

# The Economist

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AI and war

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A report card on Milei's reforms

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China in the Arctic

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The champagne boom

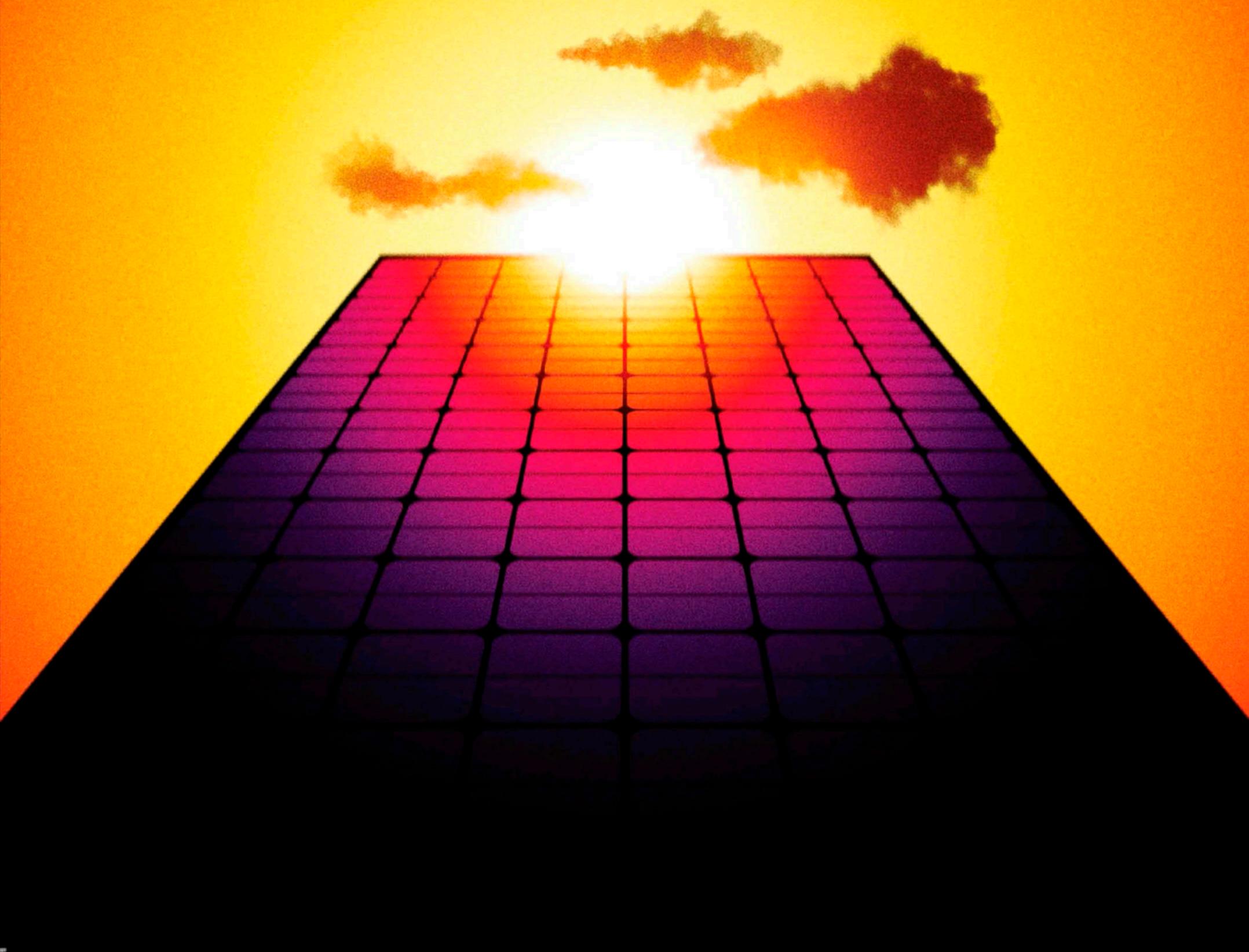
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A SPECIAL ISSUE



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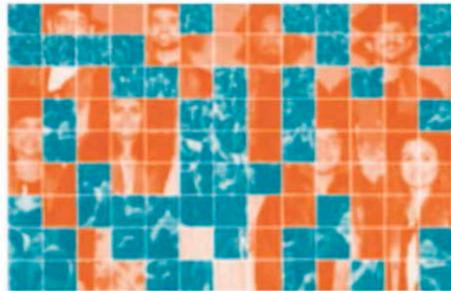
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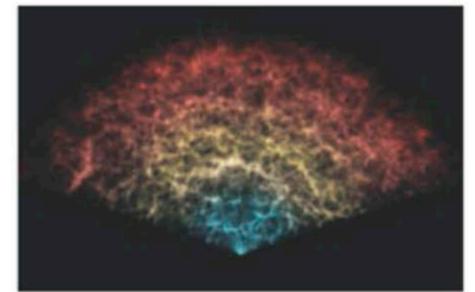
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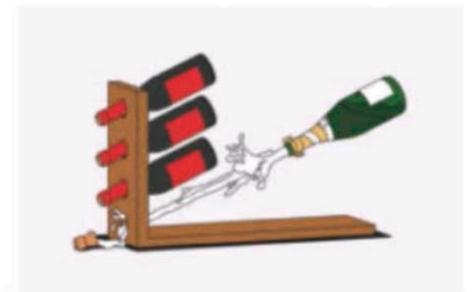
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## The world this week Politics



Vladimir Putin visited **North Korea**. The **Russian** president was given an elaborate welcome before holding talks with Kim Jong Un, the Asian country's dictator. The pair have strengthened their alliance during the war in Ukraine, with North Korea providing Russia with weapons. The West fears that in return Russia is helping North Korea with its nuclear programme. Both leaders signed a mutual-defence pact. Mr Putin then went to **Vietnam**, where he was also given the full state-visit treatment.

Thaksin Shinawatra, who was deposed as **Thailand's** prime minister in a coup in 2006 and returned from exile last year, was formally charged with insulting the monarchy. Mr Thaksin, an influential figure in Thai politics, was granted bail, deferring for now the problematic prospect of sending him to prison. The indictment is one of three politically charged cases that could rock Thai politics. The Constitutional Court has set dates for early July to hear one case that could bring down the prime minister, Srettha Thavisin, and another that could ban Move Forward, the main opposition party.

Meanwhile, Thailand became the first country in South-East Asia to legalise **same-sex marriage**, after the upper house of parliament overwhelmingly approved the measure. The king now needs to sign the bill, paving the way for gay weddings later this year.

A global summit to shore up support for **Ukraine** in its fight against Russia ended without securing the agreement of the

big non-aligned countries. China stayed away from the gathering in Switzerland and countries such as India, Indonesia, Mexico, Saudi Arabia and South Africa did not sign the final communiqué.

Jens Stoltenberg, the secretary-general of **NATO**, said that 23 of the alliance's 32 members would meet a target of spending at least 2% of GDP on defence this year. That is up from just three countries in 2014 and ten in 2023. Mr Stoltenberg was in Washington to discuss next month's NATO summit, which is expected to reach a deal on providing security assistance and training to Ukraine. Meanwhile Mark Rutte, the outgoing Dutch prime minister, looked set to succeed Mr Stoltenberg as NATO's leader in October.

### The French revolution

Jordan Bardella, the president of the hard-right National Rally (RN) in **France**, urged voters to hand his party an absolute majority at snap elections called for June 30th and July 7th. Polling shows the RN's parliamentary party, which is led by Marine Le Pen, winning the most seats but falling short of a majority. Bruno Le Maire, the finance minister, subtly criticised Emmanuel Macron's decision to call the election, saying it had caused "worries, incomprehension, sometimes anger" among French people.

The Israel Defence Forces said that it would hold a daily "tactical pause" of military activity on a road in the south of **Gaza** to allow more aid to enter the territory through the Kerem Shalom crossing. Binyamin Netanyahu, Israel's prime minister, denounced the decision. The IDF made it clear that this did not amount to a ceasefire. It said that fighting would continue in Rafah, where eight soldiers were killed recently.

Mr Netanyahu released a video criticising the Biden administration for its treatment of **Israel** during the current war in

Gaza. He said that it was "inconceivable" that America had been "withholding weapons and ammunitions" in recent months. The White House said it did not know what the prime minister was talking about, stressing that only one shipment of heavy bombs had been delayed.

After the departure of Benny Gantz and Gadi Eisenkot, Mr Netanyahu dissolved his six-member **war cabinet**. Some of the decisions previously made by the war cabinet will now fall to the larger security cabinet, which includes some of Mr Netanyahu's far-right allies.



At least 550 people died during **the hajj**, the annual pilgrimage to Mecca in Saudi Arabia, as temperatures in the city hit 51.8°C (125°F). Around 1.8m Muslims are expected to travel to the site for the pilgrimage this year.

A ship that was attacked recently by Houthi insurgents from Yemen sank in the **Red Sea**, the second vessel that the rebels have sunk since starting their campaign to disrupt shipping last November. One crewman died in the incident. The Houthis used a drone boat packed with explosives.

**South Africa's** two biggest political parties, the African National Congress and the Democratic Alliance, formed a coalition government headed by Cyril Ramaphosa, the president, after the ANC lost its parliamentary majority. The new government, which also includes other smaller parties, agreed to focus on economic growth, cheering investors. MK,

the party of Jacob Zuma, a disgraced former ANC president, will join the opposition.

The UN Security Council adopted a resolution ordering the Rapid Support Forces, a rebellious **Sudanese** paramilitary group, to lift its siege of el-Fasher, in the Darfur region. It also called for a halt in fighting between the RSF and the official Sudanese Armed Forces. The resolution, which passed after Russia abstained, points to a hardening of international opinion against the RSF amid concerns that it and allied Arab militias are conducting genocide in Darfur.

### To have and to hold

Joe Biden announced new **legal protections for migrants** who are in America illegally but married to American citizens. The new system streamlines the process for applying for permanent residency, but applicants must have lived in the United States for at least ten years. Around 500,000 spouses could potentially benefit, in one of the most significant presidential actions on immigration in a decade.

Large protests were held in **Brazil** against a proposed change to the law that would equate abortions after 22 weeks to homicide. Conservatives in Congress support the bill, but critics note that late abortions are often performed on children who were abused by relatives. Abortion is legal in Brazil only in cases of rape, fetal deformation and when the woman's life is in danger.

**Ecuador** will temporarily suspend visa waivers for Chinese nationals from July 1st, as tens of thousands of migrants travel to the country en route to the United States. Ecuador is one of only two South American countries that grant visa-free travel to Chinese visitors (Suriname is the other). From there, they often head north. The number of Chinese nationals trying to cross the US border has rocketed since 2022.

## The world this week Business



Dave Calhoun, **Boeing's** CEO, was questioned by American senators about recent safety incidents involving his company's planes, such as the blowout of a door panel on a 737 MAX. Richard Blumenthal, the chairman of the committee investigating the failures, described Boeing as "an iconic company...that somehow lost its way". Mr Calhoun, who is stepping down, apologised for the recent incidents and two earlier fatal crashes. Meanwhile, the latest whistleblower to make a complaint revealed that Boeing lost track of 400 faulty parts, and that some of them may have been installed on planes. Boeing's share price is down by 30% this year.

**Nvidia** overtook Microsoft and Apple to become the world's most valuable company, with a stockmarket value of more than \$3.3trn. The maker of chips for artificial intelligence has seen its share price surge by 40% since issuing bumper quarterly revenues and profits a month ago, and expects sales to increase from the roll-out of its Blackwell chip, billed as the world's most powerful. Nvidia is only one of a dozen companies to lead the S&P 500 since its creation in 1926. It recently split its stock, lowering the share price to make it more attractive to small investors.

**Broadcom's** share price also hit new highs, after the chipmaker announced a ten-for-one stock split that comes into effect in July. Over the past few years big tech companies have been using stock splits to dilute the price of their surging shares, though Meta and Microsoft have notably not done so.

A study by the IMF said that the "sheer scale and speed of the transformation" in AI would amplify job losses, reducing the share of **labour income** in national accounts and exacerbating inequality. It called on governments to prepare social systems that will "cushion the transition costs for workers".

### Investor reprieve

A judge in Texas dismissed what remained of **Exxon-Mobil's** lawsuit against activist investors over its emissions targets. Arjuna Capital and Follow This had proposed a proxy vote on quickening the pace of Exxon's emission cuts, but they dropped the proposal when it threatened to sue, claiming they were abusing the proxy system. The judge ruled that the case against Arjuna was now invalid, as it had pledged not to refile the motion. He had already removed Follow This from the suit.

**Tesla** submitted a letter to a judge in Delaware asking for new legal arguments on Elon Musk's 2018 pay deal, after 77% of the company's shareholders backed the package at their annual meeting. In January the judge voided the package in a case brought by a dissident

shareholder, who claimed the sum, now worth around \$46bn, was too large. Tesla says the vote backing Mr Musk's pay "significantly impacts" the issue. But lawyers for the dissident investor insist the vote has no legal impact.

**Fisker**, a maker of electric vehicles, filed for bankruptcy protection in America. The company went public in 2020 amid a wave of optimism in the industry, but its sales never took off. Fisker was delisted by the New York Stock Exchange recently because its share price was "abnormally low".

Toyoda Akio's reappointment as chairman of **Toyota** won the support of just 72% of shareholders, down from 85% last year. Two big proxy advisers had recommended voting against Mr Toyoda for failing to oversee the proper certification process on some vehicles. It was a rare instance of a rebellion in corporate Japan.

The ownership structure of **Heathrow** was overhauled, following the decision of Ferrovial, an infrastructure group, to sell down its stake. Ardian, a French private-equity firm, is now the airport's largest share-

holder, with a 22.6% stake. Saudi Arabia's sovereign-wealth fund is taking 15%. The other big investor is the Qatar Investment Authority, with a 20% holding. (Heathrow's chairman, Lord Deighton, is also chairman of *The Economist's* parent company.)

Singapore returned to the top spot in an annual ranking of **competitiveness** among 67 countries compiled by IMD, a business school. The city-state last topped the poll in 2020. Switzerland came second and Denmark, last year's champion of efficiency, came third. America dropped three places to 12th spot. China climbed seven places to 14th. Venezuela took the wooden spoon.

### Knights of Wall Street

Employees from Chessify, an online chess platform, won the **World Corporate Chess Championship** in New York, beating a team from ChessMood, another platform. Banks and financial firms, including BlackRock and Goldman Sachs, took part in the rapid-round format, though only two, Susquehanna and UBS, made it through to the semi-finals. A team from Google came second-bottom in its group.



# The solar age

The exponential growth of solar power will change the world

IT IS 70 YEARS since AT&T's Bell Labs unveiled a new technology for turning sunlight into power. The phone company hoped it could replace the batteries that run equipment in out-of-the-way places. It also realised that powering devices with light alone showed how science could make the future seem wonderful; hence a press event at which sunshine kept a toy Ferris wheel spinning round and round.

Today solar power is long past the toy phase. Panels now occupy an area around half that of Wales, and this year they will provide the world with about 6% of its electricity—which is almost three times as much electrical energy as America consumed back in 1954. Yet this historic growth is only the second-most-remarkable thing about the rise of solar power. The most remarkable is that it is nowhere near over.

To call solar power's rise exponential is not hyperbole, but a statement of fact. Installed solar capacity doubles roughly every three years, and so grows ten-fold each decade. Such sustained growth is seldom seen in anything that matters. That makes it hard for people to get their heads round what is going on. When it was a tenth of its current size ten years ago, solar power was still seen as marginal even by experts who knew how fast it had grown. The next ten-fold increase will be equivalent to multiplying the world's entire fleet of nuclear reactors by eight in less than the time it typically takes to build just a single one of them.

Solar cells will in all likelihood be the single biggest source of electrical power on the planet by the mid 2030s. By the 2040s they may be the largest source not just of electricity but of all energy. On current trends, the all-in cost of the electricity they produce promises to be less than half as expensive as the cheapest available today. This will not stop climate change, but could slow it a lot faster. Much of the world—including Africa, where 600m people still cannot light their homes (see Middle East & Africa section)—will begin to feel energy-rich. That feeling will be a new and transformational one for humankind.

To grasp that this is not some environmentalist fever dream, consider solar economics. As the cumulative production of a manufactured good increases, costs go down. As costs go down, demand goes up. As demand goes up, production increases—and costs go down further. This cannot go on for ever; production, demand or both always become constrained. In earlier energy transitions—from wood to coal, coal to oil or oil to gas—the efficiency of extraction grew, but it was eventually offset by the cost of finding ever more fuel.

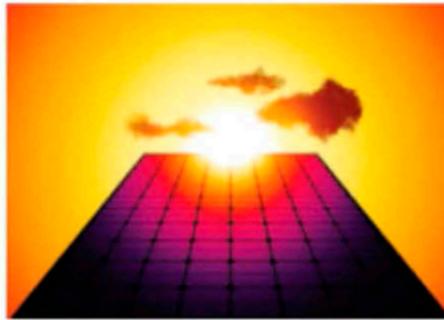
As our essay this week explains, solar power faces no such constraint. The resources needed to produce solar cells and plant them on solar farms are silicon-rich sand, sunny places and human ingenuity, all three of which are abundant. Making cells also takes energy, but solar power is fast making that abundant, too. As for demand, it is both huge and elastic—if you make electricity cheaper, people will find uses for it. The result is that, in contrast to earlier energy sources, solar power has routinely become cheaper and will continue to do so.

Other constraints do exist. Given people's proclivity for living outside daylight hours, solar power needs to be complemented with storage and supplemented by other technologies. Heavy industry and aviation and freight have been hard to electrify. Fortunately, these problems may be solved as batteries and fuels created by electrolysis gradually become cheaper.

Another worry is that the vast majority of the world's solar panels, and almost all the purified silicon from which they are made, come from China. Its solar industry is highly competitive, heavily subsidised and is outstripping current demand—quite an achievement given all the solar capacity China is installing within its own borders (see Business section). This means that Chinese capacity is big enough to keep the expansion going for years to come, even if some of the companies involved go to the wall and some investment dries up.

In the long run, a world in which more energy is generated without the oil and gas that come from unstable or unfriendly parts of the world will be more dependable. Still, although the Chinese Communist Party cannot rig the price of sunlight as OPEC tries to rig that of oil, the fact that a vital industry resides in a single hostile country is worrying.

It is a concern that America feels keenly, which is why it has put tariffs on Chinese solar equipment. However, because almost all the demand for solar panels still lies in the future, the rest of the world will have plenty of scope to get into the market. America's adoption of solar energy could be frustrated by a pro-fossil-fuel Trump presidency, but only temporarily and painfully. It could equally be enhanced if America released pent up demand, by making it easier to install panels on homes and to join the grid—the country



has a terawatt of new solar capacity waiting to be connected. Carbon prices would help, just as they did in the switch from coal to gas in the European Union.

The aim should be for the virtuous circle of solar-power production to turn as fast as possible. That is because it offers the prize of cheaper energy. The benefits start with a boost to productivity. Anything that people use energy for today will cost less—and that includes pretty much everything. Then come the things cheap energy will make possible. People who could never afford to will start lighting their houses or driving a car. Cheap energy can purify water, and even desalinate it. It can drive the hungry machinery of artificial intelligence. It can make billions of homes and offices more bearable in summers that will, for decades to come, be getting hotter.

But it is the things that nobody has yet thought of that will be most consequential. In its radical abundance, cheaper energy will free the imagination, setting tiny Ferris wheels of the mind spinning with excitement and new possibilities.

This week marks the summer solstice in the northern hemisphere. The sun rising to its highest point in the sky will in decades to come shine down on a world where nobody need go without the blessings of electricity and where the access to energy invigorates all those it touches. ■

The future of combat

# War and AI

The character of warfare is about to be profoundly changed by artificial intelligence

THE COMPUTER was born in war and by war. Colossus was built in 1944 to crack Nazi codes. By the 1950s computers were organising America's air defences. In the decades that followed, machine intelligence played a small part in warfare. Now it is about to become pivotal. Just as the civilian world is witnessing rapid progress in the power and spread of artificial intelligence (AI), so too must the military world prepare for an onrush of innovation. As much as it transforms the character of war, it could also prove destabilising.

Today's rapid change has several causes. One is the crucible of war itself, most notably in Ukraine. Small, inexpensive chips routinely guide Russian and Ukrainian drones to their targets, scaling up a technology once confined to a superpower's missiles. A second is the recent exponential advance of AI, enabling astonishing feats of object recognition and higher-order problem solving. A third is the rivalry between America and China, in which both see AI as the key to military superiority.

The results are most visible in the advance of intelligent killing machines. Aerial and naval drones have been vital to both sides in Ukraine for spotting and attacking targets. AI's role is as the solution to jamming, because it enables a drone to home in on targets, even if GPS signals or the link to the pilot have been cut. Breaking the connection between pilot and plane should soon let armies deploy far larger numbers of low-cost munitions (see Schumpeter). Eventually self-directing swarms will be designed to swamp defences.

But what is most visible about military AI is not what is most important. As our briefing explains, the technology is also revolutionising the command and control that military officers use to orchestrate wars.

On the front line, drones embody just the last and most dramatic link in the kill chain, the series of steps beginning with the search for a target and ending in an attack. AI's deeper significance is what it can do before the drone strikes. Because it sorts through and processes data at superhuman speed, it can pluck every tank out of a thousand satellite images, or interpret light, heat, sound and radio waves to distinguish decoys from the real thing.

Away from the front line, it can solve much larger problems than those faced by a single drone. Today that means simple tasks, such as working out which weapon is best suited to destroying a threat. In due course, "decision-support systems" may be able to grasp the baffling complexity of war rapidly and over a wide area—perhaps an entire battlefield.

The consequences of this are only just becoming clear. AI systems, coupled with autonomous robots on land, sea and air, are likely to find and destroy targets at an unprecedented speed and on a vast scale.

The speed of such warfare will change the balance between soldier and software. Today, armies keep a man "in the loop", approving each lethal decision. As finding and striking targets is compressed into minutes or seconds, the human may merely "sit on the loop", as part of a human-machine team. People will

oversee the system without intervening in every action.

The paradox is that even as AI gives a clearer sense of the battlefield, war risks becoming more opaque for the people who fight it. There will be less time to stop and think. As the models hand down increasingly oracular judgments, their output will become ever harder to scrutinise without ceding the enemy a lethal advantage. Armies will fear that if they do not give their AI advisers a longer leash, they will be defeated by an adversary who does. Faster combat and fewer pauses will make it harder to negotiate truces or halt escalation. This may favour defenders, who can hunker down while attackers break cover as they advance. Or it may tempt attackers to strike pre-emptively and with massive force, so as to tear down the sensors and networks on which AI-enabled armies will depend.

The scale of AI-based war means that mass and industrial heft are likely to become even more important than they are today. You might think new technology will let armies become leaner. But if software can pick out tens of thousands of targets, armies will need tens of thousands of weapons to strike them. And if the defender has the advantage, attackers will need more weapons to break through.

That is not the only reason AI warfare favours big countries. Drones may get cheaper, but the digital systems that mesh the

battlefield together will be fiendishly expensive. Building AI-infused armies will take huge investments in cloud servers able to handle secret data. Armies, navies and air forces that today exist in their own data silos will have to be integrated. Training the models will call for access to vast troves of data.

Which big country does AI favour most? China was once thought to have an advantage,

thanks to its pool of data, control over private industry and looser ethical constraints. Yet just now America looks to be ahead in the frontier models that may shape the next generation of military AI. And ideology matters: it is unclear whether the armies of authoritarian states, which prize centralised control, will be able to exploit the benefits of a technology that pushes intelligence and insight to the lowest tactical levels.

If, tragically, the first AI-powered war does break out, international law is likely to be pushed to the margins. All the more reason to think today about how to limit the destruction. China should heed America's call to rule out AI control over nuclear weapons, for instance. And once a war begins, human-to-human hotlines will become more important than ever. AI systems told to maximise military advantage will need to be encoded with values and restraints that human commanders take for granted. These include placing an implicit value on human life—how many civilians is it acceptable to kill in pursuing a high-value target?—and avoiding certain destabilising strikes, such as on nuclear early-warning satellites.

The uncertainties are profound. The only sure thing is that AI-driven change is drawing near. The armies that anticipate and master technological advances earliest and most effectively will probably prevail. Everyone else is likely to be a victim. ■



## French peril

## Looking bad

A snap election in France reveals the flimsiness of Emmanuel Macron's legacy

IT MAY NOT measure up to Napoleon's march on Moscow in 1812, but Emmanuel Macron's decision to call a parliamentary election this month is looking like one of the most self-destructive gambles by a French leader in modern times. After seven years under his centrist government, voters' judgment threatens to be severe. It may well plunge France into a political, and perhaps even economic, crisis. One victim would be Mr Macron's own project of reform.

The signs so far are ominous. The stockmarket has fallen by 4% since he made his announcement on June 9th, the night of his party's drubbing in the European Parliament elections at the hands of Marine Le Pen's National Rally. Share prices in France's three big banks are down by almost 10%. Bond spreads are widening. Euro-elections tend to be a protest vote, not a reflection of how people will express themselves when choosing their national parliament. This time, however, their anger now has barely a week left to dissipate and the polls show no sign that it will.

The president faces a squeeze between Ms Le Pen's hard right and a rapidly created New Popular Front that includes powerful hard-left elements, especially the Unsubmissive France party dominated by Jean-Luc Mélenchon, a former Trotskyist. Mr Macron seems to have assumed such an alliance would not be formed so fast. France's parliamentary elections use a two-round system, with a high threshold for going through to the second round. The danger is that most of the president's men and women will not make it that far—leaving a choice between the xenophobic nationalists and the anti-capitalist radicals. His political group, Ensemble, faces losing half its seats or more.

Mr Macron will remain in office; his term does not expire until 2027. But although the president has extensive powers over defence and foreign policy, new domestic policy, like the budget, needs to be voted through by parliament. Administer-

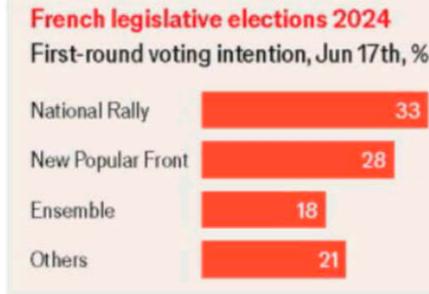
ing it is the preserve of the government, headed by a prime minister whom the president picks but whom parliament can dismiss through a simple confidence vote. In practice, Mr Macron will have little choice but to offer the job to the nominee of whichever party or alliance comes top. Mr Macron may hope that his centrists can forge a post-election alliance with other moderates, but the numbers do not look close to adding up.

That leaves three options: a hung parliament, or a government of either the hard right or hard left. None of them is good. Both the right and the left are committed to doing things France cannot afford (see Europe section). These include imposing punitive wealth taxes, slashing VAT on fuel and scrapping Mr Macron's reforms of the pension system, so that

France can go back to one of the earliest retirement ages in the world. (The right would add harsh restrictions on immigration, citizenship and free movement to the mix; the left, a big jump in the minimum wage.) The problems are compounded by the fact that France is already running a high budget deficit, of over 5% of GDP this year.

The most likely outcome is a hung parliament with an unstable government. It might be even worse. As everyone jockeyed for advantage in the presidential poll in three years' time, legislation would struggle to get through, even a budget. The gridlock could spread to the European Union. The one thing the hard left and right might agree on would be to ditch most of the past seven years' reforms.

Mr Macron's ambition was to transform France's political system by strengthening its moderate elements, and to permanently shift the national consensus towards economic modernisation. Right now his legacy looks more likely to be reforms that do not stick and a political centre that has been eviscerated—so much so that his successor as president may yet be his nemesis, Ms Le Pen. ■



## Wealth taxes

## How to tax billionaires

Closing loopholes would be better than a levy on unrealised capital gains

THE RICH are different from other people. They have more money and, in most places, they pay much less tax. Going by one broad definition of income that combines consumption and someone's change in net worth, America's best-heeled pay just a few cents on every dollar of their fortunes. Lately, those fortunes have ballooned, thanks to a soaring stockmarket. One study found that unrealised capital gains account for \$6trn of the \$11trn in wealth held by the richest Americans. Since 2023, as the artificial-intelligence frenzy has fuelled demand for both Nvidia's GPUs and its shares, the chipmaker's founder, Jensen Huang, made more than \$100bn. But until he sells some

of his stocks, all that money is off-limits to the taxman.

Cash-strapped governments want to get their hands on a slice of these riches. Next year Australia will start taxing unrealised gains in employee pension-fund accounts with balances of more than A\$3m (\$2m). As part of his re-election campaign, President Joe Biden is promising to find \$500bn over ten years for social programmes by charging a 25% tax on the unrealised capital gains of individuals who, like Mr Huang and 10,000 other Americans, are worth \$100m or more.

It is easy to understand why the world's non-multimillionaires may want to soak the very rich. It is equally easy to grasp ►►

▶ the appeal for governments, which the wealthy are playing for fools by coming up with clever ways to live in the lap of luxury without ever realising any capital gains (see Finance & economics section).

One of these manoeuvres in America is to buy assets, offer these as collateral for loans and roll over the loans until their death. At that point any capital gains accrued over the owner's lifetime are zeroed out and the clock starts anew for their heirs, who then themselves "buy, borrow and die", as this (perfectly legal) device is known.

However, taxing unrealised gains is complex and wrong-headed. It is also unnecessary. A similar end could be met with much less controversial means.

Taxes should be simple to administer and collect. Ideally, they should also raise revenue while distorting behaviour as little as possible. Taxing unrealised gains fails on each of these counts. Calculating someone's net worth is nightmarishly complicated even once, at their death, let alone every year. America's Internal Revenue Service took 12 years to put a value on Michael Jackson's estate. France, Sweden and a few other European countries that have tried to levy wealth taxes have abandoned their efforts after generating lots of administrative headaches but little actual revenue.

Taxing unrealised gains would also cause wild swings in the liabilities of people who own volatile assets, including Mr Huang and his Nvidia shares. Mr Biden's proposal, which assesses the tax over five years, smooths out some of this volatility. But some taxpayers would still fail to get a rebate for their unrealised losses. That could discourage angel investors and other risk-takers from backing promising ventures whose

stratospheric valuations could suddenly collapse, and which can be hard to price. In America taxing unrealised gains may also be unconstitutional. The Supreme Court is about to rule in a case in which the plaintiffs claim that a one-off levy on foreign investments in 2017 was illegal because it taxed their unrealised gains. Even if the justices issue a narrow ruling that leaves the principle intact, Mr Biden's idea will be challenged.

What, then, are the tax authorities to do? In America they could start by ending the rule that lets inheritors reset the clock for capital-gains each time someone dies. This provision of the tax code, called "step-up in basis", was introduced in 1921, five years after estate taxes, which are assessed on the market value of assets at the owner's death. The goal was to avoid double taxation. If heirs paid estate tax on this fair value, they should not also pay tax on any further capital gains.

This rationale looks flimsy now that the biggest estates are built not on earned income, which would have been taxed throughout an estate-builder's life, but on assets' appreciation, which was not. Heirs who get rich thanks to their benefactor's buy, borrow and die are therefore treated very differently from those who inherit a fortune amassed out of taxed income.

Scrapping step-up in basis could yield perhaps a quarter of the \$500bn that Mr Biden hopes to get from his wealth tax, at a far lower administrative cost. Taxing capital gains at death would raise the same again. He could realise much of the rest by closing other loopholes, notably the "carried interest" provision which lets buy-out barons pay capital-gains tax rather than (usually higher) income tax on their private-equity firms' investment profits. Going after unrealised gains is easy to understand and hence good politics. But it is bad economics. ■

### Reform in adversity

## Raising Argentina

**Javier Milei has made progress, but radical experiments with the currency could undo all his work**

WHEN ARGENTINA'S president, Javier Milei, donned his leather jacket and belted out rock songs to a stadium last month he cut an eccentric figure. And when he insults his country's Congress ("a nest of rats"), the governor of Buenos Aires province ("a communist dwarf") and Spain's prime minister ("the laughing stock of Europe"), he comes across as just another boorish populist. Both characterisations have a grain of truth. Even so, by most economic measures Mr Milei is beating expectations.

In December, as he took office, Argentina's economy was a tangle of rampant inflation and unsustainable price controls. To clean up, Mr Milei slashed spending. The central bank stopped printing money to finance the deficit. As a result, Argentina has had fiscal surpluses for five months in a row. Inflation spiked after a sharp devaluation, but has since fallen to a monthly rate of 4.2% in May, the lowest in over two years.

Mr Milei's coalition has so few lawmakers in Congress that some analysts feared he might have pursued his agenda by sidelining Argentina's democratic institutions or wrecking them. Instead, after Mr Milei's administration negotiated with legislators, the Senate passed two bills on June 13th to liberal-

ise the economy, promote investment and raise revenue. The lower house is expected to give its final approval soon.

Mr Milei's success so far rests on his unrelenting attacks on Argentina's establishment and unions, which have been sufficiently convincing—and entertaining—to keep his approval ratings above 50%. That has given him cover to keep reforming, even as spending cuts have caused a deep recession. His fanatical commitment to fiscal surpluses has underpinned the fall in inflation. Just as important, he has learned to compromise in order to get legislation through Congress.

Yet Argentina's knot of economic failures will be devilishly difficult to untie—and the hardest part for Mr Milei is still to come. Monthly inflation may creep up in June as energy prices rise. That will exacerbate fears over the Argentine peso, which once again appears to be overvalued (see Americas section). Mr Milei angrily denies the currency is too strong. But the longer he ignores it, the greater the risk of a more damaging and inflationary devaluation later.

Very soon Mr Milei must also decide on the future of the central bank and the peso. Argentina's awful history of inflation and default means it is right to explore new ways to an- ▶▶



▶ chor the economy. Yet on this front Mr Milei has so far offered monetary anarchy rather than a new order. On the campaign trail he promised to dollarise the economy and “blow up” the central bank. Now he and his team talk of “currency competition”, whereby the peso would coexist with other currencies. But the details remain worryingly vague. And he still wants to close the central bank. All this uncertainty has costs. Investors do not want to sink cash into a country where the monetary system and currency are up for grabs.

Mr Milei still harbours radical visions, even if some on his team do not. In May he declared that he wanted “endogenous dollarisation”. Argentines could use dollars or pesos, but the supply of pesos would be fixed. When the economy grows (and thus needs more money to circulate) Argentines would therefore be forced to start using their own dollar savings. The peso, he said, would become a “museum piece”.

This half-baked scheme raises more questions than it answers. It has never been tried elsewhere. Freezing the money

supply could lead to deflation. Or, if the goal is to push people away from pesos entirely, even for transactions, then it could stoke inflation as the supply of pesos outstrips plummeting demand for them. The IMF, which has a \$44bn lending programme to Argentina, seems worried. Mr Milei has promised to tell the fund all about his monetary plans by the end of the month. But, if endogenous dollarisation survives, it would probably be less likely to lend his government new cash.

### The art of the deal

Such a radical experiment is not just risky, it is also unnecessary. Across the Andes, Peru has the kind of currency competition that could work in Argentina. There, dollars are used alongside the sol. But in contrast to Mr Milei’s plan, the central bank adjusts the supply of the sol and supports its use. Mr Milei succeeded in Congress by compromising. To avoid squandering his hard-won gains, he needs to foster certainty and sanity by giving ground over the peso, too. ■

## Administering India

# Small-states theory

**India doesn’t need more government. It needs more governments**

**I**N HIS FIRST decade in office Narendra Modi used centralisation to help modernise the country. His ideal is a strong leader, with a national mandate and a majority in Parliament, who can direct the central government to force through changes across a huge country. Election results on June 4th cast doubts on that approach because Mr Modi’s party lost its majority and now relies on allies to rule. Centralisation appears to have reached its limit. That means it is worth considering the alternative: delegating power by creating more independently run cities and even more states.

The opening line of India’s constitution declares that the country “shall be a union of states”. After independence in 1947, princely realms were folded into new states, residual colonial territory annexed, and borders reorganised along linguistic lines. The system continues to adapt. Three new states were born in 2000. Telangana, the newest, turned ten this month (see Asia section). Today, India’s 28 states are powerful. They employ more people than local and central governments put together. And they are constitutionally responsible, or jointly responsible, for most basic functions, including health care, education, law and order, agriculture and the supply of welfare.

Yet today’s set-up has two problems. One is that India’s mega-cities lack autonomy: they are typically part of states with large rural populations whom politicians tend to put first. The other is that many states are too large. America, with a quarter of the people, has 50 states. China has 27 provinces and autonomous regions but its administrative energies are concentrated at the sub-provincial level. Uttar Pradesh (UP), the largest Indian state, has 240m people, more than Nigeria or Brazil.

Because of India’s vast political and economic diversity, centrally imposed one-size-fits-all policies only sometimes work, and exclude many policy areas that are crying out for

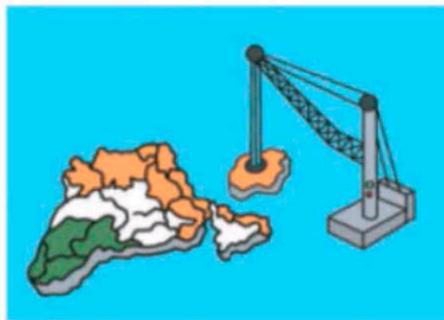
change. More local autonomy creates an alternative mechanism for reform by boosting flexibility, accountability, experimentation and competition. Since its creation, Telangana’s share of GDP has risen from 4.1% to 4.8%. Neglected when it was part of the undivided state of Andhra Pradesh, its rural areas now have regular power and water.

This newspaper does not usually argue for more government. But it has no hesitation in arguing for more governments. True, India has tried this before. In the 1990s Parliament passed constitutional amendments aimed at devolving power from states to local governments, but states proved reluctant to cede control.

Our solution is different: to allow mega-cities to govern themselves and to have more states. The constitution grants Parliament unilateral power to create states, extinguish existing ones (as Mr Modi did with Jammu and Kashmir in 2019) and change boundaries. UP should be divided up. Other places have solid claims to independence. In Maharashtra, Mumbai should have more clout; relatively poor eastern Maharashtra has long demanded statehood.

Decentralisation does have downsides. With lots more states and cities, there would be non-stop elections, so India would need to create synchronised, regular voting cycles. The distribution of resources between states, from tax revenues to energy, is a delicate affair; extra states and cities would make it more complex still. And redrawing India’s internal administrative borders would open up the thorny question of its parliamentary-seat boundaries, which give disproportionate power to the wealthy south at the expense of the poorer north.

Yet these problems would be outweighed by the benefits of better administration, more responsive government, improved services and faster-growing economies. In the long run, creating new states would help India thrive. ■



## Letters

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### Caution on competition law

Margrethe Vestager, the European Union's commissioner for competition, posits that competition law has not addressed "the structural entrenchment of companies holding market power", and that sweeping regulations like the EU's Digital Markets Act (DMA) are therefore justified (By Invitation, June 3rd). She compares the case-by-case approach of competition enforcement to "playing a never-ending game of whack-a-mole". However, enforcement is often slow and complex, especially in the kinds of "abuse of dominance" cases that have been brought against large online platforms. This deliberate pace is necessary, as the companies' business models and the consequences of their behaviour are themselves complex.

One need only see the unfortunate changes forced upon Google Maps in the EU, where users can no longer click map locations from their search results, to understand that platform design entails complex trade-offs among usability, safety and competition. In ignoring these trade-offs there is a genuine risk that heavy-handed enforcement will do more harm than good.

The case-by-case approach that prevails under most competition law allows enforcers to separate the wheat from the chaff and condemn only those business practices that ultimately prove harmful to consumers. This cautious approach has arguably helped America to become a global leader in digital markets, by nurturing promising firms rather than imposing overbearing rules upon them.

Unfortunately, the DMA ignores these lessons and categorically prohibits conduct, such as "self-preferencing" by online platforms, that can benefit consumers.  
GEOFFREY MANNE  
DIRK AUER  
MARIO ZÚÑIGA  
International Centre for Law and Economics  
Portland, Oregon

### Baby boomers and savings

Does your assertion that "a proliferation of old folk means more people saving for retirement" get the logic upside down (Free exchange, May 25th)? A rising ratio of pensioners to workers means that there will be fewer people toiling to save for their old age, and more older folk will be happily spending their retirement nest-eggs. The balance of savings to investment will be skewed towards lower savings and thus a higher neutral interest rate.

In the same vein, the balance of aggregate demand (all people consume) to aggregate supply (only those who still work) will shift towards less supply and hence more price pressures. At the margin, low birth rates helped explain why inflation and interest rates were so low over the past 15 years while the baby boomers were still working and saving. But that will be over very soon. With ever more pensioners around, brace yourself for somewhat sticky inflation and higher rates for longer.

HOLGER SCHMIEDING  
Chief economist  
Berenberg  
London

### Save London's lungs

It is an unpopular opinion these days, but green belts are doing their job well ("Labour's growth plan", June 8th). The nearest bit of green belt to central London is about 30 minutes by Tube and most of it is over an hour's commute. People don't want to live out there. They want to live 15 minutes away from their work, in places with good infrastructure and connectivity.

I sometimes take the train into Paddington. The last 20 minutes of this journey travels through seemingly endless areas of low density, low-rise Victorian or post-war housing sprinkled with industrial parks and lonely office blocks, aka urban sprawl, exactly what the green belt was created to arrest. Rather than allowing this monotonous concrete kudzu to

resume its inexorable outward creep it is much more sensible to densify and modernise the urban areas that people already reside in. The quest to build on green belts has become an end in itself and its proponents have lost sight of the real aim, which is to provide affordable housing in places where people want to live.

Britain's cities don't need to grow wider, they need to grow taller.

NICK LOTT  
South Hams, Devon

### Driving in the Big Apple

You characterised critics of congestion pricing in New York as "back-seat drivers" or a "handful of people who have a windshield view of everything" ("Jam today", June 8th). That is dismissive of the millions of working-class and blue-collar New Yorkers who do not conveniently live next to subway lines or work perfect nine-to-five jobs. Congestion pricing would be devastating to those workers who need to schlep their equipment into the city, work the overnight shift, or have to drive across town for their second job.

In fact, the only ones who are excited about this half-baked idea are affluent people who don't need to punch a clock and have the luxury of working from home. Before we go dipping into the working man's pocket (again) to fix the transit authority, how about we conduct a thorough audit to ensure our money is being spent properly first.

PATRICK LINDIE  
New York

### In praise of the lowly worm

"Wormageddon" (May 25th) noted that Charles Darwin's book on worms, "The Formation of Vegetable Mould", did not enjoy the same success as his "On the Origin of Species". Darwin's interest in worms was sparked by reading Gilbert White's "The Natural History and Antiquities of Selborne". In that study White records, in minute detail, the flora and fauna of the village of Selborne

in Hampshire and makes a life-affirming statement about the lowly earthworm, "though in appearance a small and despicable link in the chain of nature, yet, if lost, would make a lamentable chasm".

Unlike Darwin's study of worms, White's "Natural History" is one of the most published books in the English language, with some 300 editions since its first publication in 1789.

GERALD SMITH  
Wellington, New Zealand

### The equality enforcer

Dystopian cultural extremes ("Dummy business", May 25th) were a constant subject of Kurt Vonnegut's novels. In his short story, "Harrison Bergeron", Vonnegut created the Handicapper General, who is charged with enforcing equality laws, such as having athletic people wear weights and attractive people don masks. Your review of Lionel Shriver's "Mania" speaks of a cancel culture where calling someone "stupid" is banned. There was no need for that in Vonnegut's story, as clever people had to wear radios blasting loud noises to dumb them down.

RICHARD ROSENBAUM  
Boston

### Woolly thinking

Bartleby dismissed sheep as passive "followers" (May 18th). In truth, sheep are highly attuned to the needs of the flock, move around together according to weather and time, and become audibly distressed when one of them is lost or in trouble. I lived for many years next to a field of sheep. Human societies would be greatly improved if they learned to respect, and even imitate, the animal's communitarianism.

SYLVIA ROSE  
Totnes, Devon

Bartleby's discourse on the overlooked benefits of followership called to mind Dilbert's unforgettable quip: "Change is good. You go first."  
ZUBIN AIBARA  
Bülach, Switzerland

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## Briefing AI and war



### Model major-general

#### An AI-assisted general staff may be more important than killer robots

IN LATE 2021 the Royal Navy approached Microsoft and Amazon Web Services, a pair of American tech giants, with a question: Was there a better way to wage war? More specifically, could they find a more effective way to co-ordinate between a hypothetical commando strike team in the Caribbean and the missile systems of a frigate? The tech firms collaborated with BAE Systems, a giant armsmaker, and Anduril, a smaller upstart, among other military contractors. Within 12 weeks—unfathomably fast in the world of defence procurement—the consortium gathered in Somerset in Britain for a demonstration of what was dubbed StormCloud.

Marines on the ground, drones in the air and many other sensors were connected over a “mesh” network of advanced radios that allowed each to see, seamlessly, what was happening elsewhere—a set-up that had already allowed the marines to run circles around much larger forces in previous exercises. The data they collected were processed both on the “edge” of the network, aboard small, rugged computers

strapped to commando vehicles with bungee cables—and on distant cloud servers, where they had been sent by satellite. Command-and-control software monitored a designated area, decided which drones should fly where, identified objects on the ground and suggested which weapon to strike which target.

The results were impressive. It was apparent that StormCloud was the “world’s most advanced kill chain”, says an officer involved in the experiment, referring to a web of sensors (like drones) and weapons (like missiles) knitted together with digital networks and software to make sense of the data flowing to and fro. Even two years ago, he says, it was “miles ahead”, in terms of speed and reliability, of human officers in a conventional headquarters.

AI-enabled tools and weapons are not just being deployed in exercises. They are also in use on a growing scale in places like Gaza and Ukraine. Armed forces spy remarkable opportunities. They also fear being left behind by their adversaries. Spending is rising fast (see chart 1 on next page).

But lawyers and ethicists worry that AI will make war faster, more opaque and less humane. The gap between the two groups is growing bigger, even as the prospect of a war between great powers looms larger.

There is no single definition of AI. Things that would once have merited the term, such as the terrain-matching navigation of Tomahawk missiles in the 1980s or the tank-spotting capabilities of Brimstone missiles in the early 2000s, are now seen as workaday software. And many cutting-edge capabilities described as AI do not involve the sort of “deep learning” and large language models underpinning services such as ChatGPT. But in various guises, AI is trickling into every aspect of war.

#### ProSAIC but gAINful

That begins with the boring stuff: maintenance, logistics, personnel and other tasks necessary to keep armies staffed, fed and fuelled. A recent study by the RAND Corporation, a think-tank, found that AI, by predicting when maintenance would be needed on A-10C warplanes, could save

▶ America's air force \$25m a month by avoiding breakdowns and overstocking of parts (although the AI did worse with parts that rarely failed). Logistics is another promising area. The US Army is using algorithms to predict when Ukrainian howitzers will need new barrels, for instance. AI is also starting to trickle into HR. The army is using a model trained on 140,000 personnel files to help score soldiers for promotion.

At the other extreme is the sharp end of things. Both Russia and Ukraine have been rushing to develop software to make drones capable of navigating to and homing in on a target autonomously, even if jamming disrupts the link between pilot and drone. Both sides typically use small chips for this purpose, which can cost as little as \$100. Videos of drone strikes in Ukraine increasingly show "bounding boxes" appearing around objects, suggesting that the drone is identifying and locking on to a target. The technology remains immature, with the targeting algorithms confronting many of the same problems faced by self-driving cars, such as cluttered environments and obscured objects, and some unique to the battlefield, such as smoke and decoys. But it is improving fast.

Between AI at the back-end and AI inside munitions lies a vast realm of innovation, experimentation and technological advances. Drones, on their own, are merely disrupting, rather than transforming, war, argue Clint Hinote, a retired American air-force general, and Mick Ryan, a retired Australian general. But when combined with "digitised command and control systems" (think StormCloud) and "new-era meshed networks of civilian and military sensors" the result, they say, is a "transformative trinity" that allows soldiers on the front lines to see and act on real-time information that would once have been confined to a distant headquarters.

AI is a prerequisite for this. Start with the mesh of sensors. Imagine data from drones, satellites, social media and other sources sloshing around a military network. There is too much to process manually. Tamir Hayman, a general who led Israeli military intelligence until 2021, points to two big breakthroughs. The "fundamental leap", he says, eight or nine years ago, was in speech-to-text software that enabled voice intercepts to be searched for keywords. The other was in computer vision. Project Spotter, in Britain's defence ministry, is already using neural networks for the "automated detection and identification of objects" in satellite images, allowing places to be "automatically monitored 24/7 for changes in activity". As of February, a private company had labelled 25,000 objects to train the model.

Tom Copinger-Symes, a British general, told the House of Lords last year that such systems were "still in the upper ends of re-

search and development rather than in full-scale deployment", though he pointed to the use of commercial tools to identify, for instance, clusters of civilians during Britain's evacuation of its citizens from Sudan in early 2023. America seems further along. It began Project Maven in 2017 to deal with the deluge of photos and videos taken by drones in Afghanistan and Iraq.

Maven is "already producing large volumes of computer-vision detections for warfighter requirements", noted the director of the National Geospatial-Intelligence Agency, which runs the project, in May. The stated aim is for Maven "to meet or exceed human detection, classification, and tracking performance". It is not there yet—it struggles with tricky cases, such as partly hidden weapons. But *The Economist's* tracker of war-related fires in Ukraine is based on machine-learning, entirely automated and operates at a scale that journalists could not match. It has already detected 93,000 probable war-related blazes.

AI can process more than phone calls or pictures. In March the Royal Navy announced that its mine-hunting unit had completed a year of experimentation in the Persian Gulf using a small self-driving boat, the Harrier, whose towed sonar system could search for mines on the seabed and alert other ships or units on land. And Michael Horowitz, a Pentagon official, recently told *Defense News*, a website, that America, Australia and Britain, as part of their AUKUS pact, had developed a "trilateral algorithm" that could be used to process the acoustic data collected by sonobuoys dropped from each country's submarine-hunting P-8 aircraft.

In most of these cases, AI is identifying a signal amid the noise or an object amid some clutter: Is that a truck or a tank? An anchor or a mine? A trawler or a submarine? Identifying human combatants is perhaps more complicated and certainly more contentious. In April *+972 Magazine*, an Israeli outlet, claimed that the Israel Defence Forces (IDF) were using an AI tool known as Lavender to identify thousands

of Palestinians as targets, with human operators giving only cursory scrutiny to the system's output before ordering strikes. The IDF retorted that Lavender was "simply a database whose purpose is to cross-reference intelligence sources".

In practice, Lavender is likely to be what experts call a decision-support system (DSS), a tool to fuse different data such as phone records, satellite images and other intelligence. America's use of computer systems to process acoustic and smell data from sensors in Vietnam might count as a primitive DSS. So too, notes Rupert Barrett-Taylor of the Alan Turing Institute in London, would the software used by American spies and special forces in the war on terror, which turned phone records and other data into huge spidery charts that visualised the connections between people and places, with the aim of identifying insurgents or terrorists.

### EXPLAIN or ordAIN?

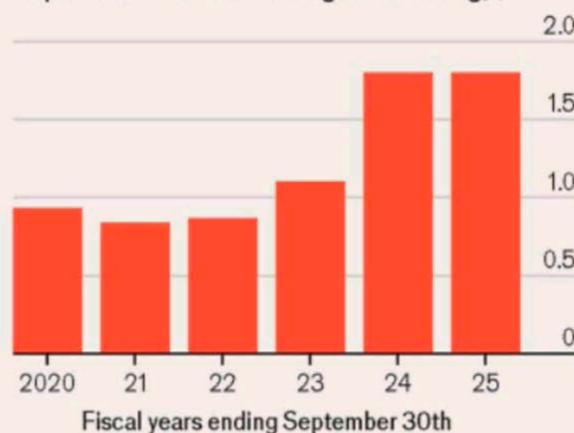
What is different is that today's software benefits from greater computing power, whizzier algorithms (the breakthroughs in neural networks occurred only in 2012) and more data, owing to the proliferation of sensors. The result is not just more or better intelligence. It is a blurring of the line between intelligence, surveillance and reconnaissance (ISR) and command and control (C2)—between making sense of data and acting on it.

Consider Ukraine's GIS Arta software, which collates data on Russian targets, typically for artillery batteries. It can already generate lists of potential targets "according to commander priorities", write Generals Hinote and Ryan. One of the reasons that Russian targeting in Ukraine has improved in recent months, say officials, is that Russia's C2 systems are getting better at processing information from drones and sending it to guns. "By some estimates," writes Arthur Holland Michel in a paper for the International Committee of the Red Cross (ICRC), a humanitarian organisation, "a target search, recognition and analysis activity that previously took hours could be reduced...to minutes."

The US Air Force recently asked the RAND Corporation to assess whether AI tools could provide options to a "space warfighter" dealing with an incoming threat to a satellite. The conclusion was that AI could indeed recommend "high-quality" responses. Similarly, DARPA, the Pentagon's blue-sky research arm, is working on a programme named, with tongue firmly in cheek, the Strategic Chaos Engine for Planning, Tactics, Experimentation and Resiliency (SCEPTER)—to produce recommended actions for commanders during "military engagements at high machine speeds". In essence, it can generate novel war plans on the fly. ▶▶

### How AI will it go?

United States, Department of Defence budget requests for artificial-intelligence funding, \$bn



Source: Department of Defence

▶ “A lot of the methods that are being employed” in SCEPTER and similar DARPA projects “didn’t even exist two to five years ago”, says Eric Davis, a programme manager at the agency. He points to the example of “Koopman operator theory”, an old and obscure mathematical framework that can be used to analyse complex and non-linear systems—like those encountered in war—in terms of simpler linear algebra. Recent breakthroughs in applying it have made a number of AI problems more tractable.

### Praise and complaints

The result of all this is a growing intellectual chasm between those whose job it is to wage war and those who seek to tame it. Legal experts and ethicists argue that the growing role of AI in war is fraught with danger. “The systems we have now cannot recognise hostile intent,” argues Noam Lubell of the University of Essex. “They cannot tell the difference between a short soldier with a real gun and a child with a toy gun...or between a wounded soldier lying slumped over a rifle and a sniper ready to shoot with a sniper rifle.” Such algorithms “cannot be used lawfully”, he concludes. Neural networks can also be fooled too easily, says Stuart Russell, a computer scientist: “You could then take perfectly innocent objects, like lampposts, and print patterns on them that would convince the weapon that this is a tank.”

Advocates of military AI retort that the sceptics have an overly rosy view of war. A strike drone hunting for a particular object might not be able to recognise, let alone respect, an effort at surrender, acknowledges a former British officer involved in policy

on AI. But if the alternative is intense shell-fire, “There is no surrendering in that circumstance anyway.” Keith Dear, a former officer in the Royal Air Force who now works for Fujitsu, a Japanese firm, goes further. “If...machines produce a lower false positive and false negative rate than humans, particularly under pressure, it would be unethical not to delegate authority,” he argues. “We did various kinds of tests where we compared the capabilities and the achievements of the machine and compared to that of the human,” says the IDF’s General Hayman. “Most tests reveal that the machine is far, far, far more accurate...in most cases it’s no comparison.”

One fallacy involves extrapolating from the anti-terror campaigns of the 2000s. “The future’s not about facial recognitioning a guy and shooting him from 10,000 feet,” argues Palmer Luckey, the founder of Anduril, one of the firms involved in StormCloud (see Schumpeter). “It’s about trying to shoot down a fleet of amphibious landing craft in the Taiwan Strait.” If an object has the visual, electronic and thermal signature of a missile launcher, he argues, “You just can’t be wrong...it’s so incredibly unique.” Pre-war modelling further reduces uncertainty: “99% of what you see happening in the China conflict will have been run in a simulation multiple times,” Mr Luckey says, “long before it ever happens.”

“The problem is when the machine does make mistakes, those are horrible mistakes,” says General Hayman. “If accepted, they would lead to traumatic events.” He therefore opposes taking the human “out of the loop” and automating strikes. “It is really tempting,” he acknowl-

edges. “You will accelerate the procedure in an unprecedented manner. But you can breach international law.” Mr Luckey concedes that AI will be least relevant in the “dirty, messy, awful” job of Gaza-style urban warfare. “If people imagine there’s going to be Terminator robots looking for the right Muhammad and shooting him... that’s not how it’s going to work out.”

For its part, the ICRC warns that AI systems are potentially unpredictable, opaque and subject to bias, but accepts they “can facilitate faster and broader collection and analysis of available information...minimising risks for civilians”. Much depends on how the tools are used. If the IDF employed Lavender as reported, it suggests the problem was over-expansive rules of engagement and lax operators, rather than any pathology of the software itself.

For many years experts and diplomats have been wrangling at the United Nations over whether to restrict or ban autonomous weapon systems (AWS). But even defining them is difficult. The ICRC says AWS are those which choose a target based on a general profile—any tank, say, rather than a specific tank. That would include many of the drones being used in Ukraine. The ICRC favours a ban on AWS which target people or behave unpredictably. Britain retorts that “fully” autonomous weapons are those which identify, select and attack targets without “context-appropriate human involvement”, a much higher bar. The Pentagon takes a similar view, emphasising “appropriate levels of human judgment”.

Defining that, in turn, is fiendishly hard. And it is not just to do with the lethal act, but what comes before it. A highly au- ▶▶



► Autonomous attack drone may seem to lack human control. But if its behaviour is well understood and it is used in an area where there are known to be legitimate military targets and no civilians, it might pose few problems. Conversely, a tool which merely suggests targets may appear more benign. But commanders who manually approve individual targets suggested by the tool “without cognitive clarity or awareness”, as Article 36, an advocacy group, puts it—mindlessly pushing the red button, in other words—have abdicated moral responsibility to a machine.

The quandary is likely to worsen for two reasons. One is that AI begets AI. If one army is using AI to locate and hit targets more rapidly, the other side may be forced to turn to AI to keep up. That is already the case when it comes to air-defence, where advanced software has been essential for tracking approaching threats since the dawn of the computer age. The other reason is that it will become harder for human users to grasp the behaviour and limitations of military systems. Modern machine learning is not yet widely used in “critical” decision-support systems, notes Mr Holland Michel. But it will be. And those systems will undertake “less mathematically definable tasks”, he notes, such as predicting the future intent of an adversary or even his or her emotional state.

There is even talk of using AI in nuclear decision-making. The idea is that countries could not only fuse data to keep track of incoming threats (as has happened since the 1950s) but also retaliate automatically if the political leadership is killed in a first strike. The Soviet Union worked on this sort of “dead hand” concept during the cold war as part of its “Perimetr” system. It remains in use and is now rumoured to be reliant on AI-driven software, notes Leonid Ryabikhin, a former Soviet air-force officer and arms-control expert. In 2023 a group of American senators even introduced a new bill: the “Block Nuclear Launch by Autonomous Artificial Intelligence Act”. This is naturally a secretive area and little is known about how far different countries want to go. But the issue is important enough to have been high up the agenda for presidential talks last year between Joe Biden and Xi Jinping.

### RemAining in the loop

For the moment, in conventional wars, “there’s just about always time for somebody to say yes or no,” says a British officer. “There’s no automation of the whole kill chain needed or being pushed.” Whether that would be true in a high-intensity war with Russia or China is less clear. In “The Human Machine Team”, a book published under a pseudonym in 2021, Brigadier-General Yossi Sarial, the head of an elite Israeli military-intelligence unit, wrote that



an AI-enabled “human-machine team” could generate “thousands of new targets every day” in a war. “There is a human bottleneck,” he argued, “for both locating the new targets and decision-making to approve the targets.”

In practice, all these debates are being superseded by events. Neither Russia nor Ukraine pays much heed to whether a drone is an “autonomous” weapon system or merely an “automated” one. Their priority is to build weapons that can evade jamming and destroy as much enemy armour as possible. False positives are not a big concern for a Russian army that has bombed more than 1,000 Ukrainian health facilities to date, nor for a Ukrainian army that is fighting for its survival.

Hanging over this debate is also the spectre of a war involving great powers. NATO countries know they might have to contend with a Russian army that might, once this war ends, have extensive experience of building AI weapons and testing them on the battlefield. China, too, is pursuing many of the same technologies as America. Chinese firms make the vast majority of drones sold in America, be it as consumer goods or for industrial purposes. The Pentagon’s annual report on Chinese military power observes that in 2022 the People’s Liberation Army (PLA) began discussing “MultiDomain Precision Warfare”: the use of “big data and artificial intelligence to rapidly identify key vulnerabilities” in American military systems, such as satellites or computer networks, which could then be attacked.

The question is who has the upper hand. American officials once fretted that China’s lax privacy rules and control over the private sector would give the PLA access to more and better data, which would result in superior algorithms and weapons. Those concerns have mellowed. A recent study of procurement data by the Centre for Security and Emerging Technology (CSET) at Georgetown University found

that America and China are “devoting comparable levels of attention to a similar suite of AI applications” (see chart 2).

Moreover, America has pulled ahead in cutting-edge models, thanks in part to its chip restrictions. In 2023 it produced 61 notable machine-learning models and Europe 25, according to Epoch AI, a data firm. China produced 15. These are not the models in current military systems, but they will inform future ones. “China faces significant headwinds in...military AI,” argues Sam Bresnick of CSET. It is unclear whether the PLA has the tech talent to create world-class systems, he points out, and its centralised decision-making might impede AI decision-support. Many Chinese experts are also worried about “untrustworthy” AI. “The PLA possesses plenty of lethal military power,” notes Jacob Stokes of CNAS, another think-tank, “but right now none of it appears to have meaningful levels of autonomy enabled by AI”.

China’s apparent sluggishness is part of a broader pattern. Some, like Kenneth Payne of King’s College London, think AI will transform not just the conduct of war, but its essential nature. “This fused machine-human intelligence would herald a genuinely new era of decision-making in war,” he predicts. “Perhaps the most revolutionary change since the discovery of writing, several thousand years ago.” But even as such claims grow more plausible, the transformation remains stubbornly distant in many respects.

“The irony here is that we talk as if AI is everywhere in defence, when it is almost nowhere,” notes Sir Chris Deverell, a retired British general. “The penetration of AI in the UK Ministry of Defence is almost zero...There is a lot of innovation theatre.” A senior Pentagon official says that the department has made serious progress in improving its data infrastructure—the pipes along which data move—and in unmanned aircraft that work alongside warplanes with crews. Even so, the Pentagon spends less than 1% of its budget on software—a statistic frequently trotted out by executives at defence-tech startups. “What is unique to the [Pentagon] is that our mission involves the use of force, so the stakes are high,” says the official. “We have to adopt AI both quickly and safely.”

Meanwhile, Britain’s StormCloud is getting “better and better”, says an officer involved in its development, but the project has moved slowly because of internal politics and red tape around the accreditation of new technology. Funding for its second iteration was a paltry £10m, pocket money in the world of defence. The plan is to use it on several exercises this year. “If we were Ukraine or genuinely worried about going to war any time soon,” the officer says, “we’d have spent £100m-plus and had it deployed in weeks or months.” ■

# United States



## The Senate

# Preparing for a takeover

WASHINGTON, DC

**Republicans are favoured to win the Senate. What do they want to do with it?**

**D**ONALD TRUMP'S visit to Capitol Hill on June 13th served as a reminder that—whatever the candidate promises—Congress will have a critical role in shaping policy if he returns to the White House. Although Republicans largely support their presumptive nominee and his programme, the finer points of a potential second-term agenda remain up for debate.

*The Economist's* election-forecast model reckons that Donald Trump is more likely than not to retake the presidency. A Trump victory would probably be accompanied by Republicans gaining control of the Senate and perhaps expanding their majority in the House. Congressional Republicans are already considering the art of the possible if they do so.

Their legislative aspirations would be limited by the filibuster, a tradition that requires 60 votes in the 100-seat Senate to approve much legislation. Republican institutionalists are loth to ditch it. Their agenda is also limited by reduced ambi-

tions: Republicans no longer talk about entitlement reform or sweeping changes to health care. Yet the party could still dramatically shift the country's fiscal trajectory thanks to a parliamentary procedure known as reconciliation, which allows the Senate to use a simple majority to change spending and revenue. That is particularly important next year, with many of Mr Trump's first-term tax cuts set to expire.

Rate cuts for individuals and estates, along with several changes for business,

will lapse by the end of 2025. Some 60% of American households would then send bigger cheques to the taxman each year. Simply extending the law would increase the deficit by around \$4trn over the next ten years, according to the Joint Committee on Taxation. The seemingly impossible task is to deliver a politically viable bill that encourages growth without expanding America's already massive deficit, which exceeded 6% of GDP in 2023.

Many Senate Republicans have plans to build on Mr Trump's 2017 legislation. "I was not a real big fan," Ron Johnson, a Republican senator from Wisconsin, says of the bill he voted for seven years ago. While the headline corporate rate fell from 35% to 21%, changes to deductions for small-business owners left some paying more. Mr Johnson believes the party needs to embrace a "paradigm shift" and radically simplify the tax code. Others are discussing how to create more predictability for business while retaining aspects of the law that encourage investment.

A relatively young but growing faction emphasises support for workers. Jim Banks, a congressman expected to win Indiana's Senate race this year, has expressed dissatisfaction that the corporate-rate cut was permanent whereas reductions for individuals were not. And Marco Rubio, a Republican senator from Florida and longtime child-tax-credit advocate, says: "Al- ▶▶

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▶ lowering families to keep more of their hard-earned money is not only fair, but absolutely essential to helping them recover from the Biden years." Jason Smith, chairman of the House Ways and Means Committee, said in May that "very well-known conservative" Republicans are even open to increasing the corporate rate.

Two complicating factors could frustrate any effort to reduce America's deficit. The first is Mr Trump, who during a recent speech vowed to eliminate taxes on tips. That is politically savvy in the service-industry-powered swing state of Nevada, but would be expensive. The second complication is the House, where tax legislation originates; the size of any Republican majority there would be pivotal.

The fiscal question could affect another priority, defence spending. John Kennedy, a Republican senator from Louisiana, sees these as inextricably linked. On the one hand, America must deal with "authoritarians throughout the world who want to kill us and drink our blood out of a boot". On the other, "You're trying to control your debt, grow your economy and pay for an older population." He says reducing wasteful spending is essential.

Roger Wicker, the top Republican on the Senate Armed Services Committee, recently called for America to increase defence spending to 5% of GDP, up from a projected 2.9% in 2024. Mr Wicker has plenty of support from key figures like Mitch McConnell, the Republicans' outgoing Senate leader. Yet a growing isolationist wing of the Senate will grumble that the country already spends, and wastes, far too much. The faction undeniably has grown in recent years, but hawkish Democrats can compensate for lost Republican votes.

A likely compromise could be increased defence spending, albeit not at the level some hawks believe is necessary. More spending directed at countries like Ukraine and Taiwan could become even more difficult. Although foreign military aid has commanded bipartisan support under Mr Biden, its approval in a Republican-run Washington could come down to the whims of congressional leaders and Mr Trump—which is not exactly comforting for leaders in Taipei or Kyiv.

### Beyond budgets and bombs

Mr Trump is also running hard against the mess at America's southern border and Mr Biden's green-energy policies. As president he could take executive action on myriad border and energy policies, but legislative action has more staying power. Few Democrats align with Mr Trump on expanding fossil-fuel production, and fewer still would vote with him on immigration. Some Republican senators see an expansive role for the reconciliation procedure. "There's actually a great deal that can be

done. We'll need to think creatively about it," says Bill Hagerty, a senator from Tennessee. "The language in the reconciliation process needs to be budget-related, but what you can say is, 'Thou shalt not fund' and fill in what you're trying to address."

Getting presidential nominees installed is critical to reshaping power in Washington. Executive-branch nominees could implement Trumpian immigration policies, undo Mr Biden's energy and environmental regulations and even claw back funds meant for green power projects. About 1,200 of the president's 4,000 political appointees require Senate confirmation. A Republican Senate majority would prioritise approving lifetime appointments to the federal judiciary over temporary jobs in the bureaucracy.

The judicial stakes help explain the most notable development from Mr Trump's visit to the Capitol on June 13th:

### The contenders

## Freezing time

WASHINGTON, DC

**Americans are not confident in the lucidity of their presidential candidates**

"I REALLY HATE doing this, but I cannot not do it," announced the conservative host Hugh Hewitt on his online show. This was a preface to a montage of video clips showing "President Biden's obvious and increasing infirmity".

One, from a star-studded fund-raiser held in Los Angeles on June 15th, shows Mr Biden staring blankly at the audience before Barack Obama, the night's other headline act, grasps his arm and leads him off-stage. The second, taken a few days earlier at the G7 summit in Italy, appears to show Mr Biden wandering away from other world leaders as they watch a skydiving demonstration. In conservative corners of the media and the internet, such clips of Biden freezes abound. Another recent entry shows the president staring blankly at a White House concert celebrating the new federal holiday of Juneteenth on June 19th, which marks the end of slavery.

Selective editing of the clips makes them look more devastating than they are. A longer recording of the Los Angeles episode shows Mr Biden waving to one side of the audience and clapping before turning and standing still for about seven seconds—possibly to try to hear what was being shouted (Mr Obama intervened before anything more awkward could occur). A fuller clip of the Italian incident shows that Mr Biden did not wander off into the distance but rather to greet a skydiver who

the former president burying the hatchet with Mr McConnell after years of acrimony. (At the moment the race to succeed Mr McConnell as the Republicans' leader in the Senate seems a toss-up between John Thune of South Dakota and John Cornyn of Texas, although if Mr Trump were to throw his weight behind an alternative, such as Steve Daines of Montana, that could prove decisive.)

All three of Mr Trump's first-term Supreme Court picks are under 60. Clarence Thomas and Samuel Alito, who would be in their late 70s by the end of a second Trump term, could retire. No one knows what America's tax system or defence budget will look like in 20 years. But anyone wondering why Republicans stick by Mr Trump through everything need only remember that, if he wins, a majority of Supreme Court justices could be Trump appointees well into the 2040s. ■

had landed off-screen (though Giorgia Meloni, the Italian prime minister, similarly intervened to bring him to centre stage).

This is not to say that the president is a paragon of lucidity. Mr Biden, an octogenarian, certainly has his senior moments. Some are hard to explain away: in 2022 he wondered whether a recently deceased congresswoman was in a crowd at a White ▶▶



Collector's item

▶ House event (“Where’s Jackie?” he asked to silent horror). The special counsel appointed to investigate classified documents at Mr Biden’s house said that he frequently confused dates, including of his son’s death in 2015. The transcript of the interview is not exactly exonerating.

The fracas gives a preview for what the next five months of campaigning will look like. Donald Trump and his allies will relentlessly scrutinise the president’s public appearances for signs of senility and distribute clips purportedly showing this (there is little need for AI-generated disinformation when simple editing tools do so well). Mr Biden’s campaign will be anxious not to give them too much material to work with, reinforcing a bunker mentality.

Allies of Mr Biden wonder why more is not made of Mr Trump’s strange utterances. On June 9th at a rally in Las Vegas, the former president told a bizarre, lengthy hypothetical story about being electrocuted by a battery-powered boat while being chased by sharks. It might be an enjoyable, absurdist scene in a B-horror film, were it not for the scarier fact that the raconteur is the leading contender to win the presidential election. Mr Trump, who is 78, has also confused the leader of Hungary for that of Turkey and mistakenly said that Mr Obama was now president.

Democrats are right about the difference in standards. Such utterances are barely news stories for Mr Trump; Democrats might forcibly commit Mr Biden to an elder-care facility for a monologue like that. Yet the difference in standards is the point. Mr Biden’s pitch is competent, rational leadership, whereas Mr Trump has been a surrealist from the start.

Voters appear to be steeling themselves for a dismal choice. A recent poll conducted for CBS News by YouGov found that just 35% of registered voters say Mr Biden is mentally and cognitively healthy enough to be president; even 29% of registered Democrats say they are not sure their man is all there. The same poll found that 50% of voters thought Mr Trump was mentally fit for office. Only in this contest could such a result be thought of as positive.

Mr Trump is sure that he has the cognitive advantage. His campaign has pushed for holding multiple debates, on the theory that Mr Biden would not be able to keep up either rhetorically or physically. While president, Mr Trump memorably bragged about his high marks on a mental-acuity test (meant as a diagnostic tool for early dementia, not admission to MENSA). Speaking in Detroit this week, Mr Trump challenged Mr Biden to take the same test he had “aced”. While issuing the blustery challenge, Mr Trump got confused about the name of the White House physician who administered it to him: he was Ronny Jackson, not “Ronny Johnson”. ■



### School of stocks

## Education that pays

WILLINGBORO, NJ

### More states in America are requiring schools to teach personal finance

“HOW IS THE stockmarket looking today?” asks Jennifer Varga, a teacher at Memorial Middle School in Willingboro, New Jersey, a suburb about 20 miles outside Philadelphia. She has projected a live visualisation of S&P 500 companies sorted by market cap onto the board at the front of her classroom. It is a sea of mostly red boxes. A 14-year-old pupil quickly answers: “Trash!” She is not wrong—it was a rubbish morning for the index on June 11th. Ms Varga adjusts the picture to show the S&P’s rise over the past month, then the past six months. The pupils nod approvingly at the sea of green boxes as Ms Varga explains the virtues of investing long-term.

Personal-finance courses that teach pupils best practices for managing their money are spreading across America, propelled by recent state laws requiring such instruction. Since 2020, 17 states have adopted mandates that make taking a financial-literacy course a requirement for high-school graduation, bringing the total up to 25. According to Tim Ranzetta, the co-founder of Next Gen Personal Finance, an advocacy group, 53% of pupils are in a state that currently requires or has decided to soon require such a course to graduate. That figure will probably grow. New York State is considering a mandate, and California has a bill in the works (potentially driving up the percentage to about 70% of all American pupils).

Pupils in these classes learn not only how to buy and sell shares, but how to save their earnings in order to have something to invest in the first place. Courses teach how to properly bank, budget, manage credit and pay for college. They cover comparison shopping and the basics of how to plan and track daily expenses. (“I save all my money and spend my parents’ money!” one future hedge-fund manager said.)

Young people badly need these courses. According to the Programme for International Student Assessment, an international survey, only 10% of 15-year-olds in the OECD, a club of mostly rich countries, score highly on financial-literacy assessments. Are personal-finance courses the answer? For a long time, the research said no. Many studies, including a meta-analysis from 2014 that was cited over 2,500 times, claimed that financial-literacy courses were ineffective. The finding made intuitive sense; many teenagers have yet to work or manage a household.

But more recent findings have changed the picture. “Research has gotten better,” explains Carly Urban, an economics professor at Montana State University. The courses themselves have also improved. Studies that use the gold standard of investigation—a randomised controlled trial—have found that the courses are effective in improving financial knowledge and behaviour. A meta-analysis of 76 randomised experiments in 33 countries found that people who take these courses learn the content, save more and budget better.

Other studies have found that pupils who take personal-finance courses in high school borrow less money. If they do borrow for college, they choose low-cost options. And low-income borrowers exposed to personal-finance coursework are more likely to pay down their balances and steer clear of exploitative, high-interest pay-day loans. They are also less likely to have credit-card debt, and they have higher credit scores and fewer defaults.

Instruction at school is necessary because it is not always available at home. “Everyone always says, ‘I wish someone taught me this when I was a kid,’” says Tony Thurmond, California’s school superintendent. “I hear that from people every time I talk about it.” Naysayers worry about adding one more graduation requirement to California’s long list, but Mr Thurmond is willing to remove courses with less direct bearing on life skills.

“When I was 20, it would have been nice to have this class,” Ms Varga says after the pupils she was educating about the S&P 500 have gone to lunch. She got into some financial trouble as a young adult before she learned the subjects she now teaches and improved her own money management. “I want them to be better than my generation.” ■

## On the trail in Colorado

## What voters want

AKRON, COLORADO

**Lauren Boebert's primary is a window into everyday Trumpism**

A WEEK BEFORE Colorado's primary elections, which take place on June 25th, Richard Holtorf was busy feeding cattle and preparing his ground for planting wheat. But the 59-year-old had politics on his mind as he stepped down from a massive tractor at his ranch on the state's eastern plains. After a brief oration on the deficiencies of battery-powered farming equipment, Mr Holtorf explained why he was running in the Republican primary and hoping subsequently to win a seat in the US House of Representatives.

After gaining legislative experience as minority whip in the state House, Mr Holtorf has developed a desire to influence policy at a higher level. And then there is Lauren Boebert. "She hasn't done anything except run her mouth and showboat and carry a pistol around, and showboat some more," he argues. Ms Boebert—who before entering politics ran Shooters Grill in Rifle, Colorado—first defeated a Republican incumbent in 2020, despite expressing sympathy for the QAnon conspiracy theory.

Her frequent television appearances, high-profile political feuds with fellow Republicans and a warm relationship with Donald Trump have made her one of the most recognisable figures on Capitol Hill. The 37-year-old grandmother was kicked out of a musical in Denver last year after vaping and fondling her date, increasing her notoriety, and maybe her appeal.

Voters in Colorado's third congressional district, which preferred Mr Trump over Joe Biden by a mere five points in 2020, grew tired of this stuff. Set for a rematch this year with a well-funded Democratic opponent, and after winning reelection by only 546 votes in 2022, Ms Boebert opted to run in the more heavily Republican fourth district. Armed with Mr Trump's endorsement and unrivalled name recognition, she is the frontrunner.

A recent survey conducted by Kaplan Strategies, a political consultancy, showed her favoured by 40% of the primary electorate, and her opponents winning between 3% and 5%. Perhaps this is not surprising in a district with a highway billboard that declares GOD BLESS DONALD TRUMP. GOD BLESS THE AMERICAN FLAG. Other candidates questioned the Kaplan survey's size, and insisted that they had met few real voters who supported Ms Boebert, but still acknowledged her strong position.

Sitting in a cluttered conference room

## White women and slavery

## The second sex

WASHINGTON, DC

**New research exposes the role of women in the slave trade**

THEY DIDN'T know how bad it was. That was how James Redpath, a northern journalist who toured the South in the 1850s, explained white southern women's support for slavery to his readers. He reckoned that women were shielded from the "most obnoxious features"—rarely witnessing the auctions and punishments—and were oblivious to the "gigantic commerce" that it had become. Historians came to agree that slavery was the business of men.

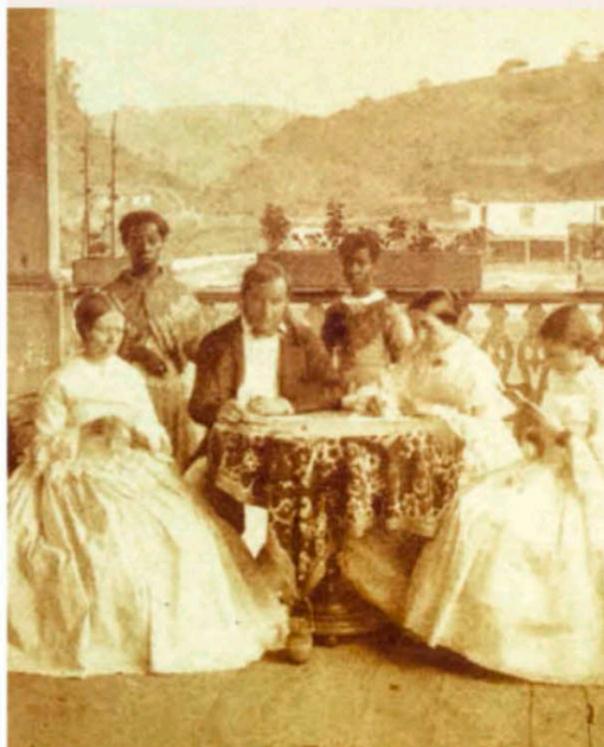
Research published last month shatters that narrative. Economists at Ohio State University analysed data from the New Orleans slave market, the biggest. They found that women were buyers or

sellers in 30% of all transactions and 38% of those that involved female slaves.

These are the first hard numbers building on qualitative work by Stephanie Jones-Rogers at the University of California, Berkeley, showing just how instrumental women were to the slave economy. In the travel logs of foreigners she uncovered descriptions of southern belles bidding at the slave markets dressed in their finest silks and "glittering in precious jewels". For the ladies of the antebellum South, slavery was more than business—it was their ticket to economic freedom. Coverture laws compelled women to relinquish property and money to men when they married, but exceptions were made for slaves. Fathers hoping to secure their daughters' futures gave them slaves at baptisms, birthdays and engagements.

Women put slaves to work selling cakes or dresses and pocketed the profits in secret. Some ran slave brothels. They then used the cash to reinvest in the slave market. But unlike their husbands, who often bought fit men to work the fields, women bought more women, who were cheaper but paid dividends later on when they reproduced.

After the civil war it would be decades before the women of the South gained the right to control their earnings, own property and vote. Ms Jones-Rogers contends that their fight for segregation into the 20th century was fuelled by the sense of power they had known and lost. In the subjugation of others they had tasted freedom.



**Habeus corpus**

at his metal foundry in Loveland, about an hour north of Denver, Mike Lynch offers this assessment of her. "If she was an incredibly effective legislator, and then has a weird life, I don't care." The former state house minority leader contrasts this with his own work on issues like fire prevention, which doesn't get much attention on social media. Mr Lynch predicts that Republicans would lose the fourth congressional district with Ms Boebert as their nominee—something the party has managed only once in the past half-century.

Ms Boebert, of course, is not the only candidate with flaws. Asked at a debate in January whether they had ever been arrested, six of the then nine candidates raised

their hands. Several candidates described ultimately failed efforts to consolidate the field. According to Peter Yu, a businessman and perennial candidate, "There were other candidates in the race who refused, no matter what the situation was, to ever drop out." Ms Boebert raised \$332,935 between April 1st and June 5th—several times more than her nearest competitor. She has campaigned in the district and frequently attacks her opponents as members of the "uniparty". In the unlikely event of an upset on June 25th, she could indeed point to a uniparty being responsible: unaffiliated voters are allowed to vote in either party's primaries, and Ms Boebert is widely reviled outside the party base. ■

Immigration

# Beyond the border

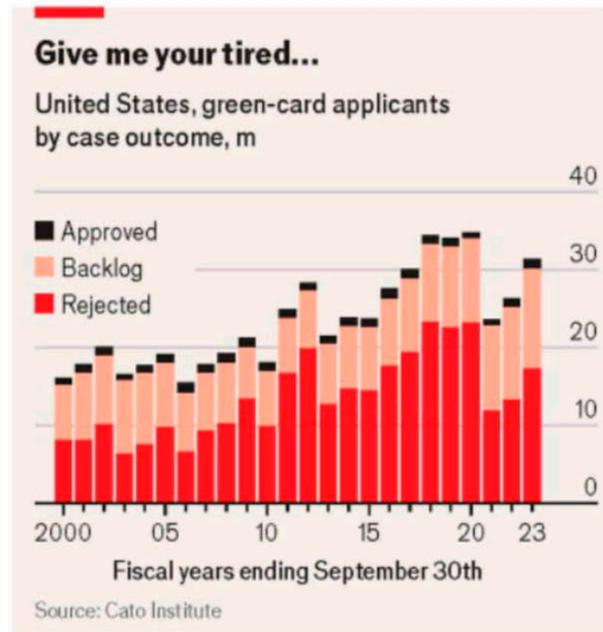
LOS ANGELES

**Legal immigration to America has rebounded. Is anyone paying attention?**

REPUBLICAN POLITICIANS often compare America's southern border to Swiss cheese. It is more like a black hole. Its gravitational pull is so strong that officials can think only of enforcement and security (or the good electoral politics that come with harping on about enforcement and security). The names of small, dusty border towns—Eagle Pass, Jacumba Hot Springs—have never been so well known. The black hole leaves little time to consider the other parts of America's creaking immigration system, such as refugees, skilled-worker visas or reforming quotas that are decades out of date.

Yet it is worth looking at what is happening beyond the border. For even while the surge of irregular migration has soaked up attention and resources, legal immigration has rebounded. And on June 18th President Joe Biden announced new safeguards—including work permits and protection from deportation—for people who have been living illegally in the country for years but are married to American citizens. The move was crafted to appeal to, among others, Latino voters and to assuage progressives angered by Mr Biden's crackdown on illegal migration in an executive action two weeks ago. At a stroke, it also swells the ranks of the country's legitimate residents by about 500,000 people.

Two things combined to decrease legal immigration to the lowest level in decades during Donald Trump's presidency: anti-immigrant policies and covid-19. Research from Giovanni Peri and Reem Zaiour, of the University of California, Davis, suggests that America's foreign-born workforce began to shrink in 2019, before the pandemic. Between 2016 and 2020 Ameri-



ca saw the longest continuous decline in new green cards issued since the 1990s. The number of refugees admitted annually tumbled to its lowest level in the resettlement programme's history. Denial rates for skilled-worker visas rocketed. Later, the pandemic closed consulates abroad.

### Liberty's lure

Legal migration took time to recover: consulates reopened slowly, and visa backlogs were huge. But in 2024 it has returned to pre-pandemic, and indeed pre-Trump, levels. Nearly 1.2m green cards were issued in the fiscal year of 2023, a 68% increase from 2020 and slightly more than the number doled out during Mr Trump's first year in office. The government is projected to resettle at least 90,000 refugees in 2024, potentially short of Mr Biden's 125,000 allotment but far more than the 11,000 or so settled during the doldrums of the pandemic.

Non-immigrant visas, the kind that temporary workers and students get, have also made a comeback. This is good news for firms wanting to hire skilled workers. The H-1B lottery system, which allots visas to high-skilled, mostly tech, workers, was rife with fraud. Hundreds of thousands of applicants compete for just 85,000 spots, a number set by Congress in 2004. Sometimes dozens of applications were submitted on behalf of one person. A tweak to the lottery system is intended to fix that.

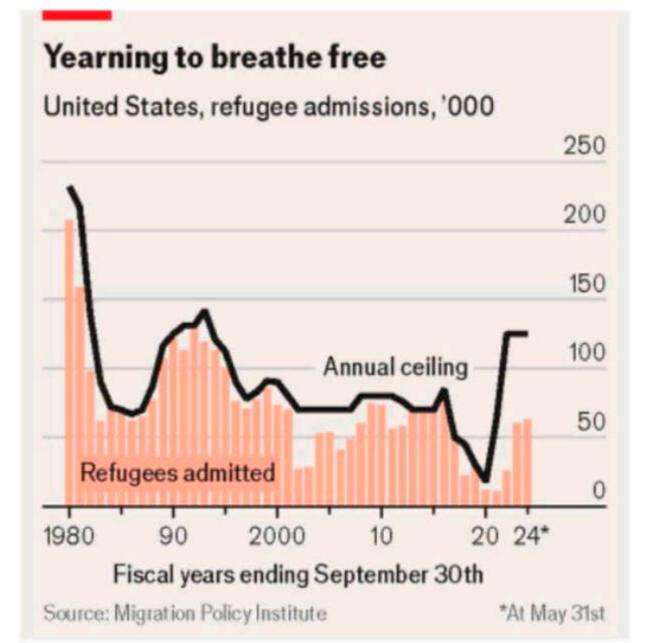
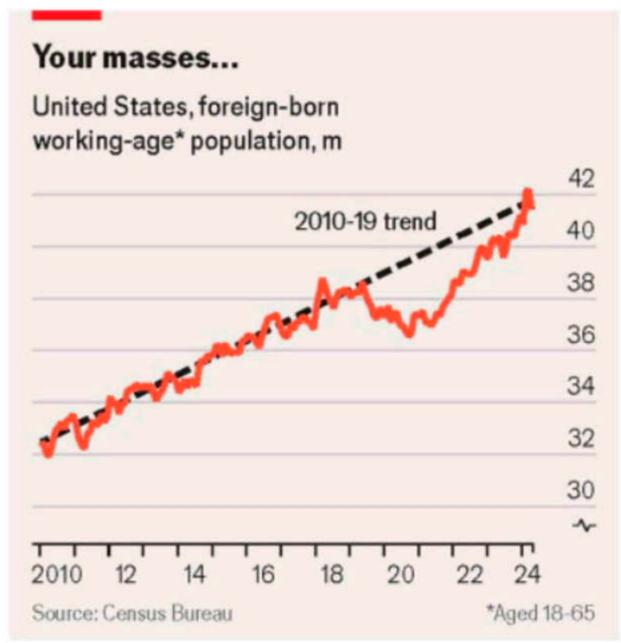
Although more students are again coming to study in America, more than ever are also being denied visas. The same factors encouraging border crossings—a hot labour market, violence and instability at home, and a more welcoming president—

may also be pushing young people abroad to seek their education in America. Cecilia Esterline of the Niskanen Centre, a think-tank, suggests that students may be failing to convince consulates that they will return to their home country after studying.

What has all this meant for the workforce? At its peak in 2021, the shortfall of foreign-born workers identified by Mr Peri and Ms Zaiour reached about 2m people. That hole has now disappeared, partly due to the number of people who streamed across the border and found work. But Mr Peri reckons the rebound has also been fuelled in part by the return of college-educated legal migrants. Some 45% of recent immigrants have a college degree, compared with 38% of native-born Americans and 33% of those who arrived in the 1990s.

One thing that has not changed is the immigration system itself. Congress has repeatedly failed to create new legal pathways for migrants, to increase caps for limited visas and to make the system more responsive to the needs of America's economy. The result is a monumental backlog for green cards, long waiting times at consulates, frustrated families who worry they will never be reunited, and irritated businesses and states eager for more labour. The process is next to impossible, says Mr Bier. "There are the people who are screwed, people who are really screwed, and then the people who are just going to die before they get a chance to come," he adds, bleakly.

Americans do not share Congress's allergy to reform. They increasingly support more deportations and the border wall, but the desire for stricter enforcement has not yet shaken their approval of immigration overall. A majority of Democrats and a plurality of Republicans support more legal pathways. Some 61% of registered voters surveyed by Pew in April maintain that America's openness to people from elsewhere is essential to its national character. But in an election year, with the black hole sucking up so much attention, reform of the legal system is unthinkable. ■



## LEXINGTON

### *Once were warriors*

*Instead of merely excusing insurrection, Donald Trump is now making a virtue of it*



HERE IS a thought experiment. Try to put politics and the presidential race out of your mind and give Donald Trump the benefit of the doubt about the attack on the Capitol on January 6th 2021. Accept that he believed the election was stolen and that he meant it when he told the crowd that day to march from the White House to Capitol Hill “peacefully and patriotically”. Accept that he believed none of his supporters was carrying weapons or intended violence of any sort. Accept that he has since come to conclude, as he has claimed, that Nancy Pelosi, then the speaker of the House, somehow “caused” the violence, that the police “ushered in” the crowd, that they were “a loving crowd”, indeed, “patriots” who have since become not just “victims” but even “hostages” of a weaponised system of justice.

Then ask yourself this: after embracing all of those assumptions and assertions, why would you celebrate the rioters as “warriors”, as Mr Trump did during a rally earlier this month?

To call them warriors is not simply to insist their cause was just and that they were somehow tricked into entering the Capitol with the guns, bats, knives and other weapons that Mr Trump once maintained they did not have; it is not just to ignore or minimise the violence that day, which resulted in five deaths; it is not even to shift the blame for that violence to others, whether police officers (some 140 of whom were assaulted), or Ms Pelosi (whom the rioters were hunting, and who can be seen on video from that day urging Mr Trump’s acting secretary of defence to dispatch troops to the Capitol). It is instead to praise the people who attacked the Capitol precisely—definitionally—for their capacity to wage war. That is to move the understanding of what happened on January 6th, at least for Mr Trump’s supporters, onto new and even darker ground.

There was a moment, back in in the mists of 2021, when just about everyone in the mainstream of American politics recoiled in shock from the mayhem of January 6th. They agreed that attacking the Capitol was wrong, and that Mr Trump, to some degree, was responsible. Even Mr Trump said so, the leader of the House Republicans, Kevin McCarthy, told colleagues at the time, according to the exacting report delivered in 2022 by the House select

committee that investigated the attack. That was briefly Mr McCarthy’s view, too, as it was that of Mitch McConnell, the Senate Republican leader, who called Mr Trump “practically and morally responsible for provoking the events of that day”. During her campaign for the Republican presidential nomination this spring, Nikki Haley called January 6th a “terrible day” and said Mr Trump “will have to answer for it”.

But the times when Republican leaders would say they wanted Mr Trump held accountable for the riot appear to be over. A few days after Mr Trump praised the “J6 warriors”, Mr McConnell joined other Republican legislators in welcoming the former president back on Capitol Hill for the first time since the attack, for a meeting Mr McConnell called “entirely positive”. And yet even as they absolve Mr Trump of responsibility, other Republican politicians at least still seem to see attacking the Capitol as a bad thing to do. “No real Republican with any credibility in the party is still blaming him” for January 6th, Senator J.D. Vance of Ohio told reporters. That construction implies the conduct of the crowd was blameworthy. By contrast, Mr Trump is valorising it.

Mr Trump faces federal charges over his efforts to overturn the last election, but that case is on hold. Meanwhile, the exhaustive work of the January 6th committee somehow already smells of mothballs and reads like the relic of a different era, back before polarisation had done its work of rallying Republicans to Mr Trump. Based on sworn testimony from witnesses who were almost all Republicans, the committee showed that Mr Trump ignored repeated assurances from top aides that he had lost legitimately and instead trumpeted lies about electoral fraud; ignored warnings that the crowd he summoned to Washington was primed for violence; used that word “peacefully” just once, as scripted by his speechwriters, but ad-libbed the word “fight” 18 times; and then sat on his hands for more than three hours as staff and family members implored him to call a halt to the riot.

Thousands of the protesters who assembled to hear Mr Trump’s speech on January 6th refused to pass through the magnetometers, or left their packs outside them, the committee found. From those who did pass through the Secret Service collected 269 blades or knives, 18 brass knuckles, 18 tasers and 30 batons or blunt instruments. In other words, Mr Trump has landed on the correct description of many of those who answered his call that day: they were warriors.

#### **The shadow knows**

And yet some of them came to lament taking part. About 820 people have pleaded guilty to various federal charges so far, and at least another 162 have been convicted in contested trials. “I guess I was like a traitor, somebody against my own government,” one told prosecutors. Another noted that every male member of his family had served in the armed forces, and he had cast “a shadow” over the family name.

This is what seems strange about Mr Trump’s celebration of “those J6 warriors”: He does not need to go that far. In fact, doing so may limit his appeal to the independent-minded voters who seem critical to victory this year, and Mr Trump’s loyalists would surely have accepted his assurances that he wanted to see only peaceful, patriotic protest. Maybe it is simply Mr Trump’s philosophy to insist that every seeming weakness is a strength, that any wrong he may be associated with is actually a right. Or maybe he is getting ready for next time round. ■

## The Americas



### Reforming Argentina

## A long way to go

BUENOS AIRES

**Javier Milei enjoys a week of successes, but the hardest part is still to come**

JAVIER MILEI, Argentina's president, has enjoyed the best week of his term. At dawn on June 13th the Senate passed two bills aiming to boost growth and raise revenue, giving Mr Milei his first legislative victory since he came to power in December. Hours later he travelled to the G7 in Italy, where he giggled with Giorgia Meloni, the prime minister, embraced Pope Francis and palled around with Kristalina Georgieva, the head of the IMF. "I always love our meetings," he gushed to Ms Georgieva. Yet the relationship between Mr Milei and the fund, which has a \$44bn lending programme with Argentina, may soon become less chummy. Uncertainty about the president's plans for the central bank is worrying investors and the IMF alike.

Mr Milei's early successes are impressive given the mess he inherited. For years, the central bank had created money to finance the fiscal deficit, fuelling inflation. It also had no foreign reserves. Another de-

fault seemed almost inevitable.

In his inauguration speech Mr Milei warned Argentines of hard times, declaring that "there is no money". He immediately fired hundreds of bureaucrats, cut spending and devalued the peso by over 50% (which initially pushed up inflation). Meanwhile, public salaries and pensions were held down, slashing their real value. As a result, Argentina has enjoyed fiscal surpluses for five months, something not seen since 2008. Inflation has fallen to 4.2% month on month, the lowest since January 2022 (see chart 1 on next page).

Some Argentines are angered by the accompanying pain. The night the Senate voted on the reforms, protesters hurled Molotov cocktails outside and set a car alight. Unions have organised huge marches. Yet despite the excruciating recession, over half of Argentines still approve of Mr Milei. Jorge Juliano, a 72-year-old taxi driver in Buenos Aires, gives a simple reason:

"With the other lot we were living in Walt Disney, a fantasy."

Investors have welcomed Mr Milei's recent progress. But their enthusiasm is dampened by uncertainty about the president's plans for the central bank and the peso, which is once again looking overvalued. The next few months of government may be harder than the first.

One reason is political. Though Mr Milei's coalition has just 15% of seats in the lower house, he came to office with a thumping personal mandate. This persuaded opposition lawmakers to negotiate. Mr Milei's main bill passed with 400 fewer clauses than the original, but it is still a big win for him. It declares a state of economic emergency for one year, during which he will have extraordinary powers over energy, economic and financial matters. It also opens the way to privatise several state-owned firms and creates incentives for would-be foreign investors. The package now goes back to the lower house for final approval. It may choose to reinstate income taxes, which the government hopes for but which the Senate had refused to do.

Opposition legislators may think they have given Mr Milei enough. "It's going to be more and more complicated," says Luis Juez, a senator who supported the reforms. The lower house is already fighting back. It recently passed a pension formula that

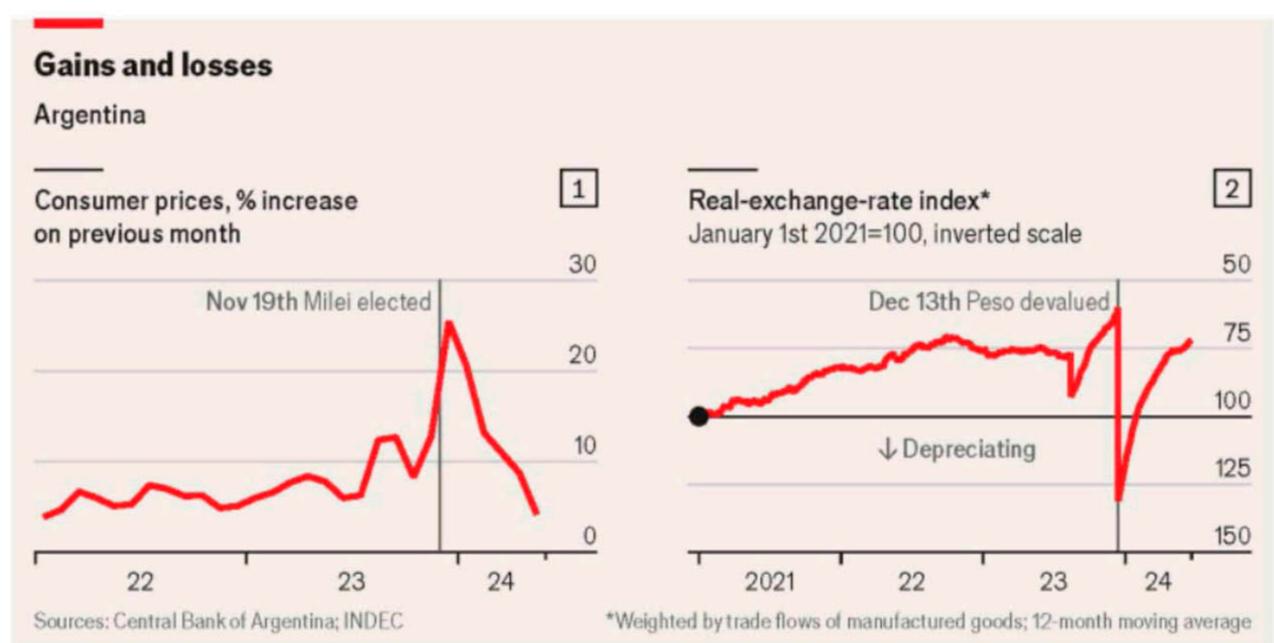
► could cost almost 0.5% of GDP this year. Mr Milei attacked those who voted for it as “fiscal degenerates” and vowed to veto it. But if it is passed with a two-thirds majority in both houses—a distinct possibility—he will be unable to change it.

The bigger challenges, however, are macroeconomic. Mr Milei has prioritised fighting inflation, but Argentines are becoming worried about unemployment and will eventually clamour for growth. The recession has been deep. Construction activity in April was down by 37% year on year.

Complicating the recovery is the overvalued peso, which is making the country unjustifiably expensive in dollar terms. The official exchange rate is currently set by the government, which also imposes capital controls. Almost all of the devaluation in December has been eroded (see chart 2). It involved initially devaluing the peso by over 50% and then by 2% each month. But monthly inflation has been greater than the crawling peg. The result is that the real effective exchange rate is rising.

The effects are obvious from atop the Andes. On a single long weekend in April some 40,000 Argentines crossed the mountains into Chile to buy everything from trainers to car tyres because, surreally, Chile has become cheaper than Argentina. Mr Milei slams those who say the peso is overvalued as “intellectually dishonest”. Yet when an Argentine president says there won’t be a devaluation, taxi drivers know there is a good chance there will be one, quips Nicolás Gadano of Empiria Consulting in Buenos Aires.

A pricey peso scares off tourists, makes exports expensive and deters investors. An overvalued currency often eventually crashes. “If you see Argentina appreciating, this is always a sign of worse things to come,” says Eduardo Levy Yeyati of Tor-



cuato Di Tella University in Buenos Aires. Falling exports make it harder for the central bank to accumulate dollars, which it needs to pay off foreign debts and to build up its safety buffers.

The government could allow the peso to float or accelerate the 2% crawling peg. But either would probably push up inflation, thus endangering Mr Milei’s popularity and undermining some of the benefits of the devaluation. For now, Mr Milei is able to keep a tight grip on the exchange rate because of capital controls.

**Money madness**

What happens next? Mr Milei has promised to ultimately remove capital controls as part of his plan to restore investor confidence. He insists that inflation will soon be 2% a month, the same as the rate of devaluation. This, he says, would allow him to slowly ease the restrictions and float the peso without its value plunging.

This is optimistic. There is little, such as rising productivity, to justify a stronger peso. Worse for Mr Milei, early data for

June suggest that inflation is edging up. Argentines are being hit with eye-popping energy bills as the government cuts subsidies that had kept prices low. Real wages are also starting to recover as workers lobby for higher pay, potentially raising other prices. Mr Levy Yeyati predicts that monthly inflation will hover at around 4-5% for a while. If that is correct, the risk of a sharp currency correction will grow.

Looming over all this is a thornier issue: what to do with the central bank and the peso. Mr Milei campaigned on a promise to blow up the former and scrap the latter, declaring that the local currency “is not worth crap”. These days his team prefers to talk about currency competition, in which dollars and pesos would both be legal tender. But no one knows the details of the plan or the monetary programme to stabilise the peso that would go with it. “Further work is needed in defining some of the key underpinnings,” the IMF diplomatically concluded on June 17th.

Mr Milei, though not his economic team, seems particularly enthusiastic about a scheme he calls “endogenous dollarisation”. This would involve fixing the supply of pesos. When the economy grows, and more cash is needed, Mr Milei expects Argentines to use their own dollar savings for transactions. “The peso will become like a museum piece,” he said in mid-May. He would then close the central bank.

The IMF seems worried. If Argentines believe the peso will end up in a museum, its supply could outstrip demand, stoking inflation. It is also unclear what would happen to the peso-denominated financial system. The IMF instead enthuses about currency competition. Peru has such a system, with the sol and dollars both used. If Mr Milei insists on his scheme, it would surely be harder for his government to get new cash from the fund.

Mr Milei has done a remarkable job so far of discarding the fiscal baggage that has been weighing Argentina down. But mess up the big macroeconomic questions and that will count for little. ■



Eyeing the future

## Asia



## Russia-North Korea relations

## Marriage of convenience

SEOUL

### Vladimir Putin's dangerous bromance with Kim Jong Un

**K**IM JONG UN has a new best friend. Out is Donald Trump, who exchanged saccharine letters but spurned him at a summit in Hanoi in 2019. In is Vladimir Putin, who has courted Mr Kim for weapons to fuel his war in Ukraine. Mr Kim has made two trips to Russia's Far East to meet Mr Putin since 2019. On June 19th Mr Putin arrived in Pyongyang for his first visit since 2000, the year he made his debut as president. Though he landed at close to 3am local time, Mr Kim was waiting on a red carpet on the tarmac to meet him. The two leaders later signed a strategic partnership agreement, promising to come to each other's aid when facing aggression.

The relationship has blossomed thanks to geopolitical shifts. Mr Kim turned away from talks with America following the failed summit in Hanoi and began making fresh overtures to Russia. The response was lukewarm—until Mr Putin's full-scale invasion of Ukraine floundered and Russia came to need munitions, one of the few

things Mr Kim's regime has in abundance. But the implications of the realignment go beyond the weapons trade. "It's a mistake to think about it simply as an arms deal," says Jenny Town of the Stimson Centre, an American think-tank.

The new agreement is evidence of the deepening relationship, bringing the two nations closer than at any time since the Cold War. Mr Putin spoke of a pledge to provide "mutual aid" in case of "aggression" against either country; Mr Kim said it amounted to "alliance relations". According to the text of the treaty published by North Korea's official news agency, the commitments echo the guarantees of im-

mediate military assistance enshrined in a treaty signed between the Soviet Union and North Korea in 1961.

Both leaders cast their partnership as a rebuke to an American-led world order. For Russia, co-operation with North Korea helps to complicate American strategy in Asia and to undermine multilateral institutions. Russia earlier this year vetoed a United Nations resolution to extend the mandate of the Panel of Experts, the main international body for monitoring sanctions on North Korea; in Pyongyang Mr Putin called for an end to the UN sanctions regime (which Russia once supported). Russia also aims to deter further support for Ukraine, in particular from South Korea, a big arms producer and American ally, which has so far refrained from providing direct lethal aid. Mr Putin threatened deeper "military-technical" partnership with North Korea if Ukraine continued to receive advanced weapons systems.

Russia has proved a godsend in a time of need for North Korea. Mr Kim was isolated abroad and diminished at home following the debacle in Hanoi; years of sanctions and the covid-19 pandemic had not helped, either. Summitry with Mr Putin has burnished Mr Kim's image and improved his diplomatic position. With both Russia and China behind it, North Korea has little incentive to engage with America. It can also play the two powers off against each

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▶ other. “It is the biggest strategic opportunity for North Korea since the end of the Cold War,” says Ankit Panda of the Carnegie Endowment for International Peace, a think-tank in Washington. Trade with Russia has also helped stabilise the North Korean economy. The new agreement includes a range of economic and cultural measures, including the construction of a bridge across the river that forms their border, the first for cars.

In Mr Kim’s and Mr Putin’s discussions, munitions will have been front of mind. American officials allege that North Korea has shipped 11,000 containers filled with arms to Russia since September. The goods include artillery shells—South Korea’s defence minister suggests as many as 5m rounds—as well as Hwasong-11 class ballistic missiles, which have been linked to dozens of deaths across Ukraine. Much of the material is of dubious quality, but it has nonetheless helped Russia buy time to ramp up its own production, says a Ukrainian official. During their latest talks Mr Kim promised Mr Putin “full support” in the ongoing conflict.

What Russia has given in return stirs much speculation. South Korea’s government estimates that at least 9,000 containers have been sent from Russia to North Korea since last September. North Korea’s wish-list probably includes nuclear-weapons designs, re-entry vehicles for intercontinental ballistic missiles, as well as technology related to satellites, submarines and hypersonic weapons. Russia could also provide less flashy but still important support for North Korea’s conventional forces, such as spare parts for aircraft or ships, and more modern air defences.

South Korean officials say that Russia has yet to transfer sensitive technology related to ballistic missiles or nuclear weapons. One area of more immediate concern is space. Mr Panda reckons that a recent North Korean satellite launch attempt may have deployed a variant of an engine used in Russia’s Angara system, which Russia has at a cosmodrome that Mr Kim toured last autumn. For now, food and fuel probably make up the bulk of the trade. Mr Putin also gave Mr Kim a Russian-made limousine in February, and a second one during his latest trip—in pointed defiance of UN sanctions, which bar the export of luxury goods to North Korea.

Yet such seeming affection belies the limits to the friendship. While Russia may flout international sanctions, that does not mean it will rush to help North Korea expand its nuclear arsenal. Russia can extract concessions without giving up its most sensitive technology; as its own production ramps up, its need for North Korean shells may wane. South Korea, in turn, can threaten more support for Ukraine to enforce its red lines.

The partnership will probably last as long as the war in Ukraine. But it may not endure beyond it. In the long run, South Korea is a more attractive economic partner; it was Russia’s fifth-largest export destination in 2021. Russia seems keen to keep the door open: its ambassador to Seoul recently said he expects South Korea to be “first among unfriendly countries to return to the ranks of friendly countries”. Few Russians want to be associated with North Korea, which they consider a synonym for dysfunction, in contrast to the economic powerhouse that is China.

China itself can also shape how deep Russia’s and North Korea’s co-operation grows. “It’s not a bilateral relationship—big brother is always watching from Beijing,” says Fyodor Tertitskiy of Kookmin University in Seoul. China’s feelings appear mixed. Its diplomats did not stop Russia from killing off the UN sanctions

panel. But during a recent summit with South Korea and Japan, China endorsed a call for the denuclearisation of the Korean peninsula, drawing a rebuke from Mr Kim’s regime. China’s primary interests are to maintain North Korea as a stable buffer state between itself and American-allied South Korea, as well as to retain influence over Pyongyang; closer military ties between Russia and North Korea could threaten these aims.

China also appears keen to avoid the appearance that the three belong to a single bloc. “China wants to be a global leader, not a rogue,” says Lee Sang-hyun of the Sejong Institute, a think-tank in Seoul. Mr Putin reportedly wanted to travel on to Pyongyang earlier, immediately after a visit to Beijing last month, but China suggested that he should wait. The picture that emerges is less of a neat authoritarian axis and more of a messy love triangle. ■

### Civil rights

## Marriage of equals

BANGKOK

**Thailand legalises same-sex marriage. But other freedoms are being curbed**

ON JUNE 18TH government bigwigs, LGBT activists and stars of popular Thai television shows about gay love partied on the lawn in front of the prime minister’s offices in Bangkok. Hours earlier the Thai senate voted through a sweeping marriage-equality bill. Thailand will soon be the first South-East Asian country to legalise same-sex marriage.



Thai-ing the knot

The attendees, some of whom left the party in a motorcade of rainbow tuk-tuks, helped bring about comprehensive legislation. In Thailand’s civil code marriage will be described as a pact between two persons, rather than a man and a woman. Married LGBT couples will also get inheritance and adoption rights. The Thai king is expected to endorse the bill soon; it becomes law 120 days later.

LGBT couples across Asia hope the Thai bill accelerates acceptance in their own countries. Some are making strides towards pride. Australia, New Zealand, Nepal and Taiwan have legalised same-sex marriage in the past decade or so. India, Hong Kong and Singapore have repealed colonial-era laws criminalising gay sex. But regional progress is uneven and often slow.

Thailand’s bill passed for several reasons. Most were on show at the celebration. First is social acceptance, which is boosted in Thailand by activists, social-media influencers and TV dramas about gay romance dubbed “Boys’ Love”. Much of Thai society is conservative and discrimination persists. But some 60% of people support same-sex marriage, among the highest shares in Asia, according to Pew Research Centre, a pollster.

Religious tolerance helps. Buddhism, dominant in Thailand, does not prohibit same-sex relationships. In Indonesia, however, conservative Muslim groups are po- ▶▶

## BANYAN

### *The king's men waging lawfare*

*A reactionary establishment in Thailand goes after its enemies*

IN ONE OF a handful of politically charged cases passing through courts in Bangkok on June 18th, Thaksin Shinawatra, a former prime minister who was ousted in an army coup in 2006, was formally indicted for insulting the monarchy. In ordinary circumstances, that ought not to be surprising. The conservative establishment close to the monarchy and the army is notorious for reaching for Thailand's harsh *lèse-majesté* law, with sentences of up to 15 years in prison, to hound perceived enemies.

Even during long years in exile Mr Thaksin, at the head of his populist Pheu Thai movement, has been enemy number one. The charge has to do with a claim he made nearly a decade ago that the king's powerful Privy Council was complicit in yet another coup, in 2014, when his sister was prime minister.

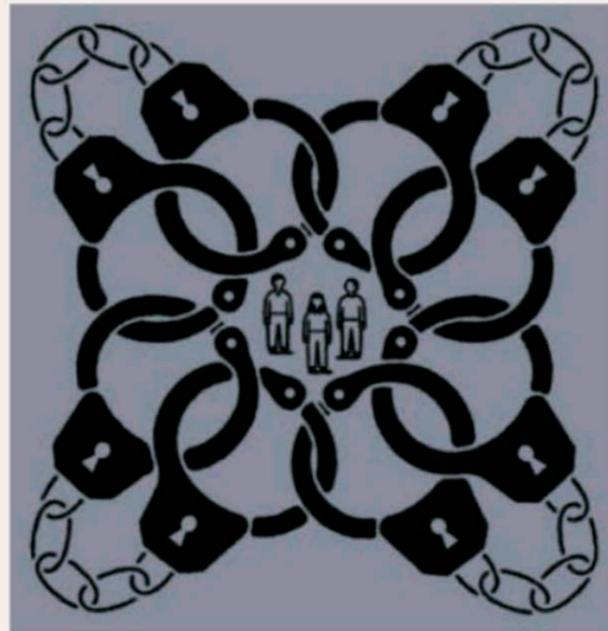
But the indictment is striking because only last year both sides made a grubby-looking pact, following a general election in May 2023. The ex-generals then running the country hoped to manage the election. But a more liberal movement than Pheu Thai, the Move Forward Party, easily won the most seats on a platform of breaking up monopolies, ending conscription and reforming the *lèse-majesté* law. Pheu Thai came second, and the main army-backed party a distant third.

Yet the army-controlled senate blocked Move Forward's bright and progressive leader, Pita Limjaroenrat, from forming a government. Instead, the prime minister who emerged was Pheu Thai's Srettha Thavisin, a businessman-turned-politician with close ties to the Shinawatras. In August 2023 Mr Thaksin himself returned from exile to a rapturous reception. Rather than go to prison to serve a long sentence for previous

convictions for corruption, he was allowed to move to a posh Bangkok hospital with service on par with a resort. Within months Mr Thaksin was out. The bane of the establishment had become its ally.

The deal made with Mr Thaksin has not been divulged. But his indictment suggests that he has since crossed a line. Perhaps the establishment thought he would steer clear of politics. Instead, he has eagerly re-entered political life, travelling about the country as if campaigning. Meanwhile, a separate case heard on the same day by the constitutional court was against his ally, Mr Srettha, brought by a group of conservative senators. They claim that Mr Srettha broke the law by appointing a convicted man (and another Thaksin ally) to his cabinet. They call for the prime minister's removal.

In the event, the courts granted Mr Thaksin bail and called for another hearing on Mr Srettha for July 10th. That puts off, for now, an immediate political crisis. Yet the cases, at the least, represent a warning to Mr Thaksin and his allies that they should not take for granted the politi-



cal space they have carved out.

The outcome of a third case, against Move Forward, is perhaps the most predictable, yet it offers the greatest reflection on the future of Thailand's dismal politics. In this case the election commission is seeking to dissolve the party, on the grounds that its call to change the *lèse-majesté* law was treason.

On June 18th the constitutional court appeared to agree. It is likely to rule in the coming weeks. Move Forward faces dissolution. That would be the same fate as its predecessor, Future Forward Party, following a strong showing in the previous election, in 2019. Mr Pita faces the possibility of a lifetime ban from politics. Other members of his party could also be banned.

Dissolution would be a slap in the face for over 14m voters. The ban on Future Forward was the catalyst for widespread student-led protests that lasted months. Since then, democracy advocates have been hounded. Some 2,000 Thais have been charged or prosecuted, among them over 270 for *lèse-majesté*. If not in prison, many activists lie low or have fled abroad. Even so, others Banyan spoke to said they would continue to fight, largely through grassroots campaigns for greater democracy and representation.

The establishment's waging of "lawfare" is wearing for many of the targets, says Mr Pita. The risks of taking peacefully to the streets are high when protests become "an excuse for another military coup". Yet, Mr Pita insists, supporters of democratic, more accountable government are far from giving up. Thais now have a taste of the ballot box. There is no going back—a lesson a reactionary establishment going after its enemies has yet to take on board.

► powerful and oppose marriage equality. In South Korea and Singapore, social conservatism is reinforced by influential evangelical Christian lobbies.

Political will was crucial. Previous Thai governments considered legalising civil partnerships rather than same-sex marriage. But the new bill, an amalgam of proposals including one each from the ruling Pheu Thai party and the liberal Move Forward Party (MFP), had strong bipartisan support. Both parties campaigned for mar-

riage equality during last year's election. Srettha Thavisin, who took office in September, recently became the first Thai prime minister to march at Bangkok Pride. Most Thai MPs and army-appointed senators backed the bill.

On the same day as the celebration, however, Thailand's Constitutional Court said it would consider a case to disband the MFP over its campaign to reform the country's *lèse-majesté* laws, which forbid criticism of the powerful royals (see Ban-

yan). The party won last year's election, but conservatives helped block it from taking power. Move Forward MPs have been sentenced to lengthy jail terms. The army-backed establishment appears intent on shutting down democratic representation, even as Thailand's social liberals celebrate a big win. Tunyawat Kamolwongwat, a gay Move Forward MP, first proposed a same-sex marriage bill to Thailand's parliament in June 2020. Four years later, his party faces dissolution. ■

## Indian federalism

## Here's a model

HYDERABAD

Telangana, India's youngest state, shows the benefits of splitting big states

A DECADE AGO the Union of India welcomed into the fold its newest member: the state of Telangana. Of India's then 29 states, it ranked 12th by population, 11th by area and 10th by per-person income. One of those rankings has since changed dramatically. By last year Telangana had shot up to boast the highest per-person income of any decent-size state, behind only tiny Sikkim and Goa.

That is not all. In the past decade the state's GDP growth has outperformed India as a whole. With just 2.7% of India's population, its share of the country's annual output has increased nearly a fifth, to 4.8%. Hyderabad, its economic powerhouse, is a multilingual, multireligious metropolis with an abundance of high-tech jobs, including the largest Amazon office anywhere. Microsoft and Google are expanding their already substantial presence in the city. It is also a pharma hub. What is Telangana's recipe for success?

The story of Telangana's independence starts in 1956, when the region became part of a new Telugu-speaking state called Andhra Pradesh, or AP (see map). They shared a language, but the two had different histories, cuisines and dialects. Tensions soon rose, as Telugus from coastal regions came to dominate business and politics in Hyderabad, the capital. Telanganites insisted they were being discriminated against. A decades-long agitation for statehood culminated in its creation by an act of India's Parliament in 2014.

The very fact of being new is one benefit of state formation. In 2000 India created three new states, hiving off chunks from unwieldy giants. For several years the new entities did better economically than the rumps they left behind. Yet that Telangana would thrive was not foretold (none of the other newish states sustained their early momentum). It was the poorer part of the state from which it was carved out. Unlike other prosperous southern states, it is landlocked. It still has only one airport. With the exception of Hyderabad, it lacks any cities of size. Many foresaw economic difficulties, even unrest.

K. Chandrashekar Rao, better known as KCR, had led the movement for statehood. But as the first chief minister of the new entity, he had to transition to governing. "There were a lot of apprehensions," says K.T. Rama Rao, KCR's son and a minister in that government (he is known, inevitably,



as KTR). People worried that "these guys were running amok in the street... can they actually come govern?" The new government proved practical, reassuring businesses that their interests were safe. There were no reprisals against the Andhraite-dominated business community.

The moment of founding has a clarifying effect, says Suyash Rai of Carnegie India, a think-tank in Delhi, causing elites to think: "We need to get our act together...so the state becomes a stable political and economic entity." There is immense pressure on leaders to prove themselves, both to voters and to their detractors. Having something to prove had "a lot" to do with



Cyberabad delivers the cyberagoods

the government's thinking, says KTR.

Another advantage of new states is that they may have greater leeway to experiment. Upon creation, Telangana immediately set about making itself attractive to investors. Many Indian states eager to rise up ease-of-doing-business rankings promise "single-window clearance" for businesses to deal with the bureaucracy. But the process is still a painful mess, with multiple departments working to their own timelines. Telangana's innovation was to do away with many requirements and promise approvals within 15 days. Such ideas were "only possible because we were a new state, and there was no legacy to pull you down", says Jayesh Ranjan, a senior bureaucrat who was involved in drafting the policies. "Everything was a clean slate."

Lastly, carving smaller chunks out of India's bigger states—undivided AP was the fourth-largest by area—allows politicians and officials to more carefully tackle local issues. On a practical level, it also eases travel and administration. In Telangana the government focused on long-standing grouses: power, water and funds. Electricity generation capacity expanded from 7.8GW to 19.5GW between 2014 and 2023. Several projects to boost water for drinking and irrigation were put in motion. Welfare schemes for farmers were rolled out.

To be sure, Telangana had an advantage: Hyderabad. N. Chandrababu Naidu, chief minister of the undivided state between 1995 and 2004, had positioned himself as a tech-savvy leader, earning the city the nickname "Cyberabad". KCR's government doubled down on the tech-first strategy. According to a state-government report, IT exports more than quadrupled to 2.4trn rupees (\$29bn) between 2014 and 2023, and IT jobs nearly tripled to 900,000.

Yet the dominance of Hyderabad alienated rural voters. Per-person income in its tech district is over twice the state average and five times that of its poorest district. Undernutrition among children has risen. Telangana's voters showed the door to KCR at elections last year. He should have seen it coming: 20 years ago undivided AP booted out the urbane Mr Naidu in favour of a rival promising more evenly spread prosperity. (The rump of AP also grew robustly since bifurcation but lavished spending on handouts. Its fiscal deficit is nearly twice Telangana's. This month voters brought Mr Naidu back from opposition.)

Telangana's new government, led by the Congress party, has made it a priority to encourage growth elsewhere. It plans to promote investment outside Hyderabad. At the same time it has signalled that it will not reverse policies that are working well. Telangana's record as a new state is impressive. But the real work to ensure its long-term prosperity—and strengthen the case for new states—is only beginning. ■

# China



## The polar silk road

# Picking through the ice

KIRKENES

## China and Russia have chilling plans for the Arctic

FOUR HUNDRED kilometres north of the Arctic Circle, in the Norwegian port of Kirkenes, there are still some who dream that this sleepy town will one day become an important shipping hub. They see it as the western end of a new, faster sea route from China to Europe, made possible by the impact of global warming on ice-filled waters off the Siberian coast. With war raging in Ukraine, this ambition now sounds fanciful. China's support for Russia is fuelling Western distrust of the Asian power's "polar silk road" plans. But China is not retreating from the Arctic. It still sees a chance to boost its influence there, and to benefit from the area's wealth of natural resources.

Rising temperatures in the Arctic are slowly opening up new possibilities for transport. But geopolitics are changing the region faster. Kirkenes feels this strongly. It is just 15 minutes' drive from the Russian border. Tourists can enjoy a "king crab sa-

fari" that takes them by boat right up to it, with eponymous crustaceans caught along the way and cooked for the visitors (the massive non-native species was introduced by the Soviets). Russians, though, no longer cross into Kirkenes for shopping and crab feasts. On May 29th Norway closed the border crossing to day-trippers from the other side. The conflict in Ukraine has cast a chill over the town. There were "tensions in the air" in October when Russia's envoy in Kirkenes laid a wreath at a monument to the Soviet troops who liberated the town from the Nazis towards the end of the second world war, the *Ba-*

*rents Observer*, a local online newspaper, reported. Politicians in Kirkenes had urged him not to do so.

In such a climate it is hard to imagine how China's Arctic silk-road project, unveiled in 2017, might take off. It had sounded a great idea. By using the Arctic's Northern Sea Route (see map on next page), shipments from Shanghai to Hamburg could take a mere 18 days, compared with about 35 days needed for the route via the Suez Canal—or ten days longer than that if rerouted around the Cape of Good Hope to avoid attacks by the Houthi rebels in Yemen (there have been dozens against ships in the Red Sea since the war in Gaza began last year).

Kirkenes had hoped to sell itself as the first ice-free port that container ships from China would reach after traversing the Russian segment. They could use it as a place to offload cargo onto vessels that would sail on to other ports in Europe. Or they could transfer their goods onto trains that would take them much faster into European markets. Chinese businesspeople were keen, says Rune Rafaelsen, who was the mayor of Kirkenes from 2015 to 2021. Were all this to happen, northern Europe would change from a mere "end point" of the flow of goods from China into a "gateway" for them, enthused *Qiushi*, the Chinese Communist Party's main theoret- ▶▶

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ical journal, in 2019. The “silk road on ice” (as China calls its polar transportation plan in Chinese) would become a “new platform” for the Belt and Road Initiative, it said, referring to the country’s spree of port, railway, road and other infrastructure-building around the world.

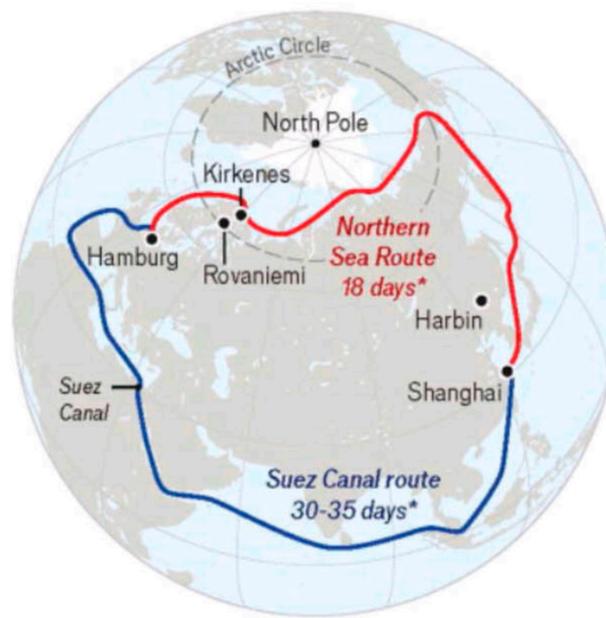
A big problem is that Kirkenes has no rail connection with anywhere in Europe. There had been talk of building one with neighbouring Finland. Its border is only 50km away; the line would join the Finnish rail network in the city of Rovaniemi, “the official home of Santa Claus”, 500km to the south. Even before the all-out Russian invasion of Ukraine the Finnish government had got cold feet about this. In 2019 it published a report expressing doubt that such a line could be profitable, let alone acceptable to indigenous reindeer-herders, the Sami, whose land it would traverse. Now, says the *Barents Observer’s* editor, Thomas Nilsen, the Finnish authorities “don’t want to subsidise and build a railway line so close to the Russian border”, given the area’s “geopolitical instability”.

### Frosty relations

Western governments have long been cautious about China’s Arctic activities, worrying that the country’s growing economic influence in the region might give it political sway and open doors to a Chinese security presence that would add to the Arctic challenge that Russia already poses. RAND, a think-tank in Washington, notes that since 2018 China’s “diplomatic activism” in Greenland, an Arctic dependency of Denmark, has waned. That is probably a result of successful efforts by Denmark and America to block Chinese attempts to invest in sensitive infrastructure and mining there (Greenland hosts an American airbase with missile-warning and space-surveillance systems).

The war in Ukraine has compounded Western scepticism about any big project involving China, which calls itself neutral but also boasts a “no-limits” friendship with Russia and is giving huge support to Russia’s defence industry. The conflict has led to the freezing of activities of the Arctic Council, a talking-shop involving the eight countries with Arctic territory, which China joined as an observer in 2013. (In a white paper in 2018 China called itself a “near-Arctic state”, though its northernmost provincial capital, Harbin, is on the same latitude as Venice.) All of the council’s members, except Russia, are now members of NATO, Finland and Sweden having joined the defence pact in the past 15 months. In Arctic affairs, China finds itself even more of an outsider.

The frustration this has caused in China is clear. In *Russian Studies*, a Chinese academic journal, two Chinese scholars, Yue Peng and Gu Zhengsheng, wrote in Febru-



\*Approximate, dependent on routing  
Source: AIG

ary that Russia was growing weaker in the high north. “The original balance of the Arctic has been disrupted, and the scales in the Arctic region are tipping towards the Western countries.” China’s image in the region, they said, faced “a significant risk of decline”. This could have a “huge negative impact on China’s future participation in Arctic affairs”, the academics suggested.

Russia controls about half of the Arctic’s shoreline and a huge share of its oil and gas reserves. For now, Chinese ships may not be pushing to use the Northern Sea Route (Russia charges stiff fees for the

use of its icebreakers). Shippers prefer predictable schedules: for all the Arctic’s warming, journey times along that passage can vary as a result of ice and fog. Chinese firms, however, see gains to be made in Russia as it turns to Asia to make up for the loss of Western markets. They include involvement in port construction, oil and gas projects and the building of ships for Russia to sail such resources eastward (China is a big buyer of Russian energy). Russia may once have been wary of getting China involved in developing its Arctic coast. Now it welcomes Chinese help. “Russia is very keen to have them, because they have no other options,” says Kjell Stokvik of the Centre for High North Logistics in Kirkenes. “So in a way for China, they’re in a very good seat.”

There are risks, as Messrs Yue and Gu noted, such as fallout from Western sanctions. They urged China to be “cautious and low-profile” in its approach to Arctic co-operation with Russia. However, during a visit by Russia’s leader, Vladimir Putin, to Beijing in May the two countries vowed to “promote the Arctic route as an important international transport corridor” and encourage their companies to “strengthen co-operation in increasing Arctic route traffic volume and building Arctic route logistics infrastructure”. The silk road on ice is slippery, but it retains its allure. ■

### International schools

## Exporting education

### China sees international schools as a service to expatriates and a source of soft power

ABOUT 500 PUPILS study at the Chinese School Dubai. Most are children of Chinese expatriates who have moved to the United Arab Emirates for work. At the school’s swish suburban campus, pupils follow much the same curriculum they would at home. On one wall hangs a bland quote from China’s leader, Xi Jinping, picked out in shiny gold. The institution, which has more than doubled in size since its opening in 2020, is a pilot project: the first of several international schools the Communist Party talks of setting up in big cities. In 2019 officials said they had asked Chinese diplomats in 45 countries, including Britain and America, to explore the possibility of creating such institutions.

American, British and French schools are easy to find in most big capital cities. But ones that teach the Chinese curriculum remain sparse, even though more than 10m Chinese nationals are thought to live abroad. The government fears this is dis-

couraging Chinese from working for its companies overseas. Children who swap domestic classrooms for foreign ones, even for a bit, can struggle when they go back to China. That mattered less when high-fliers all clamoured for spots in Western universities (which are best won with Western qualifications). But clever kids are increasingly competing for places in top Chinese colleges (see International section), so they seek out Chinese credentials.

The party’s enthusiasm for international schools is also driven by a desire to project soft power. Officials seem to believe the institutions might eventually attract pupils from China’s diaspora and beyond. That is not a wild idea. French citizens make up only about 40% of the students at their country’s overseas *lycées*. Three-quarters of the youngsters at international schools branded “American” hail from outside the United States. In 2020 the Chinese government said it was considering creat-



Blazing a trail in Dubai

ing an “international curriculum”, which might make Chinese schooling more relevant to people with no plans to live in China. Should that happen, it would in theory compete with existing degree programmes such as the International Baccalaureate.

Government-backed projects such as the school in Dubai are just one of the ways Chinese activities in international schooling are expanding, according to a report by Venture Education, a consultancy. Lately overcapacity at home has prompted companies that run private schools in China to invest abroad, particularly in Asia. The schools they create tend to offer whichever flavour of education is most in demand in their target markets. In time it seems likely that these companies will run more experiments with Chinese-language instruction or Chinese curriculums—especially if the party encourages it.

All this means growing competition for existing international schools. Many of them enroll a lot of Chinese pupils, says Julian Fisher of Venture Education. There is no guarantee that the Chinese interlopers will play fair. It is possible to imagine state-owned firms incentivising employees to enroll their children in state-favoured institutions. If it were insinuated that Chinese international schools offer privileged access to the best Chinese universities, that might give them an additional boost.

The expansion of Chinese-curriculum schools will doubtless also provoke fresh angst about the dismal propaganda China requires its teachers to spout. To keep its hosts happy, the school in Dubai seems to have downgraded some of the “patriotic education” that is usually foisted on Chinese pupils. But there is a high risk that, under pressure from inflexible apparatchiks in Beijing, new Chinese schools end up navigating such flashpoints poorly. Expect some playground scraps. ■

## Wealth displays

## Leave the Hermès at home

BEIJING

The government doesn't want people flaunting their wealth

MAO ZEDONG persecuted the rich. But his successor as paramount leader, Deng Xiaoping, decided to “let some people get rich first”, as he launched market-oriented reforms. Now a growing number of Chinese are rich—and the pendulum has swung back, with the government cracking down on ostentatious displays of wealth.

Online influencers are the state's main target. Until recently, these (mostly young) men and women flaunted their luxury goods to millions of followers. In recent months, though, many have had their social-media accounts suspended by China's internet regulators.

Among the most famous of these personalities is a man called Wang Hongquanxing. Known as “China's Kim Kardashian”, he has reportedly said that he would never leave his house without clothes, jewellery and accessories worth less than 10m yuan (\$1.4m). In May state media reported that he had been banned from China's top social-media platforms along with dozens of other influencers.

This is not the first time that influencers have found themselves in the government's cross-hairs. They were also targeted in 2021, when China's leader, Xi Jinping, launched his “common prosperity” campaign. That effort aimed to chasten the ultra-rich and reduce inequality. People and companies with a

lot of money were encouraged to contribute more to society. The slapping down of Jack Ma, China's best-known billionaire, was seen as a warning to the country's other plutocrats.

None of this is stopping people from getting rich in China, according to a report by Knight Frank, a property consultancy based in London. It tracks the number of “high-net-worth individuals” (defined as those with assets of \$1m or more). The global number is expected to rise by 28% between now and 2028. But in China it is expected to increase by 47%. Big multinational banks say they are increasing their wealth-management services for Chinese clients.

Yet luxury brands are lowering prices as unsold inventory piles up. This probably has little to do with the crackdown on influencers. Amid a sluggish economy, Chinese consumers are simply becoming more frugal, spending less on Balenciaga bags and Gucci wallets.

Some luxury brands are putting on a brave face. Louis Vuitton, a French fashion house, has just reopened its renovated boutique in the city of Guangzhou. The CEO of Tissot, a Swiss luxury-watch company, was recently in Shanghai for a product launch. Zegna, a stylish clothing brand, has opened a posh new café in Shanghai. Don't expect Chinese influencers to do much promotion though.



Going out of style?

# CHAGUAN

## *China's revealing struggle with myopia*

*Anxious parents don't want to let children play outdoors and do less schoolwork*



**N**O ETHICS COMMITTEE would let researchers trap millions of children indoors for months, just to test the effects on their eyesight. Yet China's strict zero-covid rules—notably a nationwide lockdown that closed many schools between January and May 2020, leaving children studying online with few chances to leave their homes—created just such a natural experiment.

The results are in and they are “dramatic”, says Lan Weizhong, an ophthalmologist at Central South University in Changsha. After pandemic lockdowns ended, mass eye tests in several Chinese cities detected spikes in rates of childhood myopia, or fuzzy sight at a distance. That confirms the widely held scientific belief that the healthy growth of young eyes is impeded by too much “near work”, including time spent reading books or watching screens, and by a lack of time outdoors, says Professor Lan.

The findings are being studied closely in China, where rates of myopia have surged over the past quarter-century. More than half of Chinese children and adolescents are short-sighted, with rates exceeding 80% among high-school graduates, though numbers have dipped a bit of late. In 2018 Xi Jinping, the supreme leader, declared myopia a “major concern” that threatens children's health and China's strength (fighter pilots and firefighters need perfect sight, state media noted).

Over the years many countries have treated short-sightedness as an “inconvenience” that can be fixed by visiting an optician, says Wong Tien Yin, an ophthalmologist and head of Tsinghua Medicine, a recently opened health-care and medical school at China's foremost science university. But after three decades of urbanisation and academic pressure on school pupils, China has as many as 800m people with myopia. Perhaps one-tenth of those have “high myopia”. For now, such severe cases can manage with the help of thick glasses or laser surgery. But as they age, a subset will be blinded by complications from myopia. “This requires a massive public-health response,” says Professor Wong.

In a familiar approach, central leaders have told provinces and local governments to take myopia seriously and established a few core principles. Since 2018 teachers have been told to reduce workloads, abolishing homework for the youngest pupils in prim-

ary school. After-school tutoring, once a gigantic industry, was banned in 2021. Chinese leaders have called for children to spend more time outdoors and less time playing video games. Otherwise, though, local governments are free to experiment.

It is hard to persuade busy, exam-obsessed Chinese parents to let children play outside, alas. As a result, many places are resorting to technology. Wenzhou, a prosperous commercial hub, has installed lamps that mimic natural light in nearly 28,000 classrooms. A pilot scheme in Chengdu, a western city, uses wallpaper in schools that mimics the complexity of natural scenery. Some researchers are intrigued by special glasses and contact lenses that train young eyes in helpful ways, or by atropine, a medicine applied as eye drops that seems to slow myopia's progression.

Feicheng, an agricultural city of just under a million people in the eastern province of Shandong, stands out in two ways. For one thing, scientists worldwide have cited a study based on eye tests given to tens of thousands of Feicheng schoolchildren before and after the pandemic. These found that myopia rates had tripled among six-year-olds during their months in lockdown, though the vision of some of those children later recovered. Seven- and eight-year-olds saw smaller but still significant spikes in myopia. For another thing, in order to protect those eyes, Feicheng primary schools are putting their faith in old-fashioned physical education. Children are sent outside for two hours each day for gymnastic drills, skipping, volleyball, tai-chi, dragon dancing and more.

A tree-shaded country town, Feicheng is known for growing tasty peaches. It is also a fine place to see how, for public policy in China to advance, lofty collective goals must align with individual incentives. Wang An, a section chief from the Feicheng education and sports bureau, has established an annual contest between the city's primary schools for the best “Big Sunshine Break Time”. He calls it “a very serious problem” that some parents are wary of letting children join sports teams, fearing that it will hurt their class rankings. In response he tells parents about talented student-athletes with top grades. He also recruits fathers and mothers who work at local hospitals to give talks about health to fellow parents.

### **An eye-opening visit**

Lei Peng, the headmaster of Feicheng's Shiyan Primary School, leaves little to chance. Chaguan is welcomed by saluting security guards to the large campus, with 2,800 pupils. Your columnist is shown a well-equipped science block, complete with a drone-flying arena. He watches art and music lessons, and is swiftly beaten at ping-pong by a small girl with a killer top-spin. Not one of the children on show is wearing glasses: a surprise given that over a quarter of Feicheng primary-school pupils have myopia.

Pupils' eyes are getting better and better, Mr Lei assures his foreign visitor, smoothly. He credits Mr Xi with showing the way on eye health. Then he offers a moment of candour, explaining how important it was when authorities changed how schools, teachers and education officials are evaluated. Shandong province was a pioneer when it included children's health—including eye health—in school-performance reviews. Now eye health is a metric used nationwide. Only once exams are no longer the sole basis for judging success will teachers, students and their parents “dare to ease up”, says Mr Lei. It is a revealing comment from this shrewd 38-year veteran of the teaching profession. Even in quiet spots like Feicheng, China is a ferociously competitive place. Understand that and the country comes into focus. ■

## Europe



### France's parliamentary election

## Out ahead

PARIS

**A short campaign looks likely to boost the extremes and shrink the centre**

AS FRANCE'S FLASH parliamentary-election campaign officially got under way this week, Emmanuel Macron's centrist candidates were pounding the streets, trying to put on a brave face. After days handing out flyers, one deputy standing for re-election concedes that campaigning is "extremely tough". Another describes the president's decision to call a snap legislative election as "idiotic". Many are preparing to pack their bags. "He has thrown us under a bus," says a minister.

The two-round vote for the National Assembly, on June 30th and July 7th, has turned into one of the most crucial in post-war French history. At stake is the serious possibility of a government led by either the hard right or hard left. Marine Le Pen's National Rally (RN) is the better known. But the reconstituted left-wing alliance, the New Popular Front (NFP), is now hot on its heels, with an equally drastic tax-and-spend programme.

Three main political blocs have

emerged after Mr Macron's decision on June 9th to dissolve parliament, which took everybody by surprise. Even his own government, including the prime minister, Gabriel Attal, was informed only at the last minute. Voting at this election concerns only the lower house of parliament; Mr Macron, short of a surprise resignation, remains president until 2027.

Polls show the leading bloc to be the RN, which held only 88 seats out of 577 in the old parliament. Its candidate for the job of prime minister is Ms Le Pen's 28-year-old protégé, Jordan Bardella (pictured). The RN has been joined by a scat-

tering of candidates from the centre-right Republicans (LR), after their leader, Eric Ciotti, jumped in with them. Ms Le Pen's niece, Marion Maréchal, has also lent her support, prompting her expulsion from the ultra-right Reconquest party. Alone, the RN remains ahead in first-round polls, on 33%, according to Ifop, a pollster, on June 18th. Its new LR friends, running in 62 constituencies, could bring it a further 4%. (Anti-Ciotti Republicans are putting up 400 of their own candidates.)

In a close second place, on 28%, is the NFP. Numerically it is dominated by Jean-Luc Mélenchon's Unsubmissive France (LFI), which is fielding 230 candidates, followed by the Socialists (175), Greens (92) and Communists (50). The enduring influence of Mr Mélenchon, an anti-capitalist former Trotskyite, was exposed when he deselected three of his leading outgoing deputies and put in a close ally (who, convicted of domestic violence, then had to stand down). Expediency, however, is trumping deep differences. At the last minute, François Hollande, a former Socialist president, decided to join, standing in his old rural heartland of Corrèze. Behind the scenes, a battle for control rages.

The third bloc, Mr Macron's centrist alliance Ensemble, trails far behind in third place, with just 18%. It is hoping to find future allies for an anti-extremist "republican front", on the left and centre-right, by

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▶ standing aside in some 60 constituencies.

Given polling trends, the likeliest outcome currently looks to be a hung parliament, with either the hard right or hard left in a position to try to form a government. If either succeeded, France would then face an attempted reversal of much of the economic agenda that Mr Macron has pursued since he was first elected in 2017.

Mr Bardella has promised “immediately” to lower the level of VAT from 20% to 5.5% on energy bills and motor fuel, and to use tax breaks to raise salaries by up to 10%. After the French stockmarket, the world’s sixth-biggest, fell by 6% in the first five days after the election was called, Mr Bardella took fright. Other measures, he suggested, could wait until the autumn. These include his pledge to strike down Mr Macron’s pension reform, which raised the minimum retirement age from 62 years to 64. Mr Bardella also vows to restore a wealth tax and abolish the right to French nationality for those born to foreign parents on French soil.

How such measures would be financed remains rather vague. Ludovic Subran, chief economist at Allianz, an insurer, estimates the RN’s total new annual spending costs, including a reversal of the pension reform, to be €74bn (\$79bn). Factoring in additional receipts from new taxes, Allianz calculates a net yearly cost of about €18bn or 0.7% of GDP. That would push France’s budget deficit from over 5% of GDP this year to 6.4% by 2026, it thinks.

The left-wing programme looks equally damaging. The NFP promises to raise the minimum wage by 13%, bring back the wealth tax, cap energy prices even though costs have now stabilised, and reverse Mr Macron’s pension reform. Valérie Rabault, a Socialist outgoing deputy, puts its total extra spending pledges at €35bn a year, not including the cost of lowering the pension age to 60. The NFP programme, says one French business boss, is “such madness” that it makes the watered-down RN wish-list look almost reasonable.

Projecting seat numbers from first-round polling is tricky. Any candidate backed by 12.5% of registered voters can go through to a run-off. But party deals can prompt qualifiers to stand down. In 2022 there were only seven three-way votes in the second round. What does seem clear is that Mr Macron’s party is facing crushing losses. Voters give him no credit for bringing down inflation and joblessness in France, nor for capping energy bills during the pandemic. They are neither ashamed nor nervous about backing the RN, and seem just to want “change”.

Whatever the outcome, France may be in for a period of extreme instability. Any minority government risks being voted down in a no-confidence motion. Even with a majority, a government that enters a period of cohabitation with a president of a different party will generate tension. No doubt taking note, Mr Bardella this week said that he would take the job of prime minister only if his party won a majority.

The best hope for Mr Macron is that, after the vote, a union of moderate parties might agree to work together under a technocratic leader. More probable is that France enters the uncharted territory of parliamentary instability: exactly what Charles de Gaulle sought to avoid when he founded the modern French republic. ■



The cordon holds in Germany

Most countries with no prospect of far-right government are small, such as Ireland, Malta, Portugal and Luxembourg. An interesting one is Belgium, where in the 1980s the notion of the *cordon sanitaire* was born, against far-right Flemish nationalists. In Wallonia, the French-speaking bit, far-right politicians cannot even get a hearing in the media—even though many voters may be receptive to their message.

But the most important exception is Germany. The hard-right Alternative for Germany (AfD) came second at the recent European elections, with a record 16%. Yet the AfD remains firmly beyond the *Brandmauer* (“firewall”). It has never come close to power in any of Germany’s 16 states and is shunned at federal level. Any hint that the centre-right Christian Democrats (CDU) might consider working with it invites huge backlash.

The AfD conveys both rank amateurism and a whiff of brownshirtery, making it easy to ignore. At national level, it remains small enough to work around. True, it may come first in three east German state elections due to be held in September. But although that will make forming centrist coalitions in those states hard, the firewall is likely to hold. National hostility to the AfD is such that, overall, the CDU stands to lose more by working with it in the east than by holding the line.

The CDU does, though, hope to blunt the appeal of the AfD by talking tough on irregular migration. Some find this upsetting. Mainstream parties considering aping the populist right are warned that, in the words of Jean-Marie Le Pen, founder of a xenophobic party in France, voters prefer the original to a copy. In last year’s Dutch election the leader of the ruling liberals tilted right, hoping to undercut Geert Wilders’s populist Party for Freedom. The ▶▶

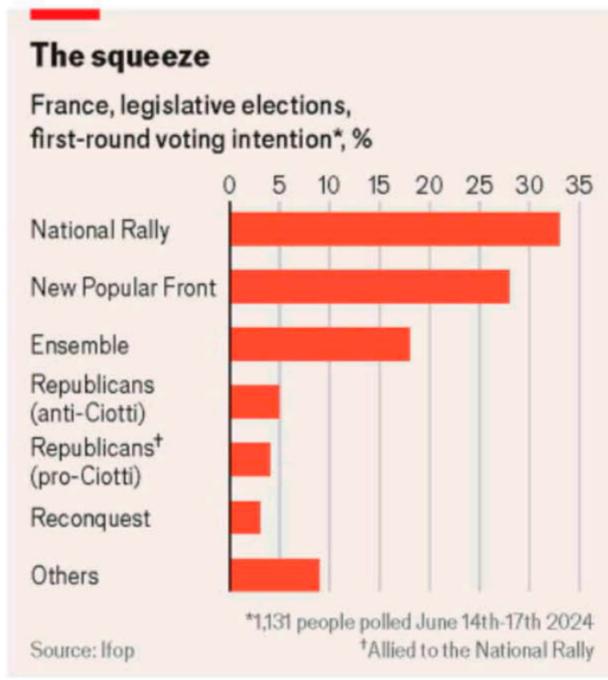
European politics

## From pariahs to participants

### Hard-right parties are entering government across Europe

IN 2000 AUSTRIA’S conservatives invited the Freedom Party (FPÖ), a hard-right outfit with Nazi roots, into government—and opprobrium onto their own heads. Other EU governments suspended contacts. Scientific and artistic boycotts were mooted. Louis Michel, Belgium’s foreign minister, urged his compatriots to snub Austria’s ski slopes.

How quaint it seems now. When Mr Michel’s son Charles, who presides over the European Council, scans the table at the EU summits he chairs, he sees eight leaders from right-wing populist parties or dependent on their support. Many of the 19 other countries have had a similar experience, or could soon face it (Austria among them; the FPÖ may rejoin government after an election in September). The *cordon sanitaire* is fraying even at EU level. Mr Michel’s counterpart at the European Commission, Ursula von der Leyen, has flirted with the Brothers of Italy, a post-fascist party, in her bid for a second term.



▶ gambit backfired, and Mr Wilders won.

Yet in many countries the hard right has simply grown too big to disregard. What to do? “This is the €1m question,” says Léonie de Jonge of the University of Groningen. Of three possible tactics—ignore, demonise or accommodate—none has consistently succeeded. Excluding far-right parties bolsters their argument that they represent the only genuine alternative. Little wonder many creep into government.

How that happens varies. In countries with proportional-voting systems hard-right parties join coalitions (usually with the centre right), or prop them up. Since 2022 Sweden, which once had one of Europe’s strongest *cordons sanitaires*, has had a government backed by the hard-right Sweden Democrats.

Elsewhere change can take more dramatic form. In France the “republican front” against the hard-right National Rally (RN), led by Jean-Marie’s daughter Marine, has so far kept the party from power. That may be about to change as France heads into a snap parliamentary election (see previous article). But even if it doesn’t, Ms Le Pen has performed steadily better in presidential elections over the past decade; in 2022 she took 41.5% of the run-off vote. If she wins a majority at the next, in 2027, the game will be up. ■

## Ukraine

# The spoils of war

## Russia’s latest crime in Mariupol: stealing property

OVER THE past few months, little white notices have appeared on doorways to residential blocks all over Mariupol, a city besieged, wrecked and then seized by Russia in May 2022. “An inventory of your block will be carried out to identify ownerless property; the owner of the apartment should be at home with documents and a Russian passport.” The print is small, the implications large. Unless the apartments are re-registered with the Russian occupying authorities and people are living in them, the properties will soon be declared ownerless and sold.

Petro Andryushchenko, an adviser to the Mariupol municipal authority in exile, says he knows his apartment has been broken into and his possessions stolen. Like many of the other roughly 350,000 Mariupolans from a pre-war population of 430,000 who have fled, he cannot risk going back to re-register his flat in person. He expects someone else will soon be living there. “It’s a normal story,” he says.



The new Russia

In May the website of the housing ministry of the Donetsk National Republic (DNR), the separatist statelet overseen by Russia since 2014, listed 514 ownerless apartments in Mariupol, complete with addresses and square footage. Re-registration is being done throughout the occupied territories to consolidate Russian control and also as a new phase of economic exploitation. It is especially venal in Mariupol, where Russia’s authorities are creating a new real-estate market in a city largely ruined by their bombs.

Estimates suggest that over 90% of the housing blocks in central Mariupol were damaged in the invasion of 2022. Some have been repaired, others demolished. Some Mariupolans have been given flats in shoddy newly built blocks. Leo, who doesn’t want to use his real name, says his parents’ new apartment has wobbly door handles and a mouldy balcony, windows won’t close properly and the bathroom fixtures had to be replaced after a month. New commercial buildings have priority over social housing, though developers are putting up residential blocks with big government grants and loans. Russia’s government offers a cheap mortgage rate of just 2% to buyers in the occupied territories, so local agents are touting for business.

A promotional video shows a young female agent walking through wrecked Mariupol apartments with an upbeat pitch: “Investment is arriving from Russian regions.” Mariupol, she assures, offers a valuable investment. She shows a buyer around a damaged three-room flat, noting the “chic layout” and the size of the children’s bedroom, where abandoned toys are strewn about. “We see the owners left in a hurry,” she says. Mr Andryushchenko reckons some 80,000 Mariupolans now live in the city alongside the same number of in-

comers, almost all from Russia. As bombed-out neighbourhoods are razed and new buildings go up, Mariupolans have been pushed out of the city centre. Compensation for demolished apartments is derisory.

Some Mariupolans who fled to Ukrainian-held territory or Europe are now trying to go back, to get a Russian passport, re-register their property and sell it—if they can. But Ukrainian passport-holders must go through a filtration point at Moscow’s Sheremetyevo airport to be asked why they are going there and what is their view of the “special operation” in Ukraine. Plenty of Mariupolans have apparently been denied entry.

To get around the new rules, some have tried to transfer ownership (often to relatives still in Mariupol) by getting documents notarised by Russian embassies abroad. But the overlapping jurisdictions of the DNR and the Russian Federation in Mariupol can snarl up the regulations.

Ultimately, says Mr Andryushchenko, “it doesn’t matter” that Russians are buying confiscated Ukrainian property. Under international and Ukrainian law, such transactions are “absolutely illegal”. If at some future date Mariupol is returned to Ukrainian control, any contract disputed by an owner citing Ukrainian records would be null and void. “Unofficially, our recommendation as a Ukrainian municipal authority is: if you can sell your property, do it,” he says. And what of Mariupolans who have bought flats in new blocks with Russian mortgages, or have bought properties illegally but unknowingly?

Mr Andryushchenko thinks such questions are moot. “We don’t know what kind of condition Mariupol will be in after de-occupation,” he points out. “It could be absolutely destroyed again.” ■

## Southern longevity

## Growing old together

MADRID

## Why southern Europeans will soon be the longest-lived people in the world

THE CALLE DE JORDÁN, a short street in central Madrid, encompasses the entire cycle of human life. On one block is a fertility clinic, an increasingly common sight in a country obsessed by its shortage of babies. A block further down is a day centre for pensioners, advertising services like memory training and help with mobility. It is common to see women in their 60s gently leading their 90-something mothers up to the door.

The Institute for Health Metrics and Evaluation at the University of Washington recently issued projections for longevity by country in 2050. Among the top 20 for living to a ripe old age are rich ones like Switzerland and Singapore. East Asia is also represented by South Korea and Japan, longtime longevity leaders.

But a geographic cluster of relatively poorer countries are also conducive to longer lives: Spain, Italy, France and Portugal. (Three nearby microstates, San Marino, Malta and Andorra, make the top 20, too.) The oldest person alive is a Spanish woman, Maria Branyas Morera (117), who succeeded a French one. Health and long life correlate unsurprisingly with GDP per capita. Why does southern Europe outperform the usual link between wealth and health, making the average lifespan in Spain (85.5 years in 2050) longer than that of the average Dane (83.5)?

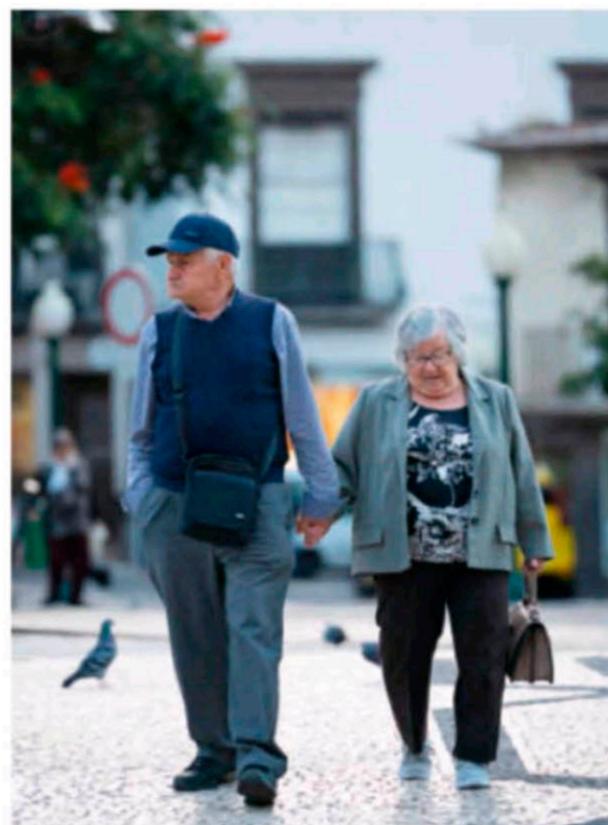
Many point to the “Mediterranean diet”—fish, whole grains, fresh fruit, vegetables and olive oil. Critics, though, point out that diets differ widely from Portugal to Greece. Besides, researchers find that today’s Mediterraneans do not stick to their namesake diet. Plazas in Spain are full of people eating fried fish and salted ham, washed down with beer at hours some might consider unseemly. Spaniards drink more booze and smoke slightly more than the European average, and are among Europe’s biggest cocaine users.

Dan Buettner, who has written several books on areas where people live long, notes that to understand why people grow old one must look not at today’s habits but at those of half a century ago, when people ate “peasant food”, dominated by grains, beans and tubers. A recent study of the “blue zone” (a designation for areas that feature many centenarians) in Sardinia found that the diet included “famine foods”, such as bread made from acorns and clay and a cheese made with insect lar-



vae. The most notable fish product was salted, dried mullet ovaries; inland shepherds rarely ate fresh fish. Diets today increasingly include Western processed foods, but “cultural inertia” keeps them somewhat healthier, says Mr Buettner.

That shepherding past points to another factor: movement. Spaniards lead western Europe in steps per day at 5,936, according to a study from 2017. (Italy, France and Portugal are less impressive.) The study found that countries with “activity inequality”—a few prolific walkers but many couch potatoes, as in America and Saudi Arabia—had the highest obesity rates. Those where everyone moved a rea-



A simple secret

sonable amount, as in Spain, had low ones. That evidently reduced mortality from obesity-related diseases.

Why do Spaniards move so much? Spanish cities, and even tiny *pueblos*, are densely populated; hit the city limits and you are often in empty countryside. Neither culture nor regulation favour sprawling suburbs, so even with abundant land, Spaniards live on top of each other. Paris and other places aiming to create “15-minute cities”, where most necessities are within walking radius, could learn much from Spain. The same study that looked at “activity inequality” examined urban America, finding that dense cities like New York and Boston had greater (and more evenly distributed) levels of activity than sprawling places like Atlanta and Phoenix.

But stressing diet and exercise misses a piece of the puzzle. Spain’s walkability is also good for social life. Cities are built around plazas where friends, family and co-workers sit, eat, drink and talk. That turns out to be good for you even if you sip vermouth and eat crisps at noon. Reams of research show that social contact is critical for physical and psychological well-being.

According to a recent survey by Gallup, a pollster, and Meta, a social-media company, 76% of Spaniards say they feel “very” or “fairly” socially supported. That is above average, though not top of the table. Jon Clifton, head of Gallup, says his firm’s research shows that Spaniards are fairly unhappy and disengaged at work. He quips that a headline in *El País*, a newspaper, got it more or less right: Spain is “the best country to live in and the worst to work in”.

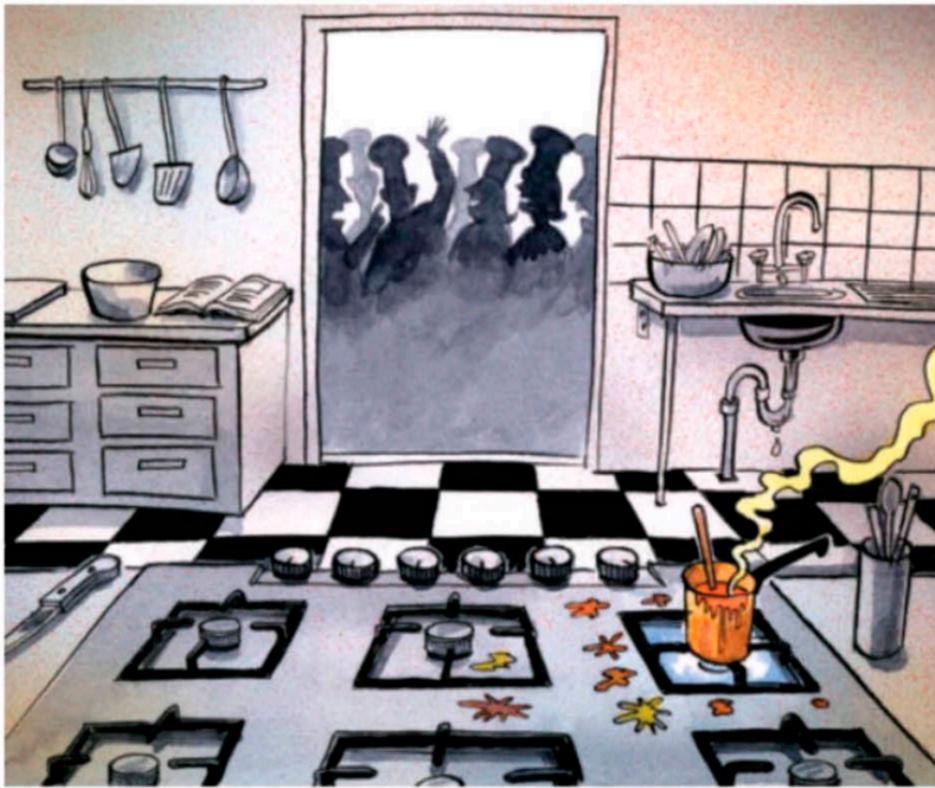
But work is not everything. Spaniards are fourth in the world when asked whether they have seen friends or family who live near or with them in the past week (Greece was second). This may be the unexpected upside of the fact that many young southern Europeans cannot get good enough jobs to afford to move out of their parents’ homes. Family bonds remain tight, including in trying times like the financial crisis and the pandemic.

Southern European countries do not score highest on happiness—that title has long been held by Denmark and Finland. But happiness assessments weight long-term life satisfaction more heavily than short-term smiling and laughing. Those sorts of gleeful emotions are reported most often by Latin Americans. And, metaphorically and physically, a line drawn from Helsinki to Buenos Aires would pass through Spain. That country has European levels of wealth (the best predictor of happiness) and health care (which keeps people alive), while also sharing cultural traits with Latin Americans: living for the moment and treasuring friendships and families. These are not just good in themselves. They keep you going, too. ■

# CHARLEMAGNE

## *Too many cooks, too little cooking*

*Europe today is a case of lots of presidents yet nobody leading*



FOR SEVERAL years in the early 1990s Deng Xiaoping ran China despite having no formal title other than Most Honorary President of the Chinese Bridge Association. The European Union today is roughly the opposite: a place crawling with presidents, yet nobody in charge. An unexpected power vacuum has befallen the continent in the midst of ongoing war, a budding trade spat with China and a nerve-jangling election in America. Whether in Brussels or in national capitals, those on hand are otherwise engaged, usually with their own domestic difficulties. Can someone—anyone—step up to lead Europe?

It has long been hard to work out whom to call if you want to speak to Europe. But that is in fact one of its charms. In centuries gone by, establishing who had the upper hand on the continent used to involve gauging whose troops had made the furthest inroads into its neighbours' territory (Germany, often). After the second world war, when fighting gave way to EU meetings convened to discuss the format of future EU meetings, the question of "Who runs Europe?" usually gave rise to a cacophonous answer. Federalists like to think it is the leaders of the bloc's main institutions in Brussels. Brits always suspected it was the Franco-German axis, which they never managed to crack. The French think the EU is led by, *naturellement*, the French; Germans stand knowingly in the corner, happy to let them believe it. Nationalist types like Viktor Orban of Hungary or Giorgia Meloni of Italy are quite sure their time has come, given a recent rightward shift in European elections. Members of the European Parliament are adamant it should be them. The correct answer is in permanent flux, keeping Brussels-based journalists gainfully employed.

Alas, all the putative leaders are currently hobbled. The most swiftly debased leader of Europe is Emmanuel Macron. Upon re-election to the French presidency two years ago, he stood as the union's standard-bearer. Here was a national leader from a large country proud to stand in front of an EU flag, always willing to opine (often at some length) about the future of Europe. That his fading popularity at home would dent his credibility in EU circles was always expected. But his calling of a snap parliamentary election due on June 30th and July 7th has raised the prospect of a

messy "cohabitation" between Mr Macron and a prime minister from a rival party, quite possibly from the hard right. What then for Europe? Nobody is quite sure, given how much the EU has evolved since 1997-2002, when France last split its top jobs. Although the president would maintain his purview on foreign affairs and keep attending summits of European leaders, that is only part of the story. The nitty-gritty of EU legislation is hammered out at meetings of ministers, which would be attended by French representatives from that rival team. France seems likely to export its domestic gridlock to the continental level, even ahead of the presidential poll in 2027.

Who can pick up Mr Macron's mantle? The German chancellor might usually be expected to step up. But the current one, Olaf Scholz, lacks his French counterpart's visceral attachment to the EU. Overseeing a messy coalition in Berlin made it difficult to act decisively in Brussels. All three ruling parties got massacred in the recent European elections. A messy fight over budget cuts will further test the stability of the government in coming months. Soon enough the focus will turn to next year's federal election.

Plenty of national leaders have tried to gatecrash the Franco-German axis; adding a third party to a squabbling couple has a certain European feel to it. Thus far nothing has worked. Poland, as the biggest central European country, was once expected to turn the Franco-German duo into a leadership triangle. But Donald Tusk, its newish leader, still has his work cut out reclaiming the state apparatus from his hard-right predecessors. The Dutch had a seasoned leader in the form of Mark Rutte, but he seems destined to take over as head of NATO. Ms Meloni has had a brief stint as putative "kingmaker" in the EU, whose support might be needed to install a new team of leaders for the bloc's central institutions after the European elections on June 9th. As it turns out, political parties in the centre did well enough to (probably) do without her backing, reducing her importance.

When leadership seeps away from national capitals, the EU machine in Brussels can usually be trusted to attempt a power-grab. Not just now: the bosses of the bloc's institutions, notably the European Commission that acts as its executive arm, are coming to the end of their terms. On June 17th the EU's 27 national leaders convened for dinner to appoint three "presidents" (the term is used loosely in Brussels) to lead the commission, chair meetings of EU leaders and preside over the parliament. They were expected to give the nod to Ursula von der Leyen for another five-year term heading the commission. Yet agreement proved strangely elusive. Most probably she will be nominated when leaders meet again on June 27th. But even assuming the parliament backs her next month—which is not yet guaranteed—Mrs von der Leyen will spend much of the rest of the year haggling with national capitals and MEPs to build a team of commissioners.

### Who you gonna call? Viktor Orban!

When all else fails, one last figurehead for the EU can be counted on: whoever leads the country holding the six-month rotating "presidency" of the council, where national governments haggle. As luck would have it, from July 1st the job falls to none other than Mr Orban. The cantankerous Hungarian prime minister is the EU's *bête noire*, always on hand to succour Russia or champion Eurosceptic culture-warriors. On June 18th he unveiled the council's new tagline: "Make Europe Great Again". That sounds like a plan, if only anyone was on hand to implement it. ■

## ESSAY *Solar power*

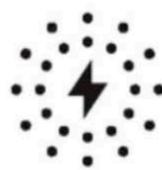


# THE SUN MACHINES

*An energy source which gets cheaper the more you use it marks a turning-point in industrial history*

A PHOTOVOLTAIC CELL is a very simple thing: a square piece of silicon typically 182 millimetres on each side and about a fifth of a millimetre thick, with thin wires on the front and an electrical contact on the back. Shine light on it, and an electric potential—a voltage—will build up across the silicon: hence “photovoltaic”, or PV. Run a circuit between the front and the back, and in direct sunlight that potential can provide about seven watts of electric power.

This year the world will make something like 70bn of these solar cells, the vast majority of them in China, and sandwich them between sheets of glass to make what the industry calls modules but most other people call panels: 60 to 72 cells at a time, typically, for most of the modules which end up on residential roofs, more for those destined for commercial plant. Those panels will provide power to family homes, to local electricity collectives, to specific industrial installations and to large electric grids; they will sit unnoticed on roofs, charmingly outside rural schools, controver-



### SOLAR SPECIAL

sially across pristine deserts, prosaically on the balconies of blocks of flats and in almost every other setting imaginable.

Once in place they will sit there for decades, making no noise, emitting no fumes, using no resources, costing almost nothing and generating power. It is the least obtrusive revolution imaginable. But it is a revolution nonetheless.

Over the course of 2023 the world’s solar cells, their panels currently covering less than 10,000 square kilometres, produced about 1,600 terawatt-hours of energy (a terawatt, or 1TW, is a trillion watts). That represented about 6% of the electricity generated world wide, and just over 1% of the world’s primary-energy use. That last figure sounds fairly marginal, though rather less so when you consider that the fossil fuels which provide most of the world’s primary energy are much less efficient. More than half the primary energy in coal and oil ends up as waste heat, rather than electricity or forward motion.

What makes solar energy revolutionary is the rate ▶▶

of growth which brought it to this just-beyond-the-marginal state. Michael Liebreich, a veteran analyst of clean-energy technology and economics, puts it this way: in 2004, it took the world a whole year to install a gigawatt of solar-power capacity (1GW is a billion watts, or a thousandth of a terawatt); in 2010, it took a month; in 2016, a week. In 2023 there were single days which saw a gigawatt of installation worldwide. Over the course of 2024 analysts at BloombergNEF, a data outfit, expect to see 520-655GW of capacity installed: that's up to two 2004s a day.

This extraordinary growth stems from the interplay of three simple factors. When industries make more of something, they make it more cheaply. When things get cheaper, demand for them grows. When demand grows, more is made. In the case of solar power, demand was created and sustained by subsidies early this century for long enough that falling prices became noteworthy and, soon afterwards, predictable. The positive feedback that drives exponential growth took off on a global scale.

And it shows no signs of stopping, or even slowing down. Buying and installing solar panels is currently the largest single category of investment in electricity generation, according to the International Energy Agency (IEA), an intergovernmental think-tank: it expects \$500bn this year, not far short of the sum being put into upstream oil and gas. Installed capacity is doubling every three years. According to the International Solar Energy Society, solar power is on track to generate more electricity than all the world's nuclear power plants in 2026, than its wind turbines in 2027, than its dams in 2028, its gas-fired power plants in 2030 and its coal-fired ones in 2032. In an IEA scenario which provides net-zero carbon-dioxide emissions by

## NAIVE EXTRAPOLA- TION HAS TROUGHED SOBER FORECASTING AGAIN AND AGAIN

the middle of the century, solar energy becomes humankind's largest source of primary energy—not just electricity—by the 2040s.

Growth in solar is not dependent on efforts to stabilise the climate; if it keeps getting cheaper it will grow even if people persist in burning coal and oil alongside it. In a paper published in 2022 Rupert Way of Oxford University and colleagues sought to see what would happen if the costs of solar and other new technologies kept falling with increased deployment as they have done in the past. Under their "fast transition" scenario, they found that by 2070 the world could be getting more useful energy from solar cells than it got from all energy sources combined last year (see chart on subsequent page).

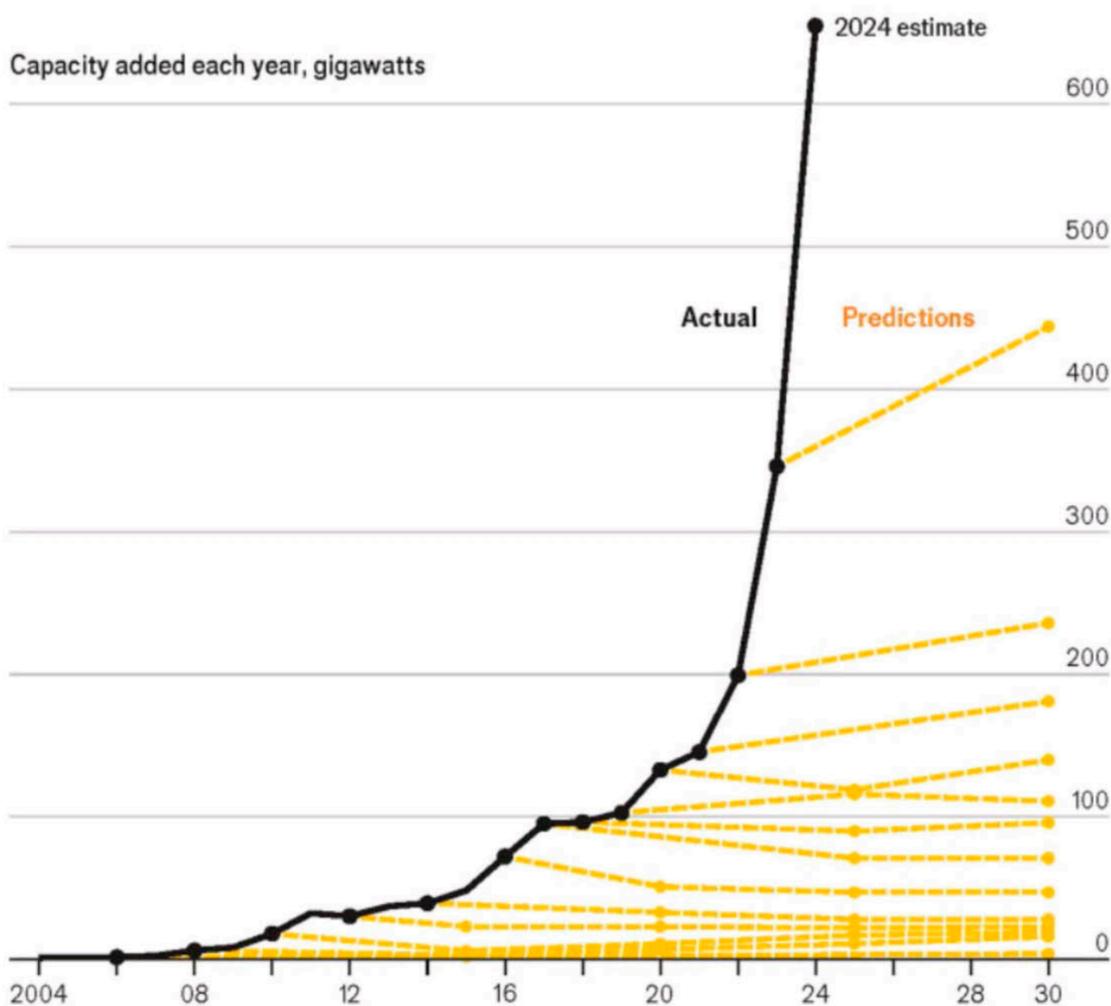
Expecting exponentials to carry on is rarely a basis for sober forecasting. At some point either demand or supply faces an unavoidable constraint; a graph which was going up exponentially starts to take on the form of an elongated S. And there is a wide variety of plausible stories about possible constraints, from manufacturers going bust, to solar farms not being able to connect to grids, to extensively solar-powered grids not being stable, to excessively solar grids no longer being attractive sites for further investment.

All real issues. But the past 20 years of solar growth have seen naive extrapolations trounce forecasting soberly informed by such concerns again and again. In 2009, when installed solar capacity worldwide was 23GW, the energy experts at the IEA predicted that in the 20 years to 2030 it would increase to 244GW. It hit that milestone in 2016, when only six of the 20 years had passed. According to Nat Bullard, an energy analyst, over most of the 2010s actual solar installations typically beat the IEA's five-year forecasts by 235% (see chart). The people who have come closest to predicting what has actually happened have been environmentalists poo-pooed for zealotry and economic illiteracy, such as those at Greenpeace who, also in 2009, predicted 921GW of solar capacity by 2030. Yet even that was an underestimate. The world's solar capacity hit 1,419GW last year.

This performance suggests that solar is not like other energy sources. History shows the same thing. From 1800 to 2020 the amount of energy the world derived from coal increased by roughly a factor of 400. But as Dr Way and his colleagues point out, when adjusted for inflation coal's cost in terms of its energy content stayed more or less the same. The same is true for the long-term costs of oil and, later, natural gas. Exploiting these fuels drove lots of economic growth; that made the fuels more affordable, their use more valuable and the returns on their production greater. But their costs stayed broadly stable in real terms.

Since the 1960s what analysts call the levelised cost of solar energy—the break-even price a project needs to get paid in order to recoup its financing for a fixed rate of return—has dropped by a factor of more than 1,000, and the trend is continuing. Now that solar energy is a significant part of the world's entire energy portfolio, the world as a whole is going to go on seeing the energy used in many applications getting cheaper and cheaper. A burst of innovation aimed at making the most of this bonanza will change the way many existing industries work and create new ones more or less from scratch. It will be the steepest drop in the price of one of the basic factors of production that the world economy has ever seen.

### ↓ EASY PV *how solar outgrew expectations*



Sources: IEA; Energy Institute; BloombergNEF

▶ **T**HE CYLINDERS for the first steam engines that Matthew Boulton and James Watt began to sell in the 1770s were not made in-house at Boulton's Soho manufactory, outside Birmingham; they were cast at the nearby foundry of John "Iron Mad" Wilkinson. But the manufactory provided the fittings that turned those cylinders into engines, supervised the engines' building and owned the patent on their design. As Boulton explained to James Boswell, a writer, when he visited the Soho works, "I sell here, Sir, what all the world desires to have—power."

The silicon foundries of China lack salesmen with Boulton's verve ("an iron chieftain...father to his tribe," as Boswell put it). But when it comes to exquisite chemical purity and physical flawlessness, the wares they provide to serve the world's desire for power should be enough to make anyone silicon mad.

Their raw material is sand made of quartz, a crystalline form of oxidised silicon. Silicon foundries heat it to 1,900°C in electric-arc furnaces with some carbon, in the form of coke. The oxygen from the sand reacts with the carbon to create carbon monoxide, leaving behind molten "polysilicon". That is then cooled, crushed and reacted with hydrochloric acid to produce a volatile liquid called trichlorosilane, which is then repeatedly distilled to remove all trace of impurity. The most advanced foundries work at "10 nines", meaning that polysilicon they derive from their trichlorosilane is 99.99999999% pure. This silicon can then be remelted and cooled in a way which sees every atom end up sitting in its properly appointed spot within a single crystal.

Until the beginning of this century the only products that were worth this sort of palaver were the wafers from which the computer industry made its silicon chips. The solar-cell industry lived on the offcuts. But the subsidies of the mid-2000s saw demand for photovoltaics rise beyond what the computer industry could spare. As the price of polysilicon rose, firms in Asia started to make the investments needed to build polysilicon foundries for supplying the PV industry.

China quickly took the lead, and kept it. In 2023 Chinese firms made 93% of all the world's polysilicon destined for solar cells. Some are vertically integrated and make photovoltaics themselves (an approach Boulton took when he invested in a foundry of his own at Soho). Some leave the diamond-saw slicing of their ingots into wafers, the precise polishing of their surfaces and the perfectly calibrated "doping" that makes the silicon into a semiconductor to their customers.

The country's foundries and manufacturers have followed extraordinarily bullish investment strategies. But as Mr Bullard explains, if as a manufacturer you are tempted to heed a forecast of solar installation that rises only gently, "you are dead the second you look at that line." It is all-in all the time.

That said, the manufacturers benefit from the fact that they are key to their country's industrial strategy. There have been some bankruptcies, but the Chinese government has extended cheap loans to many overextended firms. Gregory Nemet of the University of Wisconsin-Madison notes that the solar-cell market typically catches up with the overcapacity thus created within a couple of years. The current oversupply will see whether this remains the case. China's two biggest producers of polysilicon, GCL-Poly and Tongwei, each had a production capacity of 370,000 tonnes in 2023, more than enough to meet demand. Tongwei

## AS ONE INVESTOR PUTS IT: "THE SUN HAS WON"

has said it is investing some \$3.9bn in a new facility that will eventually be able to produce 400,000 tonnes a year. Johannes Bernreuter, an analyst of the polysilicon market, says China has facilities capable of 7m tonnes a year in the pipeline, enough to produce an annual 3.5TW of solar panels.

In terms of polysilicon such amounts are seen as huge. But it is worth noting that in terms of the material requirements of other energy technologies they are tiny. Coal production runs at roughly 8bn tonnes a year; add on oil and gas and you double that.

Chinese firms have other advantages, notably a vast and protected domestic market and low-cost energy. GCL-Poly and other Chinese firms have several factories in Xinjiang near huge coal-fired power plants which themselves sit more or less on top of large coal mines. Electricity accounts for 40% of the cost of polysilicon production, and burning coal that was mined next door in a depreciated plant that delivers power to your arc furnaces directly is pretty cheap. That said, before too long solar power could be cheaper.

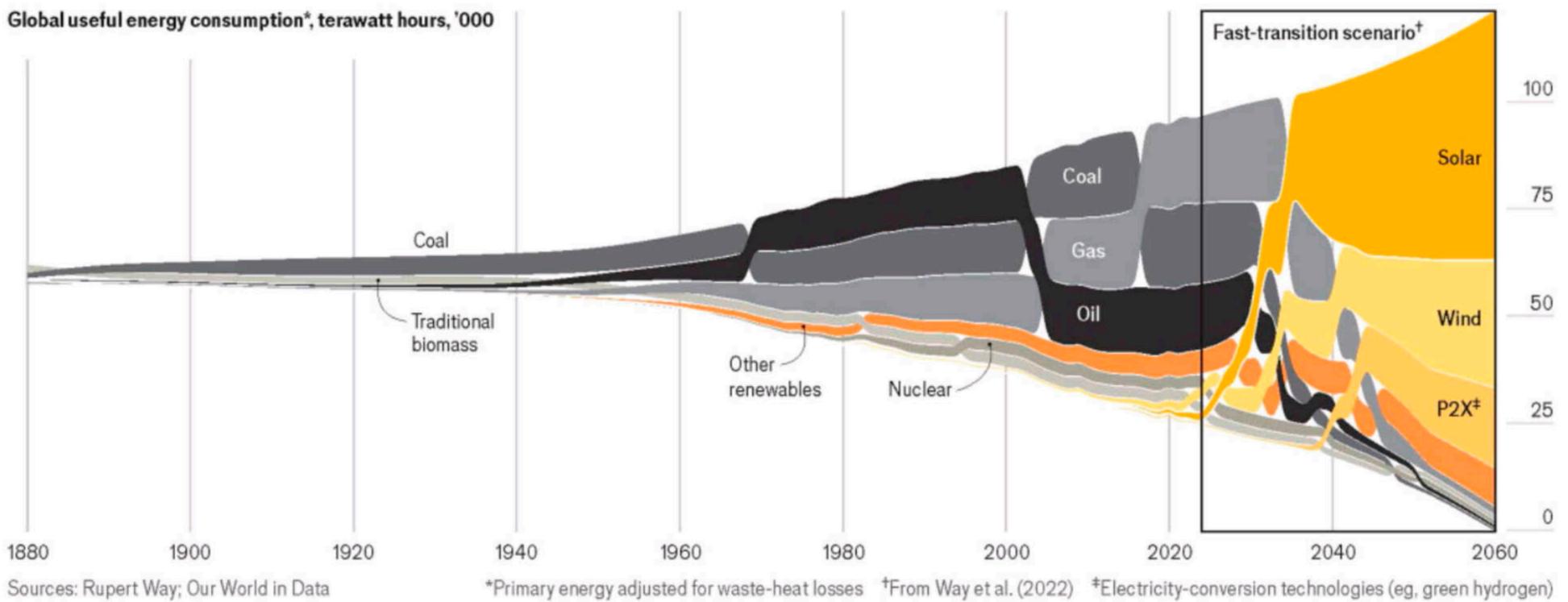
Though protected and subsidised—and open, in Xinjiang, to allegations of the use of forced labour—the Chinese industry is also fiercely competitive in the sort of way that only companies manufacturing more or less the same thing can be. Manufacturers of other energy technologies have to keep the specific needs of their various clients in mind. Engines which burn fuel are dramatically different depending on whether they are to be installed in a back-up generator or a moped. Turbines which spin under the force of moving fluids must be tailored to the steam of a coal plant or the water of a hydroelectric plant. Such specialisation produces the sort of friction and lock-in that favours incumbents. Siemens has been able to hold its edge in the manufacture of gas turbines for decades.

In PVs, though, there is no such enduring edge to be found. Solar cells are standardised products all made in basically the same way; they have no moving parts at all, let alone the fiendish complexity of a modern turbine. Manufacturers compete on cost, by either making cells that make fractionally more electricity out of a given amount of sunshine or which cost less. "The barriers to entry are capex," says Jenny Chase, who analyses the industry at BloombergNEF. "You can buy the machines [needed for manufacture], it's not super tech-intensive."

The commoditised nature of the product does not just lead to relentless competition on the supply side. It also provides incredibly diverse and deep demand. Heymi Bahar of the IEA sees this as perhaps the technology's biggest advantage. What is revolutionary about solar, he says, is that it "is addressed to all kinds of investors". From the teacher in South Africa who buys a \$2 charger for her phone to the company developing 10GW power plants, everyone who uses solar is buying basically the same product. "There is no other energy-generation tech where you install 1m or one of the same thing depending on your application," says Rob Carlson, a technology investor; as he puts it in a white paper, "The Sun has won".

The key to the way this demand grows is to be found in the industry's "experience curve". The degree to which processes get cheaper as production gets larger is frequently expressed in terms of the extent to which unit costs come down every time cumulative production doubles. From the mid-1970s to the early 2020s cumulative shipments of photovoltaics in- ▶▶

↓ **HERE COMES THE SUN** *the past and a possible future*



► creased by a factor of a million, which is 20 doublings. At the same time prices dropped by a factor of 500. That is a 27% decrease in costs for each doubling of installed capacity, which means a halving of costs every time installed capacity increases by 360%. If you treat the late 2000s, when subsidies led to the creation of foundries producing polysilicon specifically for solar cells, as an inflection point, the rate is now over 40%.

**T**HE GREEN members of the German coalition which kicked off the huge demand-establishing subsidies of the early 2000s liked the decentralisation they offered; the Social Democrats liked the prospect of developing a new manufacturing industry devoted to their production. Both sides also saw solar panels as weapons in the fight to decarbonise the economy—but not necessarily as particularly powerful ones. They offered a sort of greenness that only really worked if people radically reduced their consumption.

It took those leading the decarbonisation charge some time to appreciate that solar could in principle be much more than this. When Adair Turner, a grandee technocrat, became the first chair of Britain's Climate Change Committee, an organisation mandated by parliament to lay out the path to net-zero emissions, solar was not a large part of its thinking. "We totally failed to see that solar would come down so much," he says. "In 2008 we were thinking that capital costs would come down 19% by 2020. When we got to 2020 they were down 95%." In the 2014 report which set the agenda for the Paris agreement of 2015, the Intergovernmental Panel on Climate Change placed far more emphasis on carbon-capture at fossil-fuel plants and on burning biomass than it did on photovoltaics.

Since then, though, solar has proved the stand-out of the pack. In 2015 BloombergNEF estimated that the levelised cost of electricity (LCOE) for solar, on a global basis, was \$122 per MWh, almost half as high again as the LCOE for onshore wind, then \$83. The LCOE for coal in places without carbon prices at the time was \$50-\$75. Today both solar and onshore wind are in the low \$40s, while coal remains much where it was.

Not only have solar panels been getting cheaper

more quickly than wind power, they have done so while staying comparatively unobtrusive. For wind, more efficiency means putting bigger turbines higher into the sky on more massive pylons. Their two-dimensionality allows solar panels to be a lot less visible from a distance (and also very easy to ship; you can get 300 into a standard TEU freight container). Though covering tracts of arable countryside with them upsets some people in some places, by and large solar panels are popular: research finds they enjoy more "social licence" than any other form of energy generation, be it renewable, fossil-fuel or nuclear.

Cheap, plentiful, acceptable energy which is emissions-free at the point of generation; it might seem that the climate crisis is solved. There is a catch, though—in fact, two. Consumers want to be able to draw power at night. And the grids to which they look for it work on the basis of a "merit order": everyone supplying the grid at a given time is paid the price needed to attract the marginal supplier of power.

This becomes terribly inconvenient when very low-cost power from solar (or wind) becomes a large factor in electricity supply. When there is a lot of solar power on a grid the price of electricity in the middle of the day can fall to zero, or below. Solar-rich grids in Spain, Portugal, Germany, France, California and Texas have all experienced negative wholesale power prices in recent months. Eventually all markets which install plentiful solar can expect something similar, which makes the potential profits of further solar investment in such markets seem limited.

But there are ways around those limits. They include long-distance connections; storage (especially batteries); increasing overall demand; and the innovation low prices always encourage.

Long-distance connections allow sunnier places to serve those more dimly lit. England could be powered by panels in Morocco, New England evenings served by Nevada afternoons. Making such connections takes time and money. But if the power that is plentiful and cheap at one end can command an attractive enough price at the other they make sense.

Batteries and other storage technologies allow ar- ►►

**THE KEY TO  
DEMAND  
GROWTH  
IS THE  
INDUSTRY'S  
"EXPERIENCE  
CURVE"**

▶ bitrage across time rather than space; energy generated at midday, when grid prices are low, can be sold back when the Sun sets and prices are higher. What is more, batteries, like solar cells, are mass producible and targets of Chinese industrial policy. As a result they are moving down an experience curve even steeper than solar's. The Rocky Mountain Institute, a think-tank, calculates that the cost of a kilowatt-hour of battery storage has fallen by 99% over the past 30 years.

By providing an investment case for new solar in markets that are already seeing zero prices, batteries increase demand for panels. Take California. It first saw sunshine-driven negative prices on the grid in 2017, when it had about 19GW of solar installed. It has more than doubled its solar capacity since then in part because it now has 10GW of battery storage; there have been evenings recently when batteries have been the largest source of power on its grid. Things are moving even faster in Texas, where battery operators had revenues of \$532m in 2023.

It is possible that batteries might move electricity in space as well as time. Lawrence Berkeley National Laboratory estimates that there are 2.6TW of generation and storage capacity queuing up for grid connections in America—enough to double the country's installed generating capacity. This queue contains a full terawatt of solar power. SunTrain, in which Dr Carlson's firm, Planetary Technologies, is an investor, sees this as a market for batteries with wheels.

The company plans to use solar farms in places that have little to recommend them other than a railway line nearby as filling stations at which to charge heavy but cheap batteries built into goods wagons. A 100-car train similar to the ones that currently carry coal east from Wisconsin could deliver 3 gigawatt-hours to users. Dr Carlson describes a utility-boss's jaw hitting the floor when he proposed that, instead of a multi-decade planning battle to build a high-voltage transmission line, SunTrain could meet the utility's power-import needs with a couple of trains a day.

**F**OR THOSE who are unconvinced by such an apparently outlandish way of profiting from cheap power there is a much more tried and tested avenue. It is one of the ironies of solar power that much of its growth has been driven by relatively unsunny countries, notably those of northern Europe, where there has been little demand for additional energy. The global south has a lot of empty land, better access to sunshine and much more unmet demand.

Adani Green Energy, one of the world's largest solar developers, has obtained the rights to build solar farms on two vast tracts of land in India, one in Gujarat, near the border with Pakistan, the other in Rajasthan. Each of them is large enough to take some 30GW of solar panels, says Sagar Adani, the company's boss and the nephew of the larger Adani Group's founder, Gautam Adani. At that size they would offer a capacity more than two-thirds as large as that which Germany has installed over the past 25 years; and because India has much more sunshine, they will produce more energy in a given year than all those German cells put together. Mr Adani says the firm is installing about 5GW of solar on this land every year.

India's solar expansion, Mr Adani says, is driven by two factors: energy security and national finances. "India imports gas for fuel, transport, fertilisers. It imports oil, too." These are the main reasons for the cur-

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rent-account deficit. "So when Ukraine is invaded, Indian energy goes for a toss...You can't have 1.4bn people rely on geopolitical factors for their energy."

Not that Mr Adani is against using geopolitics to his advantage when the opportunity arises. His firm is both an operator of panels and a manufacturer of them. Adani Green Energy buys almost all the kit it is installing in India from China or firms in East Asia connected to the Chinese supply chain. It exports some 90% of the panels it makes in-house to America, which has concerns about Chinese PV supply, at prices 10-15% higher than those it pays for its imports. As Mr Adani's production scales up, and his costs fall, he will find himself in the strong position of being able to install homemade panels when it suits him, and Chinese-origin PV when it does not.

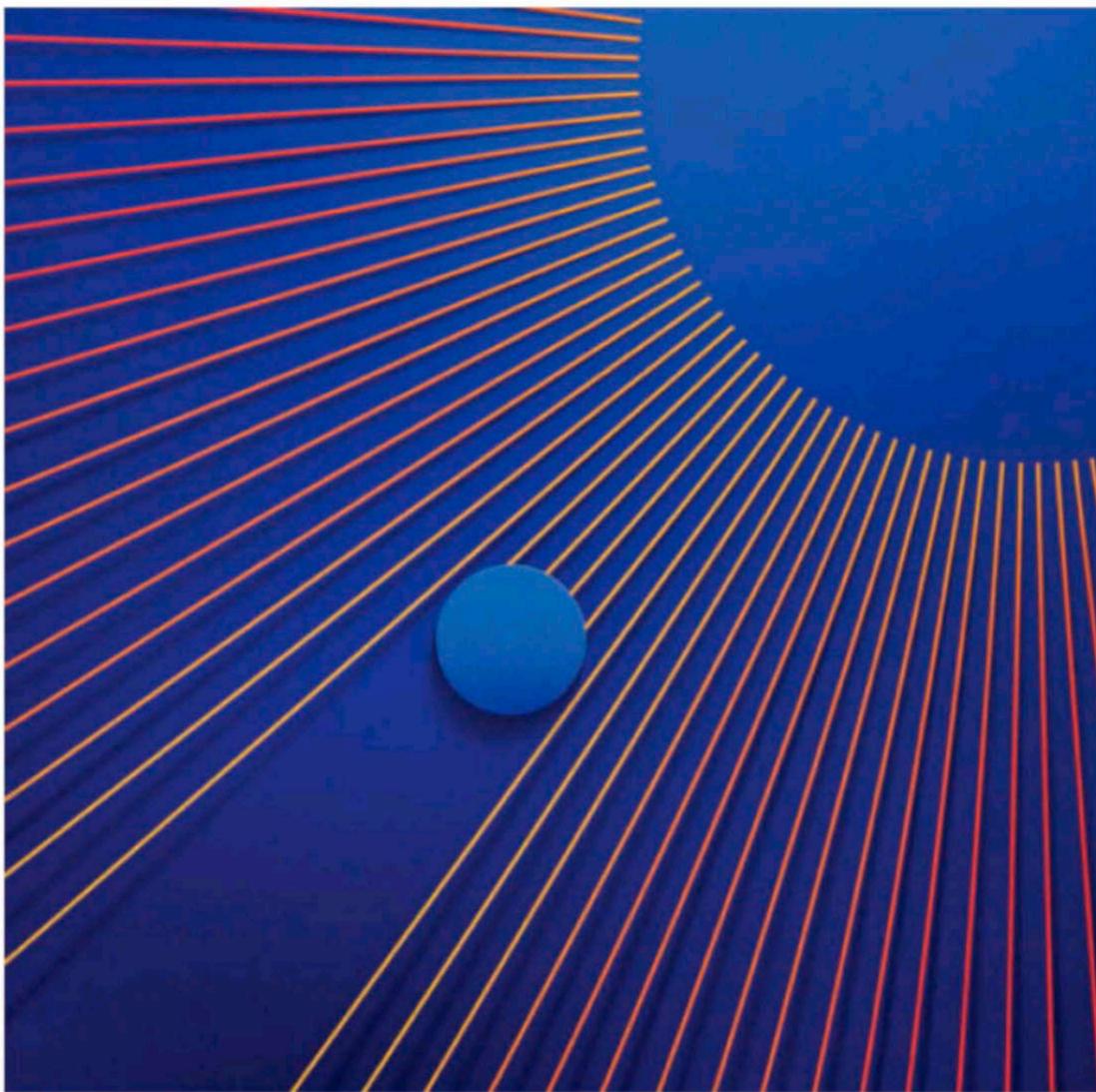
Mr Adani's first-order reasons for India's going solar do not include decarbonisation. India wants more energy from many sources; it is building coal plants and wind farms (the Adani Group is involved in both) as well as solar farms. Climate diehards argue that it would be better advised to build only solar and wind. By some calculations the capital expenditure needed to generate solar energy is now less than the fuel bill for a fully depreciated coal plant. But those calculations do not always account for the higher costs of capital in a country where such projects are not yet easily bankable, especially if you are not an Adani. Nor do they include the political issues raised by shutting down a coal industry which employs millions.

As in India, so in many other middle-income countries. In the absence of strong policies aimed at curbing carbon-dioxide emissions, solar power may add to overall capacity as much or more than it displaces existing plants. And in the absence of strong policy the existing or potential capacity which it displaces will often be that which is clean, or cleaner, and comparatively expensive, not cheap and dirty coal. It is quite plausible to imagine there will soon be countries powered by solar, coal and little else.

It is also possible to imagine poor countries that quickly become mostly solar: in particular, countries in sub-Saharan Africa. Small-scale solar is already common across the continent. One barrier to a broader roll-out is financing. "These projects require financing upfront," says Jehangir Vevaina of Brookfield, one of the world's largest solar developers. "Investors need to have confidence that contracts will be honoured." Lack of that confidence, stemming from the likelihood of political instability, means that investors demand high interest rates to finance African solar projects, increasing costs beyond the point of viability even when panels are cheaper than ever. Another problem is the parlous state of the continent's electricity grids.

This means that, for the time being, solar power's growth in sub-Saharan Africa will be more off-grid than in other regions (see Middle East and Africa section). Off-grid, its competition is mostly diesel power, which is much more expensive. Solar with batteries should be able to replace a lot of diesel generators and reduce the market for new ones very quickly.

One factor will be the spread of electric vehicles: an important driver in much of the world, but perhaps a particularly crucial one in Africa. Electric vehicles can be cheaper than those powered by internal combustion. Their batteries provide storage as part of the purchase price. And if powered by local renewables they drastically reduce fossil-fuel imports. This is the



▶ logic which has led Ethiopia to ban the import of vehicles which use internal combustion. Though in Ethiopia the renewable energy in question is mostly hydropower, and the grid which delivers it unreliable, across much of the continent the energy will be solar and may not be delivered over a grid at all.

Africa currently has the lowest electricity use per person of any continent; 600m people in sub-Saharan Africa enjoy no access to electricity at all. For the continent's average electricity use per person to rise to the level of India's, which is more than twice as high, would require 2TW of new solar. Ten years ago that would have been unthinkable. At today's prices it is beginning to look plausible. In ten years time, it should be well on its way to being done, and ambitions will have increased. And so demand will grow, and cumulative capacity will grow, and prices will fall.

**P**ROVIDING BILLIONS of people in developing countries with the benefits of access to energy represents a huge amount of demand. Unmet need for air conditioning alone is in the terawatts, and will only grow as the population and temperatures rise.

But cheaper-than-chips solar will also stimulate innovations that increase electricity demand further everywhere. William Jevons, a 19th-century economist, pointed out that when energy gets cheaper, people use more of it. When that energy has large uncoded externalities, as fossil fuels do, Jevons's "rebound effect" can be a source of environmental worry even as it provides economic benefits. If the energy's only large cost is that of the marginal land in a place with a grid connection—or, if the user is willing to move nearby, without even that—it becomes a lot more benign.

SunTrain is one example of this sort of thinking. Another is Terraform Industries, a startup founded by Casey Handmer in 2021 to make "green hydrogen".

Green hydrogen is made by powering electrolyzers which split water into hydrogen and oxygen with renewable energy. Mr Adani thinks that a good chunk of his company's solar output in India will be used this way to ease India's reliance on imported natural gas. Green hydrogen is also much touted as a way of storing energy for longer periods of time than batteries offer. But the cost of the electrolyzers needed makes it expensive. Mr Adani says that "India today is already at a place where the cost of green hydrogen is equal to the 10-year average of imported LNG [liquefied natural gas]", but not everyone agrees—and even if it is indeed the case, LNG is a pricey form of energy.

Dr Handmer, formerly of the Jet Propulsion Laboratory in Pasadena, thinks that this approach is based on economic assumptions which no longer apply. People have assumed that, because electricity has a cost, it is a good idea for electrolyzers to turn as much of the electrical energy fed into them into hydrogen as possible. The technologies which improve this hydrogen yield—platinum-group-metal electrodes, high pressures and temperatures, fancy membranes, heat exchangers—make the electrolyzers expensive. That means they have to be used as close to 24/7 as possible to pay back the capital invested in them.

What if, instead, you produce an electrolyser with no bells and whistles that uses 60% more electricity to produce a unit of hydrogen but requires much less capex. And then you site it right next to the simplest sort of solar system imaginable—one which provides power in the direct-current (DC) form that photovoltaics produce and electrolyzers use, and thus does not need the inverters most systems use to put electric power onto the grid in the form of alternating current (AC). You may need much more electricity to produce a unit of hydrogen than fancy-electrolyser systems do. But with very cheap electricity and huge savings on capital expenditure you can still come out ahead.

Terraform says that a cheap-electrolyser/off-grid-solar demonstrator it has built along these lines produces hydrogen at a cost close to \$1 per kg, the level which analysts reckon hydrogen must reach in order to compete with fossil fuels. That it is well-suited to developing markets is not a coincidence. Mr Handmer thinks people should be able to "throw solar panels on the ground and hook up some equipment, anywhere on Earth", in order to make any hydrogen they need.

Once you start to think in terms of energy being really copious and all-but free, at least at some times and in some places, brute-force approaches to all sorts of problems begin to appear. One way to drastically reduce the spread of airborne disease is to speed up the rate at which the air in the world's buildings is vented and refreshed. If energy is expensive this is not feasible. But what if...? One way to remove carbon dioxide from the atmosphere is to grind certain sorts of rock into fine dust that is then dispersed across the oceans. Given that this needs to be done at a scale of billions of tonnes a year, again the energy requirement is incredible. And again, what if...?

Energy is not the only expense; any given scheme along these lines could fail. But that human ingenuity finds useful things to do with better access to energy is one of the clearest messages of the past 200 years. If real energy costs drop dramatically across the global economy, and access to energy expands, to bet against great things is to bet against the innovative engines of capitalism. It is not a wager history encourages. ■

## Middle East & Africa



### The Palestine statehood puzzle

## Can chaos be turned into a country?

The territories may have a tad more of a basis for a state than many realise

IN THE DIPLOMACY around the forever war between Israel and the Palestinians, it is customary to describe a Palestinian state as a necessity. Consider the latest Gaza ceasefire proposal, backed by America and all the other countries on the UN's 15-strong Security Council bar Russia, which abstained. It outlines the global community's "unwavering" commitment to a two-state solution "where two democratic states, Israel and Palestine, live side by side in peace". It also insists that Gaza must be unified with the West Bank under the authority of the Palestinian Authority (PA). Most countries believe that Palestine should be recognised as a full-fledged state immediately, before any peace deal is struck between Israel and the Palestinians. On May 10th 143 countries at the UN supported this idea. On May 28th they were joined by Ireland, Norway and Spain.

Some visions of this new state are inspiring. Palestine Emerging, a study by 100 experts released in April, foresees Gaza

and the West Bank by 2050 as a single entity of 13m people, up from around 5m today, connected by a railway, replete with nature reserves and an airport. The devastation in Gaza creates a clean slate on which a new city will be built, with a seaport on an island linked to the mainland by a causeway. Palestine would prosper as a trading entrepot, its currency pegged to the dollar, underwritten by the rich Gulf states. Yet when you look away from such hopeful blueprints, the gap between the dream and reality is crushingly large.

Palestinian statehood last seemed imminent a quarter of a century ago. The Oslo accords signed between Israel and the

Palestinians in 1993 and 1995 created a semi-autonomous body, the PA, in Gaza and the West Bank. Had everything gone to plan, a final accord would have turned the PA into a sovereign state with fixed borders in 1999. But the assassination in 1995 of Yitzhak Rabin, Israel's prime minister, by a Jewish extremist removed one of the most forceful advocates of peace. The process unravelled further amid a surge in bus-bombings and other terrorist attacks on Israeli and Palestinian civilians and a rapid expansion of Jewish settlements in the West Bank, which was meant to form the core of the new Palestinian state.

When talks brokered by America over a two-state deal broke down in 2000, a second intifada (uprising) erupted, which burned until 2005 and saw Israeli tanks return to Palestinian cities. Then in 2007, almost two years after Israel had dismantled its settlements in Gaza and withdrawn its troops, the armed Islamists of Hamas, who won a general election covering both territories in 2006, took control of the coastal enclave. Yet the PA has limped on as a political mutant, partly as a government and partly an instrument of Israeli occupation, its remit limited to the West Bank. Many countries recognise Palestine as a state, but the UN Security Council does not. Without clear borders or its own army and police in sole charge of security, it lacks some essential characteristics.

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Since Oslo the Palestinian territories have changed a great deal, even before the destruction of Gaza. In some respects these changes make it a more credible state than it was in the 1990s. For example, Palestinians spend 2.4 more years in education than they did two decades ago, making them one of the most literate populations in the Middle East. In the early 1990s Gaza and the West Bank scored 0.53 on the UN's Human Development Index (one is the highest), based on health, wealth and education. By 2022 it had climbed to 0.716, ahead of Morocco.

The share of imports that come from Israel has fallen from 79% in 1995-99 to 57% in 2022, making the West Bank less dependent on Israeli inputs. On the ground and at international forums like the World Economic Forum in Davos, the PA has acquired institutional heft. In May it marked 30 years in existence. Its tenacity in the face of adversity has heightened its aspirations. "The jacket [of Oslo] no longer fits us," says Husam Zomlot, the Palestinian ambassador in London. But 30 years after Oslo, the would-be state faces glaring problems: a faltering economy, territorial fragmentation, lack of security and autocracy.

Start with the economy. With a GDP of around \$18.6bn in 2023 the Palestinian territories are the world's 127th biggest economy. In areas of the West Bank under the PA's control income per person is 43% of the global average, on a par with Iraq. There are islands of prosperity. In Ramallah, the seat of government, gated communities and shopping complexes abound and plenty of new houses and apartment blocks have risen up. And however flawed the PA has been, its economic performance far exceeds Hamas's in its besieged enclave of Gaza. On the eve of Hamas's attack on October 7th, incomes per person in the West Bank were five times higher than those in Gaza. Unemployment in the third quarter of 2023 was 13% in the West Bank, compared with 45% in Gaza.

Yet for all that, the economy is fragile and dominated by Israel. In a report before the October 7th attacks the IMF described a "fiscal crisis" in which the PA was massively in arrears. The Palestinian territories recorded a current-account deficit of around 12% of GDP, with imports far exceeding formal exports.

The Palestinian economy depends heavily on Israel. Though the PA has improved its own tax collection, some 8% of its 15bn shekels (\$4bn) of annual revenue comes from foreign aid and 67% comes from taxes that Israel gathers on its behalf. About 90% of exports go to Israel and more than 180,000 Palestinians, around 23% of the West Bank's workforce, were employed there before October 7th. After the Hamas attack Israel cancelled almost all the work permits previously granted to



Palestinians, suspended the transfer of tax revenue and tightly restricted movement out of and within the West Bank. "It's the Palestinians' worst economic crisis since 1967," says Yitzhak Gal, an Israeli economist. To these immediate hits should be added the costs of rebuilding Gaza, which the UN reckons could be \$40bn (estimates vary widely), and providing for its people. Foreign donors may pay for much of this. Even so, the PA's finances might buckle if it were to assume responsibility for Gaza.

Security is just as bad. The PA has survived in part because Israel needs it to. In 1987, when the Palestinians unleashed their first intifada, Israel had to send in lots of troops to suppress the unrest. For most of the past three decades, however, the Palestinians have largely policed themselves and maintained order in the West Bank.

### Unsteady state

Yet if one definition of a state is determined by whether it has defined borders and a monopoly on the use of force within them, then the PA may be further away from statehood than it was in the years after Oslo. The number of Israeli settlers living in the West Bank and East Jerusalem has risen from roughly 250,000 to about 695,000 today. Maps show the West Bank is far more densely peppered with settler outposts. Palestinians are cut off from East Jerusalem, their putative capital, and from Gaza. They are splintered by Oslo's division of the West Bank into Areas A, B and C (see map), denoting differing levels of control by Israel and the PA. "They're increasingly fragmented into bantustans," says Alon Cohen Lifshitz, director of an Israeli planning watchdog, Bimkom, referring to the nominally self-governing territories under apartheid in South Africa.

Since the Hamas attack last October, Israel has killed over 500 Palestinians in

the West Bank and Israeli checkpoints have stifled movement around Palestinian cities. Journeys that should take half an hour can take three. Israel has suspended security co-ordination with the PA. And increasingly Israel treats Area A, where the PA is supposed to have full control, as if it were Area C, where Israel has it. Israel regularly sends troops on raids into cities such as Ramallah and Jenin to suppress militant groups the PA has struggled to control, including those loyal to Hamas. Palestinians say these raids are intended to weaken the PA's hold and erode public confidence in it.

Then there is the PA's autocratic leadership. Superficially the political system is stable and looks more or less legitimate. "Of course partial occupation is better than full occupation," says a Palestinian official. Many appreciate the sense of order that the PA brings. Yet there is a vast lack of accountability and the legitimacy is questionable. In November Mahmoud Abbas, the supine 88-year-old Palestinian president, will have ruled for 20 of the PA's 30 years. Under Mr Abbas, Fatah, the main faction in the West Bank, forsook the violence of the second intifada.

Yet Mr Abbas has turned a fledgling democracy into a dictatorship. In 2006, a year after he was elected president, he held a parliamentary election which Hamas won (getting 44% of the vote to Fatah's 41%). But he dismissed a Hamas-led government, dissolved parliament and has postponed all subsequent elections ever since. He has purged his institutions of critics and has repeatedly rejected proposals for a national unity government, which might have reunified Gaza and the West Bank, for fear that a deal with Hamas might cost him Western support. Detractors dub the PA "*al-amila*", the agent [of Israel].

Years of autocratic rule have entrenched cronyism. "Fatah has become a company," says a journalist in Ramallah. Corruption erodes public support. The PA pays its bills selectively and stuffs its administration with party cadres. Lamis al-Alami, a former education minister, says she sacked thousands of politically appointed teachers. After she left office, she says, they promptly resumed their posts.

Since the attacks of October 7th there have been changes. In March Mr Abbas appointed a new prime minister, Mohammad Mustafa, a former economics adviser. But America has backed away from trying to force Mr Abbas to surrender some of his powers to his prime minister and government. The prospect of elections is remote. Mr Abbas and his Arab and Western backers are wary of democracy in the West Bank. In a survey published on June 12th by PSR, a Palestinian research body, only 8% of West Bankers say they have been satisfied by Mr Abbas's performance in this war; 94% want him to resign. Some 41% of

▶ respondents say they support Hamas, a notably higher share than before the war, compared with 17% who support Fatah.

The economic fragility, insecurity and political weakness of the PA suggest it would be able to play a limited role in Gaza if asked to take control immediately. It retains a presence in Gaza's hospitals and runs its registry of births and deaths. It has 37,000 employees on its Gaza payroll, including 19,000 in the security forces, though most have stayed at home for almost two decades under Mr Abbas's orders not to co-operate with Hamas. The PA mulls plans to train thousands of security people in Jordan and send them to Gaza. But neither Israel nor Hamas has included the PA in ceasefire negotiations or in providing aid. When the PA tried to distribute supplies independently of Hamas, six of its men were killed.

The bigger question for many Palestinians is not whether the PA can reimpose its rule in Gaza, but whether it can survive in the West Bank without a political horizon and faced with Israel's intransigence. Israelis have steadily become more hostile to Palestinian rights. In May Pew, a pollster, found that only 26% of Israeli adults said the Jewish state could coexist peacefully with a future Palestine state, down from 50% a decade ago.

For some Palestinians the status quo is a lesser evil than provoking their foes. "It's not the time for resistance," says the owner of a new café in the West Bank city of Nablus who was once a militant. "We'd just give the settlers an opportunity to destroy what we've built." For others, though, the attractions of violence are rising. "If the result of peaceful resistance is continued occupation, then we should reconsider our options," says one of Ramallah's biggest businessmen. "It's the first time anyone forced Israel back from the border and got 200 soldiers to surrender," says an Abbas loyalist of the Hamas attack. The target of violence could be Israel, the settlers or the PA. And the latest impulses of the Palestinian electorate are alarming. A recent PSR survey found that 62% of West Bankers favoured an armed struggle. Two-thirds of Palestinians thought the Hamas attacks were "correct"; 91% denied that Hamas had committed atrocities against civilians.

Some inside Fatah have considered marching on Mr Abbas's fortress in Ramallah to topple him. Jihadist notions of *takfir*, or excommunication, are gaining ground, says a former member of Islamic Jihad, a militant faction, in Nablus. Some *shabab* (young men), he says, are swayed by the idea that the PA is an apostate regime. So they refuse to pay taxes and they clash with the security forces. Small groups are plotting attacks on Israel and its settlers.

If violence is one way for Palestinians to disrupt the status quo, another is diploma-

cy and, in particular, the calls for the immediate international recognition of a Palestinian state. Though three-quarters of the world's countries have recognised Palestinian statehood, America and most main European powers have not. One argument for recognition is symbolic. Governments also argue that by signalling support for the two-state plan they can prevent extremists on both sides from killing off a two-state settlement. It is less plausible that recognition will have any immediate effect on the ground.

### State of change

Michael Sfar, an Israeli lawyer, sees little changing. "Recognition of Palestine doesn't end the occupation or change the validity of the Oslo accords," he says. Yet others think it would have rapid effects, including on the settlers. "All nationalities including Israelis would have to apply to live in our state and abide by our laws. This can't happen as a *fait accompli*," says Mr Zomlot. "The resources—land, water, minerals—are taken from our state and must be taxed." With clearer legal sovereignty, Palestinians could seek to tap their own resources, like offshore gas, and sign defence pacts. Some argue a new state could even seek to take control of the border crossings with Jordan and Egypt.

Yet the interconnectedness of Israel with its settlements and the West Bank means that a unilateral act of separation could be incendiary, provoking an Israeli response. "If the UN [Security Council] recognises a Palestine state, the Oslo accords would be rendered irrelevant because they deal with something less than a state," says Itzik Bam, a settler lawyer and ally of Bezalel Smotrich, Israel's ultranationalist finance minister. "We'll stop transferring tax money that we collect for you, cancel all your VIP cards for freedom of movement and watch you collapse."

As the war in Gaza drags on, the prospect of a Palestinian state is at once more relevant than ever and yet more distant. Trust on both sides has been shattered by the Hamas attacks and the Israeli response. The path towards statehood would require new leadership of the PA (or a successor organisation) and the rebuilding of its democratic credentials; a plan for what to do in Gaza when Israel's invasion ends and for its reunification with the West Bank; and a new centrist government in Israel ready to negotiate an end to the conflict with the Palestinians. Outsiders would have to apply heavy pressure on both sides to work towards an agreement. Israel and the Palestinians would have to compromise. The notion of a democratic Palestinian state alongside Israel is still a dream. But the alternative, of ceaseless Palestinian atrophy, is one that offers the region only misery, extremism and war. ■

## War in the Middle East

# A border ablaze

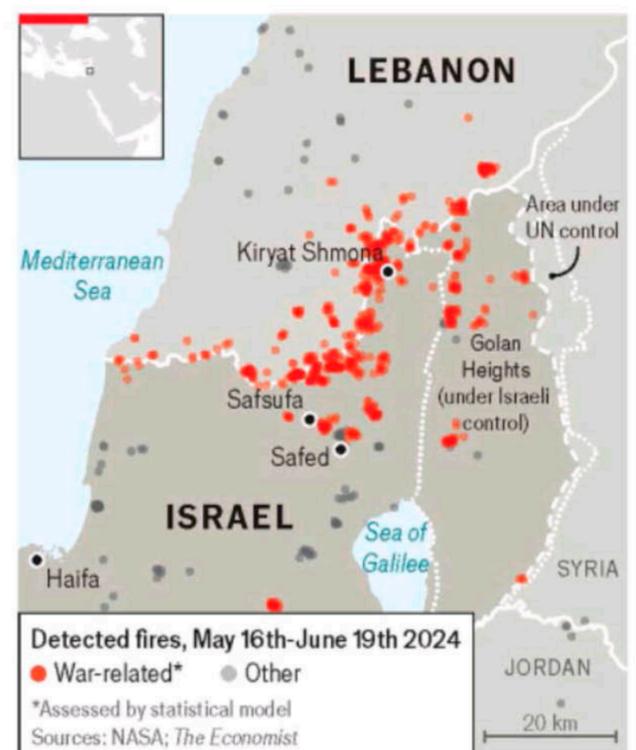
KIRYAT SHMONA

## Can Israel fight Hamas and Hizbullah simultaneously?

RED BANNERS that hang across bridges above the main roads leading north in Israel contain one word: "Abandoned". It is repeated by the few residents remaining in the near-deserted towns and villages near the border, which have been under fire for eight months from Hizbullah, the Iran-backed movement that controls much of Lebanon. It is also an accusation levelled at the government of Binyamin Netanyahu, Israel's prime minister, which has failed to find a way to stop the barrage of missiles and drones that Hizbullah began firing on October 8th, the day after Hamas's attack on Israel. Hassan Nasrallah, the leader of Hizbullah, recently vowed to continue the attacks, insisting that his group is a "support front" for Hamas.

"We're like ducks in Nasrallah's shooting-range," says Gidi Sayada, a winemaker from Safsufa, a village that has not been evacuated. "My daughters have been sleeping in the safe-room of our house for the past eight months." Hizbullah has shelled mainly targets close by the border and military bases. Israel has responded with targeted strikes on Hizbullah people, in some cases deep inside Lebanon.

Though neither side has unleashed anything near its full arsenal, the cross-border fire has increased since mid-May and last week reached its most intense level since the start of the war. Using data from a NASA satellite system and a machine-learning algorithm to track war-related fires, *The Economist* has counted the number of strikes occurring on both sides of



▶ the border (see map and chart). In the week ending on June 16th there were 640 such strikes, 254 of them on June 13th alone.

Though a measure of calm has returned in recent days, perhaps due to Eid al-Adha, a Muslim holiday, the fighting has upended lives in Lebanon and Israel. Early in the war Israel evacuated people living within 2km of the border. Some 60,000 have yet to return. Across the border in southern Lebanon more than 90,000 have also fled.

In numerical terms, Israel has caused more damage to Hizbullah, killing over 300 of its operatives during this period as well as around 100 civilians; 28 people have been killed in Israel. On June 12th an Israeli air strike killed Taleb Sami Abdallah, a senior Hizbullah member in command of its forces in southern Lebanon. But these strikes have not lessened the desperation among Israelis in the north.

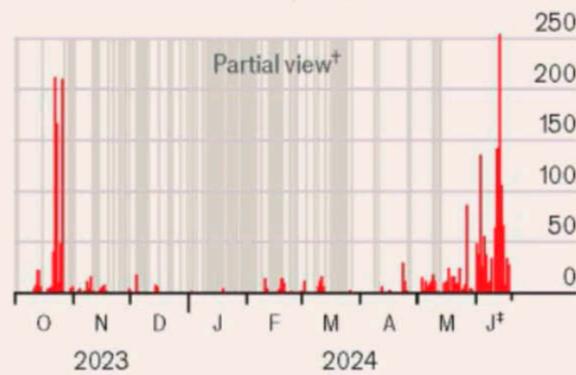
The continuing bombardment and the evacuation of civilians in Israel are leading to increasing calls for Mr Netanyahu's government to act more forcefully against Hizbullah. "It's hell here right now, so we may as well have an all-out war with Lebanon," says Danielle Levy, an exhausted police volunteer from Safed. This is a sentiment widely heard in the region. The political pressure on Mr Netanyahu is particularly intense because many of the civilians most affected are among his core supporters. In Kiryat Shmona, the largest border town, three-quarters of the electorate voted for Likud, Mr Netanyahu's party, or its allies in the last election, but it is now impossible to hear a good word said about the prime minister. "We're totally abandoned and the government are a bunch of muppets," says Shimon Maimon, a retired painter. The prime minister is also being pressed by his far-right coalition partners to escalate. But for now the leaders on both sides want to avoid all-out war.

Still, with the fighting in Gaza being scaled down, some Israel Defence Forces (IDF) units have been redeployed to the north where they are preparing for a ground offensive against Hizbullah. On June 18th the IDF announced that its general command had "authorised operational plans for an offensive in Lebanon". In such a scenario Israel would seek to occupy a "security zone" that would put northern communities out of range of some of Hizbullah's missiles. But a ground incursion would almost certainly trigger a fiercer response from Hizbullah, which would probably launch long-range missiles that could hit targets deep within Israel. To prevent this, Israel might strike the missile-launchers and Hizbullah's headquarters first, many of which are in civilian areas. Heavy civilian casualties in both Lebanon and Israel are a certainty in such a war.

Israel's American allies have been urging it to hold fire. Amos Hochstein, an ad-

### Rapid fire

Number of war-related fires\* in selected areas of Israel, Lebanon and Syria



\*Detected by satellite and assessed by statistical model

<sup>†</sup>Cloud cover over 50% <sup>‡</sup>To June 19th

Sources: NASA; The Economist

viser to President Joe Biden, has been trying to craft a ceasefire between Israel and Hizbullah. Mr Netanyahu seems open to this idea, though he is less keen on agreeing to stop fighting in Gaza.

Israeli generals insist that the IDF can fight on two fronts. But they admit that doing so would drastically stretch the army. "To take over southern Lebanon we'll need a lot more troops, but meanwhile most of the units are in or around Gaza," says one reserve commander who has been on exercises preparing for such an operation. "The plans feel incomplete."

The IDF would like to pause the war against Hamas, preferably through a ceasefire that would also secure the release of the 120 hostages still in Gaza. But a truce in Gaza would probably prompt Hizbullah also to stop firing. That would leave Israel's leaders with the dilemma of whether to start a new war to push the group away from the border or to allow it to remain in a position to threaten Israeli communities.

The consensus within Israel's security establishment is that war with Hizbullah is inevitable. But increasingly the view among the generals is that it should not take place soon. Major-General Yitzhak Gershon, who served recently as the second-in-command of the northern front, published an article on June 13th saying that although he had been in favour of attacking Hizbullah immediately on October 7th, he had since changed his mind.

"Israel should be headed to a diplomatic arrangement, not war, at this time," he wrote, adding that its strategy in the past eight months had amounted to a "mad run with the head into a wall". The country, he argued, needs a ceasefire in both Gaza and Lebanon in order to take stock, elect a new government and regroup. "We should choose the timing [of any war]," says one veteran intelligence analyst, "and not be dragged into it by Nasrallah." ■

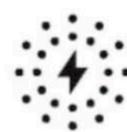
### Africa shining

## The light continent

CAPE TOWN

Private firms are driving a revolution in solar power in Africa

### SOLAR SPECIAL



AFRICAN POVERTY is partly a consequence of energy poverty. In every other continent the vast majority of people have access to electricity. In Africa 600m people, 43% of the total, cannot readily light their homes or charge their phones. And those who nominally have grid electricity find it as reliable as a Scottish summer. More than three-quarters of African firms experience outages; two-fifths say electricity is their main constraint. If other sub-Saharan African countries had enjoyed power as reliable as South Africa's from 1995 to 2007, then the continent's rate of real GDP growth per person would have been two percentage points higher, more than doubling the actual rate, according to one academic paper. Since then South Africa has also had erratic electricity. So-

called "load-shedding" is probably the main reason why the economy has shrunk in four of the past eight quarters.

Solar power is increasingly seen as the solution. Last year Africa installed a record amount of photovoltaic (PV) capacity, notes the African Solar Industry Association (AFSIA), a trade group, though this still made up just 1% of the total added worldwide. Globally most solar PV is built by utilities, but in Africa 65% of new capacity over the past two years has come from large firms contracting directly with developers. These deals are part of a decentralised revolution that could be of huge benefit to African economies.

Ground zero for the revolution is South Africa. Last year saw a record number of blackouts imposed by Eskom, the state-run utility, whose dysfunctional coal-fired power stations regularly break down or operate at far below capacity. Fortunately, as load-shedding was peaking, the costs of solar systems were plummeting. Between ▶▶

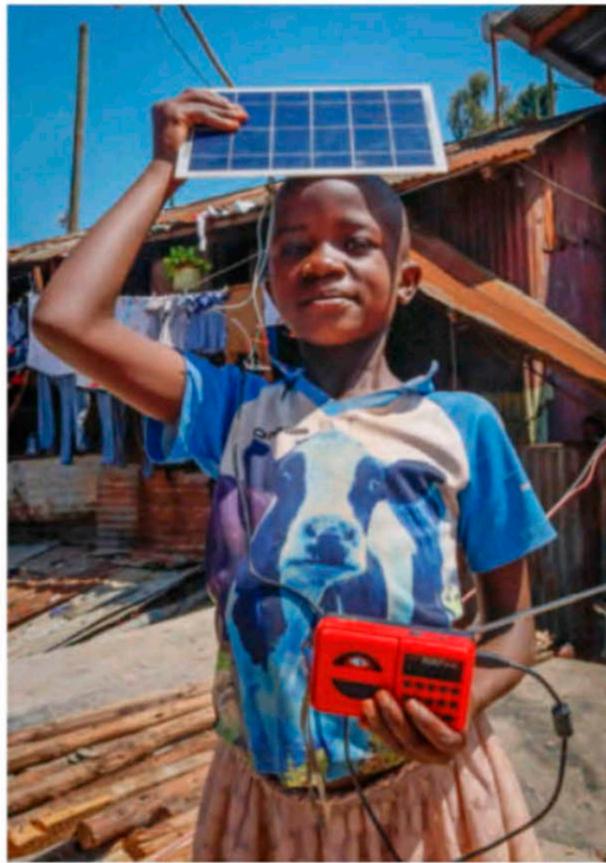
► 2019 and 2023 the cost of panels fell by 15%, having already declined by almost 90% in the 2010s. Meanwhile battery-storage systems now cost about half as much as five years ago. Industrial users pay 20-40% less per unit when buying electricity from private project developers than on the cheapest Eskom tariff. In the past two calendar years, notes AFSIA, the amount of solar capacity in South Africa rose from 2.8GW to 7.8GW, excluding that installed on the roofs of suburban homes. Altogether South Africa's solar capacity could now be almost a fifth of the capacity of Eskom's coal-fired power stations (albeit those still have a higher "capacity factor", or ability to produce electricity around the clock). The growth of solar is a key reason why there has been less load-shedding in 2024.

Other Africans point out that they have had load-shedding for much longer than South Africans. About half of African firms rely on diesel generators; in Nigeria their capacity is almost four times what the grid can reliably supply. But change is afoot: nearly two-thirds of mines in sub-Saharan Africa produce renewable energy or are in the process of installing renewables. In a symbolic acquisition in 2022, Shell, an oil giant present in Nigeria since 1937, bought Daystar Power, a startup that has provided solar-power systems to many large domestic businesses. The phasing out of petrol subsidies in Nigeria last year has further accelerated a shift to cleaner energy.

Over the past decade the number of startups providing "distributed renewable energy" (DRE) has grown at a clip. Industry estimates suggest that more than 400m Africans get electricity from solar home systems and that more than ten times as many "mini-grids", most of which use solar, were built in 2016-20 than in the preceding five years. In Kenya DRE firms employ more than six times as many people as the largest utility. In Nigeria they employ as many people as the oil and gas industry.

"The future is an extremely distributed system to an extent that people haven't fully grasped," says Matthew Tilleard of CrossBoundary Group, a firm whose customers range from large businesses to consumers. "It's going to happen here in Africa first—and most consequentially."

Ignite, which operates in nine African countries, has products that range from a basic panel that powers three light bulbs and solar-powered irrigation pumps to stoves, internet routers and industrial systems. Customers use mobile money to "unlock" a pay-as-you-go meter. Yariv Cohen, Ignite's CEO, reckons that the typical \$3 per month spent by consumers is less than what they previously paid for kerosene and at phone-charging kiosks. He describes how with electric lights farmers are more productive and children are getting better test scores because they study under bulbs.



Seizing power

One family in Rwanda used to keep their two cows in their house because they feared rustlers in the dark; now the cattle snooze *al fresco* under an outside lamp and the family gets more sleep.

In April the World Bank and the African Development Bank launched a flagship scheme to expand electricity access in sub-Saharan Africa to 300m additional people by 2030. The World Bank suggests that under its most cost-effective scenario roughly half of those would be connected via off-grid, DRE systems. But since the costs of solar kits are still prohibitively expensive for some of the poorest people in the world, the bank and donors are planning to subsidise the upfront costs in remote rural areas. The bet is that this, together with more policy certainty from governments (around, say, repatriation of profits and future plans for the grid), can bring in more private investment.

Yet there is a limit to how much can be done by avoiding legacy utilities. The World Bank reckons that the most cost-effective way to electrify the other half of its 300m target is by extending existing grids. Many African utilities have monolithic structures, meaning they control the generation, transmission and distribution of electricity—long "unbundled" in other parts of the world. Most are, in effect, insolvent. More than half in sub-Saharan Africa cannot cover their operating expenses, partly because governments insist on setting tariffs below the cost of supply.

The spread of solar may make things even worse for them. Some analysts suggest Eskom could enter a "death spiral" as its best customers go off-grid. Other utilities are perhaps even more vulnerable. Kenya Power receives 54% of its revenues from roughly 700 entities, less than 0.01%

of its total customers.

A few utilities are changing with the times. That in Namibia, one of the sunniest countries, last year made it easier for private producers to sell electricity into the regional power pool. It sees its future role as more of a platform for the buying and selling of electricity than as a generator and distributor. But others are resisting change. Senegal, Mozambique and Tanzania, for instance, still tangle up DRE firms in red tape. Other countries are hoping that the "geopolitics of solar" will mean that foreign powers seeking influence in Africa will pay to build the solar plants that their bankrupt utilities cannot otherwise afford, argues one industry veteran. In May Mali, which last year welcomed the Wagner Group of Russian mercenaries, announced that a subsidiary of Rosatom, a Russian energy giant, would build west Africa's largest solar plant. It is hard to see any purely commercial investor having gone for such a project.

That is one eye-catching aspect of Africa's solar revolution. But most of the continent is undergoing a more subtle—and significant—experiment in decentralised, commercially driven solar power. It is a trend that could both transform African economies and offer lessons to the rest of the world. ■

## South Africa

# A new era

CAPE TOWN

## A national unity government can save democracy and the economy

DESMOND TUTU once wrote that "we in South Africa...sell ourselves short." In a country with many problems it is easy to forget its "remarkable achievements", argued the late Nobel peace laureate. He felt that the world had much to learn from the largely peaceful transition to democracy in 1994; the Truth and Reconciliation Commission he chaired that shed light on the darkness of apartheid; and the forgiveness of ordinary black people scarred by decades of white rule.

If Archbishop Tutu were still alive, he might have added the events of June 14th to his list of feats. Members of parliament re-elected Cyril Ramaphosa as South Africa's president at the head of a "government of national unity". The coalition, anchored by Mr Ramaphosa's African National Congress (ANC) and the erstwhile official opposition, the Democratic Alliance (DA), was necessitated by the results of elections held on May 29th. The ANC won just 40.2% of the vote, depriving it of its parliamenta- ►►

ry majority for the first time. To gain the support of most MPs Mr Ramaphosa could have joined with dangerous populist parties. Instead he and his new partners have swiftly opted for a government that adheres to the values of the 1994 settlement and has a chance of overseeing vital reforms. Its formation reflects well on the rainbow nation's fledgling democracy.

The outcome was not inevitable. In the aftermath of the result, many figures in the ANC were against a deal involving the DA, which won 21.8% of the vote. Gwede Mantashe, the powerful party chair, reportedly preferred a tie-up with a few smaller parties and the "devil we know": the Economic Freedom Fighters (EFF), a race-baiting hard-left party run by former leaders of the ANC's Youth League, which won 9.5%. Others wanted to work with uMkhonto weSizwe (MK), a new party led by the former president, Jacob Zuma, which won a stunning 14.6%.

In characteristic style, Mr Ramaphosa trod carefully. On June 6th, after a meeting of the ANC's main decision-making body, he announced that the party had chosen to form a government of national unity—and would talk to every major party about potentially joining. At first this seemed a ludicrous case of Mr Ramaphosa trying to have his cake and eat it. Negotiators from other parties joked that the president was leaving it to his opponents to decide on the coalition on his behalf.

If that was the case, it worked. Both MK and EFF made such unreasonable demands that, in effect, they ruled themselves out. The EFF wanted the finance ministry and insisted it would not be part of the same government as the DA, which its deputy leader suggested was a puppet of the "white capitalist establishment". MK, which has been spouting Trumpian lies about the election being rigged, demanded Mr Ramaphosa's resignation—a stipulation the ANC quickly ruled out.

Mr Ramaphosa was probably relieved by the hubris. He could tell his caucus he had at least tried to talk to the populists. But while he never publicly stated his preferences, they were strongly implied. After the ANC meeting he spoke of coalition partners needing to respect the constitution (ruling out at least MK, which wants to ditch the "colonial" document) and non-racialism (excluding at least the EFF, whose leader has spewed vitriol against whites and Indians). In a newsletter sent on June 10th he wrote of the importance of Operation Vulindlela, a presidential initiative to accelerate market-friendly reforms. It was an unobvious nod: by this point DA negotiators had already highlighted the same scheme as a priority.

To its credit the DA was conscious of the time constraints (the vote for president took place just 12 days after the election re-

sults were formally announced, a 54th of the time it took Belgium to form a government in 2018-20) and the gravity of the moment. Rather than get bogged down in policy detail or demand specific cabinet jobs, the DA focused on ensuring it would not be railroaded by the ANC. A coalition agreement hammered out just before this crucial vote stipulates that government decisions need the support of parties with 60% of seats in parliament. In effect this gives the ANC and DA a veto. Another clause ensures that Mr Ramaphosa will have to assign seats in his cabinet roughly in accordance with the vote shares of the coalition partners.

### Warrior deal

The third key partner is the Inkatha Freedom Party (IFP), a Zulu nationalist party but one that believes in democracy and the constitution, unlike MK. The involvement of the party, which won just 3.9% of the national vote, in the coalition is an important nod to the interests of Zulus, the country's largest ethnic group. Velenkosini Fiki Hlabisa, the IFP's leader, may get a prominent cabinet job. On June 12th he spoke of how the coalition could also heal wounds between his party and the ANC; the two fought an undeclared civil war in the early 1990s that killed thousands. For the ANC the presence of the IFP and a few tiny parties in the government is crucial as it makes the coalition look less like just a tie-up between it and the DA, which some of its base see as a "white party".

The ANC, IFP and DA have also agreed to work together in the two largest provinces, Gauteng and KwaZulu-Natal, after no party gained a majority in regional elections. In KwaZulu-Natal, where MK won 45.4% of the vote, the coalition will have a



Thanking his lucky stars

wafer-thin majority: parties other than MK and EFF have 41 of the 80 seats.

There is much that could go wrong. There will be tensions within the administration. Moderates in the ANC share many of the same goals as liberals in the DA. But they come from different political cultures: the former sees itself as a movement, the latter more like a Western political party. And they will not see eye to eye on issues such as race-based policies. There is also the risk that the sheer dysfunction of the state will make it hard for even well-meaning ministers to get results.

Then there are the challenges from outside the government. MK and EFF will argue that—like 1994—this is a shady deal cooked up by black and white elites who are the puppets of big business. Julius Malema, the EFF's leader, said he would work with MK to oppose the new government. He called the DA "Zionists" and the "enemy". Mr Zuma is showing himself to be a Zulu Robert Mugabe, implying that his backers will turn violent unless "satisfied" with the election. In KwaZulu-Natal, the epicentre of mass unrest in 2021 encouraged by Mr Zuma's henchmen, the police must be vigilant. Even if things are peaceful, Mr Zuma will want to destabilise the fragile coalition that will run the province.

Mr Ramaphosa will have the hard task of keeping the support of the ANC. Some in the party blame him for its disappointing election result. Without a majority he has fewer cabinet jobs with which to buy loyalty. If his government's policies threaten the interests of important constituencies, such as civil servants and trade unions, he will come under pressure. Since he is expected to step down as party leader at the next major ANC conference, probably in 2027, senior figures will be biding their time before trying to nudge him out of the presidency, too.

The DA will have to square its participation with its base. At present it can make a convincing case that keeping EFF and MK out of power is worth it. But as time passes, that threat will fade. If the DA does badly in its stronghold of Cape Town in local elections due in 2026, the party might have second thoughts.

Yet all these potential pitfalls are for the future. Whatever happens next, the incoming government has already achieved something profound: it has kept Mr Zuma and the EFF away from power. This coalition may not be imbued with the optimism and idealism of the one Nelson Mandela ran with his former enemies from 1994 to 1997. But it is also impressive proof that there is a pragmatic and principled centre in South African politics. Thirty years after the end of apartheid in 1994, the Rainbow Nation has shown it still has lessons for the rest of the world in how to handle a multi-ethnic democracy. ■

# Britain



## The general election

# Labour's great expectations

GILLINGHAM

**The Conservative Party rules the Thames Estuary. Not for much longer**

ON THE EVENING of June 13th, St Margaret's Church in Rainham was packed. At a long table in front of the altar, six would-be MPs answered locals' questions about schools, homelessness and the state of the high street. The Labour Party went through the church beforehand, putting leaflets on every pew, like orders of service. But despite the presence of so many voters and a TV camera, the Conservative candidate and sitting MP for Gillingham and Rainham, Rehman Chishti, did not turn up. He skipped another hustings four days later. If he loses the seat on July 4th, it will be partly for lack of trying.

Sir Keir Starmer launched Labour's election campaign in Gillingham, east of London in the Thames Estuary. He pronounced the name correctly (the first G is soft) and cracked a lame joke about the local football team. A constituency poll for *The Economist* by WeThink suggests he will be amply rewarded. It puts Labour on 55%, the Conservatives on 23% and Reform UK, an anti-immigration party, on 15% (see chart on next page). If there is a glimmer of

hope for the Tories, it is that many undecided voters plumped for them in 2019.

That Labour has any chance is extraordinary. Mr Chishti won 61% of the vote in 2019, against only 28% for Labour. Gillingham and Rainham is part of an almost solid block of Tory seats east of London (see map). But this part of England has seen violent political swings before. Its willingness to abandon the Tories this year points to a problem with the government's regional strategy. It also hints at a change in the politics of immigration.

The Thames Estuary is not, to put it po-

lately, the prettiest corner of England. Things that London needs but does not want end up there: power stations, wind farms, sewage-treatment works. Its flat grey-brown marshes are filled with rotting boats and a rare creature known as a tentacled lagoon worm. The opening scene in Charles Dickens's novel "Great Expectations", in which Magwitch emerges from the marsh to terrify Pip, is set in the seat next to Gillingham and Rainham.

Its abiding appeal is cheapness. Property values drop quickly as you travel east from the capital. Semi-detached houses go for £346,000 (\$440,000) in the Medway local authority area compared with £640,000 in London, according to the Office for National Statistics. As the expectation of commuting five days a week crumbles, city workers are drifting out. Spencer Fortag, the director of Dockside estate agents, says that about half of the buyers in Kitchener Barracks, a new housing development just west of Gillingham, are Londoners.

The Thames Estuary is a place without snobbery, where you can refashion yourself superficially or profoundly. Gillingham is not short of nail and tanning salons, and it contains so many barbers that some of the candidates in St Margaret's mused about limiting the numbers. Modified cars roar along the roads. Mr Chishti, who was born in Pakistan, talks about arriving at the age of six with only a few words of English, and succeeding through education.

This rootless, ambitious culture might ►►

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**54 What taxes will Labour raise?**

**55 The battle against poverty**

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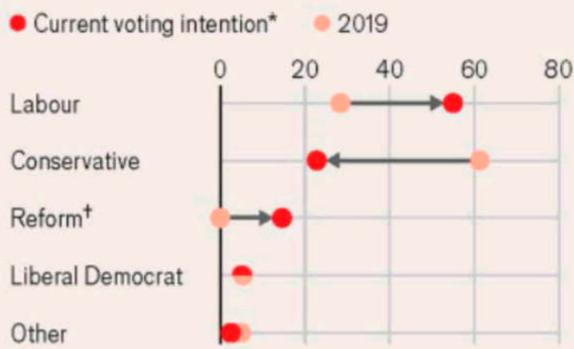
→ Read more at: [Economist.com/Britain](https://www.economist.com/Britain)

— Death and salmon

— Jeremy Corbyn, politician and poet

**Gills and spills**

Gillingham and Rainham constituency, general-election vote share, %

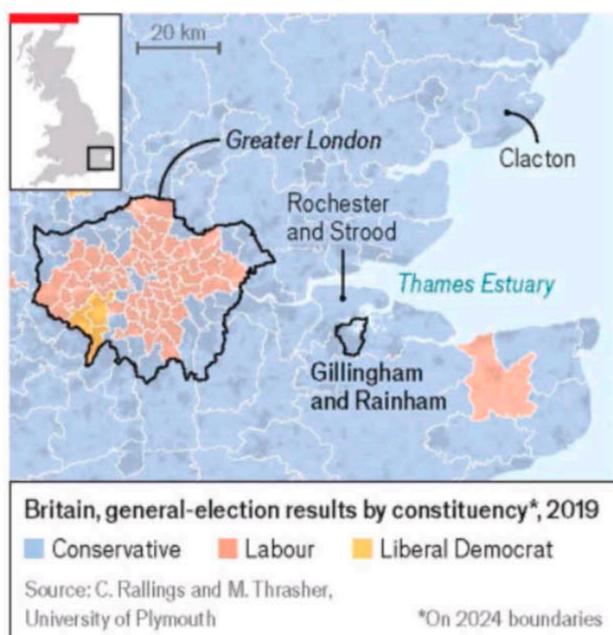


\*Face-to-face constituency poll of 376 people conducted June 4th-16th 2024. Weighted by likelihood to vote. People responding "don't know" (18% of sample) removed  
<sup>†</sup>Brexit Party in 2019  
 Sources: House of Commons Library; WeThink; The Economist

explain something about the politics of the area. Gillingham voted for Labour when it was fashionable, in 1945 and 1997. As the country moved right after the millennium, so did local voters, but more enthusiastically than elsewhere. A forthcoming book by Jamie Furlong and Will Jennings, "The Changing Electoral Map of England and Wales", describes the Thames Estuary as peculiarly Conservative—more than you would expect from looking at things like its age profile and the jobs people do. It is like the rest of England, only more so.

Now it is poised to lurch again. Labour's candidate, Naushabah Khan, argues that the government has ignored pockets of deprivation in the constituency: "They think it's affluent because it's in Kent." Mr Chishti has said much the same. When the constituency failed to win "levelling up" funds last year, he questioned whether the process was fair. The Conservatives' ostentatious showering of money on northern English towns has left southerners wondering where their share is.

Another unusual thing about the estuary is how fast its population is changing. Of the five local authorities in England and Wales where the proportion of white Britons declined most between the censuses of 2011 and 2021, three abut the River



Thames. Jason Warner, a teacher who works for a charity called Medway Culture Club, says that local schools are far more diverse than the overall population, partly because ambitious black and Asian parents in suburban London send their children to Kent's selective grammar schools.

Gareth Harris and Eric Kaufmann, two political scientists, have argued that white Britons' anxieties about immigration and ethnic change often take the form of a "halo effect". Those who live in ethnically diverse areas are relaxed; those who live in more homogeneous areas nearby are not. They may express their anxieties by voting for parties to the Conservative Party's right: the British National Party (BNP), the UK Independence Party (UKIP), the Brexit Party and now Reform UK.

As the Thames Estuary grows more mixed, the zone of anxiety seems to be concentrating to the east. Two decades ago the BNP won 12 council seats in Barking and Dagenham, in east London. A decade ago UKIP won a by-election in Rochester and Strood, next to Gillingham and Rainham. Now Nigel Farage of Reform UK pins his hopes on Clacton, on the coast north-east of the estuary. Anti-immigration fervour, like silt, has piled up downriver. ■

**How would Labour govern? (1)**

**Fiscal hole: needs filling**

**Growth is the priority. But expect more borrowing and taxes, too**

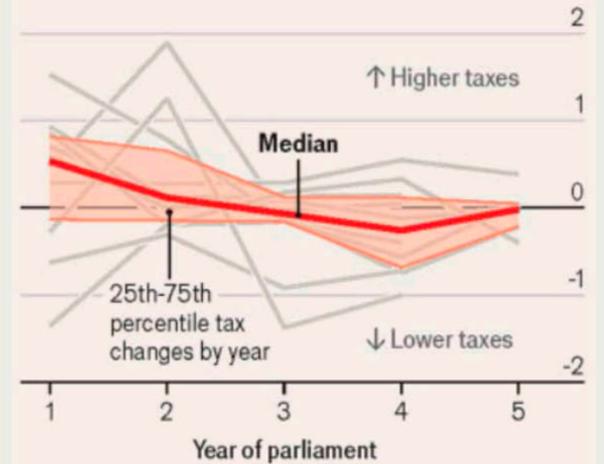
TO WIN BIG in general elections, the Labour Party needs to convince fretful voters that it can be trusted with the economy. Clement Attlee sold post-war nationalisations with the mien of a staid bank manager. Ahead of the party's landslide win in 1997, New Labour pledged to copy years of restrictive Tory spending targets. Rachel Reeves, the shadow chancellor, has adopted a similar tactic ahead of Labour's widely expected election win on July 4th.

Barring a few titbits of extra spending—worth around £10bn (\$12.7bn, or 0.4% of GDP) annually and funded by taxes on private schools, home purchases by foreigners and the like—she wants to stick to plans set out by Jeremy Hunt, the chancellor, in March. She has also committed herself to the fiscal rule that government debt must be projected to fall as a share of GDP in the fifth year of five-year forecasts from the Office for Budget Responsibility (OBR), a watchdog.

Squaring that with Labour's pledge not to return to austerity will be tricky. The commitments that New Labour inherited

**Downing Street, upping taxes**

Britain, net impact of tax changes, % of GDP  
 By parliament, 1979-2024



Sources: Office for Budget Responsibility; The Economist

were a squeeze; those that Ms Reeves has signed up to are suffocating. They imply hefty real-terms cuts to frayed courts, policing and local government. The Institute for Fiscal Studies (IFS), a think-tank, reckons that it would cost around £30bn extra annually by 2028 to prevent them.

Labour says that growth, not tax, is the answer. But it takes time for growth-enhancing policies to have an effect and the OBR's GDP projections are already bullish compared with those of other forecasters. Falling interest rates could also help a little by pulling down debt-servicing costs. Year-on-year inflation stood at 2% in May, back in line with the Bank of England's (BoE's) official target. The IFS estimates that a one-percentage-point decline in gilt yields would boost fiscal headroom by £12bn. But rates will not reliably fall.

That leaves two other options: more borrowing or higher taxes. Labour is likely to opt for a bit of both. Britain's fiscal rules are pretty loose for those willing to stretch them. The binding fiscal rule governs borrowing only in the last year of the OBR forecast. A short-term borrowing spree spent on public investment would comply with the rules Ms Reeves has committed to. A more radical option would be to change how the BoE books its quantitative-easing (QE) losses, which are projected to cost around £20bn per year until 2032. Most rich countries realise them more gradually, reducing their fiscal impact.

Still, too large a borrowing splurge would be foolish when interest rates are so high. Labour will also be especially wary of denting its aura of fiscal credibility. That leaves taxes. Post-election tax hikes are a well-worn political formula. Within a year of being elected British governments have raised taxes by 0.5% of GDP on average since 1979, *The Economist* calculates (see chart). That would be around £14bn today.

Small increases to broad-based taxes like income tax, national insurance or VAT would be best. But Labour has ruled out raising the headline rate of all three, as well

▶ as of corporation tax (though it may have left some room in its manifesto wording to fiddle with income-tax thresholds).

Capital-gains tax (CGT) looks a more likely target. Labour has said it has no plans to raise CGT but ruled it out firmly only for primary homes. Secrecy here has a valid economic rationale: asset-holders could cash out early if an increase were pre-announced. And there are also some grounds for raising it: capital gains are taxed at a much lower rate than salary or dividend income. But Labour should tread lightly; capital can be flighty and a high CGT rate may deter investment. Increases should also be coupled with reforms to ensure that only returns above inflation are taxed. Fully equalising CGT with income taxes, and taxing only non-inflationary gains, would raise £16.7bn annually, says Arun Advani of Warwick University.

Labour will probably opt for a jumble of smaller levies, too. "The Treasury is quite creative," says Thomas Pope of the Institute for Government, another think-tank; mandarins won't struggle to conjure up new taxes. The challenge is doing so without further distorting the economy and complicating the tax code.

Updating out-of-date council-tax valuations would be sensible but politically unpopular, as would other reforms like widening the VAT base. Labour may opt for smaller fiddles: narrowing inheritance-tax reliefs for small-cap equities, farms and the like; raising sugar taxes; or lifting tinier levies like insurance-premium tax. Stealth taxes will have obvious appeal. Income-tax and national-insurance thresholds are frozen until 2028, quietly pulling more people into higher tax bands as wages rise. Labour could well extend that freeze.

Thankfully, however, Ms Reeves has ruled out another stealth tax: tiering Bank of England reserves so that banks are paid interest on only a fraction of them. That proposal is central to the economic plans of Reform UK, Nigel Farage's populist outfit. It is in effect a tax on banks, but far more convoluted than a direct levy. It risks gumming up the transmission of monetary policy as well as turning QE into a reliable money-spinner for the Treasury.

It looks likely that a Labour government would try to muddle through with a bit more borrowing, a sprinkling of tax rises and a little trimming to spending, in the hope that growth will eventually change the fiscal picture. But it will struggle to skirt tougher choices. If Labour wants to make swift progress on improving public services and alleviating poverty (see next story), more money will be needed. And although the forces squeezing the British state—most obviously, the impact of an ageing population—have featured only sporadically in the campaign, they will be inescapable in government. ■

## How would Labour govern? (2)

# Expectation management

## Labour will struggle to fend off calls for higher spending on welfare

FOR A TASTE of the pressures that Labour will almost certainly soon be grappling with, watch a recent interview with Sir Keir Starmer on Sky News, a broadcaster. Pushed on how he would help families struggling with rising taxes and high energy bills, the Labour leader asked voters to trust his instincts: "It's about who do you have in your mind's eye?" The interviewer moved swiftly onto child poverty: could Sir Keir pledge to remove the two-child limit, which means families on benefits get no extra support beyond their second child? "I'm not going to make promises that I can't keep," he said.

Sir Keir and his shadow chancellor, Rachel Reeves, have spent years building a reputation for fiscal prudence. As a result they now face the prospect of being elected by millions of voters they are bound to disappoint. Tackling poverty would not be the only let-down but it is a good case study of how a Labour government would struggle without money. There are few more urgent causes for the party's core voters, many of whom work in public services and charities. It is the reason many activists and MPs—and several members of the shadow cabinet—got involved in politics. But the best the party can offer, at least for now, is modest change.

It is true, as Sir Keir likes to point out, that the last Labour government was successful in reducing poverty, particularly



Prudence or poverty

among children and pensioners. But that government made little progress in its first term between 1997 and 2001 because, as now, it had committed to tight Conservative spending plans. When it did start lifting people out of hardship, it was due to a booming economy spurred by global tailwinds. That allowed it to "throw money at the problem", says Mike Brewer of the Resolution Foundation, a think-tank.

The picture now is worse. The overall level of poverty, defined as households with income below 60% of the median, has hardly budged since 2010, hovering at around a fifth of the population. But poverty has deepened. There are now some 6m people "far below the standard poverty line", according to the Joseph Rowntree Foundation, another think-tank. In 2022 around 4m experienced destitution—meaning they struggled to stay warm, dry, clean and fed—more than double the figure from 2017. In another change, hardship is now predominantly experienced by those in work, often owing to high rents.

Set against this backdrop, Labour's proposals are timid. None of its five missions focuses on poverty. Its manifesto calls the mass dependence on food parcels a "moral scar on our society" but says little about fixing it. The party wants to develop an "ambitious strategy to reduce child poverty" but so far it has pledged an extra £315m (\$400m) for free breakfast clubs (around 90p per pupil per day, depending on take-up). It will review Universal Credit, a welfare payment, so that it "makes work pay and tackles poverty". Even if growth does tick up, there is little prospect that Sir Keir will find himself atop a government flush with cash, as happened in the 2000s.

The manifesto does offer one clue about how Labour may be thinking about squaring this circle, although it is not a promising one. The party says it will enact the socio-economic duty in the Equality Act of 2010, which would require public bodies to "have due regard" to the outcomes of all their decisions on inequality. That is more likely to gum up decision-making than to tackle poverty. A review of its implementation in Scotland and Wales found it had just created more paperwork.

In the near term the two-child limit is likely to become a totemic issue. There is plenty of evidence that this policy, which came into force in 2017 and was designed to encourage parents on low incomes to work more or have fewer children, has simply pushed children in large families into poverty. That ends up costing the state more. According to the Institute for Fiscal Studies, another think-tank, scrapping it would lift around 500,000 children out of poverty and cost £3.4bn per year by the end of the parliament. For now Sir Keir is making no promises. It is hard to see that position being tenable for long. ■

## BAGEHOT

### *The end of smol government*

*The Conservatives are losing as they governed. Meekly*



SQUINT A LITTLE and the letters “UwU” resemble someone with large, cartoonish eyes and a serene smile. The cutesy emoticon is a staple of a certain corner of the internet, in which grown-ups speak to each other in an infantile tone (“I’m just a *smol* bean”) and adopt feigned helplessness.

What is grating enough online is much worse coming from a G7 government. The Conservatives, who have spent 14 years running Britain, increasingly subscribe to a narrative that they were a mere bit-part player, rather than its main actor. Gazing upon a dying Conservative administration in 1993, Lord Lamont, who had recently been sacked as chancellor, accused Sir John Major’s government of being “in office but not in power”. What was once an attack has now become the party’s principal defence: the Conservatives may have been in office, but they were never in power. Call it UwU Conservatism.

Buck-passing starts with the historiography of the Tories’ many years in government. Sure, the histories will say that the Conservative Party entered power in 2010 and, almost certainly, left it in 2024. But between 2010 and 2015, the Conservatives had to share power with the Liberal Democrats. A brief interlude with a 12-seat majority was interrupted by the Brexit referendum in 2016. After a botched election, Theresa May struggled on with a hung parliament. True, Boris Johnson won a mighty majority of 80 seats in 2019 but a pandemic and the invasion of Ukraine stymied what he could do with it. That the errors of each era—undermining public services via austerity, leaving the European Union or putting Mr Johnson in charge during a time of national emergency—were Conservative-made is ignored. *UwU*.

Helplessness has now become an electoral strategy. Some polls suggest that Labour could end up with a majority bigger than any in the modern era. Grant Shapps, the defence secretary, has worried aloud about the threat of a Labour “supermajority”. “It doesn’t do the country any good to have that kind of size majority,” he chided. Party elders joined in. “It would be parliamentary democracy in its weakest form since the 1930s,” warned Lord Hague, a former party leader turned columnist. *Pwease help*.

Talk of a “supermajority” is constitutional nonsense. No magic

thresholds exist in the British system. In some countries, a two-thirds majority bestows a host of constitution-shredding powers upon the holder. In Britain a majority of one carries as much legal force as one of 180. Whining about a supermajority provides the perfect cover for the Conservatives’ lack of achievements in the past five years. If only the Conservatives had enjoyed a bigger majority than 80 seats, the government would have more achievements to its name. The majority was just too *smol*.

If the Conservatives are puny in their own minds, then Labour is mighty. The Conservatives have taken to warning of two decades of socialist imperium under Sir Keir Starmer’s Labour Party. Fears that a government will go wild with executive power, gerrymandering the voting system and stacking the House of Lords, are as much projection as anything else. The Conservatives repeatedly tried to drag authority to the centre. Brexit-related legislation, for example, was littered with “Henry VIII” powers, designed to allow government ministers to hack away laws at will. But they have gone largely unused by the Conservatives. A new government may be more ruthless. If Labour does decide to run amok, the Tories will be partly to blame.

Even the lightest legislation proved too heavy for a *smol* government. A proposed ban on foie gras never became law. Limits on plastic wet wipes also went nowhere. When asked about his legacy, Rishi Sunak, the prime minister, alighted on his plan to ban smoking for anyone born after January 1st 2009. Yet the smoking bill is not law because Mr Sunak himself abruptly halted its progress by calling an election he will surely lose. “That’s the type of leadership that I bring,” he said, altogether too accurately. This lack of legislative legacy is, naturally, someone else’s fault. “Blairite legislation has tied the hands of the government,” complained Miriam Cates, a backbench Tory MP. *Less UwU, more (>\_<)*.

Meekness infects the immediate political ambitions of the Conservative Party, too. It is petrified about Nigel Farage and Reform UK hoovering up voters to its right, yet seems to assume that winning voters to its left is impossible. The election result would have to turn out only slightly worse than the most damning polls for Sir Ed Davey, the leader of the Liberal Democrats, to be the one facing Sir Keir during Prime Minister’s Questions. But when it comes to liberal Britain—or indeed anyone who is not a pensioner in a town on England’s eastern seaboard—the Conservatives have all but given up.

UwU Conservatism has many weaknesses. Mr Sunak’s early departure from a D-Day anniversary memorial in France earlier this month played badly enough. But journalists at ITV, a broadcaster, made it worse by showing Mr Sunak moaning that the event “ran over” when apologising for being late for his interview with them. Idle chit-chat before an interview would usually be off-limits for an all-powerful prime minister. But for one on the way out, it is fair game. In politics, *smol* beans get trod on.

#### **C’maahn I’m a little guy, I’m just a little guy**

Pretending to be puny is the government’s only defence. A government that pledged to cut taxes and cut immigration has done the opposite. Austerity hollowed out the state, rather than slimming it. The Conservative Party’s one definitive achievement—leaving the EU—was a bad idea, badly executed and is, understandably, barely mentioned in the campaign. Rather than stand by this record, the Tories ask for pity. Big government is rarely a good idea, but *smol* government is much worse. *UwU*. ■

## International



### Indians studying abroad

## The new kids in class

### Will rich countries welcome Indian students the way they did Chinese ones?

OVER THE past two decades the number of people studying in countries other than their own has tripled, to more than 6m. International students from China have caused most of that increase. Youngsters flocked to universities in English-speaking countries to expand both their minds and their opportunities. In return they brought valuable brainpower and large piles of foreign cash. Governments have sometimes viewed this bounty as a reason to put less of their own money into higher education. Institutions in Australia, Britain and Canada have grown increasingly reliant on foreign flows to subsidise research and to cover the costs of educating local scholars.

Now the market for international study is about to undergo a huge change. Chinese school-leavers are growing gradually less keen to travel; in their place, Indian students are becoming the main engine of growth. In 2022 Britain issued more student visas to Indian citizens than they doled out to Chinese ones (see chart 1 on

the next page). So did America. In both countries, it was the first time in years that had occurred.

These newcomers have different demands from their East Asian forerunners. For one thing, Indian students as a group are much more likely to want to carry on living and working in their host countries even after their courses end. Economically this could be a boon to labour markets. Politically it could provoke more heated reactions about foreign students in countries already riven by immigration debates.

India's student exodus is driven by youthful demography and fast-increasing wealth. Given it is home to 1.4bn citizens, the country has more university-aged people than anywhere. Every month, a million more Indians turn 18. Their families are much richer than they used to be: India's GDP per person rose from \$469 in 2002 to \$2,410 two decades later, according to the World Bank. The number of middle- and high-income households in India is expanding by around 10% each year, reckons

Oxford Economics, a British consultancy.

As aspirations rise, enrolment in India's own universities and colleges is shooting up. In 2001 some 9m Indians attended higher-education institutions. Now the student body numbers about 43m, having long ago passed America to become the second-largest in the world after China. More growth seems certain: enrolment in tertiary education (the total number of students as a share of the college-aged population) remains below 30%, less than half the rate in China. The government wants this to reach 50% by 2035, which would bring total enrolment to near 75m.

Yet swift expansion has done nothing to improve the poor quality of teaching and research in many Indian institutions. No Indian university ranks among the world's top 100, judged by any of the most rigorous league tables. These take into account things like the quality of research output. The higher-education system has "islands of excellence", says N.V. Varghese of the National University of Educational Planning and Administration in Delhi. But it also has an "ocean of mediocrity". Competition for spots at the best places is furious. Several Indian institutions have rejection rates higher than America's Ivy League, including the formidable Indian Institutes of Technology.

Many Indian students see better prospects abroad. They are finding it ever easier to finance their ambitions. Banks are

▶ growing more willing to issue student loans for foreign study. This is in part because of examples set by a fast-expanding gaggle of non-bank financial firms, says Aman Singh of GradRight, which helps students pick between them.

These new outfits are less likely to require collateral. Instead they are more inclined to make lending decisions using data about a student's chosen subject and destination, rather than seeking out information about their family wealth. But plenty of people still end up making big sacrifices. Farmers sometimes sell fields to fund their children's travels, says Saif Iqbal of ApplyBoard, a Canadian edtech firm.

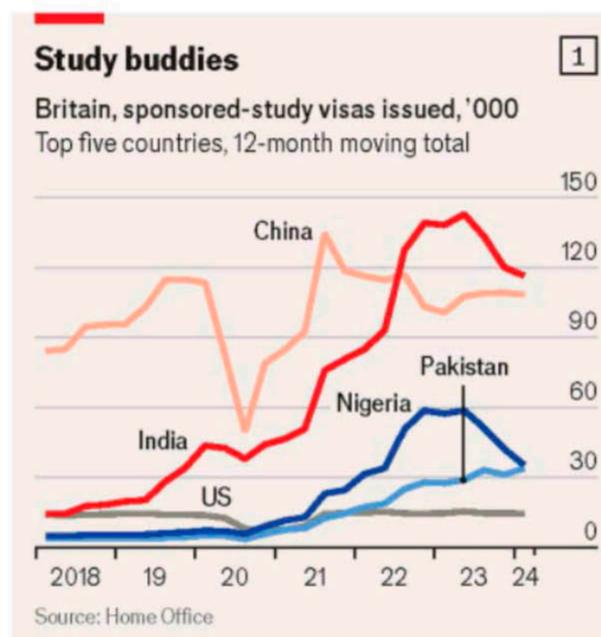
Driven by these factors—and by overhang from the pandemic years, when many youngsters put their educational dreams on hold—the number of people leaving India for study has lately surged. In the first ten months of 2023 some 760,000 Indians went abroad for foreign study of some sort, reckons the government. That is roughly 30% more than in 2019. In total some 1.5m Indian students reside overseas, it guesses, about 38% higher than before covid-19. America estimates that the number studying at its colleges and universities has grown by some 37% in five years, to 270,000 (see chart 2).

### Balancing the books

The exodus is good news for India and for the countries to which its students head. In public, Indian politicians are inclined to bemoan the departures. But behind the rhetoric everyone knows that students who go abroad generally do well, and “better than they would do at home”, says Mr Varghese. Those who return bring back valuable skills: India's best universities are full of foreign-educated academics. Those who stay away are seen as flag-fliers for India abroad. The country is proud of former foreign students such as Satya Nadella and Sundar Pichai, the bosses of the American tech giants Microsoft and Alphabet, both of whom were born in India.

Meanwhile, receiving countries—notably America, Australia, Britain and Canada—see a chance to grab talent, particularly in engineering, computer science and maths. Such skilled workers can boost research, innovation and more. According to analysis from 2022 by the National Foundation for American Policy, a think-tank, a quarter of billion-dollar startups in America had founders who came to the country as international students.

Western universities also think Indian students may help to maintain demand for their expensive degrees even as migrations from China plateau. For years analysts have warned that a decades-long boom in Chinese arrivals might be nearing its peak; the pandemic may well have accelerated that. China's youth population is shrink-



ing. Its own universities are improving fast. And as relations with the West grow more tense, Chinese students abroad may no longer feel as welcome as they once did. There are also related concerns that Chinese employers will stop seeing Western degrees as an asset.

Yet if the newcomers bring opportunity, they also present new risks. The single largest threat is that shifts in the countries that send international students affect how willing voters in receiving countries are to accept them. Debates about immigration in rich countries are increasingly toxic. As the numbers of international students rise, the more often they are drawn into these rows.

Indeed, Indian students differ from their Chinese counterparts in ways that seem likely to inflame these fights. The Indians are far less wealthy, for a start. They usually favour more affordable, lower-tier universities and incline towards shorter courses. They are much more likely, for example, to study at postgraduate level than as undergraduates. That is because funding a one- or two-year master's is more manageable than funding a full bachelor's degree overseas. In Britain, a typical Indian student spends only about half as much on tuition fees as a Chinese one.

Indian students are also much keener



than Chinese ones to remain in the countries where they have studied after graduation. Most big destination countries operate some kind of “post-study” visa scheme, which permits youngsters to stay on for a few years after they graduate, often with few strings attached. The Chinese, who tend to head home quickly, did not make great use of these. Indians, by contrast, are very keen on them. They look for these schemes when deciding where in the world to study. Their terms can affect how willing lenders are to give Indian students the money they need to pay course fees.

All these differences create complications. Postgraduate students are much more likely than undergraduates to request additional visas for spouses or children. “Post-study” visa schemes, previously little noticed by the public, are growing more controversial. Lower spending per student means that countries have to welcome more newcomers to bank the same amounts of cash. The low- and middle-tier universities that benefit most from Indian arrivals do not have a loud voice in forums where these policies are discussed.

In recent months governments in Australia, Britain and Canada have all tightened rules around foreign students. Canada is temporarily capping foreign enrolment on undergraduate and non-degree courses over worries about housing and visa abuses. Australia has just cut the amount of time it will permit international students to remain in the country after they graduate, and Britain has barred all but a sliver of foreign students from bringing dependants. America is not tightening for the moment. But its universities complain that immigration officials are rejecting a high share of Indian applicants. Last year they turned down 36% of all requests for student visas, up from 15% in 2014.

### Class action

Such measures are not unprecedented as governments frequently blow hot and cold about international students. Some think the latest round of tightening is simply another swing in that same old cycle. But Matt Durnin of Nous, a consultancy with offices in Australia, Britain and elsewhere, reckons something more fundamental is afoot. For years Western countries grew accustomed to students who were cash rich, and who headed home the day after graduation. Now they are realising that “the game is completely different”.

The risk is that rich countries will increasingly shun their opportunities to snaffle bright young things. And, worse, that they do so without revisiting the funding settlements that have made their universities ever more reliant on income from overseas. Given the growth-boosting power of big, zingy universities, that would be a foolish mistake. ■

# Business



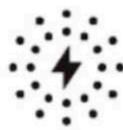
## Renewable power (1)

# Solar coaster

SHAANXI

Overcapacity in China's solar industry is causing prices—and profits—to tumble

### SOLAR SPECIAL



IN A FACTORY in a smoggy corner of China's inland Shaanxi province, the country's world-leading solar industry is on display. Robots scoot around carrying square slices of polysilicon, a substance usually made from quartz. The slices, each 180mm across and a hair's breadth thick, are called wafers. They are bathed in chemicals, shot with lasers and etched with silver. All that turns them into solar cells, which convert sunlight into electricity. Several dozen of these cells are then bundled together into a solar module. The factory, which is owned by LONGi Green Energy Technology, a giant of solar manufacturing, can churn out about 16m cells a day.

China's solar industry is dominant across every stage of the global supply

chain, from the polysilicon to the finished product. Module production capacity in the country reached roughly 1,000 gigawatts (GW) last year, almost five times that of the rest of the world combined, according to Wood Mackenzie, a consultancy. What is more, it has tripled since 2021, outgrowing the rest of the world, despite efforts by America and others to boost do-

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mestic production. China is now able to produce more than twice as many solar modules as the world installs each year.

This massive expansion in supply has helped drive down the cost of renewable energy for consumers, acting as a counterweight to the rising cost of capital needed to develop solar farms. During the covid-19 pandemic the price of solar modules spiked owing to a shortfall in the supply of polysilicon. Since then, however, the global price has fallen to a record low of less than 10 cents per watt, according to PVInsights, a data provider.

Yet the rapid growth of Chinese capacity, which has outpaced global demand, has also squeezed much of the profit out of the industry. Polysilicon, wafers, cells and finished modules now sell below their average production cost. Collapsing prices caused Chinese solar export revenues to fall by 5.6% last year, according to Wood Mackenzie, even as volumes soared. LONGi's share price has slumped by some 60% since the start of 2023. In March the company said it would fire 5% of its workers, citing an "increasingly complex and competitive environment". The share prices of other Chinese solar giants, including Trina Solar, JA Solar and Jinko Power, have also been battered (see chart on next page).

Smaller companies have been hit even harder. Yana Hryshko of Wood Mackenzie

explains that the big firms are typically diversified, helping them weather the collapse in solar prices. Others are not so lucky. Lingda, a smaller manufacturer of solar cells, recently cancelled plans to build a \$1.3bn factory. An executive at one Chinese solar company reckons that at least half of the businesses across the supply chain will go under.

So far, however, there are few signs of an end to China's overcapacity problem. Despite financial pressure from falling prices, the industry's largest companies continue to upgrade their technology and expand their output in an effort to keep their marginal costs below those of their competitors. Wood Mackenzie forecasts that China's solar industry will expand capacity to nearly 1,700GW by 2026.

State support for the industry is contributing to the supply glut. For decades leaders of municipal and provincial governments in China have sought to build local solar industries that hire from their populations and contribute taxes. Support comes in a variety of forms, including free land, free electricity, interest-free loans and access to cutting-edge technologies, notes Usha Haley of Wichita State University. She reckons all this adds up to about 35% of a solar company's costs, on average, but could be as high as 65% in some cases.

There are signs such support has been growing more generous, notes Ms Haley. Some local governments are financing and building solar factories that they then lease and later sell to companies. Many will be tempted to step in to prevent local solar champions from going under. That is especially so given the downturn in China's property sector, which has strained the finances of local governments that relied on selling land to developers to generate income. One industry insider in the inland city of Zhengzhou notes that officials there have grown more willing to aid solar companies that run into trouble.

That support may dry up. Many of China's provinces are struggling to service their debts. Solar companies must also

compete for government largesse with firms in other industries that are grappling with overcapacity as China's economy slows. More than a fifth of Chinese industrial firms were unprofitable last year, according to analysis by Rhodium, another consultancy. Efforts to export away China's overcapacity problem are encountering resistance abroad. Last month Ursula von der Leyen, the European Commission's president, declared "the world cannot absorb China's surplus production." On June 12th the EU announced it would slap provisional tariffs of between 26% and 48% on Chinese electric vehicles (EVs).

China's cut-price solar modules could come in for similar treatment. America has levied anti-dumping duties on Chinese solar manufacturers since 2012. Although the EU abandoned similar measures in 2018, some fret over the continent's dependence on Chinese solar companies. In April the bloc agreed to expand subsidies and other support for local solar manufacturers that

have been pummeled by Chinese imports.

Although China's leaders have contested claims that the country is grappling with excess supply, there are signs they are aware of it. In a meeting with business executives and economists last month, Xi Jinping, China's ruler, cautioned against focusing resources solely on EVs, batteries and solar modules—or, as a recent slogan describes them, "new quality productive forces"—and noted that investments must "have their own merits".

All this suggests a period of consolidation looms for China's solar industry. Jenny Chase of BloombergNEF, a research group, has seen this play out before. "There are slight profits, then longer periods of terrible margins, then bankruptcies and exits. We call it the solar coaster." Demand may eventually catch up with supply, as lower module prices encourage developers to install more solar power. In the meantime, China's solar industry should prepare for a bumpy ride. ■

## Renewable power (2)

# Dam good

ALQUEVA

## Floating solar has a bright future

DRIVE A FEW hours from Lisbon towards Spain, past the olive farms, and you will arrive at Europe's largest artificial lake, at the Portuguese town of Alqueva. The first thing that catches the eye is the large hydroelectric dam. But look closer and you will also spot a bright patch of floating glass. It is the floating solar-power plant built by EDP, a Portuguese utility that is one of the world's biggest developers of renewable energy. Critics have long dismissed such projects as a costly and trouble-prone experiment. The technology, however, is now ready to shine.

In this first phase of the project at Alqueva, engineers have stationed some 12,000 photovoltaic (PV) modules on floating pontoons made from partially recycled plastic and locally sourced cork. These are connected to an energy-storage system incorporating lithium-ion batteries and integrated with the hydroelectric dam's power station.

Floating solar projects like this one do face plenty of challenges. The kit has to be water-, wave-, wind- and storm-resistant, which adds complexity and cost. When located on salt water, corrosion can be a problem, though inland projects in fresh water fare better. The fish in lakes attract plenty of birds,

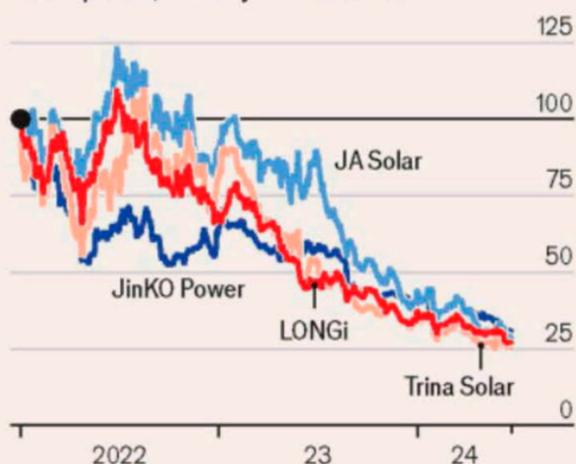
whose droppings can block the sun. To deal with this, engineers for the project at Alqueva have developed remote-controlled cleaning robots and are working on autonomous ones. "Like a Roomba for the panels," explains one.

Yet floating solar projects also enjoy several advantages. When they are located at existing hydroelectric dams they do not require any additional land, thus evading NIMBY opposition, and can be connected to the grid without the multi-year wait common for solar projects. The cooling effect of being on water boosts the efficiency of the modules, with studies suggesting gains of between 5% and 15% over land-based PV, while the shade they produce slows the evaporation of the reservoir.

EDP considers floating solar one of its "biggest bets". The five megawatts (MW) of capacity built in the first phase of its project at Alqueva is, admittedly, tiny. The company, however, is planning a second phase that would add 70MW more by 2025. Wood Mackenzie, a consultancy, reckons the technology could provide 60 gigawatts of renewable-power capacity globally by 2031. That may not seem much next to the 1.6 terawatts of solar capacity installed as of last year. But every bit counts.

## Sundowners

Share prices, January 3rd 2022=100



Source: LSEG Workspace

## Business in India

## Powering up

BANGALORE

## India's electronics industry is surging

TO WITNESS INDIA'S growing role as a manufacturing hub, dodge Bangalore's notorious traffic and head north. Around 45km outside the city, amid the dust and debris of construction, Foxconn, a Taiwanese contract manufacturer, is turning 120 hectares of farmland into a factory that will produce around 20m iPhones a year. Foxconn's plant will be the third facility near Bangalore dedicated to churning out phones for Apple, an American tech giant. The other two are run by Tata, India's largest conglomerate.

Bangalore, home to many of India's IT giants, is better known for its software than its hardware. However, the new factories suggest that, in one industry at least, India's efforts to transform itself into a manufacturing powerhouse are bearing fruit. Electronics manufacturing—the business of building mobile phones, televisions and other gadgets—is thriving in India. The value of electronics it produced rose from \$37bn to \$105bn (3% of GDP) between the fiscal years ending in March 2016 and March 2023 (see chart on next page). The government wants to triple this again by fiscal 2026. Although India's production of electronics accounts for just 3% of the global total, its share is growing faster than any other country's.

Nowhere is this boom more evident than in the production of phones, which makes up nearly half of India's electronics industry. The country is the world's second-largest maker of the devices, trailing only China. In fiscal 2015 India imported almost four-fifths of its phones. It now imports barely any. Apple sources about one in seven of its iPhones from India, double what it did a year ago. Samsung, a South Korean rival, has its largest phone-making facility in the country.

Contract manufacturers, which build products on behalf of other companies, have been rapidly expanding in India. Foxconn, which assembles nearly two-thirds of Indian-made iPhones, now has more than 30 Indian factories and employs 40,000 Indian workers. Although its Indian operations account for less than 5% of its total revenue, the company is steadily increasing its investments. It has set aside \$2.6bn for its Bangalore factory. Last year Liu Young, Foxconn's boss, told investors that the several billion dollars it had invested in India so far was "only the beginning". A steady stream of foreign suppliers to

## Condiments

## Hot mess

## What went wrong for America's favourite sriracha sauce?

SWEET AND spicy with a sour tinge, sriracha sauce was an instant hit when David Tran, a Vietnamese refugee, brought it to America in the 1980s under the brand Huy Fong Foods. Asian eateries were the first to snap up Mr Tran's hot sauce, but before long the green-nozzled bottle, with its distinctive rooster logo, had become a staple in restaurants and pantries alike. Within just a few years Mr Tran went from hawking his wares out of a Chevy van in Los Angeles to walking the floor of a 20,000-square-metre factory. By 2020 his business was worth \$1bn.

Since then, however, it has suffered a meltdown. First came grumblings by fans that the condiment had lost its vibrant crimson colour and peppery punch. Next came the shortages. Enthusiasts soon panicked and began to hoard the stuff. At one point last year resale prices for Huy Fong's sauce on eBay, an e-commerce site, reached as high as \$150 per bottle. To cap it off, last month the company announced it was halting production until at least September.

For decades Huy Fong set its sriracha apart with fresh jalapeños reddened on the vine, a difficult commodity to grow at scale. Competitors turned to dried chillies. Mr Tran turned to Craig Underwood, a Californian with a penchant for peppers. For 28 years Underwood Ranches, his company, met all Huy Fong's jalapeño needs, at one point producing close to 45,000 tonnes a year. To fill Huy Fong's bottles, Underwood Ranches expanded its acreage ten-fold. The two men became chums. In 2017, however, the relationship soured following a disagreement between Mr Tran and Mr Underwood over financial terms.

Although Mr Tran scrambled to find new growers, turning south to Mexico, none has been able to reliably meet his

Foxconn and its peers have also set up shop in India. PwC, an advisory firm, estimates that the share of value India added to phones produced in the country increased from 2% in 2014 to 15% in 2022.

It is not only foreign firms that have piled in. Tata first entered phone-making in 2021 by building parts for older models of the iPhone. After initial issues with quality control, the company has found its foot-



ing. "It wasn't easy to put together that supply chain," Mr Underwood explains. Huy Fong's woes began in earnest once its reserves began to run out in 2020.

Competitors have been all too willing to step into the gap left by the sriracha pioneer. McIlhenny, which makes Tabasco, a rival hot sauce, began peddling its own sriracha product with a campaign promising "no shortage of flavour inspiration". In the second half of last year its condiment was the bestselling sriracha sauce in America. Other brands have had a boost, too. Even Underwood Ranches has piled in with its own product, trading on its reputation as Huy Fong's erstwhile supplier. If there is one lesson from Mr Tran's debacle, then, it is to keep your friends close—and your jalapeños closer.

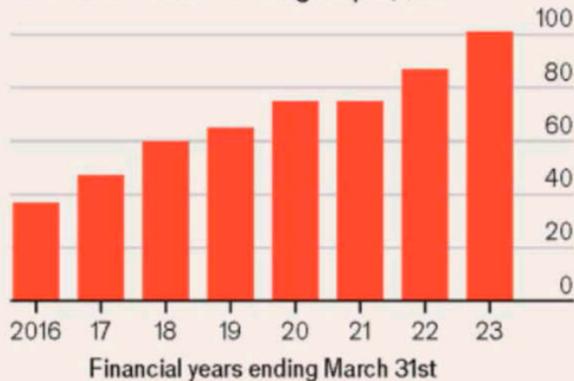
In November it acquired the Indian operations of Wistron, a Taiwanese firm, and began assembling iPhones. Tata now plans to expand its factories to nab a larger share of business with Apple.

Another Indian company benefiting from the device-making bonanza is Dixon Technologies, India's largest domestic electronics manufacturer. The company, which began making gadgets for the local

**Electrified**

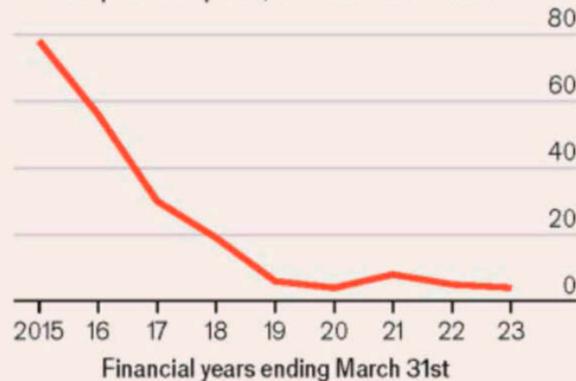
India

Electronics manufacturing output, \$bn



Sources: Invest India; Morgan Stanley; JM Financial

Mobile-phone imports, % of domestic sales



▶ market three decades ago, has jumped into producing smartphones for foreign companies. It now employs 27,000 people, up from 2,000 a decade ago. Over the past year its share price has risen by 150%.

India's electronics boom reflects a combination of the desire of Western tech firms such as Apple to reduce their reliance on China and the vast appetite of India's 1.4bn people for whizzy devices such as smartphones. Generous handouts from the government have sweetened the deal for companies mulling production in India. In 2020 the government announced a programme of "production-linked incentives" for manufacturers in various industries, including electronics.

Sunil Vachani, Dixon's boss, credits the government for its belief in India's manufacturing potential, which he says has brought about "a change in the mindset" of the country. India's government has certainly been busy wooing foreign manufacturers. In January it awarded the Padma Bhushan, the country's third-highest civilian award, to Mr Liu of Foxconn. Pranay Kotasthane of the Takshashila Institution, a think-tank in Bangalore, says the government has been courting companies such as Foxconn to lure in "anchor investors" around which supply chains can form.

The hope is that India will one day be able to dislodge China as the world's electronics factory. Narendra Modi's electoral setback earlier this month, in which the prime minister lost his parliamentary majority, does not appear to have dampened enthusiasm for that goal. His new government has signalled continuity in its support for manufacturing.

India's progress certainly looks promising. In the 12 months to the end of March, its electronic exports reached \$29bn, up by 24%, year on year. Still, that is a far cry from the almost \$900bn of electronics China exported last year. There is, then, plenty more to do. Naushad Forbes, an Indian businessman, argues that unless Indian firms invest in deepening their technical know-how, they will struggle to compete in

more advanced areas like chipmaking. India's reluctance to lower trade barriers with its Asian neighbours is also a hindrance. Import duties for the raw materials and components needed to produce electronics are typically higher than in other countries that are vying to steal production away from China, such as Vietnam.

For his part, Mr Vachani of Dixon is bullish. He believes that "this a Y2K moment" for India's electronic manufacturing, a reference to the panic over a computer bug at the turn of the century that put the wind in the sails of India's IT industry. Perhaps, in time, the term "Bangalored" could refer not, as today, to the draining of white-collar jobs away from America, but of blue-collar ones from China. ■

**Artificial or intelligent?**

Market capitalisation, \$trn



Source: LSEG Workspace

**Nvidia's ascent**

On June 18th Nvidia overtook Microsoft as the world's most valuable company. Its market capitalisation of \$3.3trn is more than 20 times what it was in January 2020. Investors are buying its shares as greedily as tech giants are buying its artificial-intelligence chips. Nvidia's revenue in the quarter ending in April rose by 262%, year on year. Its net income rose by 628%.

**Aviation****Flying off the rails**

BERLIN

**European airlines are on a buying spree**

SOME CORPORATE tie-ups delight investors. Others make them groan. The purchase of a 41% stake in ITA, Italy's national airline, by Lufthansa, a German carrier, for €325m (\$350m) is an example of the latter. Rumours that the EU is close to blessing the deal have contributed to a slump in Lufthansa's share price.

ITA, once called Alitalia, is hardly a crown jewel. Since its founding in 1946 it has turned an annual profit only three times. The Italian government privatised the company in 2009—then renationalised it in 2020, rebranding it as ITA in the hope of a fresh start. Air France-KLM and Etihad, two airline businesses that had taken minority stakes in the carrier, wrote off their investments. The Italian government spent around €3.5bn during the covid-19 pandemic to keep the company afloat, equivalent to roughly €300,000 per employee.

Turning around a business with such an impressive history of financial disaster seems like a tall order. The Italian carrier has been pummeled by low-cost rivals, including Ryanair and Wizz Air, that have expanded in Italy to capitalise on the turmoil at the company. "Acquiring ITA is one of the most challenging propositions in European aviation," says Tobias Fromme of Bernstein, a broker.

Why, then, is Lufthansa pursuing a deal? It argues that Italy is one of the company's biggest markets, and that ITA's routes to Africa and South America complement Lufthansa's routes to North America and East Asia. It adds that it already owns another small Italian airline, Air Dolomiti, which means it is familiar with the market. A further motivation may be Lufthansa's fear that ITA could fall into the hands of a rival.

European aviation is in the midst of what may be its final wave of consolidation. Six companies—Air France-KLM, EasyJet, IAG, Lufthansa, Ryanair and Wizz Air—already account for 71% of capacity on flights within the continent. IAG, which owns Aer Lingus, British Airways and Iberia, is planning to buy 80% of Air Europa, Spain's third-biggest airline, subject to EU approval. A large stake in SAS, a Scandinavian carrier, is being sold to Air France-KLM and Castlake, an American private-equity firm. Air France-KLM and IAG are expected to bid for TAP, Portugal's state-owned airline, which is up for sale. After that there will be little else left to buy. ▶▶

## BARTLEBY

### *From factories to frappés*

*Nostalgia for manufacturing jobs is misplaced*

IF THERE IS one thing politicians agree on these days, it is that manufacturing jobs are “good” jobs. Joe Biden is betting that huge subsidies for new factories will transform the outlook for America’s workers—and November’s election. His acting labour secretary recently embarked on a jolly-sounding “Good Jobs Summer Tour” to trumpet the president’s plans. Donald Trump, Mr Biden’s rival, is just as eager to get more wrenches into the hands of American workers, mostly by slapping tariffs on foreign goods. Politicians across the rich world believe that reversing the decades-long decline in manufacturing employment would leave workers better off.

Your guest Bartleby is not convinced. He has, admittedly, never worked in a factory, and thus feels no nostalgia for hard hats and high-vis vests. Still, the idea that deindustrialisation has made work worse is hard to square with the fact that data on worker satisfaction have been steadily improving for years.

The argument that manufacturing jobs are better than other sorts has a long pedigree. Adam Smith believed that manufacturing was “productive”, unlike services such as banking, retail or hospitality. The factories of the Industrial Revolution transformed living standards in Europe and America in the 19th century. Yet they were also awful places for workers, managing to be both horribly dangerous and tremendously boring. Things did not get much better with the rise of mass-production in the early 20th century. Workers in Henry Ford’s car-making plants, though relatively well paid, complained that work was stultifying. As one Ford worker noted, “If I keep putting on Nut Number 86 for about 86 more days, I will be Nut Number 86 in the Pontiac bughouse.”

Even during the post-war period—paradise lost, in the eyes of many Western politicians—people were hardly thrilled about working in factories. In 1970 *Fortune* magazine coined the phrase the “blue-collar blues” to describe the alienation many manufacturing workers felt in an impersonal industrial system. One pundit noted that such a worker would be “easy prey for demagogues who appeal to his resentment and his desire for revenge”, which sounds familiar.

Manufacturing enthusiasts will no doubt counter that jobs in the sector are much better today. Workplace accidents occur a fraction as often as they once did. Most factories are air-conditioned. Robots do many of the heaviest and most repetitive tasks. And around a third of those who work in manufacturing never go near a rivet, performing white-collar roles such as design and engineering.

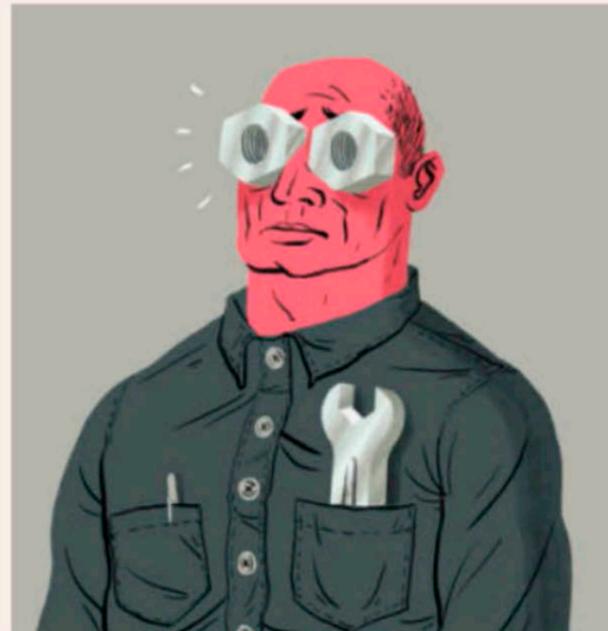
All that may be so, but compare workers of a similar education level and there is little evidence they would gain by moving from services to manufacturing. One paper by statisticians at America’s Bureau

of Labour Statistics found that, across a variety of measures including pay, benefits, job security and safety, “many industries within services equal or exceed manufacturing.” This Bartleby’s analysis of British data similarly shows that job quality in the manufacturing sector is no better than average.

For decades economists observed that manufacturing workers enjoyed a wage premium over comparable workers in other industries. A recent paper published by the Federal Reserve, however, shows that this premium has “disappeared” in recent years. Those who point to the insecurity of gig jobs, such as delivering takeaway meals, would do well to remember that manufacturing jobs are often more cyclical than those in services. They are also more likely to be automated away. It is not immediately obvious that a job tending to an industrial robot is more satisfying than one operating an espresso machine at Starbucks, especially for workers who enjoy some human interaction.

According to Mr Biden, “A job is about a lot more than a pay cheque. It’s about your dignity. It’s about respect.” That is true. Yet dignity and respect should be available for workers wherever they are employed. If not, politicians should focus their attention on ensuring the right regulations are in place, instead of spending billions of dollars trying to recreate a past that was far less rosy than they imagine.

Companies, of course, have a role to play as well, with plenty of evidence demonstrating that bosses who treat their employees well reap the rewards. And workers themselves need to face the fact that nostalgia misleads. Yes, work can be a drag. But it is probably the best it has ever been.



- ▶ Finnair, of Finland, is unlikely to attract much interest from buyers, owing in part to the country’s proximity to Russia.

All this worries the European Commission, the EU’s executive arm. It is concerned that consolidation will lead to higher fares and less choice for European consumers, which is why it has been probing the ITA and Air Europa deals. A decision on the first of these is expected by July 4th, and on the second by August 20th. Both IAG and Lufthansa have been dangling

concessions. IAG has offered to relinquish just over half of Air Europa’s landing slots. Lufthansa has reportedly said it will cede around 40 slots at Linate airport in Milan to EasyJet and Volotea, another low-cost airline. It has proposed to keep a number of ITA’s short-haul flights to Austria, Belgium, Germany and Switzerland that compete with its own flights. And it plans to delay integrating ITA into its transatlantic joint venture with United Airlines, an American carrier, for two years.

Such concessions will only make the ITA deal worse for Lufthansa’s investors. The German carrier looks to be buying itself a giant headache. Although ANPAC, the Italian pilots’ union, is supportive of the deal, it is notoriously difficult to work with. What is more, Italy’s government will remain the largest investor in the Italian carrier after the deal, at least initially. Lufthansa will have the option to buy the rest of the company at a later date. Its investors may pray it doesn’t. ■

## SCHUMPETER

### *Feeling Lucky*

*The boss of Anduril wants to disrupt the defence business*



**P**ALMER LUCKEY owns six helicopters. He would like a seventh: a Chinook, the workhorse of Western armed forces. When your guest Schumpeter, meeting Mr Luckey in London, suggests that the British Army might sell him one, he laments that “eccentric US civilians” are low on the priority list of buyers. “I’ve been thinking,” he says, “I need to maybe hit up the Taliban.”

Mr Luckey, who co-founded Anduril, a defence-technology company, in 2017, is joking. Still, coming from a mulleted 31-year-old in a Hawaiian shirt and flip-flops, who made his fortune selling a virtual-reality company to Facebook and has now branched out into Game Boy replicas, it sounds plausible. Despite his eccentricities, Mr Luckey is not a man to be taken lightly. Anduril is now nipping at the heels of America’s biggest armsmakers.

A breakthrough came in April when the US Air Force awarded the firm a contract for the Collaborative Combat Aircraft (CCA) programme, which will eventually consist of more than 1,000 advanced drones supporting American fighter jets. For the Pentagon to hand a flagship programme to a startup, and to jettison the traditional prototype phase, is “extraordinary”, he says. The war in Ukraine has been a proving ground for these sorts of weapons—and for Mr Luckey’s company. He visited Kyiv two weeks into the war. “What we’ve been doing was tailored for exactly the type of fight that’s going on and exactly what we predicted was going to happen,” he argues, pointing to three lessons.

One is the importance of drones that can navigate and strike autonomously, even in the face of heavy jamming of their signals and obscurants like metal-filled smoke clouds. Many existing drones have struggled with this, says Mr Luckey, because they lack “multi-modal” sensors, such as optical and infrared cameras, to substitute for GPS, and do not have enough built-in computing power to use the latest object-recognition algorithms.

Second is the observation that software is eating the battlefield. Imagine that Russia begins using a new type of jammer. Mr Luckey says that the data can be sent back immediately to generate countermeasures, which are then remotely installed on weapons at the front line without having to change any hardware. A recent study by the Royal United Services Institute, a think-tank in

London, noted that drones in Ukraine needed to have their software, sensors and radios updated every six to 12 weeks to remain viable. Anduril, claims Mr Luckey, is “literally pushing new updates...every single night”.

His third lesson from Ukraine is that weapons must be built in vast quantities—and therefore cheaply. He laments that Russia produces shells and missiles far more cheaply than America does: “The US is now on the wrong side of an issue that we were on the right side of during the cold war.” Anduril makes much of the fact that its production processes are modelled not on big aerospace firms, but automotive ones. Its head of manufacturing is a veteran of Toyota and Tesla, two carmakers. Its submarine drones are made using welded metal plates rather than a pressure vessel “because that can be made in something that looks a lot like a General Motors plant rather than a Lockheed Martin aircraft-assembly facility or a naval shipyard”.

For years defence-technology startups argued that the Pentagon’s byzantine procurement rules were rigged in favour of the big “prime” contractors. Anduril initially had to hire more lawyers and lobbyists than engineers, says Mr Luckey. The tide has now turned, he reckons, pointing to a flurry of defence contracts handed out to startups like Saronic, which makes naval drones. “At a very high level...there’s a belief that things can be done differently.” Investors increasingly agree. At its last funding round in December 2022, Anduril was valued at around \$8.5bn. According to the *Information*, a news site, the firm hopes a new round will push that to \$12.5bn. Still, that figure is only around a tenth of the value of Lockheed Martin, an industry giant. Mr Luckey notes that, besides Anduril, there have only been two defence “unicorns”, Palantir and SpaceX. More have made mattresses, he exaggerates.

The CCA contract is a huge boost, but it covers only the first, limited tranche of the project. Moreover, some Ukrainians grumble that software updates have been slow to arrive, leaving Anduril’s high-end Altius drones bamboozled by jamming, like other American offerings. Another person familiar with the firm’s products in Ukraine says that although the company’s software is impressive, its hardware is less so. Some in the Pentagon are keen to separate the two so that Anduril’s software can be plugged in more easily to competitors’ kit. For his part, Mr Luckey complains that America’s government retains a “caveman mentality” in which it will spend wedges of money on a high-tech product with remarkable built-in software, but will recoil in horror at the notion of paying far smaller sums for “just some code”.

#### **Not droning on**

Behind that frustration is a sense of urgency. Many defence bosses revert to euphemistic blather when asked about their products. Mr Luckey is one of the rare ones who embraces the fact that they exist to blow things up. He points to the slogan of one of his teams, “China 27”: products or features that are not ready for a conflict with America’s rival in 2027 are cast aside.

Mr Luckey’s vision of the future of war fuses two ideas: the centrality of technology and the need for vast numbers of weapons. “Fifty years from now the seas are going to be transparent. The skies are going to be transparent. We’re going to know where every sub is, every airplane is,” he says. “So then it’s a matter of: who’s going to make enough stuff to beat the other guy’s stuff.” America is not in a good place, he concludes. “We’re quite screwed.” Anduril, however, stands ready to help. ■

## Finance & economics



### Property

## The great escape

SAN FRANCISCO

### Why rich-world house prices are surging once again

**I**S A FRESH housing boom under way? In April a house-price index for the world, excluding China, rose by more than 3% year on year (see chart 1 on next page). American house prices are 6.5% higher than a year ago, Australian ones have increased by 5% and Portuguese ones are soaring. In other countries, the market looks surprisingly strong given years of high interest rates (see chart 2).

These figures follow a tough period. Adjusted for inflation, prices have fallen by 20% in Canada, Germany and New Zealand. They are well off their peaks in some American cities, including San Francisco and Phoenix. In Boise, Idaho, where prices soared during the covid-19 pandemic as people sought living space, values are down by over a tenth. Meanwhile, higher interest rates, and mortgage costs, have made people worried about their spending on housing: the share of Britons who say they find it “very” or “somewhat” difficult

to make rent or home-loan payments has risen from 24% in early 2022 to 41%.

Yet it is surprising that things have not been more difficult still. Since a trough in 2021, the rate on a typical 30-year mortgage in America has risen by about four percentage points. Rules of thumb derived from the academic literature indicated that nominal house prices would fall by 30-50%. In fact, they have hardly fallen at all in nominal terms. In real terms (ie, adjusted

for inflation) global house prices are down by 6% from their peak—but that puts them in line with their pre-pandemic trend. The downturn also claims the crown as the shortest ever, lasting just a few months.

Some worry that high rates will eventually cause a proper crash. Rohin Dhar, a housing expert, has pointed out that many listings in Florida feature the phrase “motivated”, which implies people are selling in a hurry. But in America as a whole, the share of mortgages in delinquency has never been so low, at 1.7%, compared with more than 11% at the height of the global financial crisis of 2007-09. Elsewhere the situation appears to be similarly benign. In New Zealand, the rich country that was hit hardest by the housing downturn, arrears are in line with the pre-covid norm. With the exception of Germany, there is less distress in the euro zone, too.

American observers typically credit the country’s mortgage system, which relies heavily on long-term fixed rates, for its impressively resilient housing market. Other countries have recently moved in a more American direction. Fixed-rate mortgages protect homeowners from higher rates, meaning fewer fire sales that can drag down house prices. They also give homeowners a strong incentive not to move, because they would need to obtain a new mortgage, possibly at a higher rate.

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But fixed-rate mortgages are not the only reason for housing-market resilience and recent price growth. After all, applications for new mortgages remain reasonably strong across much of the world, even if they have fallen from pandemic highs. And the National Association of Realtors, an American lobby group, finds surprisingly little evidence that higher rates are dissuading people from buying a first home or moving into a new one. According to its recent research, only 8% of people said that “getting a mortgage” was one of the “most difficult steps” of the home-buying process, marginally up from 7% in 2021.

Three further factors may explain why house prices are once again rising: immigration, sacrifices by mortgage-holders and the strength of the economy. Take immigration first. The rich world’s foreign-born population is rising by about 4% year on year, its fastest on record. Official figures on which such calculations are based probably understate the shift, since illegal immigration has also surged, especially in America. This, in turn, is pushing up both house prices and rents, argues Mark Zandi of Moody’s Analytics, a consultancy, as the new arrivals need somewhere to live. Estimates by Goldman Sachs, a bank, imply that Australia’s current annualised net migration rate of 500,000 people will raise house prices by around 5%.

The second factor concerns sacrifices. People in the rich world are dealing with higher mortgage costs by cutting back on other sorts of expenditures. A recent survey by YouGov, a pollster, found that one in five variable-rate-mortgage holders in Britain say they are making “large” cuts in household spending, even as those on fixed-rate deals are less perturbed. Others are reaching behind the sofa. A recent report by the Norwegian central bank noted that many households “have drawn on accumulated savings” to service debt.

Longer mortgages are helping borrowers to spread out repayments, sacrificing wellbeing in the future to reduce mortgage payments today. The Canadian govern-



ment recently announced that it would extend the payback period on some state-backed loans from 25 to 30 years. According to Centrix, a credit-reporting agency, 6.4% of New Zealand mortgages originated last year will last for more than three decades, compared with 2.3% in 2020. The Bank of England recently noted that in Britain “the trend towards longer-term mortgages had continued”, such that for 40% of new mortgages “borrowers would be past the current state pension age at the end of their mortgage term.”

**Mortgage moaners**

The most important factor relates to the economy. True, households are paying out more in interest, but there is also more coming in. Some benefit from higher interest income on their savings, which in the EU has risen by nearly ten times as much as interest payments have since 2020. Unlike in the housing crash of 2007-09, the labour market is also helping (and the banks have not imploded). Since 2021 average wages across the rich world have gone up by about 15%, while unemployment remains close to an all-time low. In every country for which we can find data, the increase in households’ labour income in recent years dwarfs increases in interest costs. No one likes higher mortgage payments, but the vast majority of people can afford them.

Do not be surprised, therefore, if house prices continue to rise. Some central banks have already started to cut interest rates as inflation declines; America’s Federal Reserve is set to follow before the year is out. Across the rich world, wage growth remains in pretty good shape. Falling inflation will give mortgage-holders extra breathing room. And any increase in demand for housing will run up against constrained supply. Unless something drastic changes, the world’s biggest asset class is about to get bigger still. ■

**Macron’s gamble**

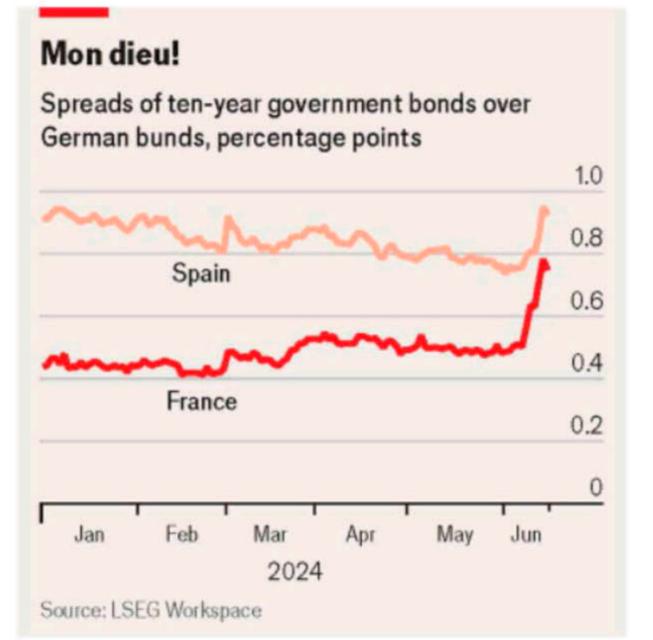
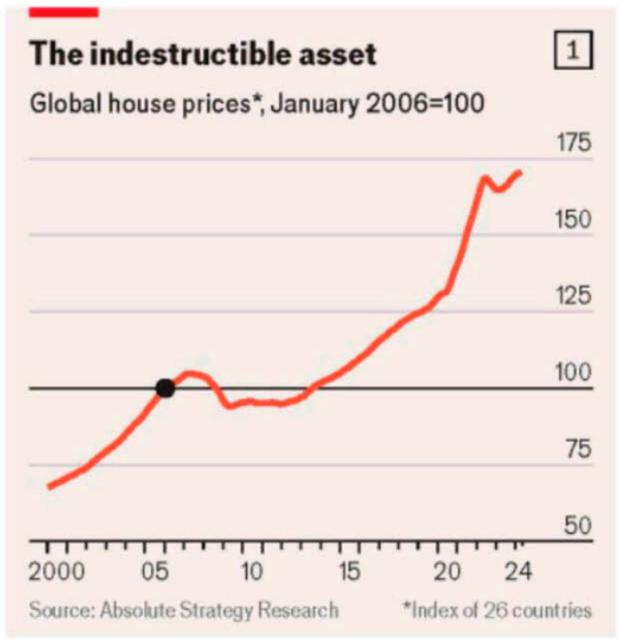
**Bardella’s burden?**

**France’s next prime minister will have to make tough spending cuts, or face chaos**

IT WAS A French politician, Valéry Giscard d’Estaing, who coined the term “exorbitant privilege” in the 1960s. He was referring to benefits received by America as issuer of the world’s reserve currency—namely, the ability to run high deficits comfortably. These days France is reminded it has no such privilege. Ahead of parliamentary elections on June 30th and July 7th, its hefty deficit and growing debt are central to the campaign. On June 19th the European Commission said it was preparing to put France into an excessive-deficit procedure, the EU’s fiscal torture chamber, meaning the country’s politicians will have to come up with a plan to fix things.

The commission’s officials have reason to do so. France has an American-style deficit of 5% of GDP, which its central bank expects to come down only slowly. The country’s debt-to-GDP ratio of 111% is similar to Italy’s before the euro crisis in the early 2010s, and is set to rise. S&P Global, a ratings agency, downgraded France’s sovereign-debt rating from AA to AA- on May 31st, before Emmanuel Macron, France’s president, gambled on elections that may bring the hard-right National Rally (RN) or the left-wing New Popular Front to power, under his continuing presidency.

Now markets are worried. The yield on French debt is similar to that on Portugal’s and its spread over German bunds, Europe’s benchmark, has widened to 0.7 percentage points. France’s stockmarket is down by 5% since the European Parliament elections on June 9th, which prompted Mr Macron to gamble. Share prices of companies focused on the domestic market have been hit especially hard. France’s two larg- ➤



▶ est banks, BNP Paribas and Crédit Agricole, have lost 11% of their value.

How bad will things get? No big political party wants to quit the euro or the EU. Nor, as French analysts rush to point out, is the country on the brink of a “Liz Truss moment”, referring to the blowout of British gilt yields after a mini-budget in September 2022. Foreign buyers of sovereign and corporate French bonds are staying put. Contrary to warnings from Bruno Le Maire, the finance minister, even a victory for the hard right or left would be unlikely to prompt a crisis. France benefits from decent economic growth, which the OECD expects to be 1.3% next year, and manageable debt-servicing costs, at 2% of GDP.

The problem is that, without spending cuts, France’s deficit will widen to 5.7% this year and 5.9% next, according to the French senate’s finance committee. Even if this is not crisis-inducing, it is a large and growing problem. Mr Le Maire has already cut around €20bn (0.7% of GDP) from state spending this year, reducing outgoings on things such as energy subsidies and state aid. Further reductions were put off until after the European elections.

Both the RN, polling in first place with over 30% of voters, and the left bloc, at just under 30%, are far ahead of Mr Macron’s centrist alliance, and have spending plans that would add to the deficit. The right-wingers want to cut levies on electricity and petrol, and exempt employers from paying taxes if they raise salaries. The leftists’ ideas are strikingly similar: they want to raise the minimum wage and bring down energy and food prices. Both groups also want to repeal Mr Macron’s pension reforms that raised the age of retirement to 64 from 62, although the RN has rowed back on plans to do so straight away.

This could lead to a clash with the European Commission and the markets. Yet if the RN is victorious it might be reined in by the need to attract centre-right voters, who tend to favour lower deficits, at the crucial presidential election in 2027. It would also have to negotiate the EU’s next budget, and would want to keep generous agricultural subsidies, for which it would need the support of allies. The hope is that, once in power, the RN would mellow in the manner of Giorgia Meloni, Italy’s hard-right prime minister.

A clash with the commission is thus likely, but also likely to end in compromise, says Jeromin Zettelmeyer of Bruegel, a think-tank. More problematic is the fact that even if a party wins a majority in the forthcoming elections, it will inherit a poisoned chalice. The victor will have to oversee spending cuts that will harm growth and prove unpopular, or risk chaos. Although there is no such thing as a bad election to win, the celebrations of France’s next prime minister may not last long. ■



The renewables boom

## Gridlock

Europe faces an unusual problem: extremely cheap energy

### SOLAR SPECIAL



OWING TO THE rapid spread of solar power, Spanish energy is increasingly cheap. Between 11am and 7pm, the sunniest hours in a sunny country, prices often loiter near zero on wholesale markets (see chart on next page). Even in Germany, which by no reasonable definition is a sunny country, but which has plenty of wind, wholesale prices were negative in 301 of the 8,760 tradable hours last year.

As solar panels and wind farms take over Europe, the question facing the continent’s policymakers is what to do with all the power they produce. Ultra-low—and indeed negative—prices suggest that it is not being put to good use at present, reflecting failures in both infrastructure and regulation. There are three main ways that firms and regulators could establish a more efficient market: sending energy to areas where there is no surplus, shifting demand to hours when energy is plentiful, and storing energy as electricity, fuel or heat.

The need to make such shifts will only become more pressing. Europe’s renewables boom is bigger than elsewhere in the rich world. Last year the continent installed roughly twice as much fresh capacity as America, with 56 gigawatts (GW) of new solar power and 17GW of new wind power, which the latest figures suggest will

be exceeded this year. By 2030, 43% of the EU’s total energy consumption will have to come from renewables, according to the latest rules, up from 23% in 2022.

Sending energy to places without surpluses would require a better connected grid. ENTSO-E, a club of European grid operators, estimates that improved international links would ensure that 42 terawatt-hours a year of otherwise wasted electricity would be put to use in 2040. That is more than Denmark’s current annual consumption. According to Bruegel, a think-tank, such a grid would also need 20-30% less storage and backup capacity.

The problem is that grid extensions take time and meet local opposition. As a result, energy firms have resorted to putting them underground, which raises costs. Extensions also prompt arguments. When a connection is established, the market with lower electricity prices will inevitably export power to the one with higher prices. Even if both sides benefit from the transaction overall, on one side the beneficiary may be electricity producers and on the other side it may be consumers, with the other group losing out in both places. On June 18th Sweden cancelled the Hansa PowerBridge, a 700-megawatt connection to Germany, over fears it would raise electricity prices for domestic consumers.

The next option for policymakers is to shift demand. This does not mean persuading everyone to take showers during their lunch breaks, when the sun is at its

▶ brightest. Instead, the idea is to move flexible sources of demand, such as electric-vehicle (EV) charging and district-heating buffers, into hours of abundant energy. Doing so requires smart meters that measure not only how much energy is used, but also when it is used, and which thus allow prices to vary accordingly. So far, however, countries are making slow progress installing these devices. Although almost everyone has a smart meter in Spain, hardly anyone does in Germany.

Existing grid-pricing regimes are another obstacle when it comes to shifting demand. Consider Karoline, a giant kettle in Hamburg, Germany, that stands ready to transform surplus electricity into heat for as many as 20,000 households. It must pay full monthly network charges, even if it is employed only briefly, which makes it too costly to switch on most of the time. As a consequence, it often sits idle, even as local wind turbines are turned off to prevent the grid from overloading. Meanwhile, consumers face similar problems. They tend to pay network charges at fixed rates, regardless of when energy is taken from the grid. The EU is pushing member states and markets in a more flexible direction, but upgrading regulations, pricing methods and grid technology takes time.

Could better storage solve the problem? In Vantaa, Finland, the local energy company is about to dig a hole the size of 440 Olympic swimming pools into the bedrock beneath the town. This will be filled with water heated to 140°C, which will store 90 gigawatt-hours of heat, an amount sufficient to keep the town toasty for a year. Other firms are making greater use of batteries for shorter-term storage. Unfortunately, such schemes are once again hindered by existing energy-market structures. When it comes to things such as congestion management and frequency control, markets are typically built on the expectation that backup capacity will arrive from conventional gas-fired plants. “The efficient use of surplus electricity is not considered and not encouraged in

Europe,” sighs Julian Jansen of Fluence, which makes energy-storage products.

With better incentives, policymakers would also be able to bring household batteries into play. Jochen Schwill of Spot My Energy, a startup, reckons that a German home with batteries might receive €600 (\$650) a year if it was able to store energy for the grid. EVs could also play a part. They are, in essence, two devices in one: a car and a battery. Octopus, a British energy provider, recently rolled out a tariff that offers free charging if the firm can decide when the car charges and sometimes feed energy from its battery into the grid. Used more widely, such tariffs would both help soak up surplus energy and by cutting costs make EVs a more attractive purchase.

Without better incentives, Europe will struggle to use growing amounts of surplus energy. That, in turn, will lower profits for investors in renewables. In May the “capture rate” of German solar panels—the share of the average daily energy price that they earned—dropped to 50%, down from 80% three years earlier, according to calculations by Julien Jomaux, an energy consultant. Ultra-cheap power is something to be celebrated. But as Europe is now discovering, it can be tough to exploit. ■

### Indian stocks

## Leviathan bound

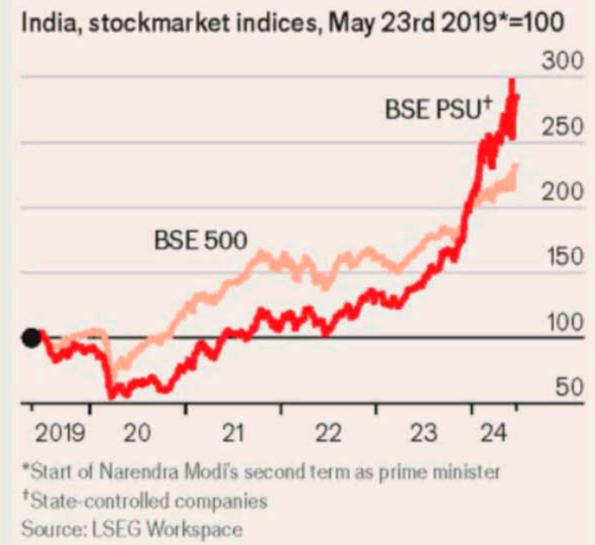
MUMBAI

### A weakened Narendra Modi is bad news for investors in state-controlled firms

INDIA'S STOCKMARKET swooned upon the news that Narendra Modi, the country's business-friendly prime minister, would return to power diminished and in a coalition after a recent general election. One benchmark, though, fell especially sharply and has yet to recover: the Bombay Stock Exchange's index for Public Sector Undertakings (BSE PSU). It comprises 56 companies that have some private ownership but remain mostly owned, and entirely controlled, by the state.

This curious corporate structure dates back to India's independence from Britain in 1947 and the country's subsequent embrace of state planning, which was extended to encompass, in the Marxist-infused language of the time, “the commanding heights of the economy”. This came to include companies in everything from aviation and insurance to artificial limbs and banking. Only when India's economy opened to the world in the 1990s did the approach change. Since then, politicians have tried, with varying degrees of enthusiasm, to put firms under private control.

### Public profits



Killing off the leviathan has proved difficult, however. When Mr Modi entered office in 2014, he vowed to accelerate divestment. His signature achievement has been the sale in 2021 of Air India to Tata, a vast conglomerate from which the airline had been expropriated in the 1950s. More often, deals have stalled owing to suspicion the buyer will be ripped off by the state or because of objections from vested interests, including powerful unions, employees who receive benefits such as housing from the firm in question and politicians who like being able to influence hiring at state-controlled companies.

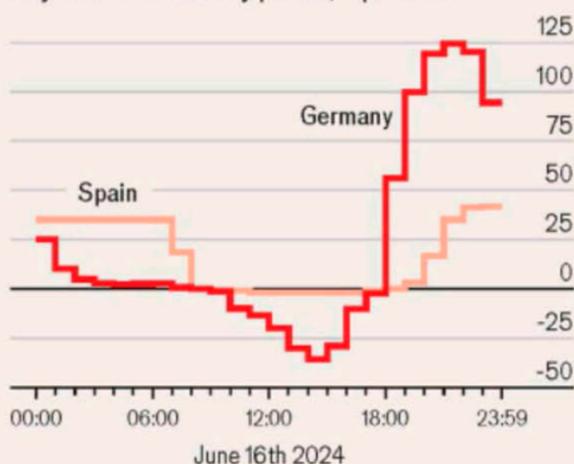
The consolation, at least until the election, has been the excellent performance of many state-owned firms (see chart). Profits at the dozen state-run banks that are included in the broader PSU index have risen from \$123m in the fiscal year that concluded just before the covid-19 pandemic to \$18bn in the most recent one. Half have a return on equity in excess of 15%, a rate better than many big global banks, reflecting government-prompted consolidation and reforms to bankruptcy procedures. Other state-owned companies have also been run more efficiently.

Why are the stocks now suffering? In part it is because investors fear India's new government will be less likely to impose reforms and to insulate the companies from regional political pressures on matters such as hiring, lending, factory openings and closings, and even the pricing of sensitive commodities like electricity, gas and petrol. More voices in government may also slow down further privatisation.

State-controlled firms in industries such as defence, infrastructure and technology saw their valuations rise as Mr Modi's previous government focused on boosting economic growth. Now they may receive less support as state spending and attention shifts to social programmes. This reflects a particularly damaging aspect of state capitalism: even if businesses are for a time well run, they remain vulnerable to changes in the political weather. ■

### Greens in the red

Day-ahead electricity prices, € per MWh



Source: ENTSO-E

Buy, borrow, die

## Sweet gains, bro

WASHINGTON, DC

**America's rich never sell their assets. How, then, should they be taxed?**

WHAT IS INCOME, really? Ask an economist and they might describe “Haig-Simons” income—the value of a person’s consumption of goods and services, plus the change in their net worth over a certain period. A lawyer might refer to Section 61(a) of the IRS Code 26, which defines “gross” income as “all income from whatever source derived”, including but not limited to commission, interest, property deals and wages. An accountant might talk about how to reduce that gross income, via deductions or carve-outs, to a skinnier “taxable income base”.

The answer matters. Whether governments should levy taxes on unrealised capital gains, as well as realised ones, is a topic of hot debate. In March, during the State of the Union address, Joe Biden reiterated his commitment to imposing a “billionaire minimum income tax” if re-elected. This would include a 25% tax on unrealised capital gains for Americans with more than \$100m in assets, which he expects would raise \$500bn (2% of GDP) over a decade. The Supreme Court is also considering the question. Its justices are poised to issue an opinion in *Moore v the United States*, a case in which the plaintiffs are arguing that a one-off tax on gains from an overseas investment was unconstitutional, since the 16th amendment, which enshrines in America’s constitution the federal government’s right to impose income taxes, does not apply to unrealised income.

A large portion of ultra-rich Americans’ wealth is in unrealised gains. Since the release of the “Secret IRS Files” by ProPublica, an investigative-journalism outfit, in 2021, a strategy known as “buy, borrow, die” has come under particular scrutiny. It allows those who employ it to avoid income and capital-gains taxes altogether.

Say you own a successful business—so successful that your stake in it is worth \$1bn. How should you fund your spending? If you pay yourself a wage of \$20m a year, the federal government will collect 37%, or some \$7.4m. So perhaps you should take a salary of \$1 and sell \$20m-worth of shares. If these were gifted to you upon founding the firm, the entire sum represents capital gains and will be taxed at 20%, which would mean a \$4m hit. What if, instead, you called up your wealth manager and agreed to put up \$100m-worth of equity as collateral for a \$20m loan. In 2021 the interest rate on the loan might have been just

2% a year, meaning that returns from holding the equity, rather than selling it, would easily have covered the cost of servicing the borrowing. Because the proceeds of loans, which must be eventually repaid, are not considered income, doing so would have incurred no tax liability at all.

The strategy is even more compelling once the “stepped-up basis” is considered. When the holder of an asset dies, the value for capital-gains assessments is “stepped up” from its purchase cost to its value at the time of death. In this way, “buy, borrow, die” does not simply defer capital-gains taxes—it can eliminate them entirely. Nothing is paid on gains made between the original purchase of an asset and the value at the death of the original holder.

**Taxman confounded**

Low interest rates and booming stock markets make a “buy, borrow, die” strategy particularly attractive. At Morgan Stanley and Bank of America (BoA), both of which run large wealth-management businesses, the total value of securities-backed loans to clients leapt from around \$80bn in 2018 to almost \$150bn in 2022. Banks are more than happy to make such loans. As lending tends to be collateralised by securities that can be easily seized and sold, it is treated as low-risk by regulators.

During the past few years of high interest rates, however, borrowing against as-

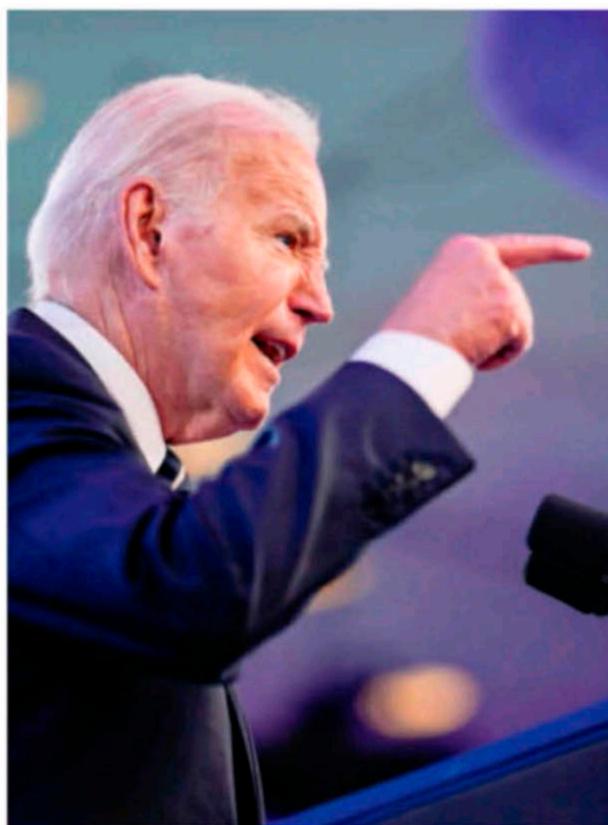
sets has become a riskier proposition. At Morgan Stanley such loans are structured as revolving lines of credit; three-quarters of them appear to have floating interest rates. If borrowing adds up to, say, 50% of a portfolio at a lofty valuation then a rout in the market can leave debtors with nothing. In 2022, after the share price of Peloton collapsed, John Foley, founder of the exercise-bike firm, ended up scrambling to restructure his loans, selling a \$55m house in the Hamptons just months after he had bought it. At BoA and Morgan Stanley the value of loans secured in such a manner had crept down by the end of 2023.

Yet politics, rather than high interest rates, represents the biggest threat to the strategy. There are three arguments against Mr Biden’s proposal: that it is unfair, that it is unconstitutional and that it would be an administrative burden. The fairness argument rests on the idea that unrealised gains are, in many ways, unreal. After all, the value of assets could change the day after a tax is paid. This perhaps explains why a survey by academics at New York University in 2021 found 75% of Americans oppose such taxation.

A clue as to whether the Supreme Court believes that wealth taxes are constitutional will arrive in the coming days, when justices opine on *Moore*. The plaintiffs were taxed under the Tax Cuts and Jobs Act, which was passed in 2017 and imposed a mandatory repatriation tax on the earnings, since 1986, of foreign corporations in which American shareholders own at least 50% of the stock. The levy applies regardless of whether the earnings were distributed to shareholders.

If the justices side with the plaintiffs, they may stop the push for an unrealised-gains tax in its tracks. But they seem unlikely to do so. Sonia Sotomayor, speaking for the court’s liberals, has noted that the concept of “realisation” was “well established” when the relevant constitutional amendment was ratified in 1913. As such, the early-20th century lawmakers could have specified that unrealised assets were to be left alone had that been what they intended. On top of this, at least two conservative justices have suggested they will not weigh in on the constitutional point.

As for the idea that wealth taxes on private assets are unworkable, that is too simplistic. Versions of them are already widely used in America, undermining arguments that they are impossible to administer in the country. Levies on property at the local or state level in effect act as taxes on unrealised capital gains. Every single American state has property taxes, which range from 0.3% to 2.3% of the property value each year. In more than half of states, property values are reassessed annually. Mr Biden’s plan also seeks to minimise headaches. It includes measures to smooth

**He's coming for your billions**

▶ volatility so that losses incurred in one year can be offset against gains in another.

Still, the bureaucratic effort to levy a new countrywide tax, on a small pool of people, on every kind of asset they might hold, would be wince-inducing. Valuing assets such as bonds and stocks is relatively straightforward. But private assets, whether a Picasso or an investment in a startup, would be another matter entirely. Adam Michel of the Cato Institute, a libertarian think-tank, points out that it took 12

years for the IRS and Michael Jackson's estate to reach a court-mediated agreement on the value of the late pop star's assets. "Going through such a process every year for all taxpayers with assets near some threshold is unworkable," he argues. Several European countries that have tried to levy wealth taxes and ultimately abandoned the effort have described administrative costs as a reason why.

Thankfully for Mr Biden, there is a less radical alternative that would have much

the same effect as going after unrealised assets. Eliminating the stepped-up basis, which Mr Biden also hopes to do, would remove lots of the incentive to buy, borrow and die. It would also probably avoid a serious legal challenge and be easier to administer. Such a move would raise a quarter of the sum the president expects his grander plan to fetch. Taxing capital gains at death would raise another hefty chunk. And closing a few additional loopholes would just about cover the rest. ■

## BUTTONWOOD

### *Buckle up, buttercup*

*Pricey American shares could get pricier still*

HOW CAN you tell it is time to get out of the market? In 1929 Joseph Kennedy, an American businessman and politician, supposedly realised the party was over upon hearing a shoeshine boy dispensing stock tips. In 2000 the exit doors beckoned after 17 "dotcom" firms paid millions of dollars each for brief advertising slots during the Super Bowl, an American-football extravaganza.

And so to a sell signal fit for 2024: Keith Gill is back on social media. Mr Gill was an architect of the meme-stock frenzy of 2021, exhorting retail traders to buy shares in GameStop, a struggling chain of video-game shops. After a three-year absence he is posting once again, now apparently in possession of a stake in the firm worth a few hundred million dollars. GameStop's share price has resumed a gut-churning roller-coaster ride and is up by more than 40% since Mr Gill's return; the ailing company has made use of the excitement to issue some \$3bn-worth of new shares. If you are looking for signs of speculative excess in markets, this is Exhibit A.

America's benchmark S&P 500 share index is hitting new highs every other week, fuelled by enthusiasm about artificial intelligence (AI). On June 18th this made Nvidia, a chip designer, the world's most valuable firm. The cyclically adjusted price-earnings ratio, popularised by Robert Shiller of Yale University, is at nearly 36. It has been higher only before the crashes of the early 2000s and 2022—and even then, not by much. That a correction will arrive at some point seems a racing certainty, but in the meantime there is a still more worrying prospect. As far as it has come, the rally may yet have further to go.

After all, pricey shares can always get pricier if investors keep bidding them up.

To see why they may now be especially prone to a melt-up, consider the concept of "duration". This is typically applied to bonds, and is similar to their maturity. It is the average time until a bond's future payouts, including both coupons and repayment, weighted by the size of each payout. Unusually in financial maths, which tends to be messy, duration has a rather elegant meaning: it is the sensitivity of an asset's price to changes in interest rates. A long-duration asset—a 50-year bond, say—is hammered by rising interest rates, and appreciates a lot if they fall. Cash, the value of which is invariant under such changes, has a duration of zero.

What about shares? Intuitively, those that derive much of their value from earnings in the distant future must be closer in duration to the long-maturity bond than to cash. So must stocks with a high price-to-earnings ratio, since it will take many years of profits to repay their initial cost. In other words, America's stockmarket—expensive overall, and led by tech behemoths promising an innovation-fuelled bonanza—has a very long duration.

Interest rates, meanwhile, are now poised to fall. True, at the last meeting of the Federal Reserve's rate-setting committee, which finished on June 12th, the median member expected only one cut before the end of 2024, down from three. But more significant was the fact that share prices rose on the news, suggesting investors had anticipated hawkishness rather than (as so often in recent years) underestimating it. Rates traders also expect the Fed's short-term rate to finish the year in line with its officials' projections. Markets have tended to be more doveish than the Fed, leaving scope for surprises that send bond yields up and long-duration assets down. Now, provided the Fed's next move really is down, the shoe is on the other foot.

There is an obvious counter to all this: that the recent buoyancy of share prices, in spite of rising bond yields, shows duration analysis to be drivel when applied to the stockmarket. A theoretician might reply that share prices have soared in spite of the downward pressure from interest rates, with expected future earnings being marked up by more than enough to compensate.

It would probably be closer to the truth to say that just now, for whatever reason, investors seem willing to buy whichever narrative paints the rosier picture. At the end of 2023 this was that bond yields were falling and monetary policy would soon follow. This year, as such hopes have faded, it has concerned AI and the resilience of America's economy. Do not be surprised if duration is soon back in the spotlight once a good-news story can be spun around it. Mr Gill's first appearance did indeed herald a crash, but only after plenty more euphoria. The shoeshine boys, your columnist hears, are not yet all-in.



## FREE EXCHANGE

### *Tipped over the edge*

*America's gratuity madness may soon calm, so long as Donald Trump does not get his way*



THINGS ARE big in America. That is true of houses, cars and food portions. Perhaps most shocking of all is the size of tips. In much of the rest of the world, gratuities are a small gesture for good service. In American restaurants they are *de rigueur*. And they are becoming more generous and more common. For workers who already get them, tips are growing; for those who do not get them, tips may be coming their way. But this cannot go on for ever. Look closer at the tipflation gripping America and a surprising conclusion emerges: the country may be approaching peak tip.

As with so much these days, Donald Trump has a hand in this. At a recent rally in Las Vegas, he casually inserted a radical proposal about halfway through his speech. "For those hotel workers and people that get tips, you're going to be very happy. Because when I get to office we are going to not charge taxes on tips," he said. It was, he argued, only right to stop the government from going after the earnings of people who provide good service.

This looks like smart politics. Mr Trump's pledge appeals to employees in the food industry, about a quarter of whom are Hispanic, a crucial group of voters. The fiscal implications are, however, ominous. In 2018, the most recent year for which data are available, Americans in hospitality jobs and the like reported about \$38bn in tipped income. Losing taxes on that—worth some \$10bn—would create a noticeable hole in the federal budget.

More worryingly, a tax exemption for tipping would alter incentives. Workers and employees in any tippable job would switch to lower base pay, leaving more to be covered as tips. Service jobs beyond restaurants, from car repairs to dentistry, would probably adopt tip-heavy wage structures. The Committee for a Responsible Federal Budget, a research group, reckons that tax losses could grow to about \$50bn a year. Congress would have to be punctilious in drawing up rules to forestall tax evasion.

What makes Mr Trump's proposal so intriguing is that it comes at a time when Americans have become frustrated with paying extra. The history of tipping, documented by Michael Lynn of Cornell University, is of steady rises. In the 1950s tips ran to about 10% of bills. By the 1980s they rose to 15%. In recent years they have hit 20%. Whereas tipping used to be reserved for table service at res-

taurants, now buying a coffee or a muffin is likely to involve the employee flipping around a tablet screen to the customer to solicit a tip. That can be hard to refuse when the person behind you in line is peering over your shoulder. And these screens typically give three options—of, say, 18%, 20% or 23%—making it difficult to opt for something smaller. A recent survey by Bankrate, a financial firm, found that 35% of Americans felt tipping culture was getting out of control, up by five percentage points from a year earlier.

So why do Americans persist with hefty tips? The conventional explanation is that it encourages good service. Anthony Gill of the American Institute for Economic Research, a think-tank, explains it as a solution to a principal-agent problem. Restaurant managers want good waiters, but struggle to monitor performance. Tipping in effect outsources supervision to the customer. Mr Lynn has found that when restaurants have eliminated tipping and instead charged higher prices, online customer ratings have suffered.

There is also a psychological element, according to Ofer Azar of Ben-Gurion University in Israel, another big-tipping country. People feel good about themselves when they leave extra, deriving a sense of generosity. Perversely, this may plant the seeds of tipflation: customers need to give a little more than the social norm in order to maintain their good feeling. As 20% becomes the norm, the next threshold, in a decade or so, may be 25%.

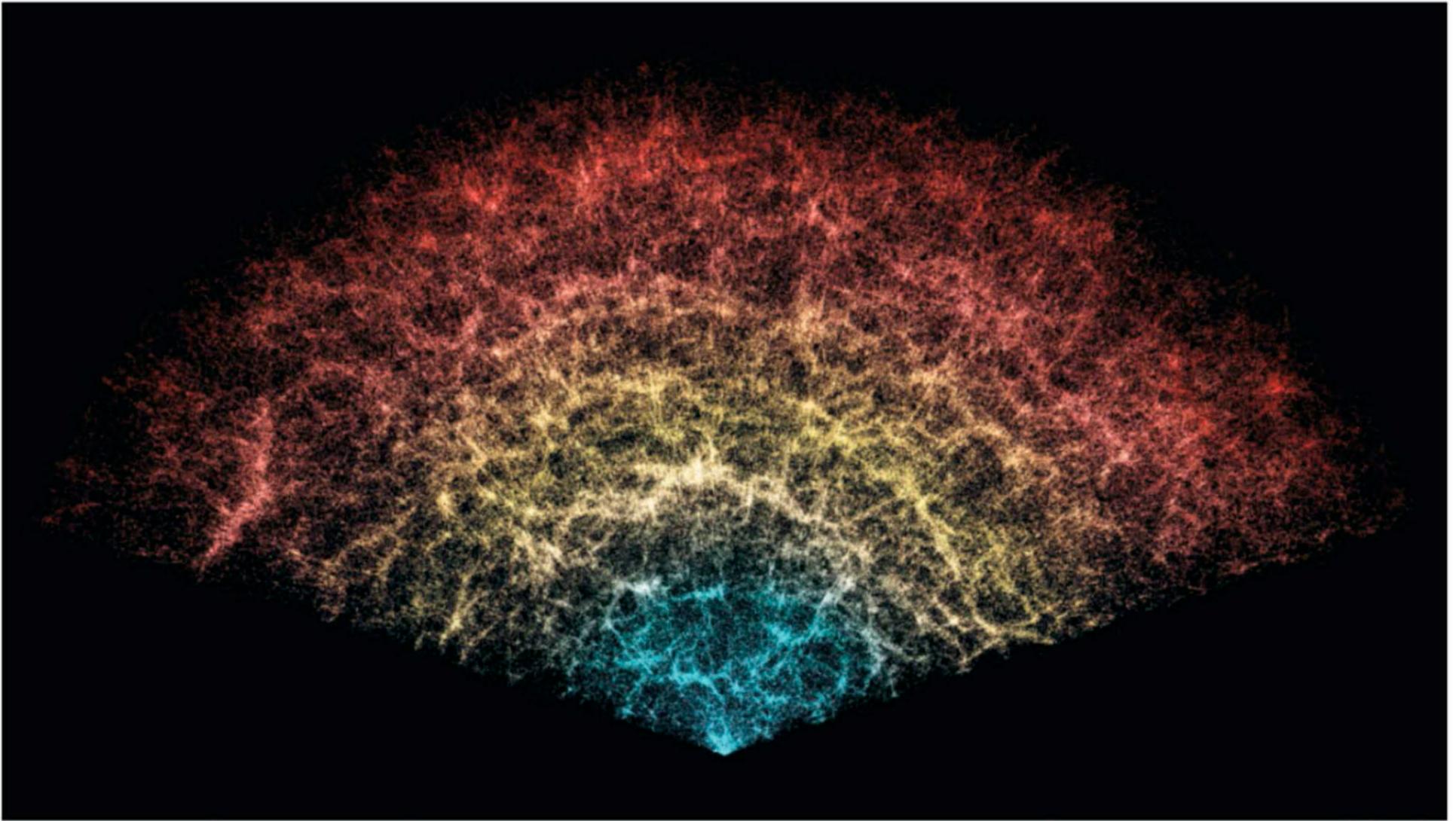
Yet there is reason to think America is approaching peak tip, so long as Mr Trump does not get his way. First, consider the sheer numbers. Tipflation is a form of super-inflation. If tips were a fixed percentage, they would rise at the rate of general restaurant inflation. Since the percentage actually increases over time, tipflation is bound to outstrip restaurant inflation. This matters because, following the price surge of the past few years, spending on meals out has hit 5.6% of post-tax incomes in America, up from the 4.5-5% typical in the previous half-century. People have long grumbled about tipping. Now complaints are more forceful.

The legal landscape is also in flux. Whereas Mr Trump's pledge raises the prospect of yet more tipping, state officials are pushing in the opposite direction. Many restaurants in America pay what is known as a tipped minimum wage, which can be as low as \$2.13. The rest—to get to the state minimum wage—is meant to be derived from tips. In practice many servers earn well above that. Restaurant owners like this system because it gives them flexibility to hire more workers and to keep menu prices down, knowing that customers will directly cover wage costs through tipping. But little by little cities and states are applying their true minimum wages to all workers, whether tipped or not. That is currently the case in a handful of states such as Minnesota and Oregon. Chicago and Washington, DC, have recently started down this path; Connecticut, Massachusetts and Ohio may be next.

#### A little gratuitous

Higher minimum wages raise labour costs for restaurants. Some establishments have responded by cutting staff or shutting during slow hours, while others have added mandatory service charges or raised prices. From a broader economic perspective, the impact need not be quite so dramatic: the main effect for customers will be to see some of the cost of their meal migrating from the tip line on their receipts to the upfront food price. This does not mean that gratuities will go away—they are too deeply entrenched in American life. But the eye-watering amounts may start to recede. The country is at a tipping-point. ■

## Science & technology



### Cosmology

## Cracks in the heavens

**New observations hint dark energy may break scientists' best model of the universe**

**I**N ARIZONA, AT Kitt Peak National Observatory, a telescope has spent three years building a three-dimensional map of the heavens. In examining the light from tens of millions of galaxies, the Dark Energy Spectroscopic Instrument (DESI) may have found something astounding.

DESI, as its name suggests, is a tool to investigate the nature of dark energy, a mysterious entity that accounts for 68% of everything in the universe and which pushes space apart in a repulsive version of gravity. Though they do not know what it is, scientists have hitherto assumed that the density of dark energy has been the same since the start of the universe, 13.7bn years ago. But DESI's initial results suggest that this assumption may have been wrong. Perhaps, say DESI's scientists, the density has been changing over time. "It's so bizarre," says Dragan Huterer from the University of Michigan, who was involved with the work. If the findings prove true, it would catapult cosmology into a crisis.

The study of dark energy is surprisingly

new. Direct evidence for its existence was not detected until 1998, when scientists discovered that extremely bright exploding stars called supernovas were moving away from Earth much more quickly than they ought to. Their conclusion: not only was the universe expanding, but that expansion was accelerating. "People did not expect that," says Adam Riess of Johns Hopkins University, who shared a Nobel prize in physics for the discovery in 2011.

Because it is hard to study directly, the true nature of dark energy remains poorly understood. The leading hypothesis is that it is energy intrinsic to the vacuum of empty space. Per quantum theory, a vacuum is not really empty, it fizzes with countless

pairs of particles and antiparticles that emerge from nothing, only to annihilate each other. These interactions produce a "vacuum energy" that, over the scales of the cosmos, could push space apart. This idea is not without its problems—when physicists try to calculate what this vacuum energy density would amount to, they get a value between 60 and 120 orders of magnitude larger than what observational evidence currently supports—a fiasco known as the vacuum catastrophe. "The general consensus is that resolving the [catastrophe] will require fundamental new insight," says Dr Huterer.

Vacuum catastrophe aside, dark energy now forms one of two central pillars of the standard model of cosmology, the best scientific description of the universe's evolution. The other pillar is dark matter, an invisible form of matter that makes up 27% of the universe. Regular matter, which constitutes stars and galaxies, accounts for a measly 5%. The standard model says that, after the Big Bang set the universe's expansion in motion, the gravitational attraction between atoms first led to the formation of stars and galaxies, while also acting as a brake on the universe's overall growth. As the amount of empty space increased, however, so did the amount of dark energy and, eventually, it took over as the primary influence on the evolution of the cosmos, driving the accelerated expansion that Dr Riess observed a quarter of a century ago. ▶▶

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▶ This expansion of the universe is expected to go on for ever, with galaxies eventually drifting out of each other's sight, a fate known as the Big Freeze. But if, as DESI suggests, the density of dark energy can change, other scenarios come into play: ever-denser dark energy could one day cause atoms and even the fabric of spacetime itself to burst apart, a scenario known as the Big Rip. Conversely, a dark energy of decreasing density could cause matter and gravity to take over the universe once again, recollapsing the cosmos into an inverse Big Bang, known as the Big Crunch. (Earthlings need not worry overmuch—the Sun will swallow up the innermost planets of the solar system long before either fate occurs.)

DESI's preliminary findings were announced at the American Physical Society's annual meeting in California in April, swiftly after a series of papers were published on arXiv, a preprint server. The papers contained the data from the first year of DESI's five-year survey. Tasked with capturing an invisible target, DESI has had to find creative, indirect methods to hunt for the signs of dark energy. The instrument's main task is to map the distribution of galaxies in space. Buried in this map are imprints of sound waves that travelled through the early universe. These patterns have grown as dark energy has caused the universe to expand. Analysing the most distant imprints in effect gives cosmologists a way of looking back in time, allowing them to chart the evolution of dark energy over the course of billions of years.

### Big crunch time

DESI's results suggest not only that dark energy's density has changed over time. According to Dr Huterer, what happened is even stranger than that: the density increased until around 4bn years ago and then it began decreasing (see chart). Nobody can explain why.

If the DESI team's results are right, it would mean a complete re-evaluation of what dark energy could be. "The moment

[dark] energy changes in time, it is no longer vacuum energy," says Bhuvnesh Jain, a cosmologist at the University of Pennsylvania. Alternative proposals already exist, centring on a dark-energy field called quintessence, which pervades all space and can change with time. However, Dr Jain says, the DESI results as they stand now indicate something more complex than the simplest quintessence models.

It would also mean that the standard model of cosmology, in its current form, is toast. It is no wonder, then, that DESI's results are causing consternation. But these are not the only vexing cracks in the model. For example, some astronomers have observed that matter in the nearby universe clumps together less than the standard model says it ought to and that the early universe does not seem to have been as uniform a place as the standard model's predictions say it should have been.

What's more, over the past decade different teams have measured differing values for the Hubble constant, the rate at which the universe is currently expanding (named after Edwin Hubble, an American astronomer, who worked out that galaxies were moving away from Earth at a velocity proportional to their distance from it). This would imply that cosmologists do not really understand the universe's historical expansion—or, by extension, how dark energy has behaved in that time. Recent observations from the James Webb Space Telescope, however, collected by Wendy Freedman of the University of Chicago and her team, seem to suggest these values can be reconciled, implying nothing unexpected in dark energy's behaviour. The results have yet to be published in a scientific journal, though, so not all sides in the debate are convinced.

All these problems have led some cosmologists to advocate for radical solutions—adopting more flexible notions of dark energy, for example, or working on an alternative to the standard model of cosmology. Some even go so far as to suggest that Albert Einstein's general theory of relativity, on which the model is based, may have reached its limits. "We know that sooner or later, it will fail. It happened to Newton, it will happen to Einstein," says Andreu Font-Ribera, a cosmologist at the Institute of High Energy Physics in Barcelona and another member of the DESI team. That would not mean that Einstein was wrong but only—small consolation though it may be—incompletely right. Just as Isaac Newton's law of universal gravitation was shown to be an approximation of general relativity under the right conditions (ie, across the relatively small distances and low gravitational fields on and around Earth), general relativity may also turn out to be the limiting case of some deeper, as-yet-undiscovered theory.

For now, all talk of replacing the standard model of cosmology, let alone general relativity, is motivated by hints and guesswork. But as the next generation of telescopes and observatories begins to generate data, a new, more complete picture of dark energy's role in the universe may emerge. The Vera Rubin Observatory in Chile, for example, will also chart the universe's expansion over time and map the universe's evolution over the past several billion years. That will start watching the heavens next year. The European Space Agency's Euclid, a space telescope, is already in orbit and building its own map of galaxies. It is likewise aiming to track dark energy through measurements of the universe's expansion. "You feel like the clues are almost there," says Dr Riess. "I keep waiting for a really smart person to put these puzzle pieces together." ■

## Football

### On the spot

#### Augmented-reality headsets could help players take better penalties

ARE YOU reading this, Gareth Southgate? As the England football manager prepares for his team's next match in this year's European championship, a Swiss neuroscientist is offering some help with their Achilles heel: penalty shoot-outs. (As a player, Mr Southgate is perhaps best remembered for missing a decisive spot-kick in a shoot-out against Germany in 1996.)

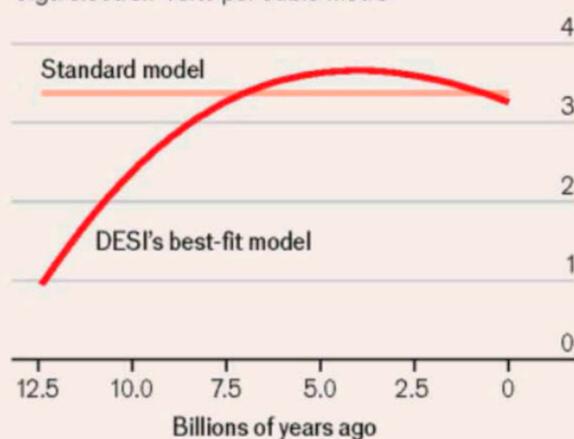
Penalty kicks are used at the knockout stage of major tournaments to determine ▶▶



The goal looks so small

### Next top model?

Density of dark energy through cosmic history  
Giga electron-volts per cubic metre



Sources: Dark Energy Spectroscopic Instrument; Dragan Huterer

▶ the outcome of drawn games. They have been used in more than 20% of World Cup matches, including the final in 2022, when France lost to Argentina. More than 30% of shoot-out kicks are missed, but pros and pundits disagree on the value of practice. In March Didier Deschamps, the French team's manager, railed against the suggestion his players could prepare better. "It is impossible to recreate a real penalty shoot-out on a psychological level," he said.

That may be true, but trials of a new augmented-reality system developed at the University of Fribourg, in Switzerland, suggest that penalty technique and success can very much be improved—even in the case of elite players. In a paper published in the *Innovation*, a journal, earlier this year, the researchers showed that just ten sessions of 20 kicks each were enough to increase by 35% the chance that international-level youth players scored a penalty.

"I cannot say we would get the same effect with Cristiano Ronaldo, because I haven't tested him. But I can say over all the players we tested it works, and it really works," says Jean-Pierre Bresciani, a neuroscientist who leads the research.

The technology focuses on the type of penalty favoured by three out of four professional penalty-takers, in which the kicker waits for the goalkeeper to move before propelling the ball into the empty part of the goal. The idea is to speed up the kicker's reaction time in cases when the goalkeeper fails to move in the expected direction, increasing their chances of switching tactic mid-stride.

Working with players from the under-18 teams of FC Luzern and FC Basel, two Swiss clubs, the scientists got penalty-takers to wear a headset that projected the avatar of a goalkeeper into the centre of a real goal. Each player was then asked to kick a real ball into one or other side of the goal, but to switch if the simulated goalie moved in that direction.

Dr Bresciani says that such tests offer several advantages over other penalty-taking drills. First, the avatars are programmed to move in consistent ways each time, which makes the results more reliable and useful for analysis than those using a real goalkeeper. And second, no human goalkeeper need muddy their shirt. Use of the headset significantly improved how quickly players reacted to an unexpected goalkeeper movement, shaving an average of 120 milliseconds off their response time. That is 28% faster than prior to training, which the scientists say would lead to a third more penalties scored.

With the European championship taking place just across the border in Germany, Dr Bresciani says he is eager to help any team that asks. With the knockout rounds beginning on June 29th, time is rapidly running out. ■



### Botany

## Blooming wonderful

**The female sex organs of flowers have a remarkable influence on fertilisation**

ANY BIOLOGICALLY aware parent who has started talking about the birds and the bees will have realised halfway through that what they are really discussing is flowers. Bees carry pollen grains from one plant to another, enabling fertilisation; birds digest and excrete the resulting seeds, allowing new blooms to grow.

The role that flowers themselves play in their own reproduction, however, remains imperfectly understood. In a new paper published recently in *EMBO Reports*, Mizuta Yoko at Nagoya University and her colleagues unveiled the secrets of this process with unprecedented detail. Among the revelations that arose from her 13-year-long investigation was the degree of control that a flower's female sex organs have over the fertilisation process. Not only do they have the power to attract male reproductive cells, but they can also repel them once fertilisation has begun.

The vocabulary of reproduction is, fortunately for parents, the same across the animal and plant kingdoms. A male reproductive cell is a sperm, a female reproductive cell is an egg. When the two meet under the right conditions, an embryo forms. Such conditions, always tricky to engineer, are even more complex for flowering plants as their sperm cells cannot move. To overcome this limitation, their sperm cells are packaged in microscopic grains of pollen. When the wind blows, say, or a bee visits, these pollen grains can then come into

contact with another flower's pistil, the rod-like structure typically located in its centre that contains the ovules, each of which in turn contains an egg cell.

To penetrate the surface of the pistil and reach a flower's eggs, a grain of pollen must create a pollen tube. The tube grows out of the pollen much like a seedling emerges from a seed. But if several pollen tubes converge on one ovule—a phenomenon known as polytubey—the offspring may contain too many copies of the paternal DNA and not form viable seeds. Yet polytubey rarely happens, despite the large numbers of pollen tubes and ovules involved. (A typical fertilisation event of *Arabidopsis thaliana*, botanists' favoured guinea pig, involves an average of 60 ovules and pollen tubes, each of which somehow finds a one-to-one match.)

To better understand why things run so smoothly, Dr Mizuta and colleagues developed a new microscope technique to observe inside a living pistil of *A. thaliana* in real time. Perfecting their technique took three years of painstaking, repetitive labour. Getting good footage took ten more. The results are the first such videos capturing the movement of individual pollen tubes within a pistil.

It has been worth the wait. In previous studies, researchers had shown that ovules send chemical signals which attract pollen tubes. These attractive signals were thought to disappear once an ovule is fertilised. The first thing the research by Dr Mizuta and her team confirms is that they do indeed vanish. It also adds valuable information about where and when fertilisation occurs. For example, they observed that pollen tubes fertilise a pistil's ovules more or less at random, rather than in an orderly fashion—from the top of the pistil to the bottom—as some had hypothesised.

The videos also revealed a new aspect of the mechanism that blocks polytubey. When Dr Mizuta and her team looked through their videos, they observed some pollen tubes seemingly trying to enter an ovule before suddenly turning away. That led the team to conclude that the ovule is capable of repelling unwanted pollen tubes once fertilisation has begun. They suspect that this repulsion arises when proteins in the ovule come into contact with receptors on the pollen tube (or, perhaps, vice versa), somehow inducing it to change direction.

Many will be watching the team's work closely. As important crops like rice, wheat and corn all reproduce in a similar way to *A. thaliana*, says Mark Johnson, a cellular biologist at Brown University who was not involved in the research, a better understanding of the mechanisms involved could help farmers boost future yields. Dr Mizuta and her colleagues hope to keep expanding that understanding. ■

## Artificial intelligence

## Painting by numbers

BOSTON

Ever more baroque laws of physics may inspire better image-generating algorithms

TODAY'S BEST image-generating artificial-intelligence (AI) models are remarkable. Ask OpenAI's DALL-E 3, or its counterparts Midjourney and Stable Diffusion, to draw a penguin sipping on a vodka martini on the French Riviera and they will do so with aplomb. Ask them to replicate it in the style of Rembrandt or Caravaggio and they will speedily oblige.

These abilities all depend on a family of physics-inspired algorithms known as diffusion models. For now, they reign supreme. But that may not always be the case. A team of physicists and computer scientists at the Massachusetts Institute of Technology (MIT) has been taking inspiration from the laws of nature to come up with a series of increasingly sophisticated algorithms that can generate higher-quality images faster, and with smaller training data sets, than diffusion models.

Diffusion models mimic the maths of the physical process of diffusion, the flow of particles from areas of high to low concentration as they are randomly jostled about in space. The MIT team's more advanced algorithms make use, instead, of the equations of electromagnetism—and may one day even use the mathematics that govern the forces at play in the atomic nucleus. This work suggests that computer scientists have barely scratched the surface of how generative algorithms can work. A new school of AI art is emerging.

The goal of a good generative algorithm is, ultimately, to create bespoke images from scratch. One growing class of models, to which DALL-E 3 and its counterparts belong, does this by taking vast data sets of training images and distorting them, pixel by pixel, until they are indistinguishable from visual static. As the patterns underlying these distortions are identified, the algorithm can run combinations of them in reverse, allowing entirely new images to be born out of nothing more than background noise.

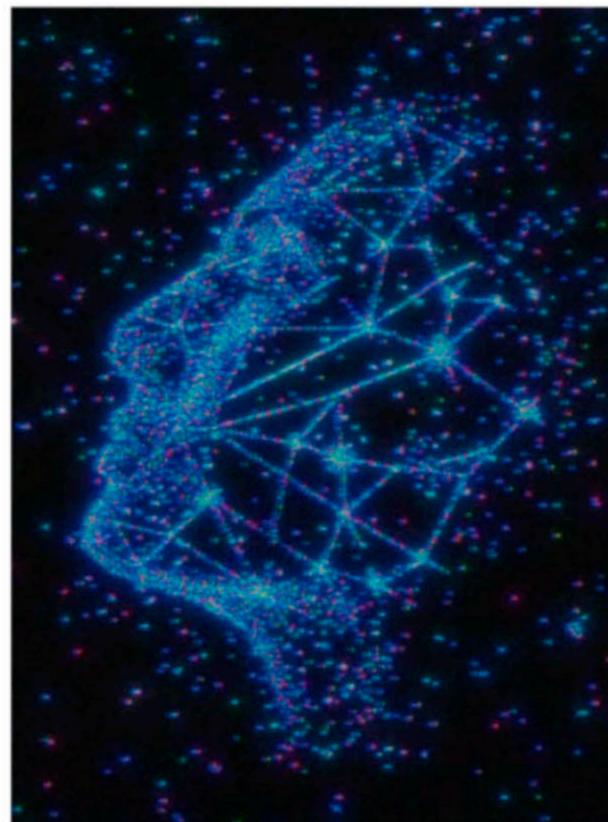
This means that mathematical ways of inducing distortion are in high demand. Enter diffusion. Imagine, for simplicity's sake, a monochrome picture consisting of a single pixel. To a computer scientist, that picture can be represented by a point on a single axis running from white to black. Or, in other words, as a point in one-dimensional space. For every pixel that is added to the picture, the number of dimensions increases by one—and the picture is

now represented by a point in multidimensional space. If random noise is added to that point (by changing the colour of the image's constituent pixels), it will then move randomly in its multidimensional space—a process mathematically identical to that of a particle undergoing diffusion.

The fact that mimicking such simple physical processes has had such profound computational benefits caught the attention of Max Tegmark and Tommi Jaakkola, two physicists at MIT, and their graduate students, Yilun Xu and Ziming Liu, in 2022. Together, they set out to explore whether models trained on more complex processes might do an even better job of image generation. They started by toying with the physics of electrically charged particles. Unlike in standard diffusion, the journeys of charged particles are not truly random. Repelled and attracted by their neighbours, they are governed instead by the electric field in which they exist.

### It's electrifying

This behaviour can be emulated in the way that noise is added to a digital image. Recall that images can be represented as points in a multidimensional space defined by the colours of each pixel. If these points are treated like particles with identical electric charge, they ought to repel one another, moving in opposite directions until the system reaches electrostatic equilibrium. Or, in other words, each image will



change in response to every other image until all have been sufficiently distorted.

It turns out that a machine-learning model trained to reverse this process can have considerable advantages. This is because the distorting noise is not merely random, as in diffusion models, but carries additional information about the training data. That makes for a more efficient algorithm. Mr Xu, Mr Liu and their colleagues then published a preprint outlining this new class of models. They called them "Poisson flow generative models" (PFGMs), named for Poisson's equation, which describes the electric field created by static electrical charges. Judged by industry standards, PFGMs generate images of equal or better quality than state-of-the-art diffusion models, while being less error-prone and requiring between ten and 20 times fewer computational steps.

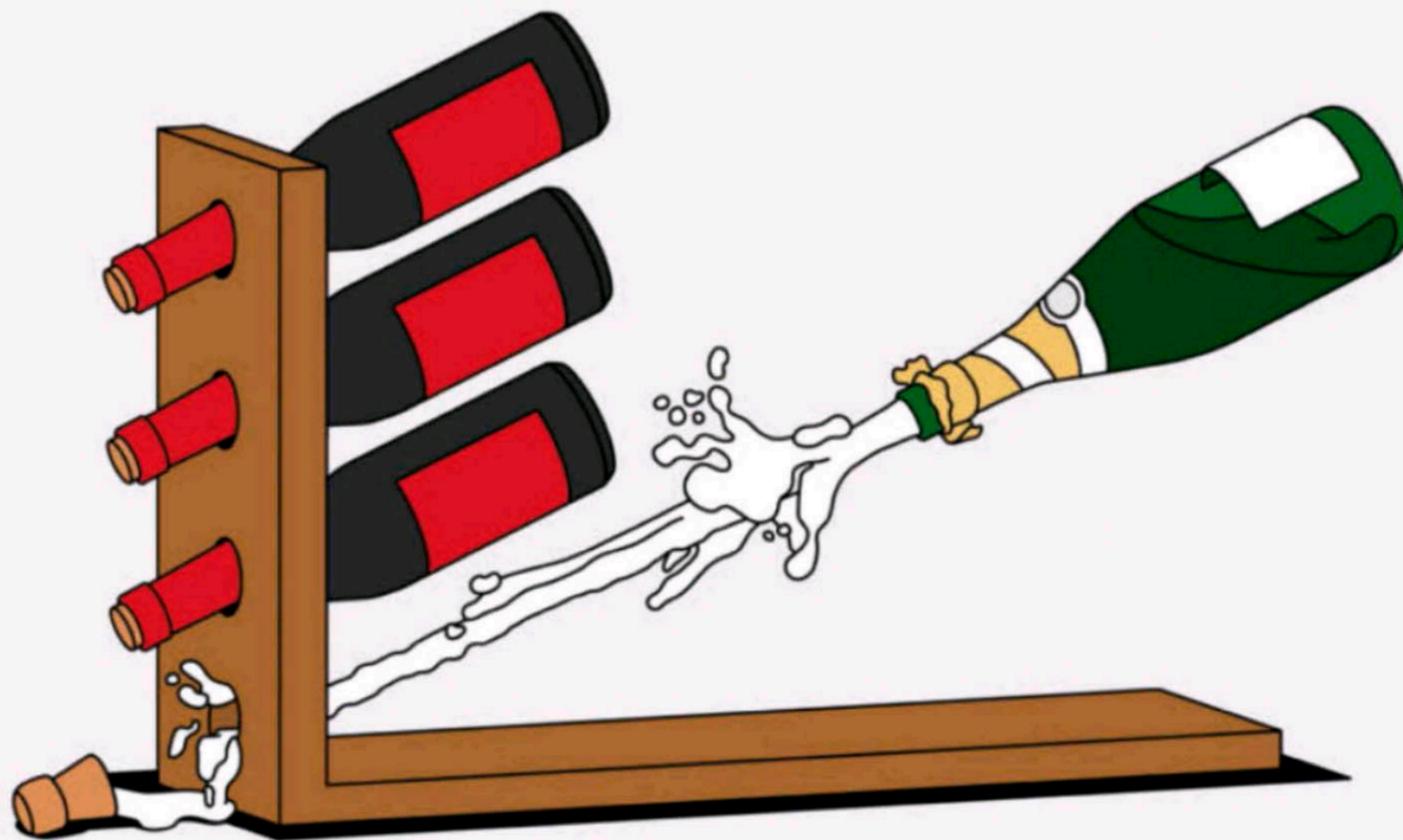
The researchers were not done yet. They also turned their attention to Coulomb's law, the equation that governs the strength of the electric field which exists between two charges (and from which Poisson's equation can be derived). The researchers found that changing the number of dimensions in which Coulomb's law operates has implications for a PFGM's behaviour. Fewer dimensions result in models that require more data to train but that need fewer parameters, make fewer errors and produce more consistent images. More dimensions result in models that require less data to train but are bulkier, more error-prone and less consistent.

In a subsequent preprint, the team called this broader family of electrostatic models PFGM++. They also made a surprising discovery. When the number of dimensions in the equations is taken to infinity, the distortion algorithm behaves like a standard diffusion model. This means that PFGM++ folds all the current physics-inspired generative models into one family.

Still more complex distortion mechanisms beckon. The next target for Messrs Xu and Liu is the weak interaction, which, alongside electromagnetism, gravity and the strong interaction, is a fundamental force of nature. (Imperceptible at human scales, it is responsible for certain types of radioactive decay.) Conveniently, its equations are almost identical to those used in the PFGM++ family of models.

The weak force, however, has special properties that the electromagnetic force does not. For one thing, it does not need to conserve the number of particles. Pairs of particles can mutually annihilate, and new ones can pop into being. If this physics is translated into an algorithm, it may unlock new behaviour: compressing data with record efficiency, for example, or offering applications in cell biology where objects multiply or die out. How well it can draw a penguin, though, remains to be seen. ■

## Culture



### The champagne boom

## Bottles up

PARIS

The French sparkling wine is being taken more seriously by collectors

NAPOLEON BONAPARTE was a champagne enthusiast. He became friends with the heir to Moët & Chandon, now the world's largest seller of French bubbly, while studying at a military academy. Later, as emperor, Napoleon stopped in Épernay on his way to, and back from, war. "In victory, you deserve champagne; in defeat, you need it," he said.

Champagne now merits its own victory tour. The value of sales of champagne hit €6.4bn (\$6.9bn) in 2023; 2021-23 were the best years on record, even after accounting for inflation (see chart). Over the past five years the "Champagne 50" index, which tracks the value of the top brands traded on Liv-ex, a wine-buying platform, has surged by 47%, more than any other regional index worldwide, including Bordeaux (up by 1.3%), Burgundy (25%) and Italy (29%). In the past half-decade the *Wine Advocate* has published more articles and

reviews devoted to champagne than it did in the preceding 41 years since its founding, says William Kelley, the editor-in-chief. (Bottles can bear the "champagne" name only if they hail from that region of north-eastern France near Épernay.)

On June 20th in Paris Sotheby's is holding the world's first champagne-only auction, which is expected to raise €1.5m-1.9m. From 2022-23 the volume and value of champagne sold by Sotheby's nearly tri-

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pled. Last year a champagne producer, Krug, ranked in the top ten wine producers sold by the auction house for the first time.

The fact that wine aficionados have only lately lapped up champagne may be a surprise. Champagne has long been a luxury brand in its own right, a global symbol of celebration and splurging. LVMH, a French luxury-goods juggernaut, has collected champagne companies like a tippler acquiring bottles: it owns seven, including Dom Pérignon, Krug, Moët & Chandon and Veuve Clicquot. Together, they account for an estimated 46% of global champagne sales by value and 23% by volume, according to Edouard Aubin of Morgan Stanley. (The disparity arises because LVMH sells a lot of "prestige *cuvées*", an elegant-sounding term for expensive bottles.)

Big champagne houses can afford Balthazar-size advertising budgets. For much of modern history champagne has been "pushed as a bubbly drink for bubbly people", writes Robert Walters in "Bursting Bubbles" a book about champagne. It has been drunk by rappers and those wrapping up their evenings at night clubs. This "double-edged marketing...has both led to champagne's incredible popularity and diminished its reputation" among connoisseurs, according to Mr Walters. Oenophiles did not take it very seriously. ▶▶

▶ “Champagne was considered a fine thing, but not necessarily a fine wine,” explains Justin Gibbs of Liv-ex.

Wine-lovers, however, have started to look at their champagne flutes differently. “People now view champagne as a wine and not just a celebratory drink,” says Jamie Graham of Brunswick Fine Wines and Spirits, a British merchant. Instead of being regarded as a mere aperitif to be sipped before moving on to something more serious, champagne is now being savoured and paired with food more often.

Two things changed. One was covid, which gave wine-lovers more time at home to research and try new bottles. It may seem odd that a festive drink flourished at such a bleak time. But well-off people who were not going out to dine in restaurants sought pleasures at home, sometimes bidding in online auctions for new bottles. They also had more time to study the *terroir* of champagne and producers’ different methods of blending and adding *dosage* (a mixture including cane sugar that sweetens it before bottling). In other words, drinkers started to “understand there is a wine behind the bubble”, says Arthur Larmandier of Larmandier-Bernier, a champagne house. At first Mr Larmandier thought it would take five years for champagne to bounce back from covid; instead, demand surged, and it “took six months”.

The second factor is more appreciation for the smaller houses that produce limited quantities of high-quality bubbly. Prices for these “grower” champagnes have rocketed on the secondary market: the *Wine Market Journal’s* grower-champagne index has more than doubled in value since 2019. Oenophiles now invoke these winemakers’ last names with the fondness that football players refer to their teammates: Selosse, Prévost, Collin, Bouchard, Egly-Ouriet. (Selosse, at around \$650 a bottle, is the Lionel Messi of grower champagne.)

Growers have brought artisanal wine-making techniques to champagne, relying more on ripe, carefully tended grapes than on *dosage*; this leads to a lower sugar profile and greater complexity. Appreciation of grower champagne connects with a broader trend in culture, including gastronomy, whereby people are seeking out local, authentic producers and tastes, says Mr Kelley of the *Wine Advocate*. More reviews of champagne by Mr Kelley and fellow critics piqued the interest of collectors and investors, who found even the highest-quality champagne undervalued, relative to top wines from Burgundy and Bordeaux.

The grower-champagne producers are disrupters, changing not only oenophiles’ minds about French bubbly but also the viticulture practices of some of the largest houses. Recently the *grandes marques* have been investing more in releases from specific vineyards, which can compete better

with grower champagne. They have also altered their marketing, no longer showing photos of suit-clad cellar masters in wine caves but instead featuring them in humble attire in vineyards, closer to the vines.

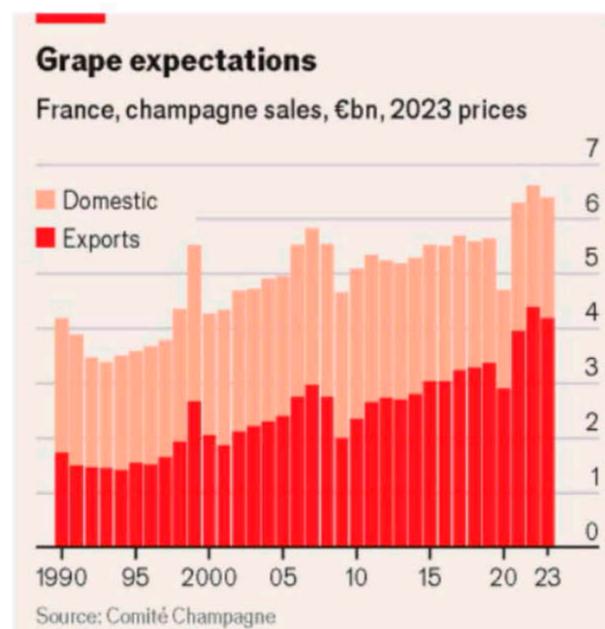
This is not champagne’s first transformation. In the 17th century, when Dom Pérignon, a monk, was making it in his abbey, bubbles were seen as a flaw: champagne then was a still wine. (Though Pérignon is credited with being the “inventor” of champagne, that is just marketing; his famous remark “Come quickly, I am drinking the stars!” first appeared in a 19th-century advert.) It was only in the 18th century that the Champagne region embraced bubbles, as both a source of differentiation and a justification for higher prices.

### Flights of fancy

What does the future hold? France used to buy most champagne, but that changed in 2012. Now America and Japan are important growth markets, says Stéphane Dalyac, chief executive of Laurent-Perrier, a prominent house. Unlike many firms peddling well-known luxury brands, bubbly-makers are not optimistic in the near term about China, where buyers over 40 tend not to gravitate to the cold fizziness of champagne, Mr Dalyac says.

But the sun is shining on champagne in many ways. Climate change is helping the region’s wine by ripening grapes naturally, therefore requiring less *dosage*, says Peter Gibson of the *Wine Market Journal*. Many think the effect of grower champagne will endure, elevating the whole region’s quality for years to come.

Recently champagne houses, thirsting for greater profits, decided to raise prices heftily to exploit the boom, thinking drinkers would tolerate it. However, demand for some fine wines has sputtered, sending wine indexes down. Inflation more broadly and economic uncertainty have also caused consumers to pull back. Champagne houses may be forced to adjust prices downward slightly, to keep demand high. Call it a champagne problem. ■



## History

# Who are you calling a Neanderthal?

**The Invention of Pre-history.** By Stefanos Geroulanos. *Liveright*; 512 pages; \$29.99 and £22.99

THERE IS NO doubt that the past can shape the future in profound ways: consider climate change, for instance. It is also true that imagined pasts can influence real-world events. Vladimir Putin invokes history to justify his invasion of Ukraine, picturing it as a child that was snatched from Mother Russia and should be returned. Ukrainians see things differently. This clash of visions underpins the bloodiest war in Europe since 1945.

Imagined histories can shape the present in subtler ways, too. Take pre-history, the 3m or so years of human evolution before the invention of writing (thought to be in the fourth millennium BC). A new book by Stefanos Geroulanos, a professor of European intellectual history at New York University, offers a sweeping exploration of Western ideas about early humankind. He shows that theories about the ancient past have exerted a strong and sometimes pernicious influence on the modern world. “Pre-history is about the present day,” Mr Geroulanos writes. “It always has been.”

Interest in pre-history grew in the 18th century. The discovery of new continents and rising disillusionment with religious creation myths encouraged thinkers to devise new theories about human origins. Yet the Enlightenment belief in the scientific method did not guarantee its application. The idea of “stages” of human development, typically divided into three—savage, barbarian and civilised—persisted.

Indigenous people were excluded from this concept of progress. European thinkers considered them to be much like humans’ long-ago forebears. After the publication of “On the Origin of Species” in 1859, the concept of the “struggle for existence” took hold. Travelling in Africa, the Americas and beyond, Charles Darwin observed that “The varieties of man seem to act on each other; in the same way as different species of animals—the stronger always extirpating the weaker.” As such, the slaughter of native peoples was seen to be in line with a ruthless natural instinct.

Archaeological evidence has sometimes reinforced misguided judgments rather than rectified them. In 1908 a French scholar examined a Neanderthal skeleton, but downplayed signs of arthritis. Its bent spine was subsequently thought to be a

## BACK STORY

### *Art and Mammon*

*A row over sponsorship betrays childish misconceptions about money and power*

TRY AS HE might, Joe Biden struggles to restrain Binyamin Netanyahu. So it is doubtful that a British literary collective can have much sway over Israel's prime minister. But though the group may not halt the war in Gaza—or mitigate climate change, its other avowed mission—it has performed one useful service. It has exposed the deep misconceptions that often feature in clashes over cultural funding: about power, morality and the exigencies of art.

The collective, Fossil Free Books (FFB), has set its sights on Baillie Gifford, a Scottish asset manager, which until recently sponsored ten literary festivals in Britain. The firm, charge the activists, invests in fossil-fuel producers and companies tied to Israeli security. (“Solidarity with Palestine and climate justice are inextricably linked,” FFB questionably maintains.) Their convoluted strategy involved pressuring the festivals and urging authors to withdraw from them, in the hope of pushing Baillie Gifford to divest from these holdings. “Disruption” and “escalation” were promised.

Cue protests, cancellations and a social-media pile-on. The upshot is that Baillie Gifford has indeed divested—from the festivals. After this year it will no longer sponsor any, nor the associated programmes for children that were its charitable focus. Three galleries (and counting) will forgo its help too. When the Hay book festival, Britain's most prestigious, cut ties with the firm, FFB crowed: “This announcement shows the power we have when we unite.”

This statement is accurate. The episode shows exactly the sort of power such campaigns have—and the kind they don't. The butterfly effect does not apply: boycotting a book festival in Wales will not prevent extreme weather



events, nor drive back Israeli tanks to their barracks. These antics cannot force Baillie Gifford to dispose of any holdings, since it can do that only on its customers' say-so. Rather than damaging its brand, the fuss has shown that it prioritises clients' interests. None has withdrawn their money.

The activists do, however, have the power to hurt Britain's book festivals, which must cobble together funding at a time of shrinking state subsidy. Some may have to put up prices for punters; others may fold. Perhaps that is a sacrifice worth making to achieve what FFB calls “a literary industry free from fossil fuels, genocide and colonial violence”. This smells like activism aimed less at global warming than the warm glow of moral smugness, more concerned with seeming good and feeling good than doing it.

In a second misconception, the likes of FFB fail to face the moral realities of a globalised world. By any sane measure, Baillie Gifford is no villain. Only 1% of the £225bn (\$287bn) it manages is invested in fossil-fuel producers; it invests far more in green technologies. As for its alleged stake

in “Israeli apartheid, occupation and genocide”, it mostly consists of shares in tech giants like Amazon and Nvidia.

The idea that any investment outfit, or indeed any person, could sever every remote and indirect link to fossil fuels or Israel, an important tech hub, is an adolescent fantasy. British authors ought to know that: their books are sold on Amazon and in Waterstones, a bookshop chain owned by Elliott, a hedge fund that trades oil. In a spider's web of global connections, moral lines and prohibitions are bound to be drawn imperfectly. That is one reason to hesitate before imposing yours on others.

The third delusion is that pristine art and filthy Mammon can ever be separate realms. Like everyone else, writers and artists must make ends meet; they have always made compromises to do so, whether in blithe ignorance, embittered hypocrisy or emasculating gratitude. In bygone eras they relied on patrons, from Roman emperors to the feudal overlords and corrupt prelates of the Renaissance. “I should be Employ'd in Greater things,” William Blake groaned in 1802 as he churned out hack work for a benefactor.

In the modern age of mass literacy and commercial entertainment, the moral hazard has been dispersed rather than eliminated. Now the compromises are over how much creative folk charge, which fads they pander to, which middlemen they employ and so on. Even today, some artistic endeavours tend to require munificent patrons. These include full-scale opera, museum construction—and book festivals.

Artists who repudiate support from the likes of Baillie Gifford are naive about power and childish about morality. More than that, if it's purity they covet, they are in the wrong business.

▶ typical trait of the species rather than one man's affliction. Partly thanks to this, Neanderthals were for decades depicted as dark, hunched, hairy and often miserable-looking brutes.

There are plenty of villains in this story, many of them respected sages in their own time. In 1925 Raymond Dart, an anthropologist working in South Africa, wrote about his discovery of a child *Australopithecus africanus*. The species would come to be understood as the direct ancestors of *Homo*,

the genus of modern humans, and the region known as “The Cradle of Humankind”. But Mr Geroulanos suggests that racial prejudice coloured Dart's attitudes. In the 1950s he offered almost ghoulish descriptions of imagined prehistoric savagery; Dart's argument “certainly hinted that the brutality of Africans' origins influenced Africans in the present day”, Mr Geroulanos observes. The theories thus appealed to supporters of apartheid.

Historians today are more meticulous,

though the author gently chides Yuval Noah Harari, a popular writer, for asserting on thin grounds that civilisation started with cooking. Recent scientific advances—such as the Nobel-prizewinning work done by Svante Paabo, a Swedish geneticist, on sequencing the Neanderthal genome—have unlocked new areas of inquiry. But Mr Geroulanos insists that “However much we may ‘know’ about Neanderthal man and his predecessors, “he continues to say more about us.” ■

## Hollywood

## No city of angels

LOS ANGELES

Los Angeles still inspires new takes on film noir

“MIDDLE OF A drought and the water commissioner drowns,” the mortician remarks drily to Jake Gittes, a private investigator played by Jack Nicholson (pictured): “Only in LA.” Indeed. June 20th marks the 50th anniversary of the release of “Chinatown”, the film truest to the Los Angeles of the countless noirs set in America’s second-most-populous city. Other films revolve around Hollywood—or at least its dark, gritty edges—where every millionaire, wannabe actor and insurance agent has a secret worth killing for. But Gittes was fixated on water, or the lack thereof, a perennial problem in a city that is otherwise constantly changing.

Film noir was so named by French critics after the second world war. It is a style of film-making that often features a cynical anti-hero who either sleuths for a living or finds himself accidentally drawn into an investigation. Think of Humphrey Bogart as Philip Marlowe in “The Big Sleep” (1946), a film based on Raymond Chandler’s novel. Or of Barton Keyes, an insurance claims investigator, hellbent on sniffing out fraud in “Double Indemnity” (1944). There is a good chance that crooked cops, cover-ups, pretty blondes and business tycoons will turn up at some point in the story. The closest thing to a happy ending is that not everyone will end up dead.

“Chinatown” was released several decades after the genre’s heyday in the 1940s-50s. The film, and the “neo noirs” that followed it, tried to strike a balance between paying homage to the classics and turning the genre on its head. In 1982 “Blade Runner” transported viewers to the futuristic Los Angeles of 2019. Rick Deckard (Harrison Ford) searches for bioengineered humans who are not supposed to be on Earth, let alone in the City of Angels.

Crime flicks can be made about any city. But Los Angeles cornered the market back when Chandler was writing screenplays. Many great crime novelists have lived there, including Chandler and, later, James Ellroy. But their novels need not be adapted faithfully. “Double Indemnity”, after all, was based on a murder in Queens.

Why does Los Angeles continue to play a leading role in film noir? Its status as America’s long-reigning film capital is part of it. The city also lends itself to film noir because it is such a study in contrasts. The relentless sunshine and skinny palm trees jar with the genre’s violence and corrup-

tion. LA is where people come to make it, and only a few succeed.

What happens to those who are disappointed? Wannabe starlets become call girls. Men who cannot pay their mortgage become muscle for mobsters. Danny DeVito, who plays a smarmy tabloid journalist in the neo-noir “LA Confidential” (1997), based on a novel by Mr Ellroy, gives an oleaginous monologue that encapsulates the duality of LA noir. “You’d think this place was the garden of Eden,” he says, “but there’s trouble in paradise.”

A newer spate of LA noirs fetishise the genre even while challenging its conventions. In the television series “Lucifer”, the lord of Hell solves murders alongside a city detective. There are sometimes musical numbers to offset all the killing. In “Sugar”, which premiered on Apple TV in April, John Sugar, a private investigator, is a cinephile. He wears a suit and drives an old Corvette in the mould of Marlowe or Gittes. A girl goes missing, and as Sugar investigates, he finds each member of her family to be corrupt in their own way. Sugar, too, loses sight of himself the more he obsesses over the case. The series even begins in black and white and features old film clips throughout.

But unlike the classics, Mr Sugar is no sarcastic anti-hero. In fact, he is nice. He does not sneer, antagonise police or hit women. He does not like guns. He helps the homeless and even adopts a dog. It is a far cry from the blood-soaked impunity of “LA Confidential”, in which almost everyone is unlikeable and gets shot. He solves his case and saves the girl.

Gittes is not so lucky. His efforts, like many a private investigator in film noir, prove futile. “Forget it, Jake,” his partner says when the woman he wants to protect is killed. “It’s Chinatown.” ■



The man who nose too much

## Money-laundering

## When screens clean the green

**Rinsed.** By Geoff White. *Penguin Business*; 288 pages; £20. To be published in America in August; \$38.99

ON JUNE 2ND Bill Guan, the chief financial officer of the *Epoch Times*, a right-wing newspaper, was arrested. Prosecutors in New York charged him with laundering \$67m, allegedly buying pre-paid debit cards using cryptocurrency. (Mr Guan has pleaded not guilty.) Chainalysis, a blockchain-analysis firm, estimates that \$22.2bn in illicit funds were laundered globally using cryptocurrencies in 2023. Despite Western sanctions, Iran, North Korea and Hamas, a terrorist group, all launder funds with crypto.

As Geoff White, a journalist, makes clear in a gripping new book, money-laundering can seem bloodless and abstruse, but it is going to become only more relevant and widespread. That is because technology is making this kind of crime easier—and much harder to detect.

Cleaning dirty money involves three steps. The first is “placement”, getting it into the financial system so it does not sit unproductively under a mattress. During the heyday of Pablo Escobar, a notorious Colombian drug kingpin, in the 1980s, couriers travelled with briefcases stuffed with cash to Anguilla, a Caribbean island with appealing banking-secrecy laws, and deposited it in local banks. Now people can get intermediaries to change stolen funds into bitcoin—or do it themselves—without the need for an aeroplane ticket.

The second step is “layering”, which means bouncing money around to sever its connection from its predicate crime. This has often involved routing funds through foreign banks and shell companies with stand-in owners. Today cryptocurrency “mixers” can mingle a customer’s bitcoin with other cryptocurrencies. The mixer then returns the same amount that the customer started with, but it has become significantly harder to trace.

The last stage of the laundering process is “integration”, or removing now-clean funds and using them to buy things. Ideally this involves assets that can either increase in value, such as art and property, or can generate cash (a car wash featured in “Breaking Bad”, one of the few crime shows to make money-laundering a pivotal plot point). This largely remains a physical process that, as Mr White explains, “sometimes comes down to a network of human

beings, who physically go to the ATMs and withdraw the money in old-fashioned, untraceable cash". But here, too, technology helps: easy communication facilitates the creation of ever-larger networks across multiple jurisdictions.

Jurisdictional whack-a-mole confounds the policing of cybercrime involving crypto. Mr White's most gruesome chapter zeroes in on Welcome to Video, a site on the "dark web"—a part of the internet only accessible with anonymising software—that charged users in bitcoin to download images of child sexual abuse. Once investigators gained access to the site's back-end, they could trace payments back to users, but not to its operator, who created more than 1.3m addresses to receive payments. Careful analysis eventually led British, American and German investigators to the site's operator in South Korea.

"Rinsed" will no doubt please cryptosceptics, but that misses the larger picture, which is about governments grappling with crypto's attractiveness to criminals. The tech sector's relentless drive to innovate has an upside: just think of all you can do with that little supercomputer in your pocket. But, as Mr White reminds us in this book, it has plenty of downsides, too. ■

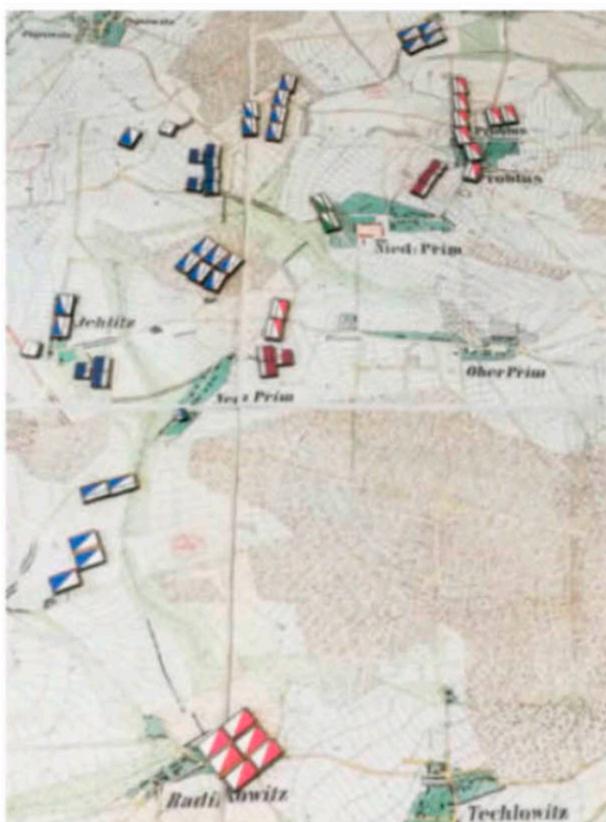
### How games changed the world

## Everything to play for

**Playing with Reality.** By Kelly Clancy.  
Riverhead Books; 368 pages; \$30.  
Allen Lane; £25

IN 1824 PRINCE WILHELM OF PRUSSIA asked for a demonstration of an elaborate game he had heard about from his military tutor. The *Kriegsspiel*, or war game, had been devised a few decades earlier as a more militarily realistic form of chess. Instead of regular squares, the board was a detailed map of a real battlefield. Wooden blocks represented different military formations; each turn of the game simulated two minutes of battlefield combat. Damage was worked out by rolling special dice and using odds-based scoring tables based on casualty statistics from historical battles. The game took two weeks to play, during which all cats had to be banished from the vicinity, so they did not climb on the board and mess up the pieces.

The prince was enchanted, and every Prussian officer was ordered to learn to play the game. It allowed new tactics to be tried out, even in peacetime. The rules were constantly updated with new weap-



It's not all fun and games

ons and statistics. When Wilhelm became king, Prussia's unexpectedly swift victory in 1871 in the Franco-Prussian war was attributed to these gamed simulations.

By the time of the first world war, *Kriegsspiel* was being used to predict when German battalions were likely to run out of ammunition, allowing timely replenishment—what would now be called supply-chain forecasting. In the interwar period, German planners used it to develop Blitzkrieg tactics and simulate the invasion of Czechoslovakia. When Hitler invaded Russia, both sides relied on the game to predict how the campaign might unfold.

The story of *Kriegsspiel* is just one of the many examples marshalled by Kelly Clancy, a neuroscientist and physicist, in her wide-ranging survey of how games can shape reality. Her story starts in earnest in the Renaissance, when mathematicians first developed probability theory, in part so that they could understand games of chance involving dice and cards. Games thus helped reveal that even random events were governed by laws and were susceptible to analysis. The resulting techniques were applied to medicine, population studies and the analysis of scientific errors. The German polymath Gottfried Leibniz saw games as models of the world, and thought studying them could "help to perfect the art of thinking". The creators of *Kriegsspiel* were inspired by his work.

Such war games, in turn, prompted John von Neumann's initial steps in the development of what is now known as game theory, a branch of mathematics that could, its proponents hoped, be the physics of human nature. By the 1950s the theory had been fleshed out, with now-familiar ideas such as the Nash equilibrium and the prisoner's dilemma, which consider how adversaries adjust their strategies in

response to each other's actions. Game theory directly underpinned the idea of "mutually assured destruction" during the nuclear build-up and stand-off of the cold war. It has since been applied in fields ranging from trade to evolution.

In the 21st century, the influence of game-like mechanisms has assumed a new, digital form. Social-media platforms are akin to games in which users compete for clicks and attention; apps have gamified dating, fitness and language-learning; and woe betide anyone whose rating on eBay, Uber or Airbnb, based on scores from other users, falls too low. Games have also been central to the development of artificial intelligence. Modern systems rely on the computational horsepower of graphics chips originally designed to run video games; and games have driven progress in the field, from chess, to Go, to the ImageNet image-recognition contest.

Gaming's power to shape reality, then, is incontrovertible. But Ms Clancy argues that games are "a map that warps the territory". Though they may be internally consistent, that does not mean they accurately reflect the world. Yet they are often treated as though they do. Worse, the neat models of reality that game theory provides not only misrepresent reality, she argues, but can deform it in malign ways by affecting how people act. Humans are not the reward-maximising automata that game theory and economists like to assume.

Economists are well aware of this, of course. The field of behavioural economics aims to understand how psychology, not just cold logic, affects decision-making. Ms Clancy dismisses it as "one of the least reputable fields of science" because it is "richly funded by corporations". She objects to the way that behavioural economists refer to "cognitive biases" as though they are defects in human thinking, when in fact "they are the way thinking works". Economists, it seems, are wrong to apply game theory uncritically, but are also wrong to try to address its limitations.

In Ms Clancy's telling, the overzealous misapplication of game theory lies behind many of the world's problems, including economic exploitation, manipulation of public opinion, racism and neoliberalism. Some readers may grow weary of Ms Clancy's demonisation of heartless economists and cut-throat capitalism. Although games and game-like mechanisms are not inherently bad, she argues, they have been used to "launder dubious beliefs" by "data-hungry technologists" and "rapacious business interests". The challenge, she concludes, is to find ways to use games for good, rather than ill; to change existing rules and devise entirely new game-like structures, such as fairer voting systems. By turns philosophical and polemical, this is a provocative and fascinating book. ■

# Economic & financial indicators

	Gross domestic product				Consumer prices			Unemployment rate			Current-account balance		Budget balance		Interest rates		Currency units	
	% change on year ago latest	quarter*	2024†		% change on year ago latest	2024†		%			% of GDP, 2024†	% of GDP, 2024†	10-yr gov't bonds latest, %	change on year ago, bp	per \$ Jun 19th	% change on year ago		
United States	2.9	Q1	1.3	2.2	3.3	May	3.0	4.0	May	-3.8	-6.3	4.2	45.0	-				
China	5.3	Q1	6.6	4.7	0.3	May	1.0	5.0	May <sup>§</sup>	1.2	-4.8	2.0	56	-47.0	7.26	-1.4		
Japan	-0.1	Q1	-1.8	0.8	2.5	Apr	2.4	2.6	Apr	3.2	-4.8	1.0	55.0	158	-10.2			
Britain	0.2	Q1	2.5	0.4	2.0	May	2.6	4.4	Mar <sup>††</sup>	-2.8	-4.2	4.1	-34.0	0.79	-1.3			
Canada	0.5	Q1	1.7	1.9	2.7	Apr	2.4	6.2	May	-0.4	-1.1	3.3	-11.0	1.37	-3.6			
Euro area	0.4	Q1	1.3	1.0	2.6	May	2.4	6.4	Apr	3.0	-3.1	2.4	-11.0	0.93	-1.1			
Austria	-1.1	Q1	0.7 <sup>†</sup>	0.5	3.3	May	3.5	4.7	Apr	2.9	-2.3	3.0	-14.0	0.93	-1.1			
Belgium	1.3	Q1	1.3	1.1	4.9	May	3.0	5.8	Apr	-0.2	-4.6	3.1	-6.0	0.93	-1.1			
France	1.3	Q1	0.6	1.2	2.6	May	2.7	7.3	Apr	-0.3	-5.2	3.2	20.0	0.93	-1.1			
Germany	-0.2	Q1	0.9	0.3	2.8	May	2.4	3.2	Apr	6.5	-1.5	2.4	-11.0	0.93	-1.1			
Greece	1.9	Q1	3.0	2.6	2.4	May	2.8	10.8	Apr	-5.8	-1.3	3.7	-14.0	0.93	-1.1			
Italy	0.7	Q1	1.4	1.0	0.8	May	1.5	6.9	Apr	1.0	-5.4	4.0	-16.0	0.93	-1.1			
Netherlands	-0.7	Q1	-0.4	0.4	2.7	May	2.8	3.7	Apr	8.2	-1.2	2.8	-9.0	0.93	-1.1			
Spain	2.4	Q1	2.9	2.4	3.8	May	3.0	11.7	Apr	2.2	-3.5	3.3	-14.0	0.93	-1.1			
Czech Republic	-0.3	Q1	1.3	1.4	2.6	May	2.2	2.8	Apr <sup>†</sup>	-0.3	-2.5	4.1	-22.0	23.2	-6.2			
Denmark	-0.2	Q1	-6.9	1.4	2.2	May	1.7	2.9	Apr	9.5	1.6	2.5	-36.0	6.94	-1.7			
Norway	-0.8	Q1	0.7	1.0	3.0	May	3.3	3.9	Mar <sup>††</sup>	15.9	12.0	3.5	2.0	10.6	1.0			
Poland	2.0	Q1	2.0	2.9	2.5	May	3.8	5.0	May <sup>§</sup>	0.4	-5.4	5.7	-31.0	4.03	1.0			
Russia	5.4	Q1	na	2.7	8.3	May	7.1	2.6	Apr <sup>§</sup>	1.8	-1.6	15.3	433	83.5	0.8			
Sweden	0.3	Q1	2.9	0.3	3.7	May	2.1	8.7	May <sup>§</sup>	5.5	-1.0	2.2	-31.0	10.4	3.1			
Switzerland	0.6	Q1	1.8	1.0	1.4	May	1.4	2.4	May	6.6	-0.3	0.7	-33.0	0.88	2.3			
Turkey	5.7	Q1	9.9	3.0	75.4	May	55.8	8.5	Apr <sup>§</sup>	-2.9	-4.7	26.8	977	32.5	-27.3			
Australia	1.1	Q1	0.5	1.7	3.6	Q1	3.2	4.0	May	0.3	-1.3	4.3	33.0	1.50	-2.7			
Hong Kong	2.7	Q1	9.6	3.2	1.1	Apr	2.2	3.0	Apr <sup>††</sup>	8.1	-2.8	3.5	-5.0	7.81	0.1			
India	7.8	Q1	5.4	6.9	4.7	May	4.8	7.0	May	-1.1	-5.1	7.0	-8.0	83.5	-1.8			
Indonesia	5.1	Q1	na	5.1	2.8	May	3.0	4.8	Q1 <sup>§</sup>	-0.3	-2.2	7.1	78.0	16,365	-8.4			
Malaysia	4.2	Q1	na	4.4	1.8	Apr	2.5	3.3	Apr <sup>§</sup>	2.1	-4.4	3.9	3.0	4.71	-1.7			
Pakistan	2.8	2024 <sup>**</sup>	na	1.8	11.8	May	19.7	6.3	2021	-2.9	-7.0	14.0	106	279	3.1			
Philippines	5.7	Q1	5.3	5.4	3.9	May	3.7	4.0	Q2 <sup>§</sup>	-2.5	-5.9	6.7	59.0	58.7	-5.1			
Singapore	2.7	Q1	0.2	2.4	2.7	Apr	2.9	2.1	Q1	19.5	0.1	3.1	13.0	1.35	-0.7			
South Korea	3.1	Q1	5.3	2.7	2.7	May	2.6	3.0	May <sup>§</sup>	2.5	-1.6	3.3	-37.0	1,382	-7.2			
Taiwan	6.6	Q1	1.1	3.3	2.2	May	2.0	3.4	Apr	14.2	0.5	1.7	53.0	32.4	-4.8			
Thailand	1.5	Q1	4.6	2.8	1.5	May	0.8	1.2	May <sup>§</sup>	2.5	-3.6	2.8	2.0	36.7	-5.1			
Argentina	-1.4	Q4	-7.3	-3.4	276	May	223.2	5.7	Q4 <sup>§</sup>	nil	-0.8	na	na	906	-72.5			
Brazil	2.5	Q1	3.1	2.0	3.9	May	4.1	7.5	Apr <sup>§††</sup>	-1.4	-7.7	12.2	96.0	5.47	-12.8			
Chile	2.3	Q1	7.8	2.8	3.4	May	3.6	8.5	Apr <sup>§††</sup>	-3.3	-2.3	6.0	78.0	926	-14.3			
Colombia	0.9	Q1	4.4	1.0	7.2	May	6.6	10.6	Apr <sup>§</sup>	-2.8	-5.7	10.8	36.0	4,153	-0.3			
Mexico	1.6	Q1	1.1	2.3	4.7	May	4.5	2.6	Apr	-0.3	-5.0	10.0	124	18.4	-7.0			
Peru	1.4	Q1	3.2	2.5	2.0	May	2.6	6.2	May <sup>§</sup>	-0.4	-3.1	7.1	-10.0	3.82	-5.0			
Egypt	2.3	Q4	na	2.6	28.2	May	30.9	6.7	Q1 <sup>§</sup>	-3.4	-5.0	na	na	47.7	-35.2			
Israel	-0.5	Q1	14.4	1.6	2.8	May	3.0	3.4	Apr	5.9	-6.8	4.8	108	3.71	-2.7			
Saudi Arabia	-0.8	2023	na	2.0	1.6	May	2.1	4.4	Q4	0.5	-1.5	na	na	3.75	nil			
South Africa	0.5	Q1	-0.2	1.1	5.1	May	4.8	32.9	Q1 <sup>§</sup>	-2.0	-5.2	9.8	-103	18.0	1.2			

Source: Haver Analytics. \*% change on previous quarter, annual rate. †The Economist Intelligence Unit estimate/forecast. ‡Not seasonally adjusted. §New series. \*\*Year ending June. ††Latest 3 months. †††3-month moving average. ‡‡5-year yield. ‡‡‡Dollar-denominated bonds. Note: Euro area consumer prices are harmonised.

## Markets

In local currency	Index	% change on:	
		one week	Dec 29th 2023
United States S&P 500	5,487.0	1.2	15.0
United States NASComp	17,862.2	1.4	19.0
China Shanghai Comp	3,018.1	-0.6	1.4
China Shenzhen Comp	1,687.6	-0.4	-8.2
Japan Nikkei 225	38,570.8	-0.8	15.3
Japan Topix	2,728.6	-1.0	15.3
Britain FTSE 100	8,205.1	-0.1	6.1
Canada S&P/TSX	21,516.9	-2.0	2.7
Euro area EURO STOXX 50	4,885.4	-3.0	8.0
France CAC 40	7,570.2	-3.7	0.4
Germany DAX*	18,067.9	-3.0	7.9
Italy FTSE/MIB	33,220.3	-3.3	9.5
Netherlands AEX	924.8	-0.8	17.5
Spain IBEX 35	11,056.4	-1.7	9.4
Poland WIG	86,385.8	1.5	10.1
Russia RTS, \$ terms	1,137.5	1.6	5.0
Switzerland SMI	12,060.2	-0.9	8.3
Turkey BIST	10,471.3	3.0	40.2
Australia All Ord.	8,010.5	0.6	2.3
Hong Kong Hang Seng	18,430.4	2.7	8.1
India BSE	77,337.6	1.0	7.1
Indonesia IDX	6,726.9	-1.8	-7.5
Malaysia KLSE	1,599.8	-0.6	10.0

	Index	% change on:	
	Jun 19th	one week	Dec 29th 2023
Pakistan KSE	76,706.8	5.4	22.8
Singapore STI	3,304.0	-0.1	2.0
South Korea KOSPI	2,797.3	2.5	5.3
Taiwan TWI	23,209.5	5.3	29.4
Thailand SET	1,303.8	-1.0	-7.9
Argentina MERV	1,576,462.0	0.5	69.6
Brazil BVSP*	120,261.3	0.3	-10.4
Mexico IPC	53,323.4	0.7	-7.1
Egypt EGX 30	26,417.6	1.1	6.1
Israel TA-125	1,973.6	0.7	4.6
Saudi Arabia Tadawul	11,498.9	-1.3	-3.9
South Africa JSE AS	80,713.8	4.8	5.0
World, dev'd MSCI	3,523.7	0.2	11.2
Emerging markets MSCI	1,095.3	2.5	7.0

## US corporate bonds, spread over Treasuries

	Dec 29th	
Basis points	latest	2023
Investment grade	108	154
High-yield	377	502

Sources: LSEG Workspace; Standard & Poor's Global Fixed Income Research. \*Total return index.

## Commodities

The Economist commodity-price index 2020=100	% change on		
	Jun 11th	Jun 18th*	month
<b>Dollar Index</b>			
All items	134.8	133.4	-4.8
Food	147.8	145.0	-0.5
<b>Industrials</b>			
All	124.1	123.9	-8.6
Non-food agriculturals	137.4	136.0	0.6
Metals	120.7	120.8	-10.9
<b>Sterling Index</b>			
All items	136.3	135.1	-4.5
<b>Euro Index</b>			
All items	143.7	142.0	-3.7
<b>Gold</b>			
\$ per oz	2,312.1	2,323.2	-4.5
<b>Brent</b>			
\$ per barrel	81.8	85.1	2.4

Sources: Bloomberg; CME Group; Fastmarkets; FT; LSEG Workspace; LME; NZ Wool Services; S&P Global Commodity Insights; Thompson Lloyd & Ewart; Urner Barry; WSJ. \*Provisional.

For historical indicators data, visit [economist.com/economic-and-financial-indicators](https://economist.com/economic-and-financial-indicators)

## OBITUARY

### *Birubala Rabha*

*The fearless campaigner against witch-hunting died on May 13th, aged 75*



SLOWLY, LIMPING and swaying with a sort of palsy, a young woman was led across the grass. Her name was Jarmila. She was 27, but had the body of a wasted child. Rain was pouring down; two women sheltered her with an umbrella. She had come to see Birubala Rabha because her sister-in-law beat her, and called her a witch. But all she really wanted was a room of her own in her brother's house. Inside the hall where Birubala was she went to sit alone, a child-woman with a reedy voice and huge pleading eyes. But Birubala made a compromise between her and her brother. At the end Jarmila crumpled to the ground, crying, to seek her brother's blessing. He had agreed that he would give her a room and never call her a witch again. As he left, he touched the feet of Birubala and, with a *namaste*, thanked her.

Those feet were hard with constant travelling on unmade hill roads between the villages of Assam. Birubala was no more than a peasant herself, a tribal woman, simple and uneducated beyond class five; a farmer's daughter, married at 15, who had grown crops and reared poultry to bring in little bits of money, as most did in this remote north-eastern corner. Her house, like theirs, had a tin roof and woven bamboo walls, with little furniture except her mosquito-netted bed and a tin trunk for papers. Her dialect was so particular to her home village, Thakurbila, that other Assamese struggled to understand it. But one hateful word had motivated her life and driven her travels: *daini*, a witch.

Between 1991 and 2010, more than 1,700 women in rural India were killed for being witches. They were declared so by tribal *bej* or medicine men, and also by their own communities. When crops failed or people fell ill for no apparent reason, the blame was almost always placed on women, usually the single, widowed or old. They were said to use the evil eye, or spells and amulets, to wither stems or stop hearts. If they were not lynched, they were tortured by being burned, tonsured, stripped, beaten and expelled from their villages. The police were loth to penalise a tradition that ran deep. Besides, many believed in it themselves.

It was all nonsense, nothing but superstition, as she told everyone who would listen. The *bej* were quacks and frauds. The real reason for this treatment was probably to let relatives grab the vic-

tim's property, express some bitter resentment, or end an argument. Sometimes, sheer ignorance was the cause. Over the years she gathered a small team, 19-20 victims and sympathisers, to put pressure on the police and state government to stop it. From 2011 her Mission Birubala purposely set out to rescue women; by her reckoning she saved around 90 lives, 35 of them personally. In 2018 came her best victory: the implementation of a law in Assam, said to be the strictest in India, which would send a person to prison for up to seven years for calling someone a witch.

She had been called one herself. In 1985, when he was 15, her eldest son Dharmeswar began to become mad. In despair, and because she had not yet abandoned the old beliefs, she and her husband went to the local quack, who told them, for a handful of betel nuts and leaves, that their son was in thrall to an evil spirit. That spirit was now pregnant; in three days the child would be born and their son would die. She was stricken, but of course he did not die; he lived for years, though his madness did not go away. Then, in 1996, her husband died of throat cancer. At that point even her close relatives declared her a witch and shunned her.

In 2001 her battle against witch-hunting resumed in force. Fearlessly she told a meeting in Goalpara, the nearest town, that five or six women who had been thrown out were not witches. There were no witches in this world. When the village men ordered her to recant or be thrashed, and she refused, hundreds came to attack her house. Was she with the *dainis*, or with the public? Though she was tiny, wiry and wore glasses, she stood her ground. Death did not bother her. For three years she was totally ostracised; she took it in her stride. At one night rescue she hugged the wounded woman, Sunila, and shouted to the violent crowd, "If she is a witch, why does she bleed? She feels the hunger that you do, the cold, the heat, sadness and joy...You fools, Sunila is one of you." She would fight this battle to the end.

Though she often blamed men and the patriarchy for witch-hunting, she knew it was not so simple. Women were just as ready to call another woman a witch. They could often be their own worst enemy. But as for the men, those she knew best had not been troublesome. Her father had died when she was six and her mother, a midwife, was often away, leaving her in charge. Her elder brother Rana, who was scared of being left in the house alone, came to depend on her. She was not scared. Her husband, though much older than she was, never criticised her campaigning, even cooking his own meals when she was out. Her brother-in-law helped set up her first village group, in 1985, to call for better roads and to stop the men drinking. Eventually she made fine allies of the police superintendents of Goalpara and Kokrajhar, as well as the politicians who drove the witch law through.

The state was proud of its law, and of her. Her work was recognised, too, by the Indian government, and she was nominated for the Nobel peace prize. That was all very well. But witch-hunting still went on in India's most backward parts, and her team was so small. What she needed were more resources, especially to build an ashram for persecuted women.

In her house, where light filtered through the bamboo walls, she searched in her tin trunk. It was full of her awards, framed or loose, in carrier bags. She arranged some along the floor for the visiting government reporter, but they were not what she was looking for. She wanted to show him the tiny ID photos of nine women. They had been tonsured and exiled, and she had rescued them. Saving lives was the important thing. ■

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## Contributors include:



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(1934-2024)  
Nobel laureate in economics; filmed 2023



**Kate Raworth**  
Author and economist



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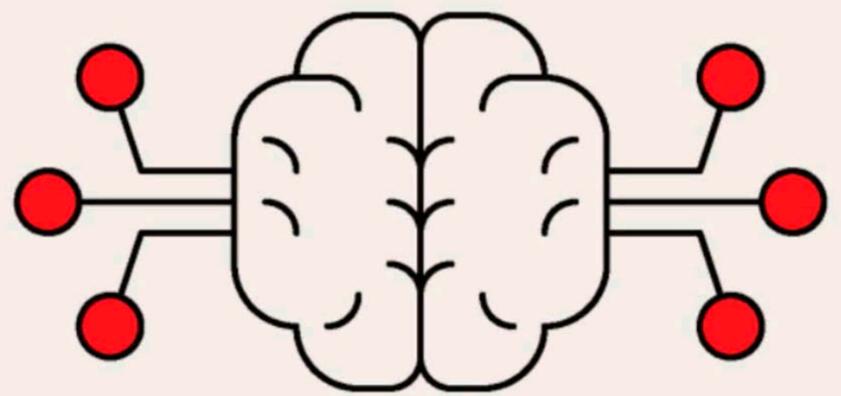
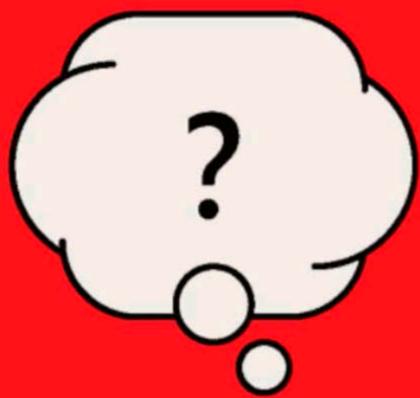
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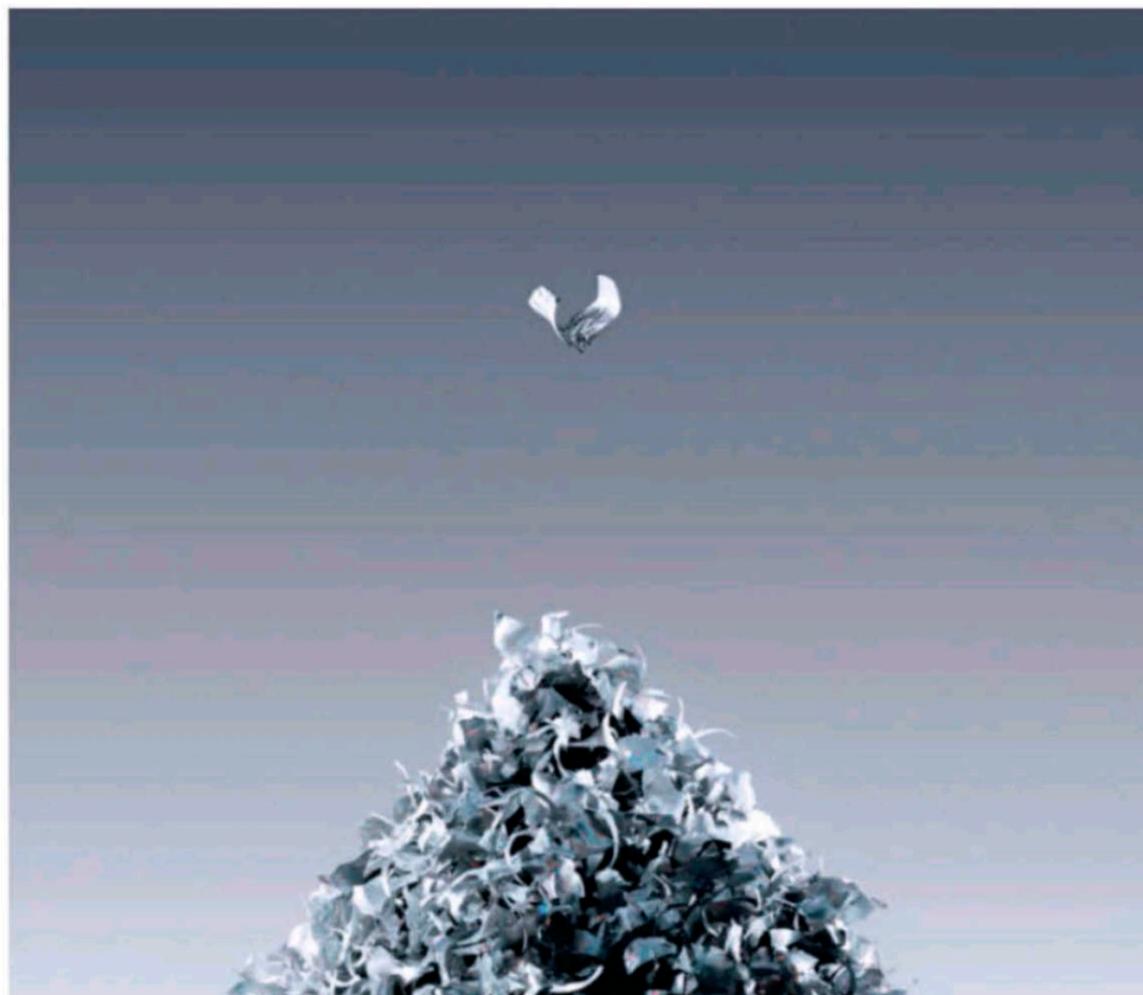


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## **FAST IS THE ENEMY**

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PRESIDENT, PATEK PHILIPPE



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