Opinion

SATURDAY, AUGUST 31, 2019

MANN KI BAAT

Prime Minister of India, Narendra Modi

There must be a constant and continuous dialogue between individuals and organisations irrespective of one's thought process. We need not have to agree on everything but there must be enough civility

Opening healthcare's third AI

Google's work with deep-learning for diagnostics offers a glimpse into how AI can revolutionise healthcare

GOOGLE'S DEEP-LEARNING research, involving a large dataset of retinal images used in diagnosis of diabetic retinopathy (DR), a diabetes-linked pathology that causes irreversible blindness, shows the transformative power of artificial intelligence (AI) in healthcare. In 2016, the tech giant announced its deep-learning algorithm that had been trained using a dataset of 128,000 images—each of which had been reviewed by 3-7 expert ophthalmologists from a panel of 54—to accurately interpret underlying symptoms (microaneurysms, haemorrhages, hard exudates, etc) from fundus images (a specific type of imaging of the eye) and detect referable DR. Given the pathology affects 18% of the 70 million diabetics in India—and with 415 million diabetics worldwide, is now the fastest growing cause of blindness—Google's algorithm vastly improves the prospects of DR being screened by doctors faster, and in greater numbers than is possible in an unassisted scenario. For countries strained for resources and healthcare infrastructure, this is truly a manna since diagnosis in the early stages can prevent/delay onset of blindness. The algorithm's performance was tested with ~12,000 images, with the majority opinion of panels of expert ophthalmologists drawn from Google's pool of 54 on each of these images set as the reference standard. The panel members had been selected on the basis of high consistency of accurate diagnosis. The algorithm's performance on diagnosing the disease and its severity, in terms of combined sensitivity and specificity matrix, was 0.95 (the highest score possible being 1), slightly above the median score of 0.91 for the ophthalmologists who were part of the tests. Google has since been working with retinal specialists to build even more robust reference standards, including focussing on 3D retinal images. It is running field trials for AI-assisted diabetic retinopathy screening in Sankara Nethralaya and Aravind Eye Hospital in India. Further, research by the company showed that its algorithm is capable of aiding doctors in detecting cases that they would have otherwise missed; what makes this machine-human collaboration even more exciting is the fact that the company's researchers found that the highest accuracy was recorded when the algorithm complemented the skills of the doctor rather than an algo-alone or doctor-alone scenario.

Last year, the company showed how retinal images used in DR diagnosis can be used to detect risk of cardiovascular (CV) disease. Using images from nearly 300,000 DR patients, Google was able to train another deep-learning algorithm to ascertain risk of an adverse CV event with high accuracy for two data-sets of 12,026 and 999 patients. Not only was the algorithm able to distinguish between the retinal images of a smoker and a non-smoker while doctors can make out the difference between retinal images of patients with high blood pressure and those having normal blood pressure, it was also able to predict the blood pressure in each case with a very narrow margin of error. The trained model correctly predicted a patient's risk of cardiovascular disease over five years, from the image having been developed, 70% of the time. This was close to the performance of other traditional risk-calculation protocols with invasive tests (involving blood drawing, etc). The Google deep learning system, thus, not only complements the skills of healthcare professionals, but also pushes the boundaries of what healthcare can achieve in real time. If this is the potential from just one tech company's research, imagine the gains from the gamut of AI work happening at the moment, and not just in healthcare.

Prejudiced policing

Report exposes bias in minds of cops against Muslims

SEVERAL STUDIES HAVE, over the years, showed that a higher proportion of Muslims—relative to their population-share—tend to get arrested than most other religious/caste groups. In November 2016, for instance, *The Indian Express* reported that, at an all-India level, 15.8% of all convicts were Muslims as compared to their population share of 14.2%; and in the case of undertrials, the proportion of Muslims was an even higher 20.9%. In certain states, this ratio was a lot more adverse. In Maharashtra, for instance, while 12% of the population was Muslim, 20% of all convicts—and 30% of all undertrials—were Muslim; in Gujarat, Muslims were 10% of the population versus 21% of all convicts, and 22% of all undertrials. In Uttar Pradesh, the figures were 19%, 19% and 27%, respectively; it was 27%, 42% and 47% in the case of West Bengal. While the population data was from the 2011 Census, the criminal data came from the National Crime Records Bureau (NCRB).

A recent study—*Status of Policing in India Report*—brought out by Lokniti, CSDS and Common Cause explains this by showing how deep the communal prejudice is. Around half of the 12,000 police personnel surveyed across 21 states believed that Muslims are "naturally prone", in degrees varying from "very much" to "somewhat", to committing criminal acts. The bias was strongest in northern and central India, with an average of 63% of the police personnel in eight states in this region—Haryana, Uttar Pradesh, Madhya Pradesh, Bihar, Maharashtra, Jharkhand, Chhattisgarh, and Uttarakhand—believing that followers of Islam naturally have a criminal disposition.

While profiling on the basis of community or caste is not desirable, several law enforcement agencies the world over do some form of this, even if this is never explicitly acknowledged. But, surely this has to be based on a more serious analysis of crime and criminals? Though there has been an attempt to do this through the Crime and Criminal Tracking Network and Systems, the scientific profiling is, at best, patchy. An average of only 68% of police data from various districts and states is available at the national level; further, forensic psychology, including profiling, is conspicuous by its absence in Indian law enforcement and criminal justice system.

Analysis by Shylashri Shankar of the Centre for Policy Research found that while in the TADA and Preventive Detention cases, there was a 19% increase in the probability of a pro-government outcome when the case pertained to security concerns, this probability doubled in the case of POTA. Given the arrest of innocent Muslims may certainly be a factor in aggravating communal polarisation, this is an issue the government needs to look at quite seriously, apart from the fact that it makes a mockery of legal and constitutional equality.

Prosperity PARADOX

India Child Well-being report highlights that prosperity is not the only parameter for children's development

AT FIRST GLANCE, the report on child well-being in India, released by World Vision India and IFMR Lead, speaks well of the state of India's children, but a closer look reveals gaps in performance of even the prosperous states. Using the same methodology as HDI, the report offers a composite index for child well-being. While Kerala (0.76) and Tamil Nadu (0.67) have the best showings, Jharkhand and Madhya Pradesh, known human development laggards, are at the bottom. The report also presents separate indices, and, here, some of the well-governed, and otherwise developed states fall short. The report finds that states like Maharashtra and Gujarat, which have high incomes (prosperity), fare poorly in terms of some indicators. Maharashtra (0.56) is at the 21st position, and Gujarat (0.55) is placed 22nd.

Besides, overall rankings do not directly correlate with performance on individual factors. West Bengal, for instance, is placed 11th on the composite index, but ends up having a higher position on the health development indicator. In terms of positive relationships—bonds at the community and other levels that contribute to a child's well-being—Kerala slips down to 8th position, Maharashtra and Telangana perform poorly. Interestingly, six of the seven north-eastern states—excluding Sikkim—are in the top seven. In the third dimension, protective contexts, which observes children's livelihood and its effect—from exploitation and education to adolescent pregnancy—Sikkim leads other states. The report, thus, highlights the need for regionally-targeted policy reorientation to better cater to children's needs. To ensure that India's future generation is physically healthy and mentally sound, it is crucial that states acknowledge and address the nuances of their strengths and shortcomings.

NO PROOF REQUIRED

WE WILL ALL MISS ARUN JAITLEY VERY MUCH—FOR HIS NON-PARTISAN FRIENDSHIP, HIS INTELLECT & HIS IMMENSE CONTRIBUTIONS TO POLICY MAKING. ABOVE ALL, HE WAS A BRILLIANT IDEAS MAN

Jaitley: Politician savant

SURJIT S BHALLA

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Views are personal

ARUN JAITLEY, A keen legal, political, economic and cricket mind, passed away way before his time at the young age of 64. He was also friend and mentor to many, and was part of the BJP trinity of Modi-Jaitley-Shah. Arun Jaitley had many leadership attributes, but in my opinion, in the main, he was a policy ideas man.

India will feel his contribution for a long, long, time. Both Goods and Services Tax (GST) and bankruptcy code are mega financial sector reforms, and possibly the most impactful. I want to briefly discuss his contribution and leadership towards making reforms happen.

GST: India's adoption of GST was not Jaitley's brainchild, but he certainly was the one who made it possible. There was a lot of opposition from the states, and from politicians of all hues. Its passage needed cajoling, negotiation, and single-minded pursuit. It required a constitutional amendment, and support from the Opposition. If you look at political leaders of all parties, the one who is respected, and befriended by all was Mr Jaitley. Both ex-post and ex-ante, Jaitley was born to make this legislation possible.

Via adoption of GST, the world learnt of another remarkable attribute about Jaitley—the ability to own up to mistakes, and work towards rectification. It is difficult to conceive of a mistake-less economic reform, particularly in implementation. The GST had too many rates, and mishaps were not properly accounted for. It had to be learning by doing, and it was. Never once did the finance minister claim that things were working well; exporters not getting their credit in time—true, and we will address that problem. And, Ms Sitharaman has promised that all past dues will be paid within the next three months. Too many rates—also acknowledged, and the GST council, led by Jaitley, repeatedly cut rates. Again, no excuses were offered other than the realistic apology that the GST decisions, given the federal nature of the tax, and the economy, had to be broadly by consensus. But India has seen more adjustments in the GST law, and with zero flip-flops (to date), than any reform in recent memory.

Policy making, even by the best, is never perfect. It is not my case, nor of any other admirer of Jaitley, that he made all of the right decisions at the right time. But, not only was he most open to criticism, he was actually very good-humoured about it. I remember the July 2014 Budget, the maiden budget of the Modi government. Mr. Modi had run a very successful political campaign against UPA economics, and one of the "jewels" of UPA policy was the retrospective tax. Everyone expected the tax to go, but it stayed there. When confronted, Jaitley smiled it off, took blame rather than point to any bureaucrat, and said it will be changed in due course.

Here, again, is a lesson for all of us recommending, or changing economic policy. The power of the bureaucracy is quite supreme. That it should be so, and was so, in 1947 is well understood. But, why that should be the case in 2004, or 2014, or 2019 is something that historians and psychologists should jointly consider.

I never worked for, or with, Arun Jaitley. Over the years, we have met at seminars. From my side (at least) there was a strong interest in establishing "contact" with Arun, especially since our interests overlapped so much. A law degree was my choice when very young; I am sure (I think!) that Mr Jaitley, at some time or another, must have wished that he was an economist! We both had a strong and passionate interest in cricket—he bought me two tickets for a match at Ferozshah Kotla some 20 years ago. And, that ticket came my way after a discussion over cricket. As it now transpires, and deservedly so, Ferozshah Kotla is going to be renamed the Jaitley stadium.

My real bond with Jaitley (again from my side) was in our obsession with policy *ideas*. The subjects for passionate discussion were economics, politics (elections) and cricket. I had asked him twice, in reasonably quick succession, to launch my books on education and the middle class (*The New Wealth of Nations*, November 2017) and *Citizen Raj* (April 2019). He readily agreed to be the guest of honour for both books, and I was particularly grateful in April for Mr Jaitley attending, launching, and staying on for the discussion, despite being ill.

He had very sound ideas about elections. Since a long time, he had been maintaining that 2019 would be a Presidential-type election. It was. That the aspirational middle class would decide the election. It did. And that PM Modi's inclusive growth agenda would win him the hearts and minds of the Indian electorate—right again. And, substantiated rumour has it that his estimate of BJP victory was very, very, close to the actual.

> **The real loss to the nation, his party, and even non-supporters, is that he was rudely taken away so much before his time**

That policy making is never perfect, even with the best of minds and the best of intentions, is illustrated by two "mishaps" in economic policy under Jaitley's stewardship. The first mishap occurred with the guarantee of 14% annual return in GST revenue for the states for five years from the date of implementation in July 2017. Nominal growth in GDP has averaged close to 10.5% from that date. That is a loss of approximately ₹45,000 crores annually to the Centre.

How much can this loss be attributed to an over-eager centre wanting to get a mega economic reform under their belt? Was Jaitley a bad negotiator? No. The 14% guarantee seemed the most expected reality at that time. Nominal GDP had grown by an average of 14% over the previous five years. The newly formed Monetary Policy Committee (the main "arbitrator" of inflation rates in India) was predicting accelerating inflation and, hence, 14% growth in GST revenues, did not seem such a stretch. It is another story that the MPC (and associated economists) got their inflation forecast horribly wrong for the next 2+ years, and possibly at least the next 5+ years, and beyond.

The "institution" of MPC may not have been much of a reform at all. Again, a reality check-mate on a reform that on paper seemed reasonable. The UPA regime had unleashed a decade of, historically, the highest annual inflation in India, even higher than that in the wake of the global high inflation decade of the 1970s (induced by the quadrupling of the price of oil in October 1973). This was also the period of the highest fiscal deficits. Economists put two and two together and reached five.

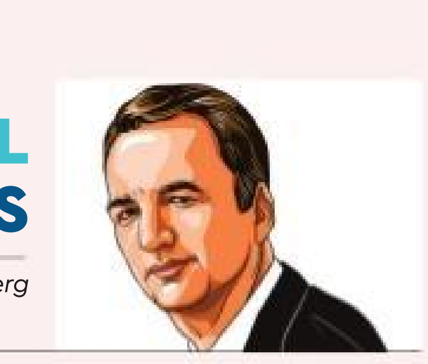
Fiscal policy is about taxation and expenditures. On expenditure, the restraint shown by Modi-Jaitley has been exceptional—and from my point of view, too exceptional. Unfortunately, the fiscal hawks (including those in the Bimal Jalan committee!) do not give the duo enough credit for the fiscally responsible path they have followed. I have already documented the path-breaking nature of GST reform. The first major direct tax reform was also initiated and inspired by Jaitley. Direct taxes were reduced in the 2019 interim budget; this was the first reduction in 22 years. Second, Jaitley announced that the goal of the government was to tax all corporates at a 25% rate. Hopefully, we will reach, and exceed, his target soon.

Mr Jaitley was an optimist, and someone who always saw possibilities for India well before most others. It is also remarkable (and a tribute to Jaitley's genius) that when no one saw potential in Modi post the 2002 Godhra riots, Jaitley was prominently by Modi's side. His ability to accurately size up individuals came across when he described me as a one-handed economist. Not sure he meant it as a compliment, but I took it as one—and he was accurate!

They say, and research proves, that an optimist lives much longer than a pessimist. The real loss to the nation, his party, and even non-supporters, is that he was rudely taken away so much before his time.

What if there was a trade war truce?

Views on whether the trade impasse can be bridged vary with Trump's every second tweet. Beijing is right to be wary of his flip-flops



DANIEL MOSS

Bloomberg

EVEN A TRADE truce could have its losers. The economic conflict between the US and China has been jarring, no doubt—decades-old commercial relationships have been torn up, supply chains are getting upended, global growth is slowing, and investors and businesses are rattled. On days when the standoff seems endless, you might find yourself asking: Can't we just go back to the way things were?

But that view would dismiss the relative winners of this conflict, particularly those countries in Southeast Asia that have attracted investment otherwise destined for China. Just this week, the Nikkei Asian Review reported that Google Inc is taking steps to shift production of its Pixel smartphone to Vietnam from China. Shipments to American ports from Asia, excluding China, jumped in the first six months of the year, while imports from the mainland declined. An outbreak of trade peace, or a meaningful suspension of hostilities, could jeopardise this.

In its annual review of China's economy this month, the International Monetary Fund gamed out some scenarios for a trade deal. The baseline for such an agreement would likely aim to steer the trade balance between the countries toward zero. At the very least, it would try to make a big dent in the $419 billion US merchandise deficit with China.

The IMF's outlined scenario would see China buy more American cars, machinery and electronics; yet the lender found that it is unlikely Beijing will stimulate its economy so much that it can absorb enough US goods without cutting back elsewhere. South Korea and Singapore—which both count China as their largest trading partner—stand to lose exports equal to about 2.1% and 3.8% of gross domestic product, respectively, under such a trade agreement, the IMF reckons.

Australian mineral exports would suffer, too, as would electronics sales from Southeast Asian countries such as Malaysia. "The impact on global GDP from the distortions introduced by a trade deal would likely be negative and weigh against the benefits from reduced policy uncertainty, the withdrawal of higher tariffs, and the introduction of new reforms," the IMF wrote.

While the biggest downsides would be felt in Asia, the disruption wouldn't be limited to the region. More purchases of US aircraft could affect France, in particular, given that Airbus SE is Boeing Co's main competitor.

This isn't to say that the IMF, a champion of free-market orthodoxy, has become an advocate of trade war. Rather the lender would prefer a pact that isn't based on quotas or scaling up of specified purchases (though its concrete alternative isn't immediately clear).

> **The IMF, a champion of free-market orthodoxy, has become an advocate of trade war. Rather the lender would prefer a pact that isn't based on quotas or scaling up of specified purchases**

Of course, you could argue that the Asia region may have been better off if the trade war hadn't started at all. But that risks ignoring some of the larger forces shaping the global economy long before President Donald Trump's election: the sustainability of the US's record expansion, the sunset of China's double-digit growth boom, and ageing populations in Europe and North Asia.

Views on whether the trade impasse can be bridged vary with Trump's every second tweet. Beijing is right to be wary of his flip-flops. As the economic damage from the trade war becomes more apparent, however, it's worth considering whether peace would necessarily be the nirvana some are expecting come January 2021. While the Treaty of Versailles was better than the trenches, it also had serious some flaws.

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LETTERS TO THE EDITOR

A cry for peace

Pakistan's all-out attempts to internationalise the Kashmir dispute in the wake of the abrogation of Article 370, its decision to close its airspace to India, its latest test firing of a nuclear-capable surface-to-surface ballistic missile and India's threat to review its No First Use nuclear policy, its posture that PoK is the only dispute that remains to be settled and its intelligence agencies' warning of a possible entry of Pakistan-trained commandos with underwater strike capabilities into the Gulf of Kutch area and sabre-rattling by both sides conspire to fill us with alarm at the prospect of a war. We cannot simply afford to be indifferent to the storm clouds of war gathering over the subcontinent inhabited by one-fifth of the world population. It is a truism to say that a clash, a conflict or a confrontation between nuclear-armed powers will have catastrophic consequences; still, it needs to be reiterated for the umpteenth time to defuse the situation before it reaches flashpoint. When nuclear powers fight, the question of one country matching or not matching the military might or superiority of the other country does not arise. The end result of a conflict fought with nuclear arms or a nuclear conflagration is nothing short of annihilation. New Delhi and Islamabad should guard themselves against matching provocation with overreaction. No doubt nationalism and religion command a lot of devotion from millions of people, but they cannot desensitise them to the dangers of a military spiral.

— G David Milton, Maruthancode

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India's innovation compulsion

The recent stimulus has offered temporary relief; however, to achieve lasting robustness, the economy needs a big dose of creativity

HARSHAVARDHAN NEOTIA

The author is president, AIMA, and chairman, Ambuja Neotia Group

ILLUSTRATION: ROHNIT PHORE

INDIA'S ECONOMY IS growing steadily despite global headwinds and is set to recover from the current setbacks soon. But the country must not waste another crisis. India has an opportunity to innovate its way out of trouble and chart a faster course for growth. Innovation spawns strong cycles of investment and consumption, and gives new competitive advantages to an economy.

Next month's National Management Convention, the All India Management Association's annual event, aims to nudge India's business and policy leadership towards innovation-led policies. Many government and business leaders will present their ideas on a range of innovation issues concerning economic reforms, infrastructure, investment, trade, technology, job creation, entrepreneurship, etc.

If India is to nearly double its economy over the next five years, fundamental policy and business innovations are needed. The recent stimulus has offered temporary relief, but to achieve lasting robustness the economy needs a big dose of creativity.

Knowledge is replacing capital and labour as the key factor of production and competitiveness. The new economy is about value-creation and not value-extraction, and the future belongs to companies with intellectual assets. Today, the most powerful global companies are innovation warriors that have very low capital and labour intensity.

India has to accelerate its climb up the innovation ladder to ensure continuity of economic growth. The country ranks 57th among 126 nations surveyed for Global Innovation Index. That is both good and bad. Although India has done well for a low-middle income country, its ranking is not commensurate with the nation's aspirations and growth needs. While it ranks number one on ICT services exports, sixth on engineering and science graduates, and 18th on global R&D companies, it ranks 80th on political and business institutions, 56th on human capital and research, 64th on innovation linkages and knowledge absorption, and 43rd on knowledge creation and diffusion. Clearly, it's time for India to get its capabilities in line with its ambitions.

Intellectual property creation is basic to building an innovation economy. India is a laggard in patent applications—for every $100 billion of GDP, India has less than 200 patent applications compared to 6,000 in China. In 2017, according to UN's WIPO report, India awarded 12,400 patents and 86% of those patent approvals were obtained by foreigners.

India could deepen its pool of foreign innovators by getting creative with its FDI practices. America's tariffs and technology bans on China are forcing global companies to look for alternative bases in Asia, but India is not attracting many of them. We could learn from Vietnam, which is offering ready-to-move-in industrial sheds with allied utilities and logistics for quick transfer of production out of China. FDI works better when it is built around market linkages and not just on cost arbitrage.

The key to becoming an innovative nation is to reward disruptors and not the establishment. The US, Europe, Japan, Israel and now China have become innovation powerhouses because they favour value-creators over rent-seekers. The Silicon Valley has been a model innovation ecosystem because the start-ups can focus on creating new ways of producing and consuming things and get rich doing it.

Government spending on basic research is critical for developing an innovation ecosystem. Internet, GPS, digital assistant, touchscreen were all developed with American government's funding. China has become a leader in 5G, electric vehicles and digital surveillance technologies because of direct government involvement. The government is best-placed to invest in experimental science and technologies because of its reliable tax revenues, whereas the private sector is best placed to build commercial applications on top of basic R&D because of its efficiency.

But it's critical that a share of private profits from public investments are ploughed back into basic science and technology research. American tech giants are coming under pressure to pay more taxes and invest more in research institutions instead of using their huge surpluses for buying out other innovators and buying back shares. If the government has no incentive to fund or support invention and discovery, the private sector will be terribly short on innovation.

Regulations and incentives play a vital role in directing innovations. Each generation of automobiles are cleaner and safer because of regulatory pressure. Solar and wind energy industries owe their development to subsidies and tax breaks. India can transform its education, sanitation and healthcare sectors by loading incentives in favour of innovations and against inefficient technologies and operating models.

The size of R&D budgets matters, but innovation is usually not proportionate to the budget. Creativity does not come by kilos. Instead, it comes by flashes of brilliance triggered by right conditions. Among American tech giants, Apple spends a lot less of its revenues on R&D than Intel, Facebook or Alphabet. Of course, mass market players have to spread their bets wider than niche players. Typically, tech giants spend 15-20% of their revenues on R&D compared to typical industrial leaders' spending of 4-6% of revenues on R&D. It is no surprise that tech companies are disrupting every industry.

Among emerging economies, China is a great example of rise to prosperity and power through innovation. India can learn from China's deliberate increase in innovation-intensity of its economy. China is the only middle-income country among the 20 most innovative nations and its R&D spending and academic research are rising the fastest in the world. At the 2018 conference of the Association for the Advancement of Artificial Intelligence, 265 research papers of China were accepted compared to 16 from India.

India has a serious innovation deficit and it has to make up in a rush. Experimentation may involve risks, but there are enormous rewards for successful innovations. More than the fear of failure, the biggest obstacle to innovation is the idealisation of obedience and safety. Time has to come for India to think disruptively and take a moonshot approach to solving its big problems.

Ravaged Bank of India?

Govt dips into central-bank reserves; it matters only because people think it does

MOST CENTRAL BANKS occupy impressive premises in expensive parts of town. Few begrudge them this perk. Nice digs seem only fitting for the guardians of the nation's currency, giving them a reassuring air of gravitas and permanence. But is grand architecture necessary for central banks to perform their functions? Is there any economic justification for it? The honest answer is 'no'.

What is true of central-bank architecture is also true of central-bank capital. Most such institutions have reassuring balance-sheets. Their assets, which usually comprise safe government securities, comfortably exceed their liabilities, which are chiefly the banknotes they issue and the deposits held with them by commercial banks. The assets of the Reserve Bank of India (RBI), for example, exceed its liabilities by over Rs 9 trillion ($125 billion), of which about Rs 2.7 trillion is ready to hand.

This balance-sheet is a source of pride, allowing the institution to feel financially independent. Thus, when Narendra Modi's government began to argue that it was too lavishly capitalised, the RBI was displeased. And when the finance ministry concluded last year that it should give some of its excess capital to the government, which was keen to shore up public-sector commercial banks, the RBI resisted. The tussle was one reason why Urjit Patel, then its governor, resigned.

The central bank asked Bimal Jalan, a former governor, to consider the issue further. This week, his committee recommended that the RBI reduce its risk buffer to 5.5-6.5% of its balance-sheet. Now, under more pliant leadership, it promptly reduced the buffer to the bottom of that range, enabling it to hand over Rs 526 billion in addition to a bumper dividend of over Rs 1.2 trillion. Rahul Gandhi, an opposition leader, accused the government of stealing from the RBI. A former minister said the institution had been left no room to intervene in a crisis. Another critic said Mr Modi had "converted the R in RBI from 'Reserve' to 'Ravaged'."

Lost amid this political controversy was the deeper economic question of whether central banks need capital at all. They cannot go bust. Their liabilities are the money they issue. But that money is simply a promise to pay money. Their creditors already hold the thing they are owed. Central banks' assets are also peculiar. The principal one is their licence to print money that people will accept in exchange for real resources. This right to earn seigniorage, as it is called, is worth a lot, even if their money-printing is constrained by the need to keep inflation in check.

Mr Jalan's committee argues that central banks do need strong financial positions to carry out their business. But its justifications mostly boil down to perceptions: central-bank capital matters because people think it does. That can include central bankers. If a central bank fears negative equity, it may sacrifice other macroeconomic goals to protect its financial position. But if this phobia distorts their work, perhaps they should work harder to shed their fear.

Several central banks have functioned well for years with liabilities that greatly exceed their assets. Often they have accumulated large stocks of foreign-exchange reserves, which fall in value relative to their domestic currency when it appreciates. In these cases, then, the central bank suffers capital losses because of growing, not diminishing, confidence in its money. Take the Bank of Thailand (BOT). It says emphatically in its financial statements that its "accumulated loss has no impact on the continued operation of the BOT." And indeed inflation in Thailand is less than 1%. Perhaps it helps that the BOT's handsome premises are valued at over $200 million.

THE ECONOMIST

DATA DRIVE

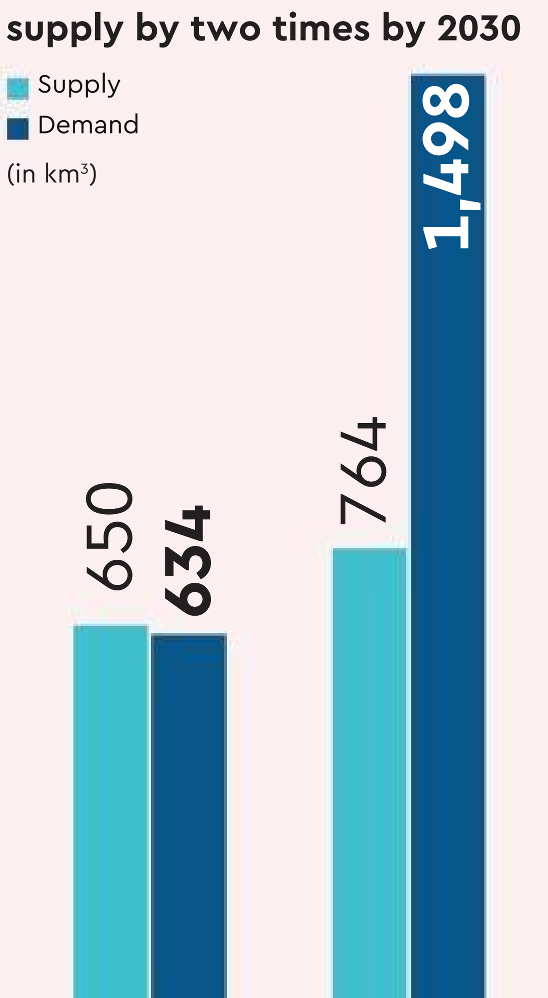
The looming water scarcity

BY 2030, INDIA'S water demand will exceed supply by two times, indicating severe water scarcity in the country. In fact, 820 million Indians living in 12 river basins have a per capita water availability close to or lower than 1,000 cubic metres—the official threshold for water scarcity. The average all-India per capita water availability is expected to be 1,341 cubic metres by 2025, and touch a low of 1,140 cubic metres by 2050, close to the official water scarcity threshold.

The second round of the Composite Water Management Index (CWMI 2019) developed by the NITI Aayog, a tool to assess and improve the performance in efficient management of water resources, focuses on policy-oriented decisions that can be taken in the water sector. The report points out that 82% of rural households in India do not have individual piped water supply and 163 million live without access to clean water close to their homes.

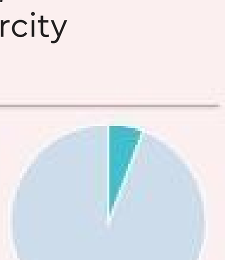
The Index shows that states are displaying progress in water management, but the overall performance remains below what is required to tackle the challenges. Around 80% of the states assessed over the last three years have improved their water management scores, with an average improvement of 5.2 points. However, 16 out of 27 states still score less than 50 points on the index, out of 100. They account for 48% of the population, 40% of agricultural produce and 35% of economic output of India.

Water demand will exceed supply by two times by 2030



Scarcity is on the horizon

Annual per capita water availability expected to reduce to 1140 m³ by 2050, close to the official water scarcity threshold of 1000m³

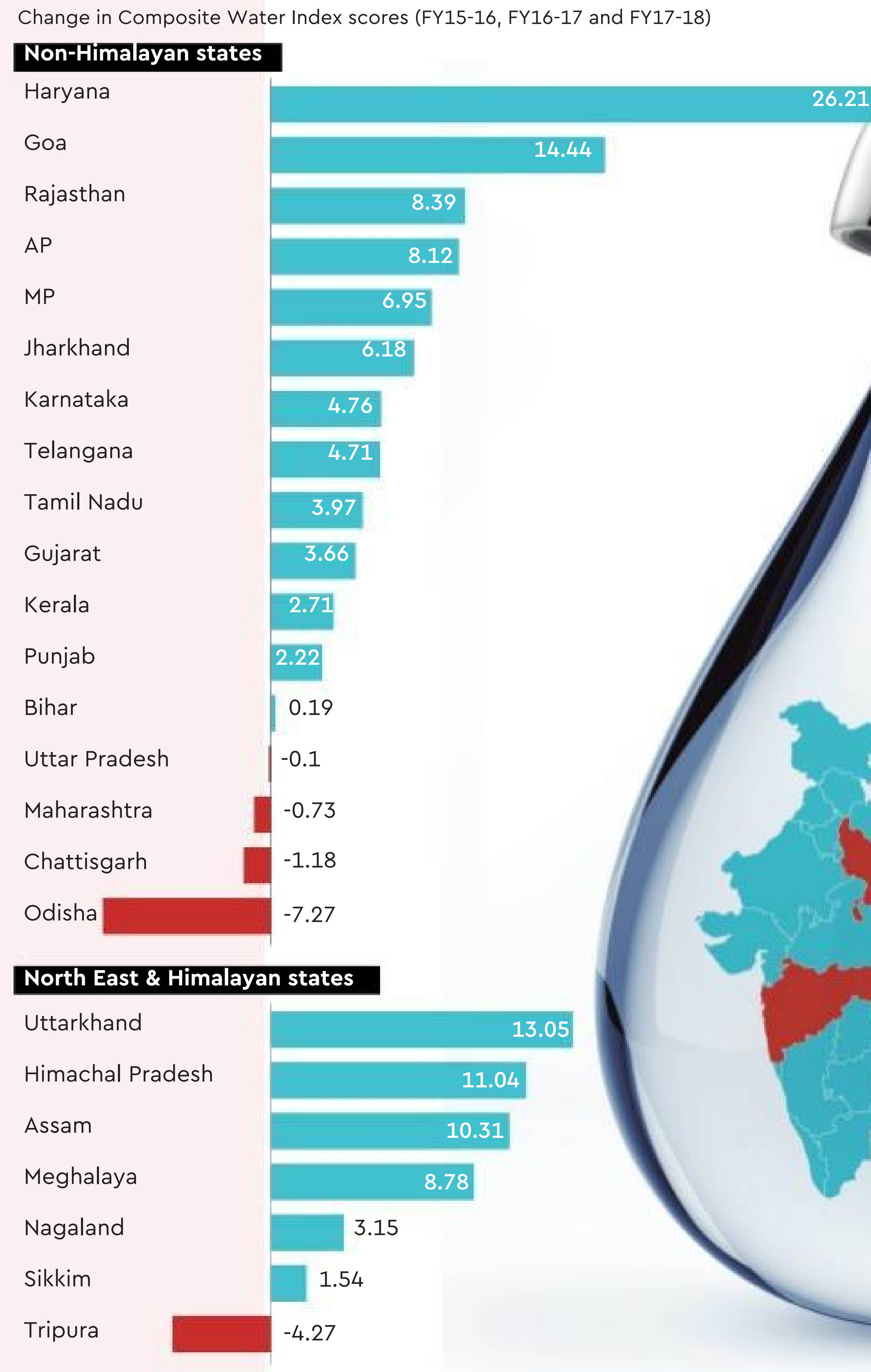


6% of GDP will be lost by 2050 due to water crisis under business-as-usual scenario

Source: Composite Water Management Index — NITI Aayog

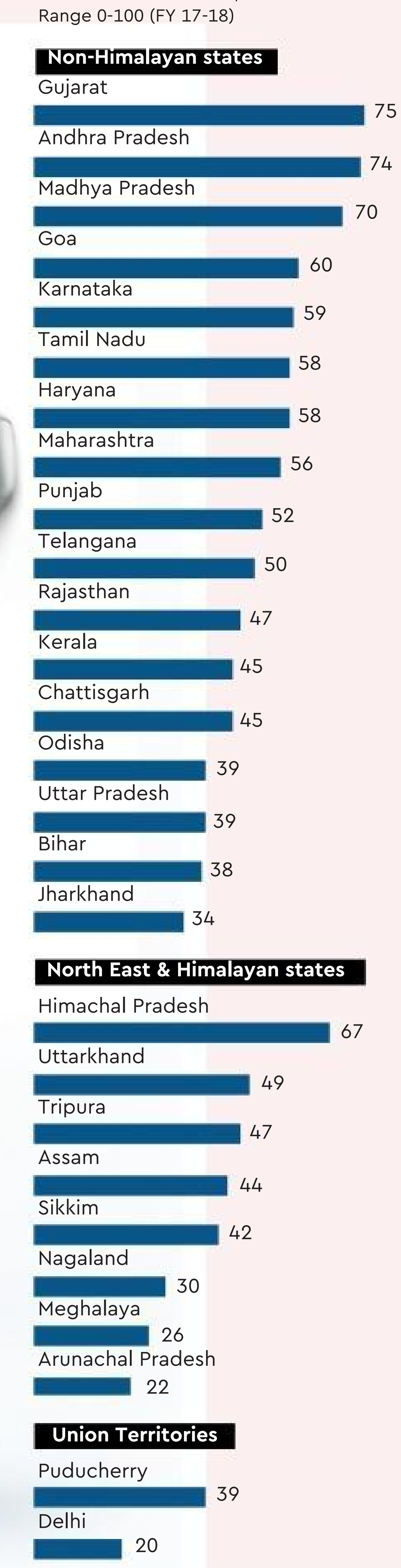
Haryana reported maximum progress on the Water Index

Change in Composite Water Index scores (FY15-16, FY16-17 and FY17-18)



Sixteen out of 27 states & UTs assessed on the Index in FY17-18 scored less than 50% of total achievable score

States scores on CWMI, Range 0-100 (FY 17-18)



Eight out of 27 states have restored more than 80% of the possible irrigation potential

Area irrigated by water bodies restored as compared to the irrigation potential area of total number of water bodies identified for restoration