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another
an overnight
the coming
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Bloomberg Businessweek

April 27, 2020

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WUHAN

REOPENS

Inside the city where it all began 38

◀ Chesky at home. He intends to follow much the same recipe that made Airbnb a success.

PHOTOGRAPHS BY KELSEY MCCLELLAN FOR BLOOMBERG BUSINESSWEEK

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GLOVES: SAMSUL SAID/BLOOMBERG

CORRECTION

"A Pandemic Made for Facebook" (Technology, April 20) should have identified Dr. Anthony Fauci as the director of the National Institute of Allergy and Infectious Diseases. ● Last week's cover story misstated Carnival Corp.'s 2019 revenue. It was $20.8 billion.

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■ COVER TRAIL

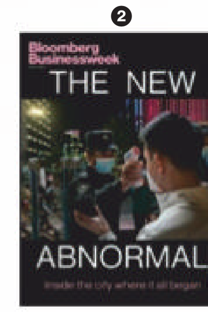
How the cover gets made

❶

"This week we're going inside Wuhan. The city where the pandemic began is getting back to work."

"And we're photographing—can't wait to see what it's like."

❷



"Powerful image. But isn't that the name of the new Strokes album?"

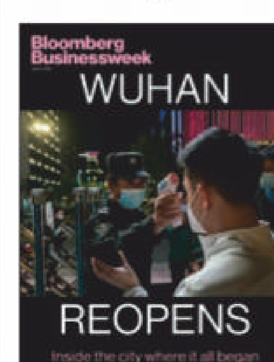
"My bad, let's change."

"Not into the Strokes, huh?"

"Well, not to be pretentious, but while I do appreciate their contributions to the early aughts New York garage-rock sound, the *Pitchfork* review of their latest album calls it 'sluggish and slight.'"

"How about *Pitchfork* giving Fiona Apple's *Fetch the Bolt Cutters* a perfect 10?!"

[Weeps] "It's so nice not to talk about the virus."



Cover: Photograph by Gilles Sabrie for *Bloomberg Businessweek*

ADVERTISEMENT

If You Transacted in Eurodollar Futures Contracts and/or Options on Eurodollar Futures on Exchanges, such as the Chicago Mercantile Exchange, between January 1, 2003 and May 31, 2011,

You May Be Eligible to Receive Payment of a Portion of Aggregate Settlement Funds Totaling $187,000,000[1]

The purpose of this notice is to inform you of a partial settlement of a class action lawsuit pending in the United States District Court for the Southern District of New York. The lawsuit involves the alleged manipulation of U.S. Dollar LIBOR ("LIBOR") and its impact on Eurodollar futures contracts and/or options on Eurodollar futures ("Eurodollar Futures") that are linked to LIBOR. The lawsuit against the Non-Settling Defendants remains ongoing. This lawsuit (referred to as the "Exchange-Based Plaintiffs' Action") has been consolidated within *In re LIBOR-Based Financial Instruments Antitrust Litigation*, 11 MDL No. 2262 (S.D.N.Y.).

There are proposed Settlements reached separately with Bank of America Corporation and Bank of America, N.A. (collectively "BOA"), Barclays Bank plc ("Barclays"), Citigroup Inc., Citibank, N.A., and Citigroup Global Markets Inc. (collectively, "Citi"), Deutsche Bank AG, Deutsche Bank Securities Inc., and DB Group Services (UK) Limited (collectively, "Deutsche Bank"), HSBC Bank plc ("HSBC"), JPMorgan Chase & Co. and JPMorgan Chase Bank, N.A. (collectively "JPMorgan"), and Société Générale ("SG") (BOA, Barclays, Citi, Deutsche Bank, HSBC, JPMorgan, and SG are referred to collectively herein as the "Settling Defendants"). These Settlements impact persons, corporations and other legal entities that transacted in Eurodollar futures contracts and/or options on Eurodollar futures on exchanges, including without limitation, the Chicago Mercantile Exchange (the "CME"), between January 1, 2003 and May 31, 2011 (the "Settlement Class Period").

The lawsuit asserts that the Defendant banks (listed on the settlement website, www.USDLiborEurodollarSettlements.com) artificially manipulated U.S. Dollar LIBOR and Eurodollar Futures during the Settlement Class Period by misreporting their borrowing costs to the organization that calculated LIBOR. The alleged manipulation of the U.S. Dollar LIBOR rate allegedly caused Eurodollar Futures prices to be suppressed and/or inflated to artificial levels, thereby causing Settlement Class Members to pay artificial prices for Eurodollar Futures during the Settlement Class Period. Plaintiffs have asserted claims under the Commodity Exchange Act and Sherman Antitrust Act and for unjust enrichment. The Court has issued at least eight published opinions addressing various legal matters raised by the parties in this action. The Settling Defendants have entered into these proposed Settlements to resolve the claims asserted against them. The Settling Defendants deny all claims of wrongdoing.

Claims against Non-Settling Defendants have been limited by the Court's prior rulings. The Court previously dismissed claims against certain defendants for lack of personal jurisdiction and other claims as against SG on statute of limitations grounds. The Court also denied Plaintiffs' class certification motion. Plaintiffs petitioned the Court of Appeals for the Second Circuit for interlocutory review of the Court's denial of class certification. The Court of Appeals denied that petition. As a result, your participation in these Settlements may offer the best, and perhaps only, chance for you to receive any monetary recovery from this lawsuit.

Am I included?

The Settlement Classes are defined in the Full Notice and the Settlement Agreements, which are available for review on the settlement website. In general, you are a Settlement Class Member if you transacted in Eurodollar futures contracts and/or options on Eurodollar futures on exchanges, including without limitation, the CME, between January 1, 2003 and May 31, 2011. Excluded from the Settlement Class are: (i) Defendants, their employees, affiliates, parents, subsidiaries, and alleged co-conspirators; (ii) the Releasees (as defined in the Settlement Agreements described below); and (iii) any Settlement Class Member who files a timely and valid request for exclusion. Notwithstanding these exclusions, and solely for the purposes of the Settlements and the Settlement Class, Investment Vehicles shall not be excluded from the Settlement Class solely on the basis of being deemed to be Defendants or affiliates or subsidiaries of Defendants. However, to the extent that any Defendant or any entity that might be deemed to be an affiliate or subsidiary thereof (i) managed or advised, and (ii) directly or indirectly held a beneficial interest in, said Investment Vehicle during the Class Period, that beneficial interest in the Investment Vehicle is excluded from the Settlement Class.

What do the Settlements provide?

In order to resolve the claims against them, the Settling Defendants have separately agreed to individual settlement amounts totaling $187,000,000 in the aggregate for the benefit of the Settlement Class in exchange for releases of the claims against them, as fully detailed in the Settlement Agreements. Specifically, BOA has agreed to pay $15 million; Barclays has agreed to pay $19.975 million; Citi has agreed to pay $33.4 million; Deutsche Bank has agreed to pay $80 million; HSBC has agreed to pay $18.5 million; JPMorgan has agreed to pay $15 million; and SG has agreed to pay $5,125,000. The Settlement Agreements are available for review on the settlement website referenced below. The Settling Defendants have also agreed to provide certain specified cooperation to the Plaintiffs that can be used in the prosecution of claims against the Non-Settling Defendants.

How can I get a payment?

If you transacted in U.S. Dollar LIBOR-based Eurodollar futures contracts and/or options on Eurodollar futures on exchanges such as the CME between January 1, 2003 and May 31, 2011 and do not exclude yourself from the Settlement Class, you must file a timely and valid Proof of Claim Form to be potentially eligible for any payment. You may obtain a Proof of Claim Form on the settlement website referenced below and submit it online or by mail. The amount of any payment under the Settlements will be determined by a Plan of Distribution approved by the Court. A copy of the proposed Plan of Distribution is available for review on the settlement website at www.USDLiborEurodollarSettlements.com.

The proposed Plan provides for distribution of 75% of the Net Settlement Fund on the basis of *pro rata* "Recognized Net Loss" and 25% on the basis of *pro rata* "Recognized Volume," subject to a guaranteed minimum payment of $20. Only Eligible Claimants may participate in the distribution of the Net Settlement Fund. An Eligible Claimant is a Settlement Class Member whose proof of claim is found to be timely, adequately supported, properly verified and otherwise valid pursuant to the Plan of Distribution all as determined by the Settlement Administrator. At this time, it is unknown how much, if anything, each Eligible Claimant may receive.

To be timely, all Proof of Claim Forms must be postmarked by mail or submitted electronically by December 1, 2020.

What are my rights?

You have the right to remain a member of the Settlement Class or to exclude yourself from the Settlement Class. If you remain a member of the Settlement Class, and if the Settlements are approved, you may be eligible to share *pro rata* in the Net Settlement Fund by timely submitting a valid Proof of Claim Form. If you participate in the Settlements, you will, however, lose your right to individually sue any of the Settling Defendants or their affiliated persons and entities for the alleged conduct at issue in the lawsuit, and will be bound by the Court's orders concerning the Settlements. If you stay in the Settlement Class, you may object to one or more of the proposed Settlements, the proposed Plan of Distribution, the requested attorneys' fees, expense reimbursement, and service awards mentioned below by August 27, 2020. Any objections must be filed with the Court and delivered to the designated representative for Settlement Class Counsel and counsel for the Settling Defendants in accordance with the instructions set forth in the Full Notice. The Settlements will not release your claims against any Non-Settling Defendants, and the lawsuit continues against them.

If you want to keep your right to individually sue the Settling Defendants or their affiliated persons and entities, you must exclude yourself from the Settlement Class for that Settling Defendant(s) by August 27, 2020, in the manner and form explained in the detailed Full Notice. All Settlement Class Members who have not timely and validly requested exclusion from the Settlement Class will be bound by any judgment entered in the lawsuit pursuant to the Settlement Agreements. If you properly and timely exclude yourself from the Settlement Class, you will not be bound by any judgments or orders entered by the Court pursuant to the Settlement Agreements and you will not be eligible to receive any payments from the Net Settlement Fund if the Settlements are approved by the Court.

A fairness hearing will be held on September 17, 2020 at 11:00 a.m. before the Honorable Naomi Reice Buchwald, United States District Court Judge, in Courtroom 21A, at the Daniel Patrick Moynihan United States Courthouse, located at 500 Pearl Street, New York, New York 10007, for the purpose of determining, among other things, whether to approve the proposed Settlements, the proposed Plan of Distribution, Class Counsel's request for attorneys' fees of up to one-third of the Settlement Fund, plus reimbursement of litigation expenses, and payment of service awards to the Settlement Class representatives of no more than $25,000 each. You or your own lawyer may appear and speak at the hearing at your own expense.

THIS IS ONLY A SUMMARY OF THE FULL NOTICE AND SETTLEMENT AGREEMENTS, WHICH CONTAIN MORE DETAILED INFORMATION THAT YOU SHOULD READ. THE FULL NOTICE AND THE SETTLEMENT AGREEMENTS ARE AVAILABLE AT www.USDLiborEurodollarSettlements.com.

Settlement Class Members should continue to review the settlement website for important updates about the Settlements and the litigation. You may also contact the Settlement Administrator below (A.B. Data, Ltd.) to obtain additional information.

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[1] The aggregate Settlements, if all receive Final Approval from the Court, will create a $187,000,000 Settlement Fund. Settling Defendants have separately agreed to settlements as follows: BOA has agreed to pay $15 million; Barclays has agreed to pay $19.975 million; Citi has agreed to pay $33.4 million; Deutsche Bank has agreed to pay $80 million; HSBC has agreed to pay $18.5 million; JPMorgan has agreed to pay $15 million; and Société Générale has agreed to pay $5,125,000.

● President Trump said he'd stop the issuance of green cards for two months.

He also hinted at additional restrictions that could complicate planning for businesses and workers looking to rebound from the coronavirus pandemic.

● Demonstrators gathered at the Washington state Capitol in Olympia on April 19 to protest Governor Inslee's stay-at-home order, which is in effect through May 4.

● Oil suffered an historic price plunge because of massive oversupply and a dearth of storage facilities. West Texas Intermediate futures plummeted to -$37.63 per barrel on April 20, the first negative price ever, as idled industries around the world have depleted demand. ▷ 20

● Kim Jong Un was in critical condition after undergoing cardiovascular surgery last week, U.S. officials said they were told.

The health of the North Korean leader, who is overweight and a heavy smoker, is one of the country's most closely guarded secrets. The reclusive regime didn't comment on it.

● Virgin Australia collapsed, the first Asia-Pacific airline to fail as a direct result of the pandemic. The carrier, which has furloughed 80% of its 10,000 workers, will still operate some flights for workers, freight, and repatriation missions. Virgin Australia's position was strained even before the outbreak, with more than A$5 billion ($3.2 billion) in debt at the end of 2019.

● "We shouldn't feel safe for a second. It would be a terrible shame if we walked straight back into a relapse."

German Chancellor Angela Merkel urged the public to stick to social distancing rules, even as new coronavirus infections slow and the country begins to reopen.

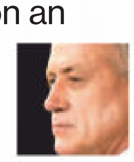
● Shake Shack will return a

$10m

U.S. government loan following public uproar that it had claimed the funds while many small restaurants were frozen out of the program by the time the initiative ran out of money.

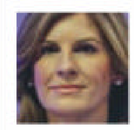
● Israel emerged from more than a year of political paralysis and multiple elections, with Prime

Minister Benjamin Netanyahu agreeing on an unusual power-sharing pact with rival Benny Gantz.



Netanyahu will serve until October 2021, and Gantz, a former military chief, will take over for the following 18 months.

● Jennifer Morgan, co-CEO



of SAP, abruptly announced she'll depart by the end of the month. Morgan took up the role only in October, alongside Christian Klein, but the software maker said the pandemic has exposed problems with the dual-leadership structure. The American-born Morgan was the first woman to run one of Germany's 30 largest listed companies.

● Canada has closed about 25% of its sawmill capacity because of a price slump and a poor outlook for construction.

But the reduced output also means fewer wood chips are available to make toilet paper and sanitary wipes, which have become hot commodities in this stay-at-home era. ▷ 12

PROTEST: ALEX MILAN TRACY/AP IMAGES. MORGAN: ALEX KRAUS/BLOOMBERG. NETANYAHU: SEBASTIAN SCHEINER/GETTY IMAGES. GANTZ: GILI YAARI/GETTY IMAGES. BEER: GETTY IMAGES. ILLUSTRATION BY CAROLYN FIGEL

● Shares of Pharming Group jumped as much as 41% on April 21 after its Ruconest drug showed positive results in Covid-19 patients hospitalized with severe pneumonia.

● Munich's Oktoberfest, which draws millions of visitors, has been canceled for the first time since World War II.

● Joe Biden solidified his status as the presumptive Democratic nominee by pulling in

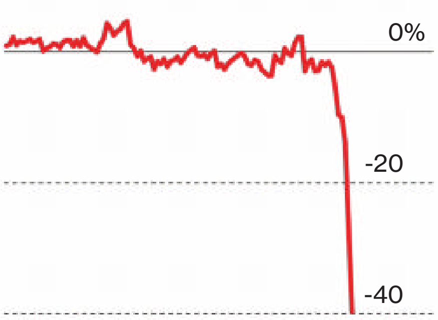
$47m

in campaign donations in March, his best month yet. ▷ 6

● Canada suffered one of its worst killing sprees after a 12-hour rampage in a seaside town in Nova Scotia left at least 19 people dead, including the shooter, a 51-year-old man.

● Luxury shopping emporium Neiman Marcus is trying to stave off bankruptcy. Even before the pandemic, traffic at malls and department stores had been slumping.

Redbook index of weekly department store sales, year-over-year change



● Argentina's proposal to restructure about

$65b

in foreign bonds into new debt was rejected by a group of creditors that includes BlackRock and Fidelity. The stalemate raises the risk that the Latin American country may default again as soon as next month.

● Executions have fallen to their lowest level in a decade, according to Amnesty International. The number of recorded executions worldwide last year fell to 657, the report said, though it doesn't contain data from China, believed to be the most prolific executioner.

● Paul O'Neill, the former CEO of aluminum company Alcoa who served as Treasury secretary under President George W. Bush, died at the age of 84.

His family said the cause of death was lung cancer.

■ AGENDA

▶ From Boom to Bust in a Few Weeks

The U.S. reports GDP for the first quarter on April 28. The data will likely reveal a rapid reversal from a booming economy into one that's contracting amid a nationwide lockdown, factory closures, and mass unemployment.

▶ UBS reports first-quarter earnings on April 28. CEO Sergio Ermotti plans to leave in November, handing the world's biggest wealth manager to Dutch banker Ralph Hamers.

▶ The U.S. Federal Reserve sets its interest rates on April 29. The central bank has little room to maneuver after two emergency cuts brought borrowing costs to near zero.

▶ On April 27 the first trial starts to determine whether utility Southern California Edison is liable for damages from the Woolsey wildfire, which tore through Malibu last year.

▶ BP's April 28 first-quarter earnings release will show the fallout from crashing oil prices, which have suffered from aggressive production and slumping factory and consumer demand.

▶ Amazon unveils its first-quarter numbers on April 30. The web retailer has benefited as people order everything from TV shows to toilet paper from home.

▶ On April 29 the DIW German Institute for Economic Research releases its monthly barometer for GDP and macroeconomic development in Europe's biggest economy.

How China Lost Biden—and America

● It's been a long journey from collaboration to confrontation for the presumptive Democratic presidential candidate

● By Peter Martin and Daniel Ten Kate

Way back in late February, when the U.S. still hadn't seen a death from Covid-19 and Joe Biden's campaign for the White House was hanging by a thread, the former vice president made a remark that could prove consequential in shaping global events over the next five years. "I spent more time with Xi Jinping than any world leader had by the time we left office," Biden said on the debate stage in South Carolina. "This is a guy who doesn't have a democratic-with-a-small-'d' bone in his body. This is a guy who is a thug."

Candidates' statements aren't necessarily a guide to how they'll act in office, but the line now stands out coming from the presumptive Democratic nominee. For one thing, Biden really does know Xi better than anyone else in U.S. politics. The two spent extensive time together on several occasions beginning in 2011, when Xi was his own country's second-in-command. Biden would also know that the Chinese government views personal attacks on top leaders as taboo, a big part of why it almost never directly criticizes President Trump. It's also notable that, not so long ago, Biden was describing Xi and China differently. As recently as 2016 he was promoting his "friendship" with the Chinese leader and, in May 2019, said the world's second-largest economy "is not competition for us" and its leaders "not bad folks."

Biden's shifting views are representative of a broader transformation in how the Washington establishment sees China. For almost 30 years, Beijing could call on an ideologically diverse group of friends on Capitol Hill, all of them in agreement that engagement and economic integration were ultimately in America's interest. That support has disappeared, and not only among followers of Trump: There's now a wide, bipartisan consensus that China poses a fundamental threat to America's values–and probably its security. Leading members of both parties agree on the need to restrict Chinese investment in the U.S., continue selling advanced weapon systems to Taiwan, keep Huawei Technologies Co. out of 5G networks, and prevent it and similar companies from dominating artificial intelligence.

It's probably not an exaggeration to say there's no longer a prominent China dove in Congress, and Biden's views, in particular, are likely only to harden as Trump cites his past statements to accuse him of being soft on Beijing. Biden, says Andrew Bates, his spokesman, "will be one of the most seasoned and experienced presidents in American history, including with respect to America's global leadership role and managing our relationship with China."

The upshot is that even if Biden defeats Trump in November, U.S.-China relations–already at their worst since troops killed protesters in the 1989 Tiananmen Square demonstrations–probably won't improve. Indeed, they could easily get worse. The coronavirus pandemic and the economic catastrophe it's caused have increased the tempo of calls for the U.S. to roll back economic integration across the Pacific. Senate Republicans introduced a bill in March aimed at breaking the U.S.'s dependence on China for pharmaceuticals and medical equipment, citing concerns about shortages. American distrust is certain to increase if it turns out that, as U.S. intelligence agencies believe, Beijing concealed the scale and lethality of its outbreak, hampering Western governments' ability to plan for their own. And Xi, who is arguably China's most repressive leader in a generation, has intensified efforts to suppress dissent as the country emerges from lockdown, citing its containment of coronavirus as evidence of the superiority of Communist rule.

"There is a general consensus across the U.S. foreign policy community that Xi Jinping's China is not the China we faced before," says Melanie Hart, the director of China policy at the Center for American Progress, a Democratic-leaning think tank in Washington. "Beijing is challenging American interests in new and increasingly damaging ways, and that calls for a tougher U.S. response."

To understand just how much the U.S.-China relationship has decayed, it's helpful to take a step back. And Biden, who became a senator a year after Richard Nixon's ▶

PHOTO ILLUSTRATION BY 731; PHOTO: GETTY IMAGES

◀ history-making 1972 visit to Beijing, has been around for more of it than almost anyone still relevant in Washington. In 1979, Biden, who was only 36, led a congressional delegation to the Chinese capital, where the group met with paramount leader Deng Xiaoping and hashed out a deal on monitoring Soviet arms-control efforts—one leg of a remarkable Cold War partnership between ideological foes. Over the next decade, the U.S. and China entered something of a golden age of mutual openness, with high-level officials traveling regularly in both directions and the first serious economic ties being established.

This cooperation was temporarily upended by the Tiananmen massacre, which prompted Biden and the entire Senate to vote for sanctions. But relations thawed out by the mid-1990s, in large part because of the eagerness of U.S. companies to access the vast potential of the Chinese market. Membership in the World Trade Organization, which would allow China to export goods more easily in return for greater access to its markets, was an obvious next step—one that Biden and much of the Washington establishment supported. Along with 82 other senators, he voted in 2000 to back the normalization of trade relations, paving the way for WTO accession. During a visit to Taiwan the next year, he explained his rationale. "The more they have to lose," he said of the Chinese government, "the more they are likely to begin to accommodate international norms."

Biden's comment was a variation on a view that was all but conventional wisdom in both American parties for more than 20 years: That even though the U.S. had significant quarrels with China, not least over the nature of its repressive political system, the way to close them was through engagement and negotiation, not confrontation and containment. A rising China that benefited from the international system, the theory went, would be far less likely to do anything that could disrupt it—like responding to pro-democracy protests with another Tiananmen or trying to take Taiwan by force.

Through the end of the George W. Bush administration and the beginning of his time as vice president, Biden seemed to think the bet might still pay off, saying in a 2007 presidential debate that China was "neither" an ally nor an adversary. Meanwhile, the country's economic strength soon made cooperation a matter of necessity. In early 2009, on her first trip to Asia as Barack Obama's secretary of state, Hillary Clinton thanked Chinese policymakers for their "confidence in United States Treasuries" amid the global financial meltdown, adding that human-rights disagreements shouldn't "interfere" with crisis-fighting efforts.

Then, suddenly, relations started going downhill. China grew more assertive as President Hu Jintao came to the end of his term, moving to assert claims to disputed territory in the South China Sea and the Sea of Japan over strenuous American objections. It was also becoming much more confident in the superiority of its economic model, which had come through the crisis relatively unscathed. When Biden visited Beijing in August 2011—shortly after S&P's Global Ratings downgraded the U.S.'s credit rating—then-Premier Wen Jiabao gave him a mini-lecture on the importance of fiscal prudence, according to a person familiar with the exchange. Wen, the person said, also delivered a thinly veiled threat, saying he hoped China wouldn't need to find an alternative to parking its wealth in U.S. bonds. Biden replied that Wen's government was welcome to sell its holdings—plenty of global investors would be happy to buy them. No one, the person recalled Biden saying, had ever won by betting against the U.S. economy.

Despite these tense exchanges, it didn't yet feel as if a breakdown in the U.S.-China relationship was inevitable. There were some signs that Beijing was willing to moderate its foreign policy, including a 9,000-word 2011 essay by its top diplomat, Dai Bingguo, that urged cooperation between the two powers and called "the notion that China wants to replace the United States and dominate the world" a "myth." In Washington, policymakers were hopeful that Obama's pivot of military resources to Asia would restrain Chinese ambitions. Besides, a new leader was waiting to take over the Communist Party, and little was known about how he viewed the U.S. The vice president was tasked with finding out.

Although he'd been a high-level official since the 1990s, Xi was something of an unknown quantity for American analysts. His father was an influential advocate for economic liberalization and a friend of the Dalai Lama, spurring optimism that Xi might usher in a new era of openness. On the other hand, he'd spent his entire career in the party, spoke almost no English, and had made only a few brief trips overseas—unlikely credentials for a reformer.

Biden's first face-to-face encounter with Xi came later in the same summer 2011 trip, when they traveled together to Sichuan province for a series of get-to-know-you discussions. Among other subjects, they spoke at length about the risks to stability and economic growth. Xi, according to a person familiar with the meeting, was intensely curious about the Arab Spring and the challenges to authoritarian ruling parties then under way in the Middle East. Their mistake, Xi told Biden, was to lose touch with the people, becoming self-satisfied and isolated. The Communist Party needed to avoid going down that road, he said.

Six months later, Biden returned the favor, hosting Xi at his home in Washington. There was a detailed list of bilateral issues to work through, including climate change, trade, and defense. But it was the unscripted moments that proved most revealing. What struck the U.S. team most, according to a former official who was present, was Xi's razor-sharp focus on internal politics. Sitting at a round table, he stressed the importance of the party speaking with one voice, through a single strong leader, to prevent China from regressing into chaos. He also seemed fascinated, the former official said, by military power and organization and the strategies other countries had employed to modernize their armed forces. When the meetings wrapped up, Xi issued a statement declaring that he and Biden had reached a "consensus" on a "new model

▲ Biden on a 2001 visit to China, as the then-U.S. Senate Foreign Relations Committee chairman

of major-power relations"—a phrase that suggested China believed the relationship would henceforth be one of equals.

It didn't take long for U.S. officials to take issue with how that relationship was changing. Xi, who became overall leader in 2012, made his first visit to the U.S. in that capacity the next year, repairing to a California ranch for an informal summit with Obama. The U.S. president publicly dubbed the encounter "terrific," but in private things got testy, according to a person who was present. Obama at one point challenged Xi over China's cyber espionage operations, a source of enduring anger for American companies. Xi responded by describing a scene from a Chinese opera in which a warrior fights an adversary in a dark room, only to find out he was battling himself—suggesting the U.S. couldn't be sure who was behind the hacking. Obama responded curtly, according to the person: "The difference is, we know it's you."

The electronic intrusions didn't abate, while Xi's government also intensified other activities the U.S. had warned against, such as island-building in the South China Sea. At the same time, another crucial constituency was growing impatient with China: corporate America. One of Xi's signature economic initiatives, Made in China 2025, called for the country to become a global leader in 10 key industries, including aircraft, electric vehicles, and biotech. But some U.S. businesspeople, already frustrated by intellectual-property theft and what they viewed as favoritism for Chinese companies, said it felt as if it put a target on their back. The plan, says Jeff Moon, a former Cisco Systems Inc. executive and U.S. trade negotiator, was a blueprint "to kick us out from anything of value." At the end of 2015, 77% of companies surveyed by the U.S. Chamber of Commerce in China said they felt "less welcome" there than before, up from 60% a year earlier.

Nor was there any evidence that, as Biden and other lawmakers from both parties had once said, an economic exchange was making China less repressive, let alone more democratic. Since taking office, Xi had spearheaded an aggressive crackdown on dissent, jailing or silencing thousands of activists, lawyers, professors, businesspeople, and journalists—almost anyone who dared contradict the government on an issue of substance. Many were personal contacts, or even friends, of American foreign policy officials. Whoever won in 2016, it seemed as if a reckoning was inevitable.

Trump has engineered a confrontation with China more direct and sustained than any in the relationship, imposing hundreds of billions of dollars in tariffs and heavily restricting investments by companies such as Huawei. Although Democrats have criticized his tactics, few have questioned the ultimate goal of significantly rebalancing the world's most important economic relationship. Beijing, meanwhile, has found that its traditional friends in New York and Washington have little ability, or desire, to restrain that impulse. Henry Kissinger, who engineered Nixon's 1972 visit and built a lucrative business advising companies doing business in China, has warned that the countries are "in the foothills of a Cold War." And in 2018 former Secretary of the Treasury Hank Paulson said he feared that if China didn't open further to foreign investment, the result could be "an economic Iron Curtain."

Biden, who leads virtually in all head-to-head polls against Trump as the coronavirus pandemic crisis guts the U.S. economy, has argued that the administration isn't going far enough. Whereas the president stayed largely silent as pro-democracy protests rocked Hong Kong last year, Biden lauded the "extraordinary bravery" of demonstrators. In a speech in October, he accused Trump of ignoring human-rights concerns such as the imprisonment of Muslims in Xinjiang to secure a trade deal. And when the so-called Phase 1 agreement was signed in January, he called China "the big winner," arguing the accord failed to "resolve the real issues at the heart of the dispute, including industrial subsidies, support for state-owned enterprises, cybertheft, and other predatory practices."

A person familiar with Biden's thinking says that if Biden defeats Trump, he'll take a firm line on China's economic and foreign policy ambitions and also seek collaboration on global issues such as climate change. His goal, the person says, is to keep China from bullying other countries while avoiding an aggressive "containment" strategy of the kind the U.S. employed against the Soviet Union.

An improvement in the relationship isn't inconceivable. Both the events of 1989 and the inadvertent U.S. bombing of the Chinese embassy in Belgrade, 10 years later, touched off serious ruptures that were eventually repaired. But there's a strong case to be made that, given China's trajectory under Xi, this time is different, and no amount of engagement is likely to push it toward convergence with liberal democracies.

Biden is certainly no longer suggesting it's possible—or that the U.S. and China don't represent distinct and incompatible visions of the future. "America's commitment to universal values sets us apart from China," he told the Council on Foreign Relations late last year. "The free world should come together to compete with China's efforts to proliferate its model of high-tech authoritarianism." Ⓑ

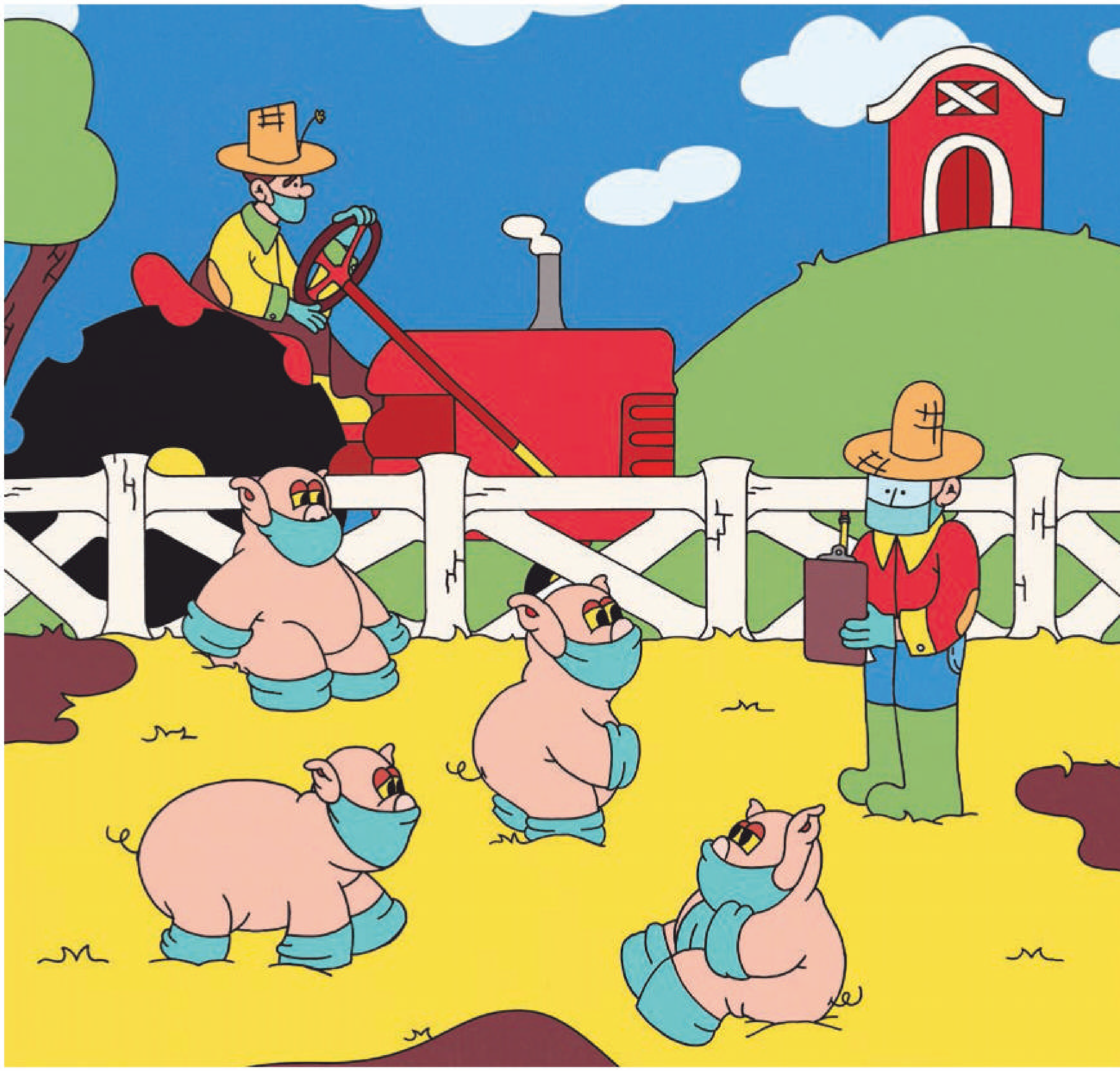


ILLUSTRATION BY HUNTER FRENCH. MEAT: RICH GRAESSLE/GETTY IMAGES. DATA: COMPILED BY BLOOMBERG

Dealing With a Virus Double Whammy

● Covid-19 and swine fever slam the world's top pork producer, China's WH Group

As businesses around the globe buckle under the strain of Covid-19, the world's biggest pork producer is fighting not just one highly contagious virus, but two. And the outcome could determine whether Americans will have enough hot dogs, bacon, and ham this summer.

Hong Kong-based WH Group Ltd. is struggling to cope with the virus that causes African swine fever (ASF), a deadly malady that's devastated hog herds and helped more than double pork prices in China, while also spreading to other countries in Asia and Europe. Like Covid-19, ASF is currently incurable and researchers have yet to come up with a vaccine. China's pork production fell 29% in the first three months of 2020; the swine disease has slashed the size of the country's hog herd by about half.

Now the coronavirus is piling on. Smithfield Foods, the Virginia-based subsidiary of WH Group, shut three of its U.S. plants this month because of Covid-19. They include a processing facility in Sioux

Edited by James E. Ellis

Falls, S.D., that accounts for about a quarter of the company's U.S. revenue.

When Smithfield announced the indefinite closure, more than 200 workers were sick; that number has risen to more than 700—almost half the state's total. With the Sioux Falls site alone handling about 5% of all hog processing in the U.S., the maker of Farmland bacon, Farmer John hot dogs, Eckrich sausage, and Armour ham warned of possible supermarket shortages. "The closure of this facility, combined with a growing list of other protein plants that have shuttered across our industry, is pushing our country perilously close to the edge in terms of our meat supply," Smithfield Chief Executive Officer Ken Sullivan said on April 12. "It is impossible to keep our grocery stores stocked if our plants are not running."

WH isn't the only meat company facing virus woes. Tyson Foods Inc. on April 22 said it's closing its 2,800-worker pork plant in Waterloo, Iowa. Brazilian processor JBS SA had said it would indefinitely close its pork plant in Worthington, Minn., after employees tested positive for Covid-19. And deaths have been reported among workers at Tyson's pork plant in Iowa and poultry plant in Georgia as well as at Cargill Inc. plants in Colorado and Alberta, Canada. "As we all learn more about coronavirus, it is clear that the disease is far more widespread across the U.S. and in our county than official estimates indicate based on limited testing," Bob Krebs, president of JBS USA Pork, said in a statement.

Even before the coronavirus disruptions, the world wasn't producing enough pork. The number of hogs worldwide has declined about 25% because of ASF, according to the U.S. Meat Export Federation. Now the double epidemic raises the specter of shortages that could put WH in the middle of a fight between its two biggest markets, says Brett Stuart, president of Denver-based consulting firm Global AgriTrends. "Smithfield is going to say, 'I have X amounts of hogs to sell, and the highest bidder gets the pork,'" he says. "Could we get to a situation where China is outbidding U.S. consumers for pork? Potentially, yes." The average wholesale price for pork in China is 45 yuan ($6.36) per kilogram, up from 20.6 yuan a year ago. "If the Chinese buyers call Smithfield and say 'We need U.S. pork,' they can potentially bid higher than our consumers or retailers can bid," Stuart says.

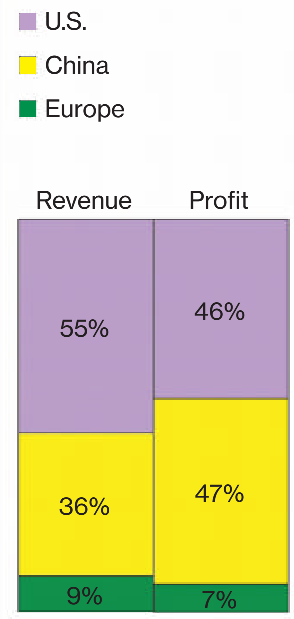
WH also is trying to avoid hits from the U.S.-China trade war. Following President Trump's first tariffs against its products in 2018, China placed retaliatory tariffs on U.S. pork imports, raising the price of American-made Smithfield meat to Chinese consumers. Still, WH managed to import about 410,000 metric tons of U.S. pork into China last year, vs. about 125,000 metric tons a year earlier.

When Shuanghui International Holdings, the precursor to WH Group, paid about $4.7 billion for Smithfield in 2013, some U.S. lawmakers expressed concern that Chinese ownership would create national security risks, including the possibility of Americans losing access to some pork products. The U.S. allowed the acquisition, and now questions about availability may again arise.

Given the higher prices for pork in China, the U.S. business isn't as lucrative as WH's China operations. While China accounted for only about one-third of WH sales in 2019, it generated about 47% of segment profit. WH's $13.2 billion of U.S. revenue last year was about 55% of its total sales, down from 60% in 2015, but only 46% of segment earnings.

About six weeks before Smithfield closed its South Dakota plant, workers asked the company to implement such safety measures as checking temperatures and staggering lunch schedules for employees, says Kooper Caraway, president of the local arm of the AFL-CIO, which is assisting plant employees. "The management did not take the workers' demands seriously and did not implement any of the procedures," he says. "It wasn't until dozens of workers tested positive that the management decided to implement these things, but by then it was too late."

▼ WH Group business by segment



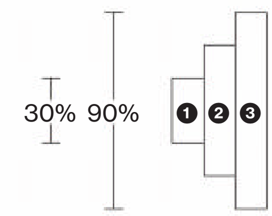
◀ An empty meat case at a New Jersey grocer

A company spokeswoman says that WH Group, through its Smithfield unit, has been adopting what it calls stringent and detailed safety processes and protocols at U.S. facilities. Following the Sioux Falls plant's closure, Smithfield announced $100 million in bonuses for employees, including those who can't work because of exposure to the coronavirus. That followed an earlier $20 million pledge. *—Bruce Einhorn, with Shuping Niu and Dorota Bartyzel*

THE BOTTOM LINE With pork brands including Smithfield, Eckrich, and Armour, WH Group had already been fighting a deadly pig disease. Now coronavirus is making matters worse.

Products That Got Harder to Buy Online

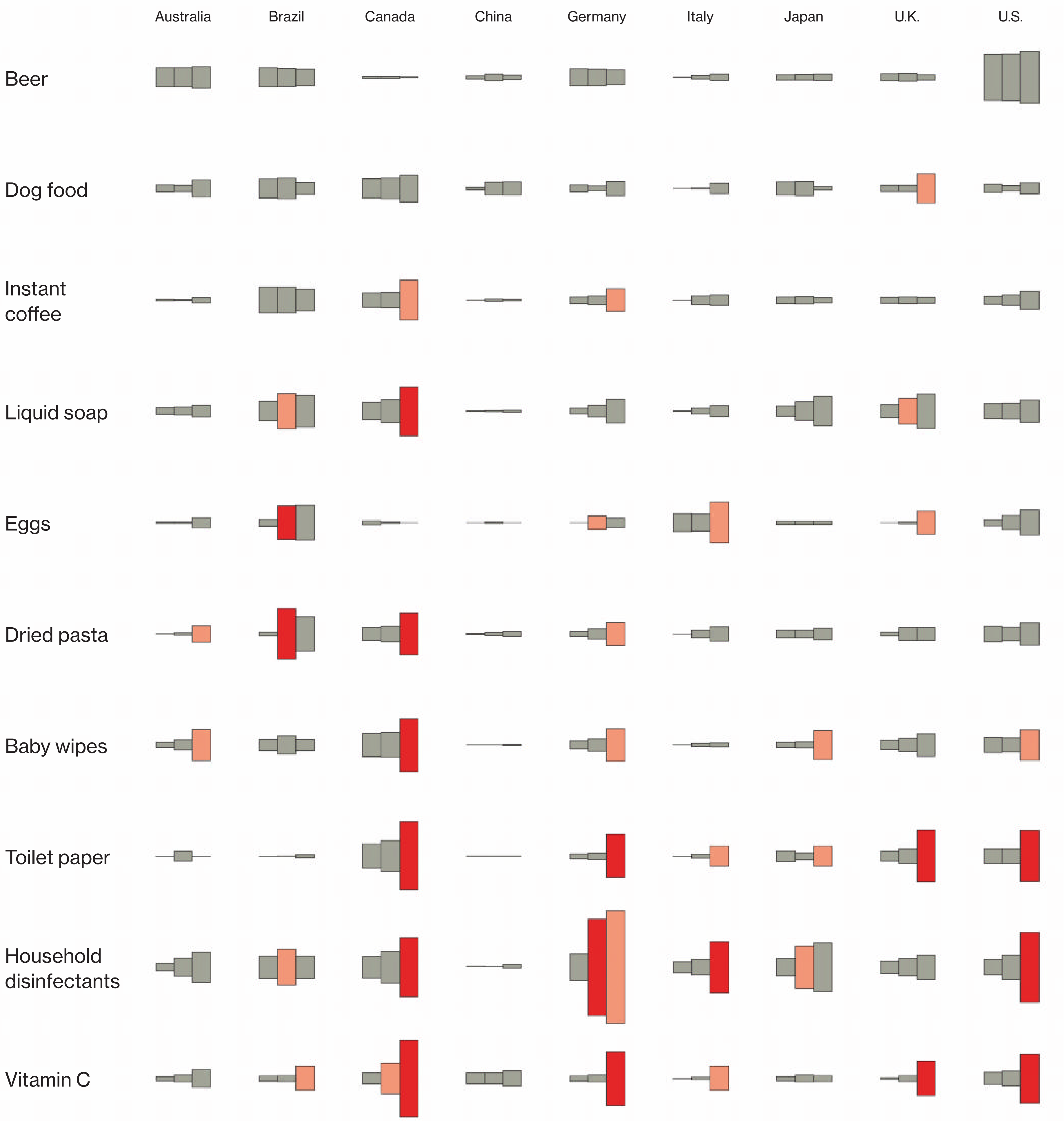
Online shopping has been plagued by shortages since the onset of the coronavirus pandemic, according to data compiled by market research firm Euromonitor International. Below is a look at how the inventory of products sold on e-commerce platforms changed in selected countries as the virus spread there.
—*Mark Glassman*



❶ Three weeks prior to the confirmation of 100 cases in nation*
❷ The day 100 cases were confirmed
❸ Three weeks after 100 cases were confirmed

Bars represent the share of product listed as out of stock†

- 10 to 20 percentage-point increase from prior period
- Increase of more than 20 percentage points



*THE FIRST DATA POINT FOR THE CHINA SERIES IS TAKEN 18 DAYS PRIOR TO THE CONFIRMATION OF 100 CASES BECAUSE DATA PRIOR TO JAN. 1, 2020, WEREN'T AVAILABLE.
†THE SHARE OF A PRODUCT THAT'S OUT OF STOCK IS THE PROPORTION OF STOCK-KEEPING UNITS FOR A GIVEN PRODUCT CATEGORY THAT ARE LABELED OUT OF STOCK ON RETAILER WEBSITES TRACKED BY EUROMONITOR.
DATA: E-COMMERCE PRODUCT AVAILABILITY FIGURES PROVIDED BY EUROMONITOR INTERNATIONAL'S VIA E-COMMERCE INTELLIGENCE PLATFORM ON APRIL 13. CORONAVIRUS CASE FIGURES COMPILED BY BLOOMBERG.

The Glove Bonanza

● Malaysia, the world's largest producer, has seen demand soar due to the coronavirus

Well before the new coronavirus came to global attention at the end of January, Lim Wee Chai had a feeling his company was headed for a good year. Since he founded Top Glove Corp. Bhd., the world's largest maker of medical gloves, in 1991, there's been one constant: Pandemics are good for business. "SARS, H1N1, bird flu, swine flu—there was a big surge in orders and demand," Lim says. So as reports of a mysterious virus began to emerge from China, "we prepared ourselves for a big thing."

The same is true of Lim's local rivals. Malaysia is the world's largest source of medical gloves, with a market share of about 65%. Dozens of companies, most clustered in industrial cities near the capital, Kuala Lumpur, turn out more than 200 billion "units"—single gloves—every year, destined for doctor's offices and hospitals all over the world. The sector has grown steadily since the 1980s, in tandem with more stringent hygiene standards in the developed world and improving medical services in China, India, and other emerging economies.

What's happening now, though, could make the previous expansion look modest. In 2019, Malaysia exported about 182 billion glove pieces, accounting for $4.31 billion in revenue; this year, according to the Malaysian Rubber Glove Manufacturers Association, the figure could go as high as 240 billion pieces. Expectations of a bonanza have made glove companies one of the few bright spots in the country's economy, with investors driving up Top Glove's shares almost 45% since the start of 2020. "I can guarantee you that every glove manufacturer in Malaysia today will expand," says Denis Low, the association's president.

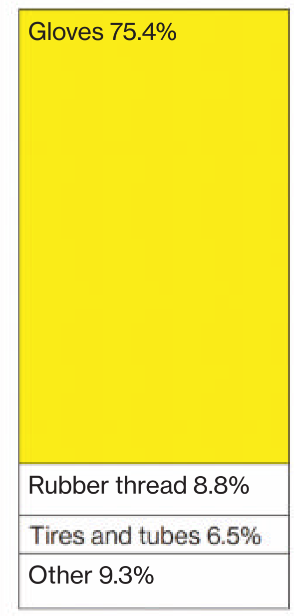
Malaysia's glove dominance can be traced to the 1980s, a period that some manufacturers refer to as the "big bang." The trigger was the AIDS epidemic, which created a surge in demand for gloves for doctors, nurses, and other health-care workers and even for police in the U.S. and Europe. Western manufacturers couldn't keep up, and Malaysian entrepreneurs, who benefited from lower labor costs, stepped in to fill the void. Although AIDS turned out to be less transmissible than initially feared, glove demand has largely held up, with Malaysia providing a rising proportion of the supply.

British colonists introduced rubber trees to what's now Malaysia in the 1870s, and the plants—originally from Brazil—thrived in the country's hot, humid climate, quickly becoming a major export industry. Rubber doesn't command the same economic significance today, but Malaysia's plantations still give glove manufacturers easy access to a crucial raw material: the drained sap better known as latex. Although so-called natural rubber gloves today make up less than half the market, in part because of concerns about allergic reactions, Malaysia's large oil industry provides local glove makers ample supplies of petrochemicals needed to make synthetic ones.

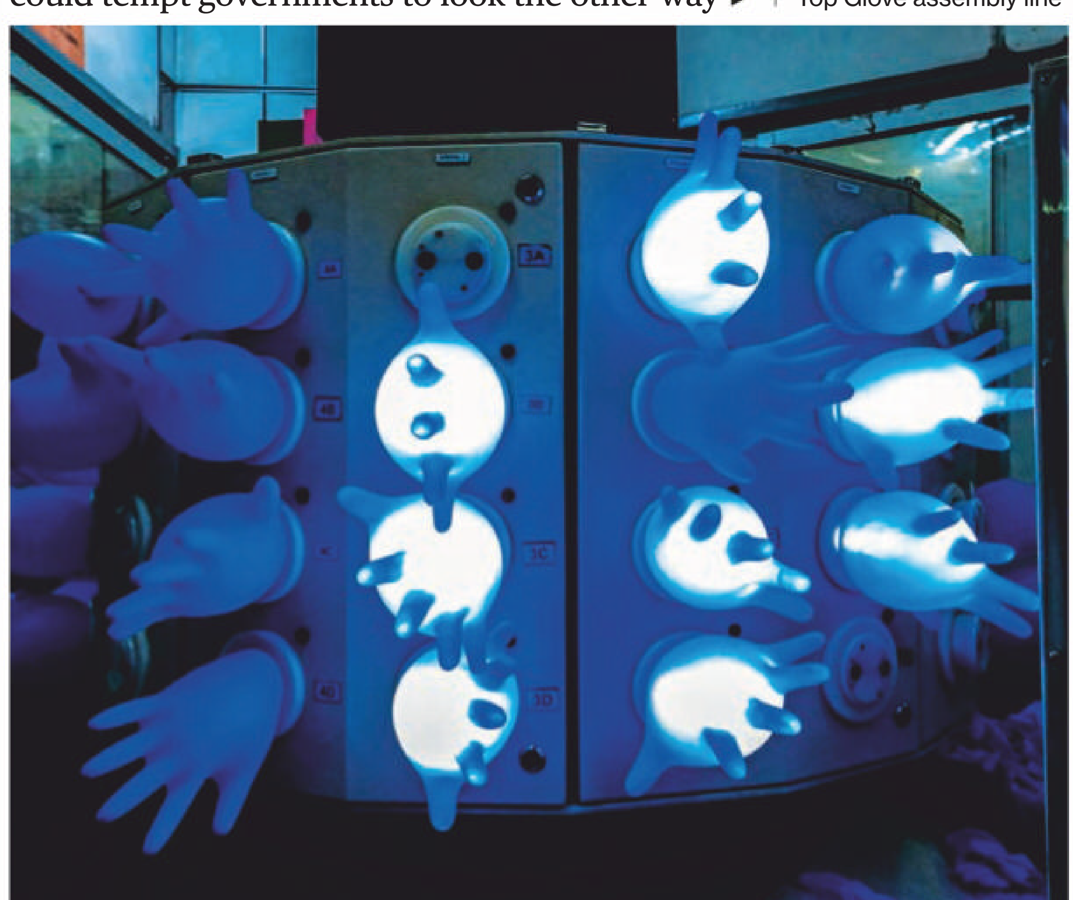
The rise of Malaysian glove making hasn't been without controversy. In 2018, *The Guardian* accused Top Glove and WRP Asia Pacific Sdn. Bhd., another large manufacturer, of mistreating migrant laborers by forcing them to work excessive hours, withholding pay, and confiscating passports. Britain's National Health Service began an investigation of glove suppliers there, while the U.S. Department of Homeland Security blocked the importation of gloves made by WRP. Both companies have denied wrongdoing, and the U.S. lifted its ban on WRP in late March because "the company is no longer producing the rubber gloves under forced labor conditions," U.S. Customs and Border Protection said in a statement.

The resulting scrutiny improved conditions somewhat for workers, who hail largely from Nepal and Bangladesh, "but there are still massive issues," says Andy Hall, a British activist who's studied the industry since 2014. And the urgent need for gloves generated by the coronavirus pandemic, he warns, could tempt governments to look the other way ▶

▼ Domestic natural rubber use in Malaysia by product, Jan. 2020



▼ Rubber gloves on a Top Glove assembly line



GLOVES: SAMSUL SAID/BLOOMBERG. DATA: MALAYSIAN RUBBER BOARD

◀ in response to abuses now and in the future. "We need to ramp up production, but the workers also need to be protected," not least from the risk of contracting the virus themselves, Hall says. "It's not either-or."

Local glove companies are in an all-out race to crank out more product, even as most of Malaysia's economy remains frozen. With more than 5,300 confirmed cases, the country has one of Southeast Asia's more severe outbreaks, and a national lockdown began on March 18. During the first 12 days of those measures, glove factories were able to operate with only 50% of their workers. The industry has since received an exemption, yet many suppliers and logistics partners remain at half strength.

At Top Glove, the crisis is necessitating other compromises. With international travel largely halted, it can't hire new workers overseas and is trying to find local recruits to fill the gap as it boosts production. The company is using almost all its manufacturing capacity, and the lead time required to fill an order has climbed from 30 days to as long as 150. —*Matthew Campbell and Anuradha Raghu*

THE BOTTOM LINE Malaysia makes about two-thirds of the world's disposable gloves. Demand is booming, but travel curbs have cut off the flow of immigrants to man its plants.

Bookstores' Coronavirus Moment

● During the pandemic, independent walk-in shops are embracing delivery and e-commerce

After several days of hunkering down at home in late March, this reporter decided it was time to seek out a few literary diversions to keep the coronavirus blues at bay—some novels for myself, mysteries for my 13-year-old, a nonfiction thriller for a friend's birthday. Learning that Walden Pond Books, my favorite independent bookstore in Oakland, Calif., was closed but still taking orders for pickup, I phoned in my list and rode my bike to the normally laid-back shop. On the door was a very unmellow admonition: a cardboard sign blaring "DO NOT TOUCH DOOR HANDLE!!"

After putting on yellow rubber kitchen gloves, I knocked on the window, then stood several feet back. Soon a lone employee wearing a mask cracked open the door and asked for my name. I whispered it. A few minutes later, he reappeared carrying a brown paper bag and handed over the sanitized goods. Before taking it, I looked furtively around, half expecting to see cops.

"Two-thirds of my staff is laid off right now," says Paul Curatolo, Walden Pond's co-owner and manager, explaining the reason behind the shop's speakeasy-like pickup strategy. "I can't pay them for work I don't have. But for every day that we're closed, we are getting more phone calls."

With much of the nation under strict stay-at-home orders, independent bookstores—which rely largely on foot traffic, browsing, and impulse buying—are struggling like never before. Amazon .com Inc. has long dominated book sales, and many independent shops are Luddite operations that lack robust websites, much less e-commerce operations.

To survive, they've had to get inventive in a hurry. Like Walden Pond, many are taking orders over the phone, then providing curbside pickup similar to the virus-impacted restaurants operating carryout only. Wheatberry Books in Chillicothe, Ohio, has launched a virtual storytime for children. Magic City Books in Tulsa is shipping curated "literary care packages" and announced a series of virtual author events. And scores of others, including Taylor Books in Charleston, W.Va., are turning to fundraisers via GoFundMe to stay afloat.

"Online sales aren't very profitable, though, as the cost to manage them is high and the margin is thin"

While the number of independent shops in the U.S. belonging to the American Booksellers Association is now more than 1,800, up from about 1,400 in 2009, the business is often fragile even in the best of times. Now the trade group warns that the Covid-19 crisis has put some of its members in grave danger, and many have embraced e-commerce in a bid to weather the long shutdowns.

"There's been a drop in overall book sales as most bookstores are closed to the public right now, except for deliveries and curbside pickup, but a significant increase in online sales," says Allison K Hill, chief executive officer of the booksellers' association. "The online sales aren't very profitable, though, as the cost to manage them is high and the margin is thin. Many independent bookstores will be dependent on government relief, fundraising, and support from their communities to survive."

Many independent shops don't have the staff, or the bandwith, to constantly update websites, much less manage the inventory, shipping, and customer-service challenges that an e-commerce expansion brings. That's where Bookshop LLC, which launched in late January, comes in. Independent bookstores can create an online store via Bookshop's platform. Bookshop contracts directly with Ingram Content Group, the largest book wholesaler in the U.S., to ship books directly to consumers. More than 500 stores have signed onto the platform, and independents have already received more than $833,000 from profits on sales on the site since its launch.

"The conventional wisdom is that if you try to beat Amazon, you're doomed," says Andy Hunter, Bookshop's CEO. "But there are consumers who want to support local businesses, and we can compete with Amazon on shipping times and inventory."

The Strand, a fixture of Manhattan's independent book scene, also has tried to maintain connections with its fans by starting a book club on the web—The Stranded—with a focus on novels that people may have at home. The first pick was *Pride and Prejudice* by Jane Austen; about 145 people discussed the book on The Stranded Book Club site on Goodreads, a review and social cataloging website owned by Amazon.

James Odom, the Strand's communication director, says the coronavirus crisis has been the most difficult in the company's 93-year-history. After surviving the Great Depression and Sept. 11, it's had to temporarily lay off almost 200 employees. Just a dozen remain on the payroll, and owner Nancy Bass Wyden isn't taking a salary. "Our focus is figuring out ways to pick up revenue so we can start hiring people back as soon as possible," says Odom. "Right now the only way we can bring in revenue is by customers purchasing gift cards."

While it's uncertain how many independent shops will survive the lockdown, some have already seen strong support from their local communities. Walden Pond exceeded its $100,000 goal via a GoFundMe campaign. But the long-term solution is developing ways to expand independents' reach.

"We have a lot of bookstores in smaller communities that scratch it out month to month and year to year," says Brian Juenemann, executive director of the Pacific Northwest Booksellers Association in Eugene, Ore. "Now everyone is figuring out how to sell books online. If we can put the focus back on supporting local businesses, that will be a silver lining." —*Dana Hull*

THE BOTTOM LINE There are more than 1,800 independent bookstores in the U.S. But since they largely depend on foot traffic, browsing, or impulse purchases, many are hurting during the crisis.

BW Talks | Aaron Levie

The chief executive officer of cloud storage company Box Inc. surveys the world in turmoil from the pandemic and, while concerned about the crisis, sees opportunities for growth in certain sectors. —*Carol Massar and Jason Kelly*

● Box began in 2004 as a college project by Levie, who was at the University of Southern California ● The company now has about 2,000 employees ● Box is used by roughly 100,000 businesses around the world ● Its customers include about 70% of the Fortune 500

What are you learning in the middle of this crisis?

This is certainly one of the most radical shifts in technology and business operations in history. Companies have had to make their business model go digital in a matter of weeks. Whole new businesses will emerge, new types of players able to get customers they previously wouldn't have been able to serve on a global basis.

What's changed with the way companies operate?

You're able to run your company almost completely in the cloud, whether that's on Zoom or Webex or Microsoft Teams or Slack, from a videoconferencing and a chat standpoint. You're able to get access to your data from applications and platforms like Box.

And how has all this affected the way people work in the WFH era?

The days are actually longer. Work is getting done more in off-hours. People are using more technology to be able to do their jobs. We've shifted to more virtual ways of working. And we're seeing an increase in collaboration amongst industries. You're going to see, in a very odd way, because of social distancing, an increase in the level of connection.

Have the dynamics within a company changed? For the better or worse?

There's an improvement—by an order of magnitude—in our ability to have conversations with dozens of people or hundreds of people at a time where anybody has a voice. You get a lot more engagement across the business—as opposed to normal meetings when a few people in the office own the conversation. As soon as companies start to settle into this remote work environment, this is probably going to be the most profound part of the transformation.

● Interviews are edited for clarity and length. Listen to *Bloomberg Businessweek With Carol Massar and Jason Kelly*, weekdays from 2 p.m. to 6 p.m. ET on Bloomberg Radio.

LEVIE: DAVID PAUL MORRIS/BLOOMBERG

PHOTO ILLUSTRATION BY 731; PHOTOS: GETTY IMAGES (10); COURTESY RICHARD WEITZ

Hollywood's Hottest Club Is on Zoom

Talent agent Richard Weitz produces Quarantunes—hangouts for the homebound

Some people—introverts, poets, couples returning from their honeymoon—are good candidates for weathering the lockdown. Richard Weitz wasn't. The Hollywood agent's pre-Covid-19 Instagram posts show him courtside at a Los Angeles Lakers game with Josh Groban, at a party in George Lucas's Chicago apartment, going to the movies with LL Cool J, eating with Lionel Richie at the Polo Lounge in Beverly Hills, posing with Chrissy Teigen in a photo booth, and hanging backstage with Lizzo at her show in Brooklyn, N.Y. For his 50th birthday last year, a fellow agent gifted him a "Richard Weitz 2018-2019 Tour" T-shirt listing the locations of 100 events he'd attended.

Now, like the rest of the country, Weitz is stuck in his house, trying to work with only a laptop, spotty Wi-Fi, and a Zoom account. "When shelter-in-place started, I asked Richard if he was OK," says Candace

Edited by Molly Schuetz

Nelson, founder of Sprinkles Cupcakes and a judge on the shows *Cupcake Wars* and *Sugar Rush*. "Then he started his first Quarantunes. I said, 'Of course. He's bringing the events to him.' He is in his flow right now unlike anyone else I've seen."

On Friday nights and Saturday afternoons, Weitz is throwing the most exclusive party—password required—in Los Angeles. And New York, London, and Sydney. Quarantunes, which can run four hours or more, is a combination of talk show ("Don't go anywhere!" Weitz often implores, as if anyone could) and Hollywood party, the kind that were popular on TV in the 1960s. Weitz, with a scruffy, cropped beard and even scruffier voice, emcees performances by Rick Astley, Weird Al Yankovic, and many more. Attendees flip through 20 pages of screens of other homebound artists, catching a glimpse of actress Tina Fey in her gorgeous library, while her husband makes pizza dough in the background; John Stamos in his den, adorned with a framed, signed photo from his days on *General Hospital*; pop singer Debbie Gibson going for a walk in a stylish hat; and singer/songwriter Taylor Dayne belting it out from her car while driving.

Music producer Clive Davis celebrated his birthday at a Quarantunes. L.A. Mayor Eric Garcetti stopped by to give updates on fighting the virus before being serenaded by Randy Newman with *I Love L.A.* After playing *I Wanna Get Better*, Jack Antonoff said the quarantine made him realize he needs animals in his life; so he talked to songwriter Diane Warren for advice on getting some birds. While Kristen Anderson-Lopez and Robert Lopez sang their songs from *Frozen* with their two daughters around a piano as Josh Gad smiled along, Walt Disney Co. Chairman Bob Iger went into the chatroom to plug *Frozen 2*: "Everyone can find it on Disney+ right now."

One night, Jimmy Fallon couldn't get in because Zoom had reached its 500-person limit. Howard Stern decided not to try. As he said on his radio show, "I don't want to be stopped by the Zoom doorman."

The parties have become a bright spot in what otherwise hasn't been the best year for Weitz, a WME partner who co-heads the talent agency's scripted department. Last April, the Writers Guild of America required its members to give up their agencies amid a fight about television show packaging, decimating his business. "I had no clients. Nothing was going on," he says. "A year later I've made the pivot from representing writers to taking my passion and connecting music artists. I'm talking to everyone I've ever been a fan of, directly. From my kitchen." Weitz's change in fortunes came via his daughter, Demi. He had no idea what to do for her 17th birthday on March 27. In desperation, he got Chicago piano bar singer Dario Giraldo to perform on a Zoom party for her family and friends, forgetting that teenage girls aren't typically denizens of piano bars. "It was not my friends' speed," Demi remembers. "I was like, 'Dad, Dad, can we please make this stop?'"

Weitz wasn't deterred. A few hours later, he set up a second Zoom party, having convinced his friend John Mayer to sing *Happy Birthday*. Soon, Mayer was playing guitar for his onetime crush Gibson while she sang *Only in My Dreams* from her house. This went over much better.

Weitz proposed that he and Demi throw another Zoom party the following week. As Quarantunes took off, though, Demi felt discomfited by all the attention she was getting in the Zoom box in their Beverly Hills kitchen. "I felt a little overly privileged to be doing this with what is going on now," she says. "It wasn't a good feeling."

She suggested they ask for donations, hoping to raise $10,000 for the Saban Community Clinic in L.A. So far, Demi and her dad have raised more than half a million dollars in total for the clinic, the United Way, and Cedars-Sinai Medical Center. Whitney Wolfe Herd, founder and chief executive officer of dating app Bumble, gave $50,000. Yvette Lee Bowser, the creator of the shows *Living Single* and *Half & Half*, made a $100,000 donation to the United Way.

"Even if people are in isolation, they don't want to feel like victims," says Arthur J. Ochoa, senior vice president and chief advancement officer at Cedars-Sinai. "They want to feel like they can do something. And Richard embodies the best of that." Weitz is planning an event to support a New York-based organization, focusing on Broadway singers and pop artists. So far, no one has turned down his offer to perform, and no one has been paid.

Comedian Jeff Ross, whom Weitz yells for between acts to demand a joke (after the fourth hour he told Weitz that he puts the "long" in "sing-along") says Quarantunes has been a highlight of the lockdown. He and his girlfriend have danced in their kitchen to the performances. "No disrespect to the great artists of our time who are doing these great benefits, but they're dreadfully depressing," Ross says. "They're playing sad songs." Quarantunes, he says, "has a party spirit. A hopeful vibe." The events could also provide a glimpse of life after the worst of the pandemic is over. Broadway actress Emmy Raver-Lampman landed two well-paid gigs after covering a Lizzo song. People have gotten back in touch—such as ▶

◀ The Weitzes and friends

"I'm talking to everyone I've ever been a fan of, directly. From my kitchen"

◀ *St. Elmo's Fire* actor Rob Lowe and David Foster and John Parr, the writer and singer of the movie's title song–after not speaking in decades. Actor Henry Winkler keeps coming by because he says it feels "normal," a feeling everyone is longing for. "You're happy to see people you haven't seen in a long time," he says. "Happy to be a part of the community. We could have been in his living room."

Jonnie Davis, president of ABC Studios, says the parties are "the closest you can get" to real-life interactions. "You probably wouldn't get all these people in a real party anyway," he says. "You'd want to go, but your kids have this thing at school. Everybody is sort of here now. It's not like people are going to dinner at Craig's tonight." Weitz is also adjusting to the new normal. As he introduces artists in the virtual greenroom, he asks them to pose on a split screen with him. "I'm still able to get my backstage selfies," he says. —*Joel Stein*

THE BOTTOM LINE Hollywood performers aren't letting the lockdown keep them from performing. Richard Weitz's Zoom parties are as close as you can get to "normal."

Iceland Is a Perfect Lab For Studying Covid-19

● Being an island with a small population gives it advantages in fighting the coronavirus

Iceland is known as the land of fire and ice, but it also turns out to be an intriguing case study during this global pandemic. The island nation has only one point of entry, Keflavik Airport, a small population of about 364,000 people, and a lot less bureaucratic red tape than most countries. And it has Kari Stefansson, a neurologist who founded DeCode Genetics in 1996 to mine the unique genetic data of his fellow countrymen. The company has become a global pioneer in population genetics and its links to disease.

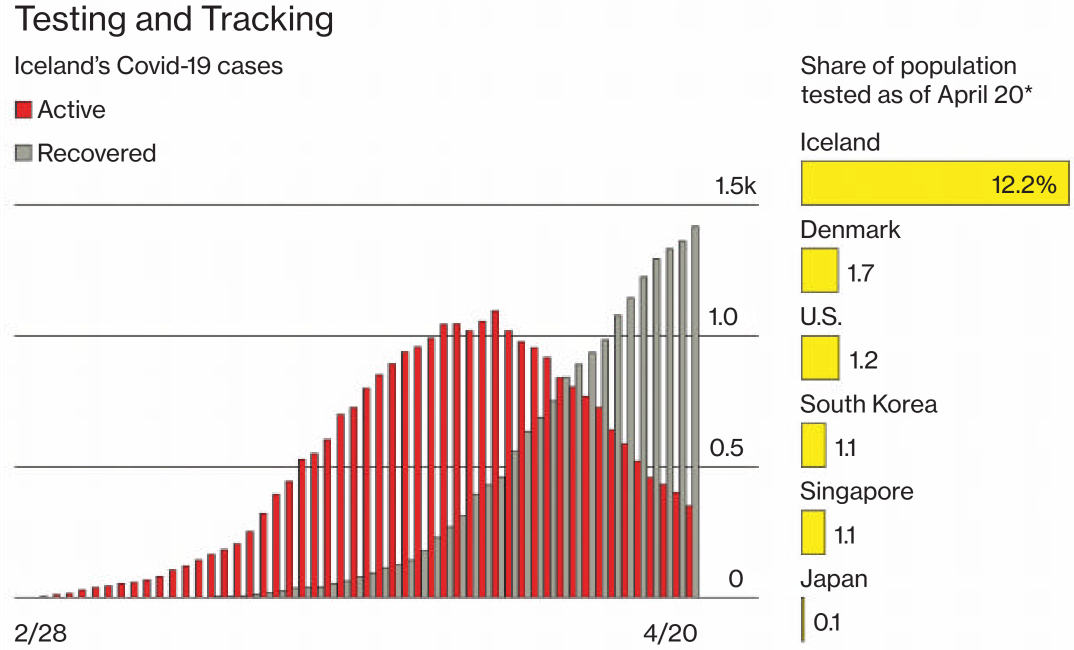
In the fight against the coronavirus, DeCode has rolled out one of the world's most extensive testing and tracking programs, helping contain the spread of Covid-19 at home and providing insights into the disease's evolution and other questions the U.S. and others are trying to answer. "Iceland is the best living lab we have," says John Ioannidis, a Stanford professor of medicine and epidemiology. "They have yielded useful insights and shown that with aggressive testing you have great resolutions."

Stefansson, 71, a fiery figure with a white beard, was driving to work in early March when he heard a statistic on the radio that jolted him to action: In China, the news report said, more than 3% of people were expected to die during the rapidly growing epidemic. "I couldn't understand how we could calculate out the death rate without knowing the spread of the virus in the community," says Stefansson, whose company was acquired by California drugmaker Amgen Inc. in 2012. "What is missing all over the world is enough screening."

He called Iceland's director of health, Alma Moller, and within a few hours persuaded her to allow DeCode to open a massive Covid-19 testing operation in its labs. DeCode then teamed up with the national health authorities and screened people with signs of upper respiratory infection as well as asymptomatic volunteers and randomly sampled people.

Through widespread testing, combined with sequencing hundreds of patients' viral samples and contact tracing, researchers have begun to develop a detailed picture of how the coronavirus entered the country and then spread from one person to another. A study by DeCode geneticists

Testing and Tracking



*TESTS PERFORMED AS A SHARE OF THE POPULATION, EXCEPT IN DENMARK AND SINGAPORE, WHERE THE FIGURE IS INDIVIDUALS TESTED AS A SHARE OF THE POPULATION. DATA: ICELAND'S DIRECTORATE OF HEALTH, GOVERNMENT HEALTH MINISTRIES, COVID TRACKING PROJECT, WORLD BANK

PHOTOS: COURTESY DECODE GENETICS

and Iceland's Directorate of Health and National University Hospital, published on April 14 in the *New England Journal of Medicine*, provides some early insights into what the nation might find.

The Icelandic people's genomes are perhaps better studied than those of citizens of any other nation. More than two-thirds of the population has participated in some of DeCode's genetic research in some way over the years. When Stefansson pitched his screening plan, the country had diagnosed only three cases of the disease. At that point, the Covid-19 death toll in the U.S. had just entered double digits; President Trump wouldn't declare a state of emergency for another week. By April 21, Iceland had tested more than 43,000 residents, over 12% of its population. In contrast, New York, which has tested more aggressively than any other state, had tested in excess of 640,000, or just over 3% of its population.

Iceland found that while early cases were primarily people returning from ski holidays in Austria and Italy, later samples showed strains of the virus coming from many countries, including places such as the U.K., at the time considered low-risk. Researchers identified more than 291 mutations that haven't been spotted anywhere else, illustrating how often the virus changes as it spreads. Iceland has also shown that the number of people who carry the virus but exhibit no symptoms may be high: About 0.8% of those who volunteered tested positive, as did 0.6% of people randomly selected to participate in the study. About half of those who have Covid-19 might be asymptomatic at any given time, Stefansson says, though many of those people may later develop symptoms.

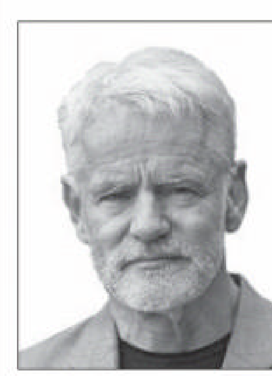
DeCode plans to search the DNA of viral hosts—patients who were previously infected with Covid-19—for clues as to why some people show no symptoms at all while others become gravely ill. The nation's studies have already added to the picture of who is most affected by infection, noting that children and women are less vulnerable. Collaborating with the government and other businesses, the company has built an app that can help trace contacts of those who've tested positive, a step that's considered one of the keys to helping get a locked-down economy back up and running. So far, Iceland hasn't instituted a widespread shelter-at-home order, as the U.S. and other countries have. While authorities have imposed social-distancing measures and banned large gatherings, primary schools remain open, as do some stores and restaurants.

"We knew the things that work, and we were fortunate enough to catch these early cases," says Kjartan Hreinn Njalsson, the assistant to Iceland's director of health. "Our great fortune in all of this is that we are a small country. It's easy to mobilize the people who need to be mobilized."

The combination of early, widespread testing and contact tracing has meant that "we have the epidemic under control," Stefansson says. The number of active infections in Iceland appears to have peaked. As of April 21, the country had 1,778 confirmed infections and ten deaths. About 1,026 people were in self-quarantine.

Iceland's aggressive efforts haven't been spared some of the same problems facing other nations, including a shortage of testing materials. But Stefansson says when they ran out of swabs to perform tests, several companies immediately called offering alternatives. When respirators began to run short, more than a dozen businesses pitched in to source more. "We are an unruly nation of scandalists who cannot find ease when things are going well," he says. "But when there is a crisis, we are better than any other nation in the world." —*Kristen V. Brown*

▲ Testing the general public at DeCode's service center, a few miles outside Reykjavik; the company's headquarters in the city



● Stefansson

THE BOTTOM LINE Fast action by a leading genetic researcher helped Iceland get out ahead of Covid-19. The country's success is providing insights other nations can use.

3

OIL

FINANCE

20

Oil's Epic Plunge

Crude prices dipped into negative territory, and the world is still awash in more oil than it can use

Edited by
Pat Regnier and
Lynn Thomasson

When oil prices crashed to below zero for the first time on April 20, the immediate financial impact was limited. The number of futures contracts priced at less than zero was just half a percent of all oil traded on Nymex, formerly the New York Mercantile Exchange. The only delivery month that went negative was May, a contract that was on the verge of expiring anyway. Investors were still pouring real money into exchange-traded funds that benefit from rising oil prices.

Still, the striking fact that some unlucky people had to pay to get rid of crude oil in the world's most liquid market raised fears that there was more trouble to come. "Today was a devastating day for the global oil industry," said Doug King, a hedge fund investor who co-founded the Merchant Commodity Fund. Daniel Yergin, a Pulitzer Prize-winning oil historian and vice chairman of research and information company IHS Markit Ltd., said, "The May crude oil contract is going out not with a whimper, but a primal scream."

The Covid-19 pandemic has killed demand for oil far faster than the world's oil producers have been able to rein in production. Storage is ordinarily the buffer that stabilizes the oil market. But the overproduction has gone on for so long that there's almost no place left to store crude. "It's kind of desperation time," says energy economist Philip Verleger of PKVerleger LLC.

On April 21, the day after the May contract for West Texas Intermediate crude oil made history by settling at negative $37.63 a barrel, the contract climbed out of the twilight zone and settled at $10.01 on its expiration day. But pricing pressure quickly shifted to the June contract, which settled on April 22 at $13.78. In spot trading tracked by Bloomberg, crude from Alaska's North Slope traded for $2.31 a barrel. The June contract for Brent crude, Europe's benchmark oil, settled just over $20. Crude started the year above $60.

The underlying problem with the oil market is inelasticity—that is, in the short term, supply doesn't fall much and demand doesn't rise much in response to a price decline. On the supply side, it's expensive to close down an oil well, and producers are reluctant to curtail production and surrender market share to rivals. On the demand side, as long as much of the world is paralyzed by Covid-19, no one is going to drive more or take more flights regardless of how cheap gasoline or jet fuel gets. "We're living out the worst possible nightmare" for oil producers, says Steven Schorck, principal of the Schorck Group, an energy market analysis company based in Villanova, Pa.

Negative prices in inelastic markets aren't unprecedented. The natural gas that's a byproduct of oil production sometimes costs less than zero because it's viewed as waste. Power generators sometimes pay customers to use electricity because it's cheaper than shutting down power plants and having to restart them later. Dairy farmers haven't reached the point of paying people to buy their milk, but they're dumping what they have because the cows are producing more than the market will bear.

In the case of Nymex oil, speculators were desperate to get out of their contracts before the April 21 expiration, because if they still owned the contracts when trading stopped they would be required to either take delivery or reach an expensive agreement with the seller to call things off. But storage space at the contract-specified delivery point—a complex of tanks and pipelines in Cushing, Okla.—is rapidly running out. People won't buy oil they can't use immediately if they have no place to store it, no matter how low the price.

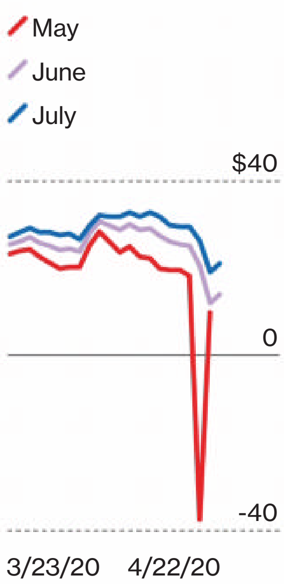
Ordinary investors bet on oil via ETFs, which buy futures contracts, but it's not clear that the average punter grasps how they work. Each month the ETF's holdings have to be switched from expiring futures contracts into later-dated ones. Lately, that's meant selling cheap contracts and buying expensive ones—what traders call "negative carry." It's a quick way to lose a lot of money. "All the doctors and dentists who have been speculating on oil to go up are getting killed," says Schorck.

The United States Oil Fund, an ETF that's fallen almost 80% this year, owned about a quarter of the May contracts. The fund bought them on behalf of investors speculating on a rebound in the price of oil. It sold May contracts well ahead of Tuesday's expiration and replaced them with June and July contracts. That removed a key price support.

Caveat emptor. John Love, chief executive officer of United States Commodity Funds LLC, which manages the United States Oil Fund, wrote a piece for the company's website on Sept. 23 warning investors to be prepared for the days when prices go kerflooey—even though they happen rarely. "Some might consider an event that happens 0.25% of the time to be too improbable to worry about," he wrote. "However, ask yourself this: How well will you sleep tonight if you know that once every year or two someone is going to wake you up by dropping a tarantula on your face?" *—Peter Coy, Javier Blas, and Will Kennedy*

THE BOTTOM LINE The oil price crash can be summed up in one word: inelasticity. Low prices aren't making people want to use more oil, while producers are reluctant to scale back.

▼ WTI crude oil futures, by contract



DATA: COMPILED BY BLOOMBERG

The Big Shale Shorts

● A handful of small funds made millions of dollars wagering on oil producers' decline

When Billy Bailey first pitched betting against shale stocks to oil tycoon T. Boone Pickens, crude prices were above $70 a barrel, and the fracking boom was in the first few years of its life. Bailey was sitting in a booth across from Pickens at R+D Kitchen in Dallas, asking his boss if he, at 28, could become sole manager of a "long-short" portfolio within Pickens's now-shuttered hedge fund, BP Capital. Long-short portfolios mix conventional investments in equities with short positions—contracts that make money when a stock falls in value.

It was November 2014, a week before OPEC would surprise the market by failing to reach a deal to curb supply, exacerbating a downturn in oil prices that would last the next two years. Bailey got the job and tilted the portfolio more toward shorting shale producers.

He went on to start his own hedge fund, Saltstone Capital, a small shop in Dallas that manages less than $10 million. His years of skepticism are starting to pay off in a big way: Saltstone was up 36% in the first quarter of the year, according to an investor letter seen by Bloomberg. A handful of other funds have done even better. Kalkriese Capital Partners, which manages $21 million from Dallas, gained 300%. Tulsa-based Exo Trading, with $5.7 million under management by the end of the quarter, was up nearly 500%. The SPDR S&P Oil and Gas Exploration and Production exchange-traded fund, meanwhile, fell 65% for the same period.

Their approaches differed, but all three investors have one thing in common: Even as shale stocks lagged the broader market for the better part of the last five years, they saw a greater reckoning coming. That reckoning may be here. Shale producers sprouted up around the U.S. when debt was cheap and oil prices were high enough to justify the relatively expensive process of extracting oil from rock. Now oil prices are crashing as demand withers throughout the global economy. Many highly leveraged companies are on the brink of bankruptcy.

"This is just ripping the Band-Aid off," says Exo Trading's Chris Bird, who also serves as president of Exponent Energy, a company that buys oil and gas assets. "It's just getting the industry back to where it should be, which is actually finding a way for their projects to make money."

Unlike Bailey, who went straight into finance after college, Bird got his start in the field as an engineer. "That's where my total disdain for the business came," he says. "The information arbitrage is huge in oil and gas, and for the last 10 years people have used that to enrich themselves at the expense of investors." Generalist investors often didn't understand the complex terminology of the oil and gas industry—and the new world of shale in particular. "It became something that was sellable," says Bird, even if many of the wells didn't make economic sense when oil got cheap.

As anyone who's ever bet on the market

knows, hindsight is 20/20. Before the coronavirus pandemic, the world economy was booming, and this year was looking to some investors like a chance for independent oil and gas producers to prove themselves. A handful hiked dividends in the first few months of the year. Others predicted they would generate free cash flow for the first time. Bailey, Bird, and David Mooney, who runs Kalkriese, weren't convinced. "The market still does not comprehend the depth of decline in the sector's financial position," Kalkriese said of oil and gas pipeline companies in a February letter to investors.

Succeeding at a time when the rest of the world feels as if it's ending can be tricky. All three firms are headquartered in cities with deep ties to the industry. Bailey counts some executives in the sector he bets against as friends. Bird keeps in touch with engineering classmates who still work in oil and gas. "Even though it's going in our way, it doesn't necessarily mean it's easy, because these are a lot of our good friends who are being affected," Bailey says.

Layoffs and furloughs at oil companies have already been announced, and more seem certain. Veterans say the industry will reemerge a better version of itself. Skeptics say there's far more pain to be felt. Even though share prices are down, Bird says it's almost impossible to find an independent shale driller that looks like a value when oil is below $15 a barrel. "Shale works at a certain price," he says. "For the most part, historically, that price was probably $75 a barrel." —*Rachel Adams-Heard*

THE BOTTOM LINE Before the pandemic, there were reasons to be skeptical of oil and gas producers' finances. But some investors' bets have paid off in a big way that would've been hard to predict.

◀ An oil well in Midland, Texas

PHOTO: BENJAMIN LOWY/GETTY IMAGES

No Room in the Tank

● Oil at negative $100 a barrel isn't a crazy idea anymore

Orbiting hundreds of miles above the Earth, the Sentinel-1 satellites are the eyes in the sky that show why U.S. oil prices dropped below zero and why prices in much of the world are likely to follow. Each satellite bounces radar signals off the massive metal tanks that store oil, and that data is used to calculate how much crude is inside. What's coming back is an alarming message: Oil storage is running out.

◀ Oil storage tanks in California

It's something that's never happened before, and the market is only beginning to guess at what it will mean. Experts say it could be a matter of weeks before there's no more room to store crude, an event in industry parlance called the "tank tops." The result would be oil prices near zero in many parts of the world, and in some cases they could go negative. "We are on a path to global tank tops in late May or early June," says Florian Thaler, chief executive officer of Oilx Ltd., a research firm that uses the satellite data.

Oil refiners aren't buying crude because there's no demand for gasoline. Some producers are cutting output, but others have kept on pumping. Even a few dollars is better than none for indebted companies. The oil has nowhere to go but into storage.

The chaos in the U.S. oil market could foreshadow what happens globally if other tanks start to fill up. It also shows the market will likely anticipate peak storage rather than wait to plunge when the limit is breached. Some oil producers have now redrafted their contracts to stop their prices from going negative. "We have clearly gone to a full-scale, day-to-day market management crisis," says Paul Sankey, a veteran oil analyst at Mizuho Bank Ltd. who correctly warned of negative crude prices in March. He went a step further, saying: "Will we hit negative $100 a barrel next month? Quite possibly."

The world of negative prices doesn't have a floor, and after the dramatic initial plunge to negative, anything is possible. One certainty is that the latest satellite data shows a massive glut. There are 50 million barrels of crude going into storage every week, equal to the combined weekly consumption of Germany, France, Italy, Spain, and the U.K.

In India, refiners have filled 95% of fuel storage capacity, according to officials at three state-owned processors. Nigeria will cut production because it has no place to keep crude, Mele Kyari, the chief of state oil company Nigerian National Petroleum Corp., told a local newspaper.

The satellite data might even be overestimating how much room is actually available. A lot of empty space has already been rented out by traders. "We can have negative prices, and very negative prices," says Pierre Andurand, founder of hedge fund Andurand Capital Management, adding that oil is a "dangerous market to trade in right now."

From hundreds of miles above, the oil market looks like a global, highly interconnected system. But the reality is that it's a collection of small and big islands, all connected via thin links. What matters isn't when the world's total storage is full but when each of those islands, or regional hubs, reaches capacity—or threatens to.

For the American market, it all comes down to Cushing, Okla., the delivery point of the West Texas Intermediate oil futures contract. The town, which calls itself the "pipeline crossroads of the world," hosts a dozen tank farms, big enough to hold almost 80 million barrels. Each month, when WTI futures expire, traders owning the contract receive barrels in Cushing and have to find storage or ship them out. Being short the contract means you have to deliver the oil. When oil prices crashed on April 20, traders who owned the May WTI contract rushed to get out before expiration because they didn't have tanks to store the oil. At the worst moment, someone paid $40.32 a barrel to avoid taking delivery of oil.

Locations that could soon fill up include those in Rotterdam, a refining hub for Western Europe; in several islands in the Caribbean; and in Singapore. In the world of storage, Rotterdam-based Royal Vopak NV is the biggest. Its executives say there's a global hunt already under way to secure more tanks. According to Chief Financial Officer Gerard Paulides, "The available capacity on the oil side is almost completely sold out." *—Javier Blas*

THE BOTTOM LINE With cities on lockdown, a lot of oil is going into storage. Space is starting to run out, which could mean prices turn negative in many parts of the world.

When ETFs Go Wild

● Turmoil in oil and bond markets puts the popular funds in the spotlight

Exchange-traded funds have been taking a bigger role in financial markets in the past decade. So it should come as no surprise that they've also been featured players in the rolling market dramas that have accompanied the coronavirus crisis.

ETFs are funds that trade throughout the day like stocks. When an ETF owns widely held, heavily traded securities such as the stocks in the S&P 500 index, it runs almost seamlessly. Things can get trickier when an ETF holds more complicated assets or markets get stressed.

Consider oil ETFs such as United States Oil Fund, ticker USO, that invest in oil futures contracts. They made it simple for ordinary investors to bet on changes in oil prices and became so popular they're a major factor in the futures market. USO recently held about a quarter of a key U.S. futures contract on the Nymex exchange.

As the oil market collapsed, USO's price has fallen almost 80% so far this year. But USO has also become increasingly untethered from the prices it's designed to track. The chance to buy oil at ultralow prices drew so many investors looking for a rebound—and likely some short sellers, too—that USO reached the limit of shares it was authorized to issue. With so much demand, its shares began to trade for more than the value of its portfolio. In a move to reduce its risk, the fund also rejiggered its strategy, shifting more money into contracts expiring in later months. This underscored that the fund isn't a simple bet on headline oil prices but an investment in a complex futures market. "The majority of retail investors in this product probably had no idea what these nuances are," Ben Johnson, Morningstar Inc.'s co-head of passive strategy research, told Bloomberg News.

● Decline in the price of United States Oil Fund so far this year

78%

Before the oil crash came the liquidity crunch in bonds in mid-March. Trading in many debt securities essentially froze up as markets first reacted to worsening news about the pandemic. But investors continued to buy and sell ETFs that invest in bonds. Normally, ETF share prices very nearly match the value of the securities in their portfolios. Specialized traders earn a profit for keeping things in sync. When fund prices fall, they'll buy some up and redeem them with the issuer in exchange for a matching set of bonds, which they can then sell.

In March those traders became afraid of getting stuck holding hard-to-trade bonds. "They required a bigger and bigger discount before they would jump in to redeem shares," says Dave Perlman, an ETF strategist at UBS Global Wealth Management. The $51 billion Vanguard Total Bond Market ETF closed a record 6.2% below its net-asset value on March 12, while BlackRock Inc.'s $70 billion iShares Core U.S. Aggregate Bond ETF closed at a 4.4% discount. The situation didn't last long. The Federal Reserve surprised markets on March 23 with a decree that it would buy corporate bonds and even some ETFs to pump liquidity into the system. As bonds traded more easily, the discounts disappeared.

Critics have warned of a possible "illiquidity doom loop," as investors in falling funds run for the exits and exacerbate a sell-off. But others argue the bond episode proved the funds' usefulness. When markets were gummed up, they say, ETFs became a tool of price discovery—that is, they may have better reflected demand than the prices of thinly traded bonds did. And the ETFs gave investors who really wanted to sell a way to do so. "It was not an exit route that didn't have a lot of big potholes in it," says Ed Keon, chief investment strategist at Quantitative Management Associates. "But at least you could get out." *—Katherine Greifeld and Catherine Ngai*

THE BOTTOM LINE ETFs are easy to trade by anyone with a brokerage account. But they're more complicated behind the scenes, which can become apparent in a crisis.

PHOTO: BING GUAN/BLOOMBERG

The Data Is Failing Us

Policymakers need real-time numbers to help guide the economic rescue effort

Checking the latest Covid-19 numbers has become a daily ritual in many American households. There's both solace and alarm to be had from the numbers—one person's comforting plateau in infection rates is another's alarm at the lack of testing. Still, there's agreement that no dataset matters more right now. It guides life-and-death policy decisions, from where to allocate protective equipment and ventilators to when it might be safe to get back to business.

In that context, the traditional indicators by which the health of our economy is gauged seem suddenly inadequate. From the Federal Reserve to Wall Street, there's a scramble to find new high-frequency data to map the destruction in real time and help guide the salvage effort. Which means one lesson of this crisis ought to be that it's not just pandemics you need to prepare better for, it's the rapid recessions that come with them.

When the world's leading central bankers dialed in to a conference call in early March for the regular bimonthly meeting of the Bank for International Settlements, some of them were already complaining that they were flying blind because of the inevitable lag in economic data.

Consider, for instance, the Bureau of Labor Statistics' monthly employment report—a highly scrutinized release that often moves markets. The March edition pegged job losses at 710,000, because it sampled data that went only through mid-month, before several U.S. cities and states began mandating shutdowns. A different set of numbers, the weekly unemployment insurance claims, showed more than 17 million people filed to collect benefits from the beginning of March to April 4.

Those numbers are also problematic. From around the country, there have been reports of websites crashing and hotlines ringing busy, as state agencies struggled to cope with the historic deluge of people filing for unemployment benefits. Also, in states including Massachusetts and Oregon, whole segments of the labor force—the self-employed and gig workers—have been told not to file their claims for the time being.

Concerns over the quality of jobs statistics prompted a group of Federal Reserve Board economists to construct their own employment index using data from payroll services provider ADP LLC, which can churn out daily stats covering 20% of U.S. companies. By these economists' calculations, the U.S. lost a net 13 million jobs in the final two weeks of March alone. Yet they also admitted that if a different methodology were used, job losses would have been as high as 23 million.

Number crunchers at the International Monetary Fund are also having to get creative in how they go about forecasting the contraction in economic output that official statistics will eventually reveal. Their latest projections have the global economy

ILLUSTRATION BY CÉSAR PELIZER. DATA: DEPARTMENT OF LABOR, MORTGAGE BANKERS ASSOCIATION, MOOVIT, OPENTABLE, BLOOMBERG, BAKER HUGHES, IRON AND STEEL INSTITUTE

Edited by Cristina Lindblad

shrinking 3% this year. To arrive at that figure, they assumed that countries suffering severe outbreaks will lose roughly 8% of working days to stay-at-home orders and other efforts to contain the virus.

For the U.S., that means the economy would be operating on the equivalent of 230 working days rather than the standard 250 or so. Those 20 lost days are deliberately fewer than the days in which containment measures are expected to be in place, as some businesses have found ways to keep operating while shutdown orders are in effect. (According to the BLS, roughly one-third of Americans can work from home.) But who's to say it couldn't be 30 days? Or more?

The unprecedented speed and scale of this recession makes it almost impossible for forecasters to tell us how bad it's going to get. Some have given up. The Federal Reserve Bank of Philadelphia recently suspended publication of its state-level leading economic indexes indefinitely because the "extreme impact" of the Covid-19-related job losses had made the exercises unreliable for predicting the next six months, which is what they're designed to do.

Other forecasters are relying heavily on documented historical experience to predict the impact of a freak event. No surprise then that the latest projections by analysts at banks and credit-rating companies span an eye-popping range. Some two dozen estimates for second-quarter annualized gross domestic product growth collected by Bloomberg since April 10 range from −65% to 0.4%.

Peering into our future might be easier if we knew with certainty what happened in our immediate past. Measuring the GDP of the U.S. is a giant forensic exercise, and in a normal year we'd be resigned that the staff at the Bureau of Economic Analysis wasn't going to rush it. Having to wait till April 29 to get preliminary estimates for the first three months of 2020 feels especially pointless in a year in which time is no longer measured in quarters but as B.C. and A.C., Before Corona and After Corona. And early figures for the three-month period everyone really cares about—the one we are in now—won't come until the end of July, perhaps too late to help policymaking.

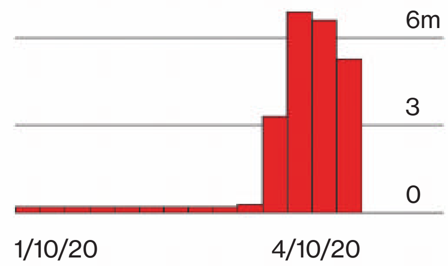
Our appetite for more data that's timely is feeding a fascination with high-frequency measures and what are normally considered alternative indicators. Economists and investors are scrutinizing everything from restaurant, hotel, and airline reservations (all down) to metrics of electricity usage (also down) and credit card spending (yup, down).

Or, put another way, it's why we all have a little Li Keqiang in us these days. One of the tidbits we learned from the 2010 WikiLeaks dump of ▶

Taking the Pulse of the U.S. Economy

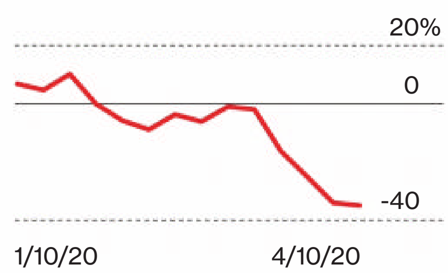
Traditional indicators are no match for this fast-paced, virus-induced recession, which is why Eliza Winger and Tom Orlik of Bloomberg Economics have assembled an alternative set of high-frequency metrics.

❶ Initial jobless claims



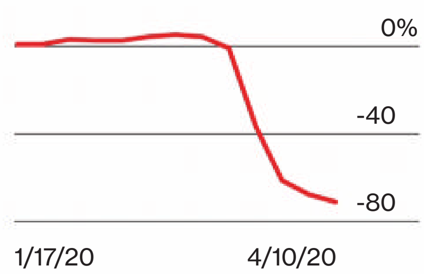
Since mid-March, the Labor Dept. says, 22 million displaced workers have filed for unemployment benefits, at a pace averaging 5.5 million per week.

❷ Mortgage applications, change from the average of the first two weeks in January



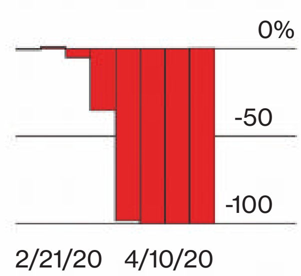
The more than 40 percentage-point drop in the Mortgage Bankers Association's Purchase Applications index signals that housing won't be spared in this recession.

❸ Public transportation usage, change in the average of Chicago, Los Angeles, and the New York area since the week prior to Jan. 15



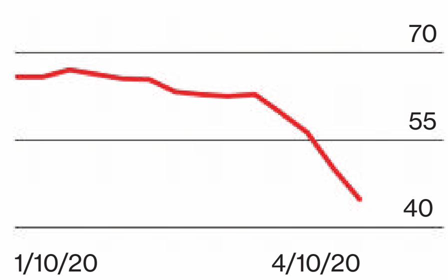
Data from the Moovit Public Transit Index show ridership in the three largest U.S. cities down substantially from the level before the virus outbreak.

❹ Restaurant bookings, year-over-year change



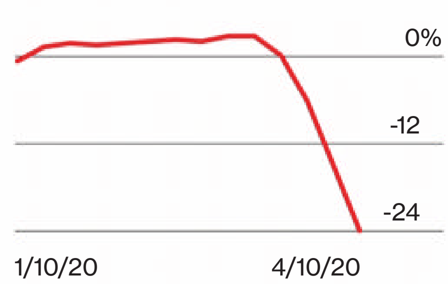
The lockdowns are having a devastating impact on the restaurant industry, as shown in data from the OpenTable restaurant booking app.

❺ Bloomberg Consumer Comfort Index



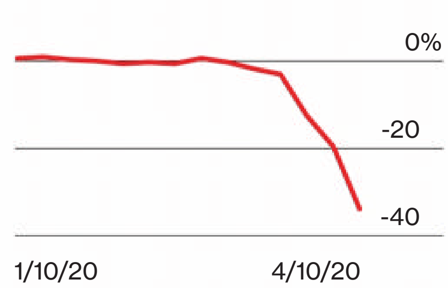
The index, which is based on Americans' views on economic conditions, tumbled to 45 in the latest reading, indicating a sharp decline in sentiment.

❻ Number of active oil rigs, change from the average of the first two weeks in January



The oil rig count has dropped more than 24% since the beginning of January as prices for crude cratered.

❼ Steel production, change from the average of the first two weeks in January



Output of raw steel has plunged 34% since the beginning of January, weighed down by idled plants and slumping demand.

◀ U.S. diplomatic cables was that Li, China's current premier, doesn't trust the country's economic data. Or at least didn't in March 2007 when, as a provincial leader and rising star in the Chinese Communist Party, he told a visiting U.S. ambassador that China's GDP figures were "man-made," hinting that cadres in the provinces were fudging their numbers to impress their bosses in Beijing.

Li confided that he developed his own gauge based on data he regarded as more reliable, including electricity usage, rail cargo volumes, and bank loans. "All other figures, especially GDP statistics, are 'for reference only,' he said smiling," the ambassador, Clark Randt, reported in his cable. The disclosure led to a rush by news organizations and data providers such as Bloomberg and the *Economist* to create their own versions of the Li Keqiang Index. Now prodded by the pandemic, many organizations, Bloomberg included, are attempting to do the same for the U.S.

It merits saying that alternative data—any data—should always be treated carefully. It can guide bad policy. During the Vietnam War the obsession of Defense Secretary Robert McNamara and other senior U.S. officials with keeping a daily "body count" of the number of enemies killed was widely blamed for Washington's conviction that the U.S. was winning a bloody war it was in fact losing.

One problem then was that American officers on the ground were inflating the numbers they were reporting up the chain of command. But there was also a blind faith in the data. What's now known as the McNamara Fallacy is best described as that fugue state that occurs when decision-makers with their eyes trained on quantitative metrics end up missing the bigger picture.

U.S. policymakers are already giving alternative metrics more weight than they used to. As a giant wave of layoffs began sweeping the country in March, one senior White House official revealed privately that the administration's conception of the extent of the damage changed following a briefing with credit card companies, which have a real-time window into consumer spending.

Since 2014, the Federal Reserve of Atlanta has been publishing a *GDPNow* index that's updated constantly with new economic data releases, from consumer spending to corporate inventories. But it's described by its creators only as a "running estimate." It now comes with a user warning that the measure "does not anticipate the impact of Covid-19 on forthcoming economic reports." It also hasn't always been used judiciously. White House economic adviser Larry Kudlow was citing its benign readings into early March as a sign of what he was then forecasting would be a limited impact on the U.S. economy.

The Federal Reserve Bank of New York produces its own *Weekly Economic Index* built on metrics such as retail sales, unemployment claims, a daily consumer sentiment gauge, steel production, and electricity usage. It too, however, comes with a health warning. Alternative data amount only to "an informative signal of the state of the economy," its makers caution, and the index itself is only "a parsimonious summary of that signal."

What we are now going through, though, has demonstrated our need for something less parsimonious. A push into live, or near-live, short-term data—that's able to track everything, from consumption to the realities of global trade and supply chains, and that's more reliable and useful in a crisis—should be a priority for governments around the world. Or we'll once again be flying blind the next time an economic disaster strikes. —*Shawn Donnan*

THE BOTTOM LINE The speed and scale of the current recession has exposed the inadequacy of widely scrutinized economic indicators, setting off a scramble for real-time data.

The Pain of U.S. Layoffs Travels South

● Central American nations that rely on remittances are seeing steep drops in inflows

It was mid-March and New York City was going into lockdown, shuttering businesses and schools. Gleiry Fernández, who left her native Guatemala two years ago to find work in the largest city in the U.S., was starting to worry.

Then the phone store where she worked as a customer service representative closed and laid her off. A few days later, she fell ill. A test confirmed she had the novel coronavirus. Sick and unsure when she would be able to work again, she cut back the

MOISES CASTILLO/AP PHOTO. DATA: WORLD BANK biweekly money transfers she's been sending to her mother and son in Guatemala.

"My mother counted on that money, and now I'm not able to support her," says Fernández, who has fully recovered. "It's frustrating. You have goals, and you want to save as much as you can, because with the immigration situation you never know when they are going to say 'bye-bye,' and then you're left with nothing." In an April 22 tweet, President Trump said he would be signing an executive order suspending immigration into the U.S.

Fernández, 44, is one of almost 2 million Guatemalans living and working in the U.S., most of whom send money home, contributing to a steady rise in remittances in recent years. Transfers climbed to a record $10.5 billion last year, according to Guatemala's central bank, equal to roughly 13% of the nation's gross domestic product.

Remittance flows to low- and middle-income countries rose to an all-time high of $529 billion in 2018, according to figures compiled by the World Bank, and were on track last year to become the largest source of external financing for these nations, exceeding foreign direct investment and international development assistance. Now the transfers are under threat as restrictions to contain the Covid-19 pandemic push the world economy into its worst recession since the Great Depression. In a worst-case scenario, Citibank sees remittance flows plunging as much as $100 billion this year.

Low wages, poverty, and gang violence have forced millions of Central Americans to migrate to the U.S. The money they send back home helps shore up fragile economies. Now that bulwark is eroding. Remittances sent to Guatemala fell 9.7% in March, according to data compiled by Bloomberg, the biggest monthly drop in inflows to the country since 2010, as migrants such as Fernández join the rapidly expanding ranks of the unemployed. In El Salvador, remittances, which account for roughly 21% of GDP, dropped 10.7% last month.

Nathalie Marshik, emerging market analyst for Stifel Financial Corp., says remittances to Central America are likely to fall much more than 10% this year, surpassing the declines seen during the 2008 financial crisis. Remittances "boost household consumption, hence local economic growth," Marshik wrote in an April 3 note to clients. "This will be all the more painful as the usual economic valve of immigration will not be available." The squeeze won't be felt just at the household level: A reduced influx of greenbacks could lead to depreciations of local currencies such as Guatemala's quetzal, according to Fitch Ratings.

▲ Villagers in Guatemala's highlands depend increasingly on food aid from the government as remittances drop

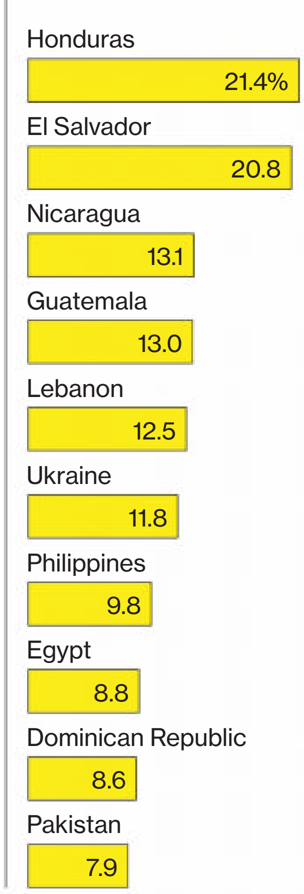
Juan, a 22-year-old undocumented Guatemalan living in New York City, lost his job as a janitor in March and has since stopped sending the usual $500 a month to his family in the Guatemalan highlands. Most of that, he says, went to paying the coyote who smuggled him into the U.S. a year ago. He hasn't been able to speak with his mom because neither of them has the money to add minutes to her prepaid mobile phone line. "Things are bad here," says Juan, who lives with his brother-in-law in a small apartment. "We owe rent, we owe the phone, we still have debts. We don't know what we are going to do."

The International Monetary Fund has approved $389 million in emergency financing for El Salvador and $143 million for Honduras to support government efforts at fighting the virus and blunting the economic pain. The fund's most recent set of economic forecasts see the economies of Central America shrinking a cumulative 3% this year.

A group of migrants has submitted a legislative proposal to the Guatemalan congress for a program that would provide low-interest loans of as much as $500 per month to those who have seen remittance flows slow or stop. One of the drafters is Guillermo Castillo, 43, who was forced to halt transfers of as much as $800 a month to his father and girlfriend in Guatemala after he was laid off from his job at a Victoria's Secret warehouse in Ohio last month. "We are facing big challenges that require comprehensive solutions for Guatemalan migrants," Castillo says. "For my father, the money helped him take care of my mom. I don't know how or when I will work again, but what I do know is that life won't be the same as before." —*Michael McDonald*

THE BOTTOM LINE Money transfers from Central Americans working abroad, many of them in the U.S., are expected to drop 10% or more this year, buffeting the region's fragile economies.

▼ Remittances as a percentage of GDP in selected nations, 2019 estimate



A Blow to Det

● After putting bankruptcy and fiscal oversight behind it, the city faces another crisis

The late Coleman Young, who was Detroit mayor from 1974 to 1994, said that when the nation gets a cold, Detroit gets pneumonia. That's sadly held true during the coronavirus pandemic: The city had recorded 7,904 cases of Covid-19 and 716 deaths from the disease as of April 21, making it a national hot spot and putting Wayne County, Mich., among the U.S. counties with the most deaths from the virus so far.

A majority-black city of 670,000, Detroit is bracing for a recession as stay-at-home orders decimate businesses and the virus overwhelms medical and social resources. Casinos, which generate 17% of municipal revenue, are shuttered indefinitely. A quarter of all Michigan residents are already out of work. "While we have a health crisis, we have the biggest budget crisis this city has seen in seven years, and we have to solve it at the same time," Mayor Mike Duggan said at an April 14 briefing.

The pandemic is a major financial test for cities across America. In a recent survey conducted by the National League of Cities, more than 2,100 municipalities of all sizes said they were expecting budget shortfalls. But Detroit is in an unusually

Edited by
Amanda Kolson Hurley

PHOTOGRAPHS BY ALI LAPETINA FOR BLOOMBERG BUSINESSWEEK (4)

roit's Revival

◀ The high-rise Greektown Casino is closed indefinitely

▼ Old Redford, a neighborhood in northwest Detroit

precarious position. The crisis has hit five years after the city emerged from the largest-ever municipal bankruptcy and two years after it shed state financial oversight.

Looming over the city is the very real threat of a budget deficit triggering a state takeover. Duggan estimates Detroit will have to make up a \$348 million shortfall over the next 16 months. The Michigan law that brought it out of bankruptcy sets the trigger at a deficit of 5% of city revenue, or about \$54 million currently. If the state does take over, it will have oversight for at least three years.

To stave that off, Duggan is going to need every dime he's saved, and then some. The mayor says he can cover \$298 million in part by tapping budget ▶

◀ surpluses and the rainy day fund, and diverting money from a program that encourages new investment and demolishes the thousands of blighted buildings that have tarnished the city's image.

He can't count on more outside help. State and local officials have pleaded for more federal aid to deal with the virus's toll, so far to no avail. The CARES Act, the relief bill Congress passed last month, helps cities cover the cost of responding to the virus, but not their lost revenue.

That means city employees will have to bear the other $50 million of Detroit's deficit. Two hundred part-time, seasonal, and temporary employees will be laid off, while the hours and wages of 2,300 of the 7,800 remaining employees will be reduced.

"These are painful cuts," Duggan said at the April 14 briefing. "If we do not handle this deficit ourselves, the state of Michigan is going to be running the city again." There could be more cuts to Detroit's workforce and services if the downturn persists, Duggan noted.

The city may struggle to make $166 million in annual pension payments that were delayed by the bankruptcy and begin in 2024. Of the 25 largest cities in the U.S., Detroit was among the most susceptible to a downturn because of its reliance on volatile revenue streams like its casino and income taxes, Moody's Investors Service said in December. With this crisis, it's not just the immediate blow of the shutdown, but also the deferments of tax and mortgage payments and other allowances for the pandemic that will persist as a drag on city finances, says Eric Scorsone, an associate professor and director of the Center for Local Government at Michigan State University. (Scorsone is also a financial adviser to the city of Flint, Mich., and is part of a group that assists Detroit in setting economic forecasts.)

▲ Luther Keith, head of Arise Detroit

◀ John George, founder of Detroit Blight Busters

However, Detroit is better positioned than in the past to navigate a crisis, thanks to the savings-conscious budgets of its popular two-term mayor. The former chief executive officer of the Detroit Medical Center, Duggan, a Democrat, has kept finances out of the red during his tenure and built up surpluses and reserve funds. Moody's in February gave the city a positive outlook. "They have a clear plan, a strategy; they really seem to know what they're doing, whereas I would say in the past that was not as true," Scorsone says. "I'm not going to say they're as strong as other big cities, but they're way better off than they would have been anytime in the last 20 or 30 years."

Detroit is more than 75% black, and its poverty rate is about three times the national average. The coronavirus has disproportionately harmed black Americans: They account for 34% of Covid-19-related deaths in the 26 states reporting statistics by race, despite representing just 13% of the population in those states, according to Johns Hopkins University data. Over decades, Detroit has suffered from institutionalized racism, white flight to the suburbs, and the loss of manufacturing jobs. The population peaked at 1.85 million in 1950 and has declined in every subsequent census count.

One plug for the city's deficit will be $72 million from blight removal funds. That means Detroit could go a year without demolitions—just when it felt like it was getting ahead of the problem, says John George, founder of Detroit Blight Busters, a volunteer group that helps rehabilitate or raze abandoned buildings in Brightmoor, one of the poorest neighborhoods. George estimates the city has demolished roughly 20,000 structures since Duggan was elected and has about another 20,000 left to fix up or tear down. Once it's safe to go out again, volunteers will need to pick up the slack, he says.

Detroit has shifted from the poster child for Rust Belt decay to a symbol of rebirth in recent years—especially in the 7-square-mile core of its downtown business district, where billionaire Dan Gilbert, founder and chairman of Quicken Loans Inc., has invested heavily in real estate. Neighborhoods such as Downtown and Midtown sprouted boutiques and pricey condos.

Brightmoor is one of the areas outside of downtown that were starting to see investment as Duggan got the financial situation under control. There are now emerging business hubs in nearly every quadrant of the city—but many of those businesses, particularly those run by women of color, are shut down and financially distressed, says Kevin Ryan, program officer for cities and states at the Ford Foundation.

At the same time, the pandemic is making it physically impossible for community groups to provide aid and support, says Luther Keith, executive director of Arise Detroit, an umbrella organization for Detroit neighborhood groups. Keith expects that an annual community service day in August, when hundreds of groups take on projects across the city, will be canceled. A longer-term recovery will hinge on whether it can bring the entire city along. "That's the dynamic that Detroit has been struggling with even before the virus hit," Keith says. "How do we make everybody part of this idea of a comeback?"

Detroit's challenges were daunting before the virus, so cooperation among private, nonprofit, and public entities is even more important if anything is going to change, says Henry Ford III, a Ford Foundation trustee and great-great-grandson of Henry Ford, the founder of Ford Motor Co. "If there is going to be some kind of silver lining that comes out of this terrible pandemic, maybe this will be the sort of wake-up call that we need to address a lot of the structural and long-seated issues that we have to deal with as a country," Ford says. "It's a gruesome thing to think about, but when people start dying at accelerated rates, that causes people to pay closer attention, as sad as that is."
—Fola Akinnibi and Jeff Green

THE BOTTOM LINE Detroit should be able to weather the immediate economic fallout of the coronavirus, but a longer-term comeback must address the city's poverty and inequality.

States Going Their Own Way

Several weeks after the adoption of social distancing and stay-at-home measures in the U.S., the big question is how and when to restart the economy without setting off a spike in infections.

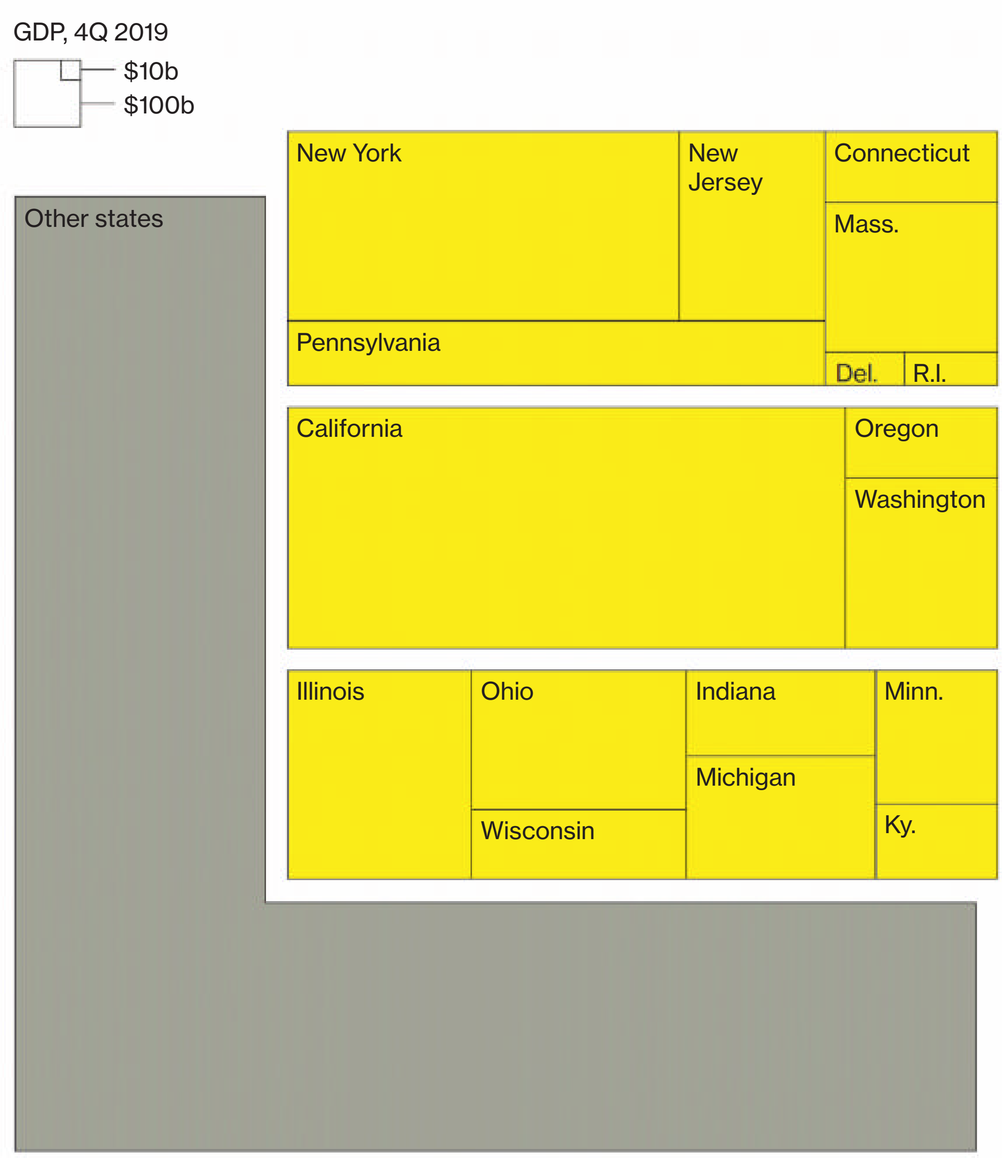
Trump vacillates

The White House's approach to reopening has been contradictory. President Trump urged swift action and insisted on April 13 that he had "total" authority over the process. He then seemed to pass the buck to governors on April 16, offering them guidelines with broad latitude. Yet just a day later he encouraged protests against social and business restrictions by tweeting to his followers to "liberate" states where protests took place.

Governors band together

Since the pandemic began, states have struggled to secure enough equipment and tests. Governors of 17 states—representing a large share of the country's population and gross domestic product—have formed three regional alliances to coordinate reopening plans. Governors in the coalitions have emphasized caution and ramping up testing despite Trump's impatience and Vice President Mike Pence's claim that testing capacity is adequate.

The Disunited States of Reopening

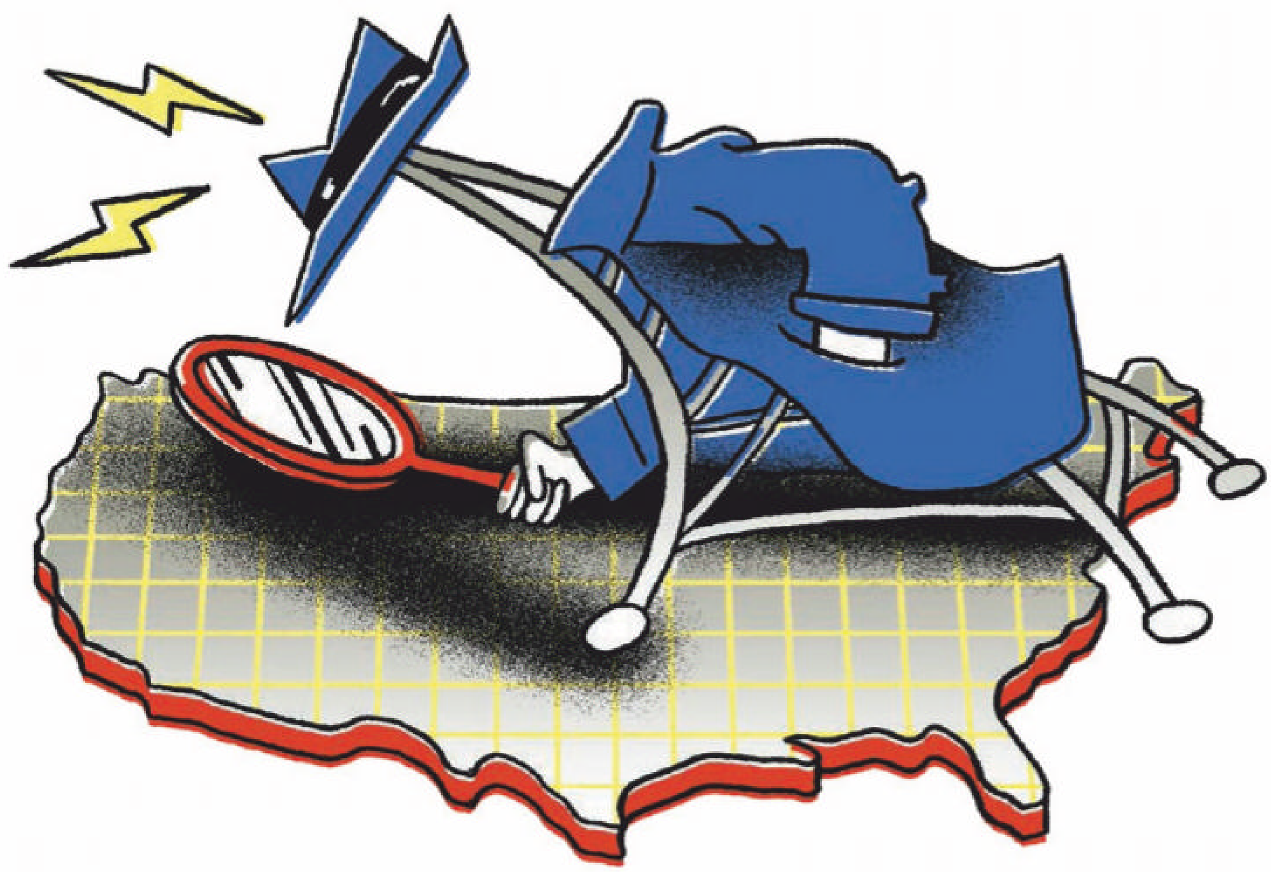


Outside of the coalitions, the governors of Georgia, South Carolina, and Tennessee announced limited reopenings, in Georgia's case drawing criticism from public-health experts. The patchwork approach reveals divides between states and the federal government and between red states—mostly reopening faster—and slower-moving blue states that are likely to widen as the pandemic continues and the election nears.

DATA: U.S. BUREAU OF ECONOMIC ANALYSIS

SOLUTIONS

Security



Rural America's Huawei Problem

Trump's crackdown on the Chinese telecom supplier hurts small phone carriers most

From its modest base in Fort Morgan, a city in eastern Colorado, Viaero Wireless has spent decades building a mobile network that serves rural stretches of four states. Now it's faced with a regulatory order to replace key pieces of its system supplied by Huawei Technologies Co., including antennas on some 1,000 towers. Viaero says the equipment swap—at a cost of more than $400 million—threatens its survival and will force it to buy pricier gear. It's also unnecessary, according to the company, which says it keeps a close watch over its systems. "I've got a dedicated team of veterans," says Viaero President Frank DiRico, "and if we thought anything wrong was going on, we'd strangle somebody."

Viaero is among 60 or more telecom operators swept up in a directive by the Federal Communications Commission to remove components produced by Huawei, which the U.S. government alleges could be spying on behalf of Beijing. U.S. officials have long been suspicious of Huawei, encouraging telecom giants such as AT&T Inc. and Verizon Communications Inc. to avoid using gear from the Shenzhen-based company. But smaller carriers turned to its low-cost, reliable products to help them roll out networks in underserved regions. That became a problem after the Trump administration launched a global campaign to persuade U.S. allies to

April 27, 2020

Edited by Rebecca Penty and Lynn Thomasson

block Huawei from their 5G mobile networks—part of an intensifying trade and economic rivalry. The effort fixed attention on Huawei equipment in existing U.S. networks.

Huawei has always maintained that it's independent from the Chinese government and would never conduct espionage, a claim U.S. officials dismiss. Banning suppliers from one country won't ensure network security, which could be enhanced by strict oversight, says Joy Tan, a senior vice president for Huawei in the U.S. Simply replacing Huawei gear "will reduce the ability of smaller broadband providers to deliver connectivity, costing them billions of dollars to comply, and ultimately hurting Americans," she wrote in an email.

Security officials and politicians of all stripes are on board with the FCC's rip-and-replace order, with some particularly concerned about Chinese equipment in networks near military installations. "We see Huawei as a threat, period, to our telecommunications infrastructure," says John Demers, assistant attorney general for national security at the Department of Justice. "And when it's near a military base, it's a threat to the confidentiality of the military activities on that base."

While Huawei products are already barred from dedicated government and military networks, officials say security hazards are also created by its equipment's presence in private networks near armed forces bases. They argue that gear on local networks could intercept signals coming from a base and allow Huawei and the Chinese government to track the personal cellphones of military personnel and their family members. "It's all about understanding a comprehensive picture of what goes on at a base," says Rob Spalding, a retired Air Force brigadier general and former member of the National Security Council. "If they are running only on weekdays, and they are all of a sudden going 24/7, that's an indication something is going on."

Viaero carries traffic on airwaves above underground missile launch facilities in Nebraska, which are operated by the F.E. Warren Air Force Base in Cheyenne, Wyo. The carrier dismisses the notion that an equipment supplier could gain a picture of military operations. Data flows displayed on a colorful wall full of big, bright flatscreens at the company's headquarters are monitored continually. On the rare occasion Huawei is let into the network core—the most sensitive part of any telecom system, with regard to security—technicians make sure the company can reach only its own equipment. "They can't just haul a lot of data out of the middle of America," says Arnold Agcaoili, Viaero's chief technology officer. "We're watching anything that goes out."

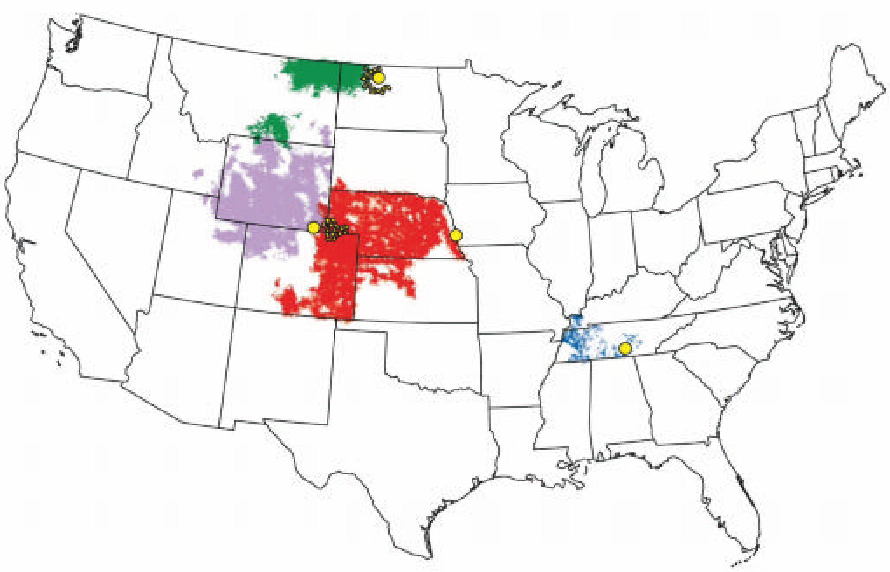
F.E. Warren hosts a missile wing responsible for a complex of Minuteman missiles capable of carrying nuclear warheads that sprawls across 9,600 square miles of Wyoming, Nebraska, and Colorado. The missiles are controlled by a command system with a diversified set of fixed and mobile connections, says Hans Kristensen, director of the Nuclear Information Project at the Federation of American Scientists. "There's no good data out in public that shows there is a vulnerability" that could allow illicit access to the missiles, he says. "I would be extraordinarily surprised if this isn't something the managers of the missiles have taken into account." A spokesman for F.E. Warren declined to discuss telecom security processes. "We maintain a concerned awareness of activities within proximity of our installations and sites," Second Lieutenant Jonathan Carkhuff said in an email.

The base is also within reach of signals from Union Wireless, a small phone carrier headquartered in Mountain View, Wyo. The company, which didn't respond to requests for comment, told the FCC last year that the rip-and-replace bill "threatens to decimate" rural networks.

Military installations near Huawei-equipped carriers

Carrier coverage: ■ MobileNation ■ Viaero ■ Nemont ■ Union

● Air Force base ◆ Intercontinental ballistic missile field



DATA: U.S. FEDERAL COMMUNICATIONS COMMISSION; U.S. DEPARTMENT OF DEFENSE; FEDERATION OF AMERICAN SCIENTISTS NUCLEAR INFORMATION PROJECT

The FCC doesn't know where all the Huawei gear is located and is asking carriers to disclose their use of the equipment, as well as the costs of the original purchase and of replacement. The telecom operators say the government should reimburse them fully. While that premise has largely been accepted on Capitol Hill, Congress has yet to appropriate money to reimburse the carriers. Rural carriers are trying to win inclusion in legislation responding to the coronavirus-induced shock to the economy.

Cheyenne Mayor Marian Orr, who won office on a platform that included better broadband access, acknowledges the tension between security concerns and delivering internet service in remote areas. "How do we make it affordable?" Orr asks. "Making it affordable at times means using Chinese parts." —*Alyza Sebenius and Todd Shields*

THE BOTTOM LINE Small telecom operators in rural America say they risk folding over federal mandates to rip and replace Huawei gear. U.S. officials say the equipment presents a security threat.

Hacker Counterattack

A volunteer online army is fighting a crime wave unleashed by the coronavirus

By day, Ohad Zaidenberg is a researcher for a private Israeli security firm, where he roots out sophisticated hacking attacks against major corporations. By night he's applying those skills against all manner of criminals, and for free.

Zaidenberg is one of the founders of a rapidly growing international volunteer network that's emerged to combat a crime wave targeting hospitals and critical infrastructure during the pandemic. The group, a team of more than 1,200 computer specialists and cyberwarriors, battles the toxic threat of phishing scams, malware hacks, and ransomware.

Hospitals and research labs have been overwhelmed with the physical challenges of treating patients for a disease that has no known cure. Online, they're under attack in a cyber landscape that's experiencing an unprecedented level of malicious activity. Since early February, when the coronavirus outbreak went global, IBM Corp.'s X-Force, which tracks online security threats, has seen a 4,300% increase in spam related to Covid-19. "When I saw some attacks on hospitals, I said, 'I can't sit on the fence anymore. I need to create something,'" Zaidenberg says.

He teamed up with Nate Warfield and Chris Mills, senior managers at Microsoft Corp., and Marc Rogers, executive director of cybersecurity at cloud security firm Okta Inc., to start Covid-19 CTI League in March. ("CTI" stands for cyber threat intelligence.) Although Zaidenberg didn't give specifics about which organizations the volunteers are helping, he says they've neutralized ransomware and phishing attacks on hospitals and worked with law enforcement to take down malicious servers and websites.

The medical industry has always been a target for hackers looking to access sensitive personal data. Last year more than 750 health-care providers in the U.S. were hit by ransomware. Most of the recent attacks on medical centers have failed because administrators are boosting defenses, including by storing data offline and off-site, according to Wendi Whitmore, who leads the global intelligence response team at IBM.

Still, that hasn't deterred criminals. "The attackers are becoming much more targeted," Whitmore says. In one ransomware strike on an unnamed company, hackers demanded $25 million. "They knew exactly the value of the data that they'd encrypted," she says. "They went after that knowing it was financially valuable but also damaging to [the company's] reputation if it had gotten out." Whitmore adds: "It's only a matter of time, though, before a hospital that isn't prepared is attacked and is forced to answer the question of whether to pay this ransom."

The majority of the ransomware is coming from Eastern Europe, and in about 60% of the cases, the attackers are using stolen information as leverage, IBM data show. "We're going to see larger attacks on the whole infrastructure," Whitmore says. "Any part of the supply chain that enables us to do business as usual is a viable target right now for a ransomware attack."

● Zaidenberg

In the depths of the dark web, criminals are also coming up with new ways to make money. There's malware tailored to the virus, and online sellers hawk allegedly resistant blood samples. Hacking tips related to Covid-19 go for $300, according to Jon DiMaggio, a researcher at Symantec. In Italy, coronavirus-themed phishing campaigns spiked in the hardest-hit regions. "It just goes to show the current cybercriminals are trying to play on people's fears," DiMaggio says.

And with so many people working from home, using personal routers and messaging apps, the vulnerabilities have multiplied. The security tools that businesses use to guard online data are akin to fortresses protected by "moats and castles and high walls," says Otavio Freire, chief technical officer at SafeGuard Cyber Inc., a cloud-based technology firm. "With Covid-19 they basically sent everyone out to the village," Freire says. "They're not going through the fort for their work anymore. Their email used to be protected, and now it's not. And the hackers know this."

CTI League isn't alone in providing services to people experiencing cyberattacks. Some companies have offered free ransomware protection to health-care organizations, while others are holding webinars to educate employees about malicious campaigns.

In Tel Aviv, Zaidenberg fits in whatever sleep he can between his two jobs. "I believe we save lives. Anytime I see another case close or when someone sends a message saying 'thank you,' I finally feel less useless," he says. "We can connect with each other, feel less lonely, and spend this horrible time doing some good." —*Jamie Tarabay*

THE BOTTOM LINE Hackers have launched malicious ransomware and phishing campaigns targeting medical facilities during the pandemic, and volunteers are coming to the rescue.

New Virus, New Vulnerabilities

Amid the pandemic, hospitals must be ever more vigilant against the threat of cyberattacks

With their mountains of personal data, outdated software, internet-connected equipment, and thousands of employees, hospitals have long drawn the unwanted attention of hackers. Now, as they focus all their resources on battling the pandemic, hospitals are even more tempting targets. We spoke to security experts about the ways the crisis is making hospitals more vulnerable to attack. —*Amy Thomson and Nate Lanxon*

● UNCHECKED VENDORS
Hospitals everywhere are racing to stock up on supplies of gowns, face masks, and ventilators. All that new equipment means finding new vendors, some of which are entering hospital supply chains without the usual security checks, Maor says. A vendor whose system has been compromised can unwittingly give hackers a backdoor to infiltrate hospital files.

● WILLINGNESS TO PAY
Companies hit with ransomware attacks often pay up rather than resist and risk being offline or losing crucial files. Hospitals may be especially appealing to hackers now. "They know that now more than ever these organizations cannot afford downtime, so they'd theoretically be more open to paying quickly vs. a normal scenario," says Dave Weinstein, chief security officer at cybersecurity firm Claroty.

● THANKS, BUT NO THANKS
Etay Maor, chief security officer at threat intelligence firm IntSights, says he's getting reports of attacks that he hasn't seen in years. In one instance, criminals sent hospital staff letters thanking them for their service, each one with a fake Best Buy gift card enclosed and a USB stick said to hold instructions on how to redeem the card. It actually contained malware. "Attackers don't attack the technology, they attack the people," he says.

● SKIPPED SECURITY CHECKS
Britain's National Heath Service has suspended cybersecurity audits put in place after 2017's WannaCry attacks until September to let hospitals focus on the pandemic. "That shouldn't happen," says Matt Lock, technical director at data security company Varonis. "If you aren't aware, you can't mitigate the risk." The NHS says it's urging members to stay on top of security updates and warns that the threat risk remains high.

● NEW WAYS IN
Medical facilities are also telling staff to work from home. Having more people logging in remotely, using file sharing and videoconferencing, creates additional vulnerabilities hackers can exploit. If an internal messaging system or VPN is slow to use, workers may turn to less secure consumer platforms. "That puts enormous stress on the security teams that have to manage this risk," Weinstein says.

PHOTO: COURTESY OHAD ZAIDENBERG


Workers on the production line of a Lenovo tablet and phone factory on the city's outskirts

WUHAN


A woman being tested for Covid-19 outside a health center

THE CITY WHERE IT ALL BEGAN TAKES ITS FIRST, HESITANT STEPS TOWARD NORMALCY

By Sharon Chen and Matthew Campbell, with Claire Che and Sarah Chen
Photographs by Gilles Sabrie

A customer in the waiting area set up outside a bank

REOPENS

Employees at Wuhan Welhel Photoelectric have their temperature taken four times a day

Every workday at Lenovo's tablet and phone factory on the outskirts of Wuhan, arriving employees report to a supervisor for the first of at least four temperature checks. The results are fed into a data collection system designed by staff. Anyone above 37.3C (99.1F) is automatically flagged, triggering an investigation by an in-house "anti-virus task force."

Daily routines at the facility, which reopened on March 28 after stopping for over two months because of the coronavirus pandemic that began in this central Chinese city, have been entirely reengineered to minimize the risk of infection. Before returning to the site, staff members had to be tested both for the virus and for antibodies that indicate past illness, and they had to wait for their results in isolation at a dedicated dormitory. Once cleared, they returned to work to find the capacity of meeting rooms built for six reduced to three and the formerly communal cafeteria tables partitioned off by vertical barriers covered in reminders to avoid conversation. Signs everywhere indicate when areas were last disinfected, and robots are deployed wherever possible to transport supplies, so as to reduce the number of people moving from place to place. Elevators, too, are an artifact of the Before Times; everyone now has to take the stairs, keeping their distance from others all the way.

Presiding over all these measures one Sunday in mid-April was Qi Yue, head of Wuhan operations for Beijing-based Lenovo Group Ltd. Qi, who's 48, with closely cropped hair and a sturdy frame, had been visiting his hometown of Tianjin, in China's north, when the government sealed off Wuhan from the rest of the country on Jan. 23. It had taken him until Feb. 9 to get home—and he was only able to make it by buying a train ticket to Changsha, farther down the line, and begging the crew to let him get off in Wuhan. His job was now to bring the factory slowly back to life while emphasizing vigilance. Compared with keeping the virus out of the plant, he said, "how much production we can deliver comes second."

Qi is one of millions of people in Wuhan trying to figure out what economic and social life looks like after the worst pandemic in a century. In some respects they're in a decent position. The outbreak in Hubei province peaked in mid-February, and according to official statistics there are now almost no new infections occurring (though other governments have cast doubt on China's figures). But scientists warn that the novel coronavirus is stealthy and robust, and a resurgence is still possible until there's a reliable vaccine. How to balance that risk against the need to reignite an industrial hub of more than 10 million people is a formidable dilemma—one governments around the world will soon be facing.

So far, Wuhan's answer has been to create a version of normal that would appear utterly alien to people in London, Milan, or New York—at least for the moment. While daily routines have largely resumed, there remain significant restrictions on a huge range of activities, from funerals to hosting visitors at home. Bolstered by China's powerful surveillance state, even the simplest interactions are mediated by a vast infrastructure of public and private monitoring intended to ensure that no infection goes undetected for more than a few hours.

But inasmuch as citizens can return to living as they did before January, it's not clear, after what they've endured, that they really want to. Shopping malls and department stores are open again, but largely empty. The same is true of restaurants; people are ordering in instead. The subway is quiet, but autos are selling: If being stuck in traffic is annoying, at least it's socially distanced.

Qi figures he's probably on the right side of this economic rebalancing. Tablets are in high demand as schools around the world switch to remote learning, and companies contemplating a work-from-home future aren't likely to skimp on technology budgets. Since restarting operations, he's hired more than 1,000 workers, bringing the on-site total above 10,000, and production lines are running at full capacity.

He said he was painfully aware, however, of how quickly work would stop if even one employee contracted the virus. "In my meetings with my staff I always tell them, 'No loosening up, no loosening up.' We can't allow any accidents."

More than 80% of China's almost 84,000 confirmed cases of Covid-19, and more than 95% of the roughly 4,600 confirmed deaths, have been in Hubei, of which Wuhan is the capital and largest city. Controlling the outbreak there, after a series of mistakes by President Xi Jinping's government, which initially downplayed the risk of human-to-human transmission and failed to prevent widespread infection of medical personnel, required a herculean effort. More than 40,000 doctors and other medical staff were dispatched from other regions to reinforce existing facilities and operate field hospitals built in the space of 10 days, and car and electronics companies were pressed into making protective gear. People suspected of having the disease were required to move into dormitories and hotels repurposed as isolation facilities, and allowed to go home only after they'd been declared infection-free.

Hubei was the last region of China to resume daily life, with curbs on movement lifted progressively from late March until April 8, more than three months after the epidemic began. The government presented the moment as a decisive victory—part of a comprehensive effort to rewrite the narrative of the virus as a Communist Party triumph, in contrast to its catastrophic spread in Western democracies.

Late on the night of April 7, crowds began arriving at Wuchang station, one of three large railway hubs in Wuhan. The first outbound train in weeks, to Guangzhou, was scheduled to leave at 12:50 a.m., followed by a dense schedule of departures to many of China's major cities. (Wuhan's position at the junction of several major rail and road routes, along with its industrial heft, has invited frequent comparisons to Chicago.) Police in black uniforms and medical masks seemed to be everywhere. "Scan your code!" they shouted at travelers approaching the

"IN MY MEETINGS WITH MY STAFF I ALWAYS TELL THEM, 'NO LOOSENING UP'"


Xiao with his company's wares

departure gates. The public-private "health code" system that China developed to manage Covid-19, hosted on the Alipay and WeChat apps but deeply linked with the government, assigns one of three viral risk statuses—red, yellow, or green—to every citizen. It's a powerful tool with clear potential for abuse. A green QR code, which denotes a low risk of having the virus, is the general default, while coming into contact with an infected person can trigger a yellow code and a mandatory quarantine. Red is for a likely or confirmed case.

Travel between cities requires a green code, and while Zeng Xiao, 22, had hers and felt fine, she was nervous about making her train. "There's still a chance I'll be stopped if my temperature is too high," she said as she neared the departure zone. Before going to the station, Zeng had checked repeatedly for a fever, worried that being even a little bit warm would prevent her from getting to Guangzhou, where she works as a teacher. "I haven't seen my cat in almost three months," she said. She didn't have to worry. Her temperature scan was normal, and she was soon able to board her train south.

Another passenger leaving on the first day, Qin Xin'an, 26, had been stranded since the lockdown began. He'd been on vacation in Wuhan when Hubei was cut off, and no amount of pleading with officials could get him on a train out. By mid-February he was living off online loans. "I was eating instant noodles for every meal," he said. He ended up getting a bed in an austere dormitory constructed by the local government for people who couldn't leave. He also found work doing odd jobs at Leishenshan Hospital, one of the temporary infirmaries built to handle coronavirus patients. He'd lost his regular job, at a company in Jiangsu province that makes robots, because he couldn't get back, and was now headed to Guangdong to look for another one and see his family. He hadn't told his parents where he'd been all this time; as far as they knew, he was away working. "I will not tell them I was in Wuhan," Qin said.

When dawn broke, Wuhan came cautiously back to life. Hairdressers were some of the first businesses to fill up. The roads were noticeably busier, and workers flowed back into office towers in the city center. But these new freedoms felt distinctly provisional. At the entrance to every mall or public building, guards stood sentry with temperature scanners, ready to turn away anyone whose reading was too high. Green codes, required even to ride the subway, have become the city's most precious possession, and one that's easy to lose. Merely visiting a building around the same time as a person later found to be infected can turn them yellow. And apartment compounds still reserve the right to bar residents from leaving if cases are reported there, as they did during the lockdown.

Even in the first city to confront the virus, following a containment effort as intense as any in the history of public health, the danger remains acute. "Asymptomatic cases and imported cases are still risks," Wang Xinghuan, the president of one of the city's major hospitals and of the Leishenshan facility, told reporters at a press conference before the latter's closing. And many residents are still susceptible. Wang's hospital gave antibody tests to all 3,600 of its staff, and fewer than 3% came back positive—a result that shows "there's no herd immunity in Wuhan." There's only one way to durably protect the population, he said: a vaccine.

Wuhan's businesses are nevertheless hoping for a safe but speedy return to conspicuous consumption. In the days before the city fully reopened for business, the sales team at a local Audi dealership gathered for their daily meeting. The 20 or so salespeople were all dressed in dark suits and face masks, standing well over a meter apart in neat columns. As a manager briefed them on the day's plans, a colleague made his way through the group, spraying everyone with disinfectant as they spun around to ensure full coverage. "Customers may not be kind enough to tell you if they don't feel well, so try not to bring them into the store," the manager said. "Just talk to them at the entrance if possible."

After reopening on March 23, the dealership had been selling about seven cars per day, on pace with last year despite all the restrictions. Most were relatively low-end vehicles, such as the A3, which retails for about 200,000 yuan ($28,000)—the kind of car often bought by families to complement a bigger, fancier model. "People are not willing to take public transport in Wuhan," said the marketing director, who asked to be identified by only his surname, Pan. "And they don't dare commute by Didi"—the ubiquitous ride-hailing app. The focus now, Pan said, was on following up with people who'd expressed interest in an Audi in the past but hadn't bought one. They might be ready to bite. The dealership was looking to expand its current staff of about 150, and employees would soon receive the pay they'd missed during the lockdown. Another salesperson added, "It's like a boom."

For many other businesses in Wuhan, though, it's anything but. Benny Xiao is director of international operations at Wuhan Boyuan Paper & Plastic Co., which produces the kinds of unremarkable but essential goods that still form the backbone of Chinese industry. In his case, they're disposable cups, which Boyuan sells to U.S. airlines and Japanese retailers, among other clients. Xiao works from an office inside a dilapidated residential compound, and, wearing a battered gray blazer over a green button-down, he didn't quite look the part of an international dealmaker. But he beamed with pride as he showed off a glass cabinet in his office stuffed with examples of his craft, from thin plastic vessels for economy-class soda to a sturdy tumbler he'd tried, unsuccessfully, to sell to Starbucks Corp. ▶

◀ The first months of the pandemic were challenging for Xiao, as they were for everyone in Wuhan. His wife, now retired, spent her career as a doctor at Xiehe Hospital, one of the first to report cases of what was later identified as the coronavirus, and she'd begun hearing from colleagues in mid-January about the impending crisis. Sick residents "were lining up outside Xiehe at 10 p.m. in the freezing cold," many of them "older people who could barely make it," Xiao recalled. "Patients were really desperately looking for help." He and his wife had stocked up on food before the lockdown began, but three weeks in they started to run out. Unlike in Europe and the U.S., Wuhan's containment measures made it difficult for people to leave their buildings, even to buy groceries, forcing them to rely on delivery apps, government drop-offs, and neighbors who wrangled permission to go out. At one point, Xiao had to spend 26 yuan (almost $4) for a single cabbage, more than triple the usual price. Some of the vegetables provided by local officials were barely edible.

He returned in late March to a company in severe trouble. Orders in the first half of the year were headed for a 50% drop, with demand from food deliveries failing to offset the calamitous decline in air travel. The government had made some financial help available, but Xiao wasn't sure he'd be able to avoid layoffs. "Back in January and February, I was expecting things to come back to normal in April," he said. Instead, "I was just calling the bank this morning to tell them that I can't repay the interest on our loan."

For a country that's experienced an essentially uninterrupted boom throughout the living memory of anyone younger than 50, broad-based economic pain is deeply unfamiliar. The Chinese economy shrank 6.8% in the first quarter of the year, and the International Monetary Fund estimates it will grow just 1.2 percent in 2020, the worst performance since 1976. Urban unemployment, a widely scrutinized indicator of overall joblessness, rose to a record 6.2% in February before pulling back slightly in March. And it's not clear what China's business model will look like in a world where Europe, the U.S., and other key markets for its goods are flirting with a depression.

Xiao is 64, part of a Chinese generation that had seen more than its share of history even before the coronavirus emerged. But he struggled to recall anything in his experience that was more dramatic, save perhaps the famine of the Great Leap Forward, when he was a young child. "This is the biggest crisis of my lifetime," he said.

The entrance to Wuhan's Biandanshan Cemetery is marked by an impressive stone gate with a pagoda-style roof and a frieze of a ferocious-looking dragon. But in recent weeks, it's been partly hidden behind a series of bright yellow crowd control barriers surrounded by temporary metal fencing and watched carefully by police. Almost no one is permitted to enter until April 30, and even then access is likely to be strictly controlled.

Officially, no patients in Wuhan are still dying from Covid-19, but the treatment of those who did pass away remains an extremely sensitive subject. On Tomb-Sweeping Day in early April, when Chinese families traditionally gather to pay respects to their ancestors, Wuhan's cemeteries were kept closed. Funerals have been banned until at least the end of the month, and family members of the dead have reported pressure from government officials to mourn quickly and quietly. According to the government, these measures are purely a matter of public health, because family gatherings are a potential vector for infection. But the restrictions also help Beijing avoid having funerals become a venue for people to vent anger about how the epidemic was handled, or to ask uncomfortable questions about subjects such as China's true death toll.

Whatever the reasons for maintaining the ban, some mental health providers in Wuhan have expressed fears that the inability to properly mourn loved ones will have deep and enduring psychological consequences. The city's residents were the first to undergo the unprecedented social shutdown that's been repeated around the world, and it seems certain to mark many of them for a long time, especially if it's compounded by a prolonged economic slump.

Yao Jun is among those struggling to move on. The petite 50-year-old is the founder and general manager of Wuhan Welhel Photoelectric Co., a manufacturer of welding helmets and protective masks that exports to France, Germany, and the U.S. She came back to work on March 13 after wading through approvals from four layers of government, including her local neighborhood committee, which took 15 days to assess Welhel's ability to prevent infections. "We can't afford to have a single one," Yao said in an interview at her factory. Every day the production line can run is crucial: Welhel was trying to catch up on orders it hadn't been able to complete in the first few months of the year, even as Yao wasn't sure her customers in locked-down overseas markets would be able to take the deliveries. She had no idea when more business would come in, given what's happening to the global economy.

Despite the uncertainties, she was trying to focus on work rather than what the city had just gone through. "I can't see news about medical workers without crying," Yao said, choking back tears and rubbing a jade keychain attached to her phone. She was having trouble sleeping, as she turned over the stories of doctors and nurses who'd succumbed to Covid-19 again and again in her head: "I don't know these people, but if someone tells me what happened to them, it's devastating. These deaths aren't just numbers or strange names to me. They're vivid lives." She believed that many of her neighbors and colleagues were experiencing similar emotions but might not be willing or able to talk about them. "Many other people are traumatized but can't recognize the problem or express their feelings," she said.

The pandemic was causing Yao to rethink her life. She spent almost half of last year on the road, often visiting clients overseas. Now, she said, she wanted to spend much more time at home, keeping her family close. Her son was supposed to return to Australia for university in February, but he was unable to get there, for obvious reasons. Yao didn't want him to go back.

The entrance to Biandanshan Cemetery

Even after seemingly world-shattering events, human behavior has a way of reverting to the mean. In the weeks after Sept. 11, commentators predicted the end of globalization, of the skyscraper, of irony—which all, needless to say, persisted. Within a couple of years of the global financial crisis, banks and homebuyers were back to arranging risky mortgages, and the very wealthy were back to, and then well beyond, pre-2008 levels of excess.

It's reasonable to think this time will be different. Hardly anyone alive today has endured a pandemic this severe, and the basic problem it's created—that anyone, whether friend, family, or stranger, might be a vector for lethal infection—is uniquely corrosive to the daily interactions that keep countries and economies going. An effective vaccine could be at least a year off, and given what the world has learned about how quickly a novel pathogen can shut everything down, even that might not return things to the way they were. Wuhan was the first place to traverse both sides of the Covid-19 curve, and how it changes, or doesn't, in the disease's aftermath will say a lot to the rest of us.

Many of the city's methods won't be universally applicable. Few other governments could assemble the all-seeing anti-viral surveillance China is trying to put in place, even if they wanted to. Fewer still, probably, have populations that would tolerate it. But whatever the tactics, the key lesson of Wuhan could be that the price of beating the virus is never-ending vigilance and a reordering of priorities that will be hard for many to accept.

At a Starbucks in one of Wuhan's fancier shopping districts, Ma Renren, a 32-year-old entrepreneur who runs a small marketing agency, talked about how he was sorting out these questions for himself. The store was open but only serving drinks to go, with customers permitted to sit at outdoor tables. Security guards were keeping a close eye on things, interrupting conversations to tell patrons to keep their masks on between sips and not sit too close together. Ma, who was wearing fashionably oversize glasses, a black baseball cap, and—of course—a light blue medical mask, had gone to stay at his parents' apartment on Jan. 24, intending to help take care of them. But soon he began to suspect that he might be sick. It was a time of greatly heightened emotion: No one knew the true fatality rate, and people in Wuhan were seeing reports on social media of appalling conditions in overwhelmed hospitals. "I wrote my last words one night and decided to say farewell to my parents and go to the hospital alone the next morning," Ma recalled. "I knew that if I went, I couldn't necessarily expect to come back."

He changed his mind at the last minute and eventually felt better, though the psychological effects lingered. He began having panic attacks, his breath short and his heart pounding. After looking up the symptoms online, he concluded that he was experiencing post-traumatic stress. Experiences like his, Ma thought, would make many people more introspective and more focused on those closest to them. "We will put aside more time for ourselves and our families" and for the other relationships that seemed truly worth holding on to during the crisis, he said. "Misfortune tests the sincerity of friendship."

Ma was now trying to get his company back on its feet. The government had recently sent him a tax rebate as part of its stimulus measures, but this would help only so much. Tourism has collapsed, and few potential clients have much money for promotion. "There's nothing to do but move on," he said. Ma had, inevitably, lowered his ambitions, and for the time being he was all right with that. "We worked nonstop for years, chasing every opportunity," he said. Now, "everyone I know has one goal for 2020. It's to survive." Ⓑ —*With assistance from Gao Yuan, Haze Fan, and Jinshan Hong*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STORAGE BAG

The home-sharing service would like to humbly encourage you to book some post-pandemic travel

By Patrick Clark and Eric Newcomer
Photographs by Kelsey McClellan

Back in March, when sheltering in place was still a novelty, Airbnb Chief Executive Officer Brian Chesky hung an oversized print from his company's in-house magazine on a bare wall above his sofa, hoping it would brighten up his home office. The image, of a rustic cabin set against snowcapped mountains, seemed to signify the monumental task of running a home-sharing website during a deadly pandemic. Or perhaps it signified the absurdity of managing a multinational company via videoconference, appearing before employees, investors, and lenders exclusively from the waist up. "I do wear pants," Chesky says in an interview over Zoom. "I want to be clear."

Airbnb Inc., which Chesky founded in a much more modest San Francisco living room in 2008, is among the world's most valuable lodging companies. It distinguished itself with an inventory of mostly short-term rentals (it takes a cut of about 15%) and had been preparing for what should have been a triumphant public listing right around now. The pandemic has crushed the global economy and shut down anything resembling a hotel. Officials who initially predicted a weekslong pause are now talking in terms of months or even seasons.

By comparison, Chesky's problems don't rate; he's safe and comfortable working at home. But that hasn't made the past few months any easier. "I'm not sure if there's a more difficult thing that a CEO of a travel company could ever do than go through this," Chesky says. "You feel like you were T-boned, or like a torpedo has just hit the ship."

Chesky started Airbnb in the middle of the last global cataclysm. To homeowners struggling through the U.S. foreclosure crisis, Airbnb offered a way to help cover the next mortgage payment. To would-be travelers who couldn't afford fancy hotels, it played up the character of the rentals its cash-strapped "hosts" were offering. Why stay at a cookie-cutter hotel in a financial district when you could rent a room in a cool-but-gritty neighborhood in Brooklyn or the Mission and stay a few more days?

Twelve years later, Airbnb is widely seen as Silicon Valley's most promising still-technically-a-startup—especially after the previous holders of that title, Uber and WeWork, were consumed by scandals that cost each company's founder-CEO his job. Now Airbnb is under pressure. Expenses had already been growing before the crisis, exceeding $5 billion in 2019 as the company sank money into new offerings aimed at increasing revenue before the initial public offering. And that was before the global lockdown. In early April, the *Wall Street Journal* reported that potential investors declined to put money into Airbnb unless Chesky relinquished some control.

Airbnb says this isn't true. "Let's be clear about why he's endured as founder-CEO. He's both a good CEO and a good person," says Alfred Lin, an Airbnb board member and a partner at venture firm Sequoia Capital. "He's larger than life and all of those things, but he's navigated well."

Early in the crisis, Chesky says, he told his board he wanted to meet virtually on Sundays because he planned to make three months' worth of decisions every week. When guests demanded to be let out of their reservations, Chesky hesitated but eventually complied, ordering hosts to distribute refunds. That placated guests, but it enraged hosts, who complained the new policy would cause them to default on their mortgages. Chesky responded by creating a $250 million fund to help reimburse them.

Not all hosts were satisfied by the gesture, which gives them a small fraction of what they would have originally made and does nothing to address the underlying issue: how the company will find customers willing to stay in other people's homes after all this. In April, Chesky struck a deal for $1 billion in debt and equity from Silver Lake and Sixth Street Partners. The agreement was a vote of confidence, but an expensive one for Airbnb, forcing Chesky to pay back the loan at about 11% interest, a rate typically reserved for companies in distress. Airbnb has since raised an additional $1 billion.

The Silver Lake deal includes warrants that value the company at $18 billion, down 40% from what investors thought it was worth in 2017. At that value, it would wipe out billions of dollars in paper gains for Airbnb's early employees and venture capitalist backers, including Sequoia and Andreessen Horowitz. Even worse off are the hundreds of thousands of small-time real estate investors who list homes on Airbnb, and the retail and service businesses catering ▶

◀ to tourists in Airbnb-heavy neighborhoods. (Bloomberg LP, which owns *Bloomberg Businessweek*, is an investor in Andreessen Horowitz.)

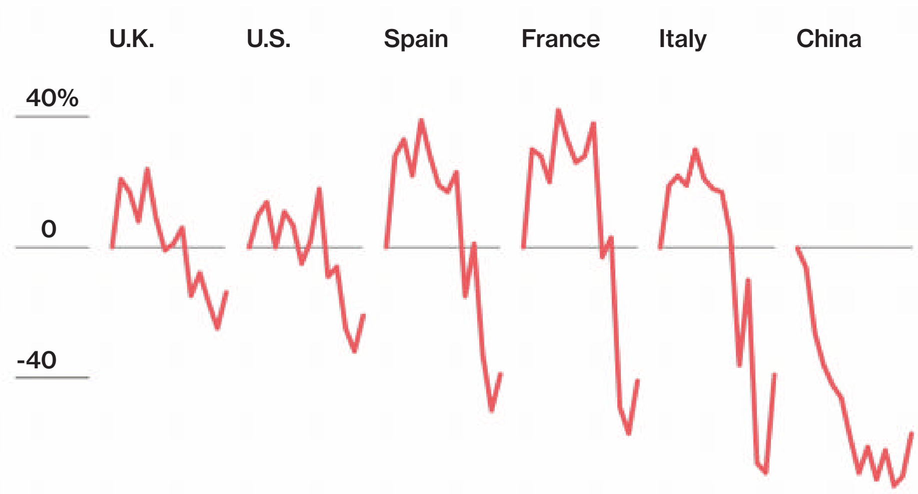
Chesky has cut ad spending and says he plans to focus on fewer new projects. But he insists the answer to the company's troubles isn't to change its business dramatically. "I'm betting on the idea that when social distancing is over, people are going to eventually want to connect," he says. Unfortunately, no one knows how long the crisis will last or how it will change consumers' behavior. As the world puts on surgical masks and latex gloves, the corporate sterility of a Courtyard by Marriott or Hilton Garden Inn suddenly seems a lot more appealing than somebody else's bed. Perhaps, despite Chesky's upbeat outlook, Airbnb's moment has ended.

Hotel executives, who themselves are scrambling to deal with the fallout of the coronavirus, have taken some comfort in watching Airbnb suffer after a run of wild growth and good press. They've long grumbled that the company got too much credit as an innovator, given that short-term home rentals have been a travel industry staple since, well, forever. Privately, a top executive at a major hotel company has quipped that if you think about it the right way, Jesus Christ was born in an Airbnb, though there's no record of Him leaving a review.

But the home-sharing business, much more than a chain hotel, depends on strangers trusting strangers. Chesky, a 38-year-old branding whiz who graduated from the Rhode Island School of Design alongside one of his co-founders, Joe Gebbia, proved adept at assuring travelers it was safe to stay in someone else's manger, while making it easy for hosts to be paid for their trouble. Improbably for a site that initially included air mattress listings, the company made all of this seem kind of glamorous. It persuaded hordes of millennials that it would be cool to sleep in a yurt or a treehouse or that the best way to experience Oktoberfest was on a Bavarian local's foldout.

Change in new Airbnb bookings

12/29/2019 to 3/29/2020



DATA: AIRDNA

As younger travelers embraced Airbnb, the site attracted lots of design-savvy hustlers who married a feel for interior decorating with an instinct for arbitrage. Before long, entrepreneurs were leasing Manhattan apartments for $4,000 a month and bringing in twice that amount by listing them on Airbnb a few nights at a time. These micro-hoteliers used their profits to add more units. By the middle of the last decade, a new class of professional host was becoming the norm on the site. Nearly two-thirds of Airbnb's 1 million U.S. listings come from hosts who manage more than one property, according to AirDNA, which publishes research on short-term rentals.

This development led to a backlash from cities, which saw Airbnb listings as unregulated hotels that were driving up rents by taking apartments off the market. Some local governments banned or limited short-term rentals, starting yearslong legal battles that Airbnb is still fighting. Even so, the company kept adding listings, paying special attention to China, which Chesky saw as a growth market for the company. Today Airbnb has more than 7 million listings, including 1.3 million in Asia, according to AirDNA. It set itself apart from other venture-backed startups by turning a profit in 2017 and 2018.

Chesky's ambitions were expansive, if quirky. He began publishing a glossy travel magazine. He spent years investing in a business Airbnb calls Experiences, in which travelers can book tours, cooking classes, and other activities. He even hinted that Airbnb had considered creating an airline. This past September, Airbnb announced its intention to go public in 2020. ("We are prepared to go public, and we will be ready when the storm clears," Chesky now says.)

Bookings crashed after China put Hubei province and its capital, Wuhan, where the virus originated, on lockdown. Then came Europe, where Airbnb generates roughly a quarter of its revenue. "You could put it on a plotted curve, and you could say, well, United States is Italy, just two weeks behind," Chesky says. "You started getting this very visceral, 'Wow, the world's going to be different.'"

In early March, Airbnb told its employees to work from home.

By the second week of April, coronavirus cases were still climbing steadily, and it had become clear the shutdown would last a lot longer than the more optimistic early predictions. The U.S. hotel occupancy rate, normally 70% at this time of year, had fallen to 21%, a level at which it barely makes sense to stay open. Shares in Expedia Group Inc., the online travel agency that owns Airbnb competitor Vrbo, are down 39% since March. Airbnb has said its revenue could drop by 50% this year, according to projections shared with prospective investors. Of course, it could be even worse. No one knows when the world will decide it's safe to go on vacation again.

Chesky says he doesn't know if the company will return to profitability next year and that everything is on the table. The company has already ended contracts with temporary employees early, and it canceled $800 million in marketing spending. Other actions, such as full refunds to all the guests who can't travel, have thornier implications.

Airbnb had more than $1 billion worth of reservations on its system when the social distancing measures took effect, and unlike hotels, which don't charge a guest's credit card until checkout and usually allow no-penalty cancellations up to 48 hours before check-in, home-sharing sites generally require customers to prepay for their lodgings. David Kauffman, who took out a second mortgage to build a granny flat in the backyard of his San Diego home, lost $10,000 when Airbnb implemented its new cancellation policy. From the company's $250 million fund to pay back hosts, Kauffman says he expects to wind up with less than 15% of what he stood to make. He's thinking about leaving Airbnb.


Chesky sheltering in place

This dynamic isn't unique to Airbnb—big hotel chains also offload risk to hotel owners—but Airbnb hosts, unlike hotels, are often sole proprietors without credit lines or much capital. "A lot of hosts feel like they co-built their business with Airbnb," says Benjamin Vail, whose company, Housepitality, manages about 60 short-term rental properties for third-party owners in Columbus, Ohio. Yet the company has sent the message that it's going to do "what's best for Airbnb and for guests."

Predicting the shape of a travel recovery is easier than pinning down the timing. Destinations that can be reached by car are a good bet to recover first, says Michael Bellisario, an analyst at investment bank Robert W. Baird & Co. Beach resorts seem like a better bet than the urban destinations where Airbnb tends to be strongest. It could be years before Americans get comfortable with the idea of booking into a Times Square hotel to catch a couple of Broadway shows. Breakfast buffets (sadly) may be gone forever.

Most industry analysts take it for granted that travel will bounce back, because that's what has happened in the past. Rich Barton had already signed a deal to sell Expedia to Barry Diller's IAC/InterActiveCorp. right before the Sept. 11 attacks. Barton, now CEO of Zillow Group Inc., says he figured IAC would back out of the contract, but Diller was unfazed and went through with it. "Rich, honey," Barton recalls Diller saying, "if we don't travel any more, we have bigger things to worry about than whether or not to buy the company." Expedia's revenue has grown 20 times since then.

Chesky is making a similar wager, hoping that the post-Covid-19 recovery will look a lot like the recovery from the last recession, with hard-up Americans more eager to list spare bedrooms, garage apartments, and second homes, even if it means taking in an asymptomatic contagious traveler. The plan, he says, is to focus on these part-time hosts and put less emphasis on the professional hosts who've been crucial to growth. He sees an expanding business offering longer-term rentals to city dwellers looking for a protracted retreat. Chesky says many of those guests may keep renting Airbnb rooms, even after the coronavirus outbreak subsides, as social distancing efforts leave more people freed from their offices. "This is a giant experiment where people are realizing they can work remote," he says. "We think that's a huge opportunity."

If that sounds speculative, it's more fully realized than the new plan for Experiences, the money-losing business Chesky loves that centers on tours and cooking classes. To adapt to the stay-at-home era, Airbnb recently began offering virtual sessions for indoor activities such as meditating with sheep. (Price: $9 for a one-hour session. Think of it as a walking tour for the mind.) Chesky says that once the worst is over, he'll market in-person activities people can do in their own cities, on the theory that the world is going to need new forms of entertainment that don't require packing into bars or movie theaters. Some of Airbnb's investors privately gripe that there's never been any evidence that Experiences can turn a profit.

Chesky argues that the sense of alienation that's come with the pandemic could be the key to getting things going again. "Oddly enough, though I've not physically seen another human being in quite a long time, because of the crisis, you talk to people more," he says. "So everyone is kind of closer together."

The biggest risk to the company, and the toughest to plan for, will be the pandemic's effect on people's psyches. Even at its best, travel is inherently a little bit scary—it's about leaving a comfort zone and generally requires close contact with a whole lot of other people. Some Airbnb hosts are already adding the phrase "thoroughly disinfected" to their listings. "To the degree that travel is based on human-to-human contact, this pandemic has made travel irresponsible or even life-threatening," says Luis Vargas, CEO of Modern Adventure, a tour operator that caters to the millennial travelers that Airbnb built its business on. "The paradox is that we're all in this together while at the same time experiencing extreme xenophobia because our fellow man could be asymptomatic and have the disease." —*With Olivia Carville*

THE BEST HOPE UNTIL A VACCINE

Regeneron's antibody treatment for Covid-19 probably won't be convenient. Who knows what it will cost. But it could be saving lives by fall

The novel coronavirus is devious, persistent, and, according to some scientists, not even alive. But, as the world has had to learn, this tiny bundle of genetic material is a highly efficient invader. Each particle is armored with roughly 100 protrusions, or spikes, perfectly evolved to latch onto an enzyme on the surfaces of throat and lung cells, then slip into them and replicate millions and millions of times. Older coronaviruses, such as the one that caused severe acute respiratory syndrome, or SARS, operated similarly. The spikes of the new coronavirus, though, clasp human cells much more tightly, which appears to be one reason it spreads more easily. In the three months since scientists in China identified it, the coronavirus has infected more than 2.6 million people around the world and killed at least 180,000.

Neutralizing those spikes may be the best way to prevent the virus from harming its host. And among the most promising approaches to doing that is finding the right antibodies. Multiple companies are doing this, using ▶

A researcher at the Regeneron lab in Tarrytown, N.Y.

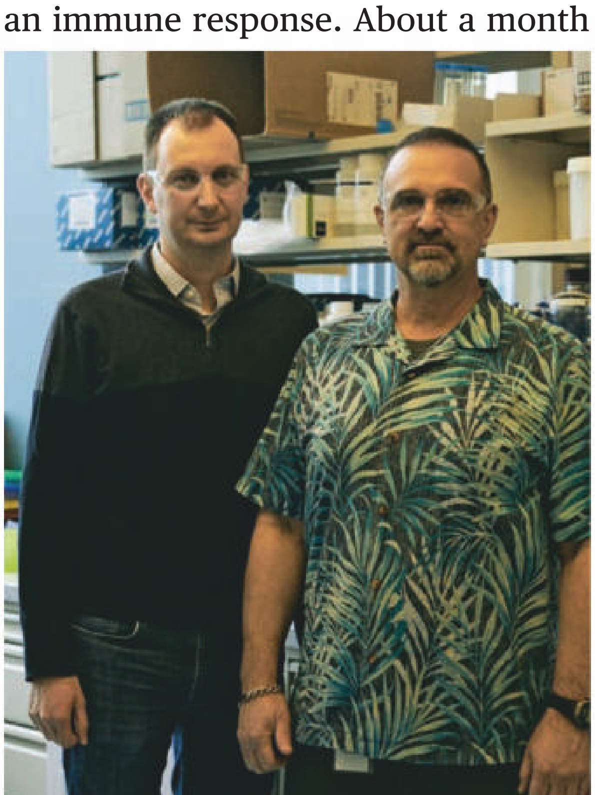
By ROBERT LANGRETH & SUSAN BERFIELD

Photographs by SAMANTHA CASOLARI

◀ antibodies from laboratory mice and recovered patients. Unlike existing medicines being tested on the virus—such as hydroxychloroquine, the malaria drug controversially touted by President Trump, and remdesivir, an antiviral compound originally developed by Gilead Sciences Inc. to fight Ebola—antibody drugs are being designed specifically to disable the new virus where it's most vulnerable. They're taking advantage of sophisticated technologies developed over the past two decades to create exquisitely targeted medicines. If they work, the therapies could be used in two crucial ways: to treat those already infected and, in the absence of a vaccine, as a short-term prophylactic for those at high risk.

Normally it can take five or more years to develop a drug and move it into human trials. No one wants to wait that long. AstraZeneca, Vir Biotechnology, and Eli Lilly and its biotech partner, AbCellera Biologics, as well as several academic labs, are hoping to start human trials by the end of summer. If all goes well, antibody treatments for those most in need could be available by fall.

Regeneron Pharmaceuticals Inc. expects to move at least as fast. The company is known in the industry for its VelocImmune mice, genetically engineered to develop humanlike antibodies when injected with viral DNA. In this case, Regeneron used genetic material identical to that of the virus in several dozen mice, provoking an immune response. About a month later the scientists removed the mice's spleens and extracted thousands of antibodies that had developed in response to the viral material. They began sorting through the antibodies, and in mid-April selected a few of the most potent to produce at one of Regeneron's main manufacturing sites for animal trials. News of that milestone produced another bump for the company's stock, which at press time was the best performer of 2020 on the S&P 500 index. Human trials could begin in June.



Kyratsous and Yancopoulos

It's possible that none of the antibody treatments Regeneron or any of the other companies develop will be effective. Or they may produce unexpected side effects that limit their use. But many who are watching the research closely think at least one of these treatments will be successful. "The odds are very high this will work, especially when you have multiple programs and multiple manufacturers," says James Crowe, a veteran immunologist at Vanderbilt University Medical Center who's working with AstraZeneca Plc and others on Covid-19 treatments. Scott Gottlieb, former head of the U.S. Food and Drug Administration, also sounded optimistic in a recent interview with Bloomberg News, saying, "If I had to place one bet on a drug that could be available by the summer and could have activity and could have a profile that I think could change the contours of the infection, it would be the antibody approaches."

"OUR TECHNOLOGY LETS US GO IN months where it takes others years," says George Yancopoulos, Regeneron's cofounder and chief scientist. Yancopoulos, who won a top award in the Westinghouse Science Talent Search in high school (his company took over the contest from Intel Corp. in 2016), is now 60 and one of the richest scientists in the biotech industry, with a net worth of more than $1 billion. During an interview in March at the company's headquarters in Tarrytown, N.Y., he wore a Hawaiian shirt, drank a can of soda, and excitedly described how modern antibody technology had evolved over the years from a slow, bespoke process to the industrialized operation that he says Regeneron has perfected.

The company was founded in 1988, went public in 1991, and, as is true of many biotech companies, required many years to get its first drug approved by the FDA. The breakthrough came in 2008, with a compound designed to treat a rare inflammatory disease. Since then, Regeneron has gotten six other drugs on the market. The best known are Eylea, a treatment for macular degeneration, and Dupixent, for severe eczema. A third, a rheumatoid arthritis drug called Kevzara, is being tested on Covid-19 patients; another, the injectable cholesterol-lowering medicine Praluent, cost billions of dollars to develop but hasn't been a commercial success. Yancopoulos himself takes that one.

Regeneron has been conducting research into infectious diseases for about a decade but doesn't yet have an approved drug against any. Its first one could be an Ebola treatment. In 2014, after an outbreak in West Africa, Regeneron devised a combination of antibody drugs—an antibody cocktail—that was ready for human trials in only 10 months. Last year, after Ebola reappeared in Congo, the drug combination slashed the death rate in half in a large clinical trial, performing the best of the four treatments tested. It beat ZMapp, a drug that had long been considered the gold-standard treatment for the disease and was featured on the cover of *Bloomberg Businessweek* in 2014. Regeneron's Ebola treatment also topped Gilead's remdesivir, the antiviral drug now being tested in Covid-19 patients. Regeneron has submitted data to the FDA and is waiting for final approval.

The person behind the Ebola success is microbiologist Christos Kyratsous, Regeneron's 38-year-old vice president for infectious disease research. He and Yancopoulos share the same heritage—Greek Macedonian—and both earned doctorates in microbiology from Columbia. Kyratsous is earnest and soft-spoken, his boss gregarious and fast-talking. Yancopoulos introduces him as "a younger, improved version of me."

In this crisis, Kyratsous plans to have a drug ready for human trials in just five months. Since January he and his researchers have been working almost all the time on the virus. His grandmother,

> **“If it turns out our antibody doesn’t work and someone else’s does, probably we would offer capacity for them. And the opposite would be true. No one is looking at this as a money-making commercial business. It’s just how quickly can we help”**

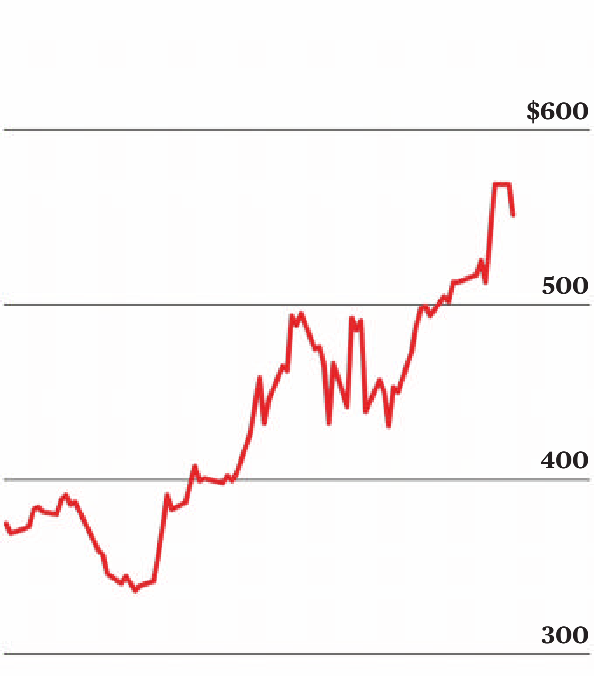
who lives in Greece, told him she was worried that he was working too much—every time she saw him on television, he was wearing the same sweater. He was working 14 hours a day, but she was seeing the same sweater because every station put up the same corporate photo while he was being interviewed.

ANTIBODY TREATMENT HAS A LONG history. In 1901, German doctor Emil von Behring won the first Nobel Prize in medicine by showing that “antitoxins” found in the blood of animals exposed to diphtheria and tetanus bacterium could be used to treat sick animals and transfer immunity against future infection. Scientists didn’t know at the time what these mysterious antitoxins were. They later determined they were blood proteins created by the body to fight infections and dubbed them antibodies. During World War I, antibody-containing plasma from horses was administered to prevent tetanus in wounded U.S. soldiers. In the midst of the coronavirus pandemic, some hospitals are trying something similar, treating Covid-19 patients with antibody-rich plasma from the blood of those who’ve recovered. This convalescent plasma, as it’s called, may help, but it’s an emergency treatment. It may be hard to scale up, because hospitals have to rely on recovered patients to donate blood. And because the blood contains a mixture of all sorts of antibodies, the more potent ones may be diluted by the others.

The human body can theoretically make hundreds of millions of different antibodies in a person’s lifetime. When a pathogen is introduced, the immune system responds by producing tens of thousands of new antibodies, each of which can bind to a slightly different part of the pathogen and either directly neutralize it or mark it for destruction by other components of the immune system. After a patient recovers from certain diseases, such as measles, highly specific antibodies can remain in the body for years, remembering the pathogen and rendering the person immune. A person infected with the coronavirus will produce antibodies, some much more effective than others. For researchers the goal is to find the specific ones that work best and concentrate them into a powerful medicine.

Antibody drugs are one of several strategies scientists are pursuing against Covid-19. The long-term goal is a vaccine that would teach the immune system to make antibodies against the virus. But testing a vaccine takes time—often 12 to 18 months or longer—and it might not work, or, like the flu shot, be only partly protective. That’s why researchers are also hunting for drugs. One possibility is an antiviral drug that could slip into infected cells and interfere with various proteins the virus uses to replicate. These are often administered in pill form, which is ideal. Gilead’s remdesivir, which must be infused, is considered among the most promising of these available options; large-scale human trials should yield results by May. Unless an off-the-shelf drug works, researchers will have to design custom antivirals from scratch, which also takes time. Antibodies occupy a bit of a middle ground between antivirals and vaccines. They have to be infused or injected, and they’re hard to mass-produce on the same scale as a pill, but the technology allows researchers to move into human trials relatively quickly. ▶

Regeneron stock price



DATA: COMPILED BY BLOOMBERG

Bacteria cultures used for generating DNA

◀ Here's where Regeneron and other biotech companies come in. In 1975 scientists devised technology to mass-produce what's called a monoclonal antibody—a single, highly potent antibody that targets exactly one site on one virus. It took decades to perfect the technique, but today many of the world's bestselling drugs—particularly those for cancer and autoimmune diseases such as rheumatoid arthritis—are monoclonal antibodies. Regeneron's Dupixent is among them.

Monoclonal antibodies are rarely used, however, for infectious disease. They're expensive, often costing $30,000 a year or more, and antibiotics and vaccines have to be cheap to be widely used. And the development process was slow relative to the urgent demands of a pandemic. That has changed. A few years ago, Vancouver-based AbCellera invented a credit card-size "lab on a chip" device that uses machine vision to test hundreds of thousands of antibody-producing cells at once. The company showed that in only 55 days it could isolate influenza-neutralizing antibodies from human blood that were effective enough to protect mice against an otherwise lethal dose of the virus.

In the current crisis, AbCellera started with blood from a patient who'd recovered from Covid-19. It received the sample on Feb. 25, began screening antibody-producing cells four days later, and by March 3 had sorted through 5 million of them, finding 500 antibodies that bound to the virus's spike protein. Then, because AbCellera focuses on discovering drugs, not developing and manufacturing them, its chief executive officer, Carl Hansen, got in touch with a company that does, Eli Lilly. They'd already been talking about working together on other antibody drugs. By April, Lilly, with help from the U.S. National Institutes of Health, had narrowed AbCellera's original 500 antibodies to 20 that lock onto particular sites on the spikes. After more testing, Lilly expects to select three or four for human trials that could begin as early as July. "We always hope there's just one antibody that's really, really great, and we can devote our full manufacturing resources to that," says Dan Skovronsky, Lilly's chief scientific officer. But the company is preparing to make more than one.

WHEN PANDEMIC FEARS WERE becoming a reality in late January, among the first calls Rick Bright made was to Regeneron CEO Leonard Schleifer. Bright was until recently the director of the Biomedical Advanced Research and Development Authority, or Barda, a division of the U.S. Department of Health and Human Services. Barda has given Regeneron about $300 million over the past five years to work on Ebola, influenza, and other diseases. "They liked us because we said we could go extremely fast," Kyratsous says. Bright, who is now at the National Institutes of Health, urged Regeneron to make Covid-19 its top priority. Schleifer immediately agreed.

Kyratsous was already at work. When Chinese researchers shared the gene sequence of the coronavirus in mid-January, his team ordered synthetic DNA for the spike protein for a couple of hundred dollars per sample. They injected the synthetic DNA into genetically engineered mice. No need to collect blood from recovered patients; the mice generate human antibodies in about a month.

By the beginning of March, Regeneron's mice had produced thousands of antibodies that bound to the spike protein on the virus, and by the end of the month, Kyratsous and his team had carefully sorted through them and selected the 40 or so that were most effective. Then Regeneron had to test the antibodies against the actual virus. For that it turned to Matthew Frieman, a coronavirus expert at the University of Maryland School of Medicine in Baltimore and longtime collaborator.

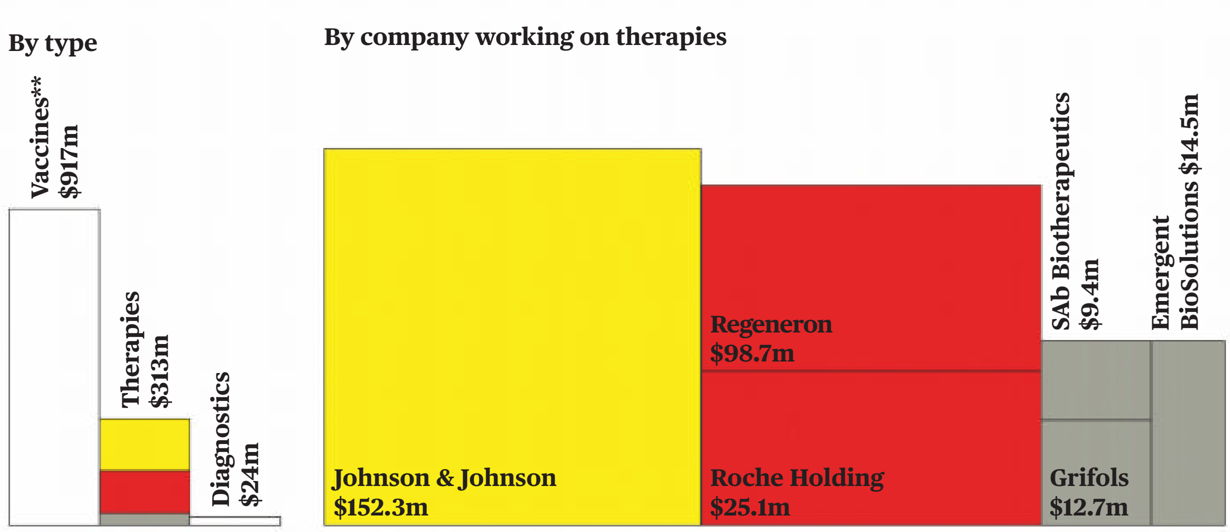
Frieman, who helped Regeneron work on Middle East respiratory syndrome, or MERS, was one of the first researchers in the U.S. to gain access to samples of the live virus when it became available in early February. He has a secure lab and a staff used to handling deadly pathogens, making him a very popular man. He's been logging 18-hour days, performing his own drug research and assisting more than a dozen drug and biotech companies as they test possible Covid-19 drugs and vaccines. He spends all day in the lab, heads home to have dinner with his family, and continues to work afterward.

He and his colleagues mix various doses of antibodies with the virus. Then they add African green monkey kidney cells to the mix—a standard type of cell that most viruses can infect—and wait to see if the cells survive. The goal is to find the antibody that binds the tightest to the right place. It's easy to tell when it works: Living cells are stained purple, and when they die the color disappears. Several of the Regeneron antibodies appear promising in preliminary tests, Frieman said in a short interview in early April while he was driving home: "Everything is moving just the way it has been supposed to."

At the same time, scientists around the world have found more than 3,000 gene sequences of the virus, from Asia, Europe, and North America, Kyratsous says, and they're not all identical. The virus is evolving. Some parts of the protein

U.S. government money invested in coronavirus countermeasures*

Antiviral ■ Monoclonal antibody ■ Other antibody



spikes so central to finding a treatment are mutating, meaning they could potentially evade an attack. Regeneron is looking specifically for antibodies that latch onto the spots that aren't evolving. "We want antibodies that bind tightly, neutralizing the virus, and are binding to sites that are not changing very frequently or not at all. That's how we're screening," Kyratsous says.

In mid-April, Regeneron chose its final antibodies to test—more than four and fewer than 10, the company says—on monkeys. Then a select few will be tested on humans. Concurrently, without waiting for those results, the company is also getting ready for large-scale production. By the end of May "we will know if there is anything horribly wrong," Kyratsous says. Because the drugs are targeted so specifically to the virus, he doesn't expect to see any signs of toxicity in the monkeys. If there are none, human trials could be under way by the end of June.

Getting antibodies into trials is one problem. Manufacturing them at an enormous scale is another. Antibodies are far more difficult to produce than traditional medicines, requiring plants that cost hundreds of millions of dollars to build and maintain. These drugs are not simple chemicals like the ones in Tylenol or Prozac or Viagra. They're complex proteins made inside living cells and purified in sterile vials or injectors.

Because most monoclonal antibody drugs are so-called specialty drugs for advanced lung cancer, multiple sclerosis, and other diseases, there is limited capacity globally to make them. "Antibody drugs are fast to develop and reasonably likely to work but inefficient in terms of manufacturing," says Skovronsky at Lilly. He says companies, nonprofits, and the government are discussing how to share manufacturing plants. "If it turns out our antibody doesn't work and someone else's does, probably we would offer capacity for them. And the opposite would be true," he says. "No one is looking at this as a moneymaking commercial business. It's just how quickly can we help."

Regeneron says it's designed its plants for speed and flexibility. Some biotech companies have customized plants for each of their major drugs. "If they have 10 products, they have 10 plants," Yancopoulos says. "We have one process for all of our drugs. We've McDonaldized the manufacturing process." Regeneron is already retooling one of its major manufacturing plants, in Rensselaer, N.Y., to make Covid-19 antibodies. It may shift much of its other production to Ireland to further increase its capacity for Covid-19 antibody production in New York.

At high doses the drugs might prevent the disease from progressing in hospitalized patients. At lower doses, the same antibodies could work as a prophylactic, conferring immediate but short-term immunity to doctors and other first-line responders. The company says it hopes by August it will be able to produce 200,000 prophylactic doses a month. Already infected patients might require a dose 10 times as strong; the company could make about 20,000 of those a month.

Kyratsous says the long-term goal is to make drugs with what he calls cross-reactive antibodies, which would be effective not just against this coronavirus but against others that have already emerged—and still more that are likely to.

Antibody treatments won't eliminate the need for a vaccine. They might not work on critically ill patients. And as a prophylactic, they would likely have to be given every couple of months. It wouldn't be practical to treat all high-risk people with regular antibody infusions. But the treatments might help communities return to a seminormal state until a vaccine is finally available. Ⓑ
—With Anna Edney

Serological pipettes used in cell culture and pseudovirus production

*AS MOST RECENTLY REPORTED BY THE BIOMEDICAL ADVANCED RESEARCH AND DEVELOPMENT AUTHORITY. MAY NOT INCLUDE ALL FUNDING AWARDED. **FUNDING FOR VACCINES MAY BE UP TO $970 MILLION, INCLUDING OPTIONS. DATA: U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, SAB BIOTHERAPEUTICS

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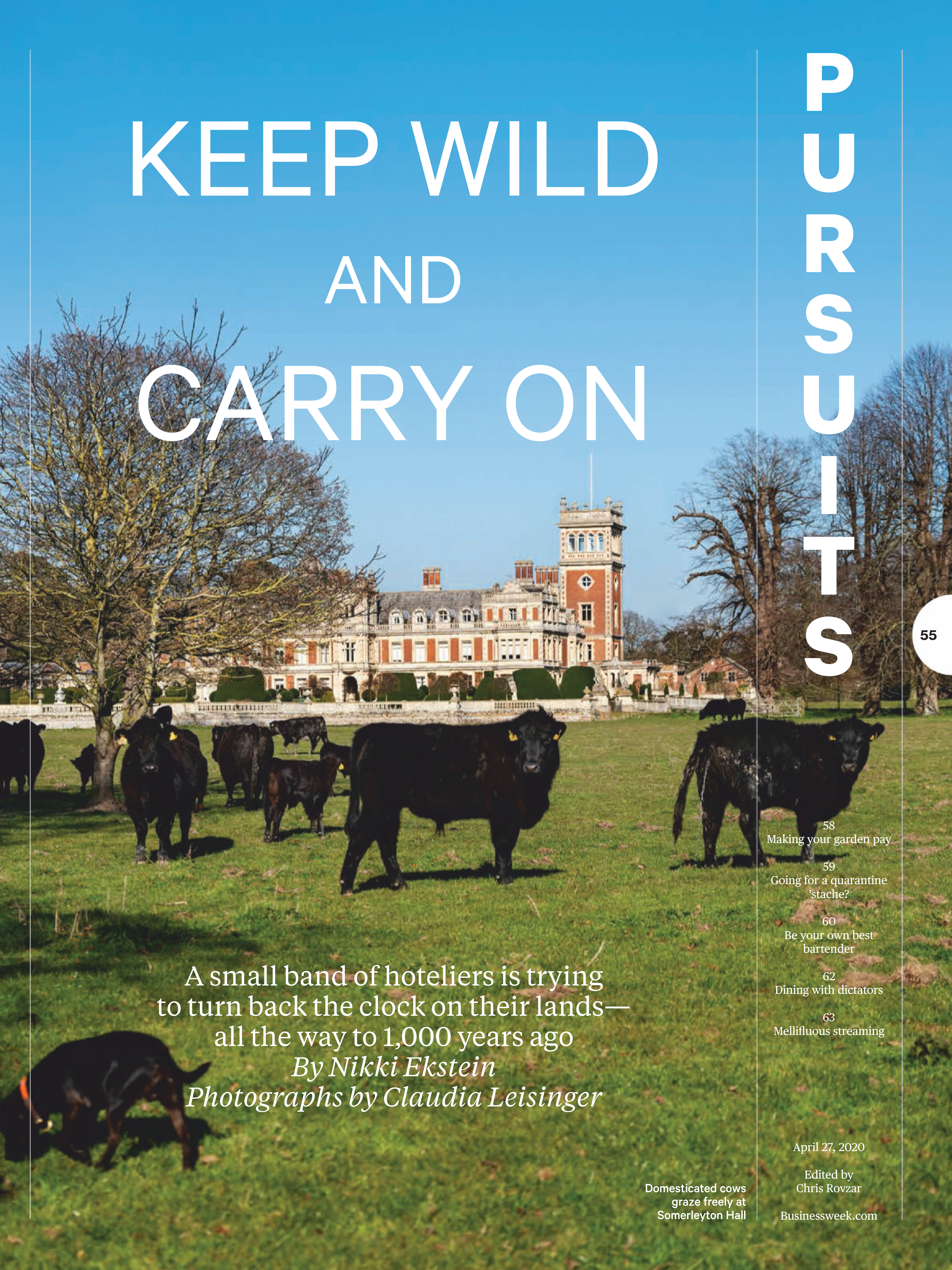

A small band of hoteliers is trying to turn back the clock on their lands—all the way to 1,000 years ago

By Nikki Ekstein

Photographs by Claudia Leisinger

Domesticated cows graze freely at Somerleyton Hall

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April 27, 2020

Edited by
Chris Rovzar

Businessweek.com

Depending on whom you ask, the tale of Somerleyton Hall begins in 1863, the 1970s, or hundreds of years earlier. For William Crossley, third baron of Somerleyton and the late owner of the Jacobean manor in East Anglia, England, it originated in the wake of the Industrial Revolution, when his grandfather, a carpet manufacturing magnate, purchased the property at a steal from a down-on-his-luck baronet. For most residents of the neighboring North Sea fishing towns, Somerleyton's relevancy really picks up in the 1970s, when the estate's adjacent holiday spot, Fritton Lake, began to offer tea parties and kayaking for day-tripping locals.

But Hugh Crossley, who inherited the Somerleyton estate after his father's death in 2012, says both stories start much too late. When he looks at the property, he sees back hundreds of years, long before the home's expansive grounds had been manicured with hedge mazes in the 1840s, work credited to royal gardener William Andrews Nesfield. The story stretches past even the generations of Dutch and Norse homesteaders who tilled the land and made it their own.

Crossley, the baron of Somerleyton, with native hogs

Crossley winds the clock to the turn of the last millennium, when nothing existed other than a patchwork of towering pine and birch trees, lowland heath, and yellow-flowered gorse. If it were up to him—and it is, mostly—that's what Somerleyton's grounds would look like today.

Crossley is among a small but growing number of trailblazers shaping Britain's nascent rewilding movement, which aims to return denuded farmland and deforested areas to their native state by removing invasive species and replanting and reintroducing native ones. "People have forgotten what the land looks like when it's not managed," he says. "It's all overgrazed or overfarmed."

This is true all across the U.K. Many country houses such as Somerleyton use farming as a way to finance high-maintenance properties; the *Downton Abbey* plotline in which Lord Grantham considers selling off land to local farmers echoes actual scenarios that have played out across the country since the early 1900s. These estates' humbler neighbors tend to be even more dependent on intensive agriculture, which uses ground-polluting fertilizers, chemical pesticides, and year-round harvesting to milk the land for every ounce it's worth. This type of farming strips the soil of nutrients, deters wild flora and fauna, and supplants the heirloom and organic crop cultivation that worked for thousands of years before the modern tractor was invented.

Rewilding attempts to reverse all that, not for the sake of nostalgia, but for a more viable future. Crossley and other landowners are increasingly aware that the degradation of topsoil and erosion is a threat to our food supply as well as to clean water, clean air, and carbon sequestration.

Some prior efforts to rewild have taken hold, primarily in Europe. A Yellowstone-size patch of Romania's Carpathian Mountains has been restored to virgin forest after years of illegal logging. And there's the reintroduction of almost extinct Pyrenean brown bears to a formerly blighted habitat along the northern coast of Spain. Both endeavors, initiated by local conservationists and nongovernmental organizations, have received the ongoing backing of the European Nature Trust, a philanthropic group that furniture tycoon and rewilding pioneer Paul Lister set up two decades ago. The same principles have also been used for decades to restore habitats and wildlife throughout Africa.

But rewilding has had its notable failures, too, such as a marshland restoration project outside Amsterdam where the flora couldn't keep up with the grazing needs of a ballooning wild horse and cattle population. In that controversial case, thousands of animals were shot to spare them from starvation. And rewilding will never restore habitats as they truly existed centuries ago, when currently endangered or extinct species such as European bison and woolly mammoths acted like natural lawn mowers by feeding on overgrown plants. Nor is it feasible to introduce lynx, wolves, and other apex predators to unfenced, densely populated areas—though they are critical to restoring the old order.

All this makes rewilding a complicated experiment, limited by cost, by damage that's already been done, and by the number of people willing to donate land. Done right, it can show fast dividends. When Crossley got started in 2006, he created a 250-acre test site. Once choked with invasive thickets, it's now covered with lush woodlands and buzzes with the sounds of insects and birds. Between his own purse and government


Wild ponies are free to roam the property

grants, he's spent about $125,000 on the project. The sum has helped him fence in almost 1,000 acres, rip out rhododendrons planted by Victorian gardeners in the 19th century, and replace them with naturally occurring heather and oak seedlings. Near the lake, where the purple-blooming bushes had overtaken essential reed grasses, the waters have visibly cleared, allowing guests to swim and kayak again.

Even for an aristocratic landowner such as Crossley, it can be a financial quagmire. Bringing in tourists to pay $200 a night helps, though attracting them required a $2 million, top-to-bottom renovation of the Fritton Lake property. The goal, he says, is to engage a new, "eco-anxious" generation of visitors and have them help shoulder the costs.

Julie Danziger, the managing director of travel consultant Embark Beyond, says this is exactly the type of experience travelers will crave when Covid-19 lockdowns give way again to open borders and transatlantic explorations. "Being in quarantine has helped people develop an appreciation for life and nature," she says. "We have an overwhelming number of people looking to reconnect with the great outdoors."

Crossley has joined a handful of entrepreneurs in the U.K. who've crossed over into hospitality in recent years. He took inspiration from Charlie Burrell and Isabella Tree of Knepp Castle Estate, a Regency-style mansion in Sussex with treehouses and safari tents amid 3,500 regenerated acres, and the European Nature Trust's Lister, whose five-star hotel, Alladale, helps fund a 23,000-acre rewilding project in the Scottish Highlands.

Crossley sees Lister's Alladale as the template for what he hopes to achieve at Somerleyton Hall. At Alladale, several cottages scattered around an 1877 Victorian hunting lodge offer idyllic accommodations for guests who want to be surrounded by nature or go on daily guided hikes. The on-site, farm-driven restaurant has planned guest-chef appearances by Francis Mallmann and Marco Pierre White.

Weekly stays, starting at about $2,100, help fund Lister's ambitious goal to reintroduce the European gray wolf, which in turn would restore the ecosystem's natural food chain and bolster tourism. "Bringing wolves back into Yellowstone has yielded an extra $40 million in tourism revenues there," Lister explains. But doing the same here would require 50,000 contiguous acres of enclosable land. "The roadblock is scale," he says.

For that, Crossley has his own solution. In conjunction with former European Nature Trust director Duncan Grossart and two other trustees, he's founded an initiative called Wild East. It educates local youth about rewilding and encourages farmers to rethink their land usage. "Rewilding can't just be about the privileged few," Grossart says. "The integrity of soil is in danger. Our crop supply is becoming limited." The key, he believes, is banding together to persuade other landowners toward a model that blends organic farming with sustainable travel experiences.

Luxury tourism is the key variable in the rewilding equation, Grossart adds. "It makes people aware, it changes [guests'] behaviors at home. Maybe it inspires them to write a million-dollar check. It's the catalyst we need." B

The High-Margin Garden

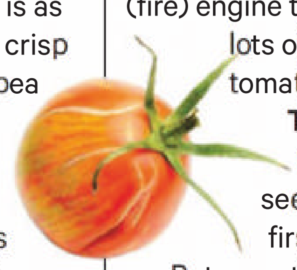
Plants that are fun for beginners can return a sweet bounty for the more sophisticated, too. *By Heather Arndt Anderson*

GENOVESE BASIL
This versatile, easy-growing herb is ideal for topping a margherita pizza, but it can also add some pesto panache to a mac and cheese.
The ROI: Woodier herbs such as sage or rosemary are shrubs, taking up a lot of space for the single sprig or two you use at a time. A few bushy basil plants will supply you with plentiful leaves.
Timing: From seed, after about 40 days in a sunny spot, it will keep producing until the fall.
Or go bigger: Lettuce Leaf basil has broad and milder-flavored leaves you can employ as casing for Vietnamese-style lettuce wraps (*bun cha*) with pork meatballs.

RAINBOW CARROTS
When it comes to root vegetables, most of the action is underground, but you can make the wait worthwhile with a colorful reveal. They have cool flowers—provided no Peter Rabbits come a-nibbling.
The ROI: The taproot isn't the only edible part. The tops make an outstanding stand-in for parsley in a gremolata or salsa verde.
Timing: From seed to table, it takes about 50 to 60 days for the fastest carrot varieties, such as the French heirloom Little Finger. Slower ones like the Kaleidoscope mix take about 75 days.
Pickle this: Use the Black Nebula, a gorgeous dark purple specimen, for bloody mary garnishes—they turn hot pink in vinegar brine.

SUGAR SNAP PEAS
Oats, peas, beans, and barley grow, like the song goes, but as you or I or anyone know ... of those, kids really just want peas.
The ROI: Pods are preceded by fragrant white blossoms pretty enough to grace even the best-appointed dinner table. You can also use the tendrils for a delicious stir-fry.
Timing: Sowing to harvesting takes about 60-70 days, making it a fast-growing veggie for fickle gardeners.
Add more color: Purple-podded Sugar Magnolia is as sweet and crisp as any snap pea on the snack tray, but it's distinctive enough to class up crudités platters and late-spring salads.

CHESTER BLACKBERRIES
It's thornless, which means giant, flavorful berries without the pain.
The ROI: Plant two or three canes along a fence or trellis, and you'll never have to buy blackberries again. They freeze well and make luscious jams and preserves.
Timing: Plants in gallon-size pots should produce from late July through October.
Grab a drink: Muddle Chester blackberries with sliced jalapeño and a pinch of sugar, then strain and add a squeeze of lime and your favorite añejo tequila for an exquisite margarita.



RED ZEBRA TOMATOES
You're probably going to grow a tomato anyway. Might as well get one that looks like it's covered in flames.
The ROI: Once the plant begins setting fruit, it's like the little (fire) engine that could: Expect lots of luscious 2-inch tomatoes.
Timing: About 75 days from seed to the first harvest. But once they're on, tomatoes can keep coming until Halloween or first freeze, whichever comes first.
Go nuclear: An even more striking small tomato (rare even in farmers markets) is the stripe-adelic Brad's Atomic Grape, which produces sweet, technicolor purple tomatoes.

GRAY MAMMOTH SUNFLOWERS
Overshadowing everything in the garden, these sunflowers come with Seussian blooms 2 feet across.
The ROI: In addition to their height, these astounding 10-foot-tall plants can act as a living trellis between rows of beans or other vining plants.
Timing: It takes 80-120 days for the sunflower seeds to mature enough to eat, but the flowers come weeks earlier.
For contrast: Interplant them with umber-mahogany Chocolate Cherry and Black Magic varieties to give your garden a gothic edge—and a stunning cut flower.

PHOTOGRAPHS: ALAMY (TOMATO, BLACKBERRIES, SUNFLOWER), GETTY IMAGES (CARROTS, SNAP PEA, BASIL)

My Mustache And Me

During coronavirus, a dangerous liaison. *By David Coggins*

Of all the worthy projects to tackle during quarantine, the one with the least chance of resulting in real self-improvement is the introduction of a new mustache.

Imagine a thick 'stache, and chances are you think of the 1970s and open-necked shirts possibly revealing gold medallions nesting in a swath of chest hair. These outlaw associations are one reason we rarely see a powerful American with one. Can you envision a presidential candidate with a mustache? He'd sooner admit he was an atheist.

But for some men, such low odds of pulling it off only heighten the mustache's louche mystique. It appeals to the part of a man that wants to buy a motorcycle. A good one conveys a sense of fearlessness while offering a man a vacation from himself.

Time away from friends can provide the push some guys need to embrace a more adventurous side. Growing a large beard, with its dignified tradition of Civil War generals and Russian novelists, is a natural impulse. But the full Tolstoy doesn't fit inside the masks we're now advised to wear in public.

At the onset of social distancing, I was on a FaceTime call with a friend and thought I detected a provocative bit of growth emerging through his stubble. "Is that a mustache?" I asked eagerly, as if spotting a rare bird. "It's not *not* a mustache," he replied cryptically. Perhaps he couldn't acknowledge the scope of what he was attempting.

As it happens, my own beard was getting particularly long because I couldn't visit my beloved barber, the only person I trust to keep things under control. Could quarantine be the time to chop it? I've been attracted to the English tradition of aristocratic mustaches—think of Trevor Howard as Major Calloway in *The Third Man*, or Robert Donat's trenchcoat-wearing fugitive in *The 39 Steps*. They're thin and go well with a refined British accent.

A mustache requires expertise, so I went looking for it. James Nord, founder of the influencer marketing platform Fohr, had successfully embraced a tidy model long before our current situation. He tells me that the move requires conviction. "I don't know if there are many style choices as risky as a mustache," he says. "If you don't take yourself seriously, how will anyone take your mustache seriously?" But it doesn't always start that way. "My first mustache was a joke that soon became serious, and I think that happens for a lot of people."

Jeremy Kirkland, who hosts the menswear-focused *Blamo!* podcast, has long dabbled in the art of face furniture. "The trick is to act like nothing has changed," he counsels. "If you make it a big thing, people will respond accordingly." But this takes time. "I had a mustache for years, and people eventually chilled out."

A man with a mustache doesn't go down his path alone. Loved ones will weigh in; some may threaten to shave it off. Photographer Jamie Ferguson has grown a robust specimen during quarantine, and when I asked him how people reacted, he joked, "It's like Marmite. People either love it or hate it."

In a perverse fit of inspiration, I fired up my clippers and mercilessly reduced my beard to some downy stubble, leaving only an ad hoc Fu Manchu as the shearing's sole survivor. What stared back at me from the mirror didn't look like it belonged on someone with a pipe and a tweed suit, as if right off the pages of *Brideshead Revisited*. It reminded me of what Michael Williams, founder of style site A Continuous Lean, said after he shaved for the first time in six years and stopped to gauge what a mustache would do for him. "It made me look like a mid-'90s groundskeeper for the Yankees," he told me.

With my long quarantine mane, I looked more like a relief pitcher—one of those sidearm specialists from the '80s who would come in and usually give up a bases-clearing double.

So far I've kept my mustache to myself, but if I deem it worthy, I'll bring it out to society, like a debutante. I've seen some newly mustachioed men take polls on Instagram, but that undermines the entire undertaking because, to work, the mustache has to be treated with the utmost seriousness.

No matter what it looks like, the key is to present the mustache to the world with confidence, not like it arrived shamefully under cover of darkness. Randy Goldberg, co-founder of the sock startup Bombas, has discovered them sprouting over the lips of friends and colleagues on Zoom calls. "Some are sad and shocking. Some are surprisingly glorious," he observes. But like all spring flowers, they're also short-lived. "Most don't last more than a day." B

ILLUSTRATION BY DANIEL SALMIERI

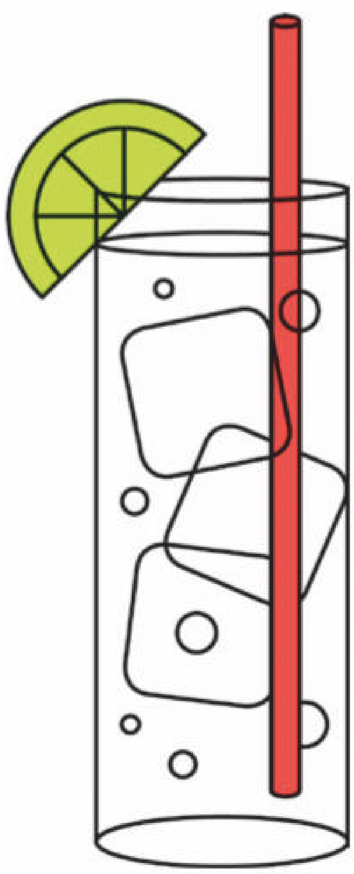
The Perfectionist's Home Bar

Take this time to master your favorite cocktail

Now that your "local" is your living room and barhopping constitutes carrying a drink from the kitchen to the couch, the best place to look for a good martini is in the mirror. It's a great time to perfect your bartending skills, and America is thirsty—spirits sales were up 63% year over year for the week ended March 22, according to data from Information Resources Inc.

We asked acclaimed mixologist Jim Meehan to help find your favorite version of beloved classic cocktails. Below, he recommends three terrific brands to try as the base liquor in each drink. You'll find the top whiskeys for a Manhattan, the best rum for a daiquiri, and even an upgrade for your go-to vodka-soda highball. (Go to bloombergpursuits.com for recipes.) The goal? Drill down on nuances of flavor and identify your taste preferences. After all, you're the bartender now.

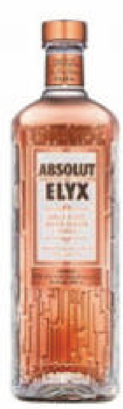
Alternatively: If you just want to stock up on top-shelf basics, buy the bottles pictured. They're Meehan's top picks.



✦ HIGHBALL

Explore: Vodka

Absolut Elyx showcases the bready character of winter wheat, producing a rich, round taste. Belvedere's two Single Estate Rye vodkas lend savory, peppery flavors to the mix. Poland's Zubrowka Bison Grass has a surprisingly sweet taste thanks to its grass base.



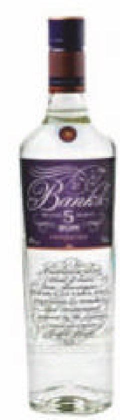
You'll also need ... Sparkling mineral water (regular club soda masks vodka's flavor), lime wedge.

Want a stiffer drink? These all make lovely martinis, too.

✦ DAIQUIRI

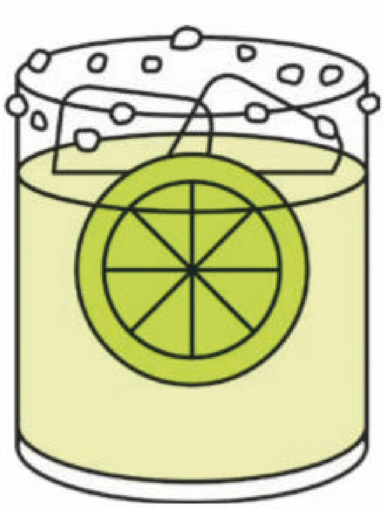
Explore: Rum

Banks 5 Island combines pot still and aged rums for a complex and highly aromatic (Japanese tea, banana) quaff. Bacardi Heritage is made in the original Cuban style: higher proof with nutty notes. Privateer Rum's Navy Yard has even higher ABV (57-plus) with a strong molasses character to balance a daiquiri's tartness.



You'll also need ... Fresh lime juice, simple syrup, lime twist.

Like smoke? Try Del Maguey Vida mezcal instead

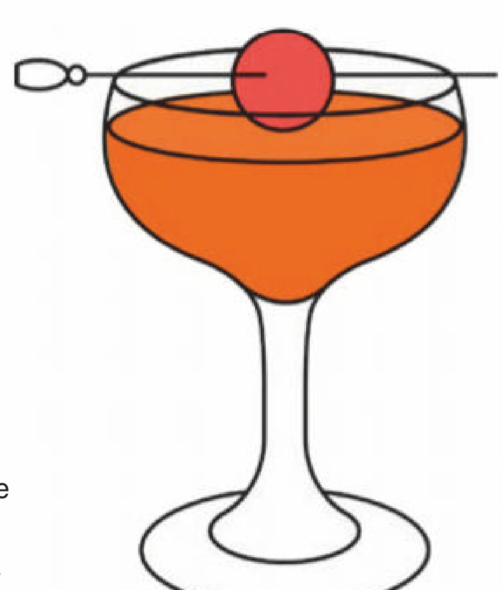


✦ MARGARITA

Explore: Tequila

Siete Leguas Blanco combines the volcanic minerality of the Tequila Valley with citrus aromatics and graham cracker sweetness. Fortaleza Blanco is even more minerally, making for a marg with bite. Aged for at least nine months, El Tesoro Reposado has a gentle oakiness that results in a rounder drink.

You'll also need ... Cointreau, simple syrup, fresh lime juice, lime round, salt (optional).



✦ MANHATTAN

Explore: Whiskey

The assertive grassiness of Ragtime rye is a superb bulwark against the vermouth. Lot No. 40 Canadian rye offers a caramel-smooth middle ground. Old Grand-Dad Bonded bourbon's baking spice flavors, notably cinnamon and vanilla, taste like liquid dessert.

You'll also need ... Sweet vermouth, Angostura bitters, maraschino cherry.

Want something less sweet? Make a Brooklyn with dry vermouth instead.

ILLUSTRATIONS BY JACI KESSLER LUBLINER

The Essentials

❶ SHAKER
There are two types. A "cobbler" is the recognizable metal shaker with a strainer beneath the fitted top. A "Boston" consists of a metal cup that covers a pint glass.

❷ BAR SPOON
The long-handled spoon for stirring.

❸ HAWTHORNE STRAINER
A flat semicircular wand with a coil that fits over the shaker.

❹ JULEP STRAINER
A finer-holed tool that keeps the ice out of drinks.

❺ JIGGER
Made to measure precise amounts of booze. Double-sided ones are best.

❻ Y PEELER
A wide blade for zest garnishes.

Going Pro

❼ ATOMIZER
For misting an accenting spirit inside a glass or on top of a drink.

❽ ICE PICK
A sharp metal spike for chipping ice.

❾ LARGE ICE CUBE MOLD
For crafting specialty ice that melts slowly in a drink.

❿ MUDDLER
Crushes sugar cubes, herbs, chiles, and more in the shaker.

Where to Shop Online

Cocktail Kingdom is the gold standard for all drink accessories, including ice trays and shakers, in an array of finishes. There are also special collections from bartending legends such as Dave Wondrich, who is selling a handsome punch bowl. California-based **Umami Mart** specializes in coveted Japanese brands, with an excellent selection of glassware, as well as bar tools, including the Yarai diamond-cut mixing glass du jour.

And What About Glassware?

Although it's all about the cocktail inside, a well-crafted glass enhances the experience immeasurably. **Steelite International** makes elegant dishwasher-safe vessels, such as tumblers, in a variety of styles. **Kimura Glass** is exceptionally thin and light, in classic shapes such as the old-fashioned and long-stemmed martini. Wine glass juggernaut **Riedel** has added drink-specific glasses—Nick & Nora, Sour, Fizz—to its already exquisite line of crystal coupes.
—Kate Krader

Cognac is brandy; not all brandy is cognac

✦ SIDECAR

Explore: Brandy
Paul Beau VSOP cognac, made with grapes from France's Grande Champagne region, is especially smooth, elegant, and a little floral. Château du Tariquet Bas-Armagnac is more rustic and in your face, with notes of dry fruit and tobacco. A California spirit on par with those of France, Osocalis Rare Alambic brandy gets fruitiness from pinot noir grapes.

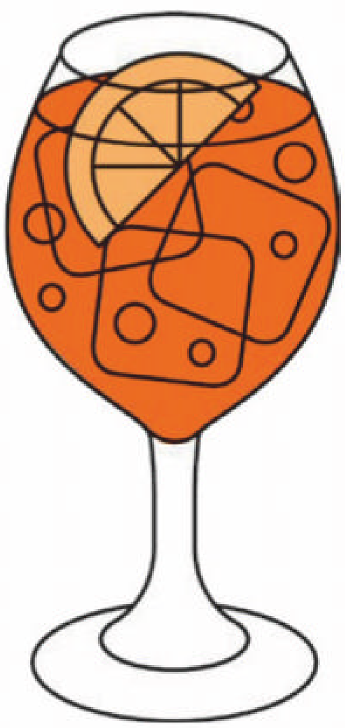
You'll also need ...
Cointreau, fresh lemon juice, sugar (optional).

✦ MARTINI

Explore: Gin
Expect a bracing finish with Fords gin, a superb, juniper-forward version of a London dry. Bombay Sapphire vapor-infuses its botanicals for a subtler, smoother taste. *Terroir* in gin is big; Hepple's potent wild juniper, Douglas fir, and lovage taste like Northern England.

You'll also need ...
Dry vermouth, olives (always three) or a lemon twist.

Like vodka better?
The brands under the highball section also make a mean martini.



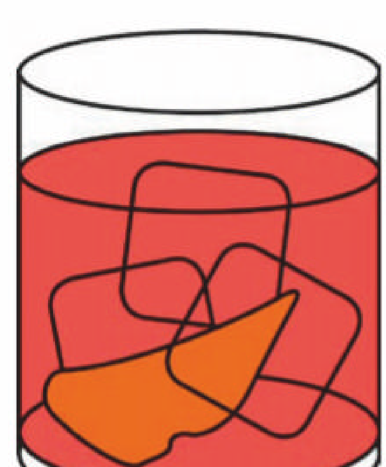
✦ SPRITZ

Explore: Bitter apéritifs
The quintessential base for the spritz, Aperol brings a sweet, citrusy burst with a gentle bitterness. Select Aperitivo, from Venice, lends a more pronounced edge. The California-made St. George Bruto Americano has an even brighter, more orangey flavor.

You'll also need ...
Prosecco, club soda, orange wheel.

See that negroni to the right? These apéritifs can sub in for Campari, too.

An equal-parts cocktail for easy drinking



✦ NEGRONI

Explore: Sweet vermouth
Martini & Rossi Rosso's singular bittersweet flavor has set the standard since 1863. Alessio Vermouth Chinato doubles down on bitterness with extra quinine (which gives tonic its pucker). You'll notice more fruitiness with Cocchi Vermouth di Torino.

You'll also need ...
Campari, gin (London dry is standard), orange peel.

Want a lighter drink?
Swap the gin for soda water, and you have an Americano.

PHOTOGRAPHS COURTESY BRANDS

Despots at the Dinner Table

When you cook for a tyrant, you see his human side—and his teeth

By Howard Chua-Eoan

In a run-down brick shack, Otonde Odera prepares a small feast. As he seasons a fillet of fish, he consciously oversalts it–just the way his former boss liked it. That would be Idi Amin, dictator of Uganda from 1971 to 1979, who allegedly consumed the blood and liver of his enemies. Odera was his chef.

Now in his 80s, Odera lives in Kisumu, Kenya's third-largest city, in a kind of genteel poverty–occasionally reminiscing about his days in neighboring Uganda. Amin was good to him: He almost tripled Odera's salary to compete with the best hotels in Kampala, gave him a Mercedes and gifts of cash–and recommended three of his four wives. Almost all of that is gone now, vanished even before Amin was overthrown.

Odera is among the six cooks whom the Polish journalist and author Witold Szablowski has tracked down for *How to Feed a Dictator*, a piquant food travelogue with dimensions that are both comic and Faulknerian, with court intrigue and betrayal so sudden that the book may as well have been titled *In the Kitchen With Machiavelli*. The half-dozen subjects served food to power and, by assuaging the culinary cravings and hunger of tyrants, perhaps influenced the fate of nations.

Szablowski travels to Baghdad to find Abu Ali, Saddam Hussein's cook, and learns the recipe for the Iraqi dictator's favorite dish (it was called "thieves' fish soup," supposedly a specialty of robbers in Saddam's hometown of Tikrit). He also hears details of the murderous family dynamic: In a fit of temper, the eldest son, Uday, once took a metal rod to the head of one of his father's favorites–the man who'd hired Ali–and killed him. Saddam wept.

Szablowski discovers Fidel Castro's two chefs along divergent paths: first, Erasmo Hernández, who now runs a thriving restaurant in Havana, and then a man called simply Flores, who's gone mad and rambles on about El Comandante, with no one knowing whether what he's saying is true or false. In Albania the author encounters the man who cooked for Enver Hoxha and his wife and political partner, Nexhmije. The chef only wants to give his name as "Mr. K," because he's tired of explaining what he used to do for a living. After all, it isn't pleasant for contemporary Albanians to be reminded of Hoxha's four decades in power–and the countless number of people he had shot or sent to prison camps.

And then there's Auntie Mouen in Cambodia. Szablowski teases out her smiling personality, following her from jungle cook for Pol Pot's rebel army to the wife of the country's ambassador to China. Her relationship with the tyrant who turned Cambodia into the "killing fields"–with as many as 2.5 million people murdered–makes for a chilling story. In Szablowski's telling, Auntie Mouen not only cooks for the man–whose eerie nickname is Comrade Pouk, meaning "mattress," because he made everyone comfortable–but she's in love with him.

The author's previous book was *Dancing Bears*, an account of people in former dictatorships who are nostalgic for life under tyranny. And that theme continues through this volume. Even mad Flores, abandoned to poverty by what has become of the Cuban revolution, says that if Castro "came here today and said, 'Flores, I need your hand,' I'd cut off my hand and give it to him." In varying degrees, all the cooks in *How to Feed a Dictator* retain a certain loyalty to the tyrant they nourished–though most admit their own life was threatened by the conspiracies of the day. (Odera had to flee to Kenya when a friend betrayed him; Auntie Mouen was fortuitously in China when her name came up on a purge list.)

When Szablowski confronts Odera with the allegations of Amin's cannibalism, he breaks down crying. "No. It never happened," Odera says. "I never saw meat of unfamiliar origin, or that I hadn't bought myself." After describing the tears dripping from Odera's face, Szablowski writes, "He's staring at me, as if wanting to make sure I believe him.... As if he weren't capable of imagining that the man...whom he fed as a mother feeds her child, and whose good mood and well-being he looked after for many years–that this man could have eaten the livers of other human beings." It's the kind of moral ambiguity that is both the fascination and the horror of the book. B

PHOTO ILLUSTRATION BY JACI KESSLER LUBLINER; PHOTOS: GETTY (5)

Sound at Full Tilt

Upgrade your next streaming experience with a custom-fit Leon sound bar

Photograph by Hannah Whitaker

Whether the screen of your TV is 4K or 8K, odds are its audio quality is no better than OK. And while a sound bar can help matters, most are middling in aesthetics and, frankly, aural performance. Leon Speakers, a maker of high-end residential and commercial sound bars in Ann Arbor, Mich., solves both problems with its highly customizable HzUltima ($6,600 as shown). Most sound bars are "active"—that is, filled with electronics and amplifiers where resonating air should be, which diminishes their output. Leon's is passive: It requires an external amplifier—one you'll need to hide elsewhere—that can be far superior to the compact unit typically crammed inside.

THE COMPETITION

- The $2,200 Klipsch Heritage Theater Bar has six 4-inch woofers and three 3/4-inch tweeters stuffed into a box 49.5 inches wide. The company's standard-setting audio pedigree stretches back to before TVs had color.
- At a mere 2 inches deep, the $1,149 Martin Logan Motion SLM X3 can sit flush with most thin TVs. That said, the 48-inch-wide bar's dual 4-inch high-velocity passive bass radiators can still produce that desirable low-end sound.
- The relatively compact $950 KEF HTF8003—it's just 37.8 inches wide—provides a depth of sound that belies its size. That's owed in part to its "Uni-Q" driver array, which places a tweeter in the center of a midrange cone to create a more even sound dispersal in a room.

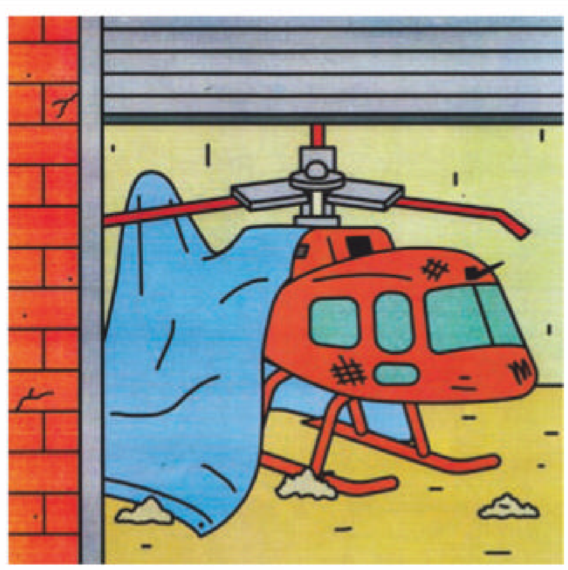
THE CASE

The first question you'll be asked when ordering an HzUltima is what size TV it will be going under. Each speaker is built to the width and contours of your screen and can be as wide as 10 feet. Leon offers seven standard wood finishes and eight fabrics for the grille, though it will customize with any color or material you choose. (Pictured is a walnut cabinet with a granite-gray grille.) The three-way speaker sports a half-dozen Morel 5-inch woofers and a trio of 28-millimeter soft-dome tweeters that produce a warm and detailed sound. Add a subwoofer if you're looking to have movie explosions truly rock the room. *$6,600 (as shown); leonspeakers.com*

A Creaky Financial System Slows China's Stimulus

By Shuli Ren

As the world's largest nations send out helicopter money amounting to well more than 10% of their gross domestic product to fight the economic effects of the coronavirus pandemic, China, which just suffered its first economic contraction in two decades, is conspicuous for its stinginess.



There are no cash handouts like the ones Americans have started receiving from Uncle Sam, or small-business loans that can be converted into grants. Instead, the stimulus estimate for China is almost embarrassingly small, at only 4% of GDP. Beijing is deploying indirect measures such as tax cuts, which aren't so helpful to a business that can't make any sales at all during the global lockdown.

So what's the problem? Beijing is paying the price for the slow pace of the country's financial reforms. When the U.S. government borrows money, it issues Treasury bonds, which are gobbled up by investors at home and abroad. Foreign governments, for instance, take up a good one-quarter of U.S. public debt. This isn't the case in China. While the nation boasts the world's second-largest bond market, there's only one major buyer of its sovereign debt: state-owned banks, which own about two-thirds of them—and don't trade them, but keep them until they mature. Foreigners hold only 10% of China's public debt, despite all the talk over the years of yuan internationalization and market opening. So every time Beijing expands its fiscal deficit and borrows money, it has to consider whether buying its new bonds will prevent banks from lending money to the corporate sector.

China is scrambling. It recently allowed banks to operate in the sovereign bond futures market, essentially giving them a hedging tool in case they wanted to trade sovereign debt instead. But it's a little late for that. Furthermore, big lenders have no incentive to aid small businesses. The diminutive scale of these loans, combined with a low maximum interest rate, mean the margins for big lenders are very thin. The big banks can make plenty of money taking deposits from the public—the rates they pay are kept artificially low by the People's Bank of China—and lending it to the government. On-and-off talks on interest-rate liberalization, which would have allowed banks to pay more to depositors, have never gone anywhere.

As a result, the government has to order banks to lend to small businesses. Recent, detailed guidelines demand that big banks discover first-time lenders themselves, instead of competing to win regional lenders' existing customers.

As Beijing is finding out, this recession is nothing like any other. It demands that China's smaller businesses, which account for about 80% of urban employment, don't go bankrupt and lay off workers. Despite all the reform talks, key elements of the country's sprawling economy remain inefficient and bureaucratic, making them ill-fit to pull China out of a deep recession. *—Ren is a columnist for Bloomberg Opinion*

ILLUSTRATION BY GEORGE WYLESOL

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