To catch a quantum jump

It seems quantum jumps are not instantaneous and there is a sign when one is about to occur

QUANTUM LEAP

DEVANGSHU DATTA

Albert Einstein once said, "God doesn't play dice with the universe" (he called himself as a non-believer, so this was rhetorical). Einstein was expressing his doubts about quantum physics, which suggests sub-atomic particles behave randomly and probabilistically.

Ironically, Einstein was a founder father of quantum theory. His 1905 paper on the photoelectric effect first proposed light consisted of packets of specific quanta of energy. Another physics legend, Erwin Schrödinger, who derived the equation for wave functions, also had doubts about quantum theory. While it yielded excellent experimental results, both these geniuses felt (or hoped) that the probabilistic behaviour of particles masked a deeper, deterministic principle.

Schrödinger satirised quantum superposition in a famous thought experiment. A cat is locked in a box with a Geiger counter connected to a lever that controls the flow of a deadly gas. A single atom of a radioactive element with a half-life of one hour, is in the box. The box is opened an hour later.

There's a 50 per cent chance the atom has decayed, tripping the lever, and releasing the gas, which kills the cat. Or else, the cat is unharmed. The decay/non-decay are superposed wave-functions. When an observer opens the box, one wave-function collapses. Until then, the cat is both dead and alive!

This collapse of the wave function is an example of a quantum jump — a change from one energy state to another. It was always assumed that jumps were probabilistic and instantaneous and there was no way to determine how this experiment would turn out.

A new experiment from Yale indicates this understanding is due for substantial review. It seems quantum jumps are not instantaneous and there is a sign when one is about to occur. It may even be possible to stop or reverse jumps. The discovery has huge fundamental significance and it could mean a breakthrough in computing.

As described in *(https://arxiv.org/abs/1803.00545 "To Catch and Reverse a Quantum Jump in Mid-flight")*, Yale Professor Michel Devoret, lead author Zlatko Minev and their team, examined quantum jumps using an "artificial atom".

Minev is associated with IBM's Thomas Research Center. The co-authors include Robert Schoelkopf, Shantanu Mundhada, Shyam Shankar and Philip Reinhold, of Yale, Ricardo Gutiérrez-Jáuregui of the University of Auckland; and Mazyar Mirrahimi, from the French Institute for Research in Computer Science and Automation.

The "artificial atom" is a superconducting circuit with an insulating junction (a Josephson junction, which is a very thin non-conducting material) placed in the middle. The superconducting electrons "tunnel" through the non-conductor.

In actual atoms, energy states are represented by the location of the electron around the nucleus. In this artificial model, the energy states are represented by changing values as electrons tunnel through the junction.

The "atom" was placed inside an aluminium box, and bombarded with microwaves. The microwaves cause photon emissions and quantum jumps. Given sensitive enough detectors, every photon emission is observed. The researchers discovered that each jump was preceded by an interesting "non-signal". Photons stopped being emitted just before there was a quantum jump.

This absence of photons is advance warning. What's more, it was discovered that it was possible to reverse a jump state by hitting the "atom" at the right instant with the right microwave signal to trigger photon emission. While jumps start randomly and can be prematurely interrupted, the deterministic signal comes as a great surprise. Also jumps are not instantaneous, resolving one of the puzzles of quantum theory.

In a scientific analogy, this discovery was compared to our understanding of volcanic eruptions: we have no idea when a volcanic eruption is due but geologists do know the warnings signs that occur just before an eruption.

Coming back to quantum computing, this may have huge applications. Computing by quantum bits (qubits) may be much quicker than conventional computing since qubits store more information and calculate faster.

A conventional bit stores only two states (on/off, or one and zero) and can be in only one state at any given time. A qubit can be both states at the same time due to superposition. A three qubit system can have a superposition of eight states at the same time, where a three-bit system can only be in one of these eight states. The differential grows for larger quantum computing systems due to this quirk.

But when qubit superposition collapses, it causes computing errors. However, this "artificial atom" is also technically a two-qubit quantum computer. So this result could yield vital clues as to how to prevent, or correct, wave-collapse errors. It would also suggest that Einstein was perhaps, correct, if there is indeed a deterministic principle that is deeper than current quantum theory.

CHINESE WHISPERS

Bankruptcy hits employees

One of the Big Four audit companies which is managing the insolvency proceedings of a consumer durables firm is playing truant with the salaries of the bankrupt company employees. The insolvency resolution professional (IRP) deducted the income tax for April 2018 and paid the tax to the government but failed to deposit the salaries in the accounts of the employees. The employees are yet to receive the salaries which have been delayed by over a year. Insiders said the IRP was taking orders directly from the former promoters and was sitting on the salaries. Looks like yet another scandal is brewing in the IRP process.

Young and embarrassed

Leaders of the Bharatiya Janata Yuva Morcha, the youth wing of the BJP, and the Akhil Bharatiya Vidyarthi Parishad, the students' wing of the party, met Civil Aviation Minister Hardeep Singh Puri to demand India change the call sign for Indian airplanes. The current call sign is 'VT' which stands of 'Viceroy/Victorian Territory' and it is a symbol of 200-years of slavery, they said. "Even our prime minister travels to meet world leaders in an Air India One B747-437, with a call sign VT-EVB," the youth leaders said. They argued countries like Nepal, Sri Lanka and Zimbabwe have changed their call signs after independence. "The fact that the most vibrant democracy in the world still uses the British era call sign is nothing short of embarrassment," they said.

Lunch and dinner

Vice-President M Venkaiah Naidu *(pictured)*, who is also Rajya Sabha chairman, hosted a lunch for the floor leaders of all political parties at his residence. MPs look forward to lunches at Naidu's residence. Apart from offering sumptuous dishes, particularly Andhra Pradesh and Telangana cuisine, Naidu is also an exception for a Bharatiya Janata Party leader to serve non-vegetarian fare. At the luncheon meeting, Naidu sought the support of all political parties for the smooth functioning of the House. Though unrelated, soon after the lunch, four Telugu Desam Party Rajya Sabha MPs joined the BJP and met Naidu with a letter to that effect. In the evening, Prime Minister Narendra Modi hosted a dinner for leaders of political parties. Vegetarian fare was served at the dinner.

A new *jugalbandi*

Here's how the RBI's June 12 circular could usher in evolved regulatory governance

CYRIL SHROFF

A rather unfortunate and antiquated quote about the relationship between a central bank and the government alludes to the role of the former being advising, but finally, complying. Perhaps it is more appropriate to think of the Reserve Bank of India as financial regulator and the Government as complementing each other. This is true of each of their respective domains and even more so in respect of their role in facilitating insolvency resolution. The RBI's June 7 circular ("revised circular") on the resolution of stressed assets restores this complementarity between these institutions.

The Banking Regulation Amendment Act 2017 had empowered the central government to direct banks to trigger insolvency proceedings in respect of specific defaults, as well as empowered the RBI to issue directions in respect of stressed assets. This amendment and the subsequent February 12 resulted in several defaulting borrowers being taken to NCLT for insolvency proceedings. The SC judgment in April 2019 raised important issues. From a regulatory governance standpoint, as well as the signaling effect on the sometimes delicate government-RBI relationship, there were concerns.

The amendments which required the authorisation of the central government to issue instructions to banks to trigger proceedings against specific defaults had the impact of shifting the balance of regulatory power between the central government and the RBI. Theoretical literature on regulatory institutions posits the rationale for such institutions being two-fold: Credible commitment on the part of governments to take decisions on the basis of domain knowledge and depth and at an arms-length; as well as specialisation of expertise relation of increasingly complex regulatory functions. The Banking Regulation Act seemed to embody these principles by vesting in the RBI the authority to issue directions to banks in respect of loans and advances, as well as banking policy generally, without the requirement of the authorisation from any other source.

The revised circular deploys tools squarely within the domain of the regulatory — prudential norms on provisioning which will have the same impact as the Amendment Act and the February 12 circular — encouraging references to IBC, but in a manner that respects the role of each institution.

Further, the February 12 circular, by directing banks to trigger insolvency proceedings against borrowers whose resolution plan had failed was in effect micro-management by the RBI. The referee and coach instructing every move of market players. The revised circular reverts to the position of RBI nudging market players through a combination of incentives and disincentives in terms of provisioning benefits and forfeits; rather than a shove. Concerns have been raised by some quarters regarding whether the provisioning will constitute sufficient incentive for lenders. The revised circular requires additional provisioning (over and above capital already provided) which could act as a "stick" as well as the reversal of provisioning in the case of a successful resolution as well as filling, and then admission under IBC which could act as a "carrot". On a lighter note, the revised circular is seen as achieving the same purpose as the original one. But with a dose of politeness.

The revised circular did not prescribe separate frameworks for different sectors or industries. Among the bases for the challenge of the February 12 circular was that it adopts a one-size-fits-all approach rather than one that takes into account the specific issues of each sector — a "sector-agnostic" rather than "sector-friendly" approach. This was not the basis on which the circular was struck down and the RBI has done well not to adopt this approach in the revised circular. The balkanisation of insolvency framework for multiple sectors by the RBI could potentially lead to regulatory arbitrage; as well as bank lending skewing in the direction of certain troubled sectors. A sector specific insolvency resolution process, if at all, could be considered by the legislature at the appropriate stage, rather than through directions or circulars of the regulator. Further, the revised circular accords sufficient flexibility to lenders to arrive at a resolution plan that takes into account issues faced by specific sectors. It therefore uses the right balance of "rules" and "discretion" to address the concern of individual industries.

The power under Section 35AA to issue directions with respect to specific defaults being referred for insolvency proceedings remains useful and may be employed at the appropriate occasion with the central government and the RBI coordinating in this regard. To prod banks to use the IBC, the approach of the revised circular is effective and certainly more polite.

The government played its role brilliantly by enacting the IBC, as well as making amendments to the law and delegated legislation in response to ground realities. The RBI, through the revised circular is complementing the IBC by incentivising banks to use the provisions of the IBC. The circular displays a keen understanding of the nuances of the IBC and the manner in which banks could deploy them. By way of example, the circular complements super priority accorded to interim finance under the IBC by prescribing standard provisioning requirements for such finance as well as additional finance during the resolution period. This will provide an impetus for effective resolution, which is often held back by limitations of funding, despite super priority status under the IBC.

The June 7 circular also recognises the challenges of achieving unanimity by all lenders, and the need to act swiftly. The requirement for 100 per cent agreement has been brought down to 75 per cent in value and 60 per cent in number; with a safeguard introduced for dissenting lenders by ensuring them at least liquidation value. This is in line with the UNCITRAL Legislative Guide for Insolvency Law as well as the World Bank Ease of Business parameters on resolving insolvency. While the IBC and regulations thereunder have been amended to remove this requirement, its introduction in the Revised Circular is a useful incorporation of global best-practice.

These developments therefore hopefully signal a welcome new *"jugalbandi"* between the government and the RBI as well as evolved regulatory governance.

The author is managing partner, Cyril Amarchand Mangaldas

Can a broken songbird sing?

OCCASIONAL ASIDE

AMIT TANDON

It is a scary time for the big four auditors in India. Their worry is not so much the business model of providing audit and a myriad of non-audit services; that, if regulators demand, they will reluctantly tweak just so. It is the audit quality and the numbers they have recently printed, that shareholders, lenders and regulators are now questioning. The Securities and Exchange Board of India (Sebi) banned PwC in 2018 from auditing listed companies for two years for its involvement in Satyam Computers Services Limited. Last month, the Reserve Bank of India barred SR Batliboi & Company LLP, an affiliate of EY, from carrying out statutory audit assignments of commercial banks for one year. The Serious Fraud Investigation Office has charged Deloitte Haskins & Sells LLP and BSR and Associates LLP (part of the KMPG network), for their failure in not disclosing the true financial health of IL&FS Financial Services Limited and the Ministry of Corporate Affairs (MCA) looks at banning them from undertaking audits for a period of five years.

How have things come to such a pass? One, the change in audit rules. From principles of prudence and conservatism, which enabled auditors to certify that the numbers are "true and fair", there is a shift to "fair value" which despite its theoretical underpinnings, has led to Sharon Bowles, a former chair of European Parliament economic and monetary affairs committee, to describe it as the "unanchoring of auditing from verifiable facts". My own experience while handling an IPO of a technology company in the late 1990s was the trepidation of its CFO when asked to prepare US GAAP accounts, giving way to high-fives, when he realised that management assumptions could be far more generous than what his local auditors allowed. Indian audit rules are far more aligned with global rules today, than any time before.

And rather than being "useful to users" fair value accounting has at often times left investors at the mercy of the auditors — who have just ticked the box, rather than exercise their judgement: in Charlie Munger's words "violated the most elemental principles of common sense". Auditors defend themselves saying that it is difficult to over-ride management when it comes to exercising judgement on business issues; recent events suggest they need to push-back, as PwC has recently done.

Some argue that audit failure to provide robust results is a consequence of their cosying up to firms they audit, in the hope of non-audit related business. Today the big four companies audit 60 per cent of the NIFTY 500 firms, thankfully not as dominant as in the UK (97 per cent of the FTSE350) or US (99 per cent of the S&P500). Deloitte's global revenues in 2018 were US$43.2billion, followed by PwC (US$41.3 billion.), EY (US$34.8) and KPMG (US$29.9billion). Between themselves they employ 1,005,753 people. Just to put this in context, Morgan Stanley's global revenues for 2018 were at US$37.9 billion and those of Goldman Sachs, US$36.6 billion. The UK's Competition and Market Authority (CMA), in its recent review of the audit industry, found that each of the Big Four generates at least three quarters of its revenue from non-audit services. One consequence is that large are getting larger. What then needs to be done? Should they be splintered into smaller 'all service' firms, should they be vertically split into audit only and non-audited firms or should there be a hefty fine for each transgression and they be allowed to continue, if the market believes they are now too important to do without? If the market believes moving forward without them is too disruptive. A practical but short-term solution.

As the big four audit firms brace themselves for a shakedown, it is not clear who the winners will be. The domestic firms, for the most, have merged with the big four — their skills, but far more their roster of clients, was far too attractive to the majors to leave untouched. Can the handful of remaining domestic firms benefit from this? It is not obvious if they now "have-it" to compete; partly this is because the companies are much larger, more global and more complex, which puts the smaller firms are a disadvantage vi-a-vis the big boys. And in part, because investors push firms to embrace the Big Four. The current crisis provides them with an opportunity, and it will be a shame if they do not take advantage that this environment provides. No one will argue that we don't need more choice. Indeed, the more daring amongst us will argue voting out the Big Four (assuming the regulators don't ban them) and bring in the smaller firms arguing that the big four have not provided the assurance their brands promised. HDFC Bank recently appointed MSKA & Associates, a firm outside of the big four. Its own credibility will compensate for that of its auditors. This could be the starting point of rejuvenating the industry, with the better governed firms moving beyond the big four.

In India, a Committee of Experts in its report to the Ministry of Corporate Affairs focused on the ownership structure, found it in compliance with Indian law, and believed that the National Financial Reporting Authority will solve the various intractable issues that face the industry today. In sharp contrast, the CMA in its report has suggested breaking-up the big four to increase choice and introducing joint audits, which will enable smaller firms to upskill themselves — the two issues which we In India grapple with today. Agreed that just having more firms will not solve by itself solve the quality problem. So, to this let me add a third, tight oversight over audits and auditors.

Change will take time and most needs wider debate. Meanwhile I advocate institutional investors and even audit committees, get involved in the policy debates around audit standards. Albeit an arcane subject, the ramifications are too far reaching and too long term, to ignore. Quicker still, investors should be more questioning of audit reports and auditors should open-up to talking to shareholder who vote their appointment, rather than cite client confidentiality.

The chartered accountants, possibly envious of doctors with a sticker of either a red-plus sign or the Rod of Asclepius on their windshield, decided to march in step with them, and put a 'CA' sticker on their windshield. As an aside, my colleague Hetal Dalal often asks, what is the relative probability of someone stopping a doctor on the roadside for a medical emergency versus flagging down a bean counter to give a tax opinion. Having embraced and made their own the sticker, auditors should go the full distance by paraphrasing and embracing a line about physicians from the bible. Let me help with it. Auditor, heal thyself.

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LETTERS

Eagle-eyed MCA

This refers to your front page lead report "Shell firms to face more PCA heat" by Veena Mani (June 20), about the Ministry of Corporate Affairs (MCA) getting active on the rogue limited liability partnerships (LLPs) that are clearly misusing the law, is heart-warming. The companies converting to LLPs is an example of the ingenuity of our business community. Obviously, with active assistance from company secretaries and chartered accountants — forever ready to oblige their conniving clients — wanting to find loopholes in the law and ways to go around the various provisions for achieving the goal of evading/avoiding/minimising taxes that are legitimately due to the exchequer.

There can't be any other explanation for the thousands of companies converting to LLPs. A bulk of them are bound to be doing so for nefarious objectives. Purpose of the LLP Act was to help proprietorship firms migrate to the organised sector. Those who drafted the act would've never imagined that there could be sort of 'reverse migration' also. Or, is it possible that the loophole was intentionally left open? Easier compliance norms for LLPs have now tempted many rogue companies to take that route. Perhaps the trigger was the crackdown on shell companies. Unusual inflow and outflow of funds in many of these firms would suggest that line of thinking.

Over half a million inoperative firms, many vanishing and untraceable listed companies, companies where PAN is not traceable... this dark wonderland would need an equally, or more, alert and eagle-eyed MCA to nail the fugitives and bring them to book.

Krishan Kalra Gurugram

Perform or perish

This refers to "Jet Airways: Exit is best" (June 20) by Naushad Forbes. It traced the evolution of Jet Airways succinctly. When Jet Airways was on its deathbed, the industry was shaken up impacting a host of entities — banks, employees and the general public. As the dust settles and most of the employees are getting absorbed in the other airlines expanding their operations, the human angle of the misery gets mitigated. With increased capacity, the air fares that had spiralled is also expected to come down bringing relief to the general public.

Taking cue from what has unravelled in the Jet Airways case, can a case be made for Air India to be unwound if it continues to make operating losses? For long Air India has been bleeding for a host of reasons. Why should the tax payers continue to subsidise this albatross? This will also send out a message of perform or perish to laggard state-controlled institutions.

KV Premraj Mumbai

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HAMBONE

Business Standard
Volume XXIII Number 221
MUMBAI | FRIDAY, 21 JUNE 2019

Avoidable delay

Jet's assets lay rusting as banks dithered on going to NCLT

On Thursday, the National Company Law Tribunal (NCLT) admitted a plea made by a consortium of lenders to initiate bankruptcy proceedings against the grounded Jet Airways. This follows the failure of the bank consortium, led by the State Bank of India, to find a buyer. This search had been ongoing even before the consortium took operational control of the airline in March this year. The banks had hoped to find an entity willing to take over Jet after its former chairman Naresh Goyal was out of the picture. But even a formal process of bidding resulted in only a single effective bid, from Jet's existing minority shareholder, the cash-strapped Etihad Airways from Abu Dhabi. There were enough problems with this bid in the banks' eyes that they allowed the opportunity to pass them by. First of all, Etihad could not become a majority owner; second, it needed regulatory exemptions from the Securities and Exchange Board of India; and, finally, the banks were uncomfortable with the size of the write-off of their loans that reviving Jet on Etihad's terms would have entailed.

The debt-laden airline's troubles began when it defaulted on a loan last December. For inexplicable reasons, Mr Goyal was given an inordinately long rope by the lenders, which worked to the detriment of everyone else. As a consequence of the banks' dithering, Jet Airways is now being subjected to the bankruptcy procedure after having been grounded for weeks — since the middle of April, in fact. A going concern with prime landing slots is a far more valuable entity than an airline that has been grounded, thanks to the mistakes of its former management and creditors. It remains to be seen how much value destruction the banks' consortium has created for itself. With the airline now referred to the NCLT, lenders can expect to recover only a fraction of the ₹8,400 crore it owes them. Instead of facing facts, the banks made grandiose statements such as claiming that a buyer would be found for Jet by May 31. Who knows how much longer the banks would have allowed Jet's assets to rust without taking any real action to dispose of them, if their hand had not been forced by the non-financial creditors of the airline who moved the NCLT on June 9.

This is another reminder that in bankruptcy proceedings a swift acknowledgement of failure from the financial creditors is vital. Banks must act swiftly when an asset has become distressed. The longer they wait, the more money they will lose. It is unfortunate that too many in banking have failed to see the advantage of early action. During Thursday's hearing, the NCLT has asked the interim resolution professional to try and resolve the matter within three months. That's good news, but one that doesn't inspire much confidence, given that the resolution of cases so far referred under the Insolvency and Bankruptcy Code has been fraught with long delays and disputes.

Lessons in inclusivity

The minority education agenda needs cautious handling

Last week, Prime Minister Narendra Modi announced government scholarships for 50 million students from minority communities — half of them for girls — for pre- and post-matric education as well as technical and professional courses over the next five years. In addition, teachers in madrasas, which impart religious education, would be trained in "mainstream subjects" such as Hindi, English, math and science. Since Muslims account for the biggest minority in India, it may be safely assumed that this community will be the biggest beneficiary of this largesse. In terms of political messaging, the scheme, which unusually is still to acquire a catchy acronym, is an inspired move, an early augmentation of Mr Modi's second-term slogan of *sabka saath, sabka vikas, sabka vishwas*.

Minority Affairs Minister Mukhtar Abbas Naqvi said Christians, Sikhs, Jains, Buddhists and Parsis would be included in this scheme, though as relatively affluent communities they are less likely to avail of these benefits. As a Hindu majoritarian party, such subsidies enable the Bharatiya Janata Party (BJP) to elude accusations of minority "appeasement", that it has consistently levelled at the Congress. Ironically, this move also marks an implicit acceptance of the findings of the 2005 Sachar Committee report, which highlighted the overall alienation of the Muslim community from access to quality social services and jobs.

How far the plan succeeds depends on how efficiently it is implemented. Muslim clerics, who have rarely been vanguards of progressive thought, have been quick to express their appreciation, saying that such a mega-education programme would enable Muslims to participate in nation-building (though why they should think Muslims have not participated in this project so far needs explanation). For the plan to succeed, however, it is vital that it remains free of narrow socio-political agendas. For instance, the plans for "modernising" teaching in madrasas by training teachers sounds unexceptionable on paper. Teaching them English, which is widely accepted as a link language globally, math and science is a sensible way of broad-basing the curricula in these seminaries. But several commentators have pointed to the fact that the curriculum includes Hindi. It is unclear why Hindi should be included to the exclusion of other Indian languages, especially when Muslims also form large minorities in states that are not Hindi-speaking (Jammu & Kashmir, West Bengal, Assam, Kerala, Andhra Pradesh and so on).

Not surprisingly, the inclusion of Hindi as a "mainstream" subject has raised misgivings that the madrasa-education proposal is tied in with the pro-Hindi BJP's broader linguistic agenda. Also, it is worth wondering whether the political messaging overwhelms the educational objective. As the Sachar report pointed out, only 4 per cent of Muslims attend madrasas — a proportion that may well have fallen since Muslims' enrolment in primary schools has been growing rapidly. The larger proportion attend *maktabs*, which provide supplementary religious education in addition to enrolment in public schools. This raises the broader issue of whether scholarships should have been extended to poor Indians (with a focus on girls) in general rather than differentiating on religious grounds. Muslims, who form a large proportion of the poor anyway, would have benefited that way too.

ILLUSTRATION: AJAY MOHANTY

FDI: Bringing all stakeholders on board

To take the economy to $5 trillion, India needs a clear and consistent position on foreign direct investment

PAHLE INDIA

RAJIV KUMAR

Gross inflows of foreign direct investment (FDI) rose to \$64.37 billion in 2018-19 after having stagnated at around \$60 billion for the previous two years (Table 1). It is quite remarkable, that despite domestic economic ups and downs, foreign investors have retained their faith in the Indian story, as demonstrated by gross FDI inflows nearly trebling since 2006-07, when these were a mere \$22.8 billion. However, it is important to focus our attention on net FDI inflows as these actually contribute towards balancing our external account and spurring economic activity. The good news is that net FDI inflows in 2018-19 also increased to \$45.28 billion from \$39.43 billion in 2017-18. This represents a much needed acceleration in these flows with growth rate in FY19 touching 15 per cent, in sharp contrast to the previous two years, when net FDI inflows had actually declined by (-) 6 per cent and 6.6 per cent respectively. Thus, net flows in 2018-19 have staged a smart comeback and marginally surpassed the peak of \$44.9 billion reached in 2015-16.

To put this achievement in perspective, it may be useful to notice that according to UNCTAD (World Investment Report) data, India is now the 10th largest recipient of FDI flows, with the US being the leader having attracted \$252 billion in 2018. India's share in global cross-border investment flows has increased from 2.0 per cent in 2010 to 3.2 per cent in 2018.

It is, however, also worth noting, that according to the World Bank data (World Development Indicators), the share of net FDI inflows in India's GDP has less than halved over the years. It had peaked in 1999 at 3.6 per cent of GDP and has since declined to come in at 1.6 per cent in 2017 (Figure 1). Having staged a comeback in 2018-19, the share would be slightly higher today. In terms of share in GDP, India's performance looks comparable in 2017 to both China and the US. However, this disguises the reality that with its GDP now nearly five times the size of India's economy, China managed to attract, \$129 billion in 2018 (latest available data). Moreover, it is clear that the remarkable Chinese economic performance since 1982, when it implemented its bold structural reforms, was driven by a relentless pursuit of FDI. Consequently, the share of net FDI inflows in Chinese GDP rose from about a measly 0.2 per cent in 1982 to a whopping 6.2 per cent in 1993. During this time per capita incomes in China rose from \$203 to \$377 and have maintained this rising trajectory ever since.

In our case, being negligible in 1982, net FDI inflows as a percentage of GDP also increased but peaked in 2008. At its peak, FDI's share in India's GDP was just more than half of Chinese peak levels. They were at about the same level in 1982. It is evident that we decided to reduce our dependence on foreign investors for creating additional jobs and spurring economic growth at a much earlier stage compared to our northern neighbour. In this context, it is perhaps worth pointing out here, that in 1991, per capita incomes in China and India were at somewhat similar levels (6-7 per cent) of global average per capita incomes. By 2018, Chinese per capita incomes were more than 85 per cent of global averages, while India's per capita incomes reached up to 18 per cent of the global averages over this period. Surely, there are some lessons to be learnt from this evidence.

Yet, another feature of FDI inflows into India needs to be recognised. The total gross FDI inflows include both greenfield inflows that create new capacity and employment and brownfield inflows that go towards acquisition of existing assets. Readers would be familiar with examples of recent brownfield FDI inflows as in the case of Walmart's investment of \$16 billion in Flipkart; Gazprom's takeover of Essar refinery for \$12.9 billion; GTL Infrastructure's takeover of Reliance communications for \$10.8 billion. A total of 25 such deals, for which data was collected from EMIS, shows a total of \$166 billion having been used for brownfield investments since 2007-08. This is surely an under-estimate. UNCTAD data Ibid. Annex tables show that the value of announced greenfield FDI investment between 2008 and 2018 totalled \$255 billion. Thus, the inflow of brownfield FDI during this period was around \$262 billion. Actual FDI inflow is significantly lower than the projected figure.

The somewhat strange and inexplicable aspect is that data that clearly distinguishes between the two types of FDI inflows, is just not available from domestic sources, whether private or official. This gap has to be rectified to make FDI data similar to the availability of data on foreign portfolio inflows, which are used for acquiring equity stakes in Indian enterprises from the secondary markets.

It is nobody's case that FDI inflows need to be given a special treatment over that extended to domestic investors. Our situation is vastly different from China's which was denuded of entrepreneurial talent and investible resources after three decades of draconian socialist expropriation of private wealth and the excesses of Cultural Revolution. We have always had a thriving entrepreneurial community, which has access to domestic investible pool, generated principally by domestic household savings. FDI finances hardly account for 5 per cent of our total investment.

We have to now discuss as widely and as passionately as possible, the relative merits and demerits of pursuing a policy that seeks to attract greenfield FDI inflows. A clear and consistent position has to be evolved, which brings all stakeholders on the same page. This will ensure that there is policy certainty and greater predictability at all levels towards FDI. In this debate we would also need to distinguish between "tariff jumping" versus "export oriented" FDI. In the vast literature available on this issue, the latter is seen to have significantly more positive economy wide impact than the former. In our effort to take the Indian economy to \$5 trillion, such clarity and a unified and predictable policy will surely help.

The writer is Vice Chairman, NITI Aayog. Views are personal

TABLE 1: **GROSS FDI INFLOWS** ($ bn)

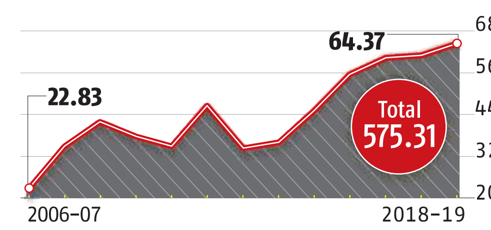
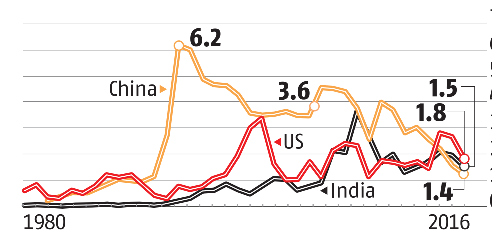


TABLE 2: **NET FDI** (as % of GDP)



Making dam water reach the farmer

WATER: REFORM OR PERISH

MIHIR SHAH

Intervening in a debate in the state Assembly on July 21, 2015, the Chief Minister of Maharashtra remarked that the state has 40 per cent of the country's large dams, "but 82 per cent area of the state is rainfed. Till the time you don't give water to a farmer's fields, you can't save him from suicide. We have moved away from our vision of watershed and conservation. We did not think about hydrology, geology and topography of a region before pushing large dams everywhere. We pushed large dams, not irrigation. But this has to change."

Devendra Fadnavis accurately sums up the great tragedy of Indian irrigation. For 70 years since Independence, we have continued to build "the temples of modern India" but recurrence of droughts and water shortages only seems to intensify by the day. We have spent more than ₹400,000 crore on their construction but trillions of litres of water stored in these dams is yet to reach the farmers for whom it is meant. As former Prime Minister Manmohan Singh would say, "the outlay-outcome gap" keeps widening. In irrigation-specific terms, this is the growing divergence between the irrigation potential we have created (113 million hectares) and how much of this potential we have actually utilised (89 million hectares) for the purposes for which it was meant.

Bridging this gap has to be the goal of the second set of key reforms needed in India's water management. This gap of 24 million hectares reflects the failure of our irrigation sector but it is also a massive low-hanging fruit, by focusing on which we could quickly add millions of hectares to irrigation. And we could do this at less than half the cost of building new dams, which are becoming more and more unaffordable, with massive delays in completion and an unbelievable cost overrun of 1,382 per cent in major projects and 325 per cent in medium dams, on an average! Which is quite apart from their humongous human and environmental costs.

Major river basins like Kaveri, Krishna, Godavari, Narmada and Tapti have reached full or partial basin closure, with few possibilities of any further dam construction. In the Ganga plains, the topography is completely flat and storage cannot be located there. Further up in the Himalayas, we have one of the most fragile ecosystems in the world, comparatively young mountains with high rates of erosion. Their upper catchments have little vegetation to bind the soil. Rivers descending from the Himalayas, therefore, tend to have high sediment loads. There are many cases of power turbines becoming dysfunctional following siltation. Climate change is making the predictability of river flows extremely uncertain. Diverting rivers will also create large dry regions, with adverse impact on local livelihoods. The neo-tectonism of the Brahmaputra valley, and its surrounding highlands in the eastern Himalayas, means that modifying topography by excavation or creating water and sediment loads in river impoundments can be dangerous. Recent events in Uttarakhand and Nepal bear tragic testimony to these scientific predictions.

We, therefore,need urgent reforms focused on demand-side management, leaving behind our obsession with ceaselessly increasing supply, which has sadly been fuelled also by the political economy of corruption. These reforms have already been tried and tested in many part of the globe: advanced nations such as the US, France, Germany, Japan and Australia; East and South Asian countries like China, Sri Lanka, the Philippines, Indonesia, Vietnam and Malaysia; Uzbekistan and Kyrgyzstan in Central Asia;Turkey and Iran in West Asia; African nations such as Mali, Niger, Tanzania and Egypt, as also Mexico, Peru, Colombia and Chile in Latin America. But even more significant are the successful examples of reform pioneered within India in command areas like Dharoi and Hathuka in Gujarat, Waghad in Maharashtra, Satak, Man and Jobat in Madhya Pradesh, Paliganj in Bihar and Shri Ram Sagar in Andhra Pradesh. These successes have now to be taken to scale.

Reforms here imply a focus on better management and last-mile connectivity. This requires the de-bureaucratisation or democratisation of water. Once farmers themselves feel a sense of ownership, the process of operating and managing irrigation systems undergoes a profound transformation. Farmers willingly pay irrigation service fees to their Water Users Associations (WUAs), whose structure is determined in a completely transparent and participatory manner. Collection of these fees enables WUAs to undertake proper repair and maintenance of distribution systems and ensure that water reaches each farm.

This kind of Participatory Irrigation Management (PIM) implies that the state irrigation departments only concentrate on technically and financially complex structures, such as main systems, up to secondary canals. The tertiary-level canals, minor structures and field-channels are handed over to the WUAs, which enables better last-mile connectivity and innovative water management. This includes appropriate cropping patterns, equity in water distribution, conflict resolution, adoption of water-saving technologies and crop cultivation methods, leading to a rise in overall water-use efficiency, which is among the lowest in the world in India.

Of course, PIM is not a magic bullet and studies across the globe reveal specific conditions under which, and under which alone, PIM works. These need to be carefully adhered to. While these are issues for the states to tackle, the Centre also has a critical role in incentivising and facilitating states to ensure that they undertake these reforms. Release of funds to states for large dam projects must be linked to their progress on devolutionary reforms and empowering WUAs. In the 12th Plan we had proposed an incentive fund specially created for this purpose. States committed to the national goal of "*har khet ko paani*" will not view this as an unreasonable imposition. And to overcome any apprehensions, the Centre should also play an enabling role,helping officers and farmers from different states to visit pioneering PIM proofs-of-concept on the ground, so that they can learn and suitably adapt them to their own command areas.

If these reforms are effectively implemented, millions of hectares can be quickly added to irrigated area, at very low cost, without even building a single new dam.

The writer is Distinguished Professor, Shiv Nadar University, and former Member, Planning Commission, Government of India. Every fortnight, he outlines multiple dimensions of long overdue reforms in the water sector

Mindless mining of epics

BOOK REVIEW

ARUNDHUTI DASGUPTA

Verbosity is tedious, except perhaps in the young and in-love. In a book, though it may seem paradoxical, it is recipe for disaster. Too many words can suck substance and style out of the most powerful story and, worse, scar readers for life. *I Duryodhana* offers just such a tragic fate to those who have a taste for the bustling genre of mythological fiction.

The author buries one of the most layered characters in the *Mahabharata* in an avalanche of words, stripping him bare of nuance and mystery. Instead of the powerful force that he was, human and flawed, the book churns up a modern-day avatar better suited for the life of a daily television soap star.

From Duryodhana's childhood travails to his troubled adulthood and violent death, the book is diligent in recounting the episodes, leaving nothing out and leaving little to the imagination. Instead of painting Duryodhana with contemporary flourish, or presenting a different perspective to the tragic trajectory of his life, the author relies on a mix of colloquialism and gilded prose to retell the story. This is a huge loss. Because Duryodhana does offer up limitless potential. Unlike his cousins, he is not a haloed character. His greys are overpowering and his relationship with his father potent material for any novelist. None of this is explored with depth or craft.

As a result, the original narrative still holds a richer exposition of the character. For instance, in all the stories in the epic, the similarities and differences between Bhima, the Pandava and Duryodhana, the Kaurava prince are interestingly juxtaposed. While the rivalry is eloquently described, it is the subtext, of twin lives separated by destiny and circumstance that spices up the narrative.

The author speaks in the voice of Duryodhana, but denies him a mind of his own. It is as if his actions are completely guided by that of his uncle (Shakuni) or blinded by emotion. Duryodhana seems unable to influence his own behaviour, making him a weak character, not a misjudged one, as the author believes. Duryodhana was never lacking in conviction He was drawn to Shakuni because he believed that this was his only well-wisher in a court full of enemies. He believed that he never was given his due by Bhishma or Vidura and even his guru, Drona; and that his father was a blind king being managed by proxy, who could be easily influenced to deny him his right to the throne. Some of the stories in the *Mahabharata* talk about his fairness even as they slam him for his arrogance.

Several scholars and commentators of the epic believe that Duryodhana was an upholder of *raj dharma*, the rule of the kings. The *Mahabharata* is a story of the growing spread and influence of Vaishnavism and the expanding cult of Krishna, which was keen to set out societal structures sanctioned by religion, not state. In such a situation, Duryodhana and his way of life had to fail. It would have been interesting if the author of this book had brought in the way society today is going through a similar churn, in terms of beliefs and political systems at work.

In the past authors and playwrights have explored the story through Duryodhana's point of view. Bhasa, a popular playwright who predates Kalidasa, wrote three plays around the dilemma faced by the prince who wanted to be king. His plays bring out the pathos of the battlefield, they force readers to question popular logic and challenge their understanding of right and wrong. He addresses the conflict between Duryodhana and Krishna and also how the former refused to acknowledge the latter's divinity, the only Kaurava to do that.

There is another aspect of Duryodhana's character that has fascinated many, especially in folk traditions. His caste agnosticism. He accepts Karna as friend and fellow king at a time when the priestly class was eager to enforce a more rigid understanding of the caste system. The book could have dug deeper into this too. And then, if these strands were too political for an author looking to entertain, Duryodhana's psychological demons were ripe for the plucking too. However, all of this is left by the wayside as the book plods its way through the familiar and known world.

I, DURYODHANA
Pradeep Govind
Om Books; 344 pages, ₹295