



SOCIAL INTELLIGENCE

BREAKING: The world's problems will not be solved by arguing with strangers on Twitter. We'll update you when we have more on this story.

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Behind high auto fuel prices, heavy excise duties

Global oil prices are half 2014 levels, the rupee has been largely neutral against the dollar, but the prices of petrol and diesel — which change 'dynamically' on a daily basis — continue to be the highest in nearly 3 years. SANDEEP SINGH & ANIL SASI explain why

THE SHARP surge in the prices of petrol and diesel since June 16, when the "dynamic" daily pricing model for these fuels was introduced, has triggered some uproar, forcing union Petroleum Minister Dharmendra Pradhan to explain on Wednesday. While Pradhan maintained that the government does not plan to intervene to control prices, which have reached their highest in nearly three years, he remained non-committal on effecting a cut in excise duties — asserting this was "up to the Finance Ministry".

SIMPLY PUT

come in for flak because, ever since it was implemented, the price of petrol has gone up from Rs 63.09 in July (weighted monthly average of petrol retailed by Indian Oil Corporation in Delhi) to Rs 70.39 on September 14 — an increase of 11.6%. Diesel prices have surged similarly, and the trend has been identical in other cities. During this period, however, the so-called Indian basket of crude has gone up 12.5 per cent.

So, how is the Indian crude basket calculated?

The Indian basket of crude oil represents a derived basket comprising Sour Grade (Oman and Dubai average) and Sweet Grade (Brent Dated) of crude oil processed in Indian refineries (in the ratio of 71.03:28.97). Prices of petrol and diesel have been made market-determined effective June 26, 2010 and October 19, 2014, respectively. Since then, the Public Sector Oil Marketing Companies (OMCs) are supposed to take appropriate decisions on the pricing of petrol and diesel, in line with international product prices and other market conditions such as exchange rate and the demand-supply situation, among others. On June 16, 2017, the dynamic

Share of taxes in fuel prices (RSP effective July 16, 2017 in Mumbai)	KEY NUMBERS			
	Petrol		Diesel	
	₹/litre	% in RSP	₹/litre	% in RSP
Price before taxes and dealer commission	25.97	40.5%	27.31	49.7%
Customs duty#	0.48	—	0.51	—
Excise duty	21.48	—	17.33	—
Total central taxes	21.96	34.3%	17.84	32.5%
Price charged to customer (depot price)	47.93	—	45.15	—
VAT (Including VAT on dealer commission)	13.63	—	8.13	—
Total state taxes	13.63	21.3%	8.13	14.8%
Total taxes	35.59	55.5%	25.97	47.3%
Dealer commission	2.55	4.0%	1.65	3.0%
RSP/litre (rounded off)	64.11	100.0%	54.93	100.0%

Petrol and diesel as per IOCL. #Customs duty on petrol and diesel as of July 2017, 2nd fortnight refinery gate price (RGP). Source: Petroleum Ministry/PPAC

Prices, basket, Exchange Rate since January 2017

	Petrol price (Delhi, month beginning)	Crude Indian basket (monthly avg)	USD/INR (month beginning)
Jan	70.6	54.08	68.28
Feb	70.6	54.86	67.42
Mar	70.6	51.47	66.86
Apr	66.29	52.49	64.99
May	68.09	50.57	64.26
Jun	66.91	46.56	64.48
Jul	63.09	47.86	64.85
Aug	65.40	50.63	64.10
Sep*	70.39	53.84	64.12
YTD change	-0.30	-0.44	-6.09

*As on Sep 14

Auto Fuels Costliest in Neighbourhood

Country	Petrol	Diesel
India (Delhi)	69.26	57.13
Pakistan	40.82	47.15
Bangladesh	69.16	52.27
Sri Lanka	49.80	40.43
Nepal	61.88	46.72

Prices in September 2017 in INR/litre. Indian prices as per IOCL. Other prices as on the web sites of Pakistan State Oil, Bangladesh Petroleum Corporation, Nepal Oil Corporation, Ceylon Petroleum Corporation. Exchange rates from www.oanda.com.

daily pricing was introduced.

What explains the divergence in the movements of the crude basket and of retail prices?

With global crude oil prices plummeting to record lows when it took charge, the NDA government resorted to a series of excise duty hikes in the second half of 2015 and the initial months of 2016 on both petrol and diesel to help shore up finances. This has helped the Centre realise higher central excise duties (total estimated revenue from the taxes on fuels this fiscal, including cess on crude oil, additional excise duty on motor spirit and diesel and SAD on motor spirit is about Rs 1,15,000 crore), primarily through the increased tax on petrol and diesel, which are still outside the ambit of GST.

Excise duty on petrol was Rs 9.48 per litre in April 2014, which after several rounds of hikes between 2015 and 2016, has risen to Rs 21.48. Similarly, the excise duty on diesel was Rs 3.65 per litre in April 2014, which after excise duty hikes, has risen to Rs 17.33 per litre. In India, the share of taxes in the retail selling prices of petrol and diesel (as on July 16) were 55.5% and 47.3% respectively, with central taxes (essentially excise duty) accounting for the bulk of it.

What other variables are involved?

The price is determined not only by the movement of crude oil price (the main raw material), but also by the rupee/dollar exchange rate and demand-supply situation in the market. While a deficit of the product leads to a rise in its price, an increase in supply will lead to a decrease. Over the first nine months of calendar year 2017, the global

crude oil price for the Indian basket fell by 0.44% while the price of petrol (in Delhi) came down by 0.3%. This is despite the fact that the rupee strengthened against the dollar by nearly 7%, something that would have translated into sharply cheaper imported oil.

How has the government justified the excise hikes?

While defending the higher duty, Pradhan has said increased revenue was only going into welfare activities of building more roads, and providing irrigation and drinking water facilities. He said oil companies would continue to have pricing freedom. "Government has no business interfering in the day-to-day affairs of the companies," Pradhan said on Wednesday after meeting top executives of state oil firms.

Finance Minister Arun Jaitley, in an intervention in Rajya Sabha on December 16, 2015, had said that "one part of the fall in oil prices as a part of proper economic and fiscal planning goes to the consumer; the second part is going to developmental activities, particularly national highways and rural roads, because those who consume petrol and diesel drive vehicles on these roads, and they must pay for it. The third part is being consumed by the states by way of VAT. Of what the central government gets, 42% is being passed on to the states. And the fourth part, let me tell you, goes to the oil companies for the reason that when oil companies make international purchases against future purchases, they suffer a huge loss. They buy at 80 dollars; by the time they sell, the price has become 60 dollars. At one stage, the loss of the oil companies was as high as Rs 40,000 crore."



IN FACT

BY AMITABHA GHOSH

SPECIAL TO THE EXPRESS

IN 1997, NASA celebrated its return to the Red Planet with a perfect landing of the Mars Pathfinder Mission. Mars Pathfinder was a very frugal mission, costing less than *Waterworld*, a Kevin Costner film from two years earlier. But a much bigger mission, more than 10 times as expensive and in development for about a decade, was also being launched in 1997 — without much press or public fanfare.

Cassini Huygens, a NASA flagship mission in collaboration with the European Space Agency, was headed to Saturn — to study the planet and its moons. Several flybys by Voyager-1 and Voyager-2, and by Pioneer, had returned enough interesting data to convince a NASA-led consortium of space agencies that the time for a major mission to Saturn had arrived. Because Saturn is so far away, the mission would be powered by a plutonium-fuelled radioactive thermal generator. The electric power needed for the mission would be less than that needed for a room air conditioner — and equal to eight 100-Watt light bulbs. Cassini would carry the Huygens probe that would attempt to land on one of the Solar System's most interesting and Earthlike moons, Titan.

Cassini took the scenic route to Saturn — it flew by Venus, Earth and Jupiter, travelling 2 billion miles to reach its destination in seven years. By the time Cassini was ready for orbital insertion around Saturn, NASA's next generation of Mars rovers, Spirit and Opportunity, were already on the ground.

Earth and Mars share similarities — both are terrestrial planets made of silicates, both have surface water. But Saturn is completely different.

Imagine landing on Saturn — there is no solid surface to walk on. Saturn has a metallic core, overlain with metallic and liquid hydrogen. It is made up of gas, and could theoretically float on water — Saturn's density is 30% lower than that of water. Although the planet is about 700 times larger than Earth in volume, its density is one-eighth that of Earth.

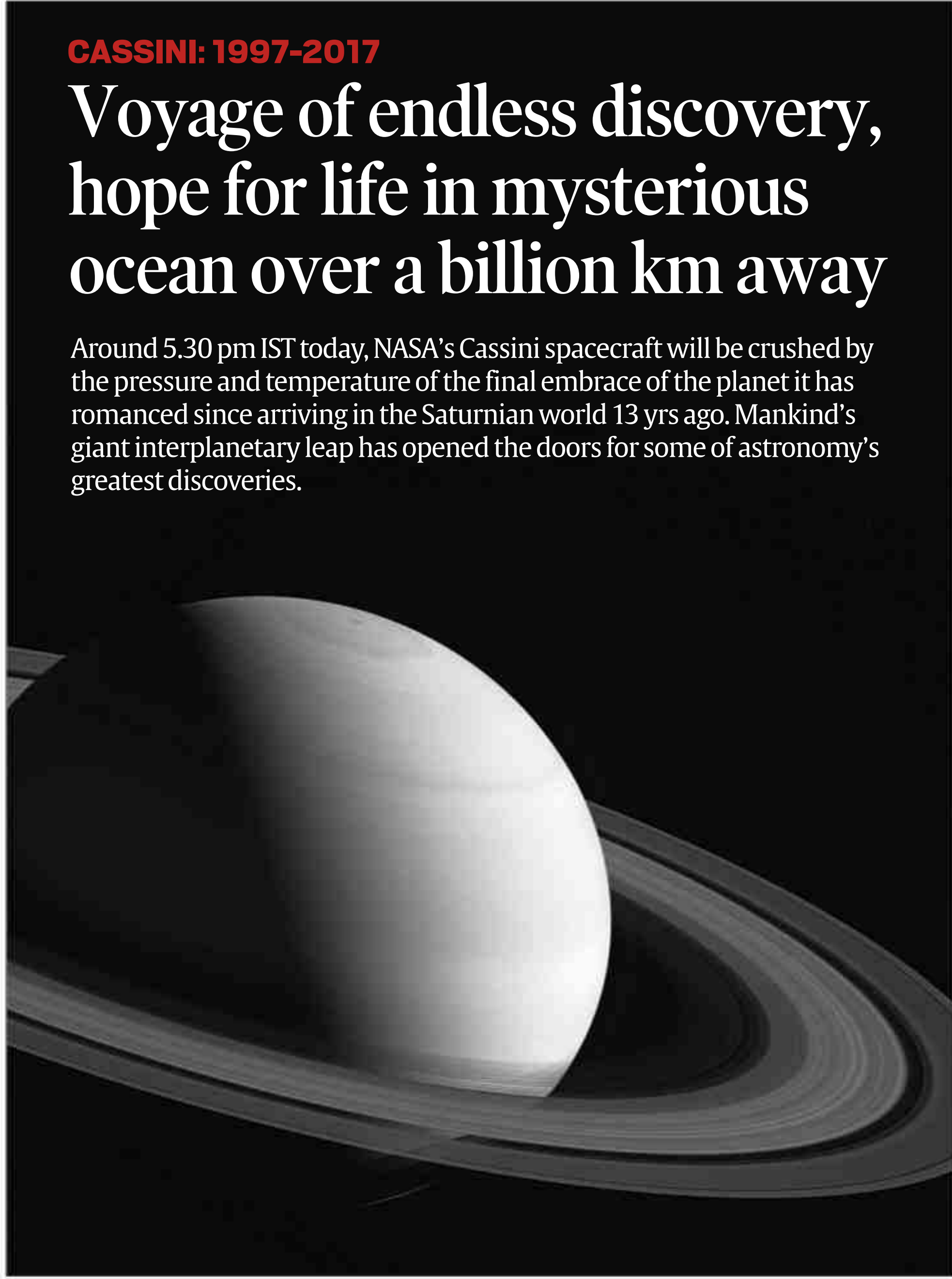
Bored of watching just one Moon on Earth? There are 62 on Saturn. The largest of those, Titan, is larger than the planet Mercury. If you thought Hurricane Irma was bad, think about this: the storms on Saturn are about 10 times stronger at 1,200 miles/hr, and last from years to decades.

Scared of lightning on Earth? The storms on Saturn sometimes produce lightning every 1/10th of a second.

Feeling old on Earth? A year on Saturn is 29 Earth years!

So, what were Cassini's science achievements over its 14-year mission? The spacecraft completed about 300 orbits around Saturn, including more than 150 flybys of its moons; it discovered six new moons and two underground oceans on different moons. Like on Earth, there are four seasons on Saturn; Cassini was able to sample three of those.

The Huygens probe carried a slew of instruments, was designed to enter and survive the approximately 3-hour descent through the atmosphere of Saturn, and to



CASSINI: 1997-2017

Voyage of endless discovery, hope for life in mysterious ocean over a billion km away

Around 5.30 pm IST today, NASA's Cassini spacecraft will be crushed by the pressure and temperature of the final embrace of the planet it has romanced since arriving in the Saturnian world 13 yrs ago. Mankind's giant interplanetary leap has opened the doors for some of astronomy's greatest discoveries.

also survive an ocean landing. It landed successfully on Titan, the farthest body by far on which NASA has landed a spacecraft.

Like that of Earth, Titan's atmosphere is primarily nitrogen, with traces of methane. Because Earth's methane has biogenic sources, the question is whether the methane on Titan is related to life. The Huygens probe revealed a fascinating world on Titan — a temperature about -180C, or colder than Antarctica, with atmospheric pressure about 50% higher than on the Earth's surface. The methane is more near the surface, and there is probably a near-surface liquid methane source.

A picture of a volcano on Earth conjures images of hot volcanic magma and gases; imagine a cold volcano. The Cassini-Huygens probe found strong evidence of cryovolcanism — a volcano where water ice and a mix of hydrocarbons is spewed into Titan's thick atmosphere. In fact, cryovolcanism is now thought to be fairly common in the satellites of the outer planets.



Where in the Solar System would you find life? This may perhaps be Cassini's greatest discovery. Data from the spacecraft indicate there is a large ocean, deeper than the Pacific Ocean, under the icy crust of Saturn's moon Enceladus. At places, the crust is just about a mile thick. What's more is that there is likely a heat source in the interior of Enceladus, which causes the water from the ocean to erupt on the surface. The ocean on Enceladus is dark, and eight times deeper than the average depth of the Pacific Ocean.

This ecological setting is eerily similar to Earth — and on Earth, such a habitat supports life. Most Earth oceans are dark — the aphotic zone where no sunlight percolates starts merely a kilometre from the surface, whereas the oceans can be as deep as 11 km at places, like at the Mariana Trench. On Earth, there are heat sources that cause volcanic or hydrothermal activity on the ocean floor. These hydrothermal vents were once thought to be inhospitable to life: what organism would, after all, live in ice cold waters, in pitch darkness, in the high pressure of the ocean floor, in sulphur-rich acidic con-



ditions? However, recent research funded by NASA has shown that life flourishes in the underwater volcanic vents. Since there is an absence of light, some of the microscopic organisms are chemoautotrophic, which means they derive energy from chemical reactions — in contrast to organisms on the Earth's surface, which are photoautotrophic (deriving energy from chemical reactions).

The billion-dollar question, then, is: if life is found in hydrothermal vents under the oceans on Earth, does life lurk in the dark depths of the massive underground ocean on Enceladus? If yes, what are the attributes of these life forms? Are they microscopic? Are they chemoautotrophic? Hopefully, a follow-up mission to Cassini in the coming decades will provide the answers.

Dr Amitabha Ghosh is Chair, Science Operations Working Group, Mission Operations, NASA Mars Exploration Rover Mission.



A LIFE OUT OF THIS WORLD

OCT 15, 1997, LIFTOFF: Titan IV/Centaur lifted off with the Cassini orbiter and the ESA's Huygens probe on board.

APR 25, 1998, FIRST VENUS FLYBY: Cassini-Huygens performed flyby of Venus, going within 176 miles (284 km) of the Venusian surface. Gravity assist accelerated the spacecraft by about 7 km/s, to help it reach Saturn

JUN 24, 1999, SECOND VENUS FLYBY: After another trip around the Sun, Cassini-Huygens performed a second flyby of Venus for another gravity assist, this time coming within 600 km of the planet

AUG 17, 1999, EARTH-MOON FLYBY: Nearly 2 years after launch, Cassini-Huygens flew within 1,100 km of Earth, gathering a 5.5 km/s speed boost

DEC 1999-APR 2000, THROUGH THE ASTEROID BELT: Cassini-Huygens became the seventh spacecraft ever to negotiate the belt

DEC 29, 2000, EXPLORING JUPITER: Cassini-Huygens made its closest approach to Jupiter at 10 million km on Dec 30, providing, along with the Galileo spacecraft already orbiting Jupiter, unique insight into the Jovian system

OCT 31, 2002, CAMERA TESTED OK: Cassini captured an image of Saturn during a camera test 20 months before reaching the planet. It was then 285 million km from Saturn, nearly twice the distance between the Earth and Sun

APR 7, 2004, WATCHING SATURNIAN STORMS: Three months from arriving at Saturn, Cassini observed two storms merging into a larger storm — only the second time this phenomenon had been observed on Saturn

MAY 31, 2004, TWO NEW MOONS: Cassini discovered two previously unknown moons — Methone and Pallene, 3 and 5 km in diameter, taking the number of known moons of Saturn to 60. This was to increase

JUN 10, 2004, FIRST UP, PHOEBE: Phoebé was the first of Cassini's many moon flybys. The spacecraft flew within 2,000 km of the dark moon, 1,000 times closer than Voyager-2, which got to within 2.2 million km of Phoebé in 1981

JUN 30, 2004, SATURN ORBIT INSERTION: Cassini, still carrying the Huygens probe, became the first spacecraft to orbit Saturn

OCT 24, 2004, FIRST ENCOUNTER WITH TITAN: Spacecraft beamed back information and pictures after successfully skimming the hazy atmosphere of Saturn's moon Titan from 1,200 km above Titan's surface

DEC 23, 2004, HUYGENS PROBE DETACHES: The Huygens probe detached from the Cassini orbiter to begin a three-week journey to Titan

JAN 13, 2005, DESCENT TO TITAN: Huygens landed on Titan — the first

and only landing on any world in the outer solar system. The descent lasted two hours and 27 minutes, and the battery-powered probe lived for another 72 minutes on Titan's surface, and transmitted spectacular images that revealed meteorology and geology that was extraordinarily like the Earth's

MAR 8, 2006, LIQUID WATER ON A MOON: Scientists announced evidence of liquid water reservoirs feeding a huge cloud of vapour over the south polar regions of Enceladus, a small moon of Saturn. Earlier in February, Cassini had discovered something like an atmosphere on Enceladus.

MAY 31, 2008, PRIMARY MISSION OVER: In four years at Saturn, Cassini revealed a wealth of new knowledge about the planet, its rings, and its moons

FEB 2, 2010, MISSION EXTENDED TO 2017: The extension enabled Cassini to observe seasonal changes in the Saturn system over almost half of the planet's 30-year orbit around the Sun

JUN 21, 2011, ENCELADUS'S HIDDEN OCEAN: Cassini found more evidence for a largescale saltwater reservoir beneath Enceladus's icy crust

MAR 1, 2012, HINT OF FRESH AIR AT DIONE: Cassini "sniffed" molecular oxygen ions around Saturn's moon Dione. The ions are sparse — one every 11 cubic cm

MAR 5, 2014, 100TH TITAN FLYBY: Each flyby provided a little more knowledge of Titan and its striking similarities with Earth. Titan is really early Earth in deep freeze

JUL 27, 2014, 101 GEYSERS ON ENCELADUS: 101 distinct geysers suggested it is possible for liquid water to reach from the moon's underground sea all the way to the surface

APR 12, 2017, ENERGY FOR LIFE? Scientists announced the indication of hydrogen gas, which could potentially provide a chemical energy source for life, in the subsurface ocean of Enceladus

APR 23, 2017, FINAL TITAN FLYBY: Cassini passed 979 km above Titan's surface on its 127th and final approach

APR 26, 2017, GRAND FINALE BEGAN: Cassini signalled the end of its historic mission with 22 daring loops through the gap between Saturn and its innermost ring, coming closer than ever before, and exploring a whole new Saturnian world in the process

SEPT 15, 2017, THE GRAND FINALE: A month shy of the 20 years in space, Cassini will make its final plunge into Saturn's atmosphere. It will be crushed and vapourised by the pressure and temperature of Saturn's final embrace.

Source: NASA



The Indian EXPRESS

FOUNDED BY

RAMNATH GOENKA

BECAUSE THE TRUTH INVOLVES US ALL

CRUDE FACTS

Consumers have reason to complain about high fuel prices. Government should ignore pressures to slash excise duties

PETROL AND DIESEL are currently retailing in Delhi at Rs 70.39 and Rs 58.74 a litre, respectively — or just below their corresponding levels of Rs 71.41 and Rs 56.71/litre on May 26, 2014 when the Narendra Modi government assumed office. Given that the average cost of crude oil imported by Indian refiners has more than halved during this period — from \$ 108.05 to \$ 53.83 a barrel — consumers have every reason to complain. That sense of feeling cheated would only have aggravated with the switch to a regime of dynamic daily fuel price revision from June 16, which has led to petrol and diesel rates increasing by around 5 per cent in less than three months. True, the Indian crude basket price has gone up even more during this period — by \$ 7.89 a barrel or 17.2 per cent — but the grouse about deregulation not benefiting consumers still has some justification.

The main reason for the crash in international oil prices not being passed on to consumers has, of course, been the Centre simultaneously hiking the specific excise duty on both petrol (from Rs 9.48 to Rs 21.48/litre) and diesel (from Rs 3.56 to Rs 17.33/litre). By doing this, it has essentially pocketed much of the gains from benign global prices. The additional revenues from the increased levies, taking annual consumption at 3.2 crore kilo-litres of petrol and 9 crore kilo-litres of diesel, works out to over Rs 1,62,000 crore a year. Is that fair? The answer, from a short-term consumer perspective, is no. The rules of the free market should, after all, allow consumers to derive the benefits of low prices, just as they must pay more when the demand-supply balance tilts the other way. But then, oil is different. For a country short of fossil fuel resources, there is a long-term case for restraining consumption and promoting energy efficient production alongside renewable technologies. One way to do it is through taxation, which will, incidentally, also contribute to the exchequer. The Modi government should, hence, ignore populist pressures to slash fuel excise duties now.

But it could do two things to partly assuage consumer feelings. The first is to convert a portion — maybe even 50 per cent — of the excise on petrol and diesel into a cess, whose proceeds would be used solely to fund railways, metro, highways, irrigation, port and other infrastructure projects. Consumers may not mind paying more in taxes, when they know where that money's going. Secondly, simply allowing oil marketing companies to make automatic price adjustments to import parity levels on a daily basis isn't deregulation. The market needs to be thrown open to independent fuel retailers, who would source petrol and diesel from where it is cheapest, rather than from captive refineries. That's how it is in the US, where Costco and Walmart sell more fuel than ExxonMobil or Chevron.

LIKE A BULLET

High speed train could be a game-changer on some counts. Railways would do well not to lose sight of its other problems

THE HIGH SPEED Railway (HSR) project inaugurated by Prime Minister Narendra Modi and his Japanese counterpart, Shinzo Abe, on Thursday, must be seen in context. In 1853, India's first railway train covered the 34 kilometres between Bombay and Thane in about an hour. More than 160 years later, the average speed of the Indian Railways is just about two times that historic journey. At 60 km/hour, the average speed of the Indian Railways is among the slowest in the world. Gatiman, India's fastest train, attains a top speed of 160 km per hour. But if things go according to the government's plan, in 2022, the HSR at its peak will operate at more than twice this speed. It will travel between Mumbai and Ahmedabad in two to three hours, slashing the 508-km journey by about six hours.

For the Indian Railways, which has been dogged by a plethora of problems — including those related to safety and punctuality — the HSR's cutting-edge Shinkansen locomotive technology could be a game-changer. A symbol of post-war Japanese industrial rejuvenation, the Shinkansen has a well-earned reputation for reliability. Since it was launched in 1964, the train has not had a single accident and its average delay is less than a minute. The carbon footprint of a passenger travelling by a HSR train is about the fifth of an air traveller. The government estimates that the HSR will attract more than 35,000 commuters every day by 2023, enabling the railway system to win back the creamy layer of travellers from the aviation sector. But apart from diverting road and air travellers, the HSR — like all efficient transport systems — could generate a new class of passengers as well. Unlike air travel, it will serve smaller centres, many of them tier II and tier III cities, en-route, providing a multiplier effect to the economy. The government estimates that the project itself will generate about 40,000 jobs. The technology transfer that Japan has agreed to is expected to boost the government's Make in India programme.

But the Indian Railways needs upgradation at several levels. According to the Anil Kakodkar Committee Report, submitted in 2012, nearly 19,000 km of tracks are in desperate need of modernisation. In June, the Minister of State for Railways, Rajen Gohain, admitted in Parliament that more than 50 per cent of railway accidents are due to derailments. While the government is justifiably upbeat about the HSR project, it should not lose sight of the other problems of the Indian Railways.

WHAT HAPPENED?

Hillary Clinton attempts to justify, rather than understand, her defeat to Donald Trump

AFTER HE LOST the US presidential election to George W. Bush despite winning the popular vote, Al Gore introduced himself at a public function as "the man who was going to be President". Like Gore, Hillary Clinton too won the vote but lost the office. Unlike Gore, she has attempted to deal with her defeat in new book, *What Happened*. The title, however, lacks a question mark. Clinton is "both apoplectic and apologetic", as David Remnick says in *The New Yorker*, but she still hasn't quite understood, the memoir notwithstanding, what happened.

Clinton is right when she says that she won "more votes than any white man in history" and questions the Electoral College, which has often (in five presidential elections) elected a US president without a popular mandate. Her contrition and despair at having lost to Donald Trump — whose misogyny, tacit support to racism and blatant nativism were no secret during the campaign — are understandable. What Clinton fails to address adequately is why large swathes of middle America, including women and white working class men, bought into Trump's message. Counties that voted twice for Barack Obama shifted to Trump in the 2016 elections and it's thoroughly improbable that all of them did so because they couldn't stomach a woman president. Clinton also attacks Bernie Sanders, saying he resorted to "impugning my character" during the Democratic Party primaries, was too idealistic and that she wishes he was "proud" to be a Democrat.

After his defeat, Al Gore kept out of the public eye for some time before re-defining his image: He became a climate change advocate, winning an Oscar for his documentary film as well as sharing the Nobel Peace Prize. Clinton, despite denying that she plans to run again, seems eager to justify (rather than understand) her defeat. Blaming voters for their choice or leaders of her own party for a hard-fought campaign, though, will never quite explain what happened.



DEV LAHIRI

THE RECENT TRAGEDIES involving the death of two schoolchildren in Gurugram have evoked the usual responses — demonstrations in protest, the institution of a "probe", the suspension of the principal, a flurry of debates in the media and so on. But the fact is that these tragedies (and indeed, many more before them, reported and unreported), are only the symptoms of an entire educational system that has gone horribly wrong.

Consider, for a moment, the following: Who sets up most of the private schools in the country and why? Barring exceptions, most private schools are set up by property dealers, liquor barons, politicians and the like, with a two-fold purpose. First of all, schools give them a fig leaf of respectability. And they are also a great avenue for the investment of dubiously acquired wealth. To impart education is very rarely the primary motive. The driving force thus becomes the recovery of the capital invested and in order to achieve this, corners have to be cut. Among the softest targets for the axe are safety and security and teacher training. After all, parents grateful for admission are hardly likely to ask questions relating to safety and security measures. Also, security measures go largely unnoticed, unlike swimming pools, air-conditioned buses and "smart" classrooms.

But do not these schools have to conform to some kind of regulations in order to secure affiliation? Of course, they do. And both the CBSE and ICSE have, on paper, very stringent norms governing the process. But the devil lies in the implementation. We all know how "inspections" are manipulated in this country. When I was heading a well-known residential school in the south, I was deputed by the CBSE to inspect a local school seeking affiliation. I was phoned by one of my own governors who happened to be a local MLA to offer the friendly advice that the promoter of the school was a very good friend of his and that I should carry out the inspection keeping this in mind!

If the new schools circumvent the norms,

Unsafe at school

The problem goes back to the way in which we view education, the hierarchy drawn of 'educational needs'

If the head of the school and the security agency entrusted with the well-being and safety of the students are both questionable in their level of competence, it is hardly likely that the teachers, who should really be the ones with their ears to the ground, will have any clue about spotting likely danger areas. Teachers also seek refuge in the fact that they are overburdened anyway and have to rush off for their private tuitions. What this effectively means is that those closest to the students are, in reality, quite far removed from a critical area of concern in more ways than one.

the older ones do not do any better. They generally suffer from the fact that they are housed in very old buildings, and compliance with safety norms would involve huge expenditure — in some cases, so high that building afresh would be cheaper. I encountered this problem in both the old "public" schools that I headed. In fact, in one, I discovered to my horror, that none of the buildings had any fire escapes. The state of affairs in most government schools is pitiable. They are, for the most part, too starved for funds to make safety a priority, and are, by and large, manned by staff just intent on getting through the day. And I am not even bringing the state of our rural schools into this discussion.

The other relevant question is, who is the person on the ground responsible for the implementation of safety norms? It is, of course, the head of school. Do heads of schools have the requisite training for this responsibility? Of course not. Just as they have no training in either financial management, the legal aspects of running a school, public relations or any one of the areas vital to school management, heads have no training in safety and security as well. So how is a head supposed to be sensitive to the requirements in this critical area?

The management and head (both of whom are equally ignorant), are thus quite content to hand over the responsibility to some private security agency. Anyone who knows how these agencies operate will also know how (in)competent they are. Most of these agencies (and more so, the ones at the lower end, which schools can afford), are quite content to have a hugely under-paid and untrained force, whose only claim to "security" is that they wear a uniform, practise marching in public view and salute the principal. And these are the people entrusted with not only guarding the premises but also responding to emergencies. All this while when even simple safety procedures are not followed. How often, for example, are fire extinguishers checked? How often are disaster drills held? The net result is that when

disasters do occur, everyone is running around like headless chickens.

The problem is further compounded by the fact that there is no way in which a regular audit in safety measures can be conducted. None of the school boards (although they have comprehensive manuals) have either the resources or the expertise to ensure conformity with safety measures. In the good old desi way, safety and security are "Ram bharose".

If the head of the school and the security agency entrusted with the well-being and safety of the students are both questionable in their level of competence, it is hardly likely that the teachers, who should really be the ones with their ears to the ground, will have any clue about spotting likely danger areas. Teachers also seek refuge in the fact that they are overburdened anyway and have to rush off for their private tuitions.

What this effectively means is that those closest to the students are, in reality, quite far removed from a critical area of concern in more ways than one. I recall a distraught mother calling me soon after I had relinquished the headship of a well-known residential school. She was sobbing hysterically whilst informing me that her son had just died in a dormitory on account of an electric shock received while making coffee with an improvised device. Those being the "pre-media" days, the incident went unreported. Surely, better supervision and training might have averted the calamity.

The problem is therefore complex. We must, of course, be "pro-active" in this area rather than "reactive". But the issue runs much deeper. It goes back to the very way in which we view school education, the priorities that we accord in the hierarchy of "educational needs" and whether we are really interested in investing in a better and safer future.

The writer is former headmaster of Lawrence School, Lovedale, and former principal, Welham Boys' School, Dehradun



GAURAV BHATT

YIN AND yang, Chinese philosophy describes how two seemingly opposing forces are complementary and interdependent. Is there a more apt way to describe the relationship between Roger Federer and Rafael Nadal?

The righty versus the lefty. Federer's free-flowing shot-making and point construction, a remnant of tennis's classical era versus Nadal's brutish ground-strokes and untiring legs, a template for today's baseline slug-fests.

While less pronounced, the contrast is evident off the court as well, even extending to their attitude towards facing each other. Quizzed about a potential, long-awaited first meeting at Flushing Meadows last week, Nadal said, "If I am in the semifinals, no. It's obvious, no? It sounds very good, but... I prefer to play against another player, an easier one if it's possible." Federer's reply? "I'd love to play Rafa here in New York."

Rivalries in tennis are unlike any other — high-stakes, perpetual and personal. The tug of war is what coaxes top players to leave their hearts out on the court. The most compelling, however, are the rivalries with the most contrast. Chris Evert and Martina Navratilova come to mind. Evert, the steady base-liner, Navratilova, the constant attacker. There's another, the rivalry of "Ice and Fire". While Bjorn Borg and John McEnroe had other, longer rivalries, there's a reason they don't make movies about Borg-Connors or McEnroe-Lendl. The strikingly different demeanour of the parties involved is what

PARTNERS IN CRIME

Roger Federer, Rafael Nadal have crafted a rivalry for the ages, without bitterness

caught the fancy of many. The cool Swede almost emotionless on court, the petulant American prone to outbursts.

Much like Evert-Navratilova or Borg-McEnroe, there has been no bad blood between Federer and Nadal, a rivalry split 23-14 in favour of the latter. Not that there wasn't scope for any.

With his idol Pete Sampras out of the game and Andre Agassi meandering, Federer, then 23, had already assumed the throne in 2004. He ran roughshod for three seasons, overwhelming all but one pretender. The two first met at the Miami Masters in 2004, and the 17-year-old Nadal beat then world No. 1 Federer. After the loss, Federer spoke about the struggle to handle the Nadal's heavy topspin and his struggle to counter the high bounce. It would take him 13 years, a bigger racquet and a rushing backhand to get out of the quandary caused by that deadly topspin.

A couple of years later, the two met on the red clay of Rome. A tense five-hour, five-set epic which saw Federer waste two championship points and, uncharacteristically, let his frustration show. During the final, he looked toward the player's box and Rafa's uncle-cum-coach Toni Nadal. "Everything all right, Toni?" "I caught him in the act. He was coaching a little bit too much again today," Federer said. Nadal replied, a day later. "He has to learn to be a gentleman even when he loses."

Promoters, TV moguls and tournament organisers were left salivating. After all, some

animosity, a little trash talk would have only driven the two up the charts. That never happened. They seemed content ruling their respective territories of grass and clay and trading the hard court wins. Unlike several other rivalries, this one never incorporated personal dislike, even when Nadal stormed Federer's bastion to win the 2008 Wimbledon.

Today, the elder statesmen are back holding the top two spots for the first time since 2011 — a duopoly preferable to the monopoly Novak Djokovic enforced in 2015. The ascent of the gluten-free Serb and worthy contenders such as Andy Murray and Stan Wawrinka have eclipsed the great rivalry of our times and Federer and Nadal have been unable to forge a similar relationship with any of them. "Our bond is stronger than the one I may have with Novak Djokovic or Andy Murray. I feel the most connected and closer to Rafa," Federer said in 2014.

Maybe the two plotted the renaissance last year when their injury lay-offs overlapped. But with the younger rivals off with injuries and the youngest not up to the mark, the stars aligned. Federer and Rafa had a field year, running away with the four Grand Slam titles in a 2017 that seems like a throwback to 2007.

Perhaps, there is a better way to describe the relationship. Federer-Nadal: Partners in crime.

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SEPTEMBER 15, 1977, FORTY YEARS AGO

INDIRA'S CAPITAL TALK IN HER FIRST major public appearance in the capital since she was ousted from power, former prime minister Indira Gandhi launched an all-out attack on the Janata government for its lack of direction, distorted priorities and approach to planning. The former prime minister delivered a lecture on "self-reliance or surrender" organised by the Krishna Menon Society. The Kamani auditorium in New Delhi, where the event was held, overflowed with an excited, cheering crowd. Mrs Gandhi spoke extempore for 35 minutes, covering a wide range of topics from the Farakka talks to the Belchi incident involving Dalits in Bihar. Her opening remarks reflected the atmosphere of fear about impending arrest. With the solid wall of

photographers on one side and power lights (for TV cameras) on the other, "I feel as if I am already in jail" was how she began her speech.

RSS ON JANATA

THE RSS IS NOT acting as the muscle of the erstwhile Jana Sangh in the Janata Party, Yadavarao Joshi, organising secretary of the RSS, said. He mentioned the controversial Madhu Limaye-Balasaheb Deoras meeting in May in Bombay and said the Janata's approach to the question of the RSS merger was unacceptable, because their assumptions about the RSS were wrong. The Janata Party wanted the RSS to liquidate and become its volunteer youth corps. This could not be possible, because the RSS was not a youth organ-

isation nor was it a volunteer corps. He said the fear of a RSS-dominated nation was being whipped up by Indira Gandhi and people like her. Joshi recalled that after the ban on the RSS was lifted in 1949, the Congress Working Committee had passed a resolution calling for the RSS to join, but Jawaharlal Nehru reversed it.

INDO-USSR PANEL

THE GOVERNMENTS OF India and the Soviet Union decided to upgrade the Indo-Soviet Joint Committee to enable closer collaboration in the economic, technological and cultural fields. External affairs minister Atal Bihari Vajpayee and the Soviet deputy prime minister, I.V. Arkhipov, will be the co-chairmen of the commission.

15 THE IDEAS PAGE

WHAT THE OTHERS SAY

"It was an exciting moment for millions of home fans as well as Pakistanis abroad when Sarfraz Ahmed's men first entered the field on Tuesday to take on the star-studded World XI."
—DAWN

A higher opportunity

India can become a global hub for higher education. Much can be achieved without government having to do the heavy lifting



ECONOMIC GRAFFITI

BY KAUSHIK BASU

A LONGSTANDING PROPOSITION in economics, under the label of "industrial policy", emphasises the importance of the government choosing special sectors to focus on and incentivise. The expectation is that this will create enough spillovers to drive up overall growth. Industrial policy has had its share of demurrers, arguing that the state should not get into picking winners and losers; but the fact is that it has been used to great effect by Britain, Germany and other nations during the Industrial Revolution and by China in recent times.

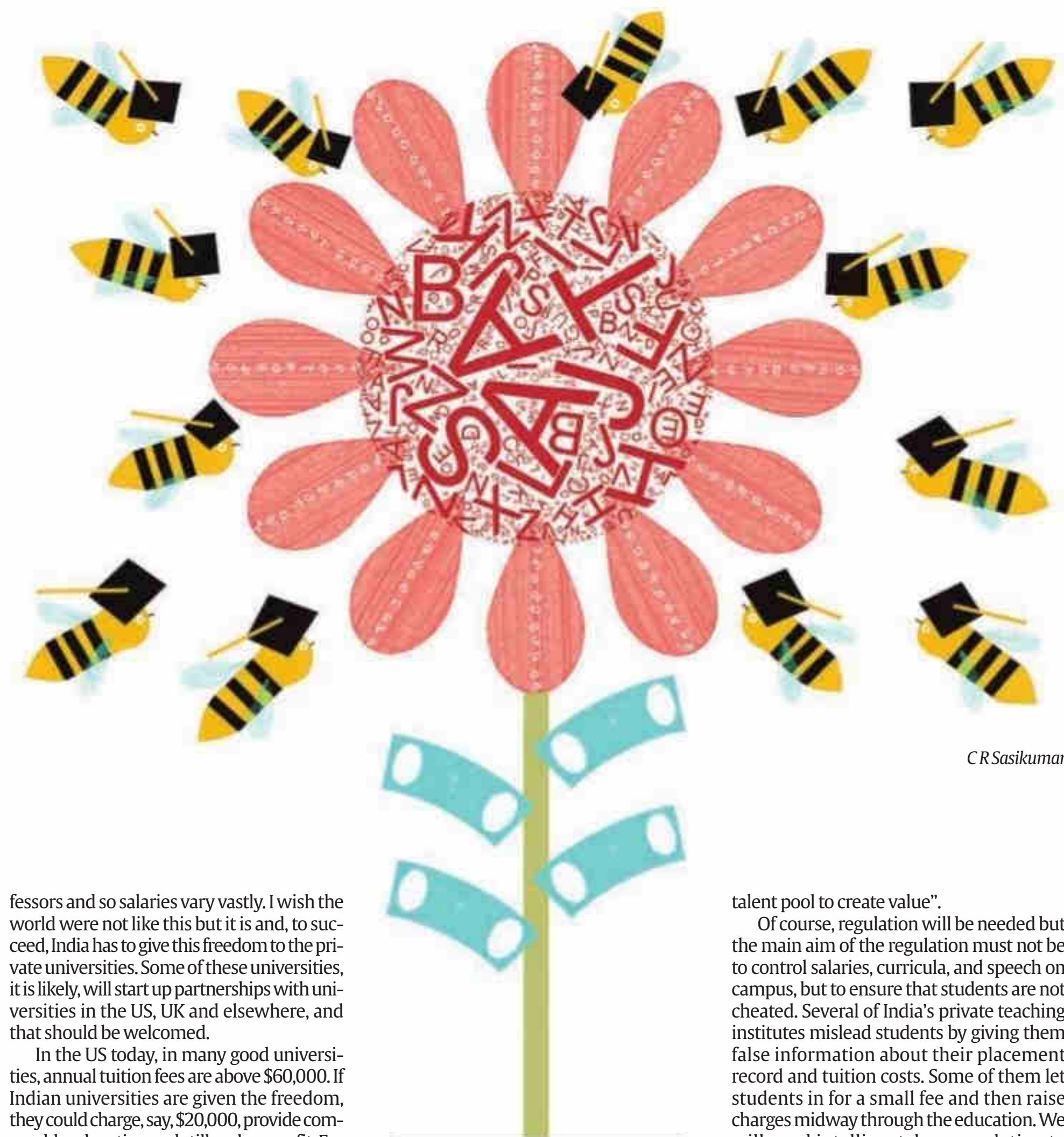
Without entering that debate, I want to point to two areas where the Indian government should put in special effort: Medical tourism and higher education. India made huge strides in the former in the early 1990s, but this sector seems to be running out of steam, with other emerging nations taking the lead. We need more effort here. The other sector where the prospect is big is a global hub for higher education. In both these sectors, much can be achieved, without the government having to do the heavy-lifting. Given my own expertise, I focus here on the second.

From ancient Greece to 19th century Britain and 20th century United States, there is evidence that when nations do well in higher education and research, they do well in economic development. For historical reasons, India has a huge strength here. First, while India's colonial history did plenty of harm, it conferred one advantage. When leaving India, luckily the English could not take away their language. English is the world's most important language and India's strength in it is a natural advantage today. Second, thanks to the far-sightedness of India's founding fathers and, in particular, Jawaharlal Nehru, India took major steps in nurturing higher education and scientific temperament, setting up the IITs, the IIMs, and promoting some fine universities.

One can see the advantage this history has conferred from indirect data. America has a large Study Abroad programme under which its students take a break from their home universities and go to other countries for education. In 2014-15, 3,13,415 students went abroad under this scheme. The biggest destination is the UK — 12.2 per cent of the students went there — followed by Italy (10.8 per cent) and Spain (9 per cent). What is surprising is India does not do too badly on this. It is the 14th most popular destination (1.4 per cent).

If we can build on these strengths and create room for private universities and institutes to flourish, India can become a destination for students from around the world. This would not be a charitable act. The aim should be to provide high-quality education and charge international students the full fee for this (though I would recommend subsidies for students from poor countries).

Private firms that invest in this sector will need some flexibility on how much they charge and what salaries they pay. In the US, universities compete to attract the best pro-



CR Sasikumar

fessors and so salaries vary vastly. I wish the world were not like this but it is and, to succeed, India has to give this freedom to the private universities. Some of these universities, it is likely, will start up partnerships with universities in the US, UK and elsewhere, and that should be welcomed.

In the US today, in many good universities, annual tuition fees are above \$60,000. If Indian universities are given the freedom, they could charge, say, \$20,000, provide comparable education and still make a profit. For a four-year education, this means a saving of over \$1,60,000 to the student. It is likely that students would come to India not just from developing nations but also rich countries. The big advantage of this is that the government does not have to do much beyond creating an enabling environment. The return on this investment will be enormous.

Often, our biggest plans flounder not because of big mistakes, but because the nuts and bolts are not in place. The government has to pay attention to the little matters. For example, students should be able to get visas for their two-, three- or four-year study at one go. No one will want to come here, however good the education, if he or she is at the mercy of the bureaucrat in the visa office every six months. There are nowadays retrogressive groups trying to take India backwards in the name of Hindutva. They will have to be restrained from shaping curricula if our institutes of higher learning are to flourish.

There is enough enterprise in India and enough profit potential in this sector that private universities will crop up and do the actual delivery once the government provides this basic ethos. As Ratan Tata wrote in the *Oxford Companion to Economics in India*, if the right policies are in place, India can "leverage the country's scientific and engineering

There is evidence that when nations do well in higher education and research, they do well in economic development. For historical reasons, India has a huge strength here. First, while India's colonial history did plenty of harm, it conferred one advantage. When leaving India, luckily the English could not take away their language. English is the world's most important language and India's strength in it is a natural advantage today. Second, thanks to the far-sightedness of India's founding fathers and, in particular, Jawaharlal Nehru, India took major steps in nurturing higher education and scientific temperament.

talent pool to create value".

Of course, regulation will be needed but the main aim of the regulation must not be to control salaries, curricula, and speech on campus, but to ensure that students are not cheated. Several of India's private teaching institutes mislead students by giving them false information about their placement record and tuition costs. Some of them let students in for a small fee and then raise charges midway through the education. We will need intelligent, lean regulation to deter such behaviour.

In this new setting, the quality of universities will vary, with only a handful being of top international standards. That is unavoidable. If we try to have 800 universities (as of February 2017, India had 789) of uniform standard, they can only be uniformly mediocre.

It is true that the private universities are likely to cater to education in the commercially more lucrative disciplines, whereas a nation's advance also depends on literature, poetry and pure mathematics, which have little immediate commercial value. The advantage of the nation becoming a global hub for education is that this can yield so much income that the government can then take the responsibility of providing these other kinds of education to its own citizens. The government should also take the responsibility to ensure that all Indians get education, taking account of the fact that many are so poor that they will have to be provided education for free.

But even with these caveats, the investment-to-return ratio for the government in the education sector can be disproportionate. Few other sectors can match it.

The writer is C. Marks Professor at Cornell University and former chief economist and senior vice president, World Bank

Going digital

All technology is vulnerable. What is needed is mitigation of risks of Aadhaar, not its abrogation



AJAY BHUSHAN PANDEY

THE SUPREME COURT has declared the Right to Privacy a fundamental right, albeit subject to reasonable restrictions in legitimate state interest. In this context, the role of Aadhaar in transforming India will surely be debated. India has embarked on a major revolution towards a transparent economy through digital payments. Digital payment, thus far, has been the exclusive privilege of a few who could afford debit or credit cards and could handle pins, passwords, OTPs and so on. India's cash-to-GDP ratio is around 12 per cent, among the highest in the world. The share of digital payments is said to be about five per cent of total personal consumption or even lower at two per cent of total transactions, which are among the lowest in the world. Now with 1.17 billion Aadhaar cards and an equal number of mobile phones, we have the opportunity to take digital payment to the masses.

Aadhaar will help India leapfrog traditional payment systems such as cheques, drafts, debit cards, POS (point-of-sale) devices and transition to modes of digital payments not seen even in the most advanced countries. BHIM with UPI was launched by the prime minister on December 30, 2016. UPI will have a far-reaching impact because it is India's own internet of digital payments. UPI is real time and fully interoperable across all banks. There are 350 million smartphone users in India, who can use UPI to make digital payments up to Rs 1 lakh without any card or POS device. Merchants can also use the Bharat QR Code to receive payments.

There are 300 million Indians living in rural and urban areas, who do not have credit cards, debit cards, smartphones or feature phones or who are not financially literate to handle PINs, passwords etc. How do they pay digitally? For them, BHIM-Aadhaar, launched by the prime minister on April 14, will prove to be convenient. In this mode, a retail corner shop would not need an expensive POS device such as a debit or credit card swipe machine. He can use his own smartphone with a fingerprint scanner, which costs around Rs 2,000, install the BHIM-Aadhaar app and link it to his bank account. Customers can pay small amounts upto Rs 2,000 without needing a debit or credit card. Upon Aadhaar authentication of the fingerprint, the money will be debited from the Aadhaar-linked bank account of the customer and credited to the merchant's account. Each one of the more than 700 million people who have linked their Aadhaar with their bank accounts, can now use her or his fingerprint to make payments.

However, beneficiaries of the cash economy as well as traditional payments systems oppose using Aadhaar in digital payments by raising concerns about the Aadhaar database being insecure, fingerprints being vulnerable to hackers etc., as if

the payment systems based on physical signatures, cheques, debit cards, ATM cards, PIN etc. were absolutely safe and had no vulnerabilities. They circulate stories showing how unsafe biometrics are, how a silicon replica of a fingerprint was used to hack into an iPhone etc, and thereby create a phobia against new technologies. They conveniently forget that people have been writing cheques and putting their physical signatures on documents for ages, knowing fully well how easy it is to forge a signature. Similarly, we read about frauds in ATMs, debit cards and internet banking through cloning, scheming, spoofing, phishing etc., and yet we have not stopped using them. Every technology is vulnerable and subject to risks. What is needed is mitigation of risks, not abrogation of technology.

The Aadhaar-based payment system has been robust and secure, which is evident from the track record of the Aadhaar Enabled Payment System (AEPS). The AEPS provides doorstep banking through more than 1,30,000 banking correspondents to people living in remote villages and enables them to withdraw or deposit money using their fingerprints on Aadhaar-based micro-ATMs. In the last four years, more than 700 million transactions have been carried out without a single case of financial loss due to fraud or identity theft. Besides, Aadhaar continuously reviews emerging threats and takes measures to counter them and minimise risk.

Further, three major reforms happened in the last six months, which would make UPI and Aadhaar-based payment systems even more secure. First, in February 2017, Parliament amended the Income Tax Act to mandatorily link PAN with Aadhaar. Second, the Supreme Court in the *Lokniti Foundation* case has required that more than 100 crore existing mobile SIM cards be biometrically verified with Aadhaar by February 2018. Third, the government amended the Prevention of Money Laundering Rules in June this year to require every bank account to be verified and linked with Aadhaar and PAN by December 31, 2017. In BHIM-Aadhaar and UPI, since the bank accounts and mobile numbers of the sender and receiver of the payment are linked to their Aadhaar and PAN cards, the transactions will undoubtedly be safer. In the worst case, if there is an unauthorised transfer from an account, the beneficiary can be identified through Aadhaar.

India has set an ambitious target of achieving 2,500 crore of digital payment transactions this year. Efforts are on to bring down transaction costs so that consumers are not at a disadvantage for choosing to pay digitally. The US in 2010 undertook reforms to protect consumers of digital transactions. The EU also passed regulations in 2015 to rationalise and reduce transaction fees. Similar steps are necessary in India to ensure mass adoption of digital payments.

Democratisation of digital payments through UPI and BHIM-Aadhaar will lead to a less cash economy, rid the country of black money and tax evasion and bring large numbers into the financial mainstream.

The writer is the CEO of Unique Identification Authority of India

The long term gain

After the shortlived disruption, demonetisation is proving its critics wrong



ANIL BALUNI

THE LATEST FIGURES released by the Reserve Bank of India clearly show that Prime Minister Narendra Modi's historic and bold decision — demonetisation — was in the national interest and in the interest of the common man. The decision, which was aimed at checking black money and strengthening our economy, has already started bearing fruit.

Unfortunately, Opposition parties have conveniently ignored these positive outcomes and have criticised the move which is being seen as an economic revolution the world over. Demonetisation was painted as a problem for the common man and an immature decision by the government. A former finance minister was crying foul over the move when, at the same time, his son was appearing before the CBI in a fraud case.

RBI figures show that lakhs of fraud transactions are already under scrutiny. Over three lakh shell companies have been unearthed and 2.1 lakh companies have been deregistered due to irregularities. As many as 1,150 companies involved in money laundering have been caught and Rs 13,300 crore has been recovered.

With demonetisation, the dream of a cashless economy is being realised. The RBI, by collecting 99 per cent of the Rs 500 and Rs 1,000 notes made defunct on November 8, 2016, amounting to about Rs 15.28 lakh crore, effec-

tively responded to the challenge. The common man of India too stood firmly with the prime minister. By standing in long queues and waiting for hours outside banks, Indians showed their acceptance towards Narendra Modi's decision.

The latest RBI figures show that the government has not only been successful in flushing out black money but also eliminating funding for terrorism in Kashmir and Naxalism in affected areas. Another major impact of demonetisation has been the elimination of fake Indian currency notes which were used to fund terror and weaken our economy.

Demonetisation had important multi-pronged objectives. The move has led to the conversion of the non-formal economy into a formal economy, thus expanding the tax base and making funds available for social and development projects. But its major impact has been felt in the way Indians have adopted a cashless mode of transactions, giving a big boost to digitalisation. From 71.27 crore digital transactions in October 2016, this figure has gone up to 111.45 crore in May 2017. Experts say that by 2020 digital payments in India will touch \$500 billion. Imagine the kind of positive impact such a development will have on our economy.

Demonetisation has also led to a crack-down on tax defaulters. So far, dubious trans-

actions worth over Rs 1.7 lakh crore have been caught, showing how a parallel black economy was thriving due to the indecision of previous governments. In 2016-17, a total of 3.61 lakh complaints related to suspicious transactions were registered against 61,000 complaints in 2015-16, proving how effective the government was in dealing with tax fraud. Post demonetisation, tax authorities have found undisclosed income worth over Rs 15,497 crore, a remarkable jump of 38 per cent.

A significant portion of Specified Bank Notes (SBNs) deposited could possibly represent black money. Accordingly, Operation Clean Money was launched on January 31, under which scrutiny of about 18 lakh suspicious accounts was initiated, a first in India's history. All this has been possible because the Modi government showed the political will to cleanse the system.

In yet another first, there is a substantial increase in the number of income tax returns filed after demonetisation. While ITRs have increased by 34 per cent, advance tax collections of personal income tax (other than corporate tax) has shown a remarkable jump of over 42 per cent.

The demonetisation drive also led to a change in saving habits and the formalisation of the assets market. Considerably more funds

came into the organised financial markets. For example, the total assets under management (AUM) of mutual funds rose by 54 per cent by the end of June 2017 from March 2016.

By August 4, the RBI had ensured liquidity of Rs 10.5 lakh crore in our banking system as compared to Rs 5.2 lakh crore a year ago, which has resulted in banks reducing interest rates. The beneficiaries have been people who have taken loans and are paying lower EMIs.

The impressive revenue collection under GST is also partially attributable to the demonetisation drive. The total revenue of GST remitted up to August 29, is Rs 92,283 crore, that too with only 64.42 per cent of assesses having completed their payments. Almost 19 lakh new taxpayers have registered with the GSTN.

Belying the critics of demonetisation, the Modi government has been able to steer the Indian economy towards a new growth path. Demonetisation and the introduction of GST have been recorded as watershed moments in India's history, where a strong prime minister made bold moves towards a New India. With demonetisation's short-term effects having played out completely, it is its long-term positive impact that will make the Indian economy stronger and ensure the well-being of its people.

The writer is head, BJP media cell

LETTER TO THE EDITOR

REFUGEE ISSUES

THIS REFERS TO the article 'Embrace the Rohingya' (IE, September 13). India is the home to over three lakh refugees and is currently facing severe security threats. Also, a rise in the refugee population may cause a strain on local infrastructure and resources. The country, by and large, doesn't take UN money to look after refugees. So the deportation of the Rohingya cannot be termed as a step that is biased towards Muslims. However, the government should take some steps to ensure resettlement and permanent citizenship status for the Rohingya in Myanmar.

Gourav Das, Midnapore

RIGHT MESSAGE

THIS REFERS TO the report, 'RSS bound by SC order on Ayodhya: Bhagwat' (IE, September 13). Mohan Bhagwat's unambiguous statement that SC order on Ayodhya will be binding on the RSS is reassuring and welcome. It is not too much to expect a similar commitment from the Babri Masjid Action Committee and other parties in the Ayodhya dispute which will settle the most contentious issue finally. Bhagwat's forthright disapproval of trolling and aggressive behaviour on the internet sends a strong message to the hotheads who abuse the social media to spread venom and hatred.

M.C. Joshi, Lucknow

JAPAN'S EXAMPLE

THIS REFERS TO the article, 'Why India needs a bullet train' (IE, September 12).

LETTER OF THE WEEK AWARD

To encourage quality reader intervention, The Indian Express offers the Letter of the Week award. The letter adjudged the best for the week is published every Saturday. Letters may be e-mailed to editpage@expressindia.com or sent to The Indian Express, B-1/B, Sector 10, Noida-UP 201301. Letter writers should mention their postal address and phone number.

THE WINNER RECEIVES SELECT EXPRESS PUBLICATIONS

While we must aim for beneficial technological and economic outcomes, both in the long and short-term, we should perhaps start taking a leaf or two from the regulatory, maintenance and vigilance framework of the Japanese railways. A sincere implementation of their admirable and effective systems could help the Indian Railways in cutting down on the number of mishaps and professionalisation of the existing Indian administrative machinery.

Alok Pandey, Kanpur