How to create a better resilient green transparent flexible efficient short supply chain

Experts are charting the post-pandemic supply chain. But can it be everything we need it to be?

Plus:
What’s driving stock market volatility

Why progress on the US racial wage gap has stalled
“No firm wants to be the dirtiest on the block.”

Page 54
While Rebecca Stropoli was in the process of researching and writing our cover story on supply chains, she was also waiting for a couch to be delivered. Like many of us over the past year, she received periodic notices that her shipment was delayed. When the couch finally arrived, two months late, it wouldn’t fit through her front door and had to go back on the delivery truck. In the meantime, she had just given away her old couch. “It’s actually pretty comedic if you think about it!” she emailed us. “What can you do?”

From couches to cars, medical devices, and industrial components, the past two years have prompted a supply-chain crisis the effects of which have ranged from the inconvenient to the life-threatening. Bottlenecks are easing, but supply chains are always evolving and will face yet more and different shocks to come. The rise of e-commerce has driven up customers’ expectations of immediate delivery, which in turn has put pressure on retailers and suppliers. Climate change is already having an effect on supply chains, and has been responsible at least in part for the shortage of computer chips.

How can logistics professionals create better, stronger supply chains that are resilient, green, and more? Our cover story (page 26) brings together insights from leading researchers including Chicago Booth’s John R. Birge, René Caldentey, Anna Costello, Nicole DeHoratius, Levi DeValve, Chad Syverson, Linwei Xin, and Yuan Zhong.

Part of the problem is a mismatch between supply and demand, two forces that are also central to our feature about stock market volatility (page 38). Harvard’s Xavier Gabaix and Booth’s Ralph S. J. Koijen are among the researchers arguing that financial models need to account for investor demand. Their inelastic markets hypothesis explains why they calculate that stock returns are more volatile than fundamental information would imply they should be.

Elsewhere, Booth’s Christina Hachikian writes about how managers can keep priorities and team members in balance at companies that are both for profit and mission driven (page 47), the first in a series of columns on social impact.

If the delivery of this magazine is ever delayed, please find us online. You’ll notice some upgrades to our website—now at chicagobooth.edu/review—including a new layout and color palette, better image quality, and improved accessibility. Our enhanced search function will help you mine our wealth of articles, videos, and interactive charts, and you can sign up for our email newsletters to make sure you never miss our coverage of the latest research.

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**Editors’ Letter**

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**Cover Illustration by Muti**
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Erik Hurst, the Frank P. and Marianne R. Diassi Distinguished Service Professor of Economics and a John E. Jeuck Faculty Fellow, is the deputy director of the Becker Friedman Institute. His research has addressed a variety of topics at the intersection of macroeconomics, labor economics, and urban economics—from the falling participation rate of men in the workforce, to the costs of gender and racial discrimination, to the causes and consequences of urban gentrification. (Page 7)

Yuan Zhong, associate professor of operations management, conducts research that focuses on the design and analysis of stochastic (randomly determined) systems, with applications in cloud computing, manufacturing, e-commerce, and more. This issue features some of his findings’ applicability to supply chains. One core message, he says, is that “businesses that invest a small amount in making capacity more flexible are better able to match supply with demand.” (Page 26)
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Your team
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Ralph S. J. Koijen, the AQR Capital Management Distinguished Service Professor of Finance and a Fama Faculty Fellow, is a research associate at the National Bureau of Economic Research, codirector of the NBER Asset Pricing Program, a research fellow of the Centre for Economic Policy Research, and a coeditor of the Review of Financial Studies. He has been awarded two prestigious early-career awards: the 2019 Fischer Black Prize and the 2020 Germán Bernácer Prize. (Page 38)

Christina Hachikian, clinical associate professor of strategic management, teaches courses on scaling, social innovation, and impact. She coaches Booth’s John Edwardson, ’72, Social New Venture Challenge and was the founding executive director of Booth’s Rustandy Center for Social Sector Innovation. She also serves on a variety of committees and boards in the education and workforce-development sectors, and was named to Crain’s Chicago Business’s 40 under 40 list in 2019. (Page 47)
DISABILITY SHOULD BE PART OF THE WORK-EQUITY DISCUSSION

Does remote work promote equity? (Fall 2021 issue)

I recently read your article regarding remote work promoting equity and thwarting microaggressions for certain populations. What was noticeably absent from the article was any mention of people with disabilities, who constitute the largest minority group in the United States. People with disabilities are also the minority group most likely to be underemployed and paid less for the same work as able-bodied colleagues.

Remote working allows people who have a mobility-related disability or who are living with chronic pain the opportunity to better manage their condition, have more privacy and control around disclosing their disability, and expend less energy on daily tasks that add no value (such as commuting). It also helps individuals with invisible illness avoid insensitive comments such as “but you don’t look sick” and increased scrutiny from human resources and managers for absenteeism if the employees cannot be physically in the office with little notice.

While I was a student at Chicago Booth, I experienced firsthand how difficult it was to receive accommodations for an invisible disability. There was no student organization on campus for Booth students with disabilities during my time there. As an alumna, I have observed that the school gives very little, if any, attention or research support to the disabled workforce or has anyone in the career office equipped to answer questions related to employment while living with a chronic condition.

For purposes of comparison, I receive full Harvard Business Review access through my employer and they publish a wealth of articles and research about employment topics for people with disabilities. I am a leader within my employer’s disability affinity group and actively share resources from HBR, yet I am unable to share any thought leadership from my alma mater with them.

I challenge Chicago Booth, as well as the University of Chicago, to examine beliefs or research practices that are ableist and to start including disability in its overall diversity and inclusion strategy.

—Dana Fortini

Thank you for this insightful letter. We will keep your points in mind as we plan coverage and write up research exploring equity issues from both workplace and policy perspectives. There is a larger institutional effort at Booth to support the full scope of diversity, starting with last year’s creation of a director of global diversity and inclusion.—Eds.

IS FEDERAL DEBT A TRANSITORY SHOCK?

What makes it hard to control inflation (Winter 2021/22 issue)

¡Qué buen artículo! Tan claro como el agua (embotellada). Hace días puse un tuit que pasó desapercibido: “Ya nadie se acuerda del Principio de Taylor.” La tasa de interés debe subir más que la inflación. Jordi Gali muestra que esto incluye choques transitorios a la inflación.

What a good article! As clear as (bottled) water. I recently wrote a tweet that went unnoticed: “Nobody remembers the Taylor Principle anymore.” It holds that the interest rate must rise more than inflation. Jordi Gali [of Pompeu Fabra University] shows that this includes transitory shocks to inflation.

—Abraham E. Vela Dib
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In a study from the Rustandy Center for Social Sector Innovation, researchers at Chicago Booth examined firms’ corporate social responsibility (CSR) reports, providing a detailed look at 69 of the most commonly disclosed metrics across S&P 500 firms. To read the report, visit bit.ly/CSRMetrics. If you’re interested in research insights like these, sign up to get the latest from the Rustandy Center, Booth’s hub for social impact.
Why progress on the US racial wage gap has stalled
Black men face barriers to entry for many of the best-paying jobs

The wage gap between white and Black men in the United States has persisted for generations, but there are reasons to think it should be smaller today than it was 40 years ago. Legalized forms of racism that allowed employers to bar Black Americans from jobs, or to pay them less for equal work, have been banned for a half century. Indicators of bias—such as white Americans’ attitudes about whether they would vote for a Black president or whether they would support interracial marriage—have improved over time, suggesting that discriminatory preferences in some domains have diminished. And although Black men still lag white men on accumulated years of schooling, the education gap has narrowed.

Yet gains in the relative wages of Black men have stalled in recent decades. By 1980, average earnings among employed Black males, measured after accounting for differences in years of schooling, were about 80 percent of those of working white men, up from 60 percent in the 1940s. Black men, both employed and as a whole, have lost ground since.

Chicago Booth’s Erik Hurst, Yona Rubinstein of the London School of Economics, and MIT PhD student Kazuatsu Shimizu have been working to understand the reason for this. Their research suggests that Black men face high barriers of entry to many of the best-paying jobs, and the returns to these jobs have increased since 1980.

The researchers’ argument is premised on a concept that they call task-based discrimination, a nod to work by the late Nobel laureate Gary...
The types of jobs people do affect earnings equity

Black men in the United States are almost as likely as white men to have jobs involving “contact” tasks, but they’re far less likely to have jobs that require “abstract” tasks.

S. Becker. In a book published in 1957, which framed discrimination in a market context, Becker argued that some prejudiced employers prefer hiring white workers rather than Black ones. He presented a model that has been known since as taste-based discrimination—as in, some employers have a “taste for discrimination” and as a result pay their Black workers less. A competing economic theory, statistical discrimination, argues that people with imperfect information end up making decisions using observable characteristics, often relying on stereotypes to make up for what they don’t know.

Neither model completely explains today’s situation, however, and Hurst, Rubinstein, and Shimizu put forward a framework that is informed by the tasks required by the modern economy. Its core idea is that every occupation involves different tasks, which in turn require certain skills to perform them. The intensity of discrimination varies depending on the mix of tasks involved.

For a half century, the Department of Labor has conducted surveys that map jobs to the tasks required, and more recently, economists including MIT’s David H. Autor and University of Zurich’s David Dorn categorized occupations by the extent to which they require three types of tasks: abstract, routine, or manual. Every occupation involves at least one of these, and sometimes all three, in varying amounts. For example, CEOs, computer programmers, engineers, and lawyers all do work that involves a higher proportion of abstract tasks.

Hurst, Rubinstein, and Shimizu added a fourth category, contact, to refer to tasks that involve a lot of personal interaction. Medical professionals, restaurant workers, sales clerks, and teachers all do jobs that involve many contact tasks. “If we’re going to look for a place where discrimination might be more important, we imagine that this might be more salient,” says Hurst.

Using data from the US Census Bureau, the researchers document that in 1960, Black men were less likely to sort into (read: end up in) jobs requiring either abstract or contact tasks. However, after 1960, the racial gap with respect to sorting into contact-heavy jobs narrowed substantially, while the gap in abstract-heavy jobs remained constant. As the economy changed, molded by forces including international trade and automation, Black men were left out of those jobs—and are now no more likely than they were 60 years ago to do work involving many abstract tasks.

That’s bad for earnings equity because wages for these tasks have risen faster, putting Black men at a disadvantage. The rising return to abstract tasks increased the racial wage gap by 7 percentage points between 1980 and 2018, the researchers calculate. If the wages paid for different tasks had instead remained equal, the racial wage gap would have shrunk instead of stagnating.

The force of those rising earnings in jobs such as information technology canceled out gains made in other areas. “Those two effects have offset each other from 1980 onward,” says Hurst. The racial gap in some skills has narrowed, and anti-Black discrimination has abated some, but the underrepresentation in jobs with rising value has been a force pushing against the wages of Black men.

What’s behind this persistent underrepresentation in abstract jobs? In short, the research argues, unequal opportunities early in life. The researchers looked to some tests and surveys that, while imperfect, provide information about how Black and white men measure up in terms of skills when they are young adults. Doing this, they find that barriers develop early on that tend to make it hard for many Black men to reach high-paying jobs.

One long-running government survey allowed the researchers to compare the skill levels of Black and white teenagers in
1979 and 1997—and then to look at what kinds of jobs the teens went on to do when they were in their 30s. There was a clear path for young people with social skills into contact-heavy jobs, regardless of their race. Black and white teens showed around the same levels of social skills, and those levels strongly predicted whether the teens would go on to do contact jobs. The end result is that the teens who started off with essentially the same social skills went on to do essentially the same jobs.

Any difference in sorting into contact jobs, the researchers conclude, stemmed largely from hiring discrimination. And when the researchers analyzed data from government surveys that have regularly asked Americans questions such as whether they’d vote for a Black president, exploiting variation across states, they find that this racial gap in sorting was highly correlated with survey-based measures of discriminatory attitudes. The racial gap in contact tasks narrowed between 1960 and 2018 as discriminatory attitudes improved. “There is no doubt that taste-based discrimination is still a feature of the US economy today. It is just that the level of discrimination today is smaller than it was 60 years ago,” says Hurst.

But the story was different for abstract-heavy jobs. According to the measures the researchers looked at, Black teens lacked certain skills that projected into the likelihood of becoming CEOs, engineers, judges, or software developers. This skills deficiency is almost certainly the result of current and past discrimination, Hurst says, and it means that the economy has penalized Black men in two ways—first through discrimination in hiring, and second through barriers to the acquisition of increasingly valuable skills.

Given that the return to abstract tasks is rising, it is more important than ever to reduce early life barriers that are preventing Black men from getting jobs that require abstract tasks, the researchers write. Applicants need to have certain skills to qualify for those jobs, and education is key. “It is becoming even more important today to equalize opportunities in early childhood to close the racial Abstract skill gap given that the return to Abstract skills has been rising over time,” Hurst, Rubinstein, and Shimizu write. This skills gap needs to be surmounted for progress on the wage gap to resume.—Dee Gill and Emily Lambert

LESSONS FROM GREECE’S LONG DEPRESSION

WHEN THE Greek economy collapsed in 2007, it sent the country into the worst depression in modern history, lasting a decade. Understanding what happened, and what the country’s leaders could have done differently, may offer useful insights for countries around the globe, suggests research by Harvard’s Gabriel Chodorow-Reich, University of Minnesota’s Loukas Karabarbourounis, and Chicago Booth’s Rohan Kekre. Among other lessons, they find that bank bailouts can be a useful tool, and that it’s important in a budgetary crisis to strike the right balance between cutting spending and raising taxes.

Depressions of this magnitude and duration happen so infrequently that many of their causes and consequences remain a mystery to economists. To make sense of Greece’s economic cycle, the researchers developed a macroeconomic model featuring diverse households, the government, banks, production sectors, and the rest of the eurozone.

They find that Greece’s economic boom resulted from increased demand for the country’s goods and increased consumption spurred by government transfers such as pension and unemployment payouts. The ensuing bust, they argue, was caused by a combination of demand and supply factors, including an uptick in long-term unemployment and higher taxes imposed by the government, which led to more precautionary savings and lower overall economic activity.

Using their model, which closely mirrors the country’s actual experience from 1998 to 2017, the researchers also evaluated what might have happened had Greece implemented several alternative policies or actions. Granted, the model doesn’t account for possible political events such as a revolution or massive social unrest—but within its scope, it provides a way to evaluate several other scenarios.

If the Greek government had focused more on cutting spending and less on raising taxes to address its budgetary crisis, the economy would have been better off, the researchers find.

Their model suggests that the decline in output would have been 6 percentage points narrower by 2017. The research doesn’t explore who might have benefited most from that improvement, focusing on the overall picture for Greece. But if the goal was maximizing output, “Did they choose the right mix of fiscal adjustments?” Kekre asks. “If you need to plug a hole in the budget, should you do it by cutting spending or raising taxes? We argue they went too far in the latter direction.”

In another alternative, if Greece had not received bailouts from the International Monetary Fund and European institutions, the country’s depression would have been even severer, the researchers find. Without that external assistance, Greece would have experienced an additional 20 percent decline in output at the beginning of the crisis and an additional 5 percent contraction by the end of it, Kekre says.

Greece’s use of some of those funds to bail out its banks was also important for mitigating an even worse depression, according to the model. Without this action, output would have been 4 percentage points lower in 2017.—Sarah Kuta

Go to chicagobooth.edu/review to see citations for research mentioned in this article.
The researchers studied the issue through the used-car market in the United States, which was big business even before the global semiconductor shortage sent prices through the roof. Auto dealers, fleet operators, and leasing companies trade more than $80 billion worth of vehicles in wholesale auctions every year, with thousands of autos changing hands on any given day.

The stakes can run high, particularly for smaller used-car dealers trying to optimize inventories and profit margins. But it’s an imperfect system. All cars are subject to rapid-fire, 90-second auctions that often fail to result in a sale. When that happens, auction houses name an intermediary to help broker a deal between the seller and the highest bidder.

To isolate and determine the role of the negotiator, Larsen, Lu, and Zhang stripped out external factors that could influence the outcome, such as the time and day of the week, the seller’s track record or background, and the model and other characteristics of each vehicle. They were then able to compare negotiations and negotiators to assess their impact on the probability of trade.
A good mediator can significantly raise the chances of closing a deal, they find. Mediators in the 75th percentile according to performance were 22 percent more likely to broker a deal than those in the 25th percentile, the researchers calculate. Mediators negotiated more money for sellers than the top bid while getting a break for buyers from sellers’ undisclosed reserve prices. 

Successful intermediaries were most effective at nudging sellers and buyers off their preconceived pricing limits, according to Zhang. “The third party’s job is to somehow get both players to back down enough to find a mutually acceptable price and have them move on to an agreement,” he says.

To determine what the successful intermediaries were doing differently, the researchers looked at the successive rounds of negotiations in each individual case. They discovered that in 66 percent of the deals made, brokers were able to get their sellers to accept the first price at the first round of negotiation. With the unsuccessful negotiators, sellers only accepted the first offer 34 percent of the time.

Thus, the best mediators were more adept at getting sellers to back down and agree more quickly, whereas the others encouraged clients to hold off and push back. Dragging things out didn’t help, the researchers find. The average bargaining thread lasted just 1.37 rounds and ended after six hours, they write.

Their findings could have ramifications for a range of real-world bargaining situations—among countries, businesses, investors, consumers, or litigants. “Third-party mediation is really common in a range of bargaining settings in industry, from used cars to real estate and beyond,” Zhang says. “People use mediators because negotiation is itself a bit of an imperfect sport.”

Mediators, the researchers observe, “are often at the center of massive transactions,” such as investment banks handling giant acquisitions and lawyers working out pretrial settlements. The analysis demonstrates the value of mediation, says Zhang, as well as what works best, which he says is “getting your seller to accept the price fast and up front.” –Aíne Doris

**WHY TO GIVE FAMILIES A CUSHION, EVEN IN ECONOMIC BOOMS**

**WHEN A** pandemic or other event delivers a shock to the US economy and business activity shrinks—potentially leading to a recession—the federal government can, if politics permits, roll out a variety of big-bucks fiscal and monetary tools to cushion the blow to the public’s welfare.

But what about household welfare when the primary wage earner dies, or becomes disabled, or loses employment for reasons unrelated to a recession? That’s where policy makers could dramatically bolster the economy and the well-being of families, according to Chicago Booth’s George M. Constantinides. It would require weaving a better social safety net, he argues, to provide insurance against such events.

Constantinides constructed a model to analyze the costs of such idiosyncratic events, as compared with aggregate shocks that affect the whole economy. These kinds of individualized disruptions can have a considerable long-term effect at the household level.

He gathered quarterly household-level consumption data from the Bureau of Labor Statistics’ Consumer Expenditure Survey from the first quarter of 1982 to the fourth quarter of 2019 and took into account interest rates, asset prices, and dividends. With these, he was able to compare the family-level benefits of easing the effects of these idiosyncratic consumption shocks, whether they were dependent on the business cycle or not, with those of smoothing out fluctuations in aggregate consumption growth.

Constantinides finds that buffering shocks unrelated to the business cycle gives households greater satisfaction (welfare, in economic terms), far more than cushioning against business cycle–specific shocks.

Specifically, he estimates that eliminating aggregate shocks, such as an economic downturn, would create a benefit to the average household member of about 77 percent of utility, an economic measure of satisfaction. In other words, households would increase their satisfaction by the same amount as if they were to increase their future consumption by 77 percent.

Eliminating idiosyncratic shocks that are related to the business cycle—think of losing your job during a downturn—would yield benefits of just 34 percent. But if a household could avoid idiosyncratic shocks unrelated to the business cycle—such as losing a job during an economic boom—that would lead to far bigger benefits, 47.3 percent, representing almost half of a person’s utility.

This implies that policies designed to ease idiosyncratic shocks not caused by a recession yield substantially greater benefits than those policies aimed at addressing recession-driven shocks. The Coronavirus Aid, Relief, and Economic Security (CARES) Act is an example of such a policy, he explains. The government sought to cushion the blow of unemployment during the pandemic, which occurred contemporaneously with a recession but was not necessarily caused by one.

The takeaway for policy makers is that in addition to trying to address economic shocks with a broad brush, they should also focus on providing relief at the household level for dramatic losses of income unrelated to the downturns of the business cycle.—Martin Daks

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We are two years into the COVID-19 pandemic, and there seems to be no clear end in sight. What could we have done differently to end the crisis faster? On one hand, vaccines are an almost unbelievably remarkable scientific, engineering, and logistical achievement—from their development to getting them into people’s arms. On the other hand, we haven’t vaccinated the world fast enough.

Starting in spring 2020, a big team of researchers, which I joined that summer, were banging the drum at policy makers to go big on vaccines. Some of our exercises suggested that countries, even before knowing which vaccines would work, should throw a ton of money at the problem to increase production capacity. To paraphrase something [Harvard’s] Larry Summers has said, if your family’s survival depended on getting a pizza in 30 minutes, you’d order from 20 different places in hopes of getting at least one on time. If we had done that with vaccines at the levels suggested by our calculations, we would’ve been able to vaccinate the United States by March 2021 and the world by October 2021.

We should have spent more to fight COVID-19. We still can.

Eric Budish, Paul G. McDermott Professor of Economics and Entrepreneurship and Centel Foundation/Robert P. Reuss Faculty Scholar
IN SOME PLACES, COMMUNITY TIES HELP SECURE TRADE CREDIT

WHEN BUSINESS owners need credit, what is the likelihood they will repay the loan, and what recourse does a lender have if a borrower defaults? In many economies, transparent financial reporting, impartial auditing, and effective courts help address these questions and keep commerce humming. But where these supports don’t exist, community plays an important role in credit access, research suggests.

Chicago Booth’s Rimmy E. Tomy and University of Southern California’s Regina Wittenberg-Moerman analyzed how trade credit is used at a large marketplace that lacks many market institutions governing finance. Community plays a strong role in credit access, providing information and some measure of insurance against default, they conclude.

The researchers studied merchants at Lewduh, a large bazaar in northeastern India. Most retailers operating there—selling everything from footwear and appliances to textiles, tobacco, and betel leaves—rely on credit from wholesalers. The market hosts multiple products and ethnic communities, and is in many ways similar to bazaars that exist across the world, the researchers write.

They interviewed 146 wholesalers who provide trade credit and 357 retailer borrowers, creating a data set that reflects 1,230 wholesaler-retailer relationships. For each trading link, the researchers collected data on trade-credit decisions, including terms, responses to defaults, information collected by lenders, and characteristics of the link, such as length of the relationship. They also recorded gender, age, education, years in operation, and other demographic information.

Trade credit, they find, is used widely. Almost three-quarters of all trading links involved extending or accepting some amount of lending. When such lending wasn’t offered or received, there were common reasons, including past nonpayment, distance between the wholesaler and a retailer’s shop, lack of trust, a policy of not giving credit to anyone, and, among retailers, infrequent visits to the wholesaler’s shop.

Community played a strong role in the decision of whether or not to offer credit, and how much. Wholesalers were 12 percent more likely to provide trade credit to retailers from their own community and extended 8 percent more credit to them. Wholesalers were also 14 percent less likely to experience defaults from same-community retailers. However, in the event of failure to pay, they were also less likely to repossess goods, deny future credit, or take other actions against retailers within their ethnic community.

The researchers provide evidence suggesting that an indirect reciprocity mechanism explains the cooperation between wholesalers and retailers from the same community. This cooperation, they write, is a response to income instability and a lack of formal sources of insurance.

Tomy and Wittenberg-Moerman conclude that in areas lacking formal reporting and resolution systems, an indirect, community-driven reciprocity mechanism may fill in and enable access to credit. And when they conducted follow-up interviews with the traders, they found the same mechanisms appeared to be at work following the region’s COVID-19-related lockdown.—Martin Daks

How to calculate how much high-frequency trading costs investors

High-frequency trading has been a popular stock market villain for more than a decade. Known as HFT, the controversial but legal practice of seeking tiny profits on rapid buying and selling of stocks was blamed for the 2010 flash crash and became the focus of Michael Lewis’s 2014 nonfiction bestseller *Flash Boys.*

For all that notoriety, nobody really knew how much HFT was costing investors, or how HFT companies competed with one another to skim profits. Chicago Booth’s Eric Budish, with Matteo Aquilina and Peter O’Neill of the UK Financial Conduct Authority, found a way of studying winners and losers in the hundreds of thousands of daily races by traders to profit from minuscule moves in individual stocks.

They estimate that in typical years in global stock markets, HFT winners may gain $5 billion at the expense of other market participants; that figure was $7 billion for 2020, a highly volatile trading year. While those are relatively small sums in global markets that have a collective $95 trillion in value, it’s still a lot of money coming out of investors’ pockets, the researchers write.

Further, HFT takes place in other markets as well, including those for futures, options, bonds, currencies, and cryptocurrencies. The researchers’ estimates apply only to the global stock market, implying that the full price tag associated with HFT could be significantly larger.

The problem of understanding HFT has been incomplete records. If a fast-trading institution successfully bids on a stock, there is a trade execution record. But for every winner, there might be many more institutions that put in a bid but weren’t fast enough to make the trade. Aquilina, Budish, and O’Neill found a work-around: they obtained nine weeks of electronic-message traffic between market participants and the London Stock Exchange from 2015, all involving the 350 biggest stocks traded there. The messages included all new orders and order cancellations sent to the exchange and, crucially, whether these requests succeeded or failed. This provided more information than what exchanges usually release to researchers, which is only successful orders and cancellations. “Traditional data are like seeing Usain Bolt run the 100-meter dash and win, without seeing all the other amazingly fast runners who run against him and lose,” says Budish. “Our data are like seeing the full race.”

The average stock in the FTSE 100 Index was involved in 537 trading races a day, with an average race time of around 80 microseconds, the researchers demonstrate. (A microsecond is one-millionth of a second.) Winners beat losers by only five- to ten-millionths of a second—“less than 1/10,000th of the time it takes to blink your eye,” they write. The six largest HFT players dominated the market, making up most of the winners and losers on each trade, Aquilina, Budish, and O’Neill find.

Trading profits were small, but the huge volumes involved led to substantial totals, according to the researchers. They calculate that winning the average race was worth about £2 ($2.75), and that HFT races accounted for more than 20 percent of the volume on the London Stock Exchange.

HFT races accounted for about a third of the bid-ask spread, the researchers find. That spread between the price buyers are offering for a stock and what sellers are asking is a key measure of the cost of transacting in the market, thus races effectively impose a tax on investors, the researchers argue.

If markets were to be designed in a way that eliminated the negative aspects of HFT, investors could save 17 percent of their liquidity costs on each trade, the researchers find. That savings might not amount to much for individual investors, but it would add up to significant trading costs for pension funds, investment funds, and other large investors, according to the researchers.

“Flawed market design drives a significant fraction of daily trading volume, significantly increases the trading costs of large investors, and generates billions of dollars a year in profits for a small number of HFT firms and other parties in the speed race,” who then have significant incentive to preserve the status quo,” they write.—Michael Maiello

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‘Stealth consolidation’ is leading to kidney-failure deaths

US antitrust law is supposed to protect consumers from sky-high prices and subpar quality. But a loophole in the current rules may be causing sickness and death among people with end-stage kidney failure, suggests Chicago Booth’s Thomas Wollmann.

By law, companies must notify the federal government of their plans to merge or buy other companies—but only in large deals, typically those valued at more than $92 million. Smaller transactions that fall below legal thresholds are exempt from the notification reporting requirement, meaning that many take place under the radar. Wollmann calls this “stealth consolidation” and says it occurs in local services or differentiated manufacturing industries ranging from software to prescription drugs to automotive sales.

These mergers are especially common in the dialysis industry, which provides life-saving care for patients whose kidneys no longer clean their blood. Two decades ago, hundreds of independent dialysis facilities across the country provided treatment. Today, after acquiring nearly all of these locations, two multinational providers—DaVita and Fresenius—and a handful of others dominate the industry.

The dialysis behemoths built their empires through years and years of small deals that largely passed unnoticed by antitrust enforcement agencies. The results, Wollmann reports, are duopolies and even monopolies in local markets. With treatment prices set by Medicare, which pays for almost all dialysis, the only way for clinics to exercise market power is to lower the quality of care.

“In most industries, increased market share will translate to price increases, but in dialysis, providers don’t have that lever to pull on,” Wollmann says. “What they can do is reduce quality. If you create a monopoly and the price is fixed, quality typically goes down. In the health-care sector, if you have very sick patients, that’s not only going to mean more trips to the hospital, but also, unfortunately, it’s going to mean people die.”

Wollmann gathered and analyzed Medicare and Federal Trade Commission data from 1996 to 2017, then created a structural model to evaluate the effects of the more than 2,000 facility acquisitions that went unreported during that period. He finds that acquisitions of competing dialysis facilities that were exempt from premerger notification were linked to a 3.6 percent increase in hospitalization rates and a 1.8 percent decrease in survival rates.

He also used the model to predict how quality would have evolved if all dialysis acquisitions required premerger notifications. In this scenario, he finds that the benefits of stricter reporting requirements—as measured in human life-years saved—are nearly two orders of magnitude higher than the costs associated with increasing antitrust-enforcement resources. By Wollmann’s count, lowering the reporting threshold for mergers and acquisitions would result in $3.6 billion–$4.7 billion in savings, while the costs would be less than $50 million.

Assuming that a statistical life year is valued between $100,000 and $150,000, the benefits produced would dwarf prosecution costs, he calculates.

This is partly because enforcement agencies are efficient in that their budgets are a small fraction of the economic activity that they regulate, and because making the rules stricter would deter dialysis companies from attempting mergers and acquisitions in the first place, Wollmann argues. “Deterrence is a broad concept, but it really has bite in antitrust,” Wollmann says. “There are big costs to organizing a merger, so if you expect the merger to be blocked, you’re not going to attempt it in the first place—that’s the very reason we’ve never seen Coca-Cola and Pepsi try to merge. Since mergers like that aren’t proposed, the government doesn’t have to spend any money blocking them.”

At a time when lawmakers are already considering how best to improve US antitrust laws, Wollmann says he hopes they will also take a closer look at premerger notification thresholds. He suggests a few creative ways to improve them, such as setting specific thresholds for different industries or assigning states to investigate smaller mergers and acquisitions, for example.

Whether small mergers in other sectors are as harmful as they are in the dialysis industry remains an open question. However, Wollmann says, “if these industries remotely resemble the dialysis industry in terms of the effects of stealth consolidation, the issue must be addressed.”—Sarah Kuta


—GUY ROLNIK of Chicago Booth at A Meeting of the Minds, an event series sponsored by Booth and the Stavansovich Institute on the Formation of Knowledge

Warren Buffett, Moats, and the Power of Storytelling

“Probably one of the top storytellers of this time and age is Warren Buffett, who only invests in companies with ‘moats.’ You have this medieval castle, and in order to make sure that people don’t take business from the castle, the duke builds this moat. This is a great story.

In economics, we have another word for a moat: monopoly. But Buffett cannot say, ‘I like investing in companies that have a lot of market power and can raise prices’ or ‘I like companies that have very little competition.’ So you come up with a story—a moat.”

—SARAH KUTA

Spring 2022 Chicago Booth Review 15
Low interest rates reflect inequality, not boomers’ savings

B lame the baby boomers. It’s a common sentiment among millennials that the generation born between 1946 and 1964 has ruined the United States and is responsible for the high cost of housing, the national debt, climate change, and low interest rates that punish savers.

That last one may not actually be their fault, according to Princeton’s Atif Mian, Harvard’s Ludwig Straub, and Chicago Booth’s Amir Sufi. Rates that are stuck near zero tend to correlate with economic stagnation and price bubbles, while also limiting monetary-policy makers’ ability to respond to downturns by lowering rates further, the researchers observe. But the likely culprit for the current situation is the dramatic increase in income inequality, Mian, Straub, and Sufi find.

Shifting demographics and related increases in savings—particularly among the massive postwar generation—are widely cited explanations for the decline in rates. The researchers put this to the test by examining data from the Federal Reserve’s Survey of Consumer Finances Plus (known as SCF+), spanning 1950 to 2019. They focused on two key factors: the variation in savings rates across demographic groups at different points in time and the subsequent shifts in income share within these groups.

The baby boomer argument is premised on the theory that when a generation hits middle age, its members begin to save more. Younger generations don’t save as much, according to this

### People who made more saved more

Savings rates varied more on the basis of income than the rates across generations did.

#### Estimated savings rates for income and age groups, 1953-2019

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<th>Income group</th>
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Mian et al., 2021
thinking, and thus borrow more. The oldest workers do not save, instead consuming all of their wealth before dying. The borrowing rates of younger generations must match the savings of the middle-aged group.

If the middle-aged population is larger than the younger generation, there will be an imbalance, and interest rates will have to fall to stabilize the lending-borrowing market. Thus, rates decline when a large population with high savings rates—such as the boomers—passes through middle age. The pattern should be reversing as the boomers age, retire, and stop saving.

However, the researchers’ data tell a different story. Mian, Straub, and Sufi examined the income distribution and savings rates of high-, middle-, and low-income households in each cohort—aged 18 to 34, 35 to 44, 45 to 54, 55 to 64, and 65 to 74. They find that savings rates varied more across income groups within each age cohort than they did across the age cohorts themselves.

Households in the top 10 percent by income within each segment saved at a rate 10-20 percentage points higher than the rate of the bottom 90 percent. While this pattern was present throughout the entire sample period, it became more significant over time, particularly between 1983 and 2019. The researchers find that the top 10 percent within each birth cohort over that period of time had an income share nearly 15 percentage points higher than the top 10 percent before 1980.

The researchers estimate that as more income flowed to the top 10 percent, that group saved 3-3.5 percentage points more of national income from 1995 to 2019 than before 1980. This represented 30-40 percent of total private saving in the US economy from 1995 to 2019.

These numbers suggest that the rise in savings by high-income households—rather than across demographic groups—is the dominant force behind plunging interest rates, Mian, Straub, and Sufi argue.

“The findings of this study fit into a broader agenda tying rising income inequality directly to important macroeconomic variables,” the researchers write. “Policy makers should recognize that rising income inequality is more than a distributional issue; it is likely a central force shaping broader macro-economic trends.”

Given that income inequality does not appear to be going anywhere, the research implies that low rates could stick around for a while.—Rebecca Stropoli

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**SUPERSTAR COMPANIES BENEFIT WHEN RATES FALL**

**DECLINING interest rates—particularly in an already low-interest-rate environment—offer a distinct advantage to so-called superstar companies, according to research from Princeton PhD student Thomas Kroen, Princeton’s Ernest Liu and Atif Mian, and Chicago Booth’s Amir Sufi.**

“Extremely low interest rates are not neutral for market competition,” Sufi says, “and they may explain why market concentration has been rising.”

Kroen, Liu, Mian, and Sufi draw from a CRSP-Compustat merged data set—focusing on 1980 onward—to measure excess returns for industry leaders in the United States versus the rest in relation to interest-rate moves. Industry leaders are defined broadly as companies in the top 5 percent by market value in any sector; the researchers also ranked leaders by the top 5 percent in earnings before interest, taxes, and depreciation, as well as in revenue. They constructed a portfolio that went long on the industry leaders and shorted the nonsuperstar companies, and then studied its performance in response to changes in the 10-year Treasury rate.

The study demonstrates that the valuations of superstar companies rose relative to their competition when interest rates fell. Those valuations were boosted by three key benefits of falling rates, whose advantages built on each other. First, the researchers argue, a decline in interest rates disproportionately lowered borrowing costs for the top 5 percent of companies in any given industry. Next, these companies took advantage of these decreased costs to issue additional debt. Third, this additional debt financing allowed them to repurchase shares, increase capital investment, and engage in M&A activities at a higher rate than non-A-list companies.

“All three of these effects also snowball as the interest rate approaches zero,” the researchers write.

They give an example in which the federal funds rate started at 2 percent, and a 10-basis-point decline in the rate spurred a 15-basis-point relative decline in borrowing costs for market leaders compared with followers.

The researchers define borrowing costs as the ratio of interest expense to total liabilities, or the average rate of interest paid on a company’s liabilities. When the rate was closer to zero at the outset, that same 10-basis-point decline in the federal funds rate meant a 24-basis-point drop in borrowing costs for superstar companies and a 9-basis-point drop for the rest.

The key finding from the research, notes Sufi, is that the interest rates of the leaders fell as rates decreased, whereas the interest rates of the followers also fell, but not by as much.

“We don’t have an exact explanation,” Sufi says, “but it could be that investors view leaders as safer and therefore more comparable with the US Treasury. In that case, whatever forces bring down the Treasury also bring down the interest rates of leaders.”

When it comes to debt, that 10-basis-point federal funds rate decline, in an already close-to-zero interest-rate environment, prompted a 5 percent relative increase in debt issued by top companies as compared with nonsuperstar companies.

—Rebecca Stropoli

In an effort to address carbon emissions, governments worldwide are trying to inspire consumers to make more eco-friendly purchases, including of big-ticket items such as solar panels and electric vehicles. US president Joe Biden is among the policy makers who have embraced offering consumers tax credits and rebates, even though there has been scant evidence that such incentives work well or are cost-effective.

Now, research by University of Wisconsin’s Cheng He, University of South Carolina’s Ö. Cem Öztürk, Georgia Institute of Technology’s Chris Gu, and Chicago Booth’s Pradeep K. Chintagunta provides this support, particularly for using tax credits to encourage electric-vehicle purchases. They find that

To get people to buy electric cars, offer tax credits

Research finds tax credits for plug-in hybrid electric vehicles were effective, relatively low cost, and benefited many middle-class families.

In Active Mutual Funds, Bigger Still Isn’t Better

An argument in favor of investing in actively managed mutual funds is that economies of scale accrue when large pools of money are put to work. Bigger mutual funds should be able to bargain with brokerages to drive down costs, and the same infrastructure created to manage $100 million can scale up without adding proportional costs.

But this often isn’t what happens, argues research by Chicago Booth’s Lubos Pastor, University of Pennsylvania’s Robert F. Stambaugh and Lucian A. Taylor, and University of Queensland’s Min Zhu.

Their findings are the latest salvo in a debate. A December 2004 study published in the American Economic Review, for instance, found that larger actively managed funds are more likely to underperform both the market and smaller competitors. This is counterintuitive. Assets tend to chase performance, so funds that are large must have impressed investors at some time. (The same doesn’t apply to passive funds that follow indexes.)


Into the controversy stepped University of Texas at Arlington’s John Adams, University of Georgia’s Darren Hayunga, and Virginia Tech’s Sattar Mansi, who in 2018 blasted the diseconomies of scale research as shot through with errors. They take issue with some fund classifications by Morningstar that they say created a false picture of laggard returns.

Pastor, Stambaugh, Taylor, and Zhu joined forces to publish a rebuttal. They went back to the data, refined and redid their analyses, and find that the errors their critics claim to have found are not really errors.

More than half the issues cited, for example, pertain to the $270 billion Growth Fund of America, the largest mutual fund in the country, the four researchers argue. Adams, Hayunga, and Mansi maintain that Morningstar improperly benchmarks Growth Fund of America against the growth-oriented Russell 1000 Index.

Pastor and his team disagree, but as a compromise, they dispense with index-based benchmarks altogether in favor of judging funds’ performance against the three-factor model created by Chicago Booth Nobel laureate Eugene F. Fama and Dartmouth’s Kenneth R. French. Larger funds, including the Growth Fund of America, underperform against that yardstick as well, the four researchers find.

While Adams, Hayunga, and Mansi further argue that the underperformance of outlier funds should be thrown out, Pastor and team maintain that doing so would give up valuable data.

Larger funds tend to hold portfolios that hew closely to benchmarks—making them more like passive funds, but potentially with higher fees.

If larger funds copy the benchmarks, that has implications for the performance of the entire mutual fund industry, the researchers conclude. “The same logic naturally extends from fund size to industry size, because when funds become bigger, so does their industry,” they write. “As a result, benchmark-adjusted fund returns are less volatile when industry size is larger.”—Michael Maiello

Go to chicagobooth.edu/review to see citations for research mentioned in this article.
tax credits are effective, relatively low cost compared with alternatives, and benefit many middle-class families.

The researchers analyzed three US states that offered tax credits to buyers of some electric vehicles and find that middle-class households responded to the credits, whose effects lasted even after the incentives concluded, according to the study.

Green cars—which include hybrid, plug-in hybrid electric, and fully electric vehicles (PHEVs and EVs, respectively)—consistently make up a tiny percentage of the US auto market, just 4 percent in 2019, according to the US Department of Energy. A handful of studies find that demand for EVs is associated with factors such as charging infrastructure. After all, people shopping for electric cars want to know they’ll be able to power up when needed.

But it’s been unclear whether, and how much, incentives such as tax credits drive demand.

He, Öztürk, Gu, and Chintagunta focused on three US examples of state tax credits for plug-in hybrids. South Carolina introduced tax-credit incentives for plug-in hybrids in January 2012 ($2,000) and Colorado did so in May 2013 ($6,000). Oregon implemented a similar $1,500 tax credit between December 2009 and December 2011.

The researchers estimated the incremental sales impact of the incentives, looking at what happened in individual counties.

They analyzed all transactions conducted at a random sample of dealerships, along with the zip codes of buyers and responses to postpurchase survey questions. They also obtained annual county-level data on demographic variables such as population, education, income, and commuting time from the US Census Bureau’s American Community Survey.

Overall, unit sales of plug-in hybrids covered by the tax credits increased by 3.7 percent in South Carolina and 1.7 percent in Colorado, on average, and the sales boost lasted even after the incentives expired in Oregon, the researchers find—perhaps because the credits increased awareness of the advantages. Sales of other cars, including those that are considered eco-friendly but didn’t qualify for the credits, didn’t see a boost.

While the overall sales increase is significant, the researchers note that the incentives were far more effective in some counties than others, boosting sales up to 53 percent in certain areas. Sales were linked to demographic factors associated with demand, such as income level. There were 24 percent more plug-in hybrid sales in Democratic counties than Republican ones. The researchers note the importance of including local preferences and factors in any analysis, noting that an aggregate state-level analysis would produce different results.

Countering concern that tax credits for eco-friendly cars mainly benefit well-off families, the researchers find that the credits helped many middle-income families too. The tax credits didn’t have much effect in counties with the lowest median income, and they mainly attracted consumers who were already considering EVs. However, they also raised sales in counties where consumers valued cost savings more. The sales boost from the incentive “comes mainly from the counties with lower-middle median income,” the researchers write.

The increased demand can be attributed mostly to people switching from fuel-efficient gasoline vehicles, as opposed to gas guzzlers, which dampened the tax credits’ efficiency in reducing carbon emissions.

Biden’s climate-change plan would restore credits, target middle-class consumers, and prioritize vehicles made in the United States. The last goal is notable, the research suggests. “Our findings indicating a significant positive impact of the tax credit incentive on the sales of a PHEV made in America (i.e., Chevrolet Volt) in lower-middle-income counties are consistent with the theme of the President’s climate plan,” write He, Öztürk, Gu, and Chintagunta.

Tax credits on PHEVs may be a low-cost way to reduce carbon emissions, they conclude. They estimate that the average cost of curbing emissions this way is $109 per metric ton, which is less than the costs calculated by prior studies that have looked at tax rebates for conventional hybrid vehicles, residential solar-panel subsidies, and solar feed-in tariffs (which pay solar buyers to send electricity to the grid). But, note the researchers, the $109 per ton still “exceeds the $75 carbon tax proposed by the IMF based on the Paris Agreement’s goal in limiting global warming.”—Sally Parker

Do monopolies actually benefit consumers?

Both Republican and Democratic politicians have been sounding alarms about market power in the United States, arguing that a few companies such as Amazon, Facebook, and Google have become too dominant. In July 2021, the White House issued an executive order and statement doubling down on antitrust law enforcement.

A growing body of research supports the notion that regulatory leniency over the past few decades is driving concentration. Stanford’s C. Lanier Benkard and Ali Yurukoglu and Chicago Booth’s Anthony Zhang provide more support for this claim—in part. The researchers find abundant evidence of rising concentration at the broader market level. But at the level of individual products, they find that more concentration has led to more competition.

Monopolies are generally considered to be bad for consumers and the economy. When markets are dominated by a small number of big players, there’s a danger that these players can abuse their power to increase prices to customers. This kind of excessive market power can also lead to less innovation, losses in quality, and higher inflation.

Thus, US legislators have historically sought to limit the market power of large corporations. Three major antitrust laws have been passed by Congress over the past century.

But the discussion about concentration has traditionally centered on the number of companies operating and competing in different segments, with less attention paid to the situation at the individual product level. When there are fewer players producing goods and services, does it follow that there are fewer goods and services to choose from—and therefore less choice for consumers in terms of prices?

The researchers analyzed newly available data from MRI-Simmons, a provider of attitudinal and behavioral US consumer insights, to reassess trends in concentration in US product markets between 1994 and 2019. Indeed, they see divergent patterns emerge when it comes to companies and products.

Consumers have more products to choose from

The prevailing popular opinion is that market power has been rising in the US. But the fraction of local product markets considered “highly concentrated” has fallen over time.

In the area of household goods, for instance, corporate concentration has increased. Proctor & Gamble and Phoenix Brands, among other larger companies, have systematically acquired the makers of brands such as Tide, Cheer, Ajax, and Fab in the detergents category.

And yet, at the level of individual product markets in detergents, as well as in personal-hygiene products, shampoos, and toothpastes, concentration has declined and competition has increased, the researchers find. Over time, P&G’s and Phoenix’s conglomerated companies have not only continued to manufacture existing products, but they’ve also ramped up efforts to produce new brands.

Similar patterns can be seen in other markets including food and financial services, according to the study. In total, the researchers assessed concentration at the market and product levels for 337 consumer markets using the Herfindahl-Hirschman Index, a standard measure of the level of concentration in an industry. They note that the study is limited to consumer markets and doesn’t look at markets for labor or intermediate goods (components used to manufacture final products).

Industries with HHI s between 1,500 and 2,500 are considered moderately concentrated, with anything above 2,500 being highly concentrated.

The researchers hypothesize that this effect could be driven by economies of scale and greater efficiencies in processes and operations as large companies consolidate their presence and integrate expertise and know-how from the smaller firms they acquire. Superior access to research and development and emerging technologies may also have a role to play in streamlining production and manufacturing—a benefit that seems to be making its way across conglomerates, and their roster of owned brands, and into the pockets of US consumers.

This has implications for US legislators concerned about rising concentration. To date, the understanding of the full dynamics at play within the US antitrust context has been incomplete, the researchers argue. “There is some subtlety required to understand the big picture and to see things through the lens of consumers, who are enjoying greater choice and more competitive product pricing from American manufacturers today than they were 20 years ago in certain markets,” says Zhang.

Aine Doris

Benkard et al., 2021

How US political divisions shape global investing

We must stop politics at the water’s edge,” famously argued Arthur Vandenburg, the late US senator (Republican of Michigan) and one-time presidential hopeful. In the early days of the Cold War, Vandenburg’s campaign for a bipartisan approach to US foreign policy shaped international relations for decades.

But even if the United States has been officially bipartisan in foreign policy, its global lending practices have reflected the widening domestic partisan divide. Research by Chicago Booth’s Elisabeth Kempf, Erasmus University Rotterdam’s Mancy Luo, Frankfurt School of Finance & Management’s Larissa Schäfer, and Cornell’s Margarita Tsoutsoura suggests that political ideology affects the lending and investing activities of US banks and money managers doing business internationally.

Kempf, Luo, Schäfer, and Tsoutsoura measured investment behavior by banks and fund managers identified as Democratic or Republican around foreign elections. For instance, if a liberal party took over from a conservative one in any given country, the researchers analyzed the change in investing behavior toward that country among the Democratic- and Republican-identified banks and funds.

To measure the political ideologies of foreign governments, they drew on the widely cited Manifesto Project Dataset, which covers 1,000 political parties in more than 50 countries beginning in 1945. They focused on 208 elections in 49 countries from 2000 to 2018.

Banks’ contributions from political action committees and individuals, as compiled by the nonprofit Center for Responsive Politics (now OpenSecrets), indicated their partisan tendency. Voter registration records allowed the researchers to identify party affiliations of managers at US-based international mutual funds.

They then tested whether finance professionals who shared an ideology with the party in power of a specific foreign country would be more positive about investing in that country. For example, a Republican-identified bank supplying corporate loans to a country with a more right-wing government might expect lower default levels than it would from a left-leaning administration; or money managers might expect higher returns from stocks in countries that align with their politics.

When it came to banks, Kempf, Luo, Schäfer, and Tsoutsoura find that the less aligned they were politically with a country, the less likely they were to make corporate loans there. Specifically, when an election widened the political divide between a bank and a country, the bank reduced its lending volume to that country by an average of 21 percent and the number of loans by 9 percent relative to banks that became more politically aligned with the country. The closer the election results and the more intensive the media coverage, the greater the effect, supporting the notion that this behavior is indeed induced by the election outcome.

Additionally, the researchers find that ideological differences between a bank and a foreign borrower led to a 6 percent increase in loan spreads—equal to about 13 basis points for the average loan. (A basis point is a hundredth of a percentage point.) Meanwhile, there was no increase in default rates between banks and foreign countries that were politically misaligned, strengthening the theory that lending behavior was based on ideology rather than on borrowers’ risk profiles, the researchers argue.

Their study also demonstrates that mutual funds reduced the share of their portfolios allocated to a country’s equity by 25 basis points following elections that widened a political divide. Kempf, Luo, Schäfer, and Tsoutsoura observed similar behavior with non-US investors that conduct business internationally and find that broad patterns in bilateral foreign direct investment flows may be affected by partisan gulf.

Overall, the researchers say, the study demonstrates that the economic effects of partisanship go much further than originally thought—well beyond the water’s edge.—Rebecca Stropoli

Casting their sights toward the end of the pandemic, many people have vowed to live richer, more meaningful lives—and one way to do so may be to have deeper conversations, even with people you don’t know.

 Skipping small talk for weightier topics will make you and your conversation partner happier, and it will likely be less awkward than you expect, according to research by Northwestern postdoctoral scholar Michael Kardas, University of Texas’s Amit Kumar, and Chicago Booth’s Nicholas Epley.

 In a series of experiments that included a range of people, from graduate students to financial executives, the researchers had participants engage in either shallow or deep conversations with people they didn’t know. In some cases, the topic was assigned—shallow ones included the weather or favorite TV shows, while deeper ones asked participants to share a time they had cried in front of another person or to name something they felt most grateful for in life. Before each exchange, the researchers

Deep conversations with strangers are more fulfilling than small talk

More positive than expected
Study participants, asked to converse with people they didn’t know, significantly overestimated the awkwardness of deep conversations over shallow ones.

Mean rating by type of conversation

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<td>5</td>
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<td>Deep conversation</td>
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Awkwardness: Connectedness: Happiness

Kardas et al., 2021
had participants report how awkward they expected the conversation would be, how connected they thought they would feel to their partner, and how much they would enjoy the conversation. Afterward, they rated how the conversations actually played out.

Across experiments, both shallow and deeper conversations were better than people expected; they tended to be less awkward, created a stronger sense of connection, and were more enjoyable than anticipated. But participants’ misjudgments were greater for the deep conversations, which they incorrectly anticipated would be especially awkward.

Participants also felt happier and more connected after deep versus shallow conversations, regardless of whether they generated the topics themselves or discussed assigned topics. When deep and shallow topics were pitted directly against each other, in setups in which participants were asked to have both kinds of conversations, deep conversations won out. Participants expected they would prefer having the shallow conversation, but after having both, these same people reported that they actually preferred the deeper one.

Why are deep conversations so undervalued, even when people say they want to have them more often in their own lives? The answer, according to Kardas, Kumar, and Epley, is that people underestimate how interested others are in having deeper conversations. In multiple experiments, participants expected that their conversation partner would be less interested in having deep conversations than their partner actually was. Thinking that others aren’t that interested in meaningful conversation is what keeps people stuck in idle chit chat, according to the research.

The findings, along with earlier studies, suggest that moving outside our comfort zone in social interactions may ultimately make us and those around us happier.

“Strengthening social relationships is critical for wellbeing,” the researchers write, “meaning that a reluctance to engage more deeply with others may leave people being less social than would be optimal for their own wellbeing. Being willing to dig a little deeper than one might normally go in conversation brings the opportunity to create a stronger sense of connection with others, especially with strangers.” —Alice G. Walton


IS THERE A LESS PAINFUL WAY TO RAISE TAX REVENUE?

SODA TAXES are an example of sin taxes levied on items that hurt public health or other aspects of society. These are generally per-unit taxes—Mexico, for example, in 2013 started charging consumers an extra 1 peso per ounce for sugary drinks. Berkeley, California, followed in 2014 with a tax of 1 cent per ounce.

Policy makers may want to levy more such per-unit taxes, also known as specific taxes, suggests research by University of Toronto’s Kory Kroft, University of Calgary’s Jean-William P. Laliberté, the Bank of Mexico’s René Leal Vizcaino, and Chicago Booth’s Matthew Notowidigdo. They find that these per-unit taxes are more efficient at promoting public welfare than the alternative.

For more than a century, research has indicated that an ad valorem tax, levied on the basis of the assessed value of an item, is as done for a sales tax, raises more money and leads to lower consumer prices than a specific tax, such as a soda tax but also a federal or state per-gallon excise tax on gasoline.

Governments rely on both ad valorem and specific taxes as major sources of revenue, and so far the field has been tilted toward sales and other ad valorem levies. US states collected $336 billion in 2019 through ad valorem taxes and $77 billion from specific taxes. But taxes also affect demand for the underlying products and retailers’ decisions about how to set prices. So from the consumer perspective, which is better?

With this question in mind, the researchers analyzed a 2006–14 sampling of Nielsen Retail Scanner Data hosted by Chicago Booth’s Kilts Center for Marketing. The data covered the top 20 percent of product categories, amount- ing to 11 million observations from 3,822 grocery stores in 543 counties across the United States. The researchers then used variation in sales taxes by state, county, and product category to develop formulas that account for the efficiency of each tax regimen.

By comparing food and nonfood pricing across jurisdictions with varying sales taxes, the researchers find that retailers absorbed neither specific taxes nor sales taxes. Instead, they passed the levies directly to consumers. Also, when sales taxes rose on a limited group of products, retailers responded by increasing prices on all products—while hiking prices even more for the specific goods subject to the sales-tax bump.

To measure the effect of sales taxes on consumer demand, the researchers compared product sales across stores, holding pretax product pricing steady by replacing individual store-level prices with average national charges. This allowed them to develop an index of quantity demand on the basis of common prices, isolating the demand change caused by variances in the sales-tax charge. They find that sales taxes—in addition to reducing consumer demand for products—also resulted in a reduction in the variety of products available to consumers, equal to about one-third of the effect of sales taxes on demand.

The finding that specific taxes are more efficient at the margin than ad valorem taxes suggests that more policy makers should consider using specific taxes on products such as soda as one of the tools for raising revenue.

—Martin Daks


Investments in companies aligned with environmental, social, and governance (ESG) principles have exploded in the past decade. Sustainable investing now accounts for a third of all professionally managed assets, according to the SIF Foundation, which promotes sustainable investment, and at BlackRock, the world’s biggest asset manager, 88 percent of clients say the environment is the “priority most in focus” among ESG criteria.

Green (environmentally friendly) stocks had quite a decade in the 2010s, dramatically outperforming their brown (environmentally unfriendly) counterparts, according to research by Chicago Booth’s Lubos Pastor and University of Pennsylvania’s Robert F. Stambaugh and Lucian A. Taylor. But green stocks don’t have superior expected returns, the researchers argue. Rather, bad climate news tends to help green assets, whose performance reflects rising concerns about the health of the planet.

Pastor, Stambaugh, and Taylor in 2020 introduced a theoretical model to explain the movement of green stocks. (See “When green investments pay off,” in the Spring 2021 issue and online at chicagobooth.edu/review.) In their model, green stocks have lower expected returns than brown stocks, as investors who want to hold green assets bid up the prices for those stocks. But green assets can still outperform brown ones when investors develop a stronger taste for green stocks, such as when there is bad climate news or discussion of environmental legislation or regulation.

**Forest fires and other climate events can affect the stock market**

As the researchers’ measure of climate concern nearly doubled, their “green factor” (the return spread between environmentally friendly and unfriendly stocks) rose nearly in tandem.
To find out if their model would explain stock movements over the past decade, the researchers looked at US stock performance from November 2012 to December 2020, using ratings of companies’ ESG performance put out by finance company MSCI to differentiate green and brown securities. They applied their model to calculate a “green factor,” the return spread between environmentally friendly and unfriendly stocks. They find that the green factor delivered a significantly positive return over this period.

They then factored in US media coverage of climate change. They find that as climate-related news nearly doubled over the past decade, the green factor moved in tandem. Zooming in on individual climate events—California forest fires or a deadly hurricane, for example—revealed a corresponding surge in green-stock performance about a month after the news peaked, the research demonstrates. But in months without climate-concern shocks, the green factor disappeared.

When the researchers took into account capital flows into sustainable funds as a measure of investors’ climate concerns, they find that green stocks might have underperformed brown ones in periods without climate events. The connection between fund flows and the performance of green stocks is hard to estimate, as flows are just one factor of many that can drive stock prices. However, when the researchers zeroed out both climate-concern shocks and flows in and out of sustainable funds, the green factor had a negative return.

The researchers also find that the greener a stock, the higher its average return. But this correlation disappeared between climate-change events, which suggests that bad news caused the superior performance, echoing the main findings: green assets outperformed brown ones in periods without climate events. The greener a stock, the higher its average return. However, when the researchers zeroed out both climate-concern shocks and flows in and out of sustainable funds, the green factor had a negative return.

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The research demonstrates that while people with higher socioeconomic and educational status were most likely to get vaccinated, the monetary incentives increased inoculation rates among all participants in the incentives group, regardless of background.

The trial also studied the effect of nudges on participants in three of the test groups. For example, subjects in one group were asked to make a list of people in their lives who would benefit from the participant being vaccinated, and in another, to take a quiz detailing the benefits of COVID-19 vaccines. The researchers find that such nudges increased participants’ intention to get vaccinated but had no meaningful effect on actual vaccination rates.

The researchers acknowledge that paying people to get vaccinated could have potential downsides, such as giving the impression that vaccines are not desirable or lessening the motivation to be inoculated for the public good rather than for financial benefit. But the study does suggest that guaranteed incentives can indeed increase vaccination rates.

—Sally Parker

Go to ChicagoBooth.edu/review to see citations for research mentioned in this article.
HOW TO CREATE A BETTER SUPPLY CHAIN (RESILIENT,
Green, transparent, flexible, efficient, short

Experts are charting the postpandemic supply chain. But can it be everything we need it to be?

BY REBECCA STROPOLI
ILLUSTRATIONS BY MUTI
Toyota, a half century ago, pioneered the just-in-time strategy for supply chains—and was celebrated for its ingenuity and efficiency. With just-in-time processes in place, companies match supply with demand, producing and receiving goods only as needed, which reduces inventory costs and waste.

However, the past two years have made clear the risks involved in such streamlined operations, and companies using just-in-time may be vulnerable to even small disruptions. And while Toyota and others have maneuvered through large disruptions—such as the 2011 earthquake and tsunami in Japan, which caused the carmaker’s production to plummet by over 60 percent in a matter of weeks—they’ve been humbled, as almost all producers have been, by the prolonged global disruption wrought by COVID-19. (For more on what happened, read “How COVID-19 broke the supply chain,” page 31.) Consumers now experience delivery delays for a broad variety of products, from cars to couches to consumer electronics. Stores are subject to shortages and rising prices. Cargo ships are stuck at ports, waiting to unload.
The COVID-19 supply-chain crisis, says Chicago Booth’s René Caldentey, has raised red flags about how a relentless focus on efficiency has compromised reliability, and it has highlighted how prone the chain is to disruption. Now many companies are moving to address that. Even Toyota has been pivoting away from just-in-time and in September reportedly instructed some of its suppliers to store five months’ worth of semiconductors, rather than the usual three.

But just-in-time is only one piece of what has created today’s supply-chain puzzle. Companies also have to plan around the explosion in e-commerce, and an increasing need for sustainability, among other factors. “This is a very dynamic system that keeps evolving,” says Caldentey, who warns that when the current crisis is resolved, other shocks will emerge, including some related to climate change. “This is going to keep happening,” he says. “COVID has this compounding effect, but many of these problems [we’re experiencing] are not due to COVID.”

As experts look ahead to a postpandemic supply chain, they’re considering the big questions beyond crisis management, some of which get to the core of what supply chains are even about. What do we want from supply chains, and what do we want most? Should companies focus on delivering same day or on being more environmentally friendly? Should a chain be more resilient and able to withstand disasters, or should it be efficient above all else? Should it be shorter? Closer to home? More flexible? Can it be all of those things at once?

**Make it transparent**

Many supply chains are global and complex beyond our current understanding. Especially since China joined the World Trade Organization in 2001, companies have done deals with suppliers and producers all over, and they’ve come to rely on “long supply chains that snake around the globe,” according to the description of a National Bureau of Economic Research project called “The Rise of Global Supply Chains, Networks, and the Rise of Interruptions: Looking Forward past COVID-19.”

The effort, led by Harvard’s Laura Alfaro and Booth’s Chad Syverson, seeks to measure the consequences of longer supply chains and consider strategies to reduce risk. Long and lean supply chains can be, and have been, interrupted by natural disasters, cyberattacks, and political upheaval.

“A lot rides on the existence and type of substitutes available within supply chains,” says Syverson. “How many companies supply a given input? How many countries and geographic locations can the input be sourced from? How costly is it for inventories to be used to insure against disruptions? Can air transport be used to substitute for ships? Basically, if interruptions occur, how costly is it to work around them? And does it make sense for companies to spend resources to expand such options before any problems arise?”

But before companies can make significant changes to their supply-chain processes, they have to get a handle on whom they actually do business with. “In the supply chain, we have six megaprocesses: plan, buy, make, move, distribute, and sell,” says Texas A&M’s Eleftherios Iakovou. Companies work with others to accomplish the six processes, but few know all the parties with which they are directly or indirectly doing business, and few have enough information to know where the next crisis could come from, much less how to address it.

This has been a problem since long before the pandemic. The lack of transparency has enabled labor exploitation, environmental destruction, and reputational damage. Greenpeace and other activist groups have called out multinationals for using suppliers linked to problems that have ranged from dumping toxins in rivers to committing labor violations. Without full transparency, including regular audits, companies can claim they weren’t aware of the less ethical aspects of their supply chain.

Booth’s Nicole DeHoratius says that the first step toward transparency is for companies to map their networks fully from tier-one suppliers down, so they understand the exact composition of their supply chain. Not all companies have a strong incentive to be more transparent. Each individual link in a chain has different goals and makes decisions in its own best interests. This is a major obstacle to sharing data within the supply chain. Consider an automaker and a brakes supplier three tiers down on the chain. The brakes supplier could be concerned that if it were to share capacity or cost information, the automaker might try to squeeze costs, or even try to bypass it and work with the supplier’s own suppliers. “There’s just a total lack of trust on how this information would be used,” DeHoratius says.

Survey responses in the Business Continuity Institute’s 2019 Supply Chain Resilience Report indicate that 57 percent of global companies surveyed likely lacked complete visibility into their supply chain before the pandemic, and another 20 percent were unsure if they had it.

However, in light of the pandemic, “the urgency is there,” DeHoratius says. “The incentive conflicts haven’t gone away, but there is more talk about the necessity of developing this map and understanding the supply chain.”
The pandemic in perspective
Various events over the past 20 years have stressed supply chains, but none as much as the COVID-19 pandemic.

Global Supply Chain Pressure Index
Standard deviation from average value

In their framework, at the cloud layer, several data streams relevant to a company’s supply chain are collected, managed, and shared across the chain according to various confidentiality levels. A Blockchain layer stores all these data securely, and the A.I. layer analyzes and processes data from the Blockchain layer to create algorithms that help supply-chain managers make decisions.

Blockchain can be used to improve transparency by streamlining transactions, notes Auburn’s Glenn Richey. He says the technology helps companies to make some data easily accessible and to keep them updated, which improves internal forecasting.

And once good data are available and accessible, they also can be shared selectively. Research that DeHoratius conducted with the Ohio State’s Elliot Bendoly and Nathan Craig provides an example of how that could help, arguing that companies can reduce the cost of uncertainty in crisis times by tracking two specific metrics: consistency (the ability of a supplier to fulfill orders repeatedly) and recovery (the ability of the supplier to fulfill orders after a service lapse). These two concepts, says DeHoratius, “have been critical in today’s dialogue about managing the pandemic disruptions to the supply chain.”

Make it resilient
Opacity can hide risks in the chain. Before Japan’s devastating earthquake and tsunami in 2011, Toyota had close contacts with its tier-one suppliers and assumed that they were using a large variety of tier-two suppliers, DeHoratius says. After the disaster, Toyota took a close look at its tier-one suppliers and found that most were themselves using the same suppliers. The diversification of risk Toyota assumed was there actually did not exist, she says.

Iakovou argues that improving digital approaches to mapping extended supply networks is crucial. Then companies can make changes so they’re able to pivot more easily to other suppliers if needed. “Qualifying and engaging multiple suppliers of course has a cost, but, in times of disruption, those costs can be paid off multiple times over,” says Booth’s John R. Birge.

Having multiple suppliers can help both reduce the costs associated with finding and onboarding a new supplier in the midst of a crisis and avoid expensive production delays. “If more companies react to current conditions by increasing redundancy in their supplier base, that should lead to more resilience in the overall supply-chain network,” says Birge.
HOW COVID-19 BROKE THE SUPPLY CHAIN

When an earthquake and tsunami hit Japan in February 2011, it caused supply-chain issues worldwide. In the auto industry, Fuji Heavy Industries, Honda, Nissan, and Toyota plants in the disaster zone were forced to close. Other Japanese plants further from the disaster halted production due to parts shortages caused, among other factors, by damage to their supplier plants.

This was a localized natural disaster, however, and largely affected company facilities. It didn’t affect customers or demand much. COVID-19 was different. It kicked off a global series of events that resulted in a mismatch between what consumers wanted and what they could get their hands on. This caused chains to buckle.

In early 2020, the virus spread from Wuhan, China, across the continents. Government-mandated shutdowns sent the global economy reeling. As offices, schools, retailers, and restaurants closed, manufacturers did, too, or significantly reduced production. By April 2020, the US unemployment rate had reached nearly 15 percent.

Manufacturers and distributors planned for plummeting consumer demand and adjusted capacity levels accordingly. They didn’t rent as many warehouses, for example, or they cut workers loose.

But in the United States, consumers who were stuck in their homes—many receiving cash from government stimulus programs—shifted their spending focus from travel, theater tickets, and restaurants to consumer electronics, furniture, bread makers, and Pelotons. Online sales soared.

Few if any of the previous disasters that hit supply-chain activities shifted consumer demand, says Georgia Tech’s Beril Toktay, an operations management expert. “I don’t think we ever imagined we would have a lockdown that effectively amounts to a year, with people completely changing their spending patterns.”

Demand increased even more as the economy started to bounce back. Major US ports were overrun with delivery ships.

“What emerged this time, which normally is not such a big glitch, is the transport capacity,” Toktay says. “Our community had done a lot to work on matching supply and demand. But rarely would transport-related disruptions or capacity constraints come into the picture.”

About 90 percent of the goods in the world are transported by sea, and over 70 percent of this is containerized cargo. Because China is a dominant producer of personal protective equipment such as masks, Chinese factories in early 2020 had to boost production of these items and deliver them worldwide, including to countries that normally don’t do much trade with China. This exceptional trade activity led to a glut of empty shipping containers everywhere, and a particular dearth of them in China.

This is an ongoing problem. On the Asia–US route, containers are waiting on ships off the coast for lack of port capacity. Even the containers that are successfully brought to land may experience a delay in unloading and distribution because of labor scarcity. A shortage of truckers existed even before the pandemic, and the American Trucking Associations puts the 2021 shortage at 800,000.

These delays have a domino effect. A product such as a car has multiple components. If just one part is unavailable, it can halt multiple plants. And a shortage of one item can affect multiple products.

This confluence of events helps explain why there has been a shortage of items, from semiconductor chips and processed lumber to chicken wings and wine bottles. Meanwhile, global shipping container rates soared year over year; Bloomberg reported in November 2021 that transpacific rates were up 300 percent from the previous year.

But there have been some signs that the crisis has eased, perhaps in part due to various government actions. Among them, in February 2021, US president Joe Biden signed an executive order aimed at strengthening US manufacturing and building out critical items and technologies such as semiconductors, drugs, and PPE. In December, Biden declared that government actions had helped to stave off a supply-chain Christmas crisis.
But building in redundancy costs more. And how much redundancy is enough? That requires accurately assessing the risk of a shock to the chain. What’s the likelihood of a tornado, energy-price shock, or pandemic that would make it worth the price of carrying extra inventory or having backup production capacity?

And what are the costs associated with assessing the risks, or not doing so? Before COVID-19, the World Health Organization put the risk of the spread of infectious diseases as below-average likelihood but above-average impact. Many companies failed to prepare, in part because of potential pushback from shareholders, and are reassessing how much it’s worth to be ready for a relatively unlikely event.

Make it flexible
Having multiple suppliers helps build resiliency, and so does flexibility, which Booth’s Yuan Zhong argues can pay off even in noncrisis times. Zhong, who studies flexibility in production plants, gives the example of a company that makes two types of cars, each in a different plant. The demand for each type of car changes over time, even over the short run.

What if one factory makes both types of cars and can adapt with demand? This same concept of flexibility applies to factories repurposing their manufacturing processes to make completely different products—just as when General Motors repurposed its factory in Warren, Michigan, to produce face masks during a critical shortage.

Of course, if you have a company that makes 100 types of cars, creating a plant that can produce them all is not cost-effective. It is usually more efficient to build a set of factories that can make three or four types of cars each, Zhong says—but then, which factories should make which cars? The key to making this work is robust demand forecasting so companies can plan years ahead.

“With a little bit of additional investment in your flexibility of capacity, you can better match supply with demand,” he says. “Then when you have a supply chain, and we’re thinking of matching supply and demand at every step of the way, this can help.”

Research by MIT’s David Simchi-Levi, Georgia Tech’s He Wang, and Duke’s Yehua Wei finds that when a production plant can build more than one product at the same time, this can help mitigate unexpected supply shocks. A company capable of adjusting its production capabilities in the case of disaster stands a better chance of managing supply and demand challenges, they conclude.

Just-in-time manufacturing sneers at the idea of keeping spare parts around, but Simchi-Levi, Wang, and Wei’s research suggests that holding excess inventory can make supply chains more resilient. The researchers imagine a case in which a company has different plants producing different products—let’s say one makes baby bottles and another makes wooden toys—but has the flexibility to change if needed. When a storm hits the toy plant, the company could use the extra baby bottles it has stored to satisfy demand while it rejiggers the bottle plant to produce toys.

“When a firm has both inventory and process flexibility, inventory helps to free up excess flexible capacities during an unforeseen event, and thus improves the firm’s ability to mitigate risk,” the researchers write, noting that it is generally more cost-effective to create plants that can produce more than one product, but not necessarily all of a company’s products.

The same idea also pertains to assemble-to-order systems, which involve keeping an inventory of product components that companies can turn into a range of products as consumer demand waxes and wanes. “This type of modularity is one way that supply chains can look to become more resilient amid the uncertainty of a post-COVID-19 world,” says Booth’s Levi DeValve.

Building resilience in inventory and component storage can also reduce kinks in the supply chain. Think of Amazon filling orders that involve items stored at multiple warehouses. But more flexibility also means more complexity, in which case efficient algorithms and similar optimization tools can help, he adds.

“It has long been known that flexibility in these systems has been an important tool for dealing with uncertainty, both from routine demand fluctuations or shocks like those from the recent pandemic,” DeValve says. “I expect this to become even more of a focus moving forward.”

Move it closer
Supply-chain managers are also reassessing where factories and partners are located. The COVID-19 crisis reinvigorated the discussion about reshoring—in the case of US companies, bringing manufacturing jobs back to the United States—by highlighting that doing so could help mitigate risk. But bringing all factories back, or building solely US plants (onshoring) is unrealistic, says Iakovou.

“Complete reshoring of supply chains cannot be the answer, as it would make US businesses less competitive and put them at a disadvantage with businesses of often adversarial nations, such as SOEs, the state-owned enterprises that dominate China’s economy and supply chains,” he says. To this effect, Iakovou, in an article he coauthored with Chip White of Georgia Tech and published at Brookings’s TechStream, is proposing the development of next-generation, cost-competitive, resilient supply chains that are based on data monetization and new manufacturing technologies.

A better solution than reshoring, say many experts, is to concentrate on ally shoring, or nearshoring. This involves identifying which plants are most conducive to moving back home or closer to home (say, to Canada and
Mexico for US companies), then focusing on strengthening supply chains with these nearer regions, which offer better relations and more overall transparency. This needn’t mean completely abandoning far-flung manufacturing locations, but it would still require a big shift in many supply chains. Even in 2020, while the COVID-19 pandemic raged, China was the US’s top trading partner by import value, with Mexico and Canada following.

“There is a real opportunity for Mexico, Central America, and the northern part of South America to get some investment and become support suppliers across a number of different industries and then, over time, to become some of the main players for a number of companies,” Auburn’s Richey says.

That said, there remains value in doing business in distant countries, despite the political difficulties involved in some places, says Booth’s Birge. He explains that just as having multiple suppliers lessens risk, having suppliers in diverse locations can help insulate a company from shocks.

Research by George Washington University’s Şenay Ağca, Birge, Chinese University of Hong Kong PhD student Zi’ang Wang, and CUHK’s Jing Wu finds that when only China had locked down and shuttered factories in the early days of the pandemic, North American companies with Chinese partners experienced higher borrowing costs. But once China reopened and the rest of the world scrambled to prevent COVID-19’s spread, those companies saw their credit risk fall. The positive impact of those connections to China illustrates the value of having suppliers in many regions, as well as the benefit of not entirely reshoring or cutting ties with companies in countries such as China, says Birge.

**Location, location, location**

There’s value in having suppliers in different areas. While US companies with Chinese suppliers and customers saw borrowing costs rise at the start of the pandemic, their costs plummeted when Chinese factories reopened and the rest of the world locked down.

**Abnormal credit default swap (CDS) spread, 2020**

*Basis points*
A waiting game

Companies have gone on a warehouse-building spree in order to deliver products as quickly as possible. But research suggests that customers are willing to wait longer for a delivery in exchange for a more precise delivery time.

**Delivery speed vs. precision preferences**

*By day of the week*

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<th>Speed (hours)</th>
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Customers were indifferent between slower delivery but a narrower delivery window, and quicker delivery but a less precise window.

**By time of day**

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<th>Noon-2 p.m.</th>
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Preferred delivery on Friday

![Graph](graph_url)

Amorim et al., 2020

As Iakovou notes, the US now has an opportunity to work collectively with its trading partners around the globe with a mix of offshoring, nearshoring, and reshoring. This strategy, he says, “will promote a new generation of diversified, resilient, and competitive supply chains, supporting employment, trade, and US prosperity, while further supporting the nation’s geopolitical prowess.”

**Make it work for individual customers**

Part of what’s challenging about the supply chain is that it’s constantly evolving. Customers, for example, have grown used to shopping online and receiving immediate deliveries.

Responding to this trend, companies have gone on a warehouse-building spree. Amazon currently has more than 110 fulfillment centers in the US, up from just six in 2005, and plans to open more. Urgent orders must be fulfilled locally, which affects what retailers house where and limits their ability to, say, ship a product from a California warehouse to a customer in New York, or respond most efficiently to an order containing multiple products. As these fulfillment decisions grow increasingly complex and expensive, research suggests that better algorithms can help control costs and maintain efficiency. (For more, read “How online retailers can fulfill orders better,” in our Spring 2021 issue and online at chicagobooth.edu/review.)

But another view is that companies should rethink immediate delivery and retrain customers accordingly. “I think companies have, in an effort to try to compete on this metric, created bad habits in consumers,” says Caldentey. “People want things the same day and have gotten used to it.”

These same people may also value other things, such as information about when a package will arrive and flexibility in delivery time. In some cases, customers prefer precision and flexibility to speed, according to research by DeHoratius, University of Porto’s Pedro Amorim and Sara Martins, and Stockholm University’s Fredrik Eng-Larsson. The average customer, they find, is willing to wait almost 11 hours longer for a product if the delivery window is just an hour shorter, and will wait an additional 7.5 hours if the delivery will arrive on a preferred day of the week. Additionally, repeat customers may be willing to pay more for delivery than occasional customers, and someone making a large order may be willing to pay double the fee to narrow the delivery window by just one hour.

Customers have also come to expect an omnichannel experience, in which they can deal concurrently with a company’s internet and physical stores. A busy parent buying a child’s rain jacket online might have it shipped home, but might also want the option of returning the item
THE BUSINESS CASE FOR SUSTAINABLE SUPPLY CHAINS

The push to create greener supply chains is picking up steam, as is the pressure to be mindful of social issues including fair labor, human rights, and overall ethical business practices.

MIT’s 2021 State of Supply Chain Sustainability report finds that 80 percent of surveyed company executives from around the globe said the pandemic had not had a negative effect on—or had actually increased—their sustainability efforts, and 59 percent said they are investing in supply-chain sustainability. Additionally, four out of five surveyed said they were committed to employee welfare and safety.

Granted, creating a sustainable supply chain involves trade-offs, and one is between sustainability and efficiency, says Auburn’s Glenn Richey. Immediate delivery, for example, requires more vehicles. “If we decide to go as fast as possible, some of those environmental standards fall by the wayside. The more you push for cheap, the less likely the company is going to be able to support a full-blown sustainability program,” he says.

And even if a company opts for sustainability over efficiency, there’s not always a clear path. For example, while supply chains could be made greener by utilizing electric vehicles to transport supplies and products, the autos still have some thorny environmental and labor issues to overcome. Among them, the lithium-ion batteries used for power are made from materials whose extraction can worsen air pollution, and some of the materials are mined by workers—including children—laboring in harsh, unregulated conditions.

But there are some solutions afoot: automakers including Ford, Tesla, and Volkswagen are moving toward using cobalt-free batteries, while the US Department of Energy has stated its goal of eliminating cobalt from all lithium batteries by 2030. Cobalt is tied to both environmental and labor-exploitation issues.

Further, such batteries could have a second life, which would make them greener. A 2020 study by MIT finds that used electric-vehicle batteries could help to power solar energy farms. Georgia Tech’s Beril Toktay points to the life extension of a product as a key aspect of a sustainable supply chain. “You’re meeting the same demands with fewer products, and that reduces the carbon emissions that come from producing and then shipping products to a destination,” she says, noting that Apple has pushed to sell refurbished products and that Caterpillar is leasing refurbished equipment. This not only reduces a company’s carbon footprint along the supply chain but also helps companies expand their market, she says, so it can be a win-win situation.

Toktay notes that a company looking to go green should focus on using lower-intensity materials—for example, recycled rather than virgin aluminum—and on making its manufacturing facilities more environmentally friendly. “Where is it getting its energy from? And is it participating in greening the grid?” she asks. “Is it trying, for example, to enter into wind and solar projects?”

A growing business imperative to embrace sustainability and responsible sourcing is changing the cost-benefit equation. Some of that imperative is mandated, and some of it dovetails with other factors, such as where to locate factories. Building them in a company’s home country, or nearer to it, could accomplish other goals while also being environmentally friendly if the new building relies on greener energy, or if the move results in reduced transportation.

The imperative is also related to risk, as shocks associated with climate change and extreme weather become more obvious. Consider the shortage of microchips, caused in part by a drought in Taiwan, where manufacturing plants need water as part of the production process. Car manufacturing is among the industries affected by the chip shortage. Chicago Booth’s René Caldentey explains that many companies rely on a few providers that have capacity and economies of scale, but in doing so expose themselves to climate-change risks. A company that prioritizes efficiency will still have to acknowledge and manage those risks—and one that becomes more sustainable will be part of the move to mitigate them.
to a store, where the child can try on another size if the first doesn’t fit. The pandemic accelerated the trend, says Chicago Booth’s Linwei Xin.

And it may be impossible to reverse. Xin notes that some retailers, such as grocery stores, had to restructure their operations during the pandemic to maintain their business. That meant transforming their stores into small warehouses and offering delivery or curbside-pickup services. Walmart expanded its online business, and Amazon added physical stores, in addition to those it gained when it acquired Whole Foods in 2017.

Richey says the pressure to deliver an omnichannel experience can make companies more efficient. However, integrating online and offline offerings can be challenging. Consider a shopper who places an order at Target.com for pickup. A store associate runs around the store shopping for that customer.

“This is an additional step that is quite costly, because picking is labor heavy and is usually a bottleneck of online-order fulfillment,” Xin says. Having workers grab items for customers at stores may also be less efficient than warehouse fulfillment, he says, particularly because warehouses tend to have equipment and robots to help select items. Some retailers will invest more in store infrastructure and upgrade stores to miniwarehouses, as Walmart has done.

The continued rise of robots is another trend with which logistics professionals are wrestling. In the US alone, according to the Association for Advancing Automation, factories ordered nearly 30,000 robots during the first three quarters of 2021, a 37 percent year-over-year increase. Research also suggests that robots can make factories more efficient, by grabbing products from shelves and handing them to human workers to package. (For more, read “Smarter algorithms stop factory robots from colliding,” Fall 2021 issue and online.)

Could they help make factories more flexible, and thus chains more resilient?

The push to make supply chains greener adds yet another dimension. (See “The business case for sustainable supply chains,” page 35.) And figuring out how all supply-chain goals fit together will occupy companies for years, even when the pandemic becomes, hopefully, a distant memory. This will mean companies must be willing to take the steps to consider some of these ideas. They’ll decide whether they want all their suppliers in farflung locations or closer to home; they’ll weigh expenses and risks on the basis of their industry, size, and other factors. “There are existing frameworks for structuring supply chains and managing risk,” says DeHoratius. “The question is: Are companies ready to execute on those frameworks?”

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TRADE CREDIT CAN HELP THE SUPPLY CHAIN, OR HURT IT

Trade credit—suppliers letting customers buy now and pay later—can bind companies in a chain together, or cause widespread disruption.

“Trade credit serves many important purposes including being used as a bargaining tool, a method to price discriminate, and a way to allow customers the time to verify the quality of goods before they make payment,” says Chicago Booth’s Anna Costello.

This type of financing eases the constraints of trading partners, enabling cash-strapped companies to obtain goods from a supplier—say, an automobile component—without paying immediately, thereby giving them time to sell products and collect cash they can use to repay suppliers. This makes the flow of goods more efficient by reducing financing constraints.

Suppliers typically set credit terms—for example, allowing for a payment delay of either 30 or 60 days—that balance the time period between when a business must pay cash to its suppliers and when they receive cash from selling its product to customers (also known as the cash-to-cash cycle). Or they may aim to balance the amount of trade credit they offer with their other available liquidity, such as a bank loan. When suppliers set their terms, they need timely payments to keep everything in balance.

Trade credit can disrupt a supply chain when customers delay payment, throwing off the supplier’s liquidity management, and echoing up and down the chain.

“If a supplier doesn’t get paid on time, he or she also delays payments to the next upstream supplier, and so on,” Costello says. “Conversely, when suppliers shrink the trade credit they offer to downstream customers, those customers also shrink the supply of credit that they offer downstream, and so on. Because the supply chain is so interlinked, the actions of one party have important economic consequences on the economy as a whole.”

One of those consequences has been discrimination against Black and female trade-credit officers. “Delayed payments happen all the time,” Costello says, “but we find that during the COVID-19 pandemic, payments were even more delayed to Black and women suppliers than they were to other suppliers.”

Using a data set that tracked transactions between suppliers and customers, Costello and Booth’s Michael Minnis find that, on average, suppliers with trade-credit officers that were female or Black saw a larger increase in past-due accounts during COVID-19, as compared with suppliers whose lead credit officers were white men. And not only is payment discrimination hurting the Black- and women-led companies themselves, but it could have drastic impacts on the liquidity of the supply chain as a whole, because of how delayed payment to one company causes spillover effects on its supply-chain partners. (For more, read “One way discrimination creeps into the supply chain,” in our Winter 2021/22 issue and online at chicagobooth.edu/review.)

Antibias training could help, Costello says. More broadly, contagion can be contained. Trade-credit insurance or alternative financing companies that provide fast cash can cover suppliers when their customers lapse on payment. But that can be expensive, she says, and insurance companies are typically more willing to work with larger, more transparent companies than the smaller companies that tend to need liquidity protection the most.

“In the next few years,” Costello says, “look for the entry of more sophisticated fintech lending companies to fill this gap and serve the supply chain’s smallest businesses.”

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Why are financial markets so volatile?

According to the inelastic markets hypothesis, the reason involves fund flows and investor demand

BY EMILY LAMBERT
ILLUSTRATIONS BY MATT CHASE
When the pandemic hit and spread in 2020, stock markets in the European Union, Japan, and the United States plummeted up to 30 percent. The implications of the virus for public health, the global economy, and numerous aspects of everyday life were uncertain, and dire. But to financial researchers, the extent of these market reactions was still perplexing. “For the stock market to decline by 30 percent only due to revised growth expectations, the shock to future dividends needs to be large and highly persistent,” wrote Chicago Booth’s Niels Gormsen and Ralph S. J. Koijen that fall. “It would be, for instance, inconsistent with a V-shaped recovery.”

Stock markets were being volatile, yes, but they were acting more volatile than could be explained by looking at the underlying fundamentals. And there have been other examples of extreme volatility, including the stock run-ups in video-game retailer GameStop and movie-theater chain AMC. The dynamics extend to different types of markets too. A single bitcoin has no future earnings or cash flow, and should therefore be worth nothing, according to traditional models. So why pay tens of thousands of dollars for one? And why should their value swing so wildly in response to a tweet from billionaire Elon Musk?

The conventional wisdom, embodied in the efficient-market hypothesis, holds that market prices reflect the fundamental value of the underlying asset. But increasingly, research is identifying another force as being important: investor demand that may or may not be informed. Chicago Booth’s Samuel Hartzmark and Boston College’s David H. Solomon, in a study of data from 1926 to 2020, find that the stock market tended to rise more on days with heavier dividend payouts, as investors took cash hitting their accounts and reinvested it in the market. (For more, read “Dividend payouts lead to stock-price bumps,” online at chicagobooth.edu/review.) “There’s no reason we should see anything like we do,” Hartzmark says, unless the conventional wisdom is wrong—or missing something.

Harvard’s Xavier Gabaix and Booth’s Ralph S. J. Koijen are among those who say that it is. And their inelastic markets hypothesis lays out an argument for why financial models need to include the long-ignored forces of supply and demand. They calculate that every $1 flowing into the market pushes up aggregate prices by $5, and that these forces also amplify volatility, explaining why stock returns are more than twice as volatile as fundamental information implies they should be.

At the heart of their argument is a new description of the stock market, which has been transformed over the past few decades by the rise of index funds and other large, slow-moving investors. “What we’re suggesting is that a large fraction of the market is restricted by mandates, therefore not necessarily reacting to new information. And in some cases, investors may be having a hard time assessing expected returns, in which case they’re also not acting much on prices,” says Koijen. With so much money essentially sitting on the sidelines, prices are more sensitive to what trading does happen. “As a result, shocks to flows and investor demand have an outsized effect on prices, leading to volatile markets.”

From an efficient market to an inelastic one

The stock market, it has long been argued, reflects all available information and is driven by what matters most. The collective wisdom of investors makes the market efficient, and ultimately the price of a stock or other asset reflects its fundamental value. There are certainly price run-ups, as of GameStop stock in early 2021, but fundamentals win out and the market is self-correcting.

This view has shaped the stock market, as well as the retirement plans for millions of people. Chicago Booth’s Eugene F. Fama, a 2013 Nobel laureate, published pioneering research in the 1960s that
produced the efficient-market hypothesis. The insight led to the rise of index funds, which now hold $12.5 trillion in assets, according to Morningstar Direct. After all, if the market is efficient, it’s hard to beat the average, in which case it doesn’t make sense to pay high fees to a money manager whose handpicked portfolio is unlikely to generate better returns than an index that reflects the market.

The idea of efficient, rational markets has repeatedly been challenged in the past few decades, however, such as after the dot-com bust and during the 2008–09 global financial crisis. Behavioral economists including Booth’s Richard H. Thaler, also a Nobel laureate, say investors have predictable biases, and Fama and Thaler have often debated whether the market is rational, including in The Big Question experts roundtable series. (Watch the episode, “Are markets efficient?” at chicagobooth.edu/review.)

But while they debate why investors trade, what is the impact of the trading itself? Gabaix and Koijen argue that uninformed flows may have an impact on prices. And they say their theory respects the importance of fundamentals but adds a layer to the discussion by arguing that fund flows matter, too, and help to explain deviations of an otherwise rational market.

Who really drives stock prices

The stock market they describe is different from the market of the 1960s, transformed by the amount of money indexed and otherwise tied to benchmarks such as the S&P 500. The researchers estimate that a large portion of the market is now sitting in vehicles—including pension funds, endowments, and mutual funds—that are either tied to benchmarks or have committed to holding a certain percentage of stocks and bonds. Even if a fund isn’t formally tied to a benchmark, its manager may be compensated in part for performance relative to one and is likely to buy shares of the same underlying companies. These positions, the researchers argue, are often in large part passive, stable, and price insensitive—or inelastic. Even if news comes out that potentially affects the earnings of a company, the money there isn’t moving.

Much of, but not all of the money they point to is essentially restricted from trading by mandates. “Estimating expected returns at any point in time is very difficult,” Koijen explains. “Faced with this uncertainty, investors may respond little to movements in prices, as they are unsure how to interpret them. Such limited response can also lead to inelastic markets.” In terms of setting prices, that gives outsized influence to active traders such as hedge funds and even groups of day traders.
UNDERSTANDING THE EUROPEAN SOVEREIGN DEBT CRISIS

The inelastic markets hypothesis from Harvard’s Xavier Gabaix and Chicago Booth’s Ralph S. J. Koijen argues that fund flows have an important effect on asset prices. Fund flows can also affect bond yields—and may explain part of the EU debt crisis in Southern Europe, research suggests.

In 2011, as the European Union was trying to claw its way out of a sovereign debt crisis, Greece teetered on the edge of solvency. Its debt crisis was so severe that the country seriously flirted with leaving the eurozone and readopting the drachma. With such extreme measures on the table, investors fled, eschewing Greece’s high bond yields for the safety of German bonds.

A sizable spread developed between the yields on long-term bonds in Germany and those in the countries in Southern Europe. The yields indicated that investors had more confidence in Germany’s stability than in Greece’s. But bond investors also punished Italy and Portugal, which didn’t have the same fundamental problems.

Booth’s Koijen and Princeton’s Motohiro Yogo analyzed what was driving yield spreads. As all countries in the eurozone share a short-term interest rate, short-term rates obviously weren’t the issue. Comparing Germany with Greece, Italy, and Portugal, the researchers determine that macroeconomic variables accounted for 64 percent of the variance in spreads. Long-term debt levels accounted for another 14 percent. And demand had about the same weight. “Latent demand of European investors accounts for 13 percent, and latent demand of offshore financial centers accounts for 4 percent of the variation in the long-term yield spreads,” Koijen and Yogo write.

But when the researchers reconstructed what happened by country, separating the outcome for Greece from the fortunes of its neighbors, they saw investor demand at work. In Greece, fundamental problems weighed on bond yields. But in Italy and Portugal, “latent demand, which captures perceived rather than realized risk, accounts for the sharp increase in the credit spread,” the researchers write. “This finding is consistent with the narrative that Greece had a realized solvency problem, while investors perceived Italy and Portugal to be still solvent but vulnerable.” Koijen says the data indicate that the sell-off was in part driven by investors in Northern Europe.

This investor fear driven by perceived risk had real consequences. It caused a wider borrowing crisis throughout Southern Europe and forced the European Central Bank to act. The ECB cut interest rates and extended low-cost loan facilities to banks that might purchase these bonds. The ECB also purchased bonds directly.

In retrospect, if the ECB had known at the time that investors were panicking, was there an alternative? Could the crisis have played out differently? Not necessarily, Koijen says. “In ongoing research, we are developing a model that can be used for policy makers, but the current research is not there yet to speak to those interesting questions.”

Gabaix and Koijen calculated the effects of fund flows on individual prices as well as on the market in aggregate. They used a variety of data sources—piecing together a picture using various public filings and reports containing information on holdings and flows in stock and bond markets, generally covering the years 1993 to 2020. Before posting their paper, they asked 102 academic researchers in economics and finance to predict what every $1 entering the stock market would do to prices. The prevailing view, held by just over half of respondents, was that it would have no price effect. Of those who said it would have some effect, only three people said it would have a multiplier effect greater than one—as in, every $1 entering the market would push up prices by $2.

But in the inelastic markets hypothesis, money that flows into the stock market leads to stronger price effects because there are essentially a set number of available shares, and many of those are not being actively traded. Pairing their theory with an empirical analysis, the researchers estimate that every $1 put into the market pushes up aggregate prices by $5.

The researchers say that while this may seem like a big multiplier, it’s roughly in line with what other researchers find at a micro level. For example, AQR’s Andrea Frazzini and Ronen Israel and Yale’s Tobias J. Moskowitz estimated the price impact one large trader had on prices.

Jean-Philippe Bouchaud, chairman of Capital Fund Management in Paris, this past summer released his own research, in which he writes that Gabaix and Koijen’s “rather awesome recent paper” validates what he has found over two decades. He calculates that the multiplier for dollars invested can be even higher for volatile stocks—or lower for companies for which a smaller fraction of the market cap is actively traded.

“The mystery of apparently random movements of the stock market, hard to link [to] fundamentals, is replaced by the more manageable problem of understanding the determinants of flows in elastic markets,” Gabaix and Koijen write. Their work, they continue, “might lead to a more concrete understanding of the origins of financial fluctuations across markets.”

Deconstructing market moves
This logic implies that it’s possible to trace fluctuations in markets back to who caused them, which is something Koijen and his colleagues have been doing. The idea of tracing movements back to investors isn’t new, but academics abandoned it decades ago, in part because the data weren’t easily available, or available at all.
Now it’s easier to obtain measurements of holdings and fund flows, and to compare those with price data. Koijen, New York University’s Robert J. Richmond, and Princeton’s Motohiro Yogo deconstructed fund flows in the roughly $50 trillion US stock market to determine what and who is moving prices. Day traders might like meme stocks, they write, while some pension and sovereign wealth funds have mandates to invest in sustainable, more environmentally friendly companies. Many hedge funds, meanwhile, look for arbitrage opportunities. (Read “Who is driving stock prices,” in the Spring 2021 issue and online, as well as “The investors with the most influence over companies’ market capitalization,” online.)

The researchers developed a framework that starts with a simple model they applied to data to identify the characteristics that determine demand and ultimately prices. They then divided investors into eight groups according to investor size and strategy—from huge, passive investment advisers to smaller, actively managed advisers and hedge funds. Then they imagined a world in which the assets of one of those groups flows to all other institutional investors. “For example, we ask by what percent does the average stock price move if we take BlackRock’s assets and redistribute these assets to all other institutional investors,” they write. “Because BlackRock has certain portfolio tilts, this experiment would lower the stock price along characteristics that BlackRock favors.”

Performing this portfolio thought experiment leads to many observations, among them that certain small, active investors have the largest influence on valuations. Hedge funds hold less than 5 percent of the equity market, Koijen, Richmond, and Yogo find—and yet, controlling for size, they are the most influential players in the market, more so than far larger pension funds and insurance companies.

“At the other end of the spectrum, we find that passive investment advisors (both small and large) and long-term investors have a relatively small impact on valuations,” the researchers write. That’s in line with the inelastic markets hypothesis that when many players are sitting on the sidelines, the ones on the field are moving prices and most responsible for fluctuations as well as outright volatility.

The international picture
With international holdings data, Koijen and Yogo performed a similar decomposition exercise, applying the idea to international stock, bond, and currency markets. “Global investors hold financial assets across many countries and have exchange rate exposure not only through short-term debt but also long-term debt and equity,” they write. “The portfolio decisions of these investors across countries and asset classes are important for exchange rates, long-term yields, and stock prices.”

While they’re making a case that demand matters, they’re not saying it’s the only thing that matters. Many other forces can move markets, including government and monetary policies, volatility, sovereign debt ratings, and macroeconomic conditions. To tease apart the various forces at work, they developed a model to study what moved exchange rates, long-term yields on bonds, and stock prices across 36 countries between 2002 and 2017. The International Monetary Fund’s annual Coordinated Portfolio Investment Survey provided information on the holdings of investors worldwide, and they essentially mapped investor portfolios at the country level with asset prices, estimating the demand for assets.

They find that fundamentals such as macroeconomic variables, foreign exchange reserves, short-term rates, and long-term debt levels were influential. In exchange rates, fundamentals accounted for 55 percent of the price movements, and macro variables were the primary drivers of stock prices, responsible for 57 percent of the variation.

But in terms of exchange-rate variation, investors’ latent demand (the component of investors’ demand that cannot be explained by prices and observable fundamentals) accounted for the balance, the researchers write, and this demand was geographically concentrated in large investor countries, with the US and European countries alone driving 16 percent of the variation.

This approach also offers a way to interpret global economic events, presenting a view of why Greece’s debt crisis spread to its neighbors in 2011, for example—and showing how fund flows can have

The models it has the potential to influence are used to decide everything from what an investment fund’s next trade or longer outlook should be to how the Fed and other central banks can best support the economy in a crisis.
A theory with big implications

The inelastic markets hypothesis raises questions, one of which is: If flows have a larger impact on prices than standard theories allow, how many of those flows are still made on the basis of fundamentals? Gabaix and Koijen haven’t sought to answer that.

Still, the conversation about the hypothesis has leapt pretty quickly from academic workshops to a public discussion. The theory has been described in Bloomberg Businessweek, the Wall Street Journal, the Economist, and the Financial Times, among other outlets. “The 2020s will probably be a tough decade, but I think the market is being driven right now by inflows,” Amy Raskin, chief investment officer of the adviser Chevy Chase Trust, said on CNBC’s Halftime Report this past July. “I’m a complete believer in the inelastic markets hypothesis, which posits that there are fewer sellers due to fixed allocations, and when you get huge inflows like this, they have a multiplier effect on the market.”

Yale’s Moskowitz was on the committee that awarded Gabaix and Koijen’s paper the AQR Insight Award, an annual prize from the investment management firm. “It’s a provocative paper that I think will spawn more research in this direction,” Moskowitz says, noting that the field of academic finance moves slowly and deliberately, and it could take years for the hypothesis to be fully vetted.

The stakes are high, as the models it has the potential to influence are used to decide everything from what an investment fund’s next trade or longer outlook should be to how the Fed and other central banks can best support the economy in a crisis. For example, as Gabaix and Koijen note, central banks have bought trillions of dollars of bonds to support markets. If it turns out that the multiplier effect exists, and is stronger in stock markets than in bond markets, this could imply that a central bank seeking to influence the economy should buy stocks instead of bonds. Indeed, in August 1998, the Hong Kong government did just that, buying up 6 percent of the stock market, a move that sent returns soaring 24 percent, consistent with the researchers’ theory. The Bank of Japan owned 5 percent of the market in March 2018, and the Chinese government indirectly owned 5 percent of China’s market in 2020.
How much does the US dollar’s primacy depend on investor demand?

When investors across the world look beyond their own borders, they often put money in assets denominated in US dollars. This demand is crucial for the dollar maintaining its global importance and role as the world’s preferred reserve currency, suggests research by Chicago Booth’s Ralph S. J. Koijen and Princeton’s Motohiro Yogo, who add that were investors to seek safety elsewhere, this could have big implications for currency markets and the US economy.

The researchers deconstructed the convenience yield, or premium associated with holding the US dollar. They calculate it to have been 1.3 percentage points between 2008 and 2017. That is, had the US dollar lost its special status, it would have depreciated, and the expected annual appreciation would have been 1.3 percent a year higher thereafter. And parsing out which investors mattered most in terms of supporting the convenience yield, they identify Pacific investors (in Australia, Hong Kong, Japan, New Zealand, and Singapore), followed by European investors and those in offshore financial centers such as Bermuda and the Cayman Islands. European investors alone, for example, accounted for 0.35 percentage points of the dollar’s convenience yield—so if only these investors were to decide to hold a different currency, it is likely that the dollar would weaken by 0.35 percentage points.

This, of course, has implications for asset markets. If the US dollar were to lose its status, the country’s long-term bond yields would rise 2.15 percentage points, according to Koijen and Yogo. They trace this to the effects of investor demand from offshore financial centers (responsible for 0.53 percentage points), Pacific investors (0.52 percentage points), European investors (0.51 percentage points), and foreign exchange reserves (0.48 percentage points). Also, stock prices would fall without the special demand for US equities. Thereafter, expected returns for US stocks would be 1.7 percentage points higher, they write, driven most strongly by European investors.

The advantage of being special

Investors pay a premium, the convenience yield, to hold US dollar-denominated bonds. Losing that status could cause yields to rise.

If the inelastic markets hypothesis sticks around, it may also have implications for corporate buybacks. By how much do those affect prices? While Gabaix and Koijen clarify conceptually when share buybacks can impact prices, they haven’t estimated key inputs to quantify the effects.

“There has been a standard way of thinking about finance roughly since the 1980s that has really been the dominant paradigm,” says Booth’s Hartzmark. Now, “we’re in a bit of a moment where no one is quite sure where the future is.”

The idea that market flows matter has skeptics and fans, and perhaps could be the future. Koijen says the new model provides a framework to start exploring the elasticity of the aggregate market and related questions. “We’re suggesting that flows from different groups of investors can have a significant impact on prices,” he says. “That’s how a lot of people intuitively thought about things, but there was no theory to back that up.”

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We offer various learning formats such as in-person, online, live-online, or blended.
George Boghos founded Autism in Motion Clinics, a mission-driven company that provides autism therapy in underserved communities in the United States. As the website states, “AIM Clinics was born out of a need for better autism care for children in Arkansas”—inspired by a woman, later the company’s first clinical director, who couldn’t find the therapists her sons needed in the mid-South region.

AIM is also a for-profit enterprise. The dual nature of the company is embodied by the team—all care about both the financial viability and the mission of the company. But the dilution effect in psychology holds that people assume that adding goals essentially distracts from an original, focal goal, and at AIM, employees tend to default to the one they most want to maximize: mission or profits. As Boghos will tell you, that puts the company’s twin goals (and sometimes the people as well) at odds.

Boghos has learned, however, to keep those two groups rowing in the same direction, as he says. He knows that these two goals, more mission and more profits, are actually mutually reinforcing. So when the team has to make big decisions such as how to structure incentives for the clinic staff, or small decisions such as the content of a tweet about World Autism Awareness Day, he pays close attention to how decisions are guided by both the mission and profitability goals of the company.

The key to balance?
Your team

Don’t underestimate the importance of hiring when pursuing mission and profits
This is a challenge to which more and more managers can relate. Many companies say they are balancing making profits with pursuing a mission, be it environmental sustainability, equality, or the like. Those that don’t may face demands from consumers and employees that they do so in the future. Rather than being sidelined as a “soft” initiative with little relationship to the central, profit-making units of a business, corporate social responsibility is increasingly seen as integral to what companies are producing and how they’re delivering these products or services.

And as corporate social responsibility becomes embedded in business units, it presents a major test for managers to keep employees aligned and customers engaged. There are business trade-offs between profit and mission, and managers can’t always anticipate what these trade-offs will be. The best way to prepare for them, then, is by building a team that is sensitive to them and can help keep priorities balanced.

If you’re in charge, it’s unlikely that everyone you hire will turn out to understand perfectly, align with, and be motivated (much less equally motivated) by both goals. And if you seek to bring on only people who understand your precise and ever-changing mix of social and profit targets, you will never find enough workers, particularly in this labor market.

This means you will often hire some people who lean in one direction and some who lean the other way. The challenge is that your company, much like a boat, has charted a course and needs a properly balanced crew. If you don’t have that, you can be tipped by a gust that arrives in the form of a bad quarter or other disappointing news. One minute you’re running a company, and the next you’re bailing water out of the boat.

It’s hard to keep your dual-minded crew motivated, happy, and afloat. Lean too far in either direction and you risk destroying value. The exact risk you run depends on variables such as your industry and market position, but the larger picture is universal: a company that strays from its mission will lose customers and key employees, while one that forgets its profit motive will lose its ability to fuel growth or to do business altogether. You can’t maximize two things, by definition. The best you can do is optimize them. Both priorities are equally important and should support each other, and it’s up to the person in charge to keep the sometimes-competing interests aligned.

This comes down to hiring, some research suggests. Maitreesh Ghatak, an economist at the London School of Economics, covers some of this territory in a chapter in The Nonprofit Sector: A Research Handbook, published in 2020. Economists, he writes, based many traditional models on the idea that companies (and people) fall into two camps: private companies that are only profit maximizing and nonprofit entities that are only social maximizing. In the face of the new “hybrid” entities (either for-profits seeking a social goal or nonprofits earning market-driven surplus), many models are now flummoxed by the idea of this new class of social enterprises, which “flexibly combine features of both nonprofit and for-profit organizations.” Conventional economic models do not quite fit these entities.

Even the language used by researchers studying these phenomena is lacking in standard economic terminology, he notes: “In the economics literature, mission is not a widely used term, and instead individuals or organizations are said to pursue objectives, which can be financial (e.g., profit maximization) or social (e.g., a cleaner environment).” US legal precedent and market forces typically push managers to prioritize the financial objectives, but executives and managers recognize there is value in the social ones, or what they often refer to as mission.

The manager at a mission-driven company, balancing its two halves, has what Ghatak calls a “mission-integrity” problem, finding it difficult to forecast how employees will react to various factors such as compensation and incentives. Profit sharing is usually a simple way to motivate profit-driven employees, but what works for mission-driven ones? Moreover, how should a company screen for and hire people who are truly committed to the mission? The models that traditional corporate managers have used don’t function for mission-driven companies.

To work through some of these issues, Ghatak suggests frameworks, drawing on joint research with his LSE colleague Sir Timothy Besley, that involve thinking of a hybrid organization as one with two different but rigid missions, where employees are either selfish (profit driven) or motivated (mission driven), as he puts it. And he concludes that to find and maintain balance at a social venture, hiring practices must be prioritized. In order to keep your ship in balance, you have to select the right crew.

Of course, people are complicated and can have more than one motivation. But Ghatak is at the lead of wrestling with this topic theoretically, and it’ll likely be some time before we have anything resembling empirical data to back up his arguments or others that arise. In the meantime, what we have to learn from is anecdotal evidence, including data from managers such as AIM’s Boghos, among others.

I have been an advisor to AIM since its founding, including as a board member, which gives me some insight into how this balancing act plays out. In addition to a clear mission, AIM has a strong business case, which helped it win the John Edwardson, ’72, Social New Venture Challenge, cosponsored by Chicago Booth’s Rustandy Center for Social Sector Innovation and the Polsky Center for Entrepreneurship and Innovation at the
Particularly in the absence of well-developed, formal frameworks, it’s imperative to have people with diverse opinions working together to hash out a solution.

University of Chicago, in 2018. AIM has carved out a high-growth position by focusing on markets in less populous cities in the southern United States, where there is a dearth of clinicians who work with children with autism.

With every new hire, particularly near the top of the company’s hierarchy, Boghos has to recalibrate the company and maintain balance. If AIM were to boost profits by compromising care, his company would lose the trust of parents who are counting on it to help their children, as well as alienate the scarce clinical talent attracted by the culture at the company. To prevent this, he has to keep pronounced and present the voices of people who are passionate about its mission. At the same time, he has to ensure operations are profitable and incentives are aligned so that his team is able to maintain the growth afforded by profitability. This conforms with Ghatak’s framework.

Yet, complicating matters, the line between mission and profit isn’t always clear. I’m also a board member at AutonomyWorks, a business-process outsourcing company that connects people with autism with work to which they are well suited—jobs that require attention to detail and focus, and tend to entail repetitive tasks. AutonomyWorks was founded by the parent of a child with autism, David Friedman, a former social entrepreneur in residence at the Rustandy Center and CEO of the company, whose mission is to create jobs for people with autism and other disabilities.

But balance is more complicated than pairing a mission-driven person with a profit-focused one. Often decisions can be made that optimize mission and profit together, but it isn’t always that simple. Consider the question of pay that AutonomyWorks faces. More than 80 percent of American adults with autism are unemployed, and for many, having a job would be truly, deeply life-changing. Meanwhile, those that are employed barely make minimum wage. These factors raise more questions bathed in gray for AutonomyWorks. Since the roles being hired for tend to otherwise go to offshore alternatives, should the company peg to the local minimum wage, thus enabling the company to keep its rates competitive, get more clients, and hire more people in life-changing jobs? Or, is it critical to pay its workers a local living wage to ensure financial independence, even if that dramatically affects its ability to lock in contracts?

Mission and profit can be opposing forces, but in working through questions such as these, it’s important to have people with the two perspectives come together as they highlight opportunities and risks. Consider a hypothetical discussion between AutonomyWorks and a big multinational. The multinational is considering replacing its current full-time workers, paid $20/hour, with a workforce of people with autism to be paid $15/hour and no benefits. This would be good for AutonomyWorks’ profits, and more importantly, it would put a lot of people with autism to work, but they would be paid less than the rate the multinational was paying. Is it a deal worth doing?

These are tough questions, and particularly in the absence of well-developed, formal frameworks, it’s imperative to have people with diverse opinions working together to hash out a solution.

Of course, multinationals routinely send jobs offshore to save money. A team with only a profit-oriented view may jump into a deal with a multinational without considering that employees and hiring partners might not be familiar with this practice and may react negatively. A team that is only mission driven may reject the project on the grounds that people with autism shouldn’t be paid any less than the going rate. They may not consider the idea of pushing the multinational to pay higher wages to generate goodwill and a narrative at home about making a social impact. Combining viewpoints on a decision prevents one-sided assumptions from prevailing.

Make sure you have a balanced executive team of people who will bring different viewpoints to the table and be able to discuss them honestly and respectfully. This only works when your team can be transparent with themselves and others about what frame they are taking on decisions, and which direction that frame rows the boat. Include them in decisions big and small as a constant sounding board, and use those decisions to underscore the idea that mission and profitability can be reinforcing. Lastly, don’t wait for agreement or consensus that may never arrive. It’s ultimately up to you to make the decisions that will keep the boat stable and moving ahead.—CBR

Christina Hachikian is clinical associate professor of strategic management at Chicago Booth.
The original version of *Nudge* was published in the spring of 2008. While we were writing it, Thaler got his first iPhone and Sunstein his first BlackBerry. In his first term as a United States senator, our former University of Chicago colleague Barack Obama had decided to challenge Hillary Clinton for the Democratic nomination for president. Senator Joe Biden was also doing that, without a whole lot of success. Real-estate developer and reality television star Donald Trump was proclaiming that Clinton was “fantastic” and would “make a great president.” A financial crisis was emerging. Taylor Swift was 19 years old (and had not yet won a Grammy), and Greta Thunberg was just five.

To say the least, a few things have happened in the intervening years. But *Nudge* continues to attract interest, and we have not been much inclined to tinker with it. Why a revision now? As we discuss in the book, status quo bias is a strong force. Very much in keeping with the book’s spirit, we were induced to emerge from our slumber by a seemingly small matter. The contracts for the American and British paperback editions had expired, and new ones had to be agreed upon. Editors asked whether we might want to add a new chapter or possibly make other changes. Our immediate reaction was to say no. After all, Thaler is famously lazy and Sunstein could have written an entirely new book in the time it would take to get the slow-fingered Thaler to agree to anything. Besides, we were proud of the book, and why mess with a good thing?

But then we started thumbing through copies we managed to find in our home offices, where we found ourselves during COVID-19. The first chapter mentions the then-snazzy but now-obsolete iPod. Jeez, that seems a bit dated. And an entire chapter is devoted to what we still think was an excellent solution to the problem of making it possible for same-sex couples to marry. Since then, many countries somehow managed to solve that very problem in a way we had not imagined was politically possible. They just passed laws making such marriages legal. So, yeah, maybe some parts of the book could use a bit of tidying up.

So, it came to pass that in the summer of 2020, a summer like no other in our lifetimes, we decided to poke around the manuscript and see if we wanted to make some changes. It helped that Thaler managed to find a set of Microsoft Word files that had been used for what we called the International Edition, and those files were (barely) usable. Without those files, this edition would not exist, because we would never have wanted to start over from scratch.

We admit to then falling into a bit of a trap. We are supposedly experts on biases in human decision-making, but that definitely does not mean we are immune to them! Just the opposite. We are not sure that this particular trap has a name, but it is familiar to everyone. Let’s call it the “while we are at it” bias. Home improvement projects are often settings where this bias is observed. A family decides that after 20 years of neglect, the kitchen really needs to be upgraded. The initial to-do list includes new appliances and cabinets, but of course,
the floor will be ruined during the construction, so we’d better replace that, and gosh, if we just pushed that wall out a bit, we could add a new window, which looks out on the patio, but oh dear, who wants to look at that patio. . . . In the military this is called mission creep. Here we plead guilty to book revision creep. The revision that we planned to knock off during the summer was not given to the publisher until late November.

However, to continue the home remodeling analogy, in spite of our slow pace, what we have here is definitely not a gut rehab. The book feels very much like the old one. All the walls remain, and we have not expanded the footprint. But we have gotten rid of a bunch of old pieces of electronics that have been collecting dust and replaced them with newer gadgets.

More specifically, the first four chapters of the book have not much changed. They set out the basic framework of our approach, including the term libertarian paternalism, which only its authors love. Examples and references are updated, but the songs remain the same. If it were a record album, we would call this section remastered, whatever that means. If you have read the original edition, you can probably skim those chapters pretty quickly. After that, however, even previous readers will find many new themes, and perhaps some surprises.

Two important topics are given new chapters early on. The first is what we call Smart Disclosure. The idea is that governments should consider the radical thought of moving at least into the 20th century in the way they disclose important information. Sure, listing ingredients on the side of food packages is useful, especially for those with very good eyesight, but shouldn’t Sunstein be able to search online for foods that contain shellfish, given that they can make him very sick? The internet is not exactly a cutting-edge technology. Widespread use of Smart Disclosure would make it possible to create online decision-making tools that we call choice engines, which can make many tasks as easy as it has become to find the best route to get to a new restaurant.

We have also added a new chapter on what we call sludge, which is nasty stuff that makes it more difficult to make wise choices. (Sludge is everywhere; you’ll see.) The use of Smart Disclosure is one way to reduce sludge. So is sending everyone a tax return that has already been completed and can be filed with one click. So is reducing the length of those forms you have to fill out to get licenses, permits, visas, health care, or financial aid, or to get reimbursed for a trip you take for your employer. Every organization should create a seek-and-destroy mission for unnecessary sludge.

The rest of the book also has numerous substantive changes and what we hope is fresh thinking. We introduce several choice architecture concepts, in addition to “sludge,” that are new to this edition. These include personalized defaults; make it fun; and curation. These concepts play a large role in the chapters about financial decision-making. We have increased the space we devote to climate change and the environment. We highlight both the limits of choice architecture (preview: we can’t solve the problem just with nudges) and the many ways in which nudges can help us succeed on a project that demands the deployment of every possible tool.

And, oh, we do have a few things to say about the COVID-19 pandemic. Some topics that we originally covered get a fresh look. The passage of years has created the chance to evaluate how policies work over time. A good example is the Swedish launch (in 2000) of a national retirement savings program, which allowed investors to create their own portfolios. In the original edition, we discussed the initial design of that plan. Now, two decades after the launch, we can provide some insights.
about how long nudges last. (Preview: some of them can last almost forever.)

We have also rewritten the chapter on organ donation, because everyone thought we supported a policy we actually oppose. We did state our policy in what we thought was plain language in the first version of the book, and we tried to make it a bit clearer in the paperback editions. But still our message wasn’t getting through, so we are trying once again. In case this is as far as you get in the book, please take note: we do not support the policy called “presumed consent.” Feel free to skip ahead to see why. We really do believe in freedom of choice.

Other topics with fresh looks are devoted to helping consumers make better choices with their money. People have amassed staggering amounts of credit-card debt, and then fail to take some simple steps to reduce the costs of maintaining those large balances. Consumers also make demonstrably bad choices in picking mortgages, insurance, and health-care plans. You may well be one of the people who could save a lot of money in these domains. But more importantly, we hope that our discussion of these issues will provoke others to make behaviorally informed policy changes in an assortment of domains that we have not explored. We emphasize that the concepts and approaches discussed here are fully applicable to the private sector. Firms should explicitly recognize that their employees and customers and competitors are human beings, and design policies and strategies accordingly. We will offer many specific ideas for how to do this.

It is important to stress what we have not done. We make no attempt to bring readers up to date on the remarkable nudge-related activity, reform, and research that have come about in recent years. Governments all over the world have been nudging, often for good, and the private sector has also been exceptionally inventive. Academic research has grown by leaps and bounds. To explore these developments would take an entirely new book, and in fact many such books have been written, some even by Sunstein. Indeed, Sunstein has coedited a four-volume collection of papers on the topic of nudging is fun; Thaler would rather be counting backward from 10 million.)

We have some things to say about objections to nudges, and in fact we devote a whole chapter to that topic, but we do not respond systematically to critics. What we hope to offer is a book that will feel fresher, more fun, and less dusty to those reading it for the first time, or even to those returning for another look, as we have spent the past months doing ourselves.

Finally, a word about our decision to call this version of the book the Final Edition. One of the earliest topics to be studied by behavioral economists was self-control problems. Why do people continue to do things they think are dumb (both in foresight and in hindsight)? These include acts such as running up credit-card bills, getting more than a bit chubby, and continuing to smoke. One strategy people use to deal with such problems is to adopt commitment strategies, in which some tempting (but ill-advised) options are made unavailable. For example, some people with a gambling problem volunteer to put their name on a list of people who will not be allowed into a casino. Using this title is our commitment strategy to prevent us from ever tinkering with this book again. We have loved working on it, and we might even have gotten addicted to it, but we pledge, right here and right now, that there will be no “post-final” edition of Nudge. And one of us actually believes that pledge. –CBR


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Is capitalism the engine of destruction or the engine of prosperity? Hosts Luigi Zingales, a world-renowned economics professor, and Bethany McLean, a *Vanity Fair* contributing editor, explain how capitalism can go wrong, and what we can do to fix it.

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Confront the climate emergency rationally

Better models, measures, and accounting can help societies and economies

This is an edited excerpt of the conversation held October 27, 2021, at the Future of Capitalism, an event series sponsored by Chicago Booth and Booth’s Rustandy Center for Social Sector Innovation. Impact investment pioneer Sir Ronald Cohen, Imperial College London’s Mili Fomicov, and University of Chicago’s Lars Peter Hansen, a Nobel laureate as well as a Booth professor, discussed how to confront the effects of climate change on economies around the world. Booth’s Randall S. Kroszner moderated.

Randall S. Kroszner: There’s an enormous amount of uncertainty when it comes to climate models. We can try to estimate it as well as we can, but in making policy and practical decisions on investment, we need to be aware of what we know and what we don’t know. Lars, what are some of the key issues that you see in climate economics that pose these uncertainty challenges? Where are the key issues of uncertainty in climate economics?

Lars Peter Hansen: I’m all in that climate change is important and challenging. My research has to do with trying to figure out how to confront uncertainty in sensible ways. A starting point is the fact that policy makers tend to want to project conclusions with great confidence, and scientific evidence doesn’t always bear that out. How do we stay true to the scientific evidence and still come up with sensible policies? Economics has had a lot to say about that.

A concern of policy makers is that once you announce, “Well, we don’t really fully understand things,” there will be arguments that we don’t do anything now, and wait. But in the case of climate change, delaying can make the problem bigger and costlier. It may be better to adjust now, even in the presence of uncertainty. That’s the type of trade-off that I’m trying to wrestle with.

Of the uncertainties that show up in our work, one is that we’re interested in emissions and how they translate into environmental changes like temperature changes. As you try to trace through the impact of emissions on temperature over 10, 20, and up to 100 years, there’s substantial uncertainty. Now factor in conjectures that once you cross certain thresholds of temperature or other environmental indicators, there will be more dramatic consequences for the climate and the overall environment. Those type of threshold effects are possibilities, but they are challenging to quantify meaningfully.

The other piece is economic damages. Once we do damage to the environment, what are the economic consequences of that? Because people will adapt, and there will be modifications, how do we really measure those potential damages? As scholars, we love evidence, but we’re talking about moving world economies to places they haven’t experienced historically. We have to think about it conceptually and make smart guesses about the nature of the uncertainties. These components of uncertainties interact, and it’s important to think about them simultaneously rather than distinctly.

Kroszner: How do you use the framework of decision-making uncertainty to think about these kinds of trade-offs?

Hansen: Imagine you’ve got a world in which we’re not sure about the extent of damages, but once we start damaging the economy, it might become more evident. It’s a trade-off. We could wait until we learn about that damage curvature, but there may be very, very steep consequences—or maybe the consequences will not be as dramatic as we feared.
To confront these types of trade-offs, we perform policy-relevant calculations, like computing the so-called social cost of carbon. From an asset pricing perspective, a social cost of carbon is just like an asset that you value with a dividend stream. Emissions go into the atmosphere and they have social consequences tomorrow, the next day, and way off in the future. How do we produce meaningful measures of factors such as the social cost of carbon, and then figure out what sensible emissions policies might progress from that?

In response to these trade-offs, it makes sense to be initially cautious, and down the road you learn more. At that point in time, you will continue with caution, or you might decide to be bolder. Those are the types of trade-offs we’re trying to confront.

What’s really important is the fact that you think about these outside the usual risk frameworks that we’re often taught in economics classes. Traditional risk analysis applies to situations in which we know probabilities but not outcomes—coin flips, rolls of the dice, and the like. If only uncertainties were that simple. So the first question has to do with, what’s the right model, the right view of the world?

And then, in the models we use, our view of the world is simplified. The world is complex, and how do we use models that take those simplified lenses and use them in sensible ways? It’s important to conceptualize the uncertainties in this more general framework.

Kroszner: What are some of your findings of how you deal with this uncertainty?

Hansen: I saw the use of models play out in real time over the pandemic, although of course it did so on a much faster time scale than climate change. You saw these model predictions reported that were distinct in important ways. Sometimes the predictions were best guesses, and other times they conveyed adverse things that could happen. And sometimes when people use models, they’re not clear about how they’re using them. Key here is the trade-off between your best guesses of the future and your concerns about what bad might happen going forward. Decision theory offers nice conceptualizations for this.

Now, as an economist, I can’t tell policy makers how averse they ought to be to these bad outcomes. But how averse society should be to uncertainty or how averse businesses should be to uncertainty has to do with preferences.

Kroszner: We have elected officials in some sense to make these social-choice trade-offs. How do you help the policy maker to think through these issues? We have a certain amount of risk aversion, but how do we turn that into policy choices?

Hansen: We use models to report which components of uncertainty should be of the most concern for alternative specifications of uncertainty aversion and what the prudent course of action should be. It is a highly structured sensitivity analysis. By inspecting our modeling outputs in this way, policy advisors can ask what magnitude of uncertainty aversion is reasonable.

Kroszner: Whether it’s the time-scale issues, or broader issues of interactions between climate and financial risk, do you have a thought on what you would focus on? What are the issues that you tell the policy makers to focus on?

Hansen: We focus much more on the fundamental uncertainties that are out there, and all the ways for potential new technologies to help us out. I think about this in the context of central-bank policy too, since central banks are also concerned about issues on climate change. But one of the things that firms have to face is policy uncertainty. When it comes to climate change, things like weather patterns are important, but in the private sector, they’re also having to speculate what policy changes will be coming down the road. Sometimes I think central banks are stuck in this position, worried about the types of uncertainties that are potentially induced elsewhere by governmental activities. Both these transitional issues as well as policy uncertainty are important to both private-sector and central-bank policy.

Kroszner: What would you say is your bottom line? If you were advising a policy maker on how to allocate a large sum of money related to the climate, where would you focus it?

Hansen: Two places come to mind, and right now we’re trying to figure out the trade-offs between such alternative
policies. One is how much social investment we want to make in developing new green technologies. Governments can take resources allocated for this purpose and start reshifting in an unproductive direction, so as we think about allocating resources toward developing new green technologies, we also have to do this in a way in which we have sensible decision makers making the call on the productive types of investments to be made there.

Second, making policies that change people's incentives, like taxation policies connected to carbon emissions, can be important. Big political issues show up, and you have to think hard about what you're going to do with the revenues and the distributional consequences. The policy challenge doesn't end with merely introducing carbon taxes. Those are the two types of activities that I find potentially most useful.

Kroszner: Mili, you've done a lot of work on thinking about the allocation of capital and what the implications of all of this uncertainty are for strategic capital allocation. If you were to allocate $1 billion a year related to the climate, what framework would you use?

Mili Fomicov: As an investor, you need to think about certain implications on macroeconomic variables such as GDP, interest rates, and inflation, but it will be path dependent. A temperature change of 2 degrees could lead to radically different growth or decline rates. Some institutions are forecasting, for example, that Canada will be a net beneficiary, while some are showing that it will see a 3–4 percent GDP decline. Also, carbon pricing can have inflationary or deflationary effects, depending on different responses.

The capital-market assumptions that most investors use when they think about their strategic allocation rely on a single scenario. A lot of practitioners are trying to model the climate risks and opportunities by simply adjusting returns and volatility expectations by stressing certain macro variables. That can go really wrong.

Climate financial scenarios must combine transition scenarios and financial risk models. Then investors can choose between different scenarios and select pathways that meet their own implementation capabilities. We provide training to investment managers and frequently talk about Lars's work and the need to formalize that uncertainty and to be more comprehensive.

Finally, diversification becomes even more important. Investors can expand their tool kits and invest in new asset classes that are part of the solution. For example, given that there's a lot of uncertainty around carbon pricing, you can own carbon allowances and then potentially mitigate some of the losses. You can also invest in adaptation and mitigation, nature-based solutions, renewable infrastructure in emerging markets, and asset classes that were not investable before. This way you're really investing in climate solutions, turning some risks into opportunities, and diversifying in this radically uncertain world.

Kroszner: We can't translate the framework that Lars and Mili were talking about into something practical without data. Sir Ronald, how have you approached the issue of getting data about impact?

Sir Ronald Cohen: Impact measurement is the lever to shift our economies from risk-return to risk-return-impact, and it is one of three major forces driving this shift. The first force is a massive change of values. Young people refuse to purchase the products of “bad” companies and refuse to work for them. This hasn't been lost on investors, who now channel $40 trillion-plus of ESG [environmental, social, and governance] investment to achieve impact as well as profit. This is half of all assets in asset management firms.

The second force is leaps in technology. Artificial intelligence, machine learning, augmented reality, Blockchain, and the coming together of the human genome are enabling us to deliver impact globally in ways humanity could never previously contemplate.

And the third major force is impact transparency. Huge computing power and the availability of big data enable us to measure in a granular way the impacts companies create on climate, the planet, and people.

It occurred to me a few years ago that if we don’t have reliable data that businesses and investors can use in their decision-making, we are not going to achieve the goal of shifting our economies to risk-return-impact. I helped establish the Impact Weighted Accounts Initiative (IWAI) at Harvard Business School. The IWAI has published, in monetary terms, the environmental impacts of investments in climate-related initiatives.

“Young people refuse to purchase the products of ‘bad’ companies and refuse to work for them. This hasn’t been lost on investors.”

— SIR RONALD COHEN
of 3,000 public companies across the world. It has used available metrics, and defined paths to value them.

Out of these 3,000 companies, 450 deliver more environmental damage in a year than they do profit. A thousand deliver environmental damage equivalent to a quarter or more of their profits. Together they deliver $4 trillion-worth of environmental damage in a single year. And most interestingly, within many sectors, you now see a correlation between higher pollution and lower stock market valuation. The weight of ESG money is tilting the value of companies.

The crucial step now is for governments to mandate impact transparency through generally accepted impact principles, paralleling what the Roosevelt administration did in 1933 and ’34, when investors had little transparency on profit because there were no accepted accounting principles. We are at a similar crossroads today.

**Kroszner:** Lars, you’ve thought about this issue of trying to encompass the externalities. How do you see what Sir Ronald just spoke about in terms of a way to be helpful in trying to address some of the issues that you have raised?

**Hansen:** The work that I’ve been doing has been focused more on the so-called social cost of carbon. It used to be that, before Donald Trump became president, the EPA [US Environmental Protection Agency] would post numbers about the social cost of carbon to be used in policy making. During the Trump administration, these numbers got pulled down, and now they’re being put back up again. It’s pretty frustrating to see how they were produced—and in many cases, they were kind of rushed out. Most of those measurements treated uncertainty in casual and sloppy ways.

Going from data to useful quantifications is an important task, and we’ve got a ways to go. I get nervous when I see numbers posted that are just not well thought out. So I hope that, going forward, we can put a lot more effort into thinking through how to do this in open and appealing ways. I’m all in favor of getting better and richer data. And I think it’s important that we open the hood on how these social metrics are constructed.

This has spun all the way over into central-bank policy. They’re putting out these deterministic, statically specified climate scenarios and asking financial institutions to do something with them.

As Mili indicated, it’s really important to take those static notion scenarios and make them dynamic and in some sense probabilistic.

**Kroszner:** How were the markets pricing in the different climate scenarios, and how are they taking into account these externalities now, if they are?

**Fomicov:** The market already started to reprice quite substantially. The International Energy Agency (IEA) and I are working on four reports looking at the power sector and how it is repricing based on certain climate and macroeconomic variables. Renewables have significantly outperformed fossil fuels in the past five years, and the past 10 years, and even during certain periods when their fundamental metrics were not really favorable. They have showed a striking degree of resilience during the pandemic, despite the fact they’re lower market cap, high leverage, and low profitability. Everyone who worked on these reports was surprised by this response.

The market is not just repricing fossil fuels and renewables; it’s also starting to price certain externalities. Certain companies within utilities or chemicals are already seeing significant dispersion. The market is starting to reprice companies that are obvious beneficiaries of the energy transition and those further down their supply chain.

**Kroszner:** That’s interesting because the usual concern with externalities is that the market doesn’t price them and that you need to have intervention in order to get the pricing right.

Thinking about incentives, how do we get the right incentives for getting the right disclosure and then using that in a systematic way to get to good policy outcomes?

**Sir Ronald:** It seems to me when you get this transparency on impacts, you shift to a fair tax system. We’re already beginning to talk of the carbon tax, but we will be able to do that for other social issues like diversity and so on if governments choose. So one incentive can be taxation, but transparency provides a massive incentive. If indeed there’s a correlation between impact performance and company valuation, as Mili was illustrating, the transparency itself would create a race to the top.

**Fomicov:** No firm wants to be the dirtiest on the block. And when you have consistent metrics across sectors and then create proper benchmarking, the role of competition can be extremely powerful. And one of the things that we are advising is that every company needs to show its breakdown of capital expenditures and all metrics that are relevant for each specific sector. Then the market will price them accordingly.

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**“The market is starting to reprice companies that are obvious beneficiaries of the energy transition and those further down their supply chain.”**

— MILI FOMICOV

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The ethics of selling out
You are fundamentally for sale, but at what price?

A “sellout.”

At business schools, the epithet is less likely an accusation than the makings of a quiet misgiving: Am I one? Am I a sellout?

Students don’t ask me for my verdict. If they did, I would tell them: it all depends on what you’re selling—and why exactly it’s being sold.

A Faustian bargain
The danger of “selling out” has long had theological overtones—and insofar as the answer to what you’re selling could be your eternal soul, a distinguished literary pedigree in the story of Faust.

A figure of German folklore inspired by at least one reputed sorcerer of the same name, Faust entered canonical literature in the late 16th century and, in time, was appropriated by writers such as Christopher Marlowe, Johann Wolfgang von Goethe, and Thomas Mann. In each of these authors’ imaginings, Faust’s offense is essentially the same. He is a savant (academically or artistically inclined) who sells his soul to the devil for an intimate acquaintance with genius and all the power that comes with it. “Whatever is the lot of humankind / I want to taste within my deepest self,” Faust says in his most famous incarnation, Goethe’s eponymous play:

\[\text{I want to seize the highest and the lowest, To load its woe and bliss upon my breast, And thus expand my single self titanically, And in the end go down with all the rest.}\]

Such ambitions must have seemed quite menacing to members of a Christian audience who were immediately reminded of the crime that got Adam and Eve banished from the Garden of Eden, but whatever one thinks of ransacking the Tree of Knowledge, the notion of selling one’s soul seems inadvisable, regardless of what one gets in exchange.

But why so? Why do we recoil at the idea of selling our souls, whether for art, for knowledge, or, more prosaically, for filthy lucre?

For the faithful, the answer is simple enough: whatever you might hope to gain by selling your soul, it can’t possibly be worth an eternity of damnation. But what about those who have no heavenly pretensions? Why should they care about some supernatural essence? Or, more intriguing yet, what about those who actually believe in an afterlife but hold that the bargain of going to work on Wall Street is merely hellish hours, not a bar to the pearly gates?

A values problem
Even if you don’t believe that accepting an offer from Goldman Sachs risks damnation, this doesn’t mean the idea of selling your soul is incoherent. Rather, it is a metaphor for the hazard of misvaluation. There are two senses in which the hazard of misvaluation might be understood. The first is more familiar to economics classrooms than colloquies about ethics. Professionally speaking, selling your soul or, less dramatically, selling out is a slur only insofar as you didn’t get the proper price for your time and attention. You are fundamentally for sale, because everything is for sale. The price for your person—mind, body, and soul—is not some abstruse matter of moral disputation but a straightforward case of profit maximization. The offense isn’t selling your soul per se, but failing to get every last penny for it.

Now, when it comes to selling one’s soul, the misvaluation that haunts most people is neither identified with nor potentially remedied by the price mechanism. Instead, it involves the moral and practical implications of putting a price
on one’s character. Judas’s mistake, we might say, was not that 30 pieces of silver was an insufficient price for betraying Jesus, but that his loyalty was for sale in the first place. This is essentially what we mean when we say that someone is selling his soul or, more simply, selling out. He is willing to sell something greater (honor, virtue, integrity) for something less (money), and striking such a bargain either corrupts one’s character or suggests it was already compromised to begin with.

Putting matters in this light raises an obvious question, however: Why might someone do such a thing in the first place?

If you take the eccentric approach of some economists, most notably those of the Chicago School, the matter is fairly straightforward. A person must be either ignorant or unskilled in striking a bargain that would maximize the return for her character. But if the misvaluation in question isn’t an economic matter, if it has something of a deeper moral or existential significance, the reason for the bargain may have less to do with an accounting error than a failure of will. Much like the man who raids the pantry for another cookie knowing that the indulgence will undercut his diet, we can be crystal clear in conscience that securing our integrity is far more important than stuffing our wallets and sell our souls nonetheless. Humans are fallible creatures, and lapses of intention are far more familiar than instances of iron resolve. Keeping this in mind can provide a helpful reminder that, if actions speak louder than words, it isn’t because the words themselves are necessarily hollow. Rather, talk is cheap, and it can be hard to live by the commitments our mouths so freely make.

Andrew Carnegie provides a useful illustration. Long before he became a steel baron, the 33-year-old Carnegie wrote to himself regarding the moral and practical upshot of the success he was already enjoying investing in railroads.

“I propose to take an income no greater than $50,000 per annum!” he declared, identifying the dividend income he already enjoyed in 1868, just over $1 million a year in today’s dollars:

Be a poet. Be a philosopher. Be a public servant. . . . You can be anything your heart desires if you don’t have to make money.

That life which will be the most elevating in its character. To continue much longer overwhelmed by business cares and with most of my thoughts wholly upon the way to make more money in the shortest time, must degrade me beyond hope of permanent recovery.

In the letter, Carnegie gave himself two more years to settle his business affairs before relocating to England to attend Oxford, make “the acquaintance of literary men,” and eventually purchase “some newspaper or live review” so that he could participate in “public matters.” Of course, even though Carnegie apparently kept this letter on his person, it would be more than 30 years before he finally gave up “the amassing of wealth” in favor of devoting all of his time to “benevolent purposes.”

Carnegie’s religious commitments are somewhat murky—he famously endowed thousands of church organs because the music they provided was the only part of Sunday services he could tolerate—but I assume that he did not literally view himself as having sold his soul to the devil for the benefit of US Steel. Nevertheless, his urgent concern over the corrupting influence of money and moneymaking highlights two potential perils of selling out.

The first is that, to the degree the practice of moneymaking encourages individuals to think consistently in terms of private benefit rather than public good, it tends to warp their approach to human affairs (of which, we sometimes forget, business conduct is always a portion). It isn’t a stretch to say that a life devoted to the single-minded pursuit of self-interest from nine-to-five tends to make one a little more selfish after hours, and, clearly, this is the degradation of character the young Carnegie hoped to avoid.

The second peril, however, is far more intriguing and, for my business school students, I suspect, much closer to the heart of their own fears when they contemplate selling out. It is hinted at in Carnegie’s warning to himself that he should be “careful to choose that life which will be the most elevating in its character.” The implication, of course, is that a life devoted to moneymaking doesn’t qualify, that there are better ways one could be spending one’s time, and, frankly, that even in his early 30s, a man who enjoyed the financial security that Andrew Carnegie did could afford to explore them.

While the notion seems quaint nowadays in light of the vigorous materialism that colors so much of contemporary life, Carnegie always doubted the worthiness of a life committed to moneymaking. “The millionaire business man rates his vocation higher than I, who sees in it the best or highest, or even a desirable career for his sons,” he wrote in 1889, nearly two dozen years after writing his letter and still a decade shy of its promised retirement.

The sons of the wealthy have a right instinct which tells them that to engage in work where the primary object is gain is unworthy of those who, relieved from the necessity of earning a livelihood, are in a position to devote themselves to any of the hundred pursuits in which their time and knowledge can be employed primarily for the good of the community.

Be a poet. Be a philosopher. Be a public servant. (Carnegie suggests.) You can be anything your heart desires if you don’t have to make money. (And if you do devote your life to making money nonetheless, know that it says something about your heart that hardly redounds to your credit.)

This, I suspect, is the real fear of my students when they contemplate selling their souls to the highest bidder. True, few of them enjoy the full luxury of choice
that Andrew Carnegie contemplated, but even if they haven’t been entirely relieved of “the necessity of earning a livelihood,” my students know that their education has opened the doors to a wide array of professions that would all pay them quite well. Maybe they don’t want to be a poet or a philosopher, but they could launch a nonprofit, serve in the Treasury, or run a public hospital. Such avenues are all available to them, and I suspect that many of my students believe such work would be far more fulfilling and make a far greater impact on the world than the choices countenanced in most recruiting sessions. And yet, they are prepared to spurn such paths and the occasion they afford for upper-middle-class comfort. Why so?

Set aside those students who have no qualms at all about moneymaking. They enjoy the eternal sunshine of a spotless mind—they don’t concern us. Of the bedeviled that remain, some feel the need to vaporize their student loans with alacrity, in which case they are making the rather unfortunate decision of treating their elite education as an anchor rather than an opportunity. Others overrate the scandalous implications of getting by on less than $100,000 a year. And finally, some cast aside career paths that are principally nonremunerative in favor of one goal chiefly: the potential for being unequivocally wealthy and perhaps even filthy rich.

The devil is in the details
If striking such bargains essentially captures what it means to sell out, what should we make of them?

Let me offer two thoughts. The first involves a key assumption of Andrew Carnegie’s letter, that, as a matter of moral estimation, not all vocations are created equal. Whether we would be inclined to admit that openly, most of us clearly believe this. We laud those who devote their lives to running into burning buildings and look askance at others who peddle predatory loans. These are extreme cases, of course, but if you look across professions, the allocation of esteem can vary considerably, and with good reason. One needn’t deem the vocation of a hedge fund manager hateful to believe the wealth enjoyed from that work is praise enough, and one may even go further in holding that the relative merits of the profession’s activities and the aims that guide them are worthy of debate. I am biased, but as an ethicist I think that not only are such controversies morally clarifying but they can have favorable repercussions for the world we share. Yes, the profit motive has a role to play in pushing society forward, but if the successful practice of a single-minded devotion to money entitles one to moral esteem as much as it does prestige, status, and purchasing power, soon we shall all be bankers.

The second thought is that ethics is mostly an art of managing trade-offs. If your world is one without hard decisions, you’ve either discovered a heaven on earth or you’re entirely delusional. Every day, we must make choices where any option has drawbacks, and the mark of moral maturity is not that we avoid these drawbacks altogether but that we accept the consequences of the choices that entail them.

How does this play out in practice? Over the years, I’ve had several students confide in me that, while they would love to take on post-MBA pursuits in which “their time and knowledge can be employed primarily for the good of the community,” they feel compelled to accept a job in banking or consulting in order to provide for their families. They don’t see such pursuits as necessarily wicked, but morally unremarkable, and given all that has been invested, not least in their Booth education, they feel like they should be doing something more.

I tell them there is nothing to apologize for, that I admire those who act with such a strong sense of duty toward those who depend on them. And yet, I add, in making this choice, they should be honest about the trade-offs. As a professional matter, they have chosen the responsibilities of family, not the opportunity to affirmatively improve the world around them. Their work does not admit of that reward, nor of the moral satisfaction that comes with it. It will most likely be what most work amounts to, a gray labor of going through the motions. It won’t be especially fulfilling, but it will entitle them to a biweekly bounty which will amply provide for their dependents.

To my mind, as long as one is clear about these trade-offs, there is nothing wrong with making such a choice. The danger is trying to convince yourself that they are not what they appear to be or even that they don’t exist in the first place. You are trading your labor for comfort and security, nothing more, nothing less. When you also endeavor to convince yourself that you really do love the work you do, that your time, your education, and your talents are all making the world a meaningfully better place, you are playing tricks of the mind that lead to moral and existential confusion.

You shouldn’t hate the work you do, but you needn’t love it, and you shouldn’t when there is no good reason for doing so. When you struggle to convince yourself nonetheless, the danger of succeeding is not that you sell your soul to the devil, but that you give it away gratis.—CM

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Fixing supply problems won’t stop inflation

Yes, unclog the ports—but the general rise in prices and wages is due to demand alone

The discussion about inflation is pretty muddled. There is a lot of confusion about aggregate demand versus individual demand, aggregate supply versus supply, and relative prices versus inflation.

My theme: inflation is entirely about demand, not supply. Fixing the ports, the chips, the pipelines, the labor disincentives, the regulations is all great and good and the key to economic growth. But all this on its own will not do much to slow inflation. We are having inflation because the government printed up a few trillion dollars, and borrowed a few trillion more, and wrote people checks. People are spending the checks.

At a superficial level, this is obvious. If people weren’t spending a lot of money, the ports would not be clogged. But it’s deeper than that.

Inflation is all prices and wages going up at the same time. Relative price changes are when one price goes up and other prices go down. Reality combines the two, but let’s use terms correctly for each element.

Supply shocks cause relative price changes, not inflation. Suppose the ports clog up, and you can’t get TVs off the boat from China. Then the price of TVs has to rise relative to other prices. The price of TVs has to go up relative to restaurant food, for example, so people buy fewer TVs and go out to eat more. Or the price of TVs has to go up relative to wages, so people buy less overall.

In practice, the world is a bit more complex. If prices and wages moved instantly, the price of restaurant food, or wages, would go down, the price of TVs would go up, and the overall price level would not change. In reality, the other prices go down slowly. So the price of TVs goes up, and other prices and wages only slowly go down. We observe a little bit of inflation, followed by a slow period of lower measured inflation.

This is one of the mechanisms people have in mind when they refer to supply shocks and say inflation will be transitory. But that’s clearly not what’s happening now. Everything is going up, though some things more than others.

Likewise what happens if people decide in a pandemic that they want to buy more TVs and go out to dinner less? That’s a relative demand shock. It drives up the price of TVs and down the price of restaurant food, and causes no overall inflation. But restaurant prices go down more slowly than TV prices go up, so we measure a bit of inflation and then less inflation. But that’s not what’s happening now. Restaurant prices are going up too.

Aggregate supply is different than the supply of individual goods and services. Aggregate supply gets at the question: How much more does the economy produce when all prices and wages are moving up at the same rate—true, pure inflation? That’s a tricky and slippery concept! Sure, if wages rise more than prices, workers might work harder and produce more. If prices rise more than wages, companies might produce more in pursuit of higher profits. Since I told the same story both ways, you can see even this is slippery. But these stories are still about relative prices and wages, not both prices and wages rising together. If prices rise 10 percent and wages rise 10 percent, why does anybody do anything different? Welcome to the mysteries of aggregate supply.

It only makes sense if you think prices or wages were sticky and one or the other was stuck at too low a level. Then a bit of inflation could unstick the sticky prices or wages, and get the economy back to a more productive level. Aggregate supply is all about sticky prices and wages, not about the actual productive capacity of the economy. Another way to see it: Why does more money, more aggregate demand ever raise output rather than immediately raising inflation? Well, something had to be wrong that inflation could fix, and in macro theory that is “sticky prices.”

Yes, this is slippery, but let’s not get too far down the rabbit hole. The central point is that, as intuitive as it sounds, it is not true that unclogging the ports will soak up demand and stop pure inflation. It will lower the relative price of TVs, but that “more supply” doesn’t do much about all prices and wages rising together.

All prices and wages rising together means that one thing is falling in value: money—and with it, government debt. Inflation is a decline in the value of money and government debt relative to everything else. Thus, inflation comes fundamentally from too much supply versus demand for money and government debt.

We seem, sadly, to be repeating all the confusion on these affairs that prevailed in the 1970s. Then too inflation was initially blamed on oil “supply shocks,” and excused as “transitory.” Then too the government hounded companies and unions not to raise prices, culminating in the ridiculous “WIN” buttons (Whip Inflation Now) of the Ford administration. Now, US president Joe Biden is sending the Federal Trade Commission to hound the oil companies to lower prices. Senator Elizabeth Warren (Democrat of Massachusetts) is blaming a grocery store conspiracy. Price controls are already hot in left-wing commentary. Can government “guideposts” be far behind?

The Council of Economic Advisers released a history of post–World War II US inflation that shamefully omits any mention of monetary or fiscal policy as a cause of inflation, ignoring everything economists have (re)learned since the 1960s.

For a thousand years, inflation has led to witch hunts for speculators, hoarders, and price-raising conspiracies, as well as to price controls, rationing, and needless economic chaos. Here we go again.—CBR

John H. Cochrane is a senior fellow of the Hoover Institution at Stanford University and was previously a professor of finance at Chicago Booth. This essay is adapted from a post on his blog, The Grumpy Economist.
Please join us as we welcome alumni and friends to Chicago Booth’s new London campus in the heart of the city’s business district. This special evening celebration includes a formal program in the grand hall featuring Booth and University of Chicago leadership, followed by a networking reception. Guided tours of the building and its art collection will also be available.

Visit chicagobooth.edu/events/leading-in-london for more information.
DO WE NEED A MINIMUM PRICE FOR CARBON EMISSIONS?

The Glasgow Climate Pact—signed by representatives from nearly 200 countries at the conclusion of COP26, the United Nations conference on climate action held in November 2021—is the latest in a string of international accords meant to formalize a cohesive global strategy for mitigating climate change. Like the 2015 Paris Agreement on which it builds, the pact features emissions-cutting commitments by its signatories. But are such national goals likely to result in significant emissions reductions? Would a global minimum price of carbon be more effective? Chicago Booth’s Initiative on Global Markets asked its US and European panels of economic experts to weigh in.

About the IGM Economic Experts Panels
To assess the extent to which economists agree or disagree on major public-policy issues, Booth’s Initiative on Global Markets has assembled and regularly polls a diverse panel of expert economists, all senior faculty at the most elite research universities in the United States and Europe. The panels include Nobel laureates and John Bates Clark medalists, among others. Polls are emailed individually to the panel members, and panelists may consult whatever resources they like before answering. Members of the public are free to suggest questions.
Statement A: Voluntary national targets are unlikely to be an effective mechanism for achieving sharp reductions in greenhouse gas emissions.

**EUROPEAN PANEL**

Franklin Allen, Imperial College London

“These voluntary targets are probably better than nothing. But it is not clear how effective they will be. Politics will be important.”

Response: Uncertain

**US PANEL**

Darrell Duffie, Stanford

“This is a classic free-rider problem. Every country will want other countries to bear the cost.”

Response: Agree

**EUROPEAN PANEL**

Jan Pieter Krahnen, Goethe University Frankfurt

“Implemented rules of self-commitment may have an important role-model effect, leading to spillovers to other countries.”

Response: Disagree

**US PANEL**

Richard H. Thaler, Chicago Booth

“Depends a lot on international social norms. We have avoided (so far) a nuclear-war ending to the world. Might happen again.”

Response: Uncertain

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Statement B: Agreement on a significant global price floor for all carbon emissions would be an effective step toward achieving sharp reductions in emissions.

**EUROPEAN PANEL**

Christian Leuz, Chicago Booth

“A significant floor would not only provide incentives for reductions and innovations but also some policy certainty.”

Response: Agree

**US PANEL**

Kenneth Judd, Stanford

“If the cost of emitting CO2 goes up, emissions will go down.”

Response: Agree

**US PANEL**

Emmanuel Saez, University of California at Berkeley

“For economists, [a] price floor is great, but in reality, it could create a populist backlash and put us further behind.”

Response: Uncertain

**EUROPEAN PANEL**

John Van Reenen, London School of Economics

“It would be great, but highly unlikely to be accomplished politically. That’s why voluntary agreements are probably the only game in town.”

Response: Agree

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Note: Percentages are weighted by confidence ratings that panelists assigned to their own responses. Charts do not include panelists who reported "no opinion" or did not respond to the poll.
In bustling Iewduh, one of the largest and oldest bazaars in northeast India, small retailers typically don’t have access to formal sources of financing, nor do they have enough cash up front to pay wholesalers for the merchandise they sell in their stores. These small enterprises thus rely heavily on trade credit—and whether a wholesaler awards it in any particular case depends, among other factors, on the community to which a retailer belongs, according to Chicago Booth’s Rimmy E. Tomy and University of Southern California’s Regina Wittenberg-Moerman. Iewduh’s wholesalers and retailers mainly come from nine communities and vary in their shared languages, cultures, and places of origin. The researchers collected data on Iewduh’s traders and find that wholesalers were 12 percent more likely to provide credit to retailers from their own community. To learn more about why these ties play an important role in Iewduh and similar markets, turn to page 13.

\[ Y_{ij} = \alpha + \theta \text{Same Community}_{ij} + \beta X_{ij} + \lambda_i + \epsilon_{ij} \]
See you online

As the public-health situation evolves, Chicago Booth and the University of Chicago continue to sponsor many opportunities for inquiry and for participants to gain insights. Some events below will have in-person and virtual components. More information can be found at the websites listed.

MARCH 25, CHICAGO
BOOTH WOMEN CONNECT CONFERENCE
chicagobooth.edu/booth-women-connect
Learn from a diverse lineup of leading women professionals, who will share strategies for building your network in different settings; empowering friends, colleagues, and employees of all backgrounds; and leading with transparency to level the playing field.

MARCH 28, LONDON
CAMPUS GRAND OPENING EVENT
chicagobooth.edu/events/leading-in-london
Celebrate this grand opening with a formal program hosted by Booth and UChicago senior leadership, followed by a Taste of Chicago reception featuring favorite Chicago foods.

APRIL 4, ONLINE
NEURODIVERSITY AT WORK
research.chicagobooth.edu/harrydavis
Join University of South Wales’s Amanda Kirby, coauthor of the book Neurodiversity at Work, for a 45-minute session about how to become a neuroinclusive leader and develop a high-performing neurodiverse workforce.

APRIL 4–8, CHICAGO
MERGERS AND ACQUISITIONS
chicagobooth.edu/ma
Gain the analytical framework and tools necessary to successfully execute mergers, acquisitions, and corporate restructuring.

APRIL 29, CHICAGO
ON BOARD CONFERENCE
chicagobooth.edu/onboard
Hosted by Booth’s Rustandy Center for Social Sector Innovation, this conference highlights key trends and insights in the nonprofit sector.

MAY 5–8, CHICAGO
RECONNECT 2022
chicagobooth.edu/reconnect
Celebrate your time at Chicago Booth at our reunion event.

MAY 6, CHICAGO
MANAGEMENT CONFERENCE
chicagobooth.edu/mancon
Join fellow alumni and business leaders to share best practices, gain new insights, and discover solutions for today’s management issues.

MAY 9–13, CHICAGO
HIGH-PERFORMANCE LEADERSHIP
chicagobooth.edu/hpl
Create an environment that drives financial results, inspires innovation, and accelerates growth.

MAY 16–20, CHICAGO
EXECUTIVE PROGRAM IN CORPORATE STRATEGY
chicagobooth.edu/epcs
Strengthen your leadership abilities by learning to translate objectives into an execution plan, coordinate and communicate corporate strategy, and evaluate your approach to competition.

ONGOING
EXECUTIVE MBA ADMISSIONS EVENTS
chicagobooth.edu/exec-events
Meet students and alumni and hear from Booth’s Admissions team at regionally focused events.

Since 1898, the University of Chicago Booth School of Business has produced ideas and leaders that shape the world of business. Our rigorous, discipline-based approach to business education transforms our students into confident, effective, respected business leaders prepared to face the toughest challenges. Visit chicagobooth.edu/programs for more information about our Full-Time MBA, Evening MBA, Weekend MBA, and Executive MBA Programs, our PhD Program, and our Executive Education courses. Chicago Booth has campuses in Chicago, London, and Hong Kong.