Breakthrough in sensitivity conjecture

Hao Huang's argument could finally help in the understanding of Boolean Functions

TECH-ENABLED

DEVANGSHU DATTA

When you make an application for a mortgage, you have to answer many questions on a form. The lender will want details about your age, health, income, net worth, other debts, family situations, etc. Those answers can be translated into binary "yes" or "no" responses, so far as the lender is concerned. Ideally, the lender wants somebody who is under 45 ("yes" for positive), who is in good health, without family encumbrances, a working partner etc.

The positive answers (say the applicant has a steady income that's sufficient to service the loan) can be translated into "1s" and the negatives (let's say, the applicant has diabetes) can be translated into "0". Then the score can be summed up. The lender may set a minimum cut-off score and take a decision on whether to offer a mortgage, and on what terms.

There may be some questions, which are complete "deal-breakers". For example, the applicant may have a very serious health problem. Or, the applicant may have been convicted for fraud, or some other serious crime. If one of those answers is a zero, the rest of the score will not matter. The mortgage will be refused. The entire score, in other words, collapses to zero.

This sort of string of ones and zeroes is known as a Boolean Function, named after the mathematician George Boole (1815-64) who first looked at such logical sequences in the 19th century. As anybody who has dealt with computers will know, the machines work in terms of ones and zeroes, with internal circuits (logic gates) being opened and shut on the basis of those numbers. Each zero or one in a string is one input, while the answer is the output.

Various Boolean functions may add up differently but the answer is always one ("the mortgage will be offered") or zero ("the mortgage will be refused"). The "sensitivity" of a string as it is known depends on the deal breakers, if any, as well as on the total number of ones or zeroes required for the outputted answer to be either zero or one.

This is a simple example of how understanding Boolean Functions matters in the real world. Everything a computer does, boils down to the use of Boolean logic. When you think of the number of things that are processed by computers, you get a sense of how important it is to understand how Boolean Functions work.

Each function can have different rules obviously. For example, there can be a blanket rule where the output is a 1, if any of the inputs are 1. Or there can be a rule where the output is 1, if there are an even number of ones in the input.

Mathematicians examine Boolean Functions in many ways. For instance, deal breakers are measured by the "sensitivity" of a Boolean function. If there are three deal breakers in that mortgage application, the sensitivity is three.

There are other measures like "query complexity", which tell the computer how many inputs are needed before an output may be produced. For example, an online health insurance form (or a doctor checking for symptoms) may start with a question about gender. The next question will vary depending on the first answer. There may be further variations in the following questions until the computer can calculate an output (or the doctor has a diagnosis). This is query complexity.

These values tend to be related — a computer scientist can usually judge what the value of one of these measures will be, for a given function, if the other measures are known. Usually one measure is the square, or the cube of another although other relationships are possible.

However, "sensitivity" is an outlier. For the last 30-odd years, mathematicians have been looking for ways to relate sensitivity to other measures of Boolean Functions. There have been dozens of papers written on the subject of the sensitivity conjecture — that it is indeed related to other measures of Boolean Functions.

Amazingly Hao Huang, a mathematician at Emory University, has just proved the sensitivity conjecture with an ingenious argument that looks at the way in which the points of a cube behave. The coordinates of the point of a cube can be represented by 000 (centre bottom), 001 (top front point), 010 (left bottom), 011 (left top), 111 (centre back top) etc. These inputs can be manipulated to colour the cube differently etc. Sensitivity is indeed related to other measures.

What is truly astonishing is that his proof is just two pages long and it was instantly accepted by the academic community. This breakthrough could lead to other results that help in the understanding of Boolean Functions.

How to make the horse drink water

For ideal monetary transmission, we need two benchmarks — one for loans and another for deposits

BANKER'S TRUST

TAMAL BANDYOPADHYAY

When it comes to monetary policy, a career bureaucrat could be more innovative than an economist. Reserve Bank of India (RBI) governor Shaktikanta Das has proved that.

After taking three baby steps since February, when the rate cutting cycle started, he changed track last week: No more baby steps (25 basis points or bps rate cut); not a giant step (50 bps) either. He followed the "golden mean" of the Buddhist philosophy — a 35 bps rate cut, bringing in the policy rate to 5.4 per cent.

Indeed, it was the decision of the rate setting body of the Indian central bank, the Monetary Policy Committee, but Das has been advocating such odd cuts for months now, as there is nothing sacrosanct about a 25 or 50 bps move that traditionally the RBI has been opting for. For him, 25 bps is too low and 50 bps is too high — a 35 bps cut is appropriate, at this juncture. If the same trend continues, the next rate cut could be 15 bps or even 40 bps, depending on economic conditions.

The Chinese central bank typically moves rates in multiples of 9 bps; for the European Central Bank, it is 10 bps; and the central bank of Taiwan, 12.5 bps. In the Das regime, the RBI will probably tread on the path of multiples of 5 bps.

One school of thought is that the Indian central bank has now been undoing what it had done in the past — too much of tightening — and more rate cuts should be on the table. But you could also say that the RBI has done enough since February and it cannot do the heavylifting of a slowing Asia's third largest economy alone. Soon, the law of diminishing marginal utility will catch up with it. In other words, with every successive rate cut, the impact will wane. Yes, that could be true for the market rates, but the credit story is different because the banking community is shy of transmitting the rate cuts.

Within hours of the latest round of rate cut, State Bank of India, nation's largest lender, rushed to cut its MCLR or the marginal cost of fund-based lending rate, by 15 basis points, roughly passing on 40 per cent of the benefit to its borrowers. A cumulative rate reduction of 75 bps since February and a change in the policy stance have led to 102 bps drop in the 10-year government bond yield but a feeble 29 bps cut in the bank loan rates. The government is the biggest beneficiary of the rate cutting cycle as its borrowing cost has gone down substantially but the banking system has cold shouldered corporate India and retail borrowers.

You can lead a horse to water but you can't make it drink. How does one ensure monetary policy transmission? Why doesn't the banking system pass on the benefit of low interest rates to the borrowers?

One way of looking at it is the bankers are lazy and greedy. They are always fast in cutting down the deposit rates but slow in paring the loan rates. Also, the benefit of lower loan rates is often given to the new borrowers while the old borrowers continue to pay high rates. This happens particularly in the retail loan segment. The largest contributing factor to such practices is the pile of bad assets. Banks do not earn any interest on bad loans and, on top of that, they need to provide for them. So, the good borrowers end up subsidising the bad borrowers.

But this is an oversimplification of the ground realities. Even after the banks cut their deposit rates, the new rates are applicable only to incremental deposits while almost the entire loan book gets re-priced immediately, following any loan rate cut. Also, the rate cut typically does not impact the banks' current accounts (on which they do not pay any interest) and savings accounts (most large banks have been paying 3.5-4 per cent interest on such accounts). So, the lowering of rate does not impact the cost of the entire deposit portfolio of the banks.

The transmission of the policy rates needs to be looked into both for loans as well as deposits — and not for loans alone. The only way to pare the deposit cost instantly is to have a substantial floating deposit base. Either the banks need to make the floating rate deposits attractive to entice savers or the regulator can explore an idea of making a part of the deposits linked to floating rates mandatory.

Media reports suggest a few banks are planning to make the RBI policy rate as the benchmark rate in place of MCLR which has been under the scrutiny of the regulator.

The Indian banking system's search for an ideal benchmark for loan rates has been on for 25 years. First, there was PLR or prime lending rate, introduced in October 1994. It was the rate at which banks used to lend to their top-rated clients but it had no relation to their cost of funds. Sometime early this century, the PLR was replaced by BPLR or benchmark PLR, which was supposed to factor in the actual cost of funds, operating expenses and regulatory requirements, provision for bad loans as well as profit margin. Then came the base rate (in July 2010) — supposedly more transparent and fairer to small and medium enterprises that had for so long been subsidising top-rated corporate borrowers. But that did not happen. So MCLR came in but again no one was happy and the RBI was planning to introduce a new benchmark from April — a move Das has kept on hold.

Unlike in the developed countries, where banks raise money from the market to lend, in India, deposits and capital are the primary sources of lending. So, the key to bringing down the loan rates is the cost of deposits. We need to look for two benchmarks — one for loans and another for deposits. In isolation, a benchmark for loan alone will never work. If we remain obsessed with monetary transmission for loans alone, banks may end up robbing Peter to pay Paul.

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CHINESE WHISPERS

The Naidu way

Vice-President and Rajya Sabha Chairman M Venkaiah Naidu completed two years in office on Sunday, when there was an event in Chennai. There Home Minister Amit Shah unveiled Naidu's book *Listening, Learning, Leading*, chronicling "two years of energetic, extensive engagement". "My thoughts always on my role in transforming India," Naidu states in the book. According to his office, Naidu has had 330 major public engagements, presided over 123 sittings of the Rajya Sabha, and visited 19 countries. The 257-page book has 232 photographs of Naidu's public engagements and a chapter on the "turnaround" in the functioning of the Rajya Sabha. The book notes in detail the success of the e-notice initiative that Naidu has introduced for Rajya Sabha members. In the just-concluded Rajya Sabha session, MPs submitted over 9,000 notices online, accounting for about 60 per cent of all such notices submitted.

Spirited speech by Rahul

The Congress on Friday had a meeting in New Delhi to discuss its position on scrapping the provisions of Article 370. Most top leaders — party general secretaries, state unit chiefs, and Chief Ministers Ashok Gehlot and V Narayanasamy — attended. Chief Ministers Kamal Nath, Amarinder Singh, and Bhupesh Baghel were absent, and Rahul Gandhi (*pictured*) reached the meeting more than an hour late. Sources, however, said he made amends for his late entry by giving a spirited speech. Gandhi asked those who wanted the party to support scrapping Article 370 how many more votes the Congress could hope to get if it did. The answer in unison was "zero". Sources said party General Secretary Jyotiraditya Scindia, who went public opposing the Congress stand on the issue, apologised to Gandhi for his public statement.

TMC makes a point

With the Congress directionless and the legislative strength of the Left parties decimated, the Trinamool Congress believes it has represented the real voice of the Opposition in the just-concluded Parliament session. The Trinamool has collated information to state that its members performed better than those of all other parties — not just the Congress but also the Bharatiya Janata Party (BJP) —in raising issues during the Zero Hours in the two Houses and in contributing to debates on Bills. According to its data, Trinamool members' contribution to debates on various Bills in proportion to the number of its members was worse that of only the Dravida Munnetra Kazhagam, but better than that of the BJP and Congress, while its MPs' Zero Hour mentions were better than those of all these parties.

INSIGHT

Dissecting the slowdown, evaluating the response

The second part of the series in which top economists and thinkers offer their views on how to revive the economy

SAJJID Z CHINOY

To appreciate India's current economic challenge, one has to only realise that if growth in April-June prints below 6 per cent again — as we expect it will — this would be the first time in almost seven years that growth has printed below 6 per cent for two successive quarters. The last time this happened was in the run-up to the 2013 taper tantrum, when India's internal and external imbalances ruptured and dragged activity down.

It's tempting to characterise India's slowdown as either "externally induced", on the one hand, or "structural", on the other. The first would imply there is very little policymakers can do, because a falling global tide is depressing all boats. The second would imply there is no role for any counter-cyclical policy response. We would argue the data conform to neither of these characterisations.

While India's growth slowed to 5.8 per cent in the January-March quarter, creating a sticker-shock for markets, it wasn't because of slowing external demand. Exports grew at nearly 11 per cent that quarter, reflecting a strong first quarter globally. To be sure, global growth has since slowed precipitously as the uncertainty-magnifying effects of the trade conflict dampen business sentiment around the world. Exports are therefore expected to weigh on growth in the coming quarters. But while they may compound the slowdown, they weren't its genesis.

Some argue that India is in the midst of a "structural consumption slowdown". But this is not borne out by the data. Private consumption growth has averaged almost 8 per cent for the last four years, and has begun to slow only in recent quarters, albeit sharply, suggesting there is nothing structural about its slowing yet. Instead, consumption began to slow after the IL&FS mayhem led do a shutdown of the NBFC sector, which had financed (unsustainably so, one could argue) much of the recent spurt in consumption. With public sector banks constrained by capital and still working through their NPA woes, they were understandably risk-averse to jump in and fill the gap. The continually worsening agrarian terms of trade further hurt rural purchasing power, and with the auto sector experiencing meaningful, though idiosyncratic, stress, consumption came up against the perfect storm.

The fact that the slowdown has a cyclical component to it is also evident in the evolution of core inflation. The annualised momentum of core-core inflation was 6 per cent in the second half of 2018 but dramatically slowed to less than 3 per cent in 2019, suggesting a sharp drop-off in pricing power and confirming output gaps have opened up.

What then should the countercyclical response be? With headline and core inflation falling meaningfully, some space for monetary easing has opened up. The question is: How efficacious will monetary easing be in the current environment? Until the financial system is repaired, the transmission of monetary policy is likely to be limited. Despite multiple rate cuts and a deluge of interbank liquidity, a large chunk of NBFCs are still being rationed out. The binding constraint hasn't been liquidity or the cost of capital. Instead, the source of lenders' risk aversion has always been asymmetric information about the underlying asset quality of NBFCs. Without some sort of "asset quality review" by regulators, the logjam is likely to continue, we think.

Bank credit growth, too, has slowed sequentially, suggesting heightened risk aversion by banks as they reassess risk against the backdrop of rising household debt, and some public sector banks still face capital constraints. Therefore, even as risk-free rates have gone down, credit spreads have gone up. All told, even as monetary policy has been eased, the plumbing (financial sector) is partially choked, leading to limited transmission. In this environment, easing beyond a point may not do much to the real economy, but simply increase the risks of an asset price bubble.

FIGHTING THE SLOWDOWN

Unsurprisingly, calls have renewed for more "fiscal stimulus". This would be counterproductive. Public sector borrowing (8-9 per cent of GDP) is consuming all household financial savings (7-8 per cent of GDP). These pressures have pushed up the term premium, keeping the cost of capital higher than it needs to be. Any fiscal stimulus at this stage would simply result in bond yields and quasi-sovereign spreads firming (perhaps sharply), which will further impede the transmission of monetary policy. Similarly, policymakers must resist calls to constantly tinker with GST rates, which adds to policy and fiscal uncertainty.

Finally, it's important to ensure monetary conditions are not inadvertently tightened by letting the exchange rate appreciate. India's bilateral merchandise trade deficit vis-à-vis China has increased over the last 15 years, and accounts for India's entire non-oil, non-gold trade deficit. Things haven't been helped by the rupee appreciating 18 per cent in real terms vis-à-vis the CNY (Chinese yuan) over the last five years. With the CNY breaching the psychologically important threshold of seven against the US dollar last week, and more depreciation expected as trade tensions deepen, it's important the rupee be allowed to depreciate in tandem with the CNY, so that bilateral competitiveness is not further eroded.

But the economic challenge isn't limited to just a demand slowdown. Business sentiment and "animal spirits" are flagging, which can't be reversed by just reducing the cost of capital. So what can the government do in the near term? How about doubling down on asset sales through a bold and decisive plan to privatise and strategically disinvest? Not only will this signal reform intent, but alleviate fiscal concerns while creating resources for a public investment injection, and attract foreign interest for some of these assets.

In the near term, therefore, the focus must be to fix the financial plumbing to allow monetary policy to transmit more fully, ensure India's exchange rate remains competitive, sell assets more aggressively (as a visible down-payment of reform intent), and exhibit strategic fiscal restraint.

But the medium-term challenge is perhaps more daunting. Growth has been driven in recent years by debt-fuelled consumption by households (which cannot sustain beyond a point) and the positive terms of trade shock from the collapse in oil prices. Externally, with the trade war deepening and protectionism rising, the global economy will pose more headwinds than tailwinds. All this has only one implication. For growth to sustain close to 7-8 per cent in the medium term, the economy will need another wave of productivity-enhancing reforms. The Bankruptcy Code and the GST are a good start. But reforming land, labour, power, and the financial sector is now imperative. Sustained growth cannot be driven by a fiscal stimulus or a monetary stimulus. Only through a reform stimulus.

The author is Chief India Economist at J.P. Morgan. All views are personal

LETTERS

Show some restraint

This refers to "Interlinking of rivers: A dangerous idea" (August 9). The topography of the Indian sub-continent has, like any other part of the world, been predetermined by nature. Nature has determined the geographical and geological pattern for all perennial and non-perennial rivers with planned distribution of suitable soil and mineral resources. Therefore, investment of funds for diversion of water is tantamount to defying nature inviting self-destruction.

Problems arise due to increased habitation, necessitating intensive deforestation that has impeded the natural flow of river water. The excessive speed of flowing rivers in the catchment areas caused by deforestation and resultant soil erosion has reduced silt availability from the mountains, reducing soil fertility, creating floods and lowering crop yields. The channelisation of water from perennial rivers to drier areas is damaging because their geological and geographical purposes have already been determined. The availability of natural resources is thus in accordance with a planned climatic condition. Human intervention upsets these conditions. Additionally, diverting water through canals to interconnect rivers clashes with natural environmental planning, destroying the natural resources on either side. We should stop playing with the naturally planned environment created for our benefit and adapt our lifestyle with it to avoid destruction in the long run. Respect for nature will create a healthy population and in the process, a sound economy.

C Gopinath Nair Kochi

Winning hearts is key

Prime Minister Narendra Modi's post-Article 370 abrogation TV address to the nation has come in for fulsome praise from many people as well as large sections of the media because he reached out to the people of Kashmir with a slew of promises and did not openly demonstrate triumphalism. But the moot question is whether his promises of early polls, restoration of statehood, benefits to government employees on par with their counterparts in other Union Territories, filling government job vacancies and investment will make up for what the people of Kashmir lost or were robbed of because of its earlier special status. They are a balm inefficacious in healing the deep wound to the Kashmiri psyche. Winning the hearts and minds of Kashmiris alone will facilitate their integration into India. The withdrawal of special status and privileges is not the way to win their trust or vishwas.

G David Milton Maruthancode

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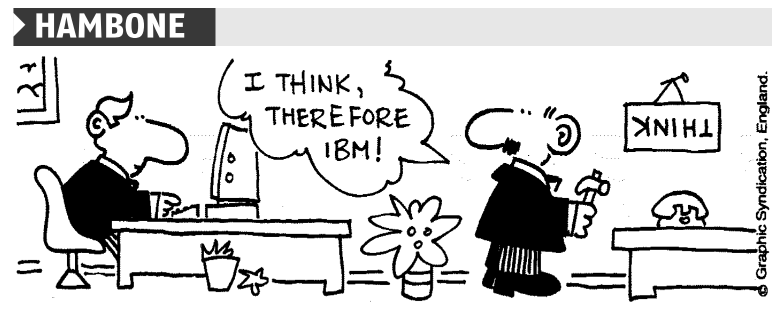
HAMBONE



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Moving onshore

India needs modern tools to hedge currency risks

The task force appointed by the Reserve Bank of India (RBI) to investigate the question of offshore rupee markets has submitted its report. The provocation for the report has been the recent sharp growth, in the committee's words, in the offshore trading volumes in the rupee non-deliverable forwards (NDF) market, "likely even beyond the volumes in the onshore markets". It is not surprising that the RBI is concerned about this issue. Maintaining the stability of the currency is one of its duties, even if it no longer targets a particular level for the rupee. If the value of the rupee is set largely by NDF markets that operate offshore and beyond the regulations and visibility of the central bank, then it becomes difficult to either anticipate or manage major changes. There is no major issue with the currency at the moment, but the "taper tantrum" episode of 2013 showed how the RBI can find it difficult to manage volatility in the currency markets.

The report correctly notes that there is little or no way to directly influence the construction of the NDF markets offshore. The only thing that is in the power of the government and the central bank to change is domestic regulations. The committee, led by former Reserve Bank deputy governor Usha Thorat, has correctly determined these should be altered to ensure that the incentives for traders to shift offshore trading in NDFs onshore are strengthened. The committee notes "there is a trade-off between the size/prominence of the offshore market and the extent of regulations/restrictions that are placed on cross-border transactions and foreign exchange markets/participants".

The clear implication is that the regulatory burden on transactions and participants is currently too high and irrationally structured, and they should be corrected. A growing economy with increasing linkages with the global economy requires modern tools to hedge currency risks.

It must be understood that fetishism for know-your-customer and a moral panic about round-tripping must give way to a clear understanding of how macro-economic stability requires the incentivisation of onshore trading. The committee suggests that at least exchange-traded NDFs should be permitted in the short term, though over-the-counter contracts are the eventual ideal. Definitely hedging volumes and convenience onshore need to be increased, so that legitimate hedging requirements are not taken to the overseas market.

While the committee's recommendations on how to ensure the rupee can be managed with greater visibility are well meant, the fundamental need is to ensure that the macro-economic environment itself is stable enough to make these concerns redundant. India needs to keep its own house in order. Often India's internal imbalances such as the high fiscal deficit and inflation result in external sector problems. Therefore, it is important that policymakers constantly work on strengthening macroeconomic stability. Strong and stable fundamentals would reduce the scope of speculation in the currency market.

In this context, a lower fiscal deficit and public-sector borrowing requirement will ensure that there are no concerns about debt sustainability. And real sector reforms to increase exports competitiveness will address the concerns about a high current account deficit.

Rising global uncertainty

India needs active policy intervention

The global economic outlook significantly worsened over the last week with no clear sign of reversal. The US designated China as a currency manipulator after the Chinese yuan depreciated past seven to the US dollar. The underlying reasoning is that China is manipulating its currency to help exporters. Earlier, as the possibility of a trade truce faded, along with the emergence of reports that Chinese firms have been asked to not import agricultural products from the US, President Donald Trump announced tariffs on an additional $300 billion worth of imports. The rise in trade tension resulted in a wider sell-off in risk assets. Stocks and emerging market currencies declined.

Although China has used its currency to push exports in the past, it is difficult to argue that the Chinese government intends to do the same thing even now. Other things being equal, slower growth and lower exports, partly because of higher US tariffs, are likely to weaken the yuan. Also, it is not in the interests of China to significantly devalue its currency at the moment. While a weaker yuan will indeed help exporters, it will affect plenty of businesses that have piled up foreign-currency debt over the years. In fact, China burned reserves worth about a trillion dollars defending its currency after the 2015 devaluation. A significant depreciation at this juncture could result in capital flight and complicate macroeconomic management.

The focus on currencies with increasing tariffs on imports from individual countries reflects the basic problem with the Trump administration's view of global trade. China is not alone. Mr Trump has accused the European Union, too, of currency manipulation. The distorted view of the world's largest economy will only increase uncertainty and impede global growth. For instance, risk aversion in the global financial system and the safe-haven demand have pushed up the Japanese yen. A stronger yen can complicate economic management in Japan. But an effort to intervene in the currency market could attract the wrath of the US.

The International Monetary Fund reduced its growth forecast for developing and emerging Asia largely because of the impact of tariffs on trade and investment. The trade tension is also affecting the US. For instance, as the Federal Reserve Bank of Atlanta has shown, investment in manufacturing declined by 4.2 per cent in 2018 because of trade tension. The Federal Reserve recently reduced interest rates for the first time since the financial crisis and markets expect it to cut rates further. Trade tension is being seen as a major risk to the current economic expansion in the US.

This has implications for India as well. For instance, Mr Trump has targeted India for higher tariffs. Also, India has not done well to increase tariffs on a range of items in recent years, including in the last Budget. Aside from bad optics, it is not in India's interests to increase tariffs. The trade-related problems will affect India through both the financial markets and trade channels. India will need active policy intervention to avert adverse consequences and capture possible opportunities, such as attracting firms that are moving out of China. Regrettably, India is not well prepared to deal with the changing global economic environment. The absence of policy adjustment would exacerbate the slowdown.

ILLUSTRATION: AJAY MOHANTY

Prioritise GDP, not tax revenues

The present tax policy is focused on increasing tax revenues, whereas it should try to obtain the same number of rupees of taxation, while enabling a higher GDP

SNAKES & LADDERS

AJAY SHAH

It is widely understood that the Indian taxation of corporations is unusual by world standards. This is also the case with the Indian taxation of foreign investors. The taxation of non-resident investors drives up the cost of capital for Indian firms, and adversely impacts physical investment in India. It hampers the growth of financial services and allied industries, and hampers the liquidity and market efficiency of financial markets.

Let's start in a world where India has residence-based taxation: That is, non-residents are not taxed. Suppose we try to sell foreigners Indian government bonds, and suppose the supply and demand are equalised at an interest rate of (say) 10 per cent.

Now suppose we add one more clause: We tell the foreign investor, "Of the interest that you earn in India, we want one percentage point as income tax." The interest rate required by the foreigners will immediately go to 11 per cent. The true cost of capital for the government does not change. Money is paid by public debt management and this shows up as income tax.

Many things do change. The bond market will involve a great deal of procedural friction, where the government first pays 11 per cent on its cost of borrowing, and then gets back a tenth of this as taxation. This is one illustration of the superiority of what all advanced countries do: Residence-based taxation.

Similar problems are found with Indian private corporate equities. We have taxation on transactions in the form of a securities transaction tax (STT). This violates the principles of public finance, where all taxation on transactions is considered "a bad tax". Instead of trading the shares of Infosys in India, the foreign investor will prefer using the Infosys ADR at the New York Stock Exchange (NYSE), where there is no STT.

The order flow that could have come to India is diverted to the NYSE. This reduces the liquidity and pricing efficiency of Indian financial markets. It also hampers the revenues of securities firms and other support services associated with the financial markets. Our attempt to tax foreigners is inducing a loss of exports and GDP in India.

The Mauritius treaty was a key part of protecting India from the consequences of mistakes in tax policy. India has long had bad tax policy, but the distortions imposed upon FPIs were limited through the Mauritius treaty. It all worked out okay, as long as fees were paid to service providers in Mauritius. Over the years, these protections have subsided. Now, there are many features of the Mauritius or Singapore treaties which are unusual by the world standards. As an example, the Mauritius treaty taxes royalty payments in ways that are not found elsewhere in the world. Similarly, the definitions and categories under 'permanent establishment' in the Singapore treaty are out of line with the way the rest of the world works.

The lost revenue adds up to rather large numbers, particularly when we look at the Nifty derivatives and the rupee derivatives. In about 2007, India had almost a 100 per cent global market share in the trading of India-related securities. From that point onwards, we have introduced a series of measures in financial regulation, taxation, and capital controls, which have induced a steady loss of financial markets business. Activity in the two largest financial products — the Nifty and rupee — is steadily moving out of India. With the INR, it is estimated that the loss of revenue for India, in 2016, works out to ₹60,000 crore per year *(http://ifrogs.org/POLICY/ndfReport.html)*.

Similarly, India-related fund management should take place here in India. Indeed, India should have become a base for global fund-management in South Asia or Asia. But this has not worked out. A great deal of India-related fund management has exited the country, in response to the policy environment, and the policy risk associated with future changes in taxation, capital controls, and financial regulation.

These problems are a test of our public policy capabilities. In the limit, we run the risk of becoming like some Latin American countries, where the financial markets have entirely moved to New York.

Tax policy is hampering the real economy. The most important raw material for a firm like Tata Steel is not coal or iron ore, it is capital. The global investor equalises the post-tax return obtained through putting equity and debt capital into competing steel companies in China, Taiwan, Australia, South Korea, or India. A foreigner who looks at a bond issued by Tata Steel only counts the post-tax rate of return, and compares this against the post-tax returns that can be obtained by other large steel companies of the world. When India has higher taxation, the cost of capital for Tata Steel goes up.

The Indian taxation of capital — corporate income tax, dividend distribution tax, cess, and STT — induces a higher cost of capital for Tata Steel, when compared with that obtained by its rivals abroad. This hampers the possibility of making and exporting steel from India.

Such enhancement of the cost of capital, for equity and debt capital of India's firms, is not in India's interests. It will induce a lower scale of investment, because the hurdle rate for investment projects in India goes up.

Tax policy is focused on increasing tax revenues or increasing the tax/GDP ratio. We should instead be asking how to obtain the same number of rupees of taxation, while enabling a higher GDP. Our objective should be a high GDP, not a high tax/GDP ratio. Tax reform is one of the important elements of the path to a $5 trillion GDP. Suppose we are at ₹20 of tax revenues on ₹100 of GDP. Suppose tax reforms make it possible to go to ₹20 of tax revenues and ₹150 of GDP. This is a highly attractive outcome. The purpose of tax reforms, and all economic policy, should be to foster GDP growth.

The writer is a professor at National Institute of Public Finance and Policy, New Delhi

Immigration in hotter times

DOWN TO EARTH

SUNITA NARAIN

I am sharing an image that has been haunting me. We are locked in a room where we can see from our narrowly opened window that the weather outside has gone berserk — fires in forests, heat waves, extreme rain, and storms, all happening as predicted. But our screams are not being heard. As if, it is happening somewhere else. Or not real.

I know this sounds too dramatic. But it is a fact. The impact of clearly changing weather patterns because of a warmer planet is happening in our face. But we are so distracted — trade wars, Brexit, immigration, economy (good and bad), nationalism, war and much more that goes with it are predominant. Climate change could not have happened at a worse time in human history it would seem. We simply don't have the bandwidth to handle it.

This is when it becomes clear that things are spiralling out of control. Every year, we are told, is the hottest year, till the next year comes around. Then a new record is broken. It is getting worse. That we know. We hear it; we can even feel it now.

We need to understand what this existential crisis means to people living on the margins of survival. It is a matter of record that every extreme weather event — flood or drought — forces people to migrate, searching for work. It pushes them out of their homes — sometimes this is temporary and sometimes relocation becomes permanent. But now, climate change has become that last straw breaking the camel's back.

Amitav Ghosh, in his new novel *Gun Island*, evocatively takes us through the generations of immigrants; when weather disturbances made people leave their homes in search of new livelihoods in the past and now. The migrant has always been that human face of change — good and bad. It is also a fact that migration is not only because of the push but also because of the pull — the grass is greener on the other side of the Mexican wall.

Today's interconnected world has simultaneous jeopardies — one, it transports climate-altering carbon dioxide emissions from one country to the global atmosphere, and, two, it transports global news at the speed of mobile telephony. The push and the pull will only increase in this context.

The question is what our response will be to this induced and hastened migration. Already immigration is defining the politics of many countries. In India, we are discussing how to count "outsiders" and we don't know what we will do once we have counted them. In Europe, the public mood (and elections) is being determined by images of hordes of boat people landing illegally; in the US, the wall and the millions that are awaiting entry are taking over airwaves, social media, and other public spaces. The "immigration" narrative is real, and already we are doing a really bad job in handling our response — both in words and in action. It is already adding to societal fear and insecurity; bitterly polarising communities and feeding the nationalist brigade.

Just think. When a white supremacist opened fire and massacred people in El Paso, Texas, US, he said that he was doing this to protect the world from climate change. His cold logic, written on his now taken down blog, is that Americans will never give up their lifestyle, which he accepts is destroying the planet. His answer: Remove enough people so that the US lifestyle can be sustainable. Kill them. Stop them from entering the US.

In the past I would have dismissed this rant as madness. But now we are getting to a point where the two crisis points will intersect, indeed implode. As yet, we have little data on the causes of migration. We talk glibly about climate refugees because it is hard to understand the nature and gravity of this problem.

This is not to say that migration is bad. The fact is cities and countries have been created because of people who have left homes and settled to build new prosperity. In India, we know that internal migration is the name of the employment game. Every region has vast numbers of people who come from the regions of distress — hit by flood or drought or destitution — or come because they seek new opportunities. Every Indian city is an amalgamation of different regions, languages, and food habits.

But it is reaching a tipping point. In India, we have no idea of the number of people who are migrating — in the short and long terms — because the last census was conducted a decade ago. But from the sheer number of illegal and unauthorised settlements springing up in cities, it is clear that the number of new settlers is huge. What this will do to politics is now apparent — from domicile reservations to migrant counting. It will only get worse.

I am writing this without an ending. I have no conclusions to offer. But I do believe it is time we discussed the true nature of our climate jeopardy. In human terms.

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China's syndromes in India's ocean

BOOK REVIEW

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Bertil Lintner's book *The Costliest Pearl* is perhaps the most comprehensive account of the contemporary geopolitics of the maritime Eastern Hemisphere. It covers the ground from Djibouti to Vanuatu and the water from the South China Sea to the Southern Indian Ocean. And although it covers the actions and reactions of the powers from within and without the region, it is China that lies at the heart of the plot.

In that sense, Mr Lintner's book mirrors the biggest geopolitical — and perhaps historic — narrative of our time: China's rise as a global power and its consequences for the countries of Asia, Africa and the Pacific. A number of books published in the last few years have sought to both chronicle international developments, assess and judge China's policies and actions, and offer policy prescriptions on what other countries ought to do about them. Written from the American, Australian, Indian, Singaporean or other South East Asian national perspective, these accounts are subjective and presume that the reader is concerned about the national interests of the author's country of origin.

Mr Lintner's readout, on the other hand, is detached. Even if he were batting for Sweden, where he comes from — which he isn't — that country has no dog in this fight. This makes his reading of the situation a little more objective than other books that you might read. As objective as the book is, Mr Lintner is not neutral. He does not see China as an innocent country trying to escape American attempts to keep it down. He is deeply suspicious of its political system, very sceptical about its geopolitical narrative and unambiguous in his conclusion: "the Indian Ocean is the pearl (President Xi Jinping) wishes to secure for his growing Chinese empire — irrespective of the cost."

It's 2019. It should be abundantly clear by now that Beijing has a plan for extending its hegemony with Chinese characteristics for a new era, and while that might involve throwing around a trillion dollars in infrastructure projects, the game is still the old one of global dominance. In chapter after chapter, Mr Lintner shows how China has attempted to convert projects into influence, often successfully. The Belt and Road Initiative (BRI), the banner under which every single Chinese project is now placed, has provided a well-marketed brand name for Beijing's initiatives. Although it is suffering a nationalistic backlash in several countries — Pakistan, Sri Lanka, Maldives, Myanmar and Malaysia — it remains a welcome calling card in the capitals of many of the smaller countries of the Indian Ocean region.

Interestingly, although the Modi government famously and correctly kept India out of the imperial durbar that goes by the name of the BRI summit, Mr Lintner reminds us that "work on a US$ 1 billion Chinese industrial park in Sanand in Gujarat began in 2016" that the *Global Times* — the English-language mouthpiece of the Chinese regime — described as a "One Belt One Road" pilot project. Of course, every brick that China lays anywhere in the world is now hailed as part of the BRI, but it only shows the reach of Beijing's charms and infrastructure projects.

How have countries of the Indian Ocean region responded to the Chinese push? They have either welcomed or been unable to resist Beijing. This is because while the first preference of small and medium powers is to have great powers balancing each other, their fallback plan is to bandwagon onto the side of the stronger ones. This means that a small island country in the region would prefer the United States, China, India and others create a stable balance where no one is able to push it around. If they cannot play one against the other for some reason, they will take the side of the strongest of the lot. In chapter after chapter, the book tells the stories of how this dynamic is unfolding.

Mr Lintner argues that in comparison to the countries of the South China Sea, those in the Indian Ocean have political and economic vulnerabilities that make them susceptible to manipulation by outside powers. The Western powers, for their part, "want to defend their possessions and interests without being sure who, exactly, their regional allies should be." This, plus a "reluctance to identify China as the main adversary", has made the Indian Ocean more volatile than other regions witnessing a tussle between great powers.

What the book misses out is the digital dimension: it may well be that the Digital Silk Road, where countries are enticed into adopting Chinese technology in their communications networks, is the most powerful card in the BRI deck. While countries and analysts are wondering what to make of overbuilt ports, forlorn railways and overgenerous lines of credit, the almost subliminal deployment of network equipment, broadband modems, smartphones and software platforms might be what ultimately strings the pearls.

THE COSTLIEST PEARL
China's Struggle for India's Ocean
Bernard Lintner
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