelet correlations among equity returns of markets included in Set 2, that is markets from South

Figure 5: Wavelet Multiple Cross-correlation among Markets in Set 2

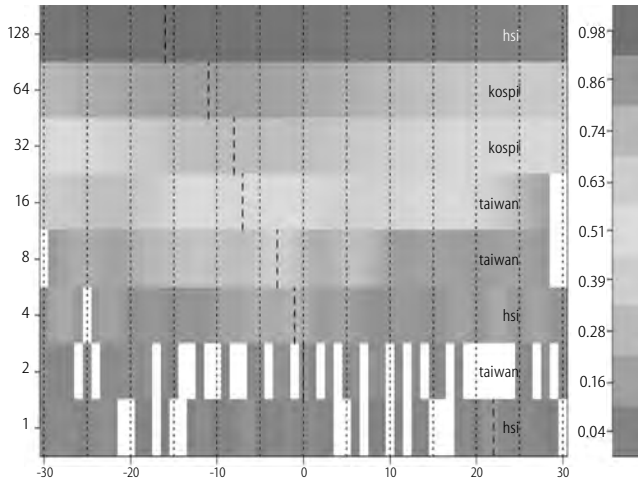


Figure 6: Pair-wise Wavelet Correlation among Markets in Set 3

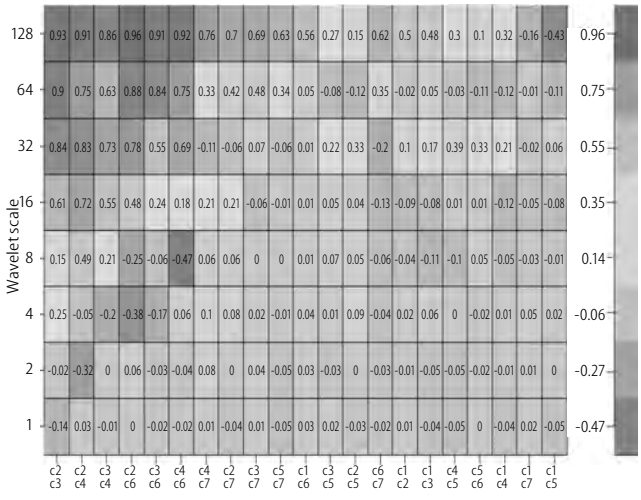


Figure 7: Wavelet Multiple Cross-correlation among Markets in Set 3

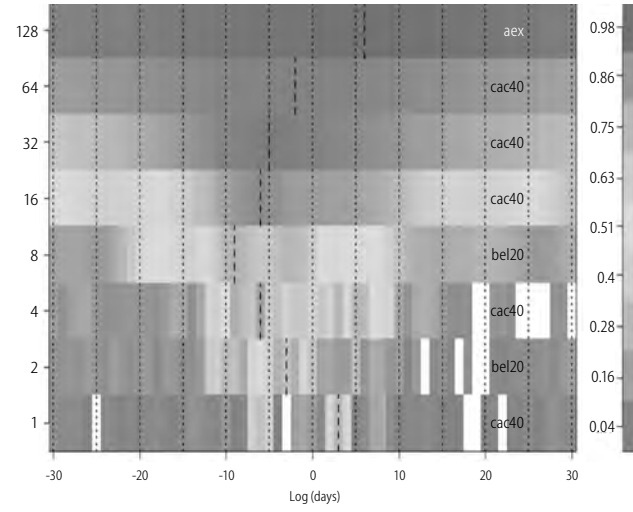
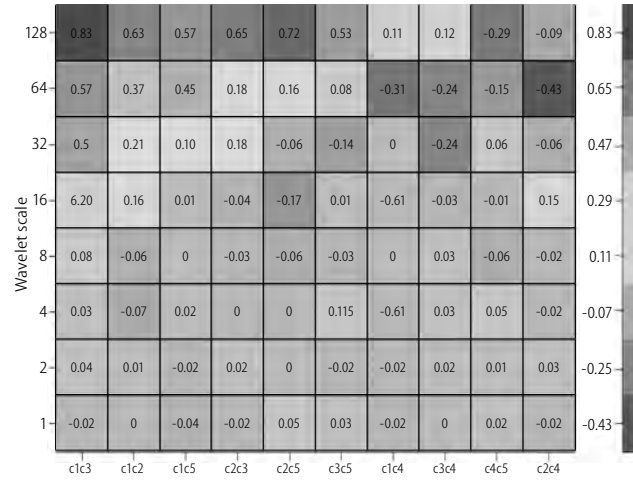


Figure 8: Pairwise Wavelet Correlation among Markets in Set 4



Korea, Malaysia, Taiwan, China, Singapore, Hong Kong and India. This set includes major Asian markets where some are closely related in terms of regional proximity, trade and culture. In the figure, the indices KOSPI, KLSE, TAIEX, SSE, STI, HSI, and BSE30 are labelled by "C1, C2, C3, C4, C5, C6 and C7," respectively.

As can be seen from the above plot, BSE30 is significantly correlated with many Asian markets. On the other hand, as observed in Figure 2, the Indian market is not significantly correlated with developed markets of Europe and the US.

Statistically significant multiscale correlation, beyond 16 to 32 days timescale, between Malaysian and Indian market (C2–C7 pair) can be observed. The same holds for South Korea and India (C1–C7 pair). BSE30 is also significantly correlated with TAIEX during the monthly time horizon and beyond. Furthermore, statistically significant correlation between BSE30 and HSI (C6–C7 pair) starting from weekly time horizon and continuing up to yearly time horizon is evidenced from the multiscale plot. However, multiscale correlation between India and China seems to be weak indicating weak market integration.

Nonetheless, the Indian equity market seems to be strongly interrelated with majority of Asian markets in the set indicating strong interdependence between Indian and some Asian markets. Figure 5 shows WMCCOR among markets in Set 2. With respect to lead-lag behaviour among markets from Set 2, the equity market of Hong Kong, Taiwan and South Korea lead all other markets in the set.

The market of Hong Kong (labelled "his") leads all other markets at levels one, three and eight corresponding to time-horizons of one–two days (or daily), four–eight days (weekly) and 128–256 days (yearly), respectively. On the other hand, South Korean market (KOSPI) leads all others at levels six and seven. Furthermore, the stock market of Taiwan leads all others at fortnightly (8–16 days) and monthly (16–32 days) time horizons. Set 3 comprises of the developed European equity markets from the UK, France, Germany, Belgium, Austria, Netherland and Spain. Figure 6 displays the multiscale correlation among these European markets.

Strong market interdependence among most equity markets of Europe in Set 3 can be observed from Figure 6. Furthermore, from Figure 7 it can be observed that the market of France leads all others at levels one, three, five, six and seven.

Figure 8 displays the pair-wise multiscale correlation among some emerging markets included in Set 4. Stock markets from Brazil, Pakistan, India, China and Indonesia comprises this set.

Figure 9: Wavelet Multiple Cross-correlation among Markets in Set 4

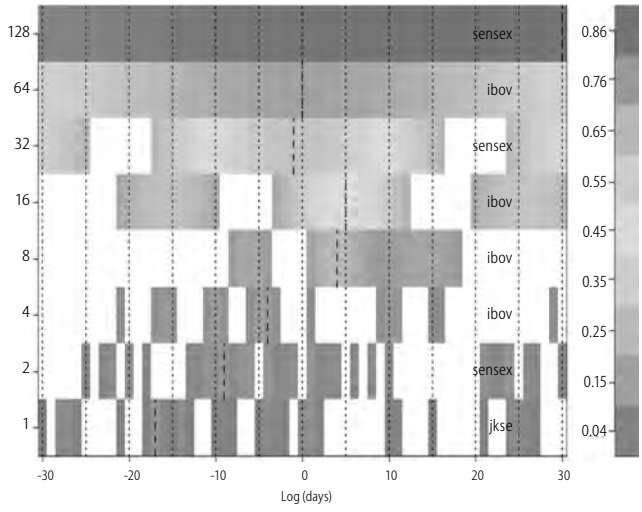
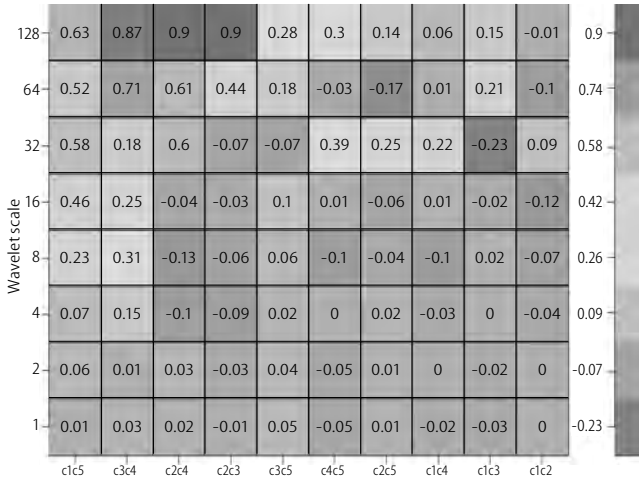


Figure 10: Pair-wise Wavelet Correlation among Markets in Set 5



Statistically significant correlation between BSE30 and IBOV (C1–C3 pair) is evidenced from the plot where wavelet correlation increases with the increase in wavelet scale, thereby implying good market integration between India and Brazil starting with the monthly scale and beyond. However, market integration of India with Pakistan and Indonesia happens only around the yearly scale (128–256 days), where correlations are very weak up to the half yearly scale. Moreover, as shown by the WMCCOR plot in Figure 9, India, Brazil and Indonesia lead all other markets in the set.

As evident from Figure 9, Indian stock returns (labelled "sensex") lead the returns of all other markets in the set at levels two, six and eight corresponding to the intra-weekly (two to four days), quarterly (32–64 days) and yearly (128–256 days) time horizons. However, stock returns of Brazil (labelled "IBOV") lead all others at levels three, four, five and seven. Nonetheless, the lead-lag dynamics during lower wavelet scales suffer from bouts of insignificance as evidenced from the white regions that encompass zero in the confidence interval.

Figure 10 shows pair-wise wavelet correlations among several combinations of equity returns of markets included in Set 5, that is markets from India, Eurozone, Switzerland, Belgium and Austria. There exists weak integration of Indian market with many European markets as multiscale correlations between BSE30 returns and returns of STOXX50, SMI, and BEL20, are very low. Interestingly, strong multiscale correlation exists between Indian and Austrian stock returns (C1–C5 pair) starting from fortnightly time horizon (8–16 days) up to yearly time horizon (128–256 days). Moreover, integration with other European markets is stronger. The lead-lag behaviour among markets in this set is given in Figure 11. The stock returns of Austria, Belgium and the Eurozone index are found to be the dominant leaders at a majority of wavelet scales, with the exception of BSE30, which lead all others at the monthly time horizon.

Figure 11: Wavelet Multiple Cross-correlation among Markets in Set 5

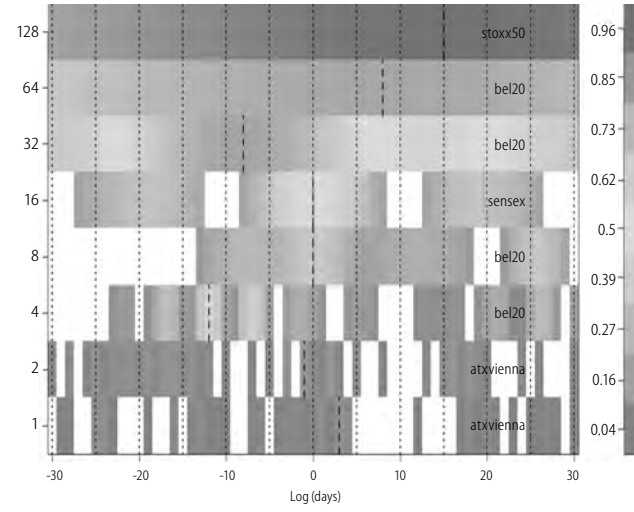
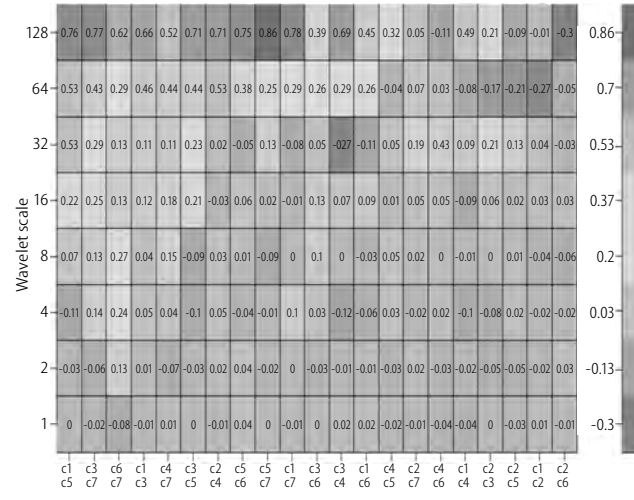
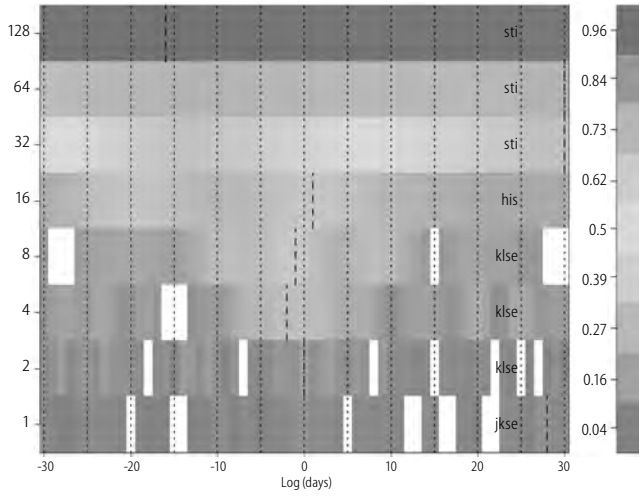


Figure 12: Pair-wise Wavelet Correlation among Markets in Set 6



The multiscale correlation between markets from the Asia-Pacific region (Set 6) is given in Figure 12 where stock returns of markets from Japan, Australia, Hong Kong, Singapore, Taiwan, Indonesia and Malaysia are considered. There is an evidence of strong integration among markets in this group. The return pairs *NIKKEI–TAIEX, HSI–KLSE, HSI–TAIEX, STI–KLSE* and *JKSE–KLSE* show statistically significant wavelet correlation at majority of scales. The stock returns of Malaysia lead all others at shorter timescales whereas returns of Singapore lead at longer time horizons. Moreover, returns of Hong Kong lead all others at

Figure 13: Wavelet Multiple Cross-correlation among Markets in Set 6



the monthly time-horizon (Figure 13). Results from wavelet multiple cross-correlation analysis can be used to identify the direction of returns spillover.

Returns spillovers from the developed market of France (CAC40) are statistically significant at levels one, three, five, six and seven. Finally, while considering emerging markets from Set 4, spillover runs from BSE30 to others at levels two, six and eight corresponding to intra-weekly, quarterly and yearly time horizons. Nonetheless, the direction of spillover runs from Brazil to other markets in zset 4 at weekly, fortnightly and monthly time horizons.

Table 2 gives the direction of returns spillover for market groups in Set 1 to Set 4. The first four set of market groups are considered as they include markets from both the developed and the emerging economies. Arrows indicate the direction of spillovers and are significant at the 5% level. There is a strong evidence of returns spill over from DAX to other markets in Set 1 on daily, weekly and fortnightly time horizons.

However, from the monthly time horizon onwards, significant returns spill over from CAC40 to other markets can be evidenced. When looking at the regional spill over dynamics within the Asian markets contained in Set 2, HSI, TAIEX and KOSPI transmit majority of shocks. At daily, weekly and yearly time horizons, significant spillover from HSI to other markets can be evidenced. However, spill overs from KOSPI to other markets are found to be significant at both quarterly and half-yearly time horizons.

In line with the objective of this paper, that is, to identify markets with lesser risks for Indian investors in terms of portfolio diversification,[5] multiscale correlations of BSE30 with all developed and emerging markets in the sample are presented in Table 3. Entries marked in bold indicate significant correlation and therefore can be used to decide upon relevant portfolio combinations for the Indian investor operating at varying time horizons.

Table 2: Returns Spillover among Equity Markets

Time Scale	Spillover Direction	
1–2 Days	DAX → Set 1 HSI → Set 2 CAC → Set 3 JKSE → Set 4	
2–4 Days	SNP → Set 1 TAIEX → Set 2 BEL → Set 3 BSE → Set 4	
4–8 Days	DAX → Set 1 HSI → Set 2 CAC → Set 3 IBOV → Set 4	
8–16 Days	DAX → Set 1 TAIEX → Set 2 BEL → Set 3 IBOV → Set 4	
16–32 Days	CAC → Set 1 TAIEX → Set 2 CAC → Set 3 IBOV → Set 4	→ Significant at 5%
32–64 Days	CAC → Set 1 KOSPI → Set 2 CAC → Set 3 BSE → Set 4	
64–128 Days	CAC → Set 1 KOSPI → Set 2 CAC → Set 3 IBOV → Set 4	
128–256 Days	CAC → Set 1 HSI → Set 2 AEX → Set 3 BSE → Set 4	

Table 3: Multiscale Correlation of BSE30 with all Markets

Time-Scale	SNP	CAC40	DAX	NIKKEI	KOSPI	JKSE	HSI	KBE	TAIEX
2–4 days	0	0.05	0.01	-0.05	0.02	-0.02	-0.05	-0.01	0.03
4–8 days	-0.05	-0.03	0.01	0.01	0.06	0.05	0.04	0.02	0
8–16 days	-0.09	-0.02	0.04	0.08	0.03	-0.03	0.16	-0.01	-0.12
16–32 days	-0.13	-0.01	0.1	0.03	0.02	0.01	0.28	0.26	-0.15
32–64 days	-0.29	0.14	0.02	-0.05	0.34	-0.14	0.43	0.32	0.22
64–128 days	0.38	0	0.13	13.32	13.43	0.08	13.71	13.53	0.44
128–256 days	0.3	0.01	0.25	13.62	4.74	0.53	13.92	13.77	0.77

Time-Scale	STI	ASX	ATX	BEL20	SMI	STOXX	IBOV	KSE100	SSE
2–4 days	0.02	0	0.06	0	-0.02	0	0.04	0.02	0.02
4–8 days	0	0	0.07	-0.03	0	-0.04	0.03	0	0.03
8–16 days	0.07	-0.04	0.23	-0.1	0.02	-0.07	0.08	-0.03	0.03
16–32 days	-0.07	-0.08	0.46	0.01	-0.02	-0.12	0.29	-0.04	-0.03
32–64 days	-0.3	0.08	0.58	0.22	-0.23	0.09	0.5	0.18	-0.24
64–128 days	0.4	-0.1	0.52	0.01	0.21	-0.1	13.57	0.18	-0.24
128–256 days	0.49	0.03	0.63	0.06	0.15	-0.01	13.83	0.65	0.12

The results from both the classical wavelet correlation and the wavelet multiple correlation document some significant wavelet correlation among the BSE30 and major Asian markets. For example, from Table 3, it can be seen that the BSE30 is not only significantly correlated at majority of wavelet scales, with HSI, KLSE, TAIEX, and KOSPI, but is also significantly correlated with the Japanese returns at both half-yearly and yearly time horizons. However, one can observe the weak multiscale correlation between the Indian and Chinese markets.

On the other hand, the BSE30 is weakly correlated with the markets of the US. and the developed markets of Europe at all time-horizons. This indicates that Indian investors, operating at varying investment holding periods, can include assets from these markets in their portfolios. One exception is the Austrian market where the BSE30 is significantly correlated from level three onwards. Moreover, both the emerging markets of India and Brazil are significantly correlated from the monthly time horizon and beyond.

The information from multiscale correlation can be used by investors operating at different time horizons to appropriately adjust their portfolio combinations. It is also important to note that a portfolio meant for shorter timescales might not yield the same risk mitigating benefits if used for other time-horizons. Therefore, that multiscalar nature of correlation structure needs to be taken into account before strategising the portfolio combinations.

Conclusions

This article uses multiscale correlation methods from the wavelet domain to identify interrelations between several market pairs at different time horizons, with special focus on the Indian market. The breakdown of correlation at different resolutions allows investors to correctly identify risks associated with assets at different time horizons. In general, wavelet cor-

relation among equity markets seems to increase as we move from shorter to longer time horizons. Correlations are significantly stronger at longer time horizons whereas shorter time horizons have very weak correlations. For example, the daily timescale (one to two days) seems to have very weak correlations. Therefore, correlations between global equity returns are found to be dependent on investment horizons.

The separation of correlation structure at different time-horizons is very beneficial for heterogeneous investors who operate at different timescales based on their investment holding periods. Moreover, information on correlation structure at varying time-horizons will aid investors in diversifying portfolios with global asset combinations, where portfolios diversified using international assets is empirically demonstrated in the literature to reduce portfolio risks (Grubel 1968; Agmon 1972; Dajcman et al 2012).

Information on correlation structures at different investment holding periods will provide additional inputs for investors whose risks might not be the same for all investment decisions that they undertake. Therefore, an analysis based on these lines aids investors in operating in international markets in diversifying their portfolios, while incorporating different investment holding periods, or time horizons, into their strategy.

The multiscale correlations among developed European markets from the same region are found to be significantly strong across different time horizons, indicating strong integration among these markets. Similarly, some Asian markets with regional proximity seem to be interdependent. This is in line with Pretorius's (2002) finding that regional proximity, and the related trade linkage that geographical proximity engineers, play an important role in determining market integration.

In view of the possible portfolio diversification benefits facing Indian investors, multiscale correlation structure between the Indian stock returns and returns from both the developed and the emerging markets are investigated. This helps in adjudicating risks that engulf heterogeneous Indian investors with varying investment holding periods. Indian investors who invest in the US equity markets and in the developed European markets may benefit from reduced portfolio risks, as the correlation between the Indian stock returns and returns of these developed western markets is very low at almost all time horizons.

Additionally, Indian investors might also be well off if they invest in the Chinese stock market. However, Indian investors should be cautious if they include assets from the Brazilian and the East Asian markets as multiscale correlation of the Indian stock returns and the returns from the markets of these regions is very significant, for a majority of investment holding periods. Since the heterogeneity of investment horizons and the corresponding information at multiple time scales allow heterogeneous Indian investors to carefully diversify their portfolio, the results obtained from this analysis might aid Indian investors in their investment decisions. Nonetheless, investors should take into account their investment holding periods and the associated risks when they make risk management and portfolio allocation decisions.

NOTES

1 These differences in factors explaining market linkages, as argued by Beine and Candelon (2011), exist due to the heterogeneous nature of markets.

2 Since our data consists of observations spanning more than a decade, there could be some breakpoints corresponding to periods of high volatility and financial crises. However, such breakpoints may not be captured by the traditional structural break methods. In this context, it may be more appropriate to use Korkas and Fryzlewicz (2017) method of change point detection based on wavelet periodogram. We intend to incorporate wavelet-based change point analysis in our future work.

3 As finite length time-series causes boundary problems, the decomposed MODWT coefficients near the boundaries are replaced by null values during computation. This is known as the brick-wall method.

4 This is obtained from linear combination of those decomposed wavelet coefficient that maximises the coefficient of determination, $R2$ (see Fernandez-Macho 2012; Polanco-Martinez 2014).

5 Since higher correlations among global equity returns can arise out of markets sharing similar risk profiles, risk-adjusted returns may be used to form portfolio of returns. We intend to extend the scope of our present work in future where wavelet filtered risk-adjusted returns encompassing information from heterogeneous time horizons would be used to test for market interdependence.

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What Drives Transitions in Milk Productivity?
Household-level Evidence from Punjab

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The trend in milk productivity and its association with breed improvement, feeding and animal husbandry practices, and efficiency in dairy farming at the household level are examined using the representative cost of cultivation surveys in Punjab. Although milk yield at the farm level is rising due to the increasing adoption of cross-bred cattle and changing composition of animal rations, evidence is found to support the argument to popularise cross-bred technology for realising a higher milk yield. However, the rising trend in milk yield coexists with declining efficiency levels in milk production.

Views expressed in the paper are personal and do not represent the organisations with which the authors are associated.

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Dairy is an important sub-sector of India's agriculture, contributing to agricultural growth and nutritional security in a significant way. Over the years, India has recorded high growth in milk production and emerged as the largest milk-producing country in the world. However, milk productivity in the country continues to be lower than major dairy farming countries. India ranks 98th in terms of milk yield per dairy animal among 200 milk-producing countries in the world (FAO 2018). Therefore, raising the productivity level remains a key strategy for ensuring food and nutritional security for the growing population in India (Kumar and Joshi 2013).

Within the country, milk productivity varies considerably across the states (Landes et al 2017). Punjab, agriculturally the most developed state, produces almost double the milk per animal than the national average (Department of Animal Husbandry, Dairying and Fisheries 2017). It is pertinent to explore the reasons behind the relatively higher milk productivity in developed states like Punjab and replicate improved dairy practices in other states to raise the overall milk productivity in India. Furthermore, Punjab, a pioneer state in ensuring food self-sufficiency in India, is reaching a plateau in crop output over time (GoI 2016; Gulati et al 2017). But, milk output in the state is still increasing and has emerged as a stabiliser of agricultural growth. Unravelling underlying transitions in milk-production activities would be helpful in accelerating diversification towards dairying.

At the household level, most of the existing studies are limited to crop sub-sectors in Punjab (Singh and Joshi 2008; Raju et al 2015; Singh et al 2017; Srivastava et al 2017). Few farm-level studies have also analysed the socio-economic and technological aspects of milk production within a given time frame (Kaur et al 2012; Bardhan and Sharma 2012; Anbukkani 2016).

The existing literature is short on studies that capture the transitions in milk productivity or examine the underlying drivers at the household level. This article fills that gap by tracking the changing dynamics of milk production at the household level during the past 14 years in Punjab using representative cost-of-cultivation survey (CCS) data. Specifically, the article examines the trend in milk productivity and its association with breed improvement, feeding and animal husbandry practices, and efficiency in dairy farming. Furthermore, this article quantifies the average potential to raise milk yield at a given level of input use (yield gap) and identifies measures for bridging the yield gap. The findings provide valuable farm-level insights for understanding the transitions in dairy farming in Punjab and for framing suitable policies to strengthen the dairy sector in India.

Data and Methodology

The study is based on unit-level data of CCSs, which are conducted under a centrally-sponsored scheme of the Indian government's Ministry of Agriculture, entitled "Comprehensive Scheme for Studying Cost of Cultivation/Production of Principal Crops in India." This scheme was operationalised in 1970–71, and presently, representative data is collected by the nodal agencies in 19 states. The sample is selected based on the crop-complex approach (state-specific selected principal crops) for three consecutive years. Thereafter, sample units and survey locations are changed for wider representation of the respective state. Although the name of the scheme mentions only crops, and the sample is selected based on cultivation of principal crops, the scheme covers aspects of the farm economy beyond mere crop production (Nawn 2013). Moreover, the crop and dairy sectors are integral parts of farming in the state.

Many scholars have recognised the underutilisation of this valuable data set in understanding rural India (Sen and Bhatia 2004; Vaidyanathan 2005). Among administrative and technical hurdles, the unavailability of unit-level data in a digital format was a major constraint in the use of CCS data, till 1990–91 (Nawn 2013). The present study examines transitions in dairy farming in Punjab using unit-level data during the period 2000–01 to 2014–15, for which data is available in the digital format. The sample size in Punjab consists of about 300 farm households, which are equally distributed over five land size categories and represent different agro-climatic regions. All of these households also own dairy animals. The details on various aspects of dairy farming, such as animal inventory, input use patterns, milk production and marketing were extracted at the farmer level for each of the 15 years. Inferences drawn out of this study represent farmer households that undertake dairy activities as a supplementary source of income. The sample does not include commercial dairy farms or those engaged in dairy activities as a primary source of income. However, as dairy activity is primarily a secondary enterprise, the results fairly represent the changing facets of dairy farming in the state.

The primary objective of the study is to provide empirical evidence on transitions in dairy farming at the household level in Punjab. The study hypothesises that changes in milk yield could be attributed to adoption of improved breeds, feeding and animal husbandry practices, and efficiency in milk production. The changes in these factors were examined and their association with milk yield was established by fitting the stochastic frontier production function model with inefficiency effects as suggested by Battesi and Coelli (1995). The model postulates simultaneous estimation of the parameters of the stochastic frontier production function and technical inefficiency effects using the method of maximum likelihood. Thus, the model permits estimation of both technical change in the stochastic frontier and time-varying technical inefficiencies. In addition to the estimation of level of efficiency, the model also identifies determinants of inefficiency in milk production. The empirical form of the model is given below:

$$\ln(\text{MILKYIELD}) = \beta_0 + \beta_1 \ln(\text{LABOUR}_{it}) + \beta_2 \ln(\text{GREENFODDER}_{it}) + \beta_3 \ln(\text{DRYFODDER}_{it}) + \beta_4 \ln(\text{MIXEDFEED}_{it}) + \beta_5 \ln(\text{GRAINS}_{it}) + \beta_6 \ln(\text{MINERALS}_{it}) + \beta_7 \ln(\text{CROSSBRED}_{it}) + \beta_8 \ln(\text{VETEXP}_{it}) + \beta_9 \text{TREND}_{it} + V_{it} - U_{it}, \quad \ldots(1)$$

where

MILKYIELD	= milk yield (litre/ milking animal/year)
LABOUR	= labour use in dairy activities (hours/ standard animal/year)
GREENFODDER	= green fodder (quintal/ standard animal/year)
DRYFODDER	= dry fodder (quintal/ standard animal/year)
MIXEDFEED	= mixed feed (kg/ standard animal/year)
GRAINS	= grains (kg/standard animal/year)
MINERALS	= minerals (kg/ standard animal/year)
CROSSBRED	= proportion of crossbred animals in herd (per cent)
VETEXP	= expenditure towards veterinary services in real terms
TREND	= year of the observation

Following Sirohi et al (2014), the physical inputs were expressed in terms of standard animal units to account for differences in age and type of animal. The subscript *it* denotes *i*th observation in *t*th year, and *ln* denotes the natural logarithm. V_{it} is assumed to be the independent and identically distributed (iid) random errors, having normal $N(o, \sigma^2 v)$ distribution and independent of U_{it}. U_{it} represents technical inefficiency and is assumed to be a non-negative truncation of the half normal distribution $N(\mu, \delta^2 u)$. V_{it} captures the stochastic effects outside the control of farmers, whereas U_{it} measures the shortfall of observed output from its maximum possible value (estimated through the stochastic frontier function).

It is further assumed that the average level of technical inefficiency as measured by (U_{it}) is a function of the following factors:

$$U_{it} = \delta_0 + \delta_1(\text{MILKSOLD}_{it}) + \delta_2(\text{HERDSIZE}_{it}) + \delta_3(\text{AGE}_{it}) + \delta_4(\text{FAMILYLABOUR}_{it}) + \delta_5(\text{EDUCATION}_{it}) + \delta_6(\text{HGGFDDR}) w_{it} + \delta_7(\text{HGDFDDR}) w_{it} + \delta_8(\text{TREND}_{it}) \quad \ldots(2)$$

where

MILKSOLD	= proportion of milk sold (%)
HERDSIZE	= standard herd size
AGE	= age of the family head
FAMILYLABOUR	= number of household members engaged in agriculture
EDUCATION	= years of education of family head
HGGFDDR	= proportion of green fodder grown in own farm (%)
HGDFDDR	= proportion of dry fodder grown in own farm (%)
TREND	=year of the observation.

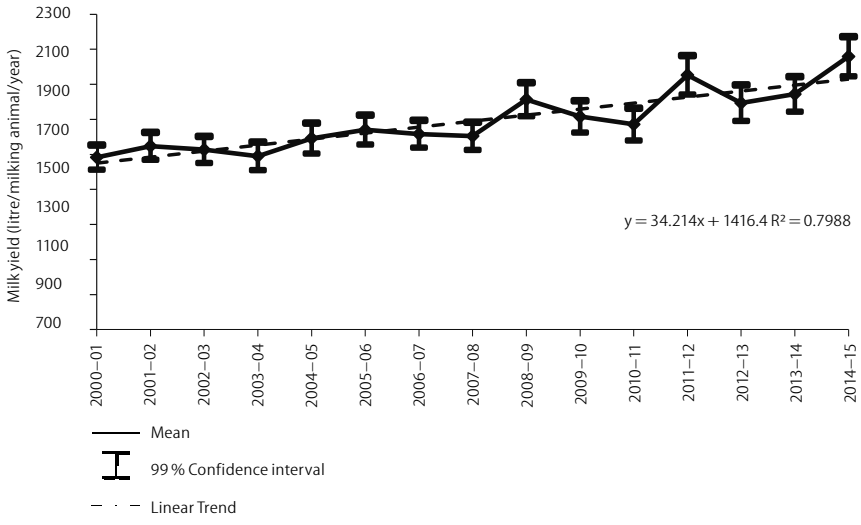
W_{it} is a random variable defined by the truncation of normal distribution with zero mean and variance σ^2. The maximum likelihood estimates of the unknown parameters of the stochastic frontier function and inefficiency effects model were obtained simultaneously by estimating the model in FRONTIER 4.1 software (Coelli 1996). Using the estimated values of technical efficiency, the average potential to raise milk yield with the given level of input use in the state was obtained for 2014–15 using the following formula:

$$\text{potential milk yiled} = \left[1 - \frac{\text{mean technical efficiency}}{\text{maximum technical efficiency}}\right] \times 100 \quad \ldots(3)$$

Results and Discussion

The successive CCS surveys have revealed an increase in milk yield from 1,483±70 litres per year in 2000–01 to 2,059±113 litres per year in 2014–15 at an annual growth rate of 2.01% in Punjab (Figure 1). The milk yield is determined by type of breed, quantity and composition of feed intake, and efficiency in animal husbandry practices. The transitions in these factors and their effects on milk yield have been analysed by estimating

Figure 1: Trend in Milk Yield at Farm Level in Punjab



Source: Authors' estimates using Cost of Cultivation Surveys data.

the stochastic frontier function with the inefficiency effects model. The summary statistics of the variables used in the model are given in Table 1.

The appropriateness of the stochastic frontier production function with technical inefficiency effects was tested using the generalised likelihood ratio (LR) test for the null hypothesis of absence of inefficiency effects in Cobb-Douglas stochastic frontier production. The computed value of the LR statistic (179.72) was statistically significant at the 1% level of significance (Table 2). This finding implies rejection of the null hypothesis and validates the presence of inefficiency effects in the milk-production process. The results also indicate that the frontier production function is an appropriate representation of data over the traditional average response function (OLS). The maximum likelihood estimates of the stochastic frontier production function and inefficiency model are presented in Table 2. The estimated parameters of the frontier production function give the marginal effects of feed, animal husbandry practices, and breed improvement on milk yield. The inclusion of the trend variable in the production function captures Hicksian neutral technological change (Batessi and Coelli 1995) and accounts for the effect of other omitted factors.

Table 1: Descriptive Statistics of the Variables used in the Model: 2000–01 to 2014–15

Variable	Mean	Minimum	Maximum	Standard deviation
Milk yield (litre/milking animal/year)	1,684.7	460.8	3,960.3	586.3
Labour use (hours/standard animal/year)	359.8	83.8	1,587.0	157.8
Dry fodder (quintal/standard animal/year)	17.6	2.1	189.7	8.9
Green fodder (quintal/standard animal/year)	68.8	11.0	290.2	24.7
Mixed feed (kg/standard animal/year)	152.4	0.0	991.2	151.0
Grains (kg/standard animal/year)	86.2	0.0	837.7	109.2
Minerals & other feeds (kg/standard animal/year)	91.2	0.0	998.6	102.3
Expenses on veterinary services (₹at real prices/standard animal/year)	32.4	0.0	1,419.3	93.7
Standard herd size (no)	6.0	1.0	41.0	4.0
Proportion of cross-bred in herd (%)	19.2	0.0	100.0	27.1
Proportion of milk sold (%)	0.3	0.0	1.0	0.3
Number of schooling years of family head (Years)	7.5	0.0	15.0	4.8
Age of family head (Years)	46.9	20.0	91.0	12.6
Family labour (Numbers)	4.0	1.0	14.0	2.0
Proportion of green fodder grown in own farm (%)	98.2	0.0	100.0	6.8
Proportion of dry fodder grown in own farm (%)	97.6	0.0	100.0	9.9

Source: Authors' estimates using Cost of Cultivation Surveys data.

Adoption of Improved Breeds

Punjab occupies a unique position in India's dairy sector due to its distinct herd composition. The macro-level data shows that cattle account for 53.4% of India's dairy herd, whereas Punjab's dairy herd is dominated by buffaloes, constituting three-fourth of the total in-milk animals (Department of Animal Husbandry, Dairying and Fisheries 2017). Furthermore, in contrast to the national average, cattle stock in the state is dominated by crossbred or exotic animals. The sample households in the state exhibited similar herd composition. The average size of the herd possessed by the sample households was five during 2014–15. About 65% of the dairy animals were buffaloes, and half of the cattle stock was crossbred. Overall, the share of cross-bred animals in the dairy herd (cattle and buffaloes) increased from 19% in 2000–01 to 30% in 2014–15 (Figure 2). The changing composition of the herd towards more productive crossbred animals is expected to result in increased milk yield (Chand and Raju 2008). The positive and significant coefficient of crossbred animals in the frontier production function revealed a positive effect of adoption of crossbred animals on milk yield in the state. The adoption of improved breeds also makes dairy farmers of Punjab more productive than dairy farmers in most other Indian states. Thus, diffusing cross-bred technology by strengthening extension and veterinary services can significantly raise milk yields in the country.

Changes in Feeding and Animal Husbandry Practices

The productivity of dairy animals is directly affected by the amount and composition of feed intake. As expected, feeding animals with green fodder was found to exhibit a positive and significant association with milk yield (Table 2). However, due to the limited availability of green fodder, dairy animals are also fed a diet based on crop residue (dry fodder) along with green fodder. Dry fodder has low nutritive value, and its intake is limited (Garg 2012). The estimated coefficient of dry fodder in the model was negative and significant, which implies

yield loss associated with an excessive quantity of dry fodder in the ration. The use of dry fodder in the animal ration, however, has been declining over time (Figure 2). On the other hand, average consumption of mixed feed has increased 2.27 times during the past 14 years in the state. The association between mixed feed and milk yield was found to be positive and significant. The reduction in the consumption of dry fodder and significant increase in mixed feed positively contributed to milk yield during the study period. The transition from fodder to a mixed feed-based ration is also visible in the reduced share of fodder in the cost of milk production1 from 49.0% in 2000–01 to 41.5% in 2014–15 and the simultaneous increase in the share of mixed feed from 5.9% to 13.2%. Supplementing animal feed with grains and minerals was also found to have a positive marginal effect on milk yield. But, the use of these supplements has declined over time, therefore negating the positive effects of other factors of production (Figure 2). Furthermore, despite a gradual shift from fodder to a mixed feed-based diet, the latter constitutes a dominant share in the cost of milk production. These findings reveal the scope of factors that may increase milk yield by promoting a balanced and nutrition-rich diet to dairy animals.

Dairy is a labour-intensive activity primarily managed by female household labour in India (Swaminathan and Usami 2016). Labour2 accounted for a 20.2% share of the milk production cost in Punjab in 2014–15. The farm-level data has revealed a 26% reduction in labour use in dairy activities between 2000–01 and 2014–15 (Figure 2). But, the declining trend in labour intensity did not have a significant effect on milk yield (Table 2). The reduction in labour use with no effect on milk yield implies the rising modernisation of animal husbandry practices leading to savings in labour. Such results also imply rising labour productivity in dairy farming in the state. However, 75% of the reduction in labour use was due to the curtailment of male labour working hours. Consequently, the share of female working hours in total labour use increased from 51% in 2000–01 to 63% in 2014–15. Such findings suggest the increasing feminisation of the dairy sector in the state.

The marginal effect of expenses towards veterinary and medical services was positive but insignificant. This could be because a meagre amount of money is spent on these services by the farmers. Interestingly, expenses towards veterinary services constituted only a 0.22% share in the total cost of producing milk in Punjab during 2014–15. In addition to the previous results, a positive and significant coefficient of the trend variable indicates technological improvement in animal husbandry practices at the household level.

Table 2: Estimated Parameters of the Stochastic Frontier Production Function with Inefficiency Effects Model

Stochastic Production Function Model		Inefficiency Model	
Variable	Coefficient	Variable	Coefficient
Intercept	7.2693***	Intercept	0.6152***
	(0.1323)		(0.1420)
Labour use	0.0050	Proportion of milk sold	-0.2708***
	(0.0172)		(0.0270)
Green fodder	0.0525***	Herd size	0.0010
	(0.0155)		(0.0020)
Dry fodder	-0.0406***	Age	0.0001
	(0.0122)		(0.0005)
Mixed feed	0.0285***	Family labour	-0.0110***
	(0.0028)		(0.0042)
Grains	0.0158***	Education	-0.0026*
	(0.0027)		(0.0014)
Minerals & other feeds	0.0308***	Home grown green fodder	-0.0005
	(0.0030)		(0.0009)
Crossbred animals	0.0013***	Home grown dry fodder	0.0001
	(0.0003)		(0.0007)
Veterinary expenses	0.0014	Trend	0.0160***
	(0.0027)		(0.0068)
Trend	0.0321***		
	(0.0061)		
Model Summary Statistics			
Sigma-squared ($\sigma 2$)			0.1093***
			(0.0044)
Gamma (γ)			0.7058***
			(0.0914)
Number of observations			3979
Log-likelihood function			-1048.44
LR test			179.72***
Estimated average technical efficiency			0.5835

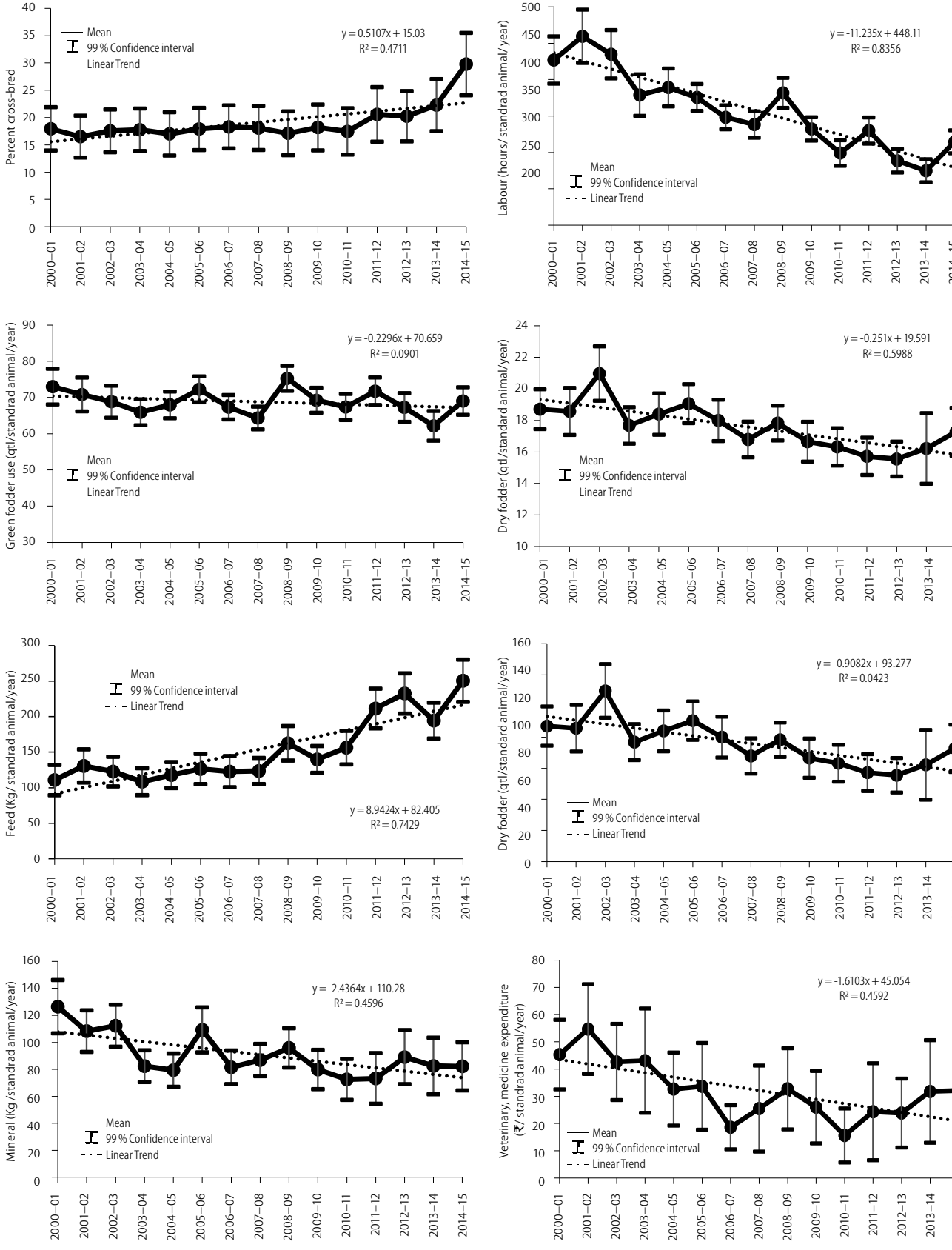
Figures within parentheses are standard error of estimated variables.
***,**, * indicate at 1%, 5%, and 10% level of significance.
Source: Authors' estimates using Cost of Cultivation Surveys data.

Efficiency in Dairy Farming

Improving efficiency in milk production is an important source of raising the yield level at a given level of input use. The estimated value of γ was 0.7058 and was significant at a 1% level of significance (Table 2). This implies that the inefficiency effect (u_i) accounts for 70.58% variation in the residual error, and random error (v_i) accounts for the remaining variation. The predicted average efficiency in milk production in Punjab was 58.35% from 1996 to 2014. Interestingly, the estimated value of the trend variable in the inefficiency model, which captures change in inefficiency with respect to time, was positive and significant. This implies a reduction in efficiency in milk production over time in the state. As shown in Figure 3a, technical efficiency has declined from 63.96±1.91% in 2000–01 to 54.74±2.10% in 2014–15. The declining level of efficiency implies a potential loss in milk yield at a given level of input use.

Efficiency in milk production also exhibited wide heterogeneity among farmers in the sample. The cumulative distribution curve for 2014–15 revealed a variation in efficiency from 26.81 to 83.33% (Figure 3b). Based on technical efficiency of the most efficient farmer (for the period 2014–15), the average

Figure 2: Transitions in Adoption of Crossbred Animals and Feeding and Animal Husbandry Practices in Punjab, 2000–01 to 2014–15



Source: Authors' estimates using Cost of Cultivation Surveys data.

Figure 3a: Trend in Estimated Technical Efficiency in Milk Production, 2000–01 to 2014–15

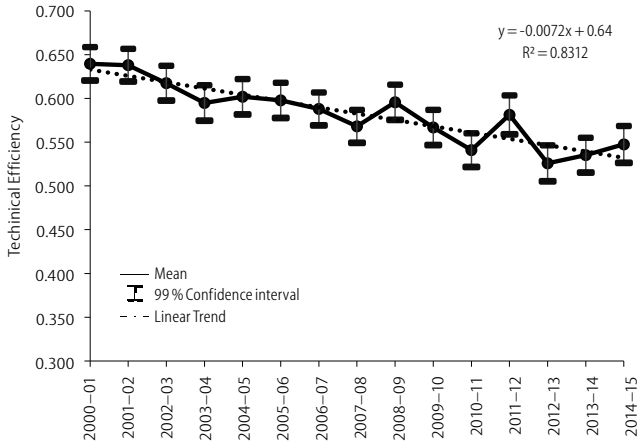
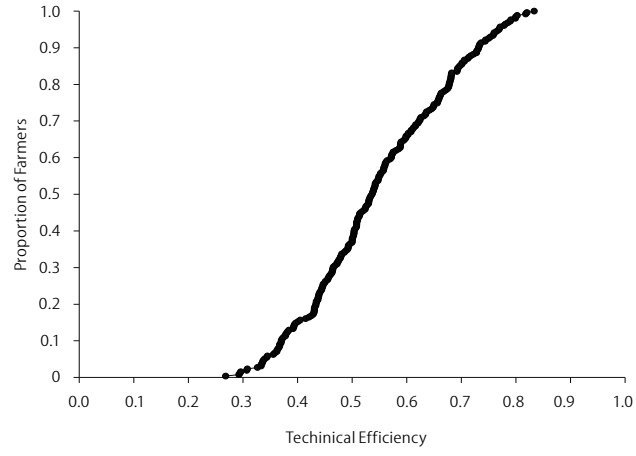


Figure 3b: Cumulative Distribution Curve of Estimated Technical Efficiency in Milk Production in 2014–15



Source: Authors' estimates using Cost of Cultivation Surveys data.

potential to raise milk yield through efficiency improvement was calculated as 34.31%. In other words, average milk yield in Punjab can be improved up to 34.31% without increasing the existing level of input use if the average farmer achieves the efficiency level of its most efficient counterpart. Such findings assume greater importance for the agriculturally most developed state, Punjab, where farming has become more input-intensive (Bhalla and Singh 2009). Thus, the strategy to raise productivity shall emphasise measures to improve input use efficiency rather than increase input intensity in dairy farming.

In order to devise such measures, determinants of efficiency were identified from the estimated parameters of the inefficiency model (Table 2). The proportion of milk sold was found to be negatively and significantly associated with inefficiency. This implies that farmers with a high degree of market participation were more efficient in milk production. Thus, improvement in market infrastructure at the village level would make dairy farming more efficient and productive. The size of the herd did not significantly influence efficiency. The scale-neutral nature of efficiency is expected because farmers practice dairy as a supplementary activity and thereby are unable to extend extra care and attention to rearing animals in case of large herd size. The age of the family head was not found to be significantly associated with efficiency. However, availability of family labour for animal husbandry operations was found to be positively associated with efficiency in milk production. Similarly, education of the family head positively and significantly influenced efficiency, which underscores the need to improve education and spread knowledge about efficient animal husbandry practices. The source of fodder (purchased versus home-grown) was assumed as an important determinant of efficiency. However, the coefficients of the proportion of home-grown green and dry fodder in total fodder use were insignificant in the model. This could be due to the fact that all farmers in the sample met almost all fodder demand out of their own produce and were least dependent on the market. This also implies strong complementarity between crop and dairy farming in the state.

Conclusions

Farm-level evidence has revealed a rising trend in milk yield in Punjab during the past 14 years. The increase is primarily driven by the rising adoption of cross-bred cattle and the changing composition of animal rations from dry fodder to mixed feed. Other supplements, like grain and minerals, also exhibited a positive association with milk yield, but their consumption is declining over time. Despite increasing diversification, animal ration is still dominated by fodder in the state. The evidences point out the scope of factors to promote a balanced and nutrition-rich diet for raising yield levels, even in the developed states like Punjab. The positive association between milk yield and cross-bred animals supports the argument of diffusion of cross-bred technology to realise higher milk yield. A meagre expenditure on veterinary services highlights the poor condition of veterinary infrastructure and the dairy farmers' lack of attention to animal health. Improvement in veterinary infrastructure and extension services would go a long way in strengthening the dairy sector. Nevertheless, dairy farming in the state is modernising and achieving labour saving without any adverse effect on milk yield. Evidence has revealed the rising share of female labour in animal husbandry activities.

The rise in milk yield was found to be accompanied by a decline in efficiency. Thus, dairy farmers are losing the opportunity to produce higher milk yield at a given level of input use. The results have revealed that bridging the yield gap among the dairy farmers can raise the milk yield up to 34.31% without increasing the existing level of input use or cost. The strategy to raise productivity shall therefore emphasise improvements to input-use efficiency over increased input intensity. Increased market participation, education level of dairy farmers and availability of family labour were significant determinants of efficiency in milk production.

NOTES

1 Cost of milk production includes expenses incurred on items such as fodder (dry and green), grains, mixed feed, mineral and concentrates, veterinary and mating charges, labour, depreciation, and interest per standard animal.

2 The cost of family labour was imputed based on prevailing wages in the village.

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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 while the index for manufactured products decreased by 0.4% compared to 2.3% .

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 and that of industrial workers (CPI–IW) to 7.5% in January 2020 from 6.6% .

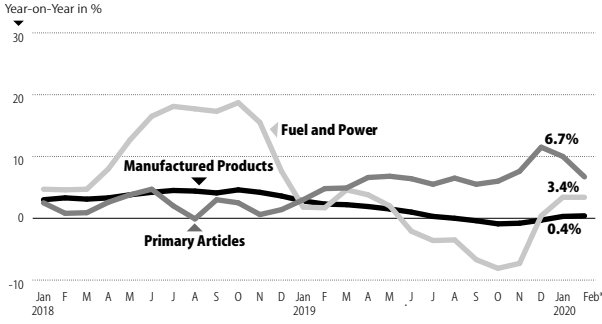
Foreign Trade

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 2.2% in January 2020 from 1.5% registered a year ago. Production of coal rose by 8.0%, refinery products by 1.9% and electricity generation by 2.8% against 2.0%, -2.6% and 0.8%, respectively, reported a year ago. Growth in the crude oil sector decelerated to -5.3%, natural gas to -9.1%, and fertilisers to -0.1% from their respective growth rates of -4.3%, 6.2%, 10.5% . Steel production slowed down by 2.2% and cement by 5.0% compared to their respective growth rate of 5.5% and 11.0%.

Movement of WPI Sub-indices January 2018–February 2020



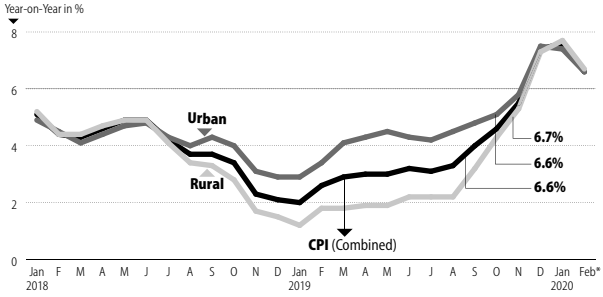
* Data is provisional; Base: 2011–12 = 100.

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) #		330.0	0.0	7.5	3.1	5.4
Agricultural labourers (1986-87=100)		1010.0	-0.6	10.1	2.2	2.1

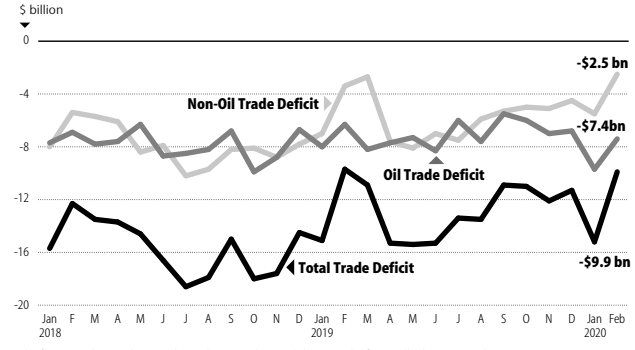
* Provisional; # January 2020; Source: NSO (rural & urban); Labour Bureau (IW and AL).

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

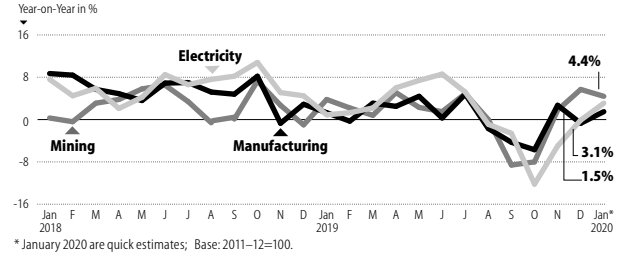
Data is provisional. Source: Ministry of Commerce and Industry.

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 January 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@	2.3	2.2	4.3	4.4
Coal	10.3	7.8	8.0	2.6	7.4
Crude oil	9.0	1.7	-5.3	-0.9	-4.1
Natural gas	6.9	-0.4	-9.1	2.9	0.8
Petroleum refinery products	28.0	3.0	1.9	4.6	3.1
Fertilisers	2.6	-3.3	-0.1	0.0	0.3
Steel	17.9	-1.4	2.2	5.6	5.1
Cement	5.4	3.0	5.0	6.3	13.3
Electricity	19.9	3.2	2.8	5.3	5.2

(Base: 2011–12=100); *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	13 March 2020	15 March 2019	31 March 2019	Variation Over Month	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	3321128	2624800	2675640	156418	696328	17210	645489	322660	218620	25300	353270	68050
$ mn	448807	379235	386814	5428	69572	-21747	61993	40486	16297	10160	53217	-14168

Monetary Aggregates

₹ crore	Outstanding 2020	Variation Over Month	Over Year	Financial Year So Far 2018–19	Financial Year So Far 2019–20	Financial Year 2016–17	2017–18	2018–19
Money supply (M_3) as on 28 February	16464808	45878 (0.3)	1410785 (9.4)	1091436 (7.8)	1032741 (6.7)	1174310 (10.1)	1170657 (9.2)	1469480 (10.5)
Components								
Currency with public	2255771	36844 (1.7)	227858 (11.2)	268200 (15.2)	203561 (9.9)	-333130 (-20.9)	495583 (39.2)	292497 (16.6)
Demand deposits	1584414	28760 (1.8)	168600 (11.9)	-67899 (-4.6)	-42099 (-2.6)	406920 (41.1)	86963 (6.2)	142800 (9.6)
Time deposits	12590066	-20426 (-0.2)	1007377 (8.7)	887433 (8.3)	868463 (7.4)	1094920 (12.1)	585266 (5.8)	1026347 (9.6)
Other deposits with RBI	34558	702 (2.1)	6950 (25.2)	3701 (15.5)	2816 (8.9)	5640 (36.5)	2817 (13.4)	7835 (32.8)
Sources								
Net bank credit to government	4983887	-30683 (-0.6)	453860 (10.0)	528628 (13.2)	595397 (13.6)	618120 (19.1)	144799 (3.8)	387091 (9.7)
Bank credit to commercial sector	10759459	5443 (0.1)	639554 (6.3)	906190 (9.8)	376740 (3.6)	608420 (7.8)	802225 (9.5)	1169004 (12.7)
Net foreign exchange assets	3691166	122095 (3.4)	716153 (24.1)	52717 (1.8)	620325 (20.2)	24510 (1.0)	364066 (14.2)	148545 (5.1)
Banking sector's net non-monetary liabilities	2995983	51017 (1.7)	399219 (15.4)	396289 (18.0)	560113 (23.0)	79910 (4.0)	140995 (6.8)	235395 (10.7)
Reserve money as on 13 March	3028987	51140 (1.7)	264522 (9.6)	345685 (14.3)	258505 (9.3)	-280260 (-12.9)	518300 (27.3)	351702 (14.5)
Components								
Currency in circulation	2399983	53287 (2.3)	258449 (12.1)	312186 (17.1)	263212 (12.3)	-328193 (-19.7)	494078 (37.0)	307423 (16.8)
Bankers' deposits with RBI	592829	-4895 (-0.8)	-2339 (-0.4)	29643 (5.2)	-9140 (-1.5)	42290 (8.4)	21405 (3.9)	36444 (6.4)
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 RBI credit to Government	1023925	26378 (2.6)	102599 (11.1)	445362 (93.6)	221974 (27.7)	195810 (46.1)	-144836 (-23.3)	325987 (68.5)
of which: Centre	1017813	28625 (2.9)	98138 (10.7)	445389 (93.9)	217340 (27.2)	195030 (45.9)	-145304 (-23.5)	326187 (68.8)
RBI credit to banks & commercial sector	-264881	24700 (-8.5)	-356819 (-388.1)	28565 (45.1)	-417732 (-273.3)	-613810 (-201.6)	372643 (0.0)	89478 (0.0)
Net foreign exchange assets of RBI	3552965	156594 (4.6)	745711 (26.6)	46473 (1.7)	704378 (24.7)	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	1309337	156567 (13.6)	227442 (21.0)	174905 (19.3)	250542 (23.7)	-120840 (-12.7)	73650 (8.8)	151805 (16.7)

Scheduled Commercial Banks' Indicators *(₹ crore)*

(As on 28 February)	Outstanding 2020	Variation Over Month	Over Year	Financial Year So Far 2018–19	Financial Year So Far 2019–20	Financial Year 2016–17	2017–18	2018–19
Aggregate deposits	13331705	7550 (0.1)	1101054 (9.0)	804602 (7.0)	757933 (6.0)	1430370 (15.3)	668389 (6.2)	1147723 (10.0)
Demand	1465470	27988 (1.9)	163867 (12.6)	-68679 (-5.0)	-45817 (-3.0)	392440 (44.1)	88842 (6.9)	141005 (10.3)
Time	11866235	-20438 (-0.2)	937186 (8.6)	873281 (8.7)	803751 (7.3)	1037920 (12.3)	579548 (6.1)	1006716 (10.0)
Cash in hand	81982	329 (0.4)	13420 (19.6)	8497 (14.1)	7105 (9.5)	3920 (6.8)	-1295 (-2.1)	14812 (24.7)
Balance with RBI	550033	-671 (-0.1)	53681 (10.8)	-29334 (-5.6)	-15674 (-2.8)	121330 (31.3)	16906 (3.3)	40021 (7.6)
Investments	3778170	42680 (1.1)	369028 (10.8)	90688 (2.7)	397114 (11.7)	405440 (15.4)	287494 (9.5)	62602 (1.9)
of which: Government securities	3769042	38326 (1.0)	361088 (10.6)	90548 (2.7)	390041 (11.5)	405820 (15.5)	287656 (9.5)	61595 (1.9)
Bank credit	10104980	2412 (0.0)	584527 (6.1)	895028 (10.4)	333257 (3.4)	591840 (8.2)	783965 (10.0)	1146298 (13.3)
of which: Non-food credit	10039384	15715 (0.2)	574575 (6.1)	881373 (10.3)	309271 (3.2)	643170 (9.0)	795906 (10.2)	1146677 (13.4)

Capital Markets

	20 March 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 2016–17	2017–18	2018–19
S&P BSE SENSEX (Base: 1978-79=100)	29916 (-22.1)	41170	38387 (16.3)	28288	41953	33019	38897	29621 (16.9)	32969 (12.1)	38673 (17.3)
S&P BSE-100 (Base: 1983–84=100)	8827 (-24.6)	12195	11701 (11.5)	8364	12456	10266	12036	9494 (21.2)	10503 (11.5)	11809 (12.4)
S&P BSE-200 (1989–90=100)	3684 (-24.1)	5093	4856 (9.6)	3491	5185	4273	5043	3992 (22.5)	4433 (12.0)	4908 (10.7)
CNX Nifty-50 (Base: 3 Nov 1995=1000)	8745 (-24.1)	12081	11521 (13.8)	8263	12362	10030	11739	9174 (18.5)	10114 (11.1)	11624 (14.9)
CNX Nifty-500	7160 (-25.0)	9959	9553 (7.1)	6807	10119	8417	9992	7995 (3.3)	8912 (12.6)	9664 (8.4)

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

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