The Economist

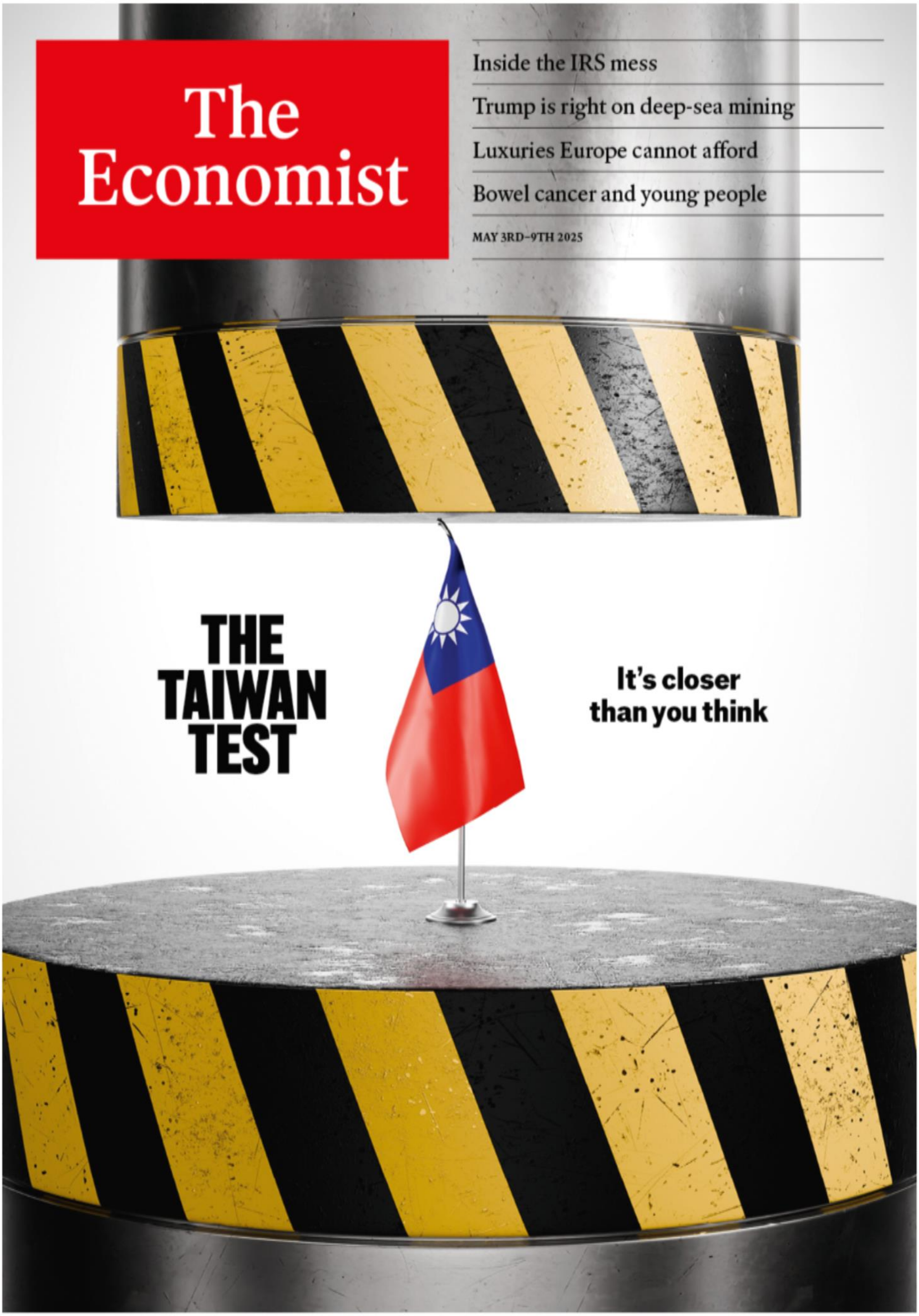
Inside the IRS mess

Trump is right on deep-sea mining

Luxuries Europe cannot afford

Bowel cancer and young people

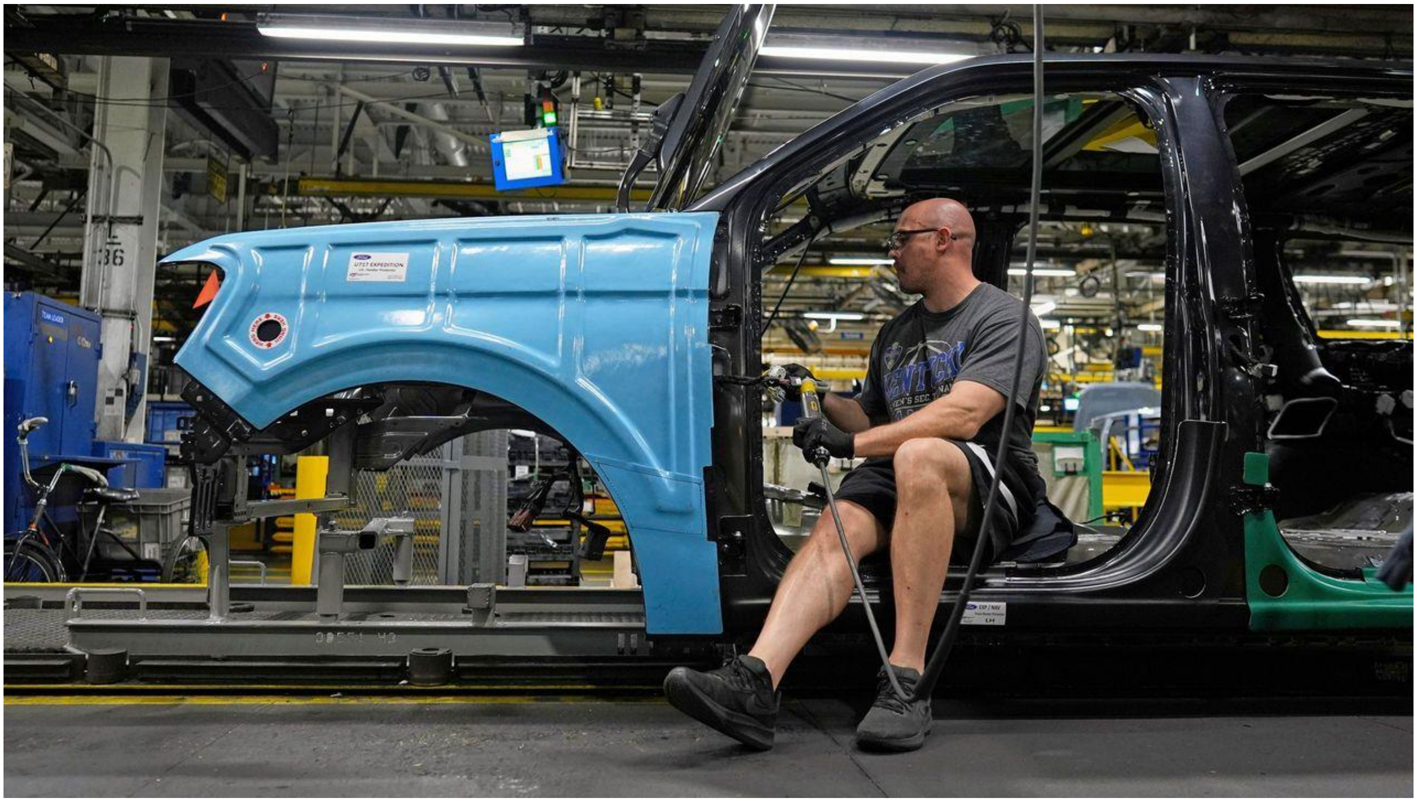
MAY 3RD–9TH 2025



THE TAIWAN TEST

It's closer than you think

Business



Photograph: AP

Donald Trump gave a little relief to a car industry left reeling by his tariffs on imports of vehicles and auto parts. The president signed one order giving carmakers a reprieve from import duties on aluminium and steel, so there is no "cumulative effect" in the tariffs they face, he said. A second order amends his 25% car tariff by allowing manufacturers who make vehicles in the United States with foreign parts to claim a rebate of 3.75% against the value of their sales, falling to 2.75% next year. Several carmakers, including General Motors and Stellantis, have pulled their profit guidance amid the uncertainty.

The Trump economy

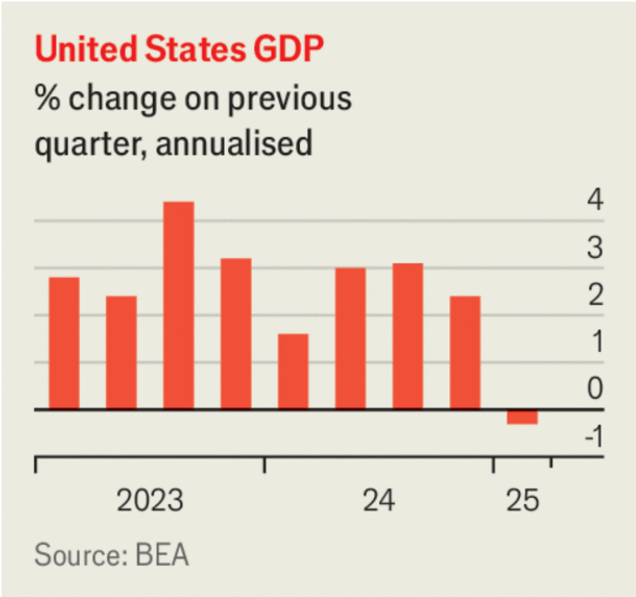


Chart: The Economist

America's economy shrank by 0.3% in the first quarter of the year at an annualised rate. The trade deficit swelled as companies rushed to build up inventories of foreign goods before tariffs came into effect. And government spending declined over the three months.

Microsoft brought some welcome cheer to investors by reporting solid earnings for the first quarter. Revenues rose by 13%, year on year, to $70.1bn, and net profit increased by 18%, to $25.8bn. Revenues from its cloud-computing division were in line with expectations, putting to rest for now market concerns of slower growth in the business.

Meta also published a set of bumper results for the quarter, with net profit up by 35%, to $16.6bn. The company raised its estimate of how much it will spend on investing in data centres. Underlining Mark Zuckerberg's wish to ensure Meta leads its rivals in artificial intelligence, the company unveiled a stand-alone app to rival ChatGPT.

An American court referred Apple, and one of its managers, for possible criminal charges over the firm's attempt to wriggle out of an injunction requiring it to change its rules around in-app purchases. Apple said it "strongly disagreed" with the ruling.

At Pirelli, an Italian maker of tyres, the board of directors voted to remove the status of Sinochem, a Chinese state-owned conglomerate, as its controlling shareholder. Sinochem is Pirelli's biggest shareholder with a 37% stake, but two years ago the Italian government used legislation to limit

Sinochem's influence. Italy's regulators gave Pirelli the option of changing its status. Pirelli's tyre-sensor technology is what's at stake. It fears being shut out of America because of its Chinese links.

First Light, a British fusion-energy firm, abandoned its plan for a reactor that would fuse heavy isotopes of hydrogen into helium, thus releasing energy. Its approach, one of more than half a dozen being tested to the same end by companies around the world, used projectiles fired from an electromagnetic gun to compress fuel-containing capsules to the point where the atomic nuclei therein would merge.

Airbus agreed to buy some factories from Spirit AeroSystems, which makes aircraft fuselage sections. The deal, which includes sites in North Carolina, France and Northern Ireland, secures a future for Spirit, an integral supplier to the aviation industry. The company used to belong to Boeing until it was sold off 20 years ago, but it struggled, despite adding Airbus as a customer. Boeing is buying back the rest of the business.

Deliveroo, a British food-delivery company that also operates in France, Italy and elsewhere, said it would probably recommend that shareholders accept a £2.7bn ($3.6bn) takeover offer from DoorDash, the largest food-delivery platform in America, if the deal's other details are acceptable. It is the latest instance of consolidation in the low-profit industry.

Investigating journalism

A presenter on CBS's "60 Minutes", America's premier current-affairs programme, told viewers that Paramount, CBS's owner, was supervising its content and that the show's top producer had resigned because he felt he had lost his independence. None of its stories has been pulled, but speculation has swirled that Paramount wants to ensure its merger with Skydance Media won't be torpedoed by the Trump administration because of its networks' political coverage. Meanwhile, Paramount was reportedly ready to settle a lawsuit brought by Mr Trump that accuses CBS News of underhandedly editing an interview with Kamala Harris, Mr Trump's Democratic opponent last year.

The recent turmoil that hit bond and currency markets proved to be a boon for Deutsche Bank, which reported its best quarterly pre-tax profit in 14 years. The German bank has now earned more in cumulative profits than it has lost over the past ten years; between 2015 and 2019 its losses were huge.

The euro area's GDP grew by 0.4% in the first quarter of 2025 compared with the last quarter of 2024, and by 1.2% year on year. German GDP expanded by 0.2%, quarter on quarter. The European Central Bank cut interest rates again recently, taking the rate on its deposit facility to 2.25%, amid concerns that a trade war would hurt the currency bloc's economy.

In a sign of the White House's sensitivity to the public's scepticism on tariffs, Mr Trump's press secretary described Amazon's reported plan to display the cost of import duties against products on its website as a "hostile and political" act. We have no such plans, Amazon hastily responded. Mr Trump called Jeff Bezos to smooth things over. He "solved the problem very quickly", said the president. "He did the right thing. Good guy."

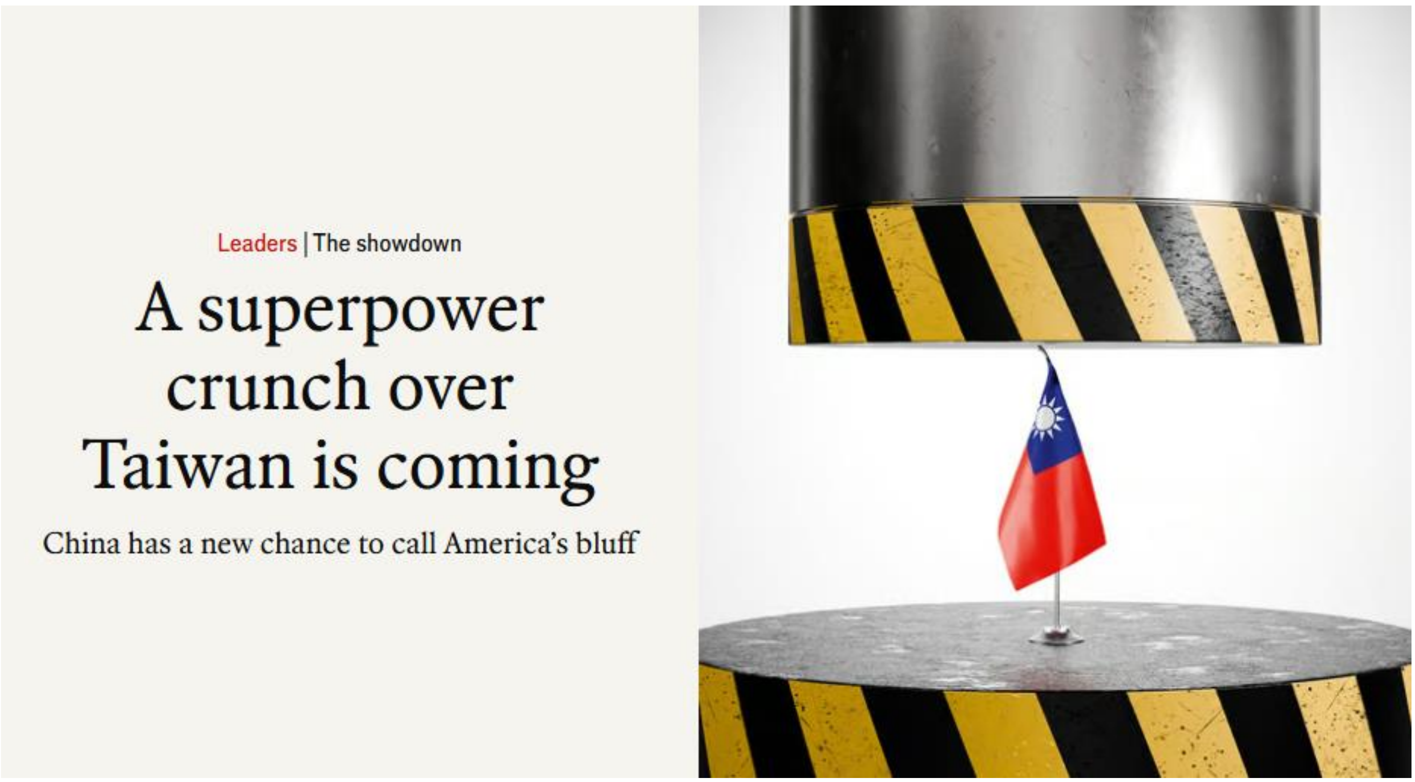


Image: Ricardo Rey

Relations between America and China are at a low ebb. Tariffs of well over 100% on both sides have severed trade. Each is striving to dominate 21st-century technologies such as artificial intelligence (AI). A massive military build-up is under way. In the previous cold war such rivalries came to a head over flashpoints like the Berlin airlift and the Cuban missile crisis. Today American resolve is likely to be tested over Taiwan—and sooner than many think.

China claims Taiwan as its own and says that it is prepared to invade, especially if Taiwan declares its independence. But Taiwan wants to continue as a self-governing democracy. America reconciles this contradiction with precarious ambiguity. It works to prevent Taiwan from formally breaking away, even as it opposes the use of force to resolve the dispute and sells Taiwan weapons without guaranteeing its security.

In recent years, this stand-off has become ever tenser. The past three presidential elections in Taiwan have been won by the Democratic Progressive Party (DPP), which leans towards independence. Since 2010 the island's economic importance has soared as a local firm, TSMC, has come to dominate the manufacture of advanced semiconductors, including those for AI. China's defence spending has tripled in current dollar terms, eroding what was America's decisive military edge in Asia. Strategists in America cling to the hope that, so long as their country can credibly signal it might fight, China's president, Xi Jinping, will defer his lifelong goal of unifying China. A war over Taiwan would be a catastrophe: why would Mr Xi rush to bet his legacy and the future of the Communist Party on an invasion that could go disastrously wrong?

Today, three factors have thrown all that into further doubt. First, under Mr Trump America is losing its deterrence. The president and his hawkish supporters talk about peace through strength. They portray his trade war and his pivot away from Europe as evidence that he is putting America's rivalry with China at the heart of his foreign policy.

Unfortunately, the trade war is having the opposite effect. In 2024 Mr Trump said that if China tried to invade Taiwan he would impose tariffs: "I'm going to tax you, at 150% to 200%." Today tariffs are at 145%. America has shot its bolt. The trade war is about who can take the most pain and that is a fight China will fancy it can win. Protectionism is also harming America's allies. Taiwan faces a levy of 32% and Mr Trump is pressing TSMC to shift plants to America. Australia, Japan and South Korea face tariffs and demands to decouple from China, a large trading partner. No Asian country is about to break its security alliance with America: none has an alternative, as our interview with South Korea's outgoing prime minister explains. But countries will be even more queasy about being dragged into a fight over Taiwan.

Second, new Chinese plans for Taiwan sidestep the all-or-nothing gamble of an outright invasion. China continues work on seizing the island by force. The recent "Strait Thunder" drills surrounded it with 38 naval ships. Yet China is also rehearsing novel, more severe "grey-zone" tactics that fall short of outright war. Top of the list are temporary quarantines and customs inspections of ships in Taiwanese waters, using China's vastly expanded coastguard force.

China's aim would be to undermine Taiwan's sovereignty and sow doubt among its citizens that America would be able or willing to come to their aid in an invasion. Many private commercial shipping firms might comply with a quarantine. International criticism of one may be less strident, following a Chinese diplomatic campaign since 2023 that has led 70 countries to support "all" efforts at reunification, creating cover for anything from inspections to invasion.

China's grey-zone tactics are designed to exploit the third factor, which is the chronic dysfunction of Taiwan's politics. While few Taiwanese want to be part of a communist-run China, their politics suffers from a toxic blend of polarisation and complacency. Since elections last year, Lai Ching-te, the president, has shared power with a parliament run by the mainland-appeasing KMT and a new third party backed by young Taiwanese disillusioned with the DPP. The resulting gridlock prevents Taiwan from taking decisive measures to raise its defence spending, cut its reliance on imported energy, or prepare for a crisis. Mr Lai's efforts to crack down on Chinese infiltration have backfired, amplifying polarisation.

These factors could power a harmful feedback loop inside Taiwan, even if Mr Trump climbs down over trade. If America weakens its commitment to defending Taiwan, then Taiwan may lose the resolve to resist. And if Taiwan is not prepared to defend itself, America will be less likely to come to its aid. The risk is that this creates a trajectory in which Taiwan gradually comes under China's sway without a shot being fired. True, Mr Trump could choose to escalate at any point. But rather than risk a nuclear war with China, he may let the island slip away or make a deal that, in effect, gives it up.

What would this mean? It would be a disaster for Taiwanese democracy. In time Taiwan might even elect a government sympathetic to China. There would also be a panic over Western chip supply. It would not necessarily end American dominance of the Pacific. But a huge amount of work would be needed to renew it. The People's Liberation Army could free up resources, giving it greater reach. America's armed forces would have to move from their current posture defending the first island chain, close to China, to the second island chain linking Japan and Guam. Allies in Asia would need new economic and military treaties if they were to be reassured. Without this they might acquire nuclear weapons.

Mr Trump wants to project strength. His protectionism and toughness with allies are supposed to make America great, but they are weakening its ability to protect Taiwan. That contradiction will not go unnoticed in Beijing. Not long ago it made sense for Mr Xi to think he should wait to wrest control of Taiwan. He may now conclude that he has an opportunity upon which he must act soon, before it goes to waste.

Finance & economics
Why economists should like booze

A martini doesn’t just steady the nerves after a rollercoaster week

Illustration: Álvaro Bernis

Sobriety is taking over the world. The amount of alcohol consumed globally is probably in decline for the first time in history. Across rich countries many members of Gen Z—born after the late 1990s—are shunning alcohol entirely: 30% of Americans in their 20s did not drink in the previous year. Even in France young professionals no longer have a pichet of wine with lunch.

Elites seem especially likely to snub the bottle. Three of the past four American presidents are teetotal (Barack Obama enjoyed a martini). In Silicon Valley temperance is a status symbol. Marc Andreessen, an investor, quit alcohol in 2022. Sam Altman of OpenAI writes about “how much changed when people stopped drinking alcohol all day”. Elon Musk refers to alcohol as a “legacy drug”. Dinner meetings with founders are fuelled by green tea.

An individual who gives up drinking can look forward to health benefits. They may lose weight. They may sleep better. Yet from an economist's point of view, teetotalism is an incoherent and damaging ideology—for three big reasons.

First, teetotallers are free-riders. For generations alcohol consumption has sustained all manner of social and economic structures. The abstemious benefit from them but do not contribute. For instance, non-drinkers who go to social events are free-riding on the joviality of hard-working drinkers. What would happen to the social fabric if everyone stopped imbibing? Perhaps Joe Strummer of the Clash, an English rock band, was on to something when he apocryphally said that "non-smokers should be banned from buying any product a smoker created".

Or consider the economics of the restaurant industry. Alcohol offers higher profit margins than food as it requires less labour to prepare. Indeed, using official American data, your columnist estimates that booze accounts for all the profits of the restaurant industry. Drinkers subsidise non-drinkers. Those who order sparkling water can feel sanctimonious in the short run. But if no one orders a bottle of Bordeaux, many restaurants will go under. In San Francisco, Sobriety Central, they are closing by the dozen.

Second, abstinence makes people lonelier. For centuries alcohol has served a social function. It helps people relax. Taking a drink also signals to others that you are happy to be slower and more vulnerable—that you have left your weapon at the door—which puts them at ease. A study from 2012 in Psychological Science found that alcohol increases social bonding. Robin Dunbar of Oxford University and colleagues find that frequenting a pub improves how engaged people feel with their community, in turn raising life satisfaction. It is not a stretch to say that alcohol has played a big evolutionary role in fostering human connection.

Many couples credit alcohol, at least in part, for bringing them together. So it may not be a coincidence that the alcohol-shunning young are lonely. Americans aged 15 to 24 spend a third less time socialising than they did in the early 2000s. A study published in 2021 by Jean Twenge of San Diego State University and colleagues found "worldwide increases in adolescent loneliness". Young people are having less sex than older generations. When it is harder to relax, partnering up is more difficult.

The third factor in favour of booze relates to innovation. Today the world sees fewer breakthroughs. Hollywood sustains itself on remakes or sequels, not originals. A recent blog by Peter Ruppert, a consultant, finds the same trend for music: "the pace of genuine sonic innovation has slowed dramatically". A paper published in 2020 by Nicholas Bloom of Stanford University and colleagues concludes that new ideas are “harder to find”. Productivity growth across the world is weak. Something has gone terribly wrong in the way that Western societies generate new ideas.

In the short term, avoiding alcohol is helpful for working efficiently. If you have a big presentation tomorrow, it is a good idea to stay off the sauce tonight. But consider the kind of world that alcohol allows to exist—even if messily, unreliably and at some cost—and abstention seems less sensible.

For centuries creative folk, from Aeschylus to Coleridge to Dickens, have relied on alcohol for inspiration. In the 1960s, when productivity was soaring, everyone was drunk all the time. No other drug has played such a consistent role in human innovation. Being intoxicated opens up the possibility of accidents of insight. Purely rational, linear minds have fewer of the flashes of brilliance that can turn an art form or an industry upside-down. It allows brains to disconnect. A study of American painters in 1946 by Ann Roe of Yale University noted that “a nightly cocktail before dinner may contribute to the avoidance of a state of chronic tension, especially...when creative activity is at its height.”

Studies suggest that alcohol, deployed judiciously, can aid the creative process. Andrew Jarosz of Mississippi State University and colleagues have found that intoxicated people solved problems faster and “were more likely to perceive their solutions as the result of a sudden insight”. A similar paper by Mathias Benedek of the University of Graz, in Austria, and colleagues concludes that “certain aspects of creative cognition benefit from mild attenuations of cognitive control”. In the short run, intoxication may limit your brain’s processing power—and that can be frustrating. The long-term effects are much less clear.

Call me old-fashioned

The best approach, as with most things in life, is moderation: not Ernest Hemingway-levels of drinking, but not abstention either. What leads to successful human relationships and breakthrough innovations remains poorly understood. So, even if you are a Silicon Valley whizzkid who wants to change the world, it is best not to mess around with traditions too much. Gin from the freezer, good vermouth, and a twist.

How a mortgage transforms your investment portfolio

They turn retail savers into hedge-fund managers

Illustration: Satoshi Kambayashi

As financial decisions go, borrowing several times your annual earnings to buy a risky asset is a pretty big one. Yet for many people, taking out a mortgage to buy a house is something of a no-brainer. It generally involves less agonising than, say, how much to save for retirement, or how to split your pot between cash, stocks and bonds.

One reason is that, some short-lived slumps aside, house prices across the rich world have been buoyant since the 1950s. More important, you need to live somewhere. Until you own a place, you have a natural short position in property, because you need to inhabit one for the rest of your life (whether you rent or eventually buy). Short positions are risky (who knows how far rents and prices might rise?).

Buying a home closes the position, resulting in a neutral one; unlike other investments, it is not really a bet on where prices are headed. The mortgage is an unfortunate necessity for those who lack the cash to buy outright, rather than a deliberate punt on the future path of interest rate

Thinking about a mortgage as a component in the borrower's investment portfolio might therefore seem odd. It should not. After all, a fixed-rate mortgage looks rather like a bond, while one with a floating rate resembles the sort of corporate loan often extended by banks and private-credit funds. In other words, the mortgage-laden investor has not only closed their natural short exposure to property. They have also opened a new short position in an asset similar to those that, elsewhere, they may hold long positions in. In many cases—think of most first-time buyers—it will be the investor's biggest position by far, offsetting any opposing ones and then some. Taking out a mortgage can transform your portfolio.

Fixed-rate mortgages can alter a portfolio's value the most. Borrowers are accustomed to seeing just the outstanding balance, which climbs as interest accrues and declines with repayments. But the mortgage's true value changes in the same way as that of a bond: it rises when market interest rates fall (meaning the borrower loses out) and vice versa.

This seems counterintuitive when the interest and repayments are fixed. It happens because, though future repayments stay constant when interest rates change, their value in the present does not—which illustrates a concept known as the "time value" of money. The promise of $1 in a year's time is worth less than $1 today, since today the dollar can be deposited in a bank account and earn a year's interest. Conversely, if interest rates fall, a commitment to pay a series of fixed sums in the future, as in a fixed-rate mortgage, becomes a bigger liability today. This is also why the market prices of bonds rise when interest rates fall.

By similar reasoning, though a floating-rate mortgage carries the risk of rising repayments, these do not change the portfolio's value. If interest rates climb, future repayments climb with them. At the same time, the present value of each future dollar falls by the same amount. The trade-off is that the investor must find the cash to meet higher repayments—perhaps by eating into returns from the rest of the portfolio.

Where does this leave the borrower's broader portfolio? The short position created by a fixed-rate mortgage can dramatically change an investor's overall exposure. If their savings follow the classic 60/40 split between stocks and bonds, for instance, but they have a fixed-rate mortgage worth 20% of their savings, their "true" allocation is more like 60/20. This effect is reduced by quirks of individual markets, such as America's and Denmark's, which generally allow borrowers to repay mortgages early without a penalty if rates have moved against them (since this makes their debt less bond-like).

For investors whose mortgages are large compared with their savings—think again of first-time buyers—the effect is far greater. If the short position created by a fixed-rate mortgage is bigger than the value of your savings, for instance, you cannot have a net positive exposure to bonds, however many you buy. Instead, your portfolio will look rather like those of the more daring hedge funds: leveraged to the hilt on one side, and long stocks and their outsize returns on the other. This is a cheery way of looking at things. Unlike the hedge fund, a stockmarket crash will not make you bust, since the debt is secured against your house, not your shares. Perhaps being saddled with a mortgage is not so bad, after all.

The risky world of private assets opens up to retail investors

Fund managers smell an opportunity to get even bigger

Photograph: Getty Images

This was supposed to be the year when initial public offerings (IPOs) came roaring back. Late in 2024 stockmarkets were hitting all-time highs and a cluster of privately owned superstars, with valuations in the tens or hundreds of billions of dollars, were preparing to go public. But now the market is frozen. As the world's trading system disintegrates before bosses' eyes, deals of all sorts, whether IPOs or mergers, have ground to a halt.

The pause is robbing private-market investors—typically deep-pocketed institutions, or uber-rich individuals—of a big payout. It is also robbing smaller investors of a chance to invest in some of the world's most successful companies, such as Stripe, a payments firm, and Elon Musk's SpaceX. That is making an existing problem worse. Measured against the value of all stocks, the monthly value of equity issued on stockmarkets globally has crumbled in recent years (see chart). That has made private markets the most exciting corner of the investing universe, with trillions of dollars flowing into private equity (PE), venture capital and private debt. Private assets under management, which also include infrastructure and property funds, have surged to $24trn, from $10trn a decade ago.

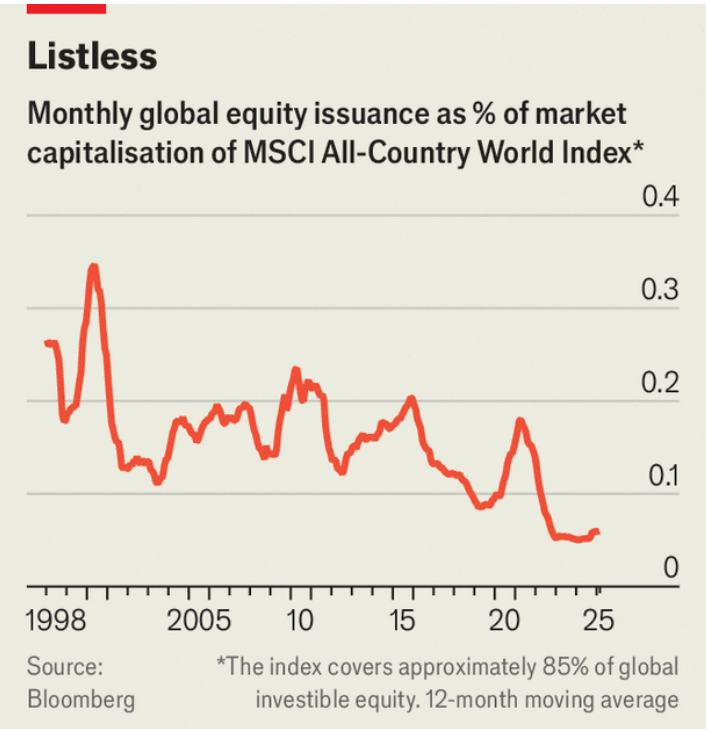


Chart: The Economist

Now private-markets firms are dreaming of getting even bigger—by luring in the investing masses. Marc Rowan, who runs Apollo, a private-credit giant, says the savings of ordinary Americans are his company's biggest opportunity. Larry Fink, the boss of BlackRock, the world's largest asset manager, focused his latest missive to shareholders on the subject. New products aimed at a broader cohort of investors are multiplying. This "democratisation" could benefit millions of investors. But, because private assets are less liquid, more opaque and much less regulated than their listed peers, it also creates new risks.

There are good reasons why private assets have long been the preserve of a select few. At its inception, the typical private-equity fund secures commitments from a small club of pension schemes, endowments and other institutions to provide a sum of capital, usually in the tens of millions of dollars. The money is then called on in instalments whenever the fund's manager finds a company to buy. At the end of the fund's life, which can extend to a decade or more, the manager sells or floats the company before returning money to investors.

Such conditions are a poor fit for the mass market. Smaller investors are less likely to tolerate the unpredictability of cashflows coming out and back. They are also ill-equipped to handle the mountains of paperwork managers would send their way. Those wanting their money back before the end of the fund's life—in the event of a stockmarket correction, for instance—cannot easily sell their stakes. Enforcing capital calls on legions of individuals would also be impractical.

But pioneering products have arrived. In 2017 Blackstone's Real Estate Income Trust (BREIT) was launched to invest in property, which is typically unlisted. The fund has a minimum buy-in of $2,500, a "perpetual" lifespan and monthly windows during which investors can sell out. BREIT limits the total amount of shares it will repurchase from investors to 5% of its net asset value (NAV) in any quarter. It has boomed in size, to a NAV of $54bn.

The Blackstone Private Credit Fund (BCRED), launched in 2021, has done the same for private debt. It is the largest of a growing array of vehicles, dubbed business development companies (BDCs), offering retail investors exposure to private investments. On April 29th Capital Group, an investment firm, and KKR, a private-markets giant, jointly launched two funds blending public and private assets. The vehicles will have a minimum investment of $1,000 and annual fees below 0.9%, much lower than most private funds. Such products "only scratch the surface of what we can offer", say the sponsors. Assets held by BDCs have more than tripled over the past five years, to $438bn at the end of December.

Barbarians at the garden gate

Whether such products fly or flop depends on their ability to solve three problems. First is the murky nature of the assets themselves. Public data on private markets are scarce. Whatever are available are hard to interpret. Firms are often accused of massaging the valuations of their holdings to flatter returns.

The measures they use are hard to compare with public-market benchmarks. Sporadic reporting allows them to smooth out bad periods.

There has been some progress. Last year MSCI, an index provider, unveiled private-market benchmarks that crunch the cashflow data for 14,000 funds since their inception. The new benchmarks also track funds' performance using figures gathered from investors. These should allow funds to be more rigorously compared with other offerings.

Another barrier to democratisation is law and regulation. Private-markets firms eye America's vast retirement system. Huge defined-benefit pension schemes, such as the California Public Employees' Retirement System (CalPERS), have invested heavily in private markets for decades. But individually managed retirement accounts, and defined-contribution 401(k) schemes run by employers, which together hold $26trn in assets, have almost no exposure to private markets. A law from 1974, which spells out pension-plan providers' fiduciary duties, makes it possible they could be sued if they invest in private assets because of their lower liquidity and the high fees charged by fund managers.

Here too, change may come soon. Daniel Aronowitz, Mr Trump's nominee to run the Employee Benefits Security Administration at the Department of Labour, has complained about frivolous lawsuits against corporate-pension providers. In 2023 Mr Aronowitz called some criticisms of pe in pension portfolios "naive and uninformed," noting that exposure could offer both diversification and returns. With narrow Republican majorities in both houses of Congress, private-fund managers are hopeful that they will finally get their foot in the door.

The most fundamental difficulty is that private assets are largely illiquid. Whereas stocks and bonds are traded all day long, stakes in private funds change hands only very rarely. Would-be buyers are scarce; working out a price is hard. Transactions, when they do happen, are not public so history can hardly serve as a guide. All this means retail investors cannot simply pile in and out of private assets at will, as they might with other parts of their portfolios.

This is a problem new products are finding hard to solve. In November 2022, amid market ructions, many investors in BREIT tried to withdraw their money. The trust could return only 43% of the capital it was asked for; more than a year later it was still limiting withdrawals. Private-equity products could face even bigger liquidity problems, notes Jerry Pascucci of UBS, a bank. Whereas credit and property generate steady streams of cash, equity funds must keep a hefty cash balance or draw on loans, both of which reduce returns, if they are to permit regular withdrawals.

To offer punters more liquidity, a few firms have started to offer exchange-traded funds (ETFs) containing private assets. The first was launched jointly in February by Apollo and State Street Global Advisers, a giant ETF provider, with the ticker PRIV. To ensure the minute-by-minute liquidity an ETF requires, however, the fund's private holdings will normally be limited to 35% of its total assets. Its largest holdings currently are mortgage-backed securities and Treasury bonds, which are very liquid.

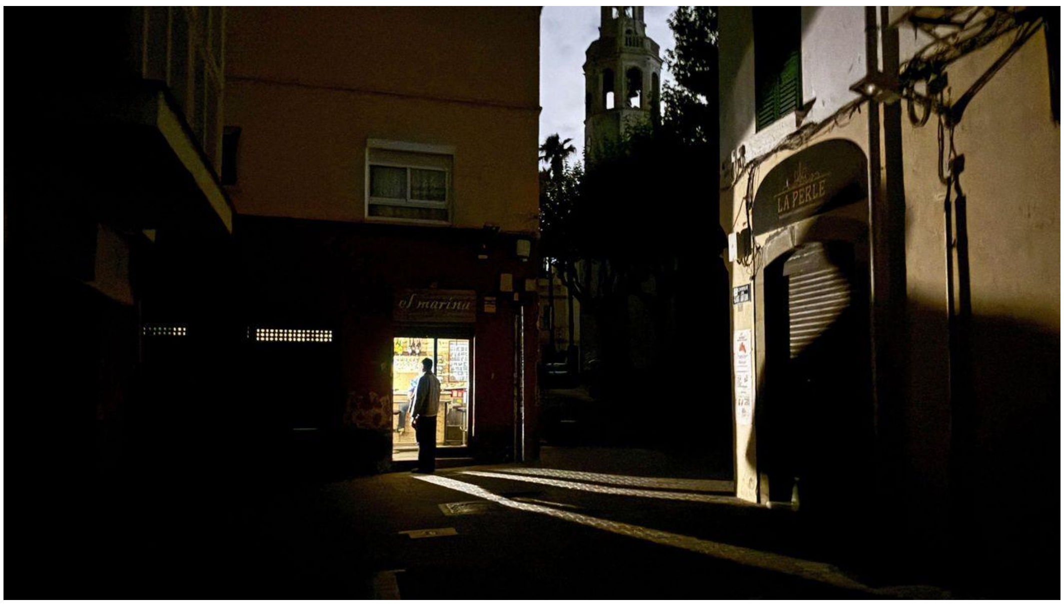
The idea of a liquid vehicle for private assets comes with its own problems. When investors want to transact shares in an ETF, the fund manager must buy or sell shares in the underlying assets to match the changing exposure. Were investors to want to sell their stakes in large volumes, the ETF managers may struggle to find buyers for the illiquid equity and debt inside them. That could cause the funds to seize up. The Securities and Exchange Commission has expressed concerns that priv may not be sufficiently liquid and could struggle to comply with valuation rules. Its warnings appear to have deterred rival firms from launching copycat products.

For a long time the democratisation of private markets, though much talked about, remained elusive. Now at last the winds of financial innovation and regulatory change are blowing in the right direction. But as they entice more retail savers, private-fund managers will come under greater scrutiny. Working around the illiquidity of the asset class is hard, and it may even be dangerous to try. In the event that new products disappoint or trap people's savings, a backlash could ensue. The potential prize is huge. But catering for the investing masses is a risky business, too.

Technology

The great Iberian power cut need not spell disaster for renewables

But there are lessons to be learned



Photograph: Alamy

SHORTLY AFTER noon on Monday April 28th, Spain's electricity grid suddenly and unexpectedly lost 15 gigawatts of power—equivalent to 60% of its national demand. The massive drop caused most of the country's electricity system to shut down, followed by much of neighbouring Portugal's. Trains and metros ground to a halt and 35,000 passengers across Spain had to be evacuated. Traffic lights stopped working; hospitals cancelled all non-essential operations; mobile-phone networks and the internet went dark.

The chaos lasted for hours. Though Portugal recovered by the end of the day, most of Spain's electricity was not restored until 7am the next day. Red Eléctrica de España (REE), Spain's state-controlled national electricity operator, called the blackout "exceptional and totally extraordinary". Pedro Sánchez, Spain's prime minister, promised to "get to the bottom" of what happened.

For now, authorities are in the dark. Rumours of a cyber-attack have been dismissed by REE; AEMET, Spain's meteorological agency, has said that it has not detected any "unusual meteorological or atmospheric phenomena", or sudden temperature fluctuations that could be a possible culprit. Identifying the true cause may take weeks, says Mike Hemsley of the Energy Transitions Commission, a London-based think-tank.

That has not stopped some from questioning the resilience of energy systems mostly powered by renewable sources. Spain and Portugal have some of the highest shares of wind, solar and hydro power in Europe: in 2024 these provided nearly 60% of Spain's electricity, and over 70% of Portugal's. The comparable figures for Britain, France and Germany are closer to 40%, 30% and 50%, respectively. Are renewable-heavy grids especially failure-prone?

Not necessarily. Even though the initial failure seems to have occurred in south-west Spain, the source of most of the country's solar power, at a time of day when the grid would have been basking in solar, two other faults then followed hard on its heels, including one in the connection between Spain and France. Simultaneous failures of this kind could be enough to take out any grid, says Janusz Bialek, an electrical engineer at Imperial College London, as their probability is low enough to make protection prohibitively expensive. That means even fossil-fuel-heavy grids can grind to a halt, as seen in Italy in 2003. Natural-gas plants ill-prepared to handle the harsh winter may also have contributed to Texas's dramatic blackout in February 2021.

That being said, renewable-heavy systems can be particularly vulnerable to major disturbances. Electricity grids rely on inertia—the physical momentum created and maintained by large rotating machines, such as the turbines in gas or coal plants—to help smooth over fluctuations on the grid. Machinery-light power sources, such as solar, have a harder time coping. In a report to the stockmarket regulator in February, REE warned that Spain's reliance on renewables could lead to grid instability. It also warned this could be exacerbated by closing nuclear power plants, which Mr Sánchez's government has previously expressed a desire to start doing in 2027.

Such problems can themselves be smoothed over, says Mr Hemsley. One solution is to build in "synthetic" forms of inertia, such as flywheels, which store energy as they spin, ready to be released back into the grid when necessary. Another is to add more inertia-heavy renewable sources—such as hydropower—to the energy mix. Indeed, it was a combination of hydropower and gas plants that helped generate enough inertia to help Spain restart its grid on Tuesday—a difficult endeavour that seems to have gone much more smoothly than many feared.

Further investment in hydropower could provide yet more stability, says Gonzalo Escribano at the Elcano Royal Institute in Madrid. For instance, the excess electricity produced during sunny periods could be used to pump water back uphill into hydropower reservoirs, in effect "storing" it until it is needed. A grid designed in this way would be less vulnerable to sudden large-scale blackouts.

Even if they are vulnerable in some ways, renewable-heavy grids can boost resilience in others. They tend to be more distributed, for one thing, because they rely on many solar or wind farms spread across a wide area, compared with large power stations, which present a single point of failure.

Of course, trends other than grid-greening could turn out to bear the bulk of the blame for the Iberian power cut. The likelihood of several faults increases as countries become more interconnected, for example, even though those connections can usually boost stability (importing extra power from France and Morocco also helped with Spain's recovery). The trick, Dr Bialek says, is making sure that there are backup systems in place that are robust enough to cope with sudden, large-scale outages—something this week's chaos showed was clearly missing.

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