Bloomberg Businessweek
May 15, 2023 ● ASIA EDITION

The Plot to Steal Coke's Other Secret Formula

A story of Chinese industrial espionage gone ridiculously wrong 34

Bloomberg Businessweek

May 15, 2023

◀ Corey Wilson, wearing a necklace with the logo of one of his favorite blockchains, sees upside in the crypto market's lows

PHOTOGRAPH BY LEVI MANDEL FOR BLOOMBERG BUSINESSWEEK

FEATURES

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■ COVER TRAIL

How the cover gets made

❶ "This week we're looking at one of the most closely guarded trade secrets at Coke."

"Omigod! Omigod! Omigod! Do you have the recipe?"

"Sadly, I do not."

"Why are we even talking then?"

"I mean, let's say I had it. What would you even do with that recipe? It's gotta be insanely complex."

"I'm reviving my food blog, brah! First post: Cooking Coke in your home kitchen."

"Not sure you'd want that language for SEO."

"Hmm, good point. Anyway, my interest is now piqued. What's the secret?"

"The lining of the can."

"OK! And what's the story with the lining?"

"What else? Someone tried to take the secret."

"Sounds explosive. Can we put Mentos in a can and see what happens?"

"I think for that you use a Pepsi bottle, but sure."

"Food blog's off to a good start after all!"

Cover: Photograph by Philotheus Nisch for *Bloomberg Businessweek*

TECHNOLOGY: PHOTOGRAPH BY MAGGIE SHANNON FOR BLOOMBERG BUSINESSWEEK


JA HELPS
TODAY'S YOUNG PEOPLE
BECOME TOMORROW'S ADULTS
By Inspiring
WORK AND CAREER READINESS
ENTREPRENEURSHIP
AND FINANCIAL LITERACY
SOLD

By Mark Leydorf, with Bloomberg News

● Israeli aircraft attacked targets in the Gaza Strip on May 10, killing at least four Palestinians, including a child.

On May 9, Israel had carried out a surprise pre-dawn attack that killed three commanders of the Iran-backed Palestinian Islamic Jihad, two other militants and 10 civilians. Palestinian militants responded by pounding southern and central Israel with rocket fire.

● War in Ukraine

▶ Speaking in Red Square on May 9 at the annual parade marking the Soviet victory over Hitler, President Vladimir Putin vowed to pursue his invasion of Ukraine, accusing his enemies of seeking to dismember Russia.

▶ About the same time Putin was speaking in Moscow, Yevgeny Prigozhin, the head of the Wagner mercenary group, said a Russian army unit had fled its position in Bakhmut, ceding territory that 500 of his fighters had died taking. By the next morning, according to a Ukrainian commander, Ukrainian troops had advanced 2.6 kilometers in the area.

● Supporters of Imran Khan, Pakistan's former prime minister, smash a vehicle in Peshawar on May 10 during a protest after he was dragged from a courtroom and arrested. The crisis comes as Pakistan grapples with an economy in deep distress.

● Goldman Sachs will pay $215 million to end a long-running class-action suit accusing it of systematically underpaying women.

The trial, set for June in New York, would have provided a rare public forum for testimony about inequality in the financial industry. All but one of the six biggest US banks have only ever been run by men.

● A jury of six men and three women found Donald Trump liable for sexually assaulting and defaming writer E. Jean Carroll, ordering the former president to pay her

$5m

in damages. The panel returned the verdict on May 9 in Manhattan federal court after deliberating for less than three hours. Trump plans to appeal.

● Chinese tourists are coming back to Thailand.

Chinese arrivals to Thailand are on course to hit 1 million a month by October, a level last seen before the pandemic, as travel gathers momentum heading into winter and the long national holidays. Chinese travelers made up more than a quarter of total visitors to Southeast Asia's second-largest economy before Covid.

● Italian Prime Minister Giorgia Meloni told US House Speaker Kevin McCarthy in Rome last week that her country intends to pull out of China's Belt and Road investment pact before yearend. The US has actively pressured Italy, the only Group of Seven country that's part of the infrastructure deal, to ditch the pact.

● "The long-term implications of a default are unthinkable."

Some of Wall Street's most experienced traders, including Goldman Sachs's Beth Hammack (right), wrote to Treasury Secretary Janet Yellen to argue for repealing the debt limit permanently. "The magnitude of adverse consequences," the current and former leaders of the Treasury Borrowing Advisory Committee wrote, "is unquantifiable." ▷ 60

● New research released for Asian American and Pacific Islander Heritage Month suggests the anti-Asian racism that surged during the pandemic isn't going away. A survey by the Asian American Foundation found that almost

80%

of Asian Americans "do not completely feel they belong and are accepted" in the US.

● AI is on its way to the Wendy's drive-thru.

The burger chain plans to start testing a chatbot system powered by Google Cloud's AI software in June. Wendy's is one of several chains incorporating AI and automation to improve service amid labor shortages. Drive-thrus surged in popularity during the pandemic; Wendy's says 80% of its customers prefer using them.

Make Flying Safer By Privatizing Air-Traffic Control

Each day, more than 45,000 flights bearing almost 3 million passengers take off and land safely across the US. Rather remarkably, the Federal Aviation Administration manages this sterling record with technology dating, in some cases, to the 1940s. Yet the calm skies have started to look troubled.

US airports have had at least eight serious safety events so far this year, including a near miss on Feb. 4 at the Austin airport, where a FedEx Corp. cargo jet flew within 100 feet of a Southwest Airlines Co. passenger flight. A few days later, an Air Canada Rouge plane was cleared for takeoff at Sarasota Bradenton International Airport just as an American Airlines Group Inc. jet was given permission to land on the same runway. The American crew averted catastrophe with a go-around.

Under pressure from Congress, the FAA convened a hearing on the mishaps in March, then established an independent team to make recommendations. Such steps are missing the bigger picture: The government shouldn't be operating the country's air-traffic-control system.

Outdated technology has plagued the FAA for decades. Notoriously, US air-traffic controllers still use strips of paper to track planes in their vicinity. The agency chronically struggles to hire technical staff. Its main system for preventing collisions between planes and ground traffic is decades old, short of spare parts and prone to prolonged failures. An outage last year almost led to tragedy when a truck ambled onto the runway at Connecticut's Bradley International Airport and narrowly missed an incoming plane.

Similar problems have bedeviled the FAA's emergency-alert system, called Notam, first adopted in 1947. It's meant to warn of potential hazards along a planned flight route. Yet its notices are composed in all-caps block text, employ arcane codes and can be so riddled with irrelevant information that pilots overlook crucial alerts. On Jan. 11, the Notam system failed entirely, leading to thousands of flight delays. A planned modernization may not be completed until sometime in the 2030s.

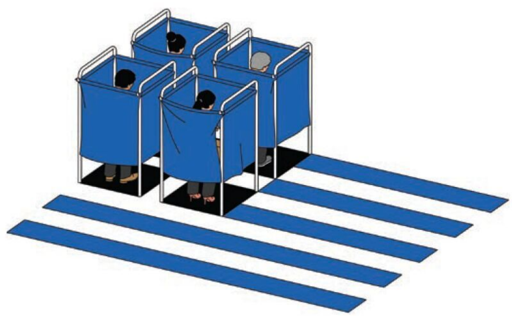
A series of other upgrades, collectively called NextGen, has been in the works for 20 years. In 2019 the airlines' trade group testified that the effort has been "plagued by significant cost overruns, delays and lack of benefits to users of the system." An inspector general's report found that the agency had overestimated the system's potential benefits by more than $100 billion. A completion date is anyone's guess.

One logical response to these failures would be to get the government out of the business altogether. That may sound extreme, but dozens of countries—including Canada and much of Europe—have turned air-traffic control over to nonprofit corporations and similar entities, funded by user fees and overseen by transportation regulators, without jeopardizing safety. In general, the result has been a more dynamic and responsive system, with lower costs and better performance.

In the US, this approach would be especially beneficial. Because the new entity would be self-funded, it would be shielded from Congress's budgetary chaos and could make sensible long-term investments. It could issue debt, consolidate facilities and otherwise streamline the system. It would also be free from onerous federal hiring and procurement rules. The FAA, for its part, could relinquish its operational duties and act solely as a regulator. The result should be faster flights, fewer delays, reduced costs, more innovation, increased efficiency and—not least—safer skies.

Lawmakers introduced a plan to do this in 2016, and it died unceremoniously. An updated version should be revived and enacted. The FAA—and the traveling public—would only benefit. *For more commentary, go to bloomberg.com/opinion*

■ AGENDA



► Election Day in Greece

All 300 seats in the Hellenic Parliament will be contested on May 21. Things are looking up in the country: Its large public debt is declining, and the government projects GDP growth of about 3% in 2024 and 2025.

► The US Census Bureau reports April retail sales on May 16. Revised data indicate sales fell 0.6% month over month in March and 0.7% in February. Expect the trend to continue.

► China's National Bureau of Statistics releases its data for industrial production on May 16. Analysts expect to see continued growth as the country puts Covid Zero behind it.

► Home Depot and Vodafone report earnings on May 16; Cisco Systems and Target, on May 17; Walmart and Applied Materials, on May 18; Deere, on May 19.

► After emerging from bankruptcy, New York institution Century 21 will reopen its flagship Wall Street outlet on May 16. The discount department store closed during the pandemic.

► The 105th PGA Championship is scheduled for May 18-21 at Oak Hill Country Club in Pittsford, New York. Oddsmakers are picking Jon Rahm or Rory McIlroy to win.

► Wes Anderson, Hirokazu Kore-eda and Alice Rohrwacher all have films in competition at this year's Cannes Film Festival, beginning on May 16. Ruben Ostlund heads the jury.

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Just Don't Call It Decoupling

The Biden administration is pushing back on the idea that it's seeking a full rupture with China

By Shawn Donnan

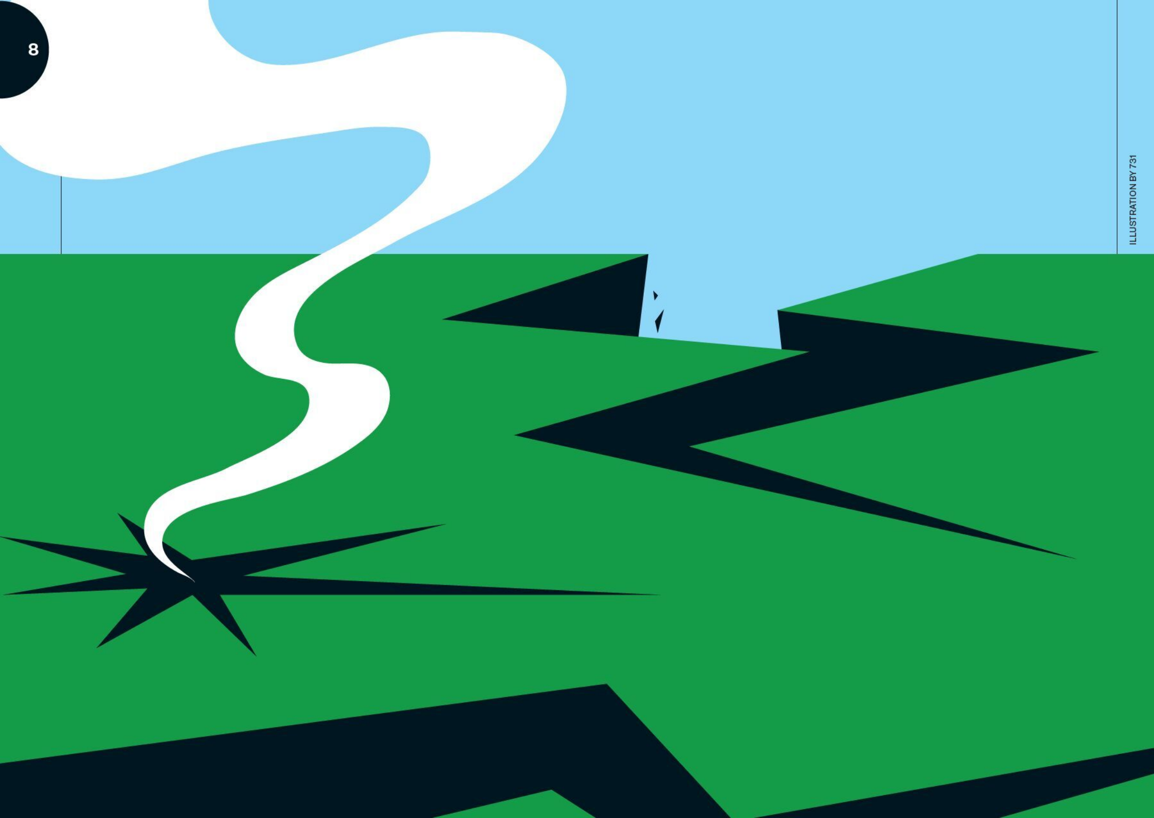


ILLUSTRATION BY 731

Faced with allies worried about the consequences of a fragmented world, the Biden administration is working hard to stress that—despite all the angst—it isn't pursuing a long-term rupture or "decoupling" of the US and Chinese economies. Treasury Secretary Janet Yellen is carrying this message to the May 11-13 meeting of Group of Seven finance ministers, and President Joe Biden will bring it to leaders' summits in Japan and Australia later this month.

Here's the rub: China's leaders certainly don't put much stock in these assurances, and many US allies and businesses are skeptical, too, fretting they'll end up as collateral damage in an escalating conflict between the world's two biggest economies.

In a May 2 tweet, the *Global Times*, a Chinese state-owned newspaper, said the US "speaks sweet as honey, while stabbing in the back." And just a day earlier, Singapore's minister for foreign affairs, Vivian Balakrishnan, warned in a speech that the "bifurcation and the weaponization of trade, supply chains and even of money" could result in a "more dangerous world."

The Biden administration hasn't used the word "containment" to describe its China policies, but it's difficult not to see at least some parallels to the US campaign to isolate the Soviet Union last century. The White House has worked to limit China's access to high-end semiconductors and blacklisted Chinese companies for their ties to the military or their use of forced labor. And the administration isn't done tightening the screws: Forthcoming are restrictions on US investment in China that both Biden and Yellen are expected to discuss on their trips.

The latest reassurances that the US isn't seeking to decouple from China came in speeches by Yellen and national security adviser Jake Sullivan. In remarks at the Johns Hopkins University School of Advanced International Studies on April 20, Yellen said that "a full separation of our economies would be disastrous for both countries" and "destabilizing for the rest of the world." Sullivan a week later made news by appropriating the term "de-risking," used by European Commission President Ursula von der Leyen and other European leaders. "We are for de-risking and diversifying, not decoupling," he said in a speech at the Brookings Institution laying out what he proclaimed to be a new "Washington consensus."

US officials stress that the speeches weren't meant to signal any change in China policy, the most aggressive bits of which they insist remain focused on limiting the country's access to critical technologies, such as advanced semiconductors, that could be used for military purposes. The goal, as Sullivan has described it, is to create a "small yard, with a high fence."

The US knows not everyone believes the message. The speeches were designed in part to appease nervous allies and articulate a policy that they argue has been misinterpreted. As one senior official says, if you're not speaking, people start to impute views onto you. And whenever the subject is a relationship as big as the one between the US and China, you're talking to the world.

Although the speeches were drafted and planned independently, their common message was part of a broader administration campaign ▶

◀ to "get back to Bali," meaning to wind back the clock to the meeting between Biden and Chinese President Xi Jinping on the Indonesian island last November, which held the promise of a less fractious relationship between the two countries.

They also were aimed at recalibrating the China rhetoric coming out of Washington—which has grown increasingly strident on issues such as Taiwan's independence since a Chinese spy balloon drifted over the US earlier this year—as well as countering what some in the administration see as overly pessimistic warnings from the International Monetary Fund and other institutions about the dangers of "fragmentation." (The word was on everyone's lips at the fund's spring meetings in April.)

Jennifer Harris, who until February served under Sullivan on the National Security Council, says the "discomfort" voiced by many of America's trade and security partners is a consequence of the important policy shift under Biden that Sullivan was laying out. The US is "settling into a new status quo that is just a different—I would argue, more sustainable—place, long term," Harris says. That's one in which important decisions about the allocation of economic resources are no longer left to markets; it's one in which a more interventionist government invests in strategic industries such as semiconductors at home and puts strict controls on related exports that might help rivals compete.

In Harris's telling, this strategic pivot is a response to a world where the costs of globalization have come home to roost and driven the rise of populists such as Donald Trump in recent years. Warnings by the IMF and others that one big consequence of the sort of policies the US is pursuing is a fragmented world that will drag on global growth are "Cassandra-like and hyperbolic," she says.

To call what the US is seeking "decoupling" misses both the point and the data, administration officials argue. Trade in goods between the US and China reached a record in 2022, they say, though they don't mention that in the first quarter of this year, US imports of Chinese products were down 20% from the same period in 2022.

It also, the administration and its defenders argue, ignores the need to execute a reset on US policy on China, which for decades has been either too naively accommodating or, as it was in the Trump years, too chaotic. "This administration's China strategy has always been—and they've meant it—that we're dealing with the China we have, not the one we wish we had," Harris says. "We're shoring up vulnerabilities and making ourselves and our allies more resilient, beginning with a set of domestic investments coordinated with allies. Does this mean decoupling? No. The bilateral relationship with China is still there. But the more important question is how we are shaping the environment around China."

China, of course, takes a different view, seeing a rival trying to restrain its rise. Xi in March accused the US of leading a Western campaign of "comprehensive containment, encirclement and suppression against us."

"We're shoring up vulnerabilities and making ourselves and our allies more resilient"

The issue for the US is that allies both in Asia and in Europe, while having their own concerns about China, don't consider the US to be an innocent participant either. They quietly point to hypocrisy in Washington: The US is engaging in an economic nationalism that, despite the language, risks veering toward a breakup that none of them really want.

The US sees allies coming around and emulating its policies. As evidence, the Biden administration points to a March 30 speech by von der Leyen that called on Europe to reduce its dependence on China and also to collaborate with Japan, the Netherlands and other countries to curb exports of chipmaking equipment.

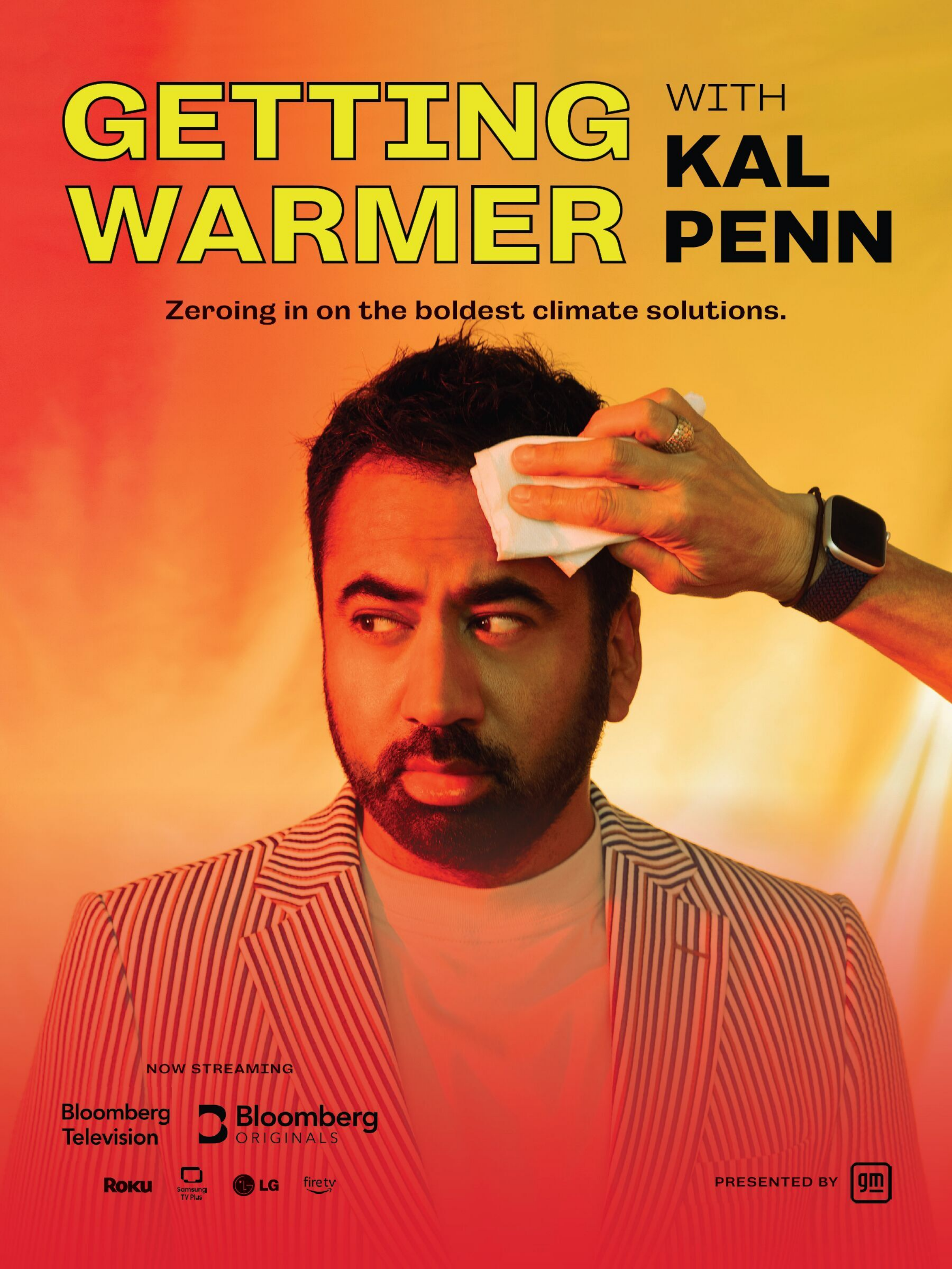
Still, by and large, America's allies are indicating their preference for a more pragmatic path. After a May 1 meeting with Sullivan in Washington, Toshimitsu Motegi, the second-ranked official in Japan's ruling Liberal Democratic Party, was quoted in the *Mainichi* newspaper as saying that "it is not realistic to decouple from China in all sectors" and citing an agreement with the US to "distinguish properly between fields where we can safely have a relationship and delicate fields where we need to be cautious."

In resource-rich Australia, where Biden is due to meet his counterparts in the so-called Quad nations (Australia, India, Japan and the US) on May 24, leaders are reembracing China as an economic partner, with politicians and business executives again making the pilgrimage to the country.

The window for the US and China to find a calmer path is narrowing. There's been talk of visits to China before the end of the year by Biden cabinet members Yellen, Secretary of State Antony Blinken and Secretary of Commerce Gina Raimondo. In normal times, Xi would attend November's US-hosted Asia-Pacific Economic Cooperation, or APEC, summit in San Francisco.

Heading into the US presidential election in 2024, any engagement with China could become a political liability for Democrats in a raucous campaign in which opposition Republicans want to portray Biden as soft on China. Taiwan's presidential contest in January could also provide a flashpoint.

Which raises an ominous prospect, say analysts such as Gerard DiPippo, a former US intelligence official now at the Center for Strategic & International Studies. "The way to actually reduce the temperature is to say, 'We're not going to do any more of these actions.' I don't think the White House is going to do that, for obvious political reasons. So I think basically the state of things now is close to as good as it is going to get." Ⓑ —*With Christopher Condon, Iain Marlow, Viktoria Dendrinou, Alan Crawford, Zibang Xiao, Isabel Reynolds, Philip Heijmans and Ben Westcott*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Can AI Help Create New Drugs?

● The chance to shave years off development sparks a global boom in AI investments

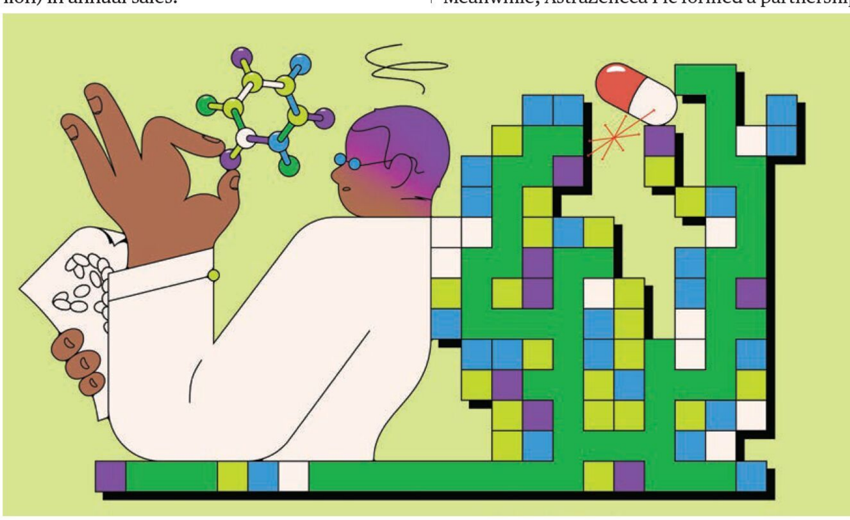
Finding a potential blockbuster medicine typically takes years of extensive analysis in the laboratory, with teams of researchers methodically sifting through data and test results to unearth a promising candidate. But when Japan's Takeda Pharmaceutical Co. bought an experimental psoriasis drug for $4 billion from a Boston startup in February, it gained a compound selected in only six months by using artificial intelligence.

In coming months, the drug—picked out of thousands of potential molecules through AI and machine learning algorithms—will progress to the final stages of clinical trials. If successful, it could become one of the first therapies discovered with the help of AI. Analysts at Jefferies estimate that it could generate as much as 500 billion yen ($3.7 billion) in annual sales.

The Japanese drugmaker's push comes at a time when pharma companies globally are embracing AI by striking deals with computer-savvy startups and adding more data scientists of their own. Their hope is to cut costs and speed up time to market. Morgan Stanley estimates that over the next decade, the use of AI in early-stage drug development could translate into an additional 50 novel therapies worth more than $50 billion in sales.

Research firm Deep Pharma Intelligence estimates that investments in AI-driven drug discovery outfits have tripled over the past four years, reaching $24.6 billion in 2022. In January of last year, Sanofi agreed to pay UK-based Exscientia Plc $100 million upfront, plus the potential for up to $5.2 billion in milestone payments to research novel medicines and develop up to 15 candidates in oncology and immunology with the use of AI systems.

Bayer, Roche Holding and Takeda are among the companies working with Recursion Pharmaceuticals Inc. in Salt Lake City to explore drug discovery using machine learning. Meanwhile, AstraZeneca Plc formed a partnership



PHOTOGRAPHS BY SIMON SIMARD FOR BLOOMBERG BUSINESSWEEK. ILLUSTRATION BY THOMAS HEDGER. DATA: DEEP PHARMA INTELLIGENCE

Edited by James E. Ellis

with BenevolentAI in the UK and Illumina Inc. in San Diego for similar efforts.

“When biopharma companies successfully apply AI in R&D, there can be significant impact,” says Alex Devereson, a partner at McKinsey & Co. who advises drugmakers on digital processes and analytics. “In five years, we expect these approaches to become more structurally embedded in pharma R&D processes and lead to more impact at scale.”

While AI can help, scientists still have to do lots of traditional legwork after the molecule is chosen. The Takeda compound went on to require years more of human clinical trials and other testing. And AI has other limitations. For instance, it can’t predict complex biological properties, such as the efficacy and side effects of compounds.

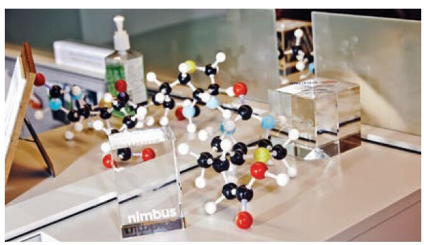
Still, using technology to identify the next blockbuster therapies can help eliminate some of the guesswork that typically requires hundreds of lab experiments—often spread over many years—to identify promising molecules.

Big Pharma became more serious about investing in AI and machine learning, or ML, after 2018, when Google parent Alphabet Inc.’s DeepMind unit used an AI program called AlphaFold to beat a biologist at predicting the shape of proteins, the basic building block of diseases. Figuring out the shape of proteins, one of the most vexing problems in biology, helps drug hunters narrow down molecules that might interact with them and identify medicines to attack disease.

Bringing a new drug to market has traditionally cost almost $3 billion, and about 90% of experimental medicines fail. So technology that speeds up the process can be a big driver of profits. Determining the 3D structure of a protein now takes seconds using AlphaFold, as opposed to many months or years, according to Eric Topol, founder and director of Scripps Research Translational Institute in California, cited on DeepMind’s website.

The growth in AI adoption by pharma companies was accelerated by the Covid-19 pandemic, as the industry rushed to develop weapons to fight an unknown virus. During the pandemic, Pfizer Inc. turned to AI to develop the Covid vaccine Comirnaty, for which it partnered with BioNTech SE. It also expanded a partnership with Shenzhen, China-based AI drug discoverer XtalPi Inc. to speed up the chemical formulation of the Covid pill Paxlovid. Both were approved by the US Food and Drug Administration in under two years—much faster than the 10 years it usually takes drugs to get to market. The speed was also helped by regulators rushing to get weapons against Covid to the public.

Takeda’s experimental drug, purchased from Boston-based Nimbus Therapeutics LLC, would be one of the world’s few oral treatments for psoriasis, a skin condition that affects 125 million people worldwide. It also has the potential to treat other conditions such as Crohn’s disease, an inflammatory bowel disorder. The drug, currently called TAK-279, has already successfully gone through the first two stages of human trials. Algorithms picked the present molecule in about a quarter of the two years a traditional approach would take, says Jeb Keiper, chief executive officer at Nimbus.

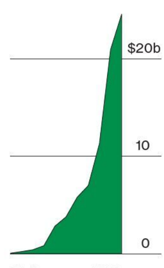


▲ Researchers at Nimbus Therapeutics spend much time with computer modeling and machine learning to identify their drug candidates

Scientists testing the chemicals in beakers would need to test many molecules—“an impossible number,” says Keiper. Instead of coming up with tens of thousands of compounds to figure out, computers suggest testing 10 compounds in a lab, then getting feedback from the lab results. The machines learn from those results to make a better prediction to provide the next hundred candidates for testing and ultimately filter to one molecule, Keiper says.

These days, more than 500 quantitative scientists and tech experts in Takeda R&D centers from Boston to San Diego to Shonan in Japan spend their days crunching data to find, develop and manufacture breakthrough medicines. The drugmaker uses AI and ML to identify the best molecules for targeting proteins and to understand the characteristics of diseases and how they vary in different patient populations. It works with the Massachusetts Institute of Technology and several AI startups. ▶

▼ Cumulative investment in AI in drug development



◀ "Any technology that unlocks cutting-edge skills for our employees, reduces manual work, takes the friction out of the system and frees up time for greater scientific insight and discovery is vital," says Anne Heatherington, head of Takeda's data science institute.

Takeda's larger rivals are also tapping AI. Pfizer expects a partnership with DeepMind's AlphaFold to help the company design and validate highly effective therapeutic targets that were previously unknown, says Lidia Fonseca, chief digital and technology officer at Pfizer. "We used powerful supercomputing capabilities with AI and machine learning models to reduce our overall computational times by 80% to 90%, and that actually helped fast-track Paxlovid," Fonseca says.

Several potential drugs that were identified by startups using AI are already in human trials. They include five from Recursion Pharmaceuticals Inc. for rare diseases and oncology and three from Exscientia for illnesses such as cancer and obsessive-compulsive disorder. Hong Kong-based Insilico Medicine has one in midstage human trials to treat the most common form of pulmonary fibrosis.

GSK Plc has more than 160 experts dedicated to AI and ML to support its R&D and manufacturing. It also generates data to build and feed the company's own machine learning models so every scientist can ultimately benefit from data the company has produced in the past, says Kim Branson, who's been the head of AI at GSK since 2019.

China is also looking to AI to enhance its drugmakers' global competitiveness. XTalpi is partly funded by Chinese tech giant Tencent Holdings Ltd., while Baidu Inc. CEO Robin Li founded an AI-driven drug discovery company called BioMap.

GSK's Branson says that while AI is really good at piecing together data from disparate sources, things get tricky when it's used for complex systems. To ensure safety, lab experiments are often necessary, he says.

That isn't stopping the jump in investments. There's been a surge in venture capitalists requesting evaluations of potential AI drug discovery companies over the past five years or so, says Russ Altman, a professor of bioengineering at Stanford University, who's conducted due diligence of biotech startups for VCs for decades. "It went from zero to a hundred," Altman says. "I hadn't done any due diligence on AI drug companies in 30 years. And now I've done six to 10." *—Kanoko Matsuyama, with Lisa Du and Ilena Peng*

THE BOTTOM LINE Investments in AI-fueled drug outfits have tripled in the past four years. Technology that speeds up the R&D process can drive profits up.

Nearshoring Fuels Tech Jobs In Latin America

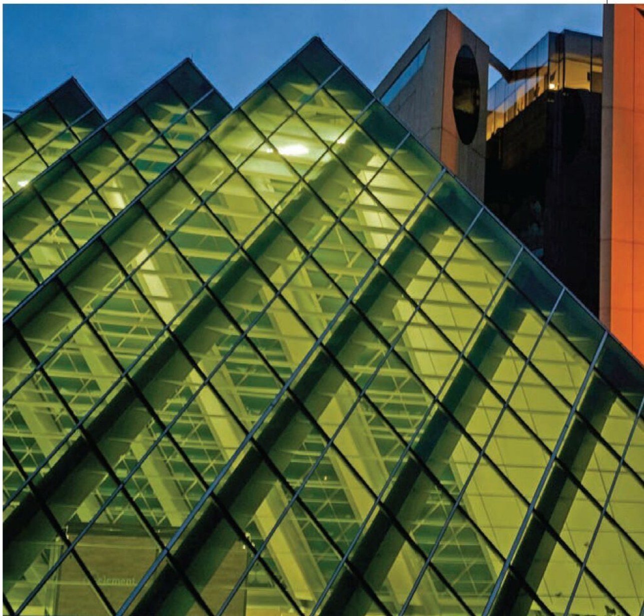
● Post-pandemic interest in reducing reliance on Asia is benefiting IT workers from Chile to Guatemala

Pandemic-era labor shortages made it hard for Austin-based Fetch Package Inc. to fill positions in the US. That led the company, which provides delivery services to marketers, to start looking for engineers elsewhere. Fetch interviewed candidates from Europe and Africa before settling on Latin American workers, in part because of the convenience of their being in the same time zone.

Now about 10% of Fetch's engineering team is in Argentina, Brazil and Peru. "You can't tell on a call or through their output who's based in one location or another," says Chief Technology Officer Boone Putney. Many résumés he reviews from Latin America include stops at places including Amazon.com Inc. and PayPal Holdings Inc.

So-called nearshoring—hiring or outsourcing to workers in locales closer to a company's home

▼ A Tata Consultancy Services office in Mexico



COURTESY TATA CONSULTANCY SERVICES. *TERTIARY EDUCATION PROGRAMS AS DEFINED BY UNESCO. DATA: UNESCO, FIGURES FOR THE MOST RECENT YEAR AVAILABLE market rather than in distant Asia—is all the rage these days in Mexico, where new factories are springing up along the US border, built by US companies shifting operations from China. But nearshoring is also benefiting countries throughout Latin America that aren't that close to the US.

Global technology companies are increasingly hiring workers in Chile, Guatemala, Uruguay and other South and Central American nations to handle such tech tasks as coding software. Some of those countries can be thousands of miles from the US border, but they're just a couple of time zones away from much of the US and Europe, making them ideal for handling anything that can be done by phone or computer during the Western business day.

Global human resources company Deel Inc., which serves clients including Shopify Inc. and Dropbox Inc., estimates that 3,000 US-based companies used its services to hire in Latin America in the first quarter of 2023, twice the number from a year earlier.

This is happening while layoffs are dominating headlines in the US as high interest rates increase fears of a recession. About 760 global corporations have slashed more than half a million jobs since October, according to an analysis by Bloomberg in March, with the median layoff leaving the company workforce 10% smaller. The technology sector has accounted for about 149,000 jobs lost. At the same time, some companies are adding employees in offshore locations where workers tend to earn less.

Deel clients pay an average annual salary of about $74,400 across Latin America for full-time and contract-based workers in areas including engineering and product design. That's compared with a median pay of $127,000 for a US-based software developer and $102,000 for a computer systems analyst as of last year, according to the Bureau of Labor Statistics. "If for the price of 10 engineers in the US we can hire 100 engineers in Brazil, there's definitely something to think about there," says Alex Bouaziz, chief executive officer of Deel.

Latin America-based hires are often financially more attractive options than remote workers in other parts of the world. Deel estimates workers in the region make roughly $20,000 less per year on average compared with Asia-based ones. And while salaries in some popular offshoring locales continue to go up—such wages in the Philippines soared 15% year-over-year in the first quarter—remote workers in Latin America saw wages fall 4% in the same period from a year earlier, Deel says.

India's Tata Consultancy Services, long a global leader in outsourcing, plans to speed up hiring in Latin America amid growing demand for nearshoring and its IT services in the region. Guatemala and Uruguay are two of the countries where it's providing those services, says Marcelo Wurmann, TCS's head for Latin America. "Due to their location, these countries have a time zone that is beneficial and functional for North American companies," he says.

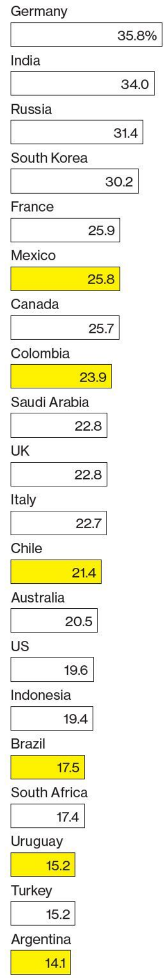
Despite the economic slowdown, TCS's clients keep pressing ahead. "There have been some drops in more discretional spending from our clients, but they are relatively small when compared to total spending in technology," Wurmann says. "We are confident that we can grow our head count another 10% to 20% next year, and that is our goal."

TCS has about 27,000 employees in nine countries in Latin America and has been steadily increasing its workforce in the region by as much as 20% per year. The company recently announced 200 new openings in Chile, focused on engineers with knowledge of cloud services such as AWS, Azure and Salesforce.

Latin America produces far fewer engineers per year than an IT outsourcing hotbed such as India. Wurmann says that tech employment services in Latin America have had to be more proactive. They're working with local universities and technical schools to get an early idea of the skills of students in the pipeline.

Companies looking to hire can also benefit from the recent slowdown in the regional venture capital industry. The region's recent record investments ▶

▼ STEM graduates as a share of all higher-education* graduates



◀ in startups, and the subsequent slowdown, resulted in a large pool of experienced workers who were laid off from unicorns and are now available for remote work.

Revelo, a provider of remote technology and developer applicants for companies, is also seeing a spike in demand and is placing developers from across 15 Latin American countries with US companies. "Our annual recurring revenue has grown 3.2 times since the beginning of 2022 through the first quarter of 2023. Demand has particularly spiked in 2023," Lucas Mendes, a co-founder, wrote in response to questions. *—Eduardo Thomson and Augusta Saraiva*

THE BOTTOM LINE Latin America's tech workers are increasingly in demand from North American companies that want cheaper remote staffers who are only a couple of time zones away.

Why US Airlines Are Sitting Out China's Reopening

● They're pressing Washington to ban Chinese planes headed to or from the US from flying over Russia

After three years of largely self-imposed isolation because of Covid-19, China is finally reopening. But US airlines aren't lining up to reinstate the once-abundant services between the world's two largest economies. In pre-pandemic 2019, direct flights between the US and China by carriers from both countries averaged 340 per week. Today there are a maximum of just two dozen weekly.

The biggest US airlines—American, Delta and United—will keep flying at reduced pandemic-era levels, though not because they expect weak demand, according to people familiar with the matter, who asked not to be identified speaking about private discussions. Rather, it's a dispute over Russian airspace restrictions that apply to about three dozen countries, including the US, but not to China.

The quiet standoff comes against the backdrop of an overall deterioration in relations between Beijing and Washington, clouding prospects for a quick diplomatic resolution. Meanwhile, Japan's ANA Holdings, IAG SA's British Airways and Emirates Airlines are among carriers that have restarted, or announced plans to resume, daily flights to Chinese cities including Beijing, Guangzhou and Shanghai. Korean Air's China service has reached pre-pandemic levels, growing from 13 weekly flights to 84 in April, with plans to expand to 99 this month, the airline says.

Air France is asking the French government to limit Chinese airlines' access to the country, saying they enjoy an unfair advantage because they can fly over Russian airspace. But it's also asking to more than double its own China-bound flights, to 14 a week.

American airlines aren't interested in dialing up from their paltry 12 flights a week currently connecting the two countries—at least not until Chinese carriers stop using Arctic routes over Russia to reach the US. That provides them an advantage in lower fuel costs and fares, as well as shorter flight times.

Andrew Nocella, chief commercial officer of United Airlines Holdings Inc., told analysts on an April 19 conference call that the carrier is "stuck" at four flights a week to China. "We are preparing to fly more than that," he said. "Hopefully later this year we will be flying more to China, and we have the aircraft to do so if the conditions allow us to do so."

The airlines and their lobbying group, Airlines for America, are pushing the Biden administration to block Chinese competitors from using Russian airspace. "This is something the government could do, should do, and is important to the competitiveness of not just the industry, but the competitiveness of the US," says Keith Glatz, the group's senior vice president for international affairs.

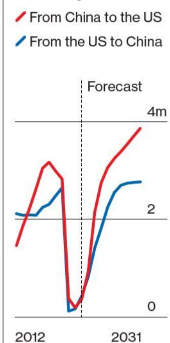
A senior Biden administration official said the White House is aware of the carriers' concerns. "It can't be business as usual with Russia in the face of Russia's illegal war of aggression in Ukraine," the official said.

US airlines say the route disadvantage has cost the Big Three $2 billion annually, because carrying the thousands of extra gallons of fuel required for longer flights forces them to block off dozens of passenger seats and reduce cargo in planes' holds. United and American Airlines Group Inc. have dropped some planned routes to India because they're also too costly to fly around Russia.

Chinese airlines, many of which are state-owned, have little incentive to compromise. And geopolitical complexity may also prove a challenge. Calls for comment to the Civil Aviation Administration of China, the country's main airline regulator, went unanswered.

There's "zero chance" the Chinese would agree to a ban on using Russian airspace, says Christopher Johnson, chief executive officer of

▼ Passenger arrivals



● Current number of weekly flights between the US and China

24

down from a pre-pandemic

340

JADE GAO/GETTY IMAGES. DATA: COMPILED BY TOURISM ECONOMICS

China Strategies Group, a political and financial risk consultant. Meanwhile, the Biden administration "has more important things it wants to fight with the Chinese over," he says.

Growing demand for flights between the two countries means money will be left on the table unless some sort of accord is reached. The number of people traveling between the US and China this year is projected to hit 1.75 million, about 32% of the 5.48 million who traveled in 2019, according to Tourism Economics, which analyzes the effects of economic activity on global travel.

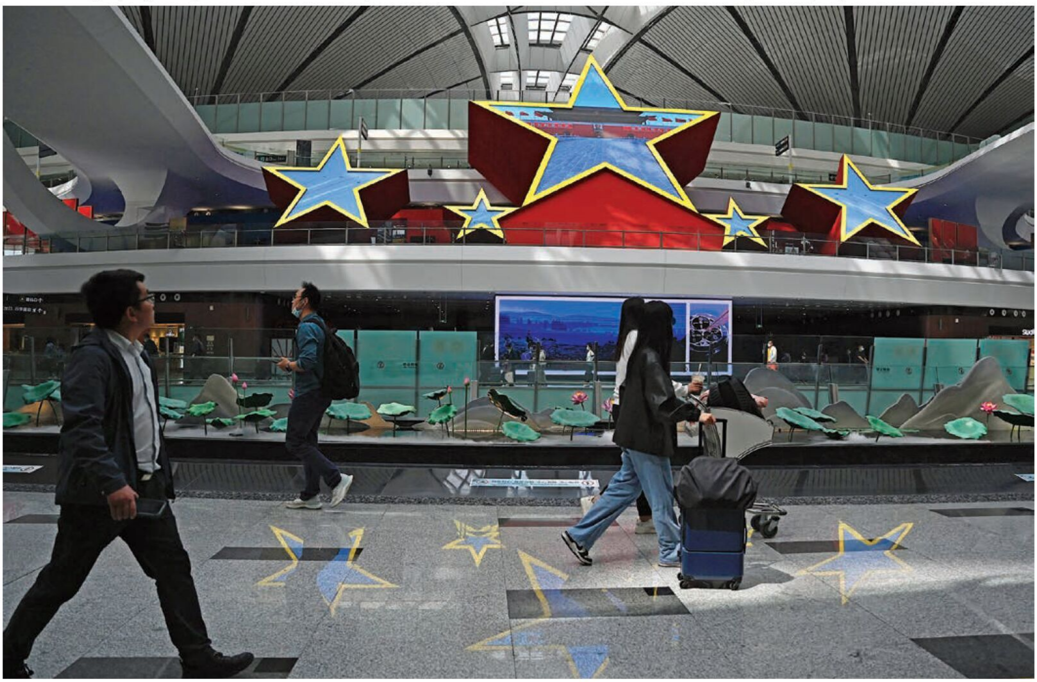
American Airlines CEO Robert Isom has said he's hopeful for a diplomatic resolution. "There can't be an unlevel playing field," he told CNBC on April 27. "Until there really is a settlement to that, that's going to stand in the way" of adding flights.

Flights between China and the US were regulated before the pandemic by an air service treaty signed by the two nations. The US Department of Transportation took over governing inbound flights by Chinese carriers after that country unilaterally imposed limits on service by US airlines in 2020.

US airlines haven't sought the same sanctions for carriers based in India and the Middle East that also use Russian airspace, in part because governments there didn't abandon aviation treaties with the US during the pandemic, say people familiar with the matter. Carriers in those countries also typically operate many fewer flights to the US over Russian airspace.

If an accord can be reached, airlines would like to add capacity. United, the most active trans-Pacific flyer, has tentative plans to offer as many as 768 flights between the US and China from May through December this year, followed by 290 at Delta Air Lines Inc. and 158 at American, according to Cirium, an aviation analytics company.

Although using Russian airspace gives China-based carriers a competitive advantage, imposing sanctions often results in a "tit-for-tat" response that could have unintended consequences, says



▲ Passengers at Beijing Daxing International Airport

Kenneth Quinn, a veteran aviation attorney who's represented airlines and aerospace companies.

"It's just a terrible long-term strategy to try to weaponize airspace," says Bill Voss, former director of the air navigation bureau of the International Civil Aviation Organization, a United Nations agency. "It's far wiser to treat economic problems as economic problems." —*Mary Schlangenstein, with Alan Levin and Jenny Leonard*

THE BOTTOM LINE Pandemic travel curbs grounded most flights between the US and China, the world's two largest economies. A flap over Ukraine war restrictions may keep it that way.

Government Surveillance, Courtesy of Ad Tech

How one firm buys advertising data and packages it for governments looking to track people

The innovation at the heart of the advertising technology industry is automated auctions to trade real-time data about smartphone users—including their physical location and browsing habits, but not their real names. The purpose of this activity, known as real-time bidding, is to put digital ads in front of people likely to click on them. But it's also possible to purchase this data with other goals in mind.

One notable nonadvertising participant is Rayzone Group Ltd. The Tel Aviv-based surveillance company for years has quietly harvested advertising data and repurposed it to help governments track individuals through their mobile phones. As part of these efforts, Rayzone has acquired companies specializing in ad technology and established relationships with brokers that resell data from major advertising exchanges, including the one owned by Alphabet Inc.'s Google.

Rayzone feeds advertising data it obtains into a service called Echo, which it sells to governments around the globe. Echo is among the first known commercially available surveillance systems to exploit advertising data this way, according to industry experts. Rayzone positions the product as an all-seeing technology that's more or less impossible to avoid or disable. As its marketing materials say: "You can run, you can hide, but you can't escape your own echo."

When not talking directly to clients, Rayzone has worked to keep details about Echo private, making employees who work on it sign nondisclosure agreements. Its website doesn't mention Echo by name, referring only to a "location investigation platform" it sells. A company spokesperson declined to answer

Edited by Joshua Brustein

specific questions on the record, instead providing a statement saying the company and its subsidiaries "supply government agencies with passive tools to combat terror and crime in line with local and international regulations, alongside our cybersecurity division defending against cyberattacks."

In an email, a Google spokesperson said that the company was investigating the matter and that it had not identified any relationship between Rayzone and its ad exchange, known as Authorized Buyers. Google's policies "strictly prohibit" any effort to identify people based on its real-time bidding data, the spokesperson said, adding that it doesn't share "precise location or sensitive personal" information.

Privacy experts have long warned about the dangers of real-time data exchanges. "What everyone on the internet is reading, watching and listening to, and where they move in the real world, is being broadcast to thousands of companies all of the time," says Johnny Ryan, a senior fellow at the Irish Council for Civil Liberties. "This is the biggest data breach ever recorded–and it's repeated every day."

In 2021 six users filed a proposed class-action lawsuit against Google in federal district court in California, claiming the company had "misled consumers into believing that it does not sell their personal information." (Google has sought to have the case dismissed, saying the data on its ad exchange shouldn't be considered private because people share it with websites through their internet use.) In an April 2021 letter, a bipartisan group of US senators also expressed concerns about data shared through real-time bidding, saying it "would be a goldmine for foreign intelligence services that could exploit it to inform and supercharge hacking, blackmail, and influence campaigns."

The US government itself has purchased mobile location data to track people, as have private entities looking to conduct their own surveillance. *Forbes* reported in December 2020 that Rayzone and another Israeli company, Bsightful, were selling surveillance technology based on location data gathered from smartphone apps. This account, based on interviews with people familiar with Rayzone–all of whom asked not to be named discussing confidential matters–as well as internal documents, provides new information about its operations, technology and client base. (Representatives for Bsightful didn't respond to a request for comment.)

Rayzone was founded in 2010. One of the co-founders, President Yohai Ben-Zakai, is a former deputy director of Unit 8200, the electronic surveillance unit of the Israel Defense Forces sometimes likened to the US's National Security Agency. The company first made a name for itself by selling to governments technology that tracked the location of mobile devices by exploiting weaknesses in a telecommunications protocol known as SS7, or Signaling System 7, a sort of switchboard for the global telecom industry dating to the 1970s. As network operators improved SS7's security, Rayzone began developing Echo in 2017, according to people familiar with the company. It's been selling the service since at least 2018.

To feed Echo, Rayzone obtains data directly from some ad exchanges as well as from other companies that trade in location and other information gathered from mobile phones, according to four people familiar with the company's operations. Rayzone and its affiliates have at times posed as prospective advertisers to acquire data through a system known as a demand-side platform, the people say. It owns two companies specializing in ad technology: Impulse Programmatics and Oxillon, the latter of which says it's "trusted by the world's top advertising agencies." Both operate out of the same eastern Tel Aviv office building as Rayzone, according to business records.

Surveillance through ad tech has some regulatory advantages. The government of Israel, where many surveillance firms are located, has export controls on certain digital surveillance products that rely on hacking into devices or installing technology within telecom networks. Because Echo simply interprets commercially available data, it's not subject to those controls, say people familiar with the business.

Rayzone offers governments custom installations of Echo, priced according to the country or region where the customer wants to track people and how much data it requires. The company looks to charge as much as $10 million for its most expensive licenses, according to people familiar with its sales. Dozens of law enforcement and intelligence agencies in Europe, the Middle East, Asia, and North and South America have purchased Echo, according to four people familiar with Rayzone's operations. The company has partners that sell its technology in countries including Thailand, the Philippines and Mexico, those people say.

Advertising technology generates data every time a person uses a phone to carry out a routine function, such as browsing the internet or using an app to check the weather. These data don't include people's names, but researchers have shown it's possible to de-anonymize them by combining various data sets.

Rayzone's marketing explains that the company "collects information from each internet ▶

"This is the biggest data breach ever recorded—and it's repeated every day"

ILLUSTRATION BY SHIRA INBAR

◀ user worldwide," with one document boasting that "the target is not aware of the monitoring and can't avoid it." From there, Rayzone tells clients its technology can retrieve information about phones that have been in specific locations, then connect them to profiles that include a person's name, gender, age, address, hobbies and browsing history, according to company documents. Rayzone says it can provide up to six months' worth of mobile phone records, allowing governments to peer back in time to find out who was at a particular location and when.

In a demonstration for prospective clients in April 2022, a Rayzone representative showed how the technology could track people's whereabouts across Mexico, analyzing almost 2 billion location records that he said had been gathered from the advertising industry. The system could home in on a particular building and identify who was there on a given day or time going back several months.

Privacy advocates say products such as Rayzone's pose a particular threat because they sidestep limits on government spying. Regulations in many countries make it hard for phone providers to share personal data with foreign governments, says Paul Vines, a security and privacy researcher who's studied the advertising industry. Surveillance that utilizes advertising data, he says, "represents a loophole around protections—some third-party company can go and get the data, and the government will just buy it."

Rayzone sells several other tracking tools. It claims that one of them, called Optimus, can deploy fake social media profiles—or "avatars"—to gather information on web forums while masking the user's true identity. Another tool, known as Sprinter, can be carried in a suitcase and used remotely to eavesdrop on phone calls and text messages.

Such services are inherently controversial, and Israel's surveillance sector in particular has been subject to increased scrutiny as its tactics have come to light in recent years. During a November 2021 conference in Tel Aviv, Rayzone's former chief cybersecurity officer, Guy Mizrahi, offered a full-throated defense. "I want to say that as a private individual, I want that my government will be able to spy on people, even on me, if they think that I have done something wrong," he said. "Other countries should have those capabilities also, and not all of them can develop it on their own. So if we can sell those kinds of things and help them to do it, then it's great." —*Ryan Gallagher*

THE BOTTOM LINE Rayzone Group leverages the infrastructure of the digital ad industry as a surveillance product that sidesteps regulations that cover other tools designed for similar means.

Webtoons Go Global

● The US has become a key market for South Korea's digital comics

The boom in Korean television in the US has been hard for anyone with a Netflix account to miss. But at the same time American audiences were bingeing on *Squid Game* and *All of Us Are Dead* over the past two years, another Korean cultural phenomenon was quietly insinuating itself into the US media diet: the webtoon.

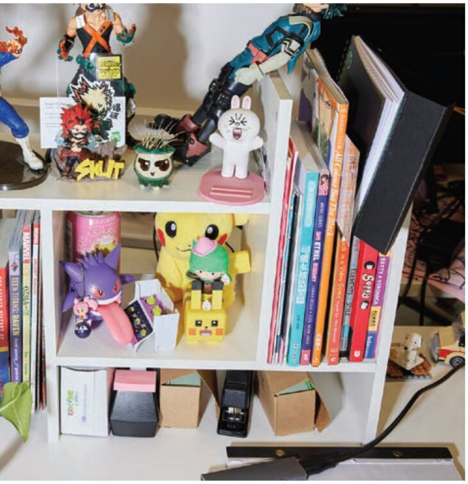
Webtoons are colorful digital comics designed to be scrolled through on mobile devices, usually consisting of serialized stories doled out in short episodes. Since emerging almost two decades ago, the medium has become a force in its home country, pushed by South Korean companies such as Naver Corp. and Kakao Corp. These platforms made it easy for authors to release content that might not have appealed to traditional publishers. As with other novel forms of digital distribution, this allowed new types of creators to reach large audiences and, in some cases at least, make significant money. The medium has thus gained a reputation for producing content whose appeal stretches beyond the traditional comic book audience of young men.

Naver, which also runs South Korea's most popular search engine, established a Los Angeles-based

subsidiary in 2016 to focus on the US market. The operation, run by Ken Kim, is part of Naver's global webtoons division, Webtoon Entertainment. It has developed into the company's second-largest regional platform for webtoons, after South Korea. Of the 86 million users Naver's webtoons had as of last June, about 12 million were in the US, more than twice the total from 2019.

At first, Naver seeded its US operations with Korean content that was adapted for an American audience, but the company has also recruited non-Korean authors to make webtoons for global readers. Webtoon Entertainment is planning a US-based listing, according to Kim Junkoo, chief executive of the division. "You could say that we've tested the business in our home market," he says. "It's clearly a model that works."

Naver's webtoons subsidiary isn't yet profitable,



and company executives told investors in a May 8 earnings call that they'd been cutting costs on the unit in part to prepare for its public listing, which they expect to take place next year. They described their efforts to make money from webtoons through advertising as "nascent" and said they expected the unit to become profitable, excluding certain expenses, by the end of the year.

In addition to subscriptions and advertising, webtoons can make money through merchandising, television, film or other licensing deals. One of Webtoon Entertainment's biggest hits has been Rachel Smythe's *Lore Olympus*, a modern retelling of the Greek myth of Persephone's abduction. The webtoon version, which comprises more than 200 serialized episodes, was also converted into an award-winning graphic novel that topped the *New York Times* bestseller list for its category. *Lore Olympus* won the Harvey Award for digital book of the year in both 2021 and 2022, as well as the Eisner award for best webcomic in 2022. Its success shows the medium's growth potential in the US, says Son Jeho, a Korean author who's been writing webtoons for almost as long as they've existed. "When the market gets bigger, it'll be tremendously big," he says. "Probably something beyond my imagination."

Son says the rapid-fire social nature of webtoons appeals to young users who grew up glued to their phone instead of whiling away their afternoons in a comic book store. Readers often respond instantly to new episodes by leaving comments, either through dedicated webtoon apps or general-use reading apps. "It's an industry that's supersensitive to the latest market trends," he says. "That's what makes it possible for this business to be the starting point for all content culture."

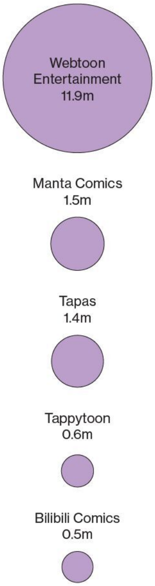
Webtoons are also fueling other forms of Korean culture that are finding traction internationally. Netflix horror hits *All of Us Are Dead*—one of the platform's most successful non-English-language shows, measured by hours watched in its first 28 days—and *Hellbound* were initially webtoons. Netflix Inc. announced on April 25 that it would

expand its investment in South Korea, where it has operated since 2016, by spending $2.5 billion in Korean content over four years.

It's a good bet some of the shows that come from that commitment will have a connection to webtoons. About 30% of South Korean dramas in development can be traced to a webtoon, estimates Woody Lee, the founder and CEO of Kenaz, a webtoon production company. Lee says producers in South Korea and abroad see a popular webtoon as a sign that a story has a built-in audience that can increase the chances of success. "I'm seeing a lot of green lights from Hollywood," he says. —*Min Jeong Lee and Sohee Kim, with Youkyung Lee*

THE BOTTOM LINE Naver is planning a US listing for its global webtoons division, which is expanding the reach of its serialized stories but isn't yet profitable.

▼ Top webtoon platforms in the US, by monthly active users



◀ Ken Kim (left), president of Webtoon America, and David Lee, head of content, in their Los Angeles offices

PHOTOGRAPHS BY MAGGIE SHANNON FOR BLOOMBERG BUSINESSWEEK. DATA: DATA.AI, NAVER

Too Small to Succeed

● A shifting economy caught some banks unprepared

In the wake of the 2008 crisis, the financial giants rescued from the brink were dubbed too big to fail, and policymakers and regulators focused on rules to make sure those banks ran more safely. Meanwhile, just out of view, a different problem was taking shape: What if some banks turned out to be too small to thrive?

"Small" is a relative term. The turmoil that's recently gripped the industry has centered on banks often referred to as regionals—which, depending on whom you ask, covers institutions with $10 billion of assets all the way up to the likes of Silicon Valley Bank and First Republic, which each had about $200 billion in assets when they collapsed. That was enough to put them in the top 20 US banks but nowhere near the top four, where size is measured in trillions. JPMorgan Chase & Co. moved the needle only slightly on its almost $4 trillion in assets when it bought the remains of First Republic, taking it off the hands of the Federal Deposit Insurance Corp.

There was some hope that the shadow over regional banks might lift after the problem of First Republic was resolved. After all, both that bank and SVB had specific problems, most notably their high levels of uninsured deposits that customers were prone to yank the moment they had a reason to worry. But the market is still having trouble shaking its anxiety. The KBW Regional Banking Index is down 30% since the start of the year, and it's off 9.5% since May 1, when JPMorgan stepped in.

That's unsettling not only for the banks' shareholders. Regional institutions are a key source of financing for small businesses, which employ about half of private-sector workers. If these banks are weak, it could make it even harder for these businesses to borrow money and potentially shift more power to bigger banks or force smaller ones to combine. People "underestimate what these banks mean for our financial ecosystem," former FDIC Chairman Jelena McWilliams said in an interview with Bloomberg Television.

In hindsight it looks as if the low-interest-rate, high-stimulus pandemic economy was a trap for some unwary banks. For many businesses, having low rates and cash-rich consumers was like playing on an easy setting. But for bankers those conditions were tricky. All that government money being deployed to ease the pain of the pandemic needed somewhere to go, and a lot of it ended up in bank

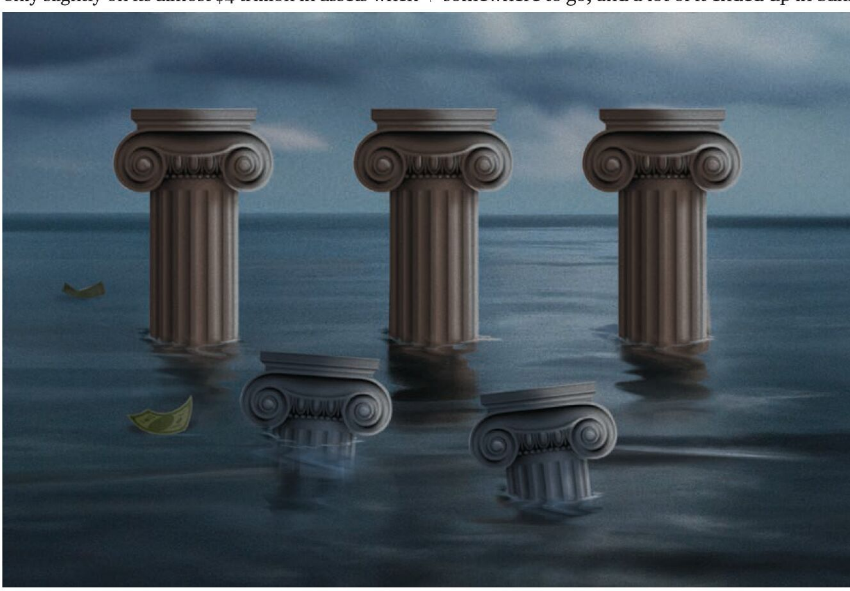


ILLUSTRATION BY MARK PERNICE

Edited by Pat Regnier

accounts. And because prevailing interest rates were so low, banks were under little pressure to reward customers with anything but the stingiest yields.

But there was a problem on the other side of the balance sheet: Low yields also made it harder for banks to earn money from lending or investing in securities. And demand for loans was anemic, as businesses and consumers were getting help from stimulus programs. So some banks chased growth through specialization. First Republic carved out a niche with wealthy customers, and SVB became a kind of financial concierge to the tech startup scene. When these banks looked to deploy the money they took in, they generally played it safe—or so they thought—buying government bonds or offering mortgages to wealthy customers with high credit scores. But these instruments had longer maturities and exposed the banks to interest-rate risk.

When prevailing interest rates go up, longer-dated assets paying lower rates become less valuable. Essentially, some banks had bet that rates wouldn't go too much higher, too quickly—and SVB and First Republic, at least, got that wager dead wrong. In 2022 the US Federal Reserve pivoted to fighting inflation and started aggressively raising rates from near zero. By this May the central bank had brought the target on its benchmark rate above 5% for the first time since 2007.

The Fed's hikes helped saddle banks with paper losses of $620 billion as of the end of 2022. If a bank can hold money-losing securities to maturity, which is typically the plan, the problem might remain hypothetical. But if depositors start withdrawing their money quickly, banks with too much interest-rate risk—known on Wall Street as duration—may face the prospect of having to sell those holdings at a loss, tipping them into insolvency. And this spring deposits came under pressure, as customers began to notice the losses some banks were exposed to—or just decided to move their money to higher-paying accounts elsewhere when yields rose. Banks that counted on the relationships they cultivated with their specialized clientele discovered loyalty was fleeting. "It's like, Banking 101," says Darius Palia, a Rutgers University finance professor. "Why didn't bankers and regulators anticipate that they would be caught with this duration mismatch?"

The megabanks have so far steered clear of this pain. It's partly that they're more closely watched: The largest banks face more stringent rules and supervision. (Some of those rules would've applied to SVB and First Republic, too, if not for the partial rollback five years ago of the 2010 Dodd-Frank financial reforms.) Wall Street banks also tend to have a lot of capital to cushion losses, as well as economies of scale and more ways to move low-yielding assets off their balance sheet, such as securitization or asset sales. The bigger regionals may also be more resilient, says Joseph Mevorah, a senior managing director with Empire Valuation Consultants LLC.

But many smaller banks seem stuck in a grinding cycle of doubt and guarded optimism. Amar Reganti, a former US Treasury Department official and now a managing director at Wellington Management, likens it to a "slow-burning fire that sparks up every several weeks." The sequence starts with a bank's stock price diving: Speculation abounds, deposits remain relatively steady, and then things calm down until anxiety picks up again. "Almost what's true or not becomes irrelevant to what the price action is," Reganti says.

One way to lower the temperature would be for Congress to raise the $250,000 cap on deposit insurance. Although that's plenty to cover the vast majority of individuals, many businesses maintain bigger balances for their operational expenses. And in the end, when SVB and New York's Signature Bank failed on the same weekend, the government backed up all depositors. "The caps to me look like a human tailbone in a way," a vestige of another time, says Robert Hockett, a professor at Cornell Law School.

Others say raising or getting rid of deposit caps could encourage riskier bank behavior. "Countries with more generous systems have more frequent banking crises," and the severity of those runs are worse, says Patricia McCoy, a professor at Boston College Law School specializing in financial regulation. It's better, she says, to focus on regulations that help keep banks out of trouble in the first place.

Larger capital buffers would help. Banks can accumulate capital in a number of ways including boosting profits (tough right now), cutting dividends or raising money from investors. Asking for more capital can be perceived as a distress flare, so it has to be done carefully, and it's not a quick fix.

Another debate is whether the bank mess is the result of the Fed pushing too hard or just the ugly reality of how monetary tightening works. "A lot of what's going on is exactly what you should have thought you were trying to do as a policymaker," said Seth Carpenter, chief global economist for Morgan Stanley, during a recent panel hosted by the New York Fed. But he added a caution: "Is there an additional exogenous component? I think therein lies the real question of what could go wrong." When banks are under stress, they may break in unpredictable ways. *—Paige Smith, Max Reyes and Jonnelle Marte*

THE BOTTOM LINE Regional banks play a huge role in the economy, but in the shift to higher rates, they've struggled in ways megabanks haven't.

● Banks' unrealized losses as of Dec. 31

$620b

The Quiet Star in Ken Griffin's Market Empire

● CEO Peng Zhao keeps Citadel Securities at the heart of Wall Street

Among all the tales Wall Street leaders tell of pivotal moments that led them to their careers, Citadel Securities Chief Executive Officer Peng Zhao's may be the only one that involves sifting through garbage.

Zhao was a second grader at what he describes as a middling public school in Beijing when his class received two coveted tickets to take a test to enter a prestigious math olympiad. One went to Zhao, the top student, who promptly lost it. No need to worry, he told his father, he didn't want to go. When his dad pressed, Zhao said he'd have to ask the school for the other kid's ticket. His dad wouldn't allow that either.

Soon they were back at the school retracing steps, then off to the neighborhood garbage depot. They poured trash onto the ground and started peeling through. Day turned into night. Zhao pleaded to call it quits. His father refused. As the mountain of waste shrunk to the last remnants, they found the missing ticket. Zhao took the exam, passed and eventually entered an educational fast track that led him to working in the heart of the US financial system.

Citadel Securities runs a key part of Wall Street's infrastructure. As a market maker it has computerized systems that are constantly buying and selling stocks—often in milliseconds—helping to facilitate others' trading while collecting a profit on small price differences. This process adds up to a big business: Citadel Securities handles about 1 out of every 5 US stock trades and more than a third of those by retail investors. It generated about $7.5 billion in revenue last year.

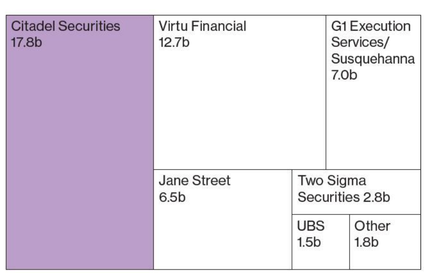
Yet even inside his industry and among the most ardent critics of Citadel's power, Zhao, 40, hardly draws attention. That's thanks in part to the shadow cast by its outspoken billionaire founder, Ken Griffin, who also owns Citadel LLC, the $58 billion hedge fund manager.

Griffin is constantly in the spotlight—speaking before US lawmakers, on television, at conferences and to college graduates—often defending Citadel Securities' growing role in markets and the controversial practice of gathering equity and options business from retail brokerages by paying to have their orders directed its way. Critics including US Securities and Exchange Commission Chair Gary Gensler have pointed to the company's dominance in equities markets as emblematic of a competitive problem in the industry. Last year his staff put forth a 1,600-page proposal to rework US market structure and move more trading into the open on public exchanges.

Griffin has stirred further controversy by aligning himself with Republican Florida Governor Ron DeSantis and recently uprooting his businesses from Chicago to Miami, embracing the city's campaign to become a low-cost subtropical financial hub competing with New York. Yet behind the scenes, Griffin rarely visits Citadel Securities, keeping tabs remotely, according to people close to the company. Instead it's Zhao who's up to his elbows in the firm's efforts to rewire Wall Street markets with new systems for handling orders from institutional and retail clients. "If you want to make a trade, we should be the first name that comes to mind," Zhao says in a rare interview at

Leader of the Market-Making Pack

Total retail shares processed in March 2023



FIGURES EXCLUDE TRADES OF FEWER THAN 100 SHARES.
DATA: REGULATORY FILINGS COMPILED BY BLOOMBERG INTELLIGENCE

ZHAO: BLOOMBERG

his Chicago office, which he's in until his move to Miami this summer.

Citadel Securities' ambitions aren't constrained to the US. The company aims to expand in Asia and Europe, and further, beyond stocks and options, to play a bigger role in fixed-income and rates trading. It's also been at the forefront of pioneering direct listings, an alternative to time-intensive initial public offerings.

If—or when—Citadel Securities eventually sells shares to the public, it would put an overdue spotlight on a CEO whose formal receipt of that title in 2017 wasn't even marked by a press release. "The only thing he hasn't done a ton of is have a big public profile," says Jamil Nazarali, a former senior Citadel Securities executive who's now CEO of EDX Markets, which is backed by Citadel.

◀ Zhao

Zhao's lack of visibility is all the more striking given the unusual story behind his rise—starting with that math olympiad. Participating in those competitions set him up for an accelerated program giving 10-year-olds a chance to finish their high school degree in four years. But first, Zhao needed to be evaluated at a two-week camp. In one crucial test, the camp organizers led students to a track and gave them a simple task: Move. Applicants were left guessing at how to impress observers. Some sprinted and petered out. Others jogged or walked for what turned into a two-hour slog. Those who lasted, as Zhao did, demonstrated persistence and gained entry to the program.

Zhao developed a taste for games. And at 12 he discovered his calling while reading a newspaper on the Beijing subway. An article described how physicists, mathematicians and computer scientists were developing systems to beat Wall Street professionals in predicting market moves. He was enthralled by the high stakes and potentially massive rewards. "It pulled me in," he says.

So with his eyes on reaching the US financial industry, he enrolled in Peking University to study applied mathematics. He was 14. "He was well known on campus not just for his age but his intellect," says Fung Wu, a member of Zhao's class who was four years older. They lived on different floors of the same dorm. Wu recalls that groups would spend weeks on problem sets, but Zhao would finish in days and spend the rest of the time playing video games.

Years later, after Zhao earned his doctorate in statistics at the University of California at Berkeley, and Wu got his in physics at Stanford University, they would reunite at Citadel Securities. Zhao arrived there first, in 2006, following a summer internship at Lehman Brothers. Griffin's market maker was only a fraction of its current size.

Zhao's partnership with Griffin took off about a year later. The US mortgage market was starting to seize up, and Griffin went looking for someone able to model the potential fallout. A colleague pointed to Zhao, but it was almost the weekend. That evening, Zhao's wife suggested he set an alarm "just in case Ken calls." So Zhao did, for 6 a.m. on a Saturday. The phone rang at 6:30.

The pair ended up spending hours in front of a whiteboard. Soon, Griffin had a temporary seat in Zhao's office, where he'd look over the mathematician's shoulder. Later, as Citadel made it through the 2008 crisis, business took off and so did Zhao's career. In 2014 he was put in charge of market-making for options. Although the unit was already considered a success, Zhao thought it could make multiples more. He redesigned the way it fielded orders, emulating how equities trading was evolving by using predictive analytics and technology instead of human intervention for trading. That led to more assignments. "You need credibility with senior leadership, and with Ken, that you can grow the business," says Matt Culek, the company's chief operating officer. "Peng got things done."

Zhao made recruiting a priority. Betting that the best minds had the strongest shot at making money, he was ready to persuade people with other interests to come to Chicago and work in finance. He started with his former classmate Wu. Flattered, Wu thanked him for his interest but said he didn't know much about money, just physics. Zhao kept calling and started sending "brain teasers" that ▶

◀ intrigued Wu, who broke down and agreed to an interview. Wu figured it would be a day trip to Chicago. Soon he was a full-time employee commuting from the Bay Area. "He's not a bad guy. He has good intentions," Wu says. "He just gets his way."

It's not only recruiting that Zhao treats like a puzzle to be solved. To entertain the table in restaurants, he asks the waiter to pick a bottle and bring it without showing the label, so he can taste it and identify the type, vintage and origin. "I don't like alcohol, I like the study of it," he says. "There's so much noise and randomness." The trick, which he honed while working on his doctorate near wine country, is to take something that seems subjective or chaotic and break it into pieces that can be mapped and understood.

At Citadel Securities, he says, building new business lines always starts with figuring out how to find the correct price for an asset instantly, using math, modeling and machine learning. Once that's solved, the company devises a method for buying and selling near that price, making it a process that can be scaled up. Those who know Zhao from his early days at the company say his transition from those problems to managing the business seemed natural. But the mathematician was slower to see himself as senior leadership material.

In mid-2016, with great fanfare, Griffin recruited former Microsoft Corp. COO Kevin Turner to run Citadel Securities. Zhao, who became chief scientist, says he wasn't bothered by being passed over. "If my career goal was to be CEO, I would not have studied math in undergrad," he says.

Turner didn't develop the same kind of rapport with Griffin that Zhao had. And as an outsider unaccustomed to the company's idiosyncrasies, he lasted only several months. Zhao then stepped into the roll with no further ado. By then, some colleagues saw his new title as simply describing what he was already handling. "He was the driving force behind the innovation, in charge of the research agendas and the revenue," says Roy Kaiser, head of derivatives.

The decision put Zhao in the position to protect and expand much of Griffin's multibillion-dollar empire. There's a common misperception that market-making is relatively safe and boring, akin to a power company keeping the lights on, says Moody's analyst Fadi Abdel Massih. The reality is that it's "a highly complicated process with the potential for huge losses."

As CEO, Zhao is known to obsess over metrics. He helped build an internal management portal that tracks the performance of employees and business lines in real time, tallying revenue and showing how the company is doing relative to peers. Managers go over the results every month, deciding where to expand or retreat. "There's a close-knit alignment of interest when it's the founder's capital being put at risk," Massih says. When Zhao adds business lines, it diversifies the company's earnings so it can better stomach a desk's occasional loss.

Citadel Securities is preparing to join the Federal Reserve's select roster of primary dealers, which trade directly with the New York Fed as it implements monetary policy and promise to bid in every US Treasury auction. And even if regulators push through a rewrite to equity trading rules, Fitch Ratings analyst Bain Rumohr predicts Citadel Securities will be fine. "There's a lot at stake, but the big firms will be able to adapt," focusing, for example, on the most profitable trades, he says.

"Peng got things done"

Zhao acknowledges that regulatory and public scrutiny of the company's role in markets is intensifying, but he's confident that the business will keep its edge. "People recognize the fundamental role we play in the market," he says. "And yet we're subtle." —*Katherine Doherty*

THE BOTTOM LINE Zhao isn't well known even in the financial industry, but behind the scenes the company he runs handles about 1 out of every 5 US stock trades.

When College Debt Is a Double Burden

Double

● Borrowers with children face a squeeze as long-paused payments are slated to resume

Many parents with student loans in the US are getting sandwiched by college costs. After a three-year pause, required payments on federal loans are scheduled to restart in coming months. The situation is uniquely tough for borrowers with children who'd like to go to college one day. Parents who want to help their kids shoulder the cost will find it harder to set aside money as payments resume.

ILLUSTRATION BY KANIOKO. DEBT FIGURES EXCLUDE PRIVATE LOANS AND LOANS WITH NO REPORTED AGE GROUP. DATA: US DEPARTMENT OF EDUCATION

The common image of someone hampered by student loans is a recent grad in their 20s, but a significant number of older people are still carrying debt from their college years or from Parent PLUS loans they took out to help their children pay for school. The largest chunk of federal student loans—some $636 billion held by 14.7 million people—belongs to borrowers age 35 to 49. "I don't want my daughter to go through the same thing," says Whitney Mitchell, a 37-year-old who works for a nonprofit in Alabama and has an 8-year-old. "But I don't know which ball I would have to drop to save enough for her to go to college."

Mitchell took out $40,000 in federal student loans when she enrolled in college more than a decade after finishing high school. She graduated in 2020 after the pandemic-era freeze took effect, meaning she's one of millions of people who've yet to pay a student loan bill.

Payments will resume no later than Aug. 29, depending on when the Supreme Court hands down its decision on President Joe Biden's one-time forgiveness program, which would cancel as much as $20,000 of an individual's debt based on income and other factors. Borrowers are also waiting to see how changes to income-driven repayment plans may affect their monthly bills. But no matter what happens, many people with budgets that are already overextended will be hit with extra costs.

Mitchell anticipates needing to pay $300 or $400 a month toward her loans, putting her on par with the pre-pandemic average. "I don't know if I'm financially ready for it," she says. "Groceries are really high, gas is really expensive, and our other bills are going up."

An April 2021 survey by the Harris Poll found that 68% of people born from 1981 to 1988 still had student debt. Many people end up carrying that debt for decades. There's $296 billion in outstanding federal student loans held by people age 50 to 61, and $111 billion carried by people 62 and older, according to data from the US Department of Education. Borrowers 24 and younger owe $99 billion.

The fastest-growing demographic with student debt is people over 50, says Natalia Abrams, president of the Student Debt Crisis Center, an advocacy group. "So many parents have to deal with their own personal student debt and the extra loans they've taken out as Parent PLUS loans for their children," she says.

Megan McCarthy is facing the prospect of three generations of her family carrying student debt. The 34-year-old, who works in social welfare in

Oneonta, New York, has about $80,000 in federal loans, with monthly payments of around $200 set to return this summer. And her mother has Parent PLUS loans—she won't tell her daughter how much—from helping her four kids, including McCarthy, with their college expenses.

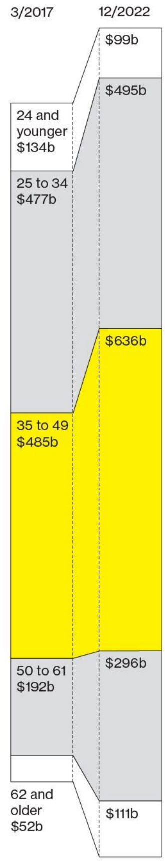
McCarthy has a 9-year-old daughter and is already worried about paying for her education. "It's like a generational thing that's being passed on," she says. "My daughter is into running and gymnastics, so I'm looking into scholarship opportunities. I'm saving every little bit I can, but then emergency stuff pops up."

A public four-year school cost an average of $20,500, and a private nonprofit cost $52,590, in the 2022-23 academic year including tuition, fees, and room and board, according to College Board data. Those prices have more than doubled since the 1970s when adjusted for inflation. And that's just the average: For a highly prized spot at an Ivy League school, the price tag is now approaching $90,000 a year.

Matt Bruss, a 42-year-old lawyer in Detroit, has been aggressively paying down his private loans during the pause, but he still has about $11,000 left in federal and private debt. He and his wife plan to be pragmatic when talking about which majors their kids, age 7 and 9, should pursue and which colleges are worth their price. "I would love to be able to pay for their college. I don't want them to go through what we went through," Bruss says. "School was nothing compared to the 10 years trying to get out of that hole of debt." —*Ella Cerón and Claire Ballentine*

THE BOTTOM LINE Many parents carrying high student debts of their own want to help their kids pay for school, but it's not easy with college costs that have more than doubled since the 1970s.

▼ US student loan debt by age group



Give Us Your Engineers, Your Investors, Your Entrepreneurs

● Arditi at the Ron Diplomático facility

PHOTOGRAPH BY ROSE MARIE CROMWELL FOR BLOOMBERG BUSINESSWEEK

● Professionals fleeing Venezuela bring skills, money and jobs to Panama

Under a blazing tropical sun, two of Latin America's biggest rum distillers face off across the hot tarmac of the Panapark Free Zone. Both are from Venezuela, and both chose Panama as a safe haven from their homeland's yearslong downward spiral. The industrial park, a 30-minute drive east of Panama City's business district, is home to at least four other Venezuelan businesses, including a fabricator of oil drilling machinery, two logistics companies and, the latest arrival, a fruit juice bottler.

The two rum companies—Ron Diplomático and Ron Santa Teresa—operate as repackagers, importing alcohol processed from sugar cane on haciendas in Venezuela, which is aged into rum in wooden casks in Panama until the distilled product can be bottled for export.

Gian Guido Arditi, Ron Diplomático's manager in Panama, says it was the 2015 collapse of Venezuela's petroleum boom that drove the company to seek refuge here. The premium brand, whose blends can run as much as $300 a bottle, had thrived for decades in a country famous for its overconsumption of luxury goods. But, as hyperinflation set in, Venezuelans' purchasing power evaporated practically overnight.

The business turned to exports, and Panama's ▶

Edited by Cristina Lindblad and Rebecca Penty

◀ Soto on one of his vessels

◀ use of the US dollar as its currency, as well as its position as a global trade crossroads, made the country an obvious choice as a base of operations. Ron Santa Teresa made the same calculation, as did many of the more than 5,000 Venezuelan entrepreneurs who've established themselves here in recent years. Says Arditi, who came to assist Ron Diplomático in its transition, "I consider Venezuela the world's leading exporter of brainpower today."

Over the past half-century, no Latin American country churned out as many college graduates as Venezuela did during the petroleum-powered boom that began in the 1970s. Migration experts estimate some 2 million Venezuelans with advanced degrees now live outside their country. Most have settled in the region, where the demand for Spanish-speaking managers, engineers and other trained professionals often outstrips the local supply.

In November, the United Nations' International Organization for Migration (IOM) released a study showing that the almost 145,000 Venezuelans who've secured legal residency in Panama contribute more than $200 million annually in taxes on retail sales and property assessments, along with other fees. That's almost four times the $53 million a year Panamanian authorities budget for the expats' integration, mainly for school enrollment and access to the nation's health-care system.

The IOM study also highlighted the more than 5,500 enterprises formally registered by Venezuelans residing in the country, of which about 1,000 have annual sales of at least $1 million. In total, these enterprises have created almost 40,000 jobs, with 75% of salaries earned by Panamanian citizens.

At least 7 million Venezuelans live outside their homeland, the largest concentration in neighboring Colombia. Migration experts predict the Venezuelan diaspora could top 8 million by 2025, although recent data suggest the pace of departures has slowed markedly. Some Venezuelans have returned home as the economic situation has stabilized, though data on their numbers is spotty.

◀ Stizzoli at his Casa Stizzoli bistro

A December report by the International Monetary Fund estimates the influx of Venezuelan migrants into Peru and Colombia had the capacity to lift the economic output of those countries by as much as 4.4% and 3.7%, respectively, by the end of the decade. The report also noted that because a large share of the recent arrivals have advanced degrees, they've been able to find employment with relative ease and without causing the labor market displacement that often fuels anti-immigrant sentiment.

"Venezuelan migrants have structural advantages over other large migration episodes," the IMF researchers concluded, nodding to the exodus in the 1960s triggered by the Cuban Revolution, the one sparked by the Mexican peso crisis in the '90s and the more recent waves of Haitians and Nicaraguans fleeing political instability and economic hardship. "Venezuelans tend to be more educated than the average citizen of destination economies," wrote the authors of the report, adding that their "language and cultural assimilation barriers are relatively low."

● Share of Venezuelan migrants in Panama that have college degrees and advanced training

65%

Orlando Soto moved to Panama City in 2008 from Maracaibo, the center of Venezuela's oil industry. There he'd scaled up his father's small metal shop—which produced milk cans for dairies—into a manufacturer of steel tanks to transport Venezuelan crude to refiners such as Shell, Chevron and Petróleos de Venezuela (PDVSA), the state oil monopoly. At one point the business had 300 employees. "But with Chávez it all went to shit," says the 54-year-old, referring to the late paratrooper-turned-president, whose socialist revolution led to an economic collapse.

Soto says that besides purging PDVSA of ideologically unreliable technocrats, crippling his most important customer in the process, Chavistas urged his own employees to go on strike and at one point threatened expropriation. Then there was the deteriorating security situation, which hit home when Soto's younger brother became the victim of a so-called express kidnapping—a snatch-and-release typically involving small ransoms.

PHOTOGRAPHS BY ROSE MARIE CROMWELL FOR BLOOMBERG BUSINESSWEEK

Soto managed to send two small harbor craft he operated on Lake Maracaibo to Panama. There he started a company called Stward Corp. to cater to maritime shippers, mainly those transiting the Panama Canal, shuttling crews back and forth from the waterfront and dispatching teams to do patch-up work on hulls. His fleet of seven vessels includes a floating gas station where megayachts can fuel up. "Someone pulls alongside, and we can have it topped off in two hours," he says. The business has 200 employees, almost all Panamanian; Soto says gross sales should hit $85 million this year.

Daniel Uranga, 42, arrived in Panama a decade after Soto, in 2018. His eyes mist as he recalls the multiple kidnap attempts that finally drove him to sell his 12,000-acre cattle ranch outside Caracas at what he calls a fire-sale price. With the proceeds, he purchased 150 acres near Panama's border with Costa Rica and established himself as the country's top producer of Haas avocados. "Panama is a small country, but it's big in opportunity," he says. "There's personal security and legal security."

Many of the new arrivals have been able to secure legal residency in Panama with relative ease. Obtaining a work permit is harder. Cepaven, a local chamber of commerce that represents Venezuelan-owned businesses, has been lobbying the government to waive rules that limit certain professions to Panamanian citizens, either born or naturalized. Medicine, accounting and law are among the most restricted industries.

Some Cepaven members, like Soto, now are naturalized. But many Venezuelan engineers, technicians and managers looking for work are not. Among them is Enrique Álvarez, director of construction company Grupo OTI. The Cornell University-educated engineer makes light of his quandary: "I can't practice here as an engineer or an accountant or an architect or a designer," all positions he held while building a successful business in Venezuela. "But I can be the director of a company."

Álvarez, 57, earned a good living in Venezuela building public housing, a priority under the Hugo Chávez regime. "Then the government decided to cut private-sector builders out," he says. He moved to Panama in 2009 after considering other locations, including Florida, Spain and Colombia. He soon discovered that Panama's tiny size meant he could no longer rely on big public contracts, where volume compensates for thin profit margins. But Panama's smallness also offered opportunity: No large builder was serving the lower end market, giving Grupo OTI an opening. Álvarez started by investing $4 million in a ready-mix concrete plant and also took advantage of Panama's low trade barriers to import building materials duty-free. Today, Grupo OTI builds single-family homes for Panama's working class that sell for less than $70,000 apiece. It's a far cry from the $500,000 to $1 million luxury condos Venezuelans typically purchase along Panama City's oceanfront. Álvarez plans to erect 300 units this year.

Unable to work as a graphic designer, Roberto Stizzoli, 43, decided to pursue his lifelong dream of running a restaurant. His Casa Stizzoli, a high-end bistro that caters to tourists and wealthy expats, now has three locations, and he also operates an eatery called Xawarma Guys that serves Middle Eastern fare, as well as a gelato store. He ticks off the Venezuelan startups among his suppliers: one raising organic mushrooms, another wholesaling liquor, a third providing fish and meats.


▲ One of Grupo OTI's cement mixers

Venezuelans with fewer skills and less means haven't had as easy a time putting down roots in Panama. That's particularly true in rural communities, where they're stigmatized as street-corner beggars. Since the middle of last year, Panama has encouraged migrants trekking in from its southern border with Colombia to keep moving north, even subsidizing the cost of bus fare to Costa Rica.

"Countries sometimes create their own irregular immigration crisis when they limit ways migrants integrate into their economies," says Giuseppe Loprete, chief of IOM's Panama mission. He's urged authorities to liberalize rules to let more Venezuelans qualify for work visas. He points to Mexico, Costa Rica, the Dominican Republic and Ecuador—whose governments seek to leverage Venezuelan talent to create more jobs for locals. Says Loprete: "Panama could be doing much more to maximize the benefits that come with this new population." —*Joel Millman*

THE BOTTOM LINE Venezuelan migrants in Panama and elsewhere in the Americas are helping seed new businesses, refuting the notion that they are a drain on government coffers.

Addressing Menopause In the Workplace

● Companies can better retain female leaders by reducing the taboos around this natural phase of life

Tracy Gardner was in her late 40s when she began to feel unwell. Gardner, who at the time was president of J.Crew International Inc., recalls enduring intense hot flashes while she chaired packed meetings at the apparel maker. "I felt like I was living that scene in *Broadcast News*, where Albert Brooks's character is sweating uncontrollably, soaking through his clothes on air during a news segment," says Gardner, now 59, who works as a board director and executive adviser. "It was as if overnight, everything changed." The shift was physical, mental and emotional, she says.

Gardner didn't realize it right away, but she was heading toward menopause, defined as the phase after 12 consecutive months without a period. More specifically, she was experiencing perimenopause, the lead-up to a person's final menstrual period in which the symptoms often associated with menopause begin. Typically starting in someone's mid- to late 40s and lasting seven to nine years, the symptoms can include hot flashes, erratic and sometimes heavy periods (known as flooding), night sweats, body aches, energy decline, brain fog, mood changes, sexual dysfunction and, most precarious to long-term health, significant sleep disruption. Any combination of them can harm self-confidence, memory and mental health.

By 2025 the number of postmenopausal women globally is expected to rise to 1.1 billion, according to the North American Menopause Society. An historical taboo around speaking about perimenopause and menopause—especially in the workplace—as well as a pronounced knowledge gap within society and among clinicians mean many sufferers don't attribute their experience to this natural phase of life and struggle

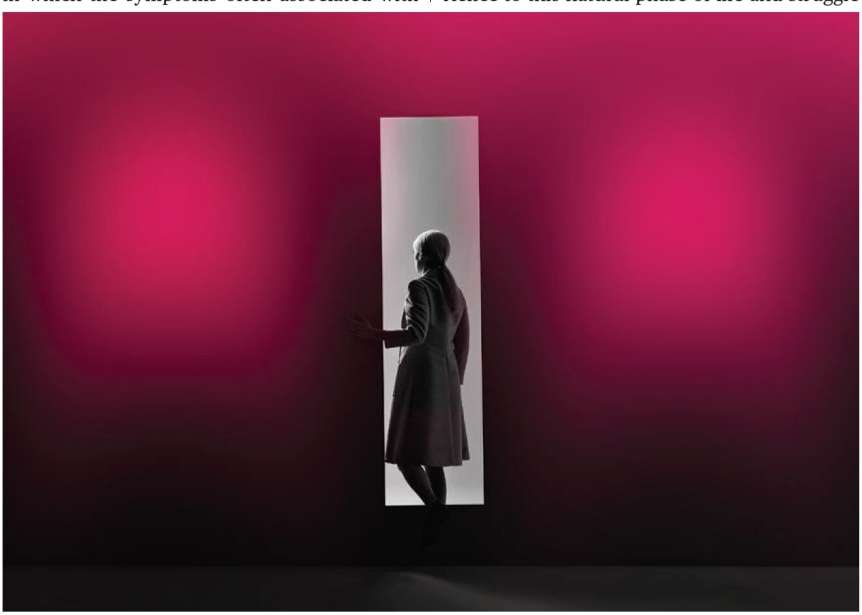


PHOTO ILLUSTRATION BY 731; PHOTO: GETTY IMAGES. DATA: OECD to cope. "When I was going through it, no one spoke about menopause, and I hadn't even heard the word 'perimenopause,' not even in private," Gardner says, adding that because people's symptoms can vary in number and severity, it was hard to unpack what was happening. "But I knew that I didn't feel at the top of my game, and I didn't love the exhausted person that was left for my family at the end of the day."

To protect her mental health and establish a greater work-life balance while she was raising two young children, Gardner stepped down from her position at J.Crew in mid-2010, leaving behind a lot of money and a lot of perplexed peers. "I kept hearing, 'Why would you give this up?' " she says. "All I could say was, 'I hit a wall. I needed to shift things around, create boundaries.' "

Menopause often occurs right as women are moving into senior or executive leadership roles while simultaneously raising children, caring for elderly parents and potentially facing ageism. The corporate world isn't the most hospitable place to navigate what can feel like a second puberty, says Michelle Jacobs, a co-founder and chief operating officer of Womaness, a brand of personal-care products and supplements targeted at alleviating menopause symptoms. "Like pregnancy, menopause can be difficult water to tread while working in environments with a lot of men, where you simply can't say you're falling apart, where women are often phased out, their work made invisible, even in their late 40s," Jacobs says. "I don't have one friend in their 50s who has remained in their corporate jobs. These are women who have run companies, but they're all doing other things now—sitting on boards, starting businesses and usually working from home."

Not everyone is in a financial position to shift gears this way, and those who don't entirely leave the corporate scene because of perimenopause and menopause symptoms may struggle in silence. A study released by the Mayo Clinic in April found that of the 4,400 women age 45 to 60 it surveyed, 13% had experienced challenges at work related to menopause symptoms, and about 11% had missed workdays because of those symptoms. While more research is needed among a broader and more diverse sample, "The odds of having an adverse outcome due to menopause symptoms is approximately three times higher for Black women," says Ekta Kapoor, assistant director of Mayo Clinic Women's Health and the report's senior author. And the annual cost to the US economy of all these missed days of work? Upwards of $1.8 billion, according to the report.

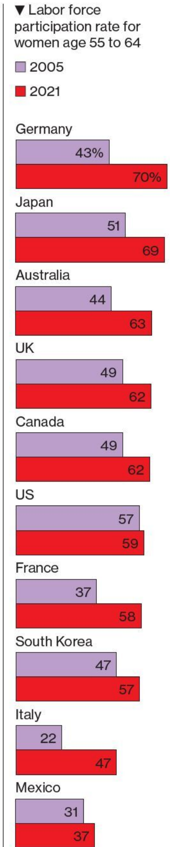
A separate assessment conducted by Elektra Health, a telemedicine startup for menopause care based in New York, found that 20% of women surveyed had left or were considering leaving a job because of menopause symptoms. A further 18% had forgone pursuing promotions as a result of them, and 44% felt they didn't have enough support from their employers.

These studies come at a time when there's been increasing coverage about perimenopause and menopause in mainstream media. Celebrities including Michelle Obama and Drew Barrymore have spoken about their experiences, and a growing crop of female-led startups is working to shake off the taboos while cashing in on what is shaping up to be a $15 billion industry for menopause-related products.

While the narrative might finally be shifting more broadly, the issue is hardly discussed in the workplace. That's starting to change in the UK, where the government recently appointed its first Menopause Employment Champion to generate greater awareness and promote the business benefits of supporting menopausal employees who stay in the workplace. Lee Chambers, the British business psychologist who leads Essentialise Workplace Wellbeing, has made it his mission to normalize menopause in business by helping companies implement strategies, run workshops and inclusion training programs, and encourage male allyship. "It's a real hormonal journey that men don't have a reference point for, but because the workplace has been built by men, for men, there is no consideration for this experience," Chambers says.

The idea of paid menopause leave has been discussed in the UK and Australia, but some, including the Womaness founders, wonder if such a policy might risk further stigmatizing sufferers—particularly if there isn't enough awareness within a company about the matter. "It certainly helps when there are women at the top of a company or team who are open about what they're going through, but it's unrealistic to expect everyone to feel comfortable doing so," says Sally Mueller, Womaness co-founder and chief executive officer, who adds that women need to better recognize their symptoms and realize that there are products and therapies that can help. "From the workplace, I think they need compassion, safe spaces and flexibility in working hours," she says. "A little in this journey can go a long way." —*Lindsey Tramuta*

THE BOTTOM LINE A lack of awareness and supportive policies regarding menopause in the workplace is causing women to step back from senior roles, costing the economy.



THE COKE CAN LINER CAPER

BY DRAKE BENNETT AND JORDAN ROBERTSON WITH PHOTOGRAPHS BY PHILOTHEUS NISCH

SHANNON YOU WAS A GOOD CHEMIST, A BAD COLLEAGUE AND A THIEF. SHE PLANNED TO USE THE IP SHE'D STOLEN TO START A COMPANY IN CHINA. AND IT MIGHT HAVE WORKED IF SHE HADN'T HERSELF BEEN DUPED

The metal of this can has been dissolved, leaving behind the microns-thin liner

On the evening of Aug. 8, 2017, Shannon You badged out of the Atlanta headquarters of the Coca-Cola Co. for one of the last times. Coke was struggling to retain its perch atop the world beverage market, as once-loyal consumers migrated to brands that evoked wilderness aquifers or herbal healing or masochistic sports workouts—not fizzy fun and mass culture. The new chief executive officer's plan involved a restructuring. Twelve hundred employees would be let go, and You, a chemist in her mid-50s, had been informed several weeks earlier that she was among them.

Anytime a company lays someone off, there's a possibility the person will take something with them. Coke, holder of the world's most famous trade secret, was particularly attuned to that risk. It had an intelligence-bureau-style classification scheme, like other corporations that deal in proprietary information, and it had software that tracked employees' data use. That summer, as more and more employees learned they were leaving, the data loss prevention system began to ripple with alerts. "To say that that activity blew up the DLP system" would be "a bit of an understatement," a Coke information security manager later testified. Much of that activity resulted from employees reclaiming personal files they'd stored on their work computers—tax returns, kids' school projects, bank loan information. But not all of it did.

Shannon You in particular had access to some of the most closely held information at the company: a set of detailed chemical recipes for the 2-micron-thick plastic liners inside the beverage cans Coke filled and sold. A federal prosecutor would later describe these as the company's "other secret formulas." Developed at great expense, they were likely even more important than the theatrically guarded recipe for Coke's namesake soft drink—that sugary, acidic brew would, without a liner, devour the metal of its can. The liner formulas didn't actually belong to Coke but to the multinational paint and coatings companies that were its partners. You was responsible for evaluating the formulas; she was one of only two people at Coke with access to many of the specifics.

An internal company report on the chemist's activity that August evening begins at 6:02 p.m. You plugged a Western Digital hard drive into a USB port on a computer, then tried to move files onto the drive from a folder entitled BPANI—an abbreviation for a class of can liner. Because she was being laid off, however, she was flagged in the internal network, and the transfer was blocked. A pop-up on her screen reminded her that any file transfers off her work computer should go through a cloud storage account the company had set up with the software company Box Inc.

You ignored the message. At 6:08 she plugged a different hard drive into her computer and tried to move files onto it, again unsuccessfully. At 7:00, she plugged the original Western Digital drive back into her computer, but rather than drag and drop files, she opened Microsoft Excel and tried saving them onto the external drive through that. That didn't work either. Nor did it work at 8:41 when she tried the same thing with Microsoft Word.

It wasn't until the end of the month that she found a solution. On Aug. 25, You used her phone to take a series of photos of her work computer monitor with one file after another open. And around that time she learned, probably from colleagues, of another simple workaround. Late in the evening on Aug. 29, she uploaded several encrypted files from her computer to a personal Google Drive account. Coke's information security system, set up to block transfers to USB devices, let these proceed. The next night she uploaded some more.

You had not left herself much time—the following day was her last at Coke. But the month had been a busy one. On Aug. 17, unbeknownst to her supervisors, she'd traveled to the Chinese city of Weihai. There she met with businessmen who were helping her start her own coatings company. To fund the venture, You was applying for millions of dollars in government money, and while in town she had an interview for a provincial grant program called Yishi-Yiyi.

A month later, she'd fly to Beijing to stand for another application, this time to a national grant program called the Thousand Talents. The money, she wrote in her application, would help the company she was co-founding "build the first BPANI coating production line in China," breaking the "international monopoly" in the global food container coatings industry. The files from her Coke computer were central to the plan, and she apparently was aware of the legal jeopardy that put her in. "I'm the one taking all the risks in the end," she complained in Mandarin to one of her fellow aspiring co-founders in a WeChat voice message. "If anything happens to me, the money I've made wouldn't even be enough for the lawyer's fee."

Three years later, You did go on trial, for wire fraud, conspiring to steal and possessing trade secrets, and economic espionage. Federal prosecutors argued that the victims of her crimes were the

"THE REALITY IS IT'S A COMPLETE FACADE FOR INTELLIGENCE OPERATIONS"

游晓蓉	Gender	Female	
Xiaorong You	Date of Birth	[redacted]	
None	Ethnicity	[redacted]	
USA	Political Affiliation	None	
[redacted]	ID Number	None	
	Passport Number	[redacted]	
美国宾夕法尼亚州伯利恒理海大学 高分子材料与工程专业、博士			
Ph.D., Polymer Science and Engineering *Lehigh University* *Bethlehem, PA, USA*			
可口可乐公司 首席工程师			
Principal Engineer, The Coca-Cola Company			

You's Thousand Talents application

UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TENNESSEE

seven companies that, at a cost of nearly \$120 million, developed the coatings—companies against which her venture intended to compete. But You's can coating conspiracy may have had another victim, too.

Western counterintelligence officials have long warned about Chinese grant programs such as Thousand Talents. Their stated purpose is to tap Chinese scientists and engineers who've gone abroad for educational and professional opportunities, luring them back to start businesses in China with the promise of generous financial support and freedom from bureaucratic hurdles. And that in part is what they do. But the grants can also work as bounties, inducing entrepreneurs to steal trade secrets from non-Chinese companies, then use them to start competitors. "The reality is it's a complete facade for intelligence operations," says Jay Tabb, a former executive assistant director of the FBI who headed its national security branch when You was indicted. "We know now from many, many, many cases that these programs are a way for the Chinese government and Chinese Communist Party to enlist people to illegally collect information."

You's case supports that idea up to a point. But it also suggests that if the Chinese government has created a system for incentivizing intellectual-property theft, it's a balky, unpredictable one. You ripped off the multinational companies she worked for and worked with, but her confederates also appear to have scammed the Chinese government. Sometimes if you try to pay people to take things for you, they just take your money instead.

Most of the objects we touch, and many we don't, have a coating. Computer keys have a special layer so they're not smudged by skin oils. So do touchscreens. Specially developed paints protect suspension bridges from salty air, help stealth fighters evade radar detection and kill the barnacles that would otherwise encrust ship hulls. All of these are developed and sold by paint and coatings companies such as Akzo Nobel, Dow Chemical, PPG Industries and Sherwin-Williams.

Aluminum beverage cans are particularly tricky. The biggest factories stamp out 16 million cans a day; each requires a perfectly uniform inner coating, sprayed on in seconds. The liner recipes are calibrated to the recipes of the drinks, with their different levels of acidity, sugar, caffeine, oils and, in some cases, alcohol. The polymer, once dried, can't react in any way with the beverage, even after months on a supermarket shelf, lest the precisely calibrated flavor profile of a Topo Chico strawberry hibiscus hard seltzer or a Monster Assault energy drink be corrupted.

All that complexity lends the industry a deep resistance to change. But You arrived at Coke at a rare moment of disruption, caused by concerns about a ubiquitous liner ingredient called bisphenol A, or BPA. A growing, if not unanimous, body of research has suggested that BPA can interfere with the body's endocrine system, increasing the risk of a host of health problems including Type 2 diabetes and accelerated puberty. In 2010, France banned BPA in baby bottles, later expanding the ban to include any food packaging sold in the country. California, the European Union and China followed with baby bottle bans the next year, and California later added BPA to a list of chemicals that required warnings in consumer products.

The prospect of broader bans set off a scramble for new liner chemistries. But replacing BPA was a challenge; the chemical is exceptionally good at linking together other monomer molecules into tough, lightweight epoxy resins. It took coatings companies several years and multiple generations of liners to create formulations that didn't compromise durability. The technical term for the category is BPANI, for "bisphenol A non-intent." The last part, short for "non-intentionally," reflects that even nominally BPA-free products may have absorbed trace amounts from their surroundings.

Coke, in the jargon of the packaged food value chain, is a "filler," buying its cans from such global canmakers as Ball Corp. It doesn't make coatings or even apply them, but as the world's biggest maker of carbonated soft drinks, its decisions essentially determine which liners will find a market.

You found herself in a position of great power over that process, as Coke continued to seek better BPANI formulations. She'd come to the US from China on an academic scholarship in 1990, earning a master's degree from Kent State University in Ohio, then a Ph.D. in polymer science and engineering from Pennsylvania's Lehigh University. She became an American citizen in 1999, settling with her daughter and husband, a mechanical engineer, in Delaware, where she had a job as a senior chemist in DuPont's 3D printing business. Her DuPont manager later described her as one of the best scientists he'd ever worked with.

In 2004 she relocated her family to Massachusetts for a job with the French firm Cie. de Saint-Gobain, then, five years later, joined Honeywell International Inc. as a materials engineer. Over time she shifted her specialty to abrasion technologies, co-inventing sandpaperlike adhesives for industrial grinders and scratch-proof films that can block laser beams.

In December 2012, Coca-Cola hired You as a principal engineer in its global research division, responsible for helping decide which BPA-free liner formulations would come before the company's powerful Scientific and Regulatory Affairs group. The job ▶

◀ made her the main contact between Coke and the coatings companies, and upon her arrival, those relationships immediately grew strained. Her professional persona, like her research interests, tended toward abrasion. "Dr. You was more aggressive in her approach than anyone else we had worked with," Dan Leschnik, Akzo Nobel NV's global technical services manager, would testify at her trial. "She was pushy for additional information, not only down to the component level, but specific amounts of each ingredient."

The companies had never had to disclose this information before and were deeply reluctant to do so. But You was unafraid to use the leverage that came from representing one of the world's biggest fillers. "She told us frequently that we were always behind, we were trailing our competitors, and she would tell us that she could help us," testified Leschnik. It wasn't just Akzo—she told multiple suppliers that they were the industry laggards and, therefore, in particular need of her help. She claimed "that she knew more about polymer chemistry than we did," testified Tom Mallen, vice president for compliance and technology marketing for Sherwin-Williams Co.'s packaging division, "and that we needed to reveal our chemistry to her so that she could know whether the material was going to be worth looking at or not." If she didn't get the information she asked for, she told Mallen, "she was going to stop any qualifications of our material or prohibit them from ever occurring."

On one level, it made sense for You to push for as much data as possible about a new packaging technology. But there were also suggestions that she was not acting purely in her employer's interests. Executives at one prospective supplier, Japan's Toyochem Co., were bewildered when she tried to get them to sign a one-way nondisclosure agreement, under whose terms they, not she, would be prohibited from revealing any proprietary information to anyone else. She told Takayuki Suzuki, a Toyochem marketing manager, it was a way to avoid the hassle of a traditional bilateral NDA. It would be better, she suggested, not to involve anyone else at Coke in the arrangement.

You's focus at work didn't always fit with her responsibilities, either. "She was obviously very, very interested in the chemistry to the exclusion of the performance of the coating," Sherwin-Williams's Mallen recalled, which was "a major step change from people that had held the position beforehand." Chemistry rather than performance was the kind of thing that would interest someone making a liner rather than just approving one.

Eventually, Sherwin-Williams and some other suppliers came up with an unorthodox solution to their Shannon You problem: They created a custom NDA covering You by name, so she could then be given access to the details she demanded. That had the effect of entrusting some of their most valuable intellectual property to her individually. In two years, she had amassed a personal liner formula database worth tens of millions of dollars. Her computer at Coke's headquarters was the only place in the world where all those trade secrets coexisted.

By 2016, Coke seems to have realized that it, too, had a Shannon You problem. Dana Breed was hired that year to oversee the approval of new materials used by the company. At Coke's Atlanta headquarters, Breed, like other employees who sat within earshot of You's cubicle, couldn't help but hear her conversations with suppliers, and Breed was warned she would need headphones to tune You out. "On her phone calls, Shannon was very animated," Breed recalled at trial. The contentiousness of the negotiations was impossible to miss.

Breed clashed immediately with You, who refused to provide even basic data about the formulations. Less than a year after Breed's hiring, You was notified that she was being laid off as part of Coke's "lean center initiative." Even at this point, Coke's attempts to deal with You's liner formula hoard were ad hoc. The IT department was never informed that she had exceptionally valuable IP that should be subject to extra security. On Aug. 3, as Coke prepared to work with the chemical companies to undo the unusual NDAs, Breed gave You an external hard drive and instructed her to put the formulas on it—though, if You had tried to comply, she'd have triggered the same IP protection measures that would temporarily frustrate her after-hours data transfer attempts later that month. Breed followed up daily. You didn't respond to the messages, nor could she be found at her desk.

By Aug. 31, her last day at Coke, You had found a job in Tennessee, at Eastman Chemical Co. There she would make $157,000 a year, a slight bump over her Coke salary, with a $15,000 signing bonus. Unable to reach her, Breed looked in You's vacated cubicle and found the hard drive, still empty.

It's unclear exactly when You began contemplating going out on her own, but correspondence with Fan Hongmei, her aunt, suggests that the two had been discussing it for nearly a decade. Fan lived in China—her text and voice memo exchanges with You were in Chinese and used You's Chinese given name, Xiaorong. In the voluminous communications log submitted as evidence in You's trial, Fan emerges as a cajoling, indefatigable presence—the idea of starting a state-subsidized Chinese company seems to have originated largely with her. You, with a sister and an ailing mother in China, found the idea appealing. Also, there was the money. In her Thousand Talents application, You estimated that the market for BPANI coatings in China, where there was no domestic supplier, was worth about 20 billion yuan ($2.9 billion) annually.

In early 2017, Fan connected her niece over WeChat with Liu Xiangchen, the general manager for a chemical company called Weihai Jinhong Group, based in Weihai, in Shandong province. A photo of Liu later uncovered by the FBI shows a man with a wary expression and a mop of hair swept across his forehead. The idea he proposed was for his company to make the coatings at first, then spin off an independent firm. In exchange for overseeing the process, he'd own 5% of the new company. You would be its chief technology officer and own a third of it. Much of the rest of the ownership would be a family affair: Fan would also own a large stake, as would her husband and two of Liu's aunts.

Liu presented himself as an expert on getting government money; he said seven of Weihai Jinhong's 800 employees had won talent grants. For the new venture, Liu applied on You's behalf for national and provincial grants worth a total of 30 million to 50 million yuan.

From March through August 2017, as You's time at Coke was coming to an end, Liu set about creating an alternative, more accomplished version of her for the grant applications. Some of the burnishing was purely cosmetic: In one WeChat message, Liu asked You to retake her application photo. "If you could straighten up your hair a little bit," he wrote, "that would be great." Other improvements were more significant. In March, Liu asked You for an employment verification letter from Coke that identified her as the company's chief technology officer, a meteoric fictional promotion. She demurred at first, but in a PowerPoint later prepared for her Thousand Talents application, she identified herself as having "served as chief technology officer or technical director at six different Fortune 500 companies"—a description true only if one allowed for a very generous definition of "or." Most significantly, You's application claimed falsely that she herself had "manufactured the world's most advanced second-generation BPANI coating production and preparation technologies."

Just as important was the fiction created around the technology on which the new company would be built. Investigators would later find on You's external hard drive a patent license from Coke giving Weihai Jinhong permission to use its BPANI coatings and manufacturing techniques. That license, cited multiple times in her Thousand Talents application, was fake—the relevant technologies weren't even Coke's to license. But the application was in all likelihood not read with a critical eye, thanks to an added measure Liu took. In a September WeChat message, Fan claimed that Liu had paid a 10,000-yuan bribe to facilitate the application process. There are hints of other bribes as well.

After You's presentation in Weihai in August 2017 supporting her application to Shandong's provincial grant program, Yishi-Yiyi, and then her defense, in a Beijing conference center a month later, of the Thousand Talents application, the early feedback was promising. Liu sent word in October that "reviews for the Yishi-Yiyi scientific and technological investment project were mostly good. Barring something unforeseen, the project should be officially approved." Fan wrote that they could start preparations for the new company by late fall.

Other members of You's family, however, began to worry about her venture. A sister in California sent You links to news stories about the FBI targeting Thousand Talents participants. Another, in China, expressed similar concerns: "The Americans are very bad! They are framing Chinese people everywhere!" she said in a WeChat audio message. Nor did she like the sound of her sister's business associates: "These people are really shady! They are treating you like a fool, thinking you care about the fame, the little bit of money."

You reassured her siblings, but she didn't trust her partners, either. Her main concern wasn't getting caught but getting bilked. In February 2018, Liu received official confirmation ▶

◀ that You had won both the Thousand Talents and Yishi-Yiyi awards, entitling her to a total of 5 million yuan over four years. Not all the news was good: Weihai Jinhong had gotten a corporate award, too, but it was a fraction of what Liu had requested. And after the initial jubilation, months went by without You seeing any of the money. "All this excitement," she said in a WeChat voice message to Liu. "Excitement is useless!" Suspicion came to dominate her correspondence. "If the money is not in my account, I won't even begin," she threatened in a series of voice messages to Liu. "I wouldn't even discuss it. It's not like I'm starving here like those Chinese people who went back because they couldn't make it here." On the contrary, she said, she was doing very well in America. "I'm making a lot of money here. You just want to talk nonsense? To scam me?"

In a text to Fan, Liu defended himself, pointing to his year of work on the falsehood-ridden applications, the risks he had taken by knowingly misrepresenting the terms of You's employment to the Chinese government, and his drafting of the 29-page fraudulent patent licensing authorization from Coke. After all that, he said, it was You, not he, who got the grant money, a reward that "bears no risk for her, only great fame and wealth." Fan, for her part, tried to placate her niece: After decades in the US, she had forgotten how things got done in China. "It's been so many years that people would call you 'unacclimatized,'" Fan told her.

As for the intellectual property You would be bringing with her, there was no hurry with that, either. The plan was for the Weihai Jinhong spinoff to first form a partnership with an overseas supplier—the Italian company Metlac SpA, a major European coatings company, seemed like a good candidate—to legitimately license existing liner formulas to produce for the Chinese market. Then, over a few years, You and her team could quietly incorporate the BPANI formulas she had taken from Coke into their own products, shortcutting years of trial and error. The resulting product wouldn't be exactly the same as, say, Akzo Nobel's or Sherwin-Williams's. "You are not stupid," Fan said in a voice message in early 2018. "At the most, the technology will have some resemblance at a glance, but no one can prove it." And there was plenty of precedent for the strategy, Fan said: "The scholars returning from overseas are all doing it this way."

Less than a month later, You flew to Weihai to sign her employment contract with Weihai Jinhong. Her signature made the new coating venture official, codifying her 33.5% stake and entitling her to a salary of 600,000 yuan per year. A trio of photos later recovered from You's iPhone document the signing ceremony. In a coral-colored dress and black lace cardigan, You sits beside Weihai Jinhong's CEO, Xu Dongguo, whose gray crew cut gives him a military air. They are at a table in a banquet hall, and a white wine rack in the shape of a double bass looms up behind them. In the last photo, You shakes hands with Xu and smiles, her left hand balled at her side.

You's time at Eastman Chemical would prove shorter and even more tumultuous than her tenure at Coke. Eastman, spun off in 1994 from the once-mighty Eastman Kodak Co. and based in Kingsport, Tennessee, is a major producer of the polymers used by coatings companies. Impressed by You's research background and experience at Coke, her new employers wanted her to help improve their compounds, not in beverage packaging, where the company had a strong research program, but in food—tuna and soup cans require their own types of polymer liners.

From the start, however, You showed a stubborn focus on drink cans. One of her Eastman supervisors was Deep Bhattacharya, at the time global director of technology for the company's coatings and inks business. "It was not unusual to find her spending a lot of time trying to figure out what Eastman was doing on the beverage side," he would later testify.

Nor had You changed her interpersonal style. She would "belittle people," Bhattacharya said. "She took on a very aggressive and combative approach and also drove hard to indicate that she knew a lot more than the others because of her prior work experience." She described herself, he recalled, as "very famous."

That turned out to be true—within coatings chemistry, anyway. When Coke's suppliers learned of her hiring by Eastman, several reached out to her new employer. Sherwin-Williams sent a letter advising the chemical company of its legal responsibility to ensure that she didn't use the information from her special Coke NDA. "A lot of our customers actually shared a concern about having Dr. You work on some of those project teams because of the experience they had while she worked at Coke," Bhattacharya testified.

Her work personality also made her extended absences that much more noticeable. The trip to Beijing to defend her Thousand Talents application came just two and a half weeks into the job. The following spring, in April 2018, she took a business trip to meet members of the company's technical team in Shanghai and attend an industry conference in Guangzhou. The trip was supposed to last two weeks. While there, You met with prospective customers, ostensibly on behalf of Eastman, but she neglected to include her local Eastman colleagues in the meetings. She met with Weihai Jinhong and signed the partnership paperwork with the company's CEO, Xu. All the while, she was parrying increasingly exasperated emails from her bosses at Eastman. "Greetings, Shannon," one began, "quite a few concerns are being raised with this trip." In the end she stayed for more than a month, then asked to work for an additional week from Atlanta, where she still had a house.

During this time, You was reaching out to the Italian supplier Metlac to set up meetings about collaborating in the Chinese market. She led Metlac to believe that Eastman's CEO, Mark Costa, would be accompanying her. But then she reported that he regrettably had a conflict. She offered to speak to Metlac CEO Pier Ugo Bocchio herself, not

This photo of You and Xu after she signed on to work for Xu's company was used as evidence in her trial

UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TENNESSEE

necessarily about Eastman but about a Chinese company that was, as she put it in one text, "very interested in working together with you to get in this field." Investigators would later find photographs she took with her phone, against company policy, of the specialized equipment in Eastman's labs. They'd also find emails You sent to vendors from her Eastman email address inquiring about similar equipment for a lab in China. No one at Eastman had asked her to equip a lab there; no one at Eastman had any idea what she was doing.

On June 21, 2018, You received an email invitation for a meeting that afternoon with Bhattacharya, along with another of her supervisors and a human resources representative. A half-hour before the meeting was to start, she spent 11 minutes uploading files from her work computer to the same Google Drive account she'd used to circumvent Coke's data loss prevention measures 10 months earlier. At the meeting, Bhattacharya handed her a printed list of Eastman's concerns about her job performance. The conversation quickly deteriorated. "She refused to read through them," he testified. "She flung it across the table back to me." Ashley Angles, the HR manager, decided to stop the meeting. She asked You to work from home for the rest of the day to cool off.

What You did instead brought her career at Eastman swiftly to an end. She left the building that houses the company's technology research division and its labs. Rather than go home, however, she crossed Eastman's campus to the executive offices, where she spent the next two hours. She badged in and went looking for Bhattacharya's supervisor. When she couldn't find him, she demanded to meet with the chief technology officer, one of the most senior people at the 14,000-person company. When informed that the CTO was busy, she attempted to interrupt his meeting. She was asked to leave the building. Eventually, she did.

At that point, Eastman's HR department decided to fire her, and had events unfolded differently, that might have been that. Despite the trail of alarmed business partners and shell-shocked colleagues behind her, You could have moved on, going down in Eastman office lore just as she had at Coke. But that night, after finally going home, she logged on to the company network and copied the documents she'd saved to her Google Drive to a personal hard drive connected to her work laptop. Eastman's IT department, growing increasingly concerned about her, was on alert: The next morning a technician was able to reconstruct what she had done by remotely querying the operating system on You's laptop.

That afternoon, June 22, You was invited to another meeting and informed of her termination. According to Angles, she took the news with surprising equanimity. Then Angles demanded the hard drive with the proprietary data on it. You seemed to grow nervous, Angles would recall at trial, and said the device was back at her condo. Unwilling to let her out of their sight until they had the hard drive, Angles, along with a company security manager and an IT manager, followed You home in an improvised caravan and waited outside her house while she retrieved it.

Back on campus, an Eastman IT security technician examined the hard drive, where he found some of You's personal files and the Eastman data she'd taken. He also found her Coke documents, organized neatly in folders bearing the names of the chemical companies she'd gotten them from. Eastman's lead global investigator, a former FBI agent, reached out to his former colleagues there and handed over You's devices.

In the meantime, You quickly found yet another job, as a principal engineer at XG Sciences, a nanomaterials maker in Lansing, Michigan. (It ceased operations last year.) She traveled again to China, where Liu gave her some cash, and Xu walked her through the process of buying a luxury waterfront apartment so she could have a place in China to park her grant money. And the three of them accompanied Weihai city government officials to Italy to meet with Metlac.

In September 2018, You flew back to the US and was met at the Atlanta airport by agents from Customs and Border Protection. The CBP agents didn't say so, but they were acting at the behest of the FBI. Agents at the FBI's Knoxville, Tennessee, field office had obtained a search warrant for the hard drive Eastman had recovered, and they would go on to obtain warrants for You's Yahoo! and Google accounts. ▶

◀ Agents had sent the files they found on You's devices to the chemical companies whose names appeared on the files; the companies confirmed the information was proprietary. At the Atlanta airport, You was led to a small interview room, while agents down the hall inspected her laptop, two phones and a hard drive. She had more than $10,000 in cash. When a CBP agent began asking her questions from a list he had in front of him, she took it, read it herself and wrote her answers directly onto the paper.

When You got her devices back, she deleted her WeChat history, which the agents had already copied. She pressed on with her plans. In November 2018 she took another trip to Italy with her Chinese partners and Weihai officials to meet again with Metlac. The company had been noncommittal before. This time, it was definitive: It wanted no part of the proposed deal, and it did not want to work with You. Without a partner already established in the industry, the Weihai Jinhong team was at an impasse. They apparently balked at the prospect of building an entire research and development team around You's expertise and pilfered IP.

There's another possibility, though, and it's the one You seems to have come around to: that the fabricated applications were part of a larger, more cynical scam. At some point, Liu and Xu may have realized that, rather than invest their government money in a chancy venture with a volatile personality, they could just pocket it. "The main problem right now is that I don't know what shenanigans Liu Xiangchen is up to," You said at one point in a WeChat message to family members. "He just utters nonsense all the time! You know?! All shenanigans!"

You's aunt had voiced similar concerns. Once Weihai Jinhong had some of its grant money from the government, Fan warned on WeChat, it didn't need to do anything for the venture. Liu could spend the money on himself and write it all off as the cost of trying to start a business, a palatable explanation should any authorities decide to look. He could, she said, "use it however he wants, like dine-and-wine, buying gifts, work on personal connections, and it will be enough for everyone to submit their invoices." It would be just one more example of a Chinese government-backed venture failing. Perhaps the whole thing was, indeed, shenanigans.

The evidence uncovered by federal investigators, while suggestive, doesn't settle the question one way or the other. Attempts by phone and email to reach Liu and Xu were unsuccessful. *Bloomberg Businessweek* couldn't find contact information for Fan. Weihai Jinhong didn't reply to a query conveyed via its official website, and calls to the company's legal office went unanswered.

There is evidence, though, that the Chinese government itself has begun to worry about widespread fraud in its tech funding programs. After the failure of several major government-backed chip projects in recent years, Chinese anticorruption authorities announced investigations into a cabinet official in charge of industrial policy and three executives from the National Integrated Circuit Industry Investment Fund Co., China's main investment vehicle for building domestic chipmaking capabilities. These investigations may be a way to place blame for the disappointments of failed high-profile technology efforts, but they aren't the only example. There are also allegations of widespread fraud in the electric vehicle market, an industry with extensive government support. Chinese investigators have found that some domestic automakers, to qualify for extra subsidies, were inflating their sales by selling cars to shell companies, then stripping them for parts.

On Feb. 12, 2019, a federal grand jury in Tennessee returned wire fraud and trade secret theft charges against You and Liu. Two days later, the FBI arrested You at her apartment in Lansing. Agents also searched her town house outside Atlanta and interviewed her husband at their home in Massachusetts—he would lose his job after her arrest. The agents noted that You's Michigan home, where she'd been living for months, was barely furnished, with a mattress on the floor, TV trays for shelving and, in the living room, a bankers box containing a Western Digital hard drive. In a kitchen cabinet was a locked briefcase whose combination she claimed not to know. When agents got it open, they found about $4,000 in Chinese yuan, euros and other foreign currencies. All of her important personal documents were there, too, including her passport, Social Security card, diplomas and marriage certificate, as well as her daughter's birth certificate. "She was intending to run away," Assistant US Attorney T.J. Harker said at trial.

Agents took You to the FBI's Grand Rapids, Michigan, office and spoke with her for a little over two hours. In a video recording of the session, she faces the camera, wearing a pink sweater and glasses. Sitting across the table from her is Bill Leckrone, the lead investigator on the case, and a second agent who speaks little except to mention that he is a chemical engineer. When Leckrone asks You about Weihai Jinhong, she insists at first that she was

You being interviewed by the FBI in Grand Rapids merely a matchmaker, helping Metlac break into the Chinese market. There was, she says, no money involved. Asked about her aunt's role, she says that Fan probably wanted to give her niece an excuse to come back to China so they could spend time together.

As Leckrone reveals how much of You's digital life he has seen, she does admit to a greater and greater role. But the plans for a company were "just talking," she says. The contract she signed with such fanfare was "just paper" and came to nothing. "I have never had any intention to develop anything," she says. Nor, she insists, did she have any intent to share her secrets with anyone. It does seem to be the case that she ended up keeping the coatings formulas to herself–one of her refrains to her partners was that they had to pay up before she would deliver anything. The FBI is convinced that there is at least one additional device of hers that they were not able to recover.

In August 2020 a federal grand jury returned a superseding indictment adding economic espionage charges, because You allegedly acted to benefit a foreign government through a business it supported, and adding her aunt as a defendant. (Like Liu, Fan presumably remains in China, beyond the reach of US law enforcement.) At You's trial, held in Greeneville, Tennessee, in April 2021, her lawyers contested that the coatings formulas she was accused of stealing were trade secrets at all and put a patent attorney named J.D. Harriman on the stand. A reasonably skilled chemist could have come up with the formulas on their own based on publicly available data, he argued, contradicting the coatings company executives whose testimony had preceded his. The defense also put the Coke executive Yu Shi on the stand; You and the company's broader coating research effort had been under her supervision at the time. Under questioning, she said that Coke had been on a tight deadline to approve the new coatings and that the sensitive files Coke received from its suppliers weren't always clearly marked as such.

UNITED STATES DISTRICT COURT EASTERN DISTRICT OF TENNESSEE

THERE'S ANOTHER POSSIBILITY: THAT THE FABRICATED APPLICATIONS WERE PART OF A LARGER, MORE CYNICAL SCAM

The defense's other witness was You's daughter, Linda Xu, a computer scientist at Google. Xu described a frugal, itinerant upbringing, the small family sometimes having to be apart as her parents found and lost work. Once her mom got her job at Coke, her parents fell in love with Atlanta and wanted to retire there. "She doesn't always express herself well," Xu would later write to the judge, "but you won't find anyone as caring."

At trial, Xu recalled two vacations in Italy, when she was in college and her mom still at Coke. The family was hosted by the Bocchios, the family that owns Metlac. "There were a lot of toasts that I remember," she said, "where we were celebrating they got some approval for something, and we're talking excitedly about opening the market somewhere in the US, some places in Europe and Asia."

On April 22, 2021, the jury returned a verdict of guilty on all counts. In May 2022, You was sentenced to 14 years in federal prison. Coca-Cola and Eastman declined to comment on the case. You's lawyer, Corey Shipley, didn't return messages, nor did Metlac representatives.

"The government completely fabricated my case," You says. It's a few minutes before 5 p.m. on Oct. 13, and she is calling from the phone bank of the low-security penitentiary in Aliceville, Alabama, where she's serving her sentence. She is responding to a letter asking to speak for this story, which she received the night before. She would have called earlier in the day, she says apologetically, but she was at her job in the prison factory.

"It's profiling," she says of the case against her. "I'm a naturalized citizen, I'm well educated and well known in the field, and I traveled to China to do business. So that's the reason that they targeted me." It was all just political. Tennessee is "a red state," she adds. "The judge is completely, completely on the government's side." And the jury didn't understand the nuances of trade secrets. "This is not like something like robbery, drugs or murder. I had some files in my home that somebody else sent to me," she says. "They claim that's proof."

The conversation isn't long–inmate calls at Aliceville are limited to 15 minutes. You proposes a second call the next evening, and perhaps more after that. She has so many arguments to make; she's working closely on her appeal and mentions that she's speaking with her lawyer the next day. At the appointed hour the next evening she doesn't call, though. Months later, responding to a follow-up email, she writes that her lawyer has discouraged her from speaking to the press for the time being. "I will contact you after appeal," she writes. "I look forward to telling you the truth." Ⓑ
—*With Gao Yuan*

TALES FROM THE

Some acolytes lost faith, others blamed devils—and some went even harder. An essay exploring what happens when the prophecy of blockchain fails

By Christopher Beam
Illustration by Chanyu Chen


E CRYPTO WINTER

One day in early 2021, my old friend George called. I always enjoyed our catch-ups. We'd usually talk about dating, movies and his screenwriting career. But this time he steered the conversation toward a new topic: Bitcoin.

George, whose surname I'm omitting to protect his privacy, seemed genuinely eager for me to learn about the cryptocurrency. He sent me podcasts featuring blockchain "experts" and chart-heavy newsletters about "on-chain analytics." George was planning his financial future around Bitcoin, he told me, and didn't want his friends to get left behind. For a while, I ignored his appeals—the whole thing seemed complicated and vaguely annoying. But as the price of Bitcoin rose, his messages became more insistent. I agreed to look into it, and after "doing my own research," i.e., half-listening to a few podcasts set on 2x speed, I decided to buy some.

A series of cascading implosions caused the value of crypto to plummet last year. After that, George and I had a very different conversation. "Let me issue a blanket apology here," George said. "It was the blind leading the blind." Indeed, since I'd bought it, Bitcoin had lost three-quarters of its value. We were deep in what the blockchain faithful are calling crypto winter—an extended downturn that has yet to thaw.

For George, apologizing to me wasn't the hardest part. He'd persuaded his Chinese immigrant parents to refinance their mortgage and lend him $50,000 to invest in Bitcoin. He stored the funds on Celsius, a sort of crypto bank where they could accrue interest. The company collapsed into bankruptcy, and now the money was frozen, much of it likely lost. "I said, 'I'm really sorry, I'm deeply ashamed, and I will commit ritual seppuku if you demand it,'" he says. They didn't, but he said he plans to pay them back when he can.

It seemed that George, like a lot of us who got caught up in crypto, was experiencing not just a financial loss but a kind of financial grief—a tangle of guilt, second-guessing and that awful feeling of having fallen for something. Bitcoin's price has bounced back some since we spoke, but that's little comfort if you've had your money stuck on a janky platform such as Celsius, or lost funds on Sam Bankman-Fried's allegedly fraudulent FTX exchange, or held one of the now-worthless "altcoins" that popped up like mushrooms in a big rain during the pandemic trading boom. For many, crypto had become an identity, a way to feel smart and subversive and on the cutting edge of a new technology. What happens to that self-image when its foundation erodes? When instead of being someone's savvy son or daughter, you are the sheepish adult child who has to explain where the family savings went? (Disclosure: I haven't sold the tokens—mostly Bitcoin and Ether—that I bought near the top of the bull market, making me the object of delicate inquiry and gleeful mockery at family gatherings.)

It's complicated. George, despite the frauds, the constant hacks and the market's collapse, says he still has faith. "I still believe blockchain is a revolutionary development," he says. "In 10, 20, 50 years, I do believe—I want to believe, badly—that we'll look back and say Bitcoin was an invention on the scale of the printing press or the internet."

In their seminal 1956 social psychology study, *When Prophecy Fails*, Leon Festinger, Henry Riecken and Stanley Schachter described how followers of a doomsday cult responded when their prophet's precise predictions of apocalypse turned out to be false: They just pushed the date back. Some became even stronger believers and proselytized more. They'd already committed too much, perhaps quitting their jobs or giving away money, to accept that there was nothing to it. The study became a classic example of the "cognitive dissonance" that occurs when evidence contradicts one's model of the world.

I was curious about how people in crypto were handling dissonance. In the summer of 2021, with blockchain fervor in full swing, I wrote an article about crypto communities and found it useful to divide them into factions based on their favorite investment. There were the Bitcoin maximalists, who thought the OG token was the one true way to resist the scourges of modern finance and government; Ethereum hobbyists who regarded blockchains as a nifty Lego set for building new widgets; DeFi (decentralized finance) day traders who just gambled for the buzz. Each group came with its own values and culture. Today it feels more apt to sort people by their narratives of what the hell happened to crypto and where it all goes from here.

THE DOUBLE-DOWNERS

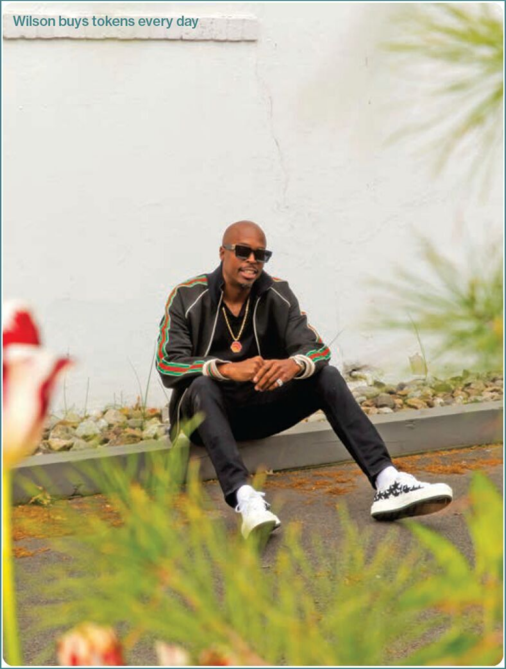
At a dude-heavy meet-up at a Midtown bar in New York in January, a group stood in a circle debating what had gone wrong with crypto. One guy blamed the large amount of "fluff" in the market, because anyone could spin a token out of nothing. Another pointed to the lack of transparency in many crypto institutions. A trader named Boris Friedman said that while people are currently "fearful" of crypto because of FTX, he expects the market to rebound in the next three to five years. "Long term, there will be more adoption," he said.

Nearby, Corey Wilson, wearing two necklaces—one featuring the Egyptian Eye of Ra, the other the logo for a blockchain called HEX—sipped a margarita. Wilson told me that after losing funds on the crypto scam BitConnect and then making it all back and more with HEX, he still buys tokens every day. "I see a higher upside now that we're in the lows of the market," he said. (HEX is down almost 90% from its peak.)

Rich Etienne, an engineer in Florida who lost about $100,000 in the Celsius collapse, said in a phone interview that he has a good feeling about the market now. He says it's a matter of watching for patterns in the charts—"little movements, fake-outs, certain people shilling." It's less science than art, he says: "You start to get the vibe that this is it."

A Dutch institutional investor-turned-Bitcoin analyst who goes by the handle "Plan B" is best known for his charts predicting that Bitcoin would pass $100,000 in 2021. When that didn't happen, his reputation took a hit. "You see a lot of hate," Plan B told me over Zoom. (Like many crypto influencers, he prefers to be identified by his handle out of concern for his safety.) He stands by his optimistic analysis, particularly

WILSON: PHOTOGRAPH BY LEVI MANDEL FOR BLOOMBERG BUSINESSWEEK. BLEC: PHOTOGRAPH BY TAMARA REYNOLDS FOR BLOOMBERG BUSINESSWEEK


Wilson buys tokens every day

his popular "stock-to-flow" model that predicts Bitcoin will continue trending upward as the issuance of new coins slows, as it was programmed to do by its pseudonymous creator, Satoshi Nakamoto. (The model assumes Bitcoin's price is driven by scarcity, a logic familiar to gold bugs as well as Beanie Babies collectors.) Plan B now estimates that by 2028, Bitcoin will be worth $100,000 to $1 million, up from about $27,000 today. The date, in other words, moved back a few years. "For me it's the long game," he says. He adds that his bet on Bitcoin is all-or-nothing: "It's either going to zero or it's going to be the successor to the US dollar."

Academics say this type of thinking—doubling down on one's conviction, despite a crash—is consistent with the psychology of both trading and gambling. Investors are more apt to sell assets that have gained in value than to let go of ones that have dropped; it's a phenomenon known as the disposition effect. There are different explanations for this, says Tobin Hanspal, assistant professor of finance at the Vienna University of Economics and Business. One is that traders with plunging assets become risk-loving because they feel they have nothing to lose. Another says they're avoiding feelings of regret. People "do not want to admit defeat or face the realization that they made a mistake," Hanspal says. (This is me.)


Blec blames the collapse on "too much trust"

Others keeping the faith describe the crash as a purge that proves crypto must return to its roots. The whole point of Bitcoin, according to Satoshi's white paper, was to allow people to transact money directly with "no central authority" like a government or bank, or a company such as FTX or Celsius. This idea of decentralization has a totemic power for some, with a resonance that seems as much emotional as intellectual.

Chris Blec, who writes an online newsletter called the *Blec Report*, has made a career out of criticizing any crypto project that deviates from the original purpose of blockchain technology. Companies such as FTX were "abusing Satoshi's invention," he says. "They're using it in ways it's not intended to be used." Blec argues that most of the projects that collapsed over the past year suffered from the same problem: "too much trust." Any system that requires trusting human beings is inherently unstable, he says, and can create a bubble. "Every time it bursts," he says, "more people understand that."

THOSE WHO KNEW

Frances Coppola wasn't always a crypto hater. "When Bitcoin first came out, I was quite keen on it," she says. The UK-based writer on economics and banking had long seen a need for an alternative to the bank-based payment system, and cryptocurrencies seemed like a promising development. But by 2021 she'd turned skeptic. That summer she posted a Twitter thread explaining why even decentralized crypto systems run by code could be prone to catastrophic failure. She argued that they'd suffer digital bank runs if investors started to pull their money out quickly, which their algorithms wouldn't be able to stop. "The algos are built on the assumption that humans never panic and stampede for the exit, ignoring the overwhelming evidence that they do," she wrote.

Her tweets caught the attention of Do Kwon, the creator of TerraUSD, a then-hot coin that used a decentralized algorithm to maintain a steady value of $1. TerraUSD was a popular substitute for US dollars among DeFi traders, and it could be reinvested to earn high yields. "I don't debate the poor on Twitter," Kwon tweeted in Coppola's thread.

"That came back to haunt him," Coppola says. "I ended up being cited in the court case." She then bursts into a merry laugh. In May 2022, TerraUSD unraveled in exactly the type of bank run Coppola had described. Kwon is now being sued by investors and has been charged with fraud by US prosecutors; he's denied wrongdoing. For Coppola, the crash, which TerraUSD's fall partly triggered, has been bittersweet. She doesn't want to take pleasure in it, given how many people have gotten hurt. And ▶

Coppola foresaw the crypto panic

◀ yet, "I did feel a bit, 'So there,'" she says. "Schadenfreude is the right term."

Coppola belongs to a community of skeptics who have long pushed back against the narratives spread by crypto boosters. During the bull market, many of those boosters swamped the skeptics with derision. "We did take a lot of abuse from the 'Have fun staying poor' crowd," she says. Since the crash, the skeptics have taken a victory lap. "I wouldn't say people are opening bottles of Champagne," says Amy Castor, another prominent crypto critic, who works as a freelance journalist and writes a reader-supported blog. But they've seen their ranks grow. "There were a handful of us before, screaming into the abyss," she says. "Now there's a lot more."

THE BLAME-CASTERS

In crypto, 2022 was the year of the "bad actor." (As in malefactor, not Steven Seagal.) Bad actors were suddenly everywhere, tainting the purity of the otherwise unassailable technology. Instead of pointing to structural problems in crypto—the lack of investor protections, say, or the fundamental question of how to prevent a fully decentralized, largely anonymous currency from being used to fund terrorism—believers blamed individuals (or groups) for…acting badly.

The baddest actor of all, of course, is the man now known across the cryptosphere as "Scam Bankrupt-Fraud." Molly White, a vocal crypto critic who runs the site Web3 Is Going Just Great, has argued that Bankman-Fried is a useful scapegoat for crypto fans. "It's very convenient for them to say, 'This isn't our problem, this is just one guy,'" she said in a recent podcast interview. (Bankman-Fried, who's facing criminal fraud charges, has denied wrongdoing.)

Other scapegoats abound. On Fox News' *Tucker Carlson Tonight*, guest host Tulsi Gabbard highlighted an unfounded theory that American politicians were channeling US taxpayer dollars to Ukraine, which was then investing in FTX, which was then funneling money back to Democrats. (Bankman-Fried was a major Democratic donor; his colleague Ryan Salame gave millions to Republicans.) Ukraine's deputy minister of digital information tweeted that Ukraine "never invested any funds into FTX."

Crypto-friendly legislators blamed regulators for failing to rein in FTX before its collapse. Representative Tom Emmer, a Minnesota Republican, accused US Securities and Exchange Commission Chair Gary Gensler of "working backroom deals…with people who are doing nefarious things." Never mind that Emmer has long pushed a hands-off approach to crypto. There's even been blame-casting by the blamed. Kwon recently suggested that Bankman-Fried orchestrated trades that caused the collapse of TerraUSD (federal prosecutors are investigating this possibility), and Bankman-Fried has blamed FTX's unraveling on a tweet from Binance Holdings Ltd. Chief Executive Officer Changpeng Zhao (though it's clear FTX's problems ran much deeper). The industry can seem like the Spider-Man pointing meme come to life.

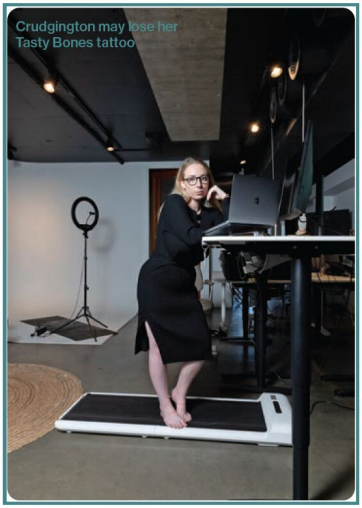
THE COMMUNITARIANS

Perhaps the only byword in the crypto lexicon as powerful as decentralization has been community. Across Twitter and Telegram and Discord, owners of the same asset gather to discuss the greatness of their asset, share memes about it and trash competing assets. This was particularly true of nonfungible tokens, or NFTs, those bits of digital art that in some cases traded for hundreds of thousands of dollars. Now, previously bustling Discord chatrooms lie quiet, and a few remaining fans wait for updates. "Devs, do something" is the pitiable refrain, the digital equivalent of poking a dead animal with a stick.

The dissolution of these communities has left scars—some of them literal. In February 2022, Emma Crudgington was scrolling Twitter at her office in Brisbane, Australia, when she spotted a hot new NFT. It was called Tasty Bones, and the logo

COPPOLA: PHOTOGRAPH BY JACK KENYON FOR BLOOMBERG BUSINESSWEEK. CRUDGINGTON: PHOTOGRAPH BY TAMMY LAW FOR BLOOMBERG BUSINESSWEEK featured a cartoonish skull with an ice cream cone upended on it. The art was "cute," she thought, and, more important, the project was getting lots of hype. Demand for access to the presale exceeded supply, and she needed a way to distinguish herself. "I was like, 'What's the most extreme thing I can do?'" she says. She got the logo tattooed on her arm. She posted a photo of it on the Tasty Bones community Discord chat, and the creators put her on the list to receive two NFTs. She ended up selling them a week later, netting around $12,000.

Now that the project has disintegrated—a Tasty Bones currently sells for about $50—Crudgington is amused by the tattoo. "It's a great story to tell people," she says. "It's very funny to look back and think, 'Were we all just drunk or something?'" She expects she'll have it removed or covered up. Crudgington is still involved in an NFT project called Sappy Seals. She spends hours every week talking to a subgroup of Seals owners called Sappy Sisters. "It's like having a personal therapist," she says. "We talk about the most random things, from physics to lip gloss." Crudgington says the Sisters have transcended their origins. They've raised money for a dog charity, rallied support for a community member with cancer and discussed sexual harassment in the NFT space. She can be vague describing the nature of their bond ("the theme of the community is community") but says the connection is authentic.



Crudgington may lose her Tasty Bones tattoo

Connection in crypto can be dicey. White has coined the term "predatory community" for the way it can foster bonds at the expense of its users, much like a multilevel marketing scheme. When emotions get tied up with money and a sense of belonging, it can be hard to see oneself and one's peers clearly, especially communities that tout virtuous causes. Such environments are ripe for manipulation. Countless projects have gotten "rugged," or sold off by the creators, leaving investors with worthless tokens. Those that simply fizzle produce the same result.

Crudgington says she recognizes such communities can be exploitative, but the Sappy Sisters are different. "There's no monetization," she says. "There's no ulterior motive behind it."

THE ONES WHO STEP AWAY

In 2021, after working half a decade in traditional finance— TradFi is the dismissive crypto term—Jill took a job at a firm specializing in DeFi. (She requested I not use her full name so she can speak candidly about her work.) She was drawn to the idea of transaction without go-betweens, particularly in a world where governments can prohibit bank accounts from being used for, say, sex work or birth control. "For a while, I drank that Kool-Aid," she says. "Then I realized no one had any idea about OFAC rules." (The Office of Foreign Assets Control enforces sanctions against terrorist organizations.) The more she learned about the technical aspects of crypto, the less it seemed about financial freedom than "getting around capital controls." She says she was also put off by its consumerist culture of boats and models: "I did not fit in." She recently left that job and is looking for work in TradFi.

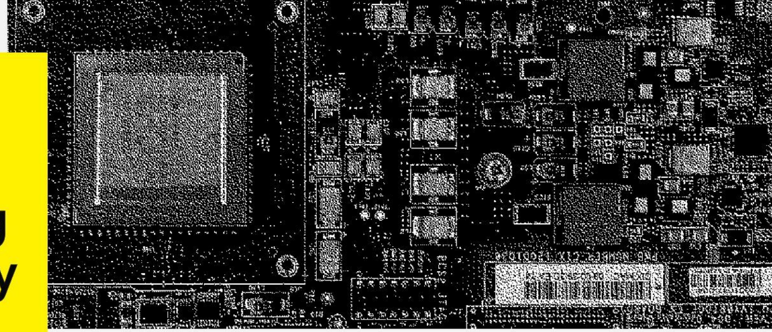
The idea of boats and models didn't seem to bother another former crypto worker I spoke to, who asked not to be named at all. (People in this group are skittish about talking.) After making six figures in the 2021 bull run, he dropped out of college and took a job at a crypto venture capital firm. His thinking was simple, he says: School sucked, and he wanted to be free, make a ton of money and have a Lambo. The business model in the space was to find a project, promote it, wait for its tokens to rise and take profits. This didn't seem sinister because everyone was making money. When he did think about the morality of his work, it wasn't hard to justify; if anyone was getting rugged, it was rich people. In retrospect, he says it was callous not to think about what was going on under the hood.

After the market began to slip, what had felt to him like a positive-sum game suddenly seemed zero-sum. He realized that if anyone was making outsize returns, that wasn't happening for free. A lot of projects his firm had invested in had failed, and he found it hard to get excited about the new ones. I asked if his colleagues believed the projects had real value. They do, he says, and he thinks that's delusional. Last fall he went back to school.

In early March, I told David, my normally laconic barber, that I was writing about crypto winter. He perked up and, taking long pauses between snips of hair while gesturing with his scissors, delivered an analysis of what he assured me is the next big thing: artificial intelligence tokens.

Indeed, after the debut of ChatGPT in November, crypto tokens with some link to AI technology (the connection isn't always clear) have rocketed in value. Multiple people I spoke with mentioned AI integration as a possible path forward for crypto. Perhaps chatbots will be able to spend cryptocurrency to accomplish their tasks. Maybe blockchain technology can help verify authenticity in a world saturated with deepfakes. The influential Twitter account @punk6529 recently posted, "AI will unveil what crypto's true purpose is." The tone of these conversations—hushed, commiserating, vaguely oracular, comically speculative—felt familiar. I told David I'd look into it. I have not. Ⓑ

Beam is a freelance journalist. He made his first crypto purchase in April 2021; he hasn't made a trade since April 2022.



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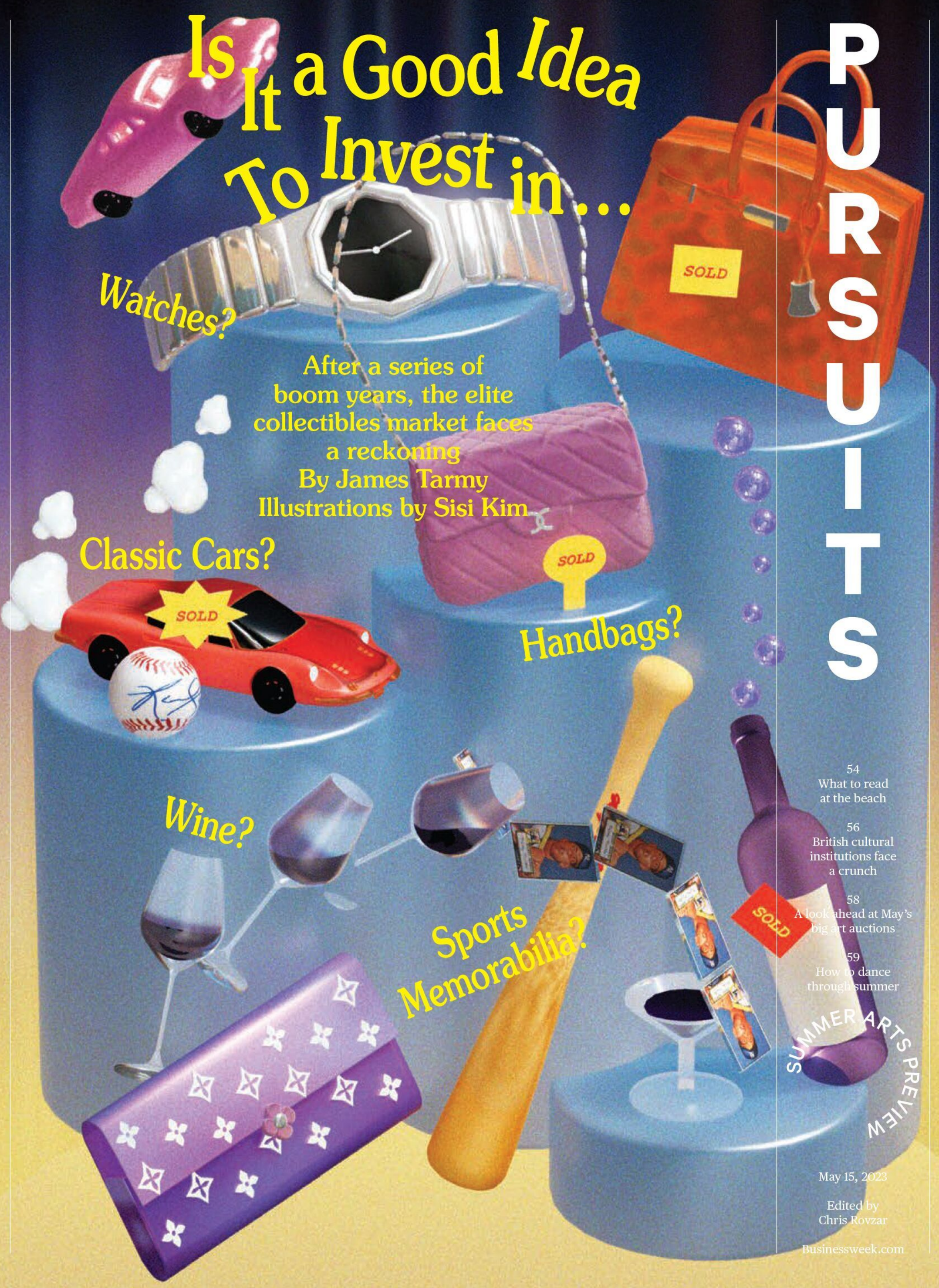
Is It a Good Idea To Invest in...

After a series of boom years, the elite collectibles market faces a reckoning

By James Tarmy

Illustrations by Sisi Kim



SUMMER ARTS PREVIEW

May 15, 2023

Edited by Chris Rovzar

Businessweek.com

FOR SALE! FOR SALE! FOR SALE! FOR SALE

FOR SALE! FOR SALE? FOR SALE! FOR SALE! FOR SALE? FOR SALE!

Expectations were high at an April auction for a pair of Michael Jordan's sneakers, which Sotheby's estimated would sell for $2 million to $4 million. An anonymous collector had agreed in advance to pay an undisclosed amount for the used Air Jordans (an "irrevocable bidder" in auction parlance); the only question was how many people would try to top that existing price. The answer, it turned out, was zero.

The sneakers sold after one bid, presumably to that irrevocable bidder, for $1.8 million. With auction house fees, the total came to $2.2 million, squeaking past the low estimate but nevertheless a global auction record.

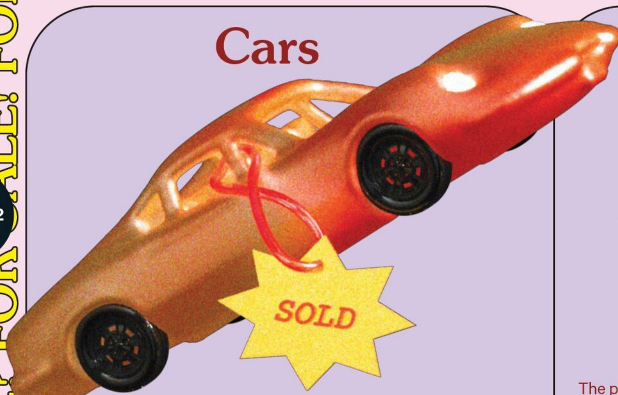
Welcome to the world of high-end collectibles in 2023, where healthy—sometimes even superlative—prices for cars, memorabilia, watches and handbags have failed to mask an uncomfortable reality: As interest rates rise and the economy falters, the overall market is slowing down.

Global economic volatility is "going to have an impact on the collectibles market over the next 6 to 9 to 12 months," says Sarah Willersdorf, a managing director and partner and the global head of luxury at Boston Consulting Group (BCG).

Waning price growth for these objects was probably inevitable. Like almost every other luxury category, collectibles saw their value soar during the first years of Covid-19, when people had money to burn and nowhere to go. Now money is more expensive, and consumers are being pulled in different directions: After covering car payments, pricey restaurants and even pricier vacations, a second Rolex or fifth handbag is less of a priority.

Nonetheless, this slowdown flies in the face of what was once a major selling point for the collectibles market—namely that these secondhand watches, purses and trading cards were a viable hedge against the stock market. "We've definitely seen things move closer to in tandem" with the stock market, says Rob Petrozzo, co-founder of the fractional ownership trading

Cars

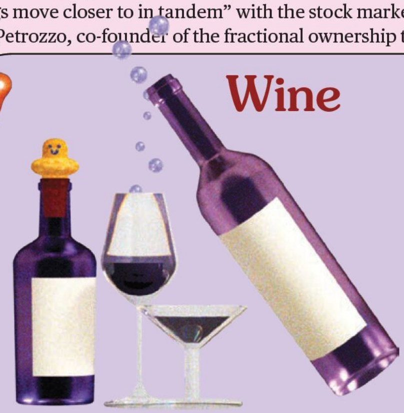


The collectible car market has shifted into neutral. "The news isn't as optimistic as it was maybe a year or two ago," says Brian Rabold, Hagerty's vice president for automotive intelligence. "The market overall is starting to slow. It doesn't mean it's contracting, but we're beginning to see that growth curve bend closer to zero." Car enthusiasts rich and poor can take heart that they're not alone: This prognosis applies to "all ranges of the market," he says, "no matter the budget."

To some extent, this slowdown is to be expected. "Your average collector who buys to enjoy probably already bought something in the last three years," Rabold says. Now "they say, 'Maybe I just enjoy what I have.' And rather than invest in something new, they're investing in what's already in their garage." Going forward, he predicts "less volatility, a bit more slowing, and then we're going to see performance as it was [pre-pandemic], absent some sort of large shock."

Easy profit, in other words, is in the rearview mirror. The average price of a 1987-1991 BMW M3 E30 might have shot from around $56,000 in 2020 to about $83,000 in 2023, but another 50% hike in three years is unlikely. People who entered the market during Covid, Rabold adds, "don't understand that what we just went through was unprecedented. It's very unusual for cars to appreciate at 10% a month for two years."

Wine



The primary wine market has a problem: Its customers are dying off. "Those younger than 60 are less in love with wine than those older than 60," reads State of the US Wine Industry 2023, a highly regarded report from the now-defunct Silicon Valley Bank. "That means that we're replacing consumers who are more committed to the category and who spend more on wine today with consumers who drink more across all the alcohol beverage categories and are less committed to wine."

The secondary market, however, appears to be doing fine. Since 2020 the Liv-ex Fine Wine 100, an index of the top traded fine wines, has risen about 40%. "We just came out of another record year," says Yves de Launay, head of wine in the Americas for Sotheby's. "The first half of this year will be terrific, and the second half of this year looks quite bright." He attributes the wine auction market's resilience to its being much narrower and much more expensive than the broader wine market. "The quantities are much smaller, and there's a higher selection of wines," he says. "These are carefully selected in terms of producers, vintages and formats. There's an element of scarcity." That might be true, but the even more select wine index, the Liv-ex Fine Wine 50—which tracks prices of Bordeaux first growths, including the 10 most recent vintages of Château Mouton Rothschild, Margaux and a few others—fell 0.7% during this year's first quarter. "It's a long-term game," de Launay says. "Depending on the region, you need at least five years minimum to make sure you get a good return on it."

FOR SALE? FOR SALE! FOR SALE? FOR SALE! F site Rally, where people can buy and sell shares of everything including Lamborghinis and Audemars Piguet watches.

"This new investing generation came of age in a Covid window where making 20% in a week was normal," he continues. "But now we're seeing people realize that not everything goes up. People are starting to ask questions and do more research."

Although industry experts are slightly less bullish than in years past, few doubt collectibles' longevity: Resale sites have normalized the buying and selling of these used goods, and a younger generation takes for granted that luxury objects are meant to be bought, then sold, then bought again. Resale revenue is expected to grow to $47 billion by 2025, according to McKinsey & Co.'s *The State of Fashion 2023* report, up from $15 billion in 2022. "My hypothesis is that even if you do have a slowdown more than we've already seen, it's basically going to be a blip and then continue to accelerate up, so over the long term you're going to see premiums hold," Willersdorf says.

Sports Memorabilia

Collectors are playing it safe in the field of cards and other sports ephemera, says Rally's Petrozzo. "In the beginning of 2022, they might have had [shares in] 15 assets," he says. "It was a mix of riskier assets and blue chip." Now, he says, they're going for fewer items and focusing on sure things. "It might be three to seven assets, like a Mickey Mantle card," he says.

"Anything that's pre-1980 sports is doing really well," he notes. A 1933 Goudey #144 Babe Ruth baseball card entered the site in 2020 with a $77,000 valuation; currently it's around $278,000, a 263% increase. Overall, though, the field appears to be slowing down. A recap of the 2022 market by alternative-asset investment researcher Altan Insights Inc. showed the volume of six-figure sales fell 17% from the previous year in the fourth quarter, and fractional sports card and sports memorabilia finished 2022 down 35.9% and 26.7%, respectively. In a later report, Altan suggested 2023 could be a year when "trophy assets" continue to do well, though there may be "a reset lower for assets that no longer seem exceedingly rare or desirable."

Handbags

After years of rising prices for used purses from the likes of Chanel, Gucci, Hermès and Louis Vuitton, the mega-resale site the RealReal announced that it had begun to see a slowdown. Louis Vuitton purses suffered the most—down 20% year over year in the fourth quarter of 2022, according to the site. Gucci wasn't far behind, down 17% in the same period. "Instead of investing in ultraluxury classics, many consumers are looking for more affordable, trendier styles," the site announced in its 2023 Luxury Consignment Report, citing slightly cheaper brands such as Burberry, Miu Miu and Valentino.

Yet at the height of the market, buyers remain undaunted. "We just had a sale last month that was 100% sold, which was a really phenomenal result," says Rachel Koffsky, the international head of handbags and accessories at Christie's. "I certainly can't speak to other venues, but I think our success has a lot to do with the curation of our sales. We're choosing the best of the best pieces, ones which are extremely rare and very limited." For that type of piece (a rare crocodile Hermès Kelly handbag, for instance), the audience, Koffsky says, keeps showing up. It's not just Christie's: The Sotheby's Hong Kong handbag sale in April had a 91% sell-through rate, with 50% of sold lots going for above their high estimate.

Watches

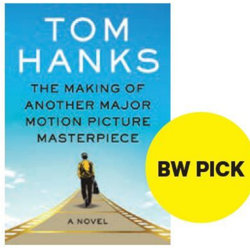
It hasn't been a great few months for watch collectors, at least not for those who track the month-to-month value of their timepieces. March's Chrono24 Watch Collection Report estimates that collectors lost an average of 5.3% on the value of their watches compared with the year before. "As a general trend, the collections with higher-than-average values also saw higher-than-average value depreciation, as the top of the watch market was most affected by the downturn," the report states.

But overall gains for many collectors dwarf recent declines. Watches tracked by Chrono24's watch collection tool that were acquired within the past 10 years had an average value increase of 29%. And Willersdorf, of BCG, suggests positive returns are in store long term for a select group of brands. She declines to name which ones, but big players such as Audemars Piguet, Patek Philippe and Rolex are strong contenders. "The expectation is the [market] remains quite strong," she says. "It won't be strong across everything, but it will be driven by the power brands and some more niche independent brands."

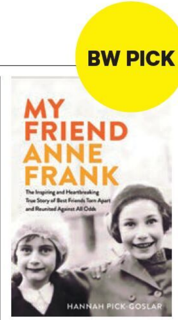
FOR SALE? FOR SALE! FOR SALE? FOR SALE!

The Best Books of Summer

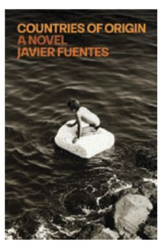
These guarantee a thrilling read—but they won't promise a happy ending. *By James Tarmy*



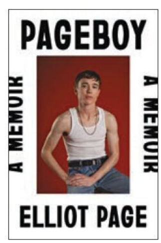
The Making of Another Major Motion Picture Masterpiece
By Tom Hanks
Out now, Knopf
Will the relentless cultural hegemony of Tom Hanks ever cease? Not content with his two Oscars and his status as America's sweetheart, he's set his sights on the world of literature. First there was a 2017 collection of short stories, which became a national bestseller. Now he's written a novel, which tells the story of making a Hollywood blockbuster. Filled with insider-y tidbits and written in the same cadence Hanks speaks, the book is a winner. Look out, interpretive dance: You could be next.



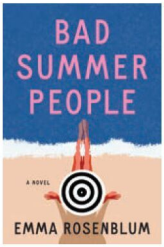
My Friend Anne Frank
By Hannah Pick-Goslar
June 6, Little, Brown Spark
Anne Frank's diary brought the vast horror of the Holocaust down to a painful human scale. Pick-Goslar, who died last year at the age of 93, nearly suffered the same fate as her childhood confidante. After her family was forced to leave its comfortable life in Germany, she moved to Amsterdam and in time grew close with Frank. Pick-Goslar's own story has been told before, but this memoir has lost none of its clarity and urgency. Her chronicle of her own time in Bergen-Belsen—as she watches her father, then grandmother, die—is wrenching.



Countries of Origin
By Javier Fuentes
June 6, Pantheon
Fuentes, a 2018 Lambda Literary Fellow, has come charging out of the gate with a cool, terse debut that follows the tribulations of a very skilled pastry chef who's been living in the US illegally. Fuentes's protagonist, Demetrio, is from Spain. He's spent his life in New York, getting by with fake papers and, it seems, raw talent. When the book begins, he's working at a restaurant that bears more than a few similarities to New York's Daniel. Soon enough, a background check forces Demetrio back to Europe, where he begins a new life with new anxieties and, encouragingly, new opportunities.



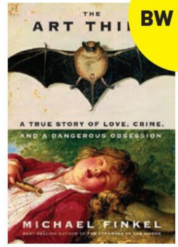
Pageboy: A Memoir
By Elliot Page
June 6, Flatiron Books
Page, now 36, rose to fame with the hit 2007 movie *Juno*, which chronicles the travails of a willful teenager who decides to go through with an unexpected pregnancy. Arguably the pinnacle of the early aughts hipster cultural canon, the film made Page, who then identified as female and went by Ellen, a star. So when he came out as a trans man in 2020, it was both a source of shock and celebration: Here was a rare celebrity able to articulate to the world the complexities and exigencies of a misgendered life. But how did Page actually feel about it all while it was happening? And how does he feel now? In this memoir, Page's devoted public will finally find out.



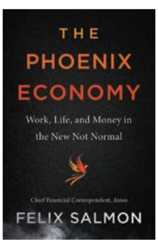
Bad Summer People
By Emma Rosenblum
May 23, Flatiron Books
Rosenblum, a former editor at *Bloomberg Businessweek* and now chief content officer at Bustle Digital Group, nails the formula for a beach-book blockbuster. Set in a thinly veiled version of Fire Island's Saltaire, the vacation town where Rosenblum spent summers growing up, her debut novel has it all: wealth, gossip, unhappy husbands and even unhappier wives, infidelity, still more gossip—and murder. (To be fair, this is less a whodunit and more a who's-doing-it-with-whom.) Expect to see it on beach towels up and down the Eastern Seaboard.

The Chieftain and the Chair: The Rise of Danish Design in Postwar America
By Maggie Taft
May 22, University of Chicago Press
Danish design (or at least stuff that looks like it) has been a fixture of American interior decoration since it was first imported in the 1950s. Pieces like Hans Wegner's Round Chair and Finn Juhl's Chieftain are ubiquitous, so it's easy to forget that someone had to make people believe they were emblems of middle-class good taste before, you know, they actually were. Taft, an art historian and writer, uses this clear, tight book to trace the origins of these objects and in doing so demolishes some of the many myths about a field you know and (might) love.

BW PICK

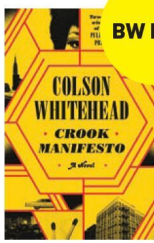


The Art Thief: A True Story of Love, Crime, and a Dangerous Obsession
By Michael Finkel
June 27, Knopf
It is romantic to liken art thieves to Pierce Brosnan's glamorous character in *The Thomas Crown Affair*. The reality is far less charming. Case in point: Stéphane Breitwieser, one of the most successful art thieves of all time. From roughly 1994 to 2001, Breitwieser executed more than 200 heists. The book's first lesson? Europe has a lot of understaffed historic buildings. The second? Even a kleptomaniac with delusions of grandeur can be made mildly sympathetic in the hands of a skilled writer.

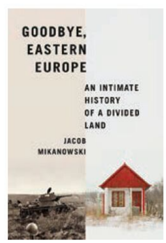


The Phoenix Economy: Work, Life, and Money in the New Not Normal
By Felix Salmon
Out now, Harper Business
Salmon, chief financial correspondent at Axios Media Inc. and host of a popular podcast, has made an ambitious attempt to articulate the changes wrought by the Covid-19 pandemic. Focusing mostly on Western societies, he sketches out changes in life and work, drawing connections among broader macroeconomic phenomena. The book is simultaneously of the moment and an attempt to predict trends that will have staying power. It's a tricky balancing act and a valuable contribution to a growing mountain of literature grappling with the most universal and consequential tragedy since World War II.

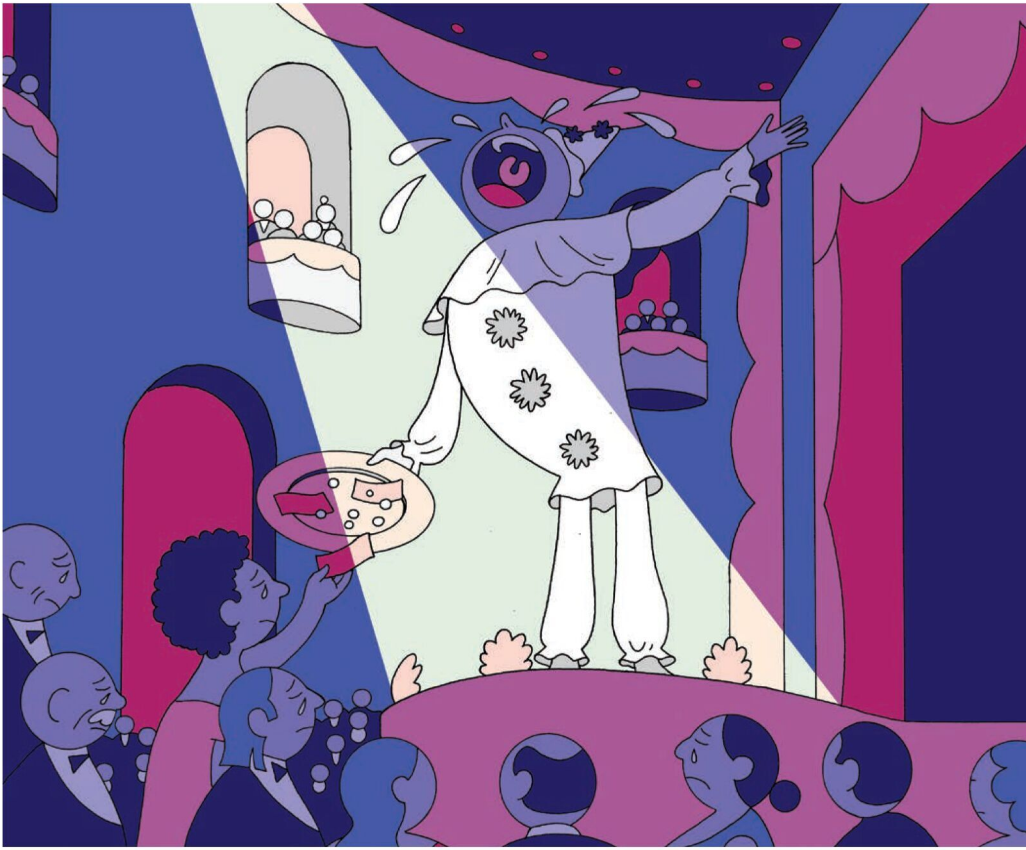
BW PICK



Crook Manifesto
By Colson Whitehead
July 18, Doubleday
At this point, Whitehead's two Pulitzer Prizes should condition readers to expect something skillful, but it's still a rush to sink into his dazzling, lightly humorous storytelling. Set in 1970s Harlem, the book begins with a "one more job and then he's out" setup: The protagonist, furniture salesman and erstwhile fence Ray Carney, needs impossible-to-get Jackson 5 tickets for his daughter. The plot quickly becomes more interesting and much more expansive, eventually encompassing a mosaic of criminal, oftentimes sympathetic characters, but the action remains rooted in Harlem as the neighborhood goes up in metaphorical (and literal!) flames.



Goodbye, Eastern Europe: An Intimate History of a Divided Land
By Jacob Mikanowski
July 18, Pantheon
The last millennium hasn't been kind to people living in the area we call Eastern Europe. Its native pagan inhabitants were largely wiped out in the Middle Ages (some of the region's first Christian kings got rich shipping locals to slave markets as far afield as Baghdad and Córdoba). Even under more enlightened rulers, the area became a hotly contested border between the great powers. Mikanowski, a journalist and historian, has timed his book all too well: After a post-Soviet period of relative calm, Russia's invasion of Ukraine has brought the unlucky region into the spotlight once again.



The Battle for British Arts

A funding crunch has spurred creative organizations to get, well, creative. *By James Tarmy*

For decades, the Glyndebourne opera company would travel to towns and cities around the UK with a group of top-notch singers giving world-class performances. But in 2023, if people want to see its productions of Mozart's *Don Giovanni* or Handel's *Semele*, they'll have to travel to its summer festival in East Sussex. Glyndebourne's annual fall/winter tour was canceled in its entirety, a victim of funding cuts by the Arts Council England. "We heard about the cuts after we had contracted people," says Helen McCarthy, Glyndebourne's director of development. "We're obviously losing loads of money, because we have to pay those people, so we're doing the best we can."

Glyndebourne isn't alone. The UK is in a cultural funding crisis, fed by a combination of lackluster attendance since the pandemic, shifting government support and controversies over charitable gifts from oil companies whose business practices have been deemed unsavory by some vocal opponents.

"It's important for the kind of cleansing of the philanthropy industry to be prudent about where we accept

ILLUSTRATION BY PETE GAMLEN

funds," says Stuart Murphy, chief executive officer of the English National Opera, about these now-taboo sponsors. "Even if it wasn't morally correct, the pressure from audiences is so great now. They'd not just judge us on artistic content, but the company we keep."

For decades the UK's major arts organizations have tried to redirect their funding from government support toward private donations. "That's happened for two reasons," says Gabriele Finaldi, the director of London's National Gallery. "One, there's a crisis in public support. And two, there's increased ambition on the part of cultural institutions to do more and reach more audiences and plan bigger exhibitions." (Bloomberg Philanthropies is a major supporter of arts programs in the UK.)

Through its 2023-26 Investment Programme, the Arts Council England doles out more than £445 million a year (about $560 million) to almost 1,000 organizations. In a blow to some recipients, it announced last year that it was cutting millions of pounds' worth of grants to London institutions, diverting the money to organizations beyond the capital. (Several other institutions outside of London, such as Glyndebourne, also received less than in years past.) "Overall, our new portfolio is richer and more varied than ever before," wrote an Arts Council England spokesperson in a statement. "By funding new organisations in new places, we are delivering on the vision set out in our strategy, *Let's Create*: that everyone, everywhere, deserves to benefit from public investment in culture and creativity."

Because funding by the Arts Council hasn't kept pace with the needs of the country's arts sector, especially for established institutions, finding other forms of income is crucial, Finaldi says. "We're going to be obliged to rely on our own initiative, and that will mean developing commercial models," he says. "Also developing philanthropic sources of funding for our activities."

Unlike in the US, however, there are very few tax incentives to induce private donations in Britain, and many citizens have been conditioned over the years to expect that the government will support its museums and concert halls. "You have to educate potential donors about what has shifted in terms of the financial model," says Suzanne Hilser-Wiles, president of philanthropy consulting firm Grenzebach Glier & Associates. "And why philanthropic support is needed in a way it hasn't been previously."

The pandemic has given that mandate new urgency. Museum visits are down globally, but London's institutions appear to be faring worse than most: Last year the British Museum had 4.1 million visitors, down about 34% from 2019's 6.2 million, according to a report by the *Art Newspaper*. The National Gallery's numbers were down 55%, from 6 million in 2019 to 2.7 million in 2022. The Tate Modern was down 36%; the Tate Britain slumped 49%. Lower attendance means more than reduced ticket sales; it can also trickle down to revenue earned at gift shops and cafes.

Some organizations also have a financial hangover from the Covid-19 era. Like many others, the Royal Shakespeare Co. in Stratford-upon-Avon took out a government loan to cover costs during the shutdowns. "We got about £20 million of debt," says CEO Catherine Mallyon. "That's a completely new picture for companies like us to have on the balance sheet of debt to pay off." And so, adds Rebecca Preston, the RSC's director of development, "we're still very much in the recovery period, and have been hit by everything else everyone's been hit by in terms of inflation and cost of living."

It's within this context that climate activists have become more strident about fossil fuel donations. The group Just Stop Oil started the vogue of gluing oneself to picture frames (people have stuck themselves to the frames of paintings by Constable, Turner and others, if only temporarily) to protest oil company sponsorships, which followed several years of less vandalous, arguably more effective efforts to separate culture from fossil fuel money.

It hasn't, organizers say, been particularly painful to remove fuel companies' philanthropy from their bottom line. BP committed £7.5 million total in 2018 to the British Museum, National Portrait Gallery, Royal Opera House and RSC, to be paid out over five years. Split evenly, that would come to about £375,000 a year for each institution. Since then, all but the British Museum have publicly concluded their partnerships with BP.

What has made things harder, though, is trying to anticipate (and avoid) controversy even as institutions attempt to broaden their fundraising reach. "We have a responsibility to the public and need to be sensitive to what the concerns of the broader public are," Finaldi says. "However, we're also charities, and we have obligations: an obligation to present our collection to the public and increase engagement and acquire new art." Those two exigencies—responding to the public and serving it—seem at times to be at cross purposes.

But organizations are responding proactively, and many are beginning to make headway. Some have introduced sponsorship initiatives, and most are making their ethical positions clear while approaching individuals and foundations that have heretofore sat on the cultural sidelines.

"We're creative about the way we talk to corporations in the way that works for them as well as what works for us," says the RSC's Mallyon. The theater just teamed with Cunard Line cruises, for instance, to perform scenes from Shakespeare aboard ships. ("All the world's a stage … even the Mid-Atlantic," boasts a release.) The English National Opera, Murphy says, has been soliciting more small donations to create critical mass—he calls it "the Obama approach"—and "working imaginatively in partnerships." He cites enlisting Uber to sponsor its drive-in operas during Covid. At Glyndebourne, McCarthy is looking into nontraditional sources of funding for next year's tour. "I'm doing some extra research on where other money can come from that's not in our current donor base," she says. "The hunt is on." Ⓑ

Rising to The Top

May's evening art auctions will feature works drawn heavily from collections and estates.

By James Tarmy

After November's unprecedented New York auctions, which included the standalone Paul Allen estate sale ($1.5 billion spent on art in about three hours), almost everyone agreed the market needed a break. "It was the biggest season ever," says Alex Rotter, chairman of Christie's 20th and 21st century art department. "After spending $3 billion in two weeks, it's legitimate to be a little exhausted from it."

As a result, the coming May evening sales–widely considered the companion to the November sales in scope, price and quality–will be a comparatively subdued affair, auction house specialists predict. "The overall volume of auctions together, across all the houses, will be smaller," says Brooke Lampley, Sotheby's chairman and worldwide head of sales for global fine art.

"We were seeing a lot of delayed decisions from the pandemic coming to fruition," Lampley says, explaining the deluge of big-ticket items last fall. "People who'd been hesitating to sell were finally confident to sell, so that brought a lot of material onto the market." The May auctions, she continues, "will revert to the normative level of strength."

That, of course, assumes the current economic instability won't get in the way.

People in the auction world like to point to the art market's resilience, noting that it managed to bounce back from Covid-19 virtually unscathed. But the coronavirus was, by and large, great for the world's rich. In roughly the first year of the pandemic, billionaires accumulated an estimated $4 trillion of wealth, according to an analysis from the Institute for Policy Studies.

Today's economic volatility is different: Rich people are also taking a hit. The top 500 billionaires on the planet lost a combined $1.4 trillion in 2022. Rising interest rates have constrained buying power, and anyone with a half-decent financial adviser is preparing for a possible recession by keeping cash on hand. Spending millions of dollars on a painting runs counter to that strategy.

None of this is lost on Rotter. "I grew up in an America where money was basically free, and the more you had, the freer it got," he says. "Now is the first time in I think 20 years that people have to pay to get money. That's a new situation." But, he continues, recession fears are currently a problem for the US and Europe. "Asia and the Middle East have it very different right now," he says, "and that's why this global art market is a great thing in times like this. When things get tricky in certain regions, others don't see those problems."

The solution, both Rotter and Lampley say, is to bring items to auction that are top-tier and fresh enough that they lure buyers who'd otherwise stay on the sidelines. To do so, houses are relying on large tranches of art from estates rather than one-off consignments.

"I'm pretty sure, from a lot count, about 80% of lots in the evening sale come from collections or estates," Rotter says, name-checking the trove owned by late commodities trader Alan Press and his wife, Dorothy. It will represent nine separate lots in Christie's 20th century evening sale, including an Ed Ruscha painting from 1966-69, *Burning Gas Station*, which carries an estimate of $20 million to $30 million. There's also an array from late philanthropists Jacques and Emy Cohenca, whose estate has 12 works across multiple auctions, including a bronze Louise Bourgeois sculpture executed in 1960 that will sell in the 20th century evening sale.

Sotheby's will auction works from the collection of the late music executive Mo Ostin. His assortment of 30 pieces is valued at more than $120 million and includes Rene Magritte's famous *L'Empire des lumières* painting from 1951, which has an estimate of $35 million to $55 million.

There are a few big-ticket standalone items, too. Christie's will sell a large 1983 Jean-Michel Basquiat with an estimate in the region of $45 million, as well as an extremely rare 1910 painting by Henri Rousseau estimated at $20 million to $30 million. Works by the artist come up so seldom that Rousseau's previous auction record of $4.4 million was set in 1993. Sotheby's, meanwhile, is selling a gorgeous 1901-02 Gustav Klimt landscape estimated in the range of $45 million. It also has a huge 1974 "color chart" painting by Gerhard Richter, coming to auction for the first time in 20 years; its estimate is $18 million to $25 million.

"We're selling globally desired wish-list items," Lampley says. "We have a whole steady evolution of the market." Ⓑ

COURTESY CHRISTIE'S

Dance's Summer Vacation

Creators and performers flee the city for more idyllic—and inspirational—environs. *By Brian Schaefer*


Cissoko

COURTESY VAIL DANCE FESTIVAL

"I can't stress enough the *Brigadoon* quality of Vail," says Damian Woetzel, artistic director of the Vail Dance Festival, referring to the mythical village that appears in the Scottish Highlands for one day every 100 years. "Artists arrive for a short time and coexist in this creative atmosphere."

Luckily for dance fans, the Vail festival lasts 10 days and occurs annually. It's a place where performances amid the wildflowers and pines of Colorado can ignite an even deeper appreciation of the art form. "The natural environment is so conducive to that sense of doing things in a fresh way," says Woetzel, who also serves as president of the Julliard School and is a former star dancer with New York City Ballet. "I want a place where artists go to do things they don't do in their everyday life."

The Vail Dance Festival was established in 1989 as a seasonal residency for the Bolshoi Ballet Academy. Woetzel took the reins in 2007 and helped transform it from a reliable showcase into a busy incubator by playing the role of matchmaker between dance artists from disparate styles. In past years he's paired New York City Ballet star Tiler Peck with the Memphis jookin artist Lil Buck, and Michelle Dorrance, a venerated tap dancer, with Bill Irwin, a venerated clown.

"The intention is to foster something new," Woetzel says. The mountainous location, with audiences picnicking under the moon with the Rockies in view, plays an integral part, allowing festivalgoers to think of dance more as an expression of nature rather than merely a genre of theater.

This year's program, from July 28 to Aug. 7, exemplifies what Woetzel calls Vail's "balance of history" by featuring the iconic Martha Graham Dance Co. along with a deep dive into the works and process of the revered choreographer George Balanchine. But that balance tips in favor of the new, with 10 world premieres, including a pas de deux by Tiler Peck performed by American Ballet Theatre's Cory Stearns and Devon Teuscher, a Jamar Roberts co-commission with BalletX, and an ensemble work by Kyle Abraham, a choreographer of unique fluidity and feeling. Other notable debuts include a dance by Vail's artist-in-residence, Adji Cissoko, and a collaboration between City Ballet's resident choreographer Justin Peck and Pulitzer Prize-winning Caroline Shaw, the festival's composer-in-residence.

(Justin Peck also breaks away from dance this summer, directing *Illinois* from June 23 to July 2 at Bard College's Fisher Center in New York's Hudson Valley. The show is based on Sufjan Steven's 2005 album of the same name, crafted into a narrative by Pulitzer-winning playwright Jackie Sibblies Drury.)

Just as nature is a key ingredient in experiencing dance in Vail, it also reframes the way audiences interact with the art form at Jacob's Pillow, a verdant campus in the mountains of western Massachusetts, part of the Berkshires' famous cultural corridor. Founded in 1933, its summer dance festival (where I sometimes serve as a scholar-in-residence) is the country's oldest and has long been a pilgrimage given its role in the development of American modern dance. Even companies that frequently perform in cities look and feel more vivid there.

This year's festival takes place from June 28 to Aug. 27 and boasts an eclectic curation of domestic and international artists, all of whom can be found wandering the wooded grounds by day and performing against a breathtaking vista or inside a charming, rustic barn by night. You might also encounter them unwinding after a show at the Pillow's on-site pub.

One highlight will be the Pillow debut of the esteemed Dutch National Ballet (July 5-9) and its new member, Olga Smirnova. The mesmerizing former prima ballerina of the Bolshoi defected after Russia invaded Ukraine, becoming one of the country's most high-profile artists to condemn the war.

Like Vail, the Pillow mixes modern dance mainstays, such as the Mark Morris Dance Group (June 28 to July 2), with daring contemporary artists, as exemplified by Germany's Gauthier Dance (July 12-16). It also offers bespoke programs, such as a minifestival celebrating hip-hop dance (Aug. 2-6).

And if you find yourself in New York this summer, consider a day trip to the annual Fire Island Dance Festival (July 14-16), where the location brings an integral emotional wallop. There, on an outdoor stage facing the bay that separates the sand dunes from Long Island, notable Broadway, ballet and modern dancers perform works honoring the festival's AIDS activist origins and exuberant spirit, all lit by the flames of a slowly setting sun. B

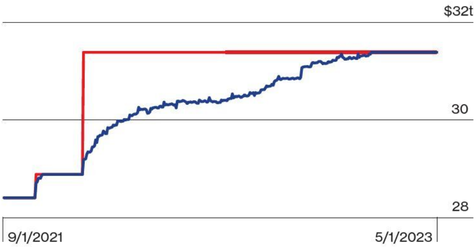
The Debt Ceiling Countdown

By Alex Harris

Investors are watching Washington with a keen eye as President Joe Biden and House Speaker Kevin McCarthy wrangle to resolve the impasse over the debt ceiling and avoid a potentially catastrophic default on US obligations. After a White House meeting on May 9, McCarthy said, “I didn’t see any new movement,” while the president said he viewed the talks as productive.

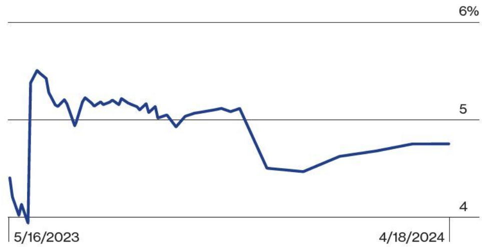
● US DEBT CEILING

US statutory debt limit / US public debt subject to limit



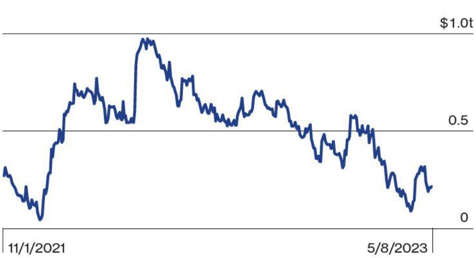
Treasury Secretary Janet Yellen and the nonpartisan Congressional Budget Office warned this month that there’s a risk the government could exhaust borrowing capacity as soon as early June. On May 7 she reiterated her argument that the only “good” option is for lawmakers to raise the ceiling. If that doesn’t happen, she said, the government will need to figure out “what to do with the resources that we do have.”

● US TREASURY BILL YIELDS



Investors tend to demand higher yields on debt due to be repaid shortly after the US is predicted to run out of borrowing capacity. That puts the focus on the shortest-dated Treasury bills. Yields on the most at-risk securities have seen remarkable spikes, as investors, who’d previously priced some level of risk across the summer, zeroed in on early June as the prime danger zone.

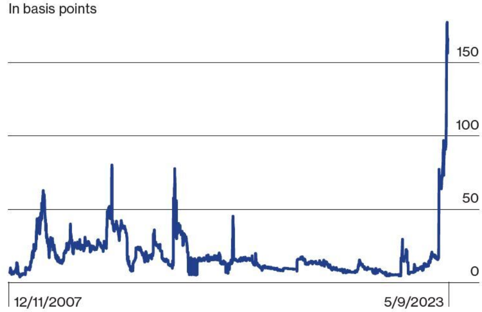
● US TREASURY CASH BALANCE



The government’s ability to pay debts and meet obligations comes down to whether it has enough cash on hand, so the amount sitting in its checking account is the crucial figure to watch. The balance changes from day to day, depending on spending, tax receipts, debt repayments and the proceeds of new borrowing. On May 8, the figure stood at about $215 billion.

● ONE-YEAR CREDIT-DEFAULT SWAP PRICES

In basis points



Beyond T-bills, another key financial market to watch for insight on debt ceiling risks is the cost of insuring US government obligations against nonpayment. Credit-default swaps for US Treasuries, which pay out in the event of skipped payments, surged this month well above levels seen even amid the bitter debt ceiling battle of 2011.

DATA: BLOOMBERG, US TREASURY DEPARTMENT, CME

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