Do shoppers have too many choices?

US consumer goods are proliferating rapidly, with implications for consumers and companies.

Plus:
How to vaccinate the world (next time)
Is that college worth the price tag?
“Offering people $100 every year if they take their booster, that would have a pretty big effect.”
Retail products have made news over the past two years, often because of scarcity. But while missing merchandise took the spotlight, less noticed was the sheer variety of products available. As our cover story (page 28) explains, there has been an explosion in the past two decades in “niche” offerings. An analysis by Chicago Booth’s Joseph Vavra and Brent Neiman of consumer packaged goods finds that the number of products in that category increased by 4.5 percent a year from 2004 to 2016.

This surge reflects falling barriers to market entry and is in a sense an achievement of capitalism—evidence that the market is giving people a dazzling array of choices. But do they actually want all this choice? And is the growth an indication that product markets are healthy and innovative, or does it mask corporate consolidation that has implications for competition? Researchers offer a variety of perspectives in a debate that is evolving along with the CPG market.

The shopping theme runs through this issue. What should you look for when choosing a college? Many students aspire to go to the most prestigious schools, but Booth’s Jack Mountjoy finds that selectivity tells you more about incoming students than the school itself and the value it will provide (page 10). Many state legislators and consumer advocates are concerned that women pay more than men do for essentially the same personal-care products—but research by Booth’s Sarah Moshary, Northwestern’s Anna Tuchman, and Cornerstone Research’s Natasha Bhatia indicates that the dreaded “pink tax” might not exist (page 16). Booth PhD student Benedict Guttman-Kenney looked at what happened when people charged a lot of these and other products to their credit cards and then set up minimum automatic payments (page 18).

The pandemic is, of course, far from over, and we’re continuing to track the academic research that is coming out about what lessons lie in the ongoing data. In this issue, we have a feature on four key lessons from the vaccine rollout that could help us improve our response to the next public-health crisis (page 38).

When you’ve finished reading this issue, turn to chicagobooth.edu/review to find more articles, videos, and charts on the latest research and insights. Just as retail products are multiplying, so are our offerings. We recently debuted a Tiny Course—five modules (each featuring two short videos and two quick quizzes) that will, in less than an hour, help you start to master the science of motivation. Test your knowledge, and let us know what you think by connecting with us on our social channels. What else would you like to learn about?

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Anuj K. Shah, associate professor of behavioral science, uses psychology and behavioral science to examine social issues such as crime, poverty, and youth violence. He is an affiliate of the University of Chicago Crime Lab and a member of the Scientific Advisory Board at ideas42, a social-science research and development laboratory that uses scientific insights to design innovative policies and products. (Page 9)

Christina Patterson, assistant professor of economics and a Biehler Junior Faculty Fellow, studies macroeconomics and labor economics, focusing on how inequality across workers and companies affects the economy’s response to shocks. She has been a member of the Chicago Booth faculty since 2020. This issue features her findings, from research conducted with MIT PhD students Joel P. Flynn and John Sturm, on how to improve fiscal stimulus. (Page 12)
In a tight labor market, remote work advances
By Steven J. Davis, Claudia Macaluso, and Sonya Ravindranath Waddell

Is it ethical to use facial imaging in decision-making?
The Big Question

Seat belts demonstrate the spillover effect
By John A. List

Why hasn’t the Fed done more to fight inflation?
By John H. Cochrane

The ethics of a ‘passive’ investment
By John Paul Rollert

Is crypto’s volatility bad for the financial system?
The IGM Panels

Jean-Pierre Dubé, the James M. Kilts Distinguished Service Professor of Marketing and a Charles E. Merrill Faculty Scholar, is also the director of the Kilts Center for Marketing at Chicago Booth. An empirical researcher, he has studied topics from price discrimination to food deserts to the economics of brands and branding. His research in this issue’s cover story explores some of the forces that have created a surge in product choices for shoppers. (Page 28)

Steven J. Davis, the William H. Abbott Distinguished Service Professor of International Business and Economics, cocreated the Economic Policy Uncertainty Indexes, is a senior fellow at the Hoover Institution, and co-organizes the annual Asian Monetary Policy Forum. He is also the cofounder and codirector of the Work from Home Research Project, which chronicles the changing nature of the modern workforce. (Page 47)
FEEDBACK

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LET THE MARKET MOVE YOU

Why are financial markets so volatile? (Spring 2022)

“A really interesting read for active investors.” —David John

“Super interesting on how flows from specific investors have substantial effects on asset prices and drive them away from levels based on fundamentals. The reason is that most investors are passive and inelastic to market events. Every $1 flowing into a market pushes up prices by $5.” —Anders Akerman

DEMAND FOR A COUNTERPOINT?

Fixing supply problems won’t stop inflation (Spring 2022)

“I’ve been for the Fed hiking rates since last fall. Still, it is simply wrong to claim that inflation can only be due to excessive demand growth. Even with constant total spending, the P effect of adverse supply shocks doesn’t ‘cancel out.’ MV = Py; P = (MV) / y. (The rest is for homework.)” —George Selgin

“I think that’s reductionist and oversimplified. If supplies of all types are stuck in ports, creating shortages, all prices go up, not just on one class of goods. Fuel goes up, and food goes up because it costs more to ship it. Wages go up to keep up with the cost of living. I have no doubt that monetary policy caused some of the inflation. But to say it’s just “too much easy money” and not “too much money chasing too few goods” is probably wrong. In economics, it’s supply and demand. Not just demand. Supply-siders have been debunked before.” —Karen F. Duncan

“Well said.” —Scott Brave

“Inflation is a spiral, and once it starts it is hard to stop. Unfortunately, it’s also part of a cycle that usually starts with inflation, then transitions to higher interest rates to bring it down, and ends in recession, which does finally stop inflation because people are out of jobs and don’t have money to spend.” —David Brown

A PLAYBOOK TO FIGHT COVID-19

We should have spent more to fight COVID-19. We still can. (Spring 2022)

“Spend $100 billion annually on public-health education, surveillance, and global public-health infrastructure. Follow the previously written pandemic playbook. And look at history.” —Broderick Adams
CELEBRATING THE SUCCESS OF WOMEN

On March 25, a packed crowd of inspiring entrepreneurs, nonprofit founders, executives, and rising leaders explored issues geared toward the success of women during the daylong event. This year’s conference focused on the themes of leading with transparency to help level the playing field, creating a community that builds up women of all backgrounds, and committing to meaningful change locally and globally.

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Phone calls are a thing of the past. Should they be?

Booth researchers are exploring how less text-based messaging and more talking could improve communication.

Follow your curiosity at chicagobooth.edu/communication
The proportion of corporate profits paid out to workers has shrunk in recent decades. From 1978 to 2017, employee compensation as a percentage of corporate gross value added—or businesses’ total contribution to GDP—steadily fell in the United States, from 63 percent to 58 percent.

Economists have blamed automation, the decline of manufacturing, and the increase in outsourced offshore production for the contracting labor share. But the US tax code is also a significant contributor, according to the US Treasury’s Matthew Smith, University of California at Berkeley’s Danny Yagan, Princeton’s Owen Zidar, and Chicago Booth’s Eric Zwick.

They find that incentives in Congress’s 1986 rewrite of the tax code spurred a migration by businesses away from the traditional corporate form—known as C corporations after subchapter C of the Internal Revenue Code—and toward alternatives such as partnerships and S corporations. The result is that income in the billions of dollars is treated as profits instead of wages, and this has accounted for about a third of the decline in the corporate-sector labor share, according to the research.

Entrepreneurs have long had the ability to characterize their income as

Billions in income is now treated as profits instead of wages

US tax policy is shrinking the labor share
The case of disappearing wages

As the proportion of corporate profits paid out to workers has shrunk in recent decades, economists have blamed automation and the decline in manufacturing, among other factors. But research suggests that changes to the tax code explain a third of the decline.

**Labor share of US corporate income adjusted for pass-through businesses**

- Reported labor share in the national accounts
- Adjusted labor share

If a portion of *S corporation* profits were reclassified as wages, as it would be for *C* corporations, the labor share of US corporate income would be higher. Treating *partnerships* as *C* corporations would likewise increase the labor share. **Together,** these two adjustments would account for about a third of the decline in the share of US corporate income accruing to labor between 1978 and 2017.

![Graph showing the labor share of US corporate income adjusted for pass-through businesses from 1980 to 2017.](image)

Smith et al., 2021

The more we know about others, the more we think they know about us

Large-scale social and economic phenomena such as globalization, urbanization, and the movement of an ever-growing number of interactions online have made anonymity an increasingly salient part of life in the 21st century. Anonymity is desirable in some contexts and can be an important aspect of personal privacy, but it also has a dark side: research has found, for instance, that it can encourage dishonesty and other antisocial behavior.

But it’s possible to change how anonymous we feel even without changing how anonymous we are, according to Chicago Booth’s Anuj K. Shah and Penn State postdoctoral scholar Michael LaForest. In a series of experiments in the lab and a follow-up experiment in the field, they find that when people have more information about a stranger, they expect the stranger to know more about them too—an effect with such potency that it may even help reduce crime.

Shah and LaForest designed their experiments to explore people’s expectation of “social symmetry”—the idea that a relationship between two people will be balanced along given dimensions. For example, if Person A feels friendship toward Person B, you might have a default expectation that Person B feels a similar degree of friendship for Person A.

Shah and LaForest tested the social-symmetry assumption to see how acquiring information about a stranger affects how well we think the stranger knows us. In nine laboratory experiments, they told participants they had been paired with a partner—though in reality, there was no partner—with whom they would interact online. Participants were then asked to share information about themselves as part of an icebreaker exercise.

In one set of experiments, participants provided minimally informative details about their lives, such as their marital or employment status. Some received similar information about their “partner”—the responses were preprogrammed and randomly generated—and some did not. Those who received information felt their partner knew them better, relative to those who didn’t receive information.

In other cases, participants were instructed to tell their partner four truths and one lie about themselves. Those who received information about their fictitious partner (again, preprogrammed responses) thought their partner would be better able to detect their lie. Participants in other experiments, given a monetary incentive to lie but warned that their partner would flag suspected dishonesty, were less likely to lie when they received information about their partner. The less anonymous participants felt, the less likely they were to lie.

Probing the assumption of social symmetry and its implications for anonymity in a real-life setting, Shah and LaForest sent mailers to residents of some New York City Housing Authority housing developments, providing prosaic personal information about neighborhood coordination officers, who patrolled the developments as part of a community policing program. In surveys taken two months after the mailers were sent, residents of developments that received the information thought it was more likely their NCO would know if they committed a crime than did residents of developments that didn’t receive the mailers.

The researchers further find that in the three-month period after the mailers were sent, crime dropped in and around the developments that received them, relative to those that didn’t. The effect was modest—a 6 percent drop in the immediate vicinity of the development and a 7 percent drop within a slightly larger radius—but reliable. And this reduction was in line with the typical results of hotspot policing initiatives that entail amplifying police presence in particular areas of concern.

Shah points out that the effect of the treatment faded quickly, and cautions that the mailers in themselves are not necessarily a crime-prevention strategy. “I wouldn’t look at our field experiment as testing a ready-to-go intervention,” he says.

Shah doesn’t speculate on how the findings might apply in other contexts, but he points out that social media allows people to gather information about others in a way that blurs the line between acquaintance and stranger. When you check a new colleague’s LinkedIn profile before meeting for the first time, you may be trying to get to know the person a little better. But, the research suggests, you may come away feeling, and acting, as though your colleague knows you a little better too.—Jeff Cockrell

Many people seem to agree that “equitable allocation of resources is an intrinsic public good,” the researchers write, but they find that people prefer collective action. Governments that put taxes toward reducing inequality “can help people implement their taste for redistribution in situations where the desire for voluntary giving is too weak to achieve the equitable outcomes that many desire,” Mollerstrom, Strulov-Shlain, and Taubinsky argue.

Their results also highlight how findings derived from small study samples may not translate well to policy: in an experiment they conducted to test whether the size of groups might change the outcomes, they find that participants’ willingness to donate declined as the number of potential beneficiaries rose. Only one in six rich participants donated when 100 people were due to share the spoils, compared with one in three when the recipients were in more intimate clusters of four. This size effect might explain why a relatively high propensity toward charitable giving seen in laboratory experiments does not always play out in real-world scenarios.

The only condition under which the portion of participants willing to make personal donations matched the portion voting in favor of a wider tax on the rich was when the potential donors were told the money they donated would land entirely with one “partner” in the poorer group with whom they had been paired. The researchers posit that this effect came about because the language of partnership effectively reduced the group size in the minds of the donors.—Rose Jacobs


TO ADDRESS INEQUALITY, DONORS PREFER TAXES TO CHARITY

A GROWING chorus of critics argues that philanthropists get too much praise—and too many tax breaks—relative to the good they do in the world. Government funding for science, the arts, and poverty reduction outstrips charity by trillions globally, and whether Bill Gates is better than bureaucrats at picking the worthiest causes is hardly a settled contest.

As for raising money to reduce inequality in particular, most donors tend to favor taxes over donation requests, find George Mason University’s Johanna Mollerstrom, Chicago Booth’s Avner Strulov-Shlain, and University of California at Berkeley’s Dmitry Taubinsky.

“These results suggest that government programs, such as progressive tax- and-transfer systems, can help satisfy other-regarding preferences for redistribution in a way that creating opportunities for voluntary giving cannot,” the researchers write.

Mollerstrom, Strulov-Shlain, and Taubinsky ran a series of online experiments involving 1,600 American and Canadian subjects, testing participants’ willingness to donate their own money in changing settings. The researchers find that, as long as subjects with relative wealth (US$3.50 versus 10 cents) had a say over only their own giving, no more than a third were willing to donate as much as $1.20 to members of the poorer group.

This was in contrast to scenarios in which the rich participants could influence whether their rich peers would also have to part with cash—by voting for or against money being redistributed more fairly. In these cases, about half voted in support of transfers from rich to poor.

Is that college worth the price tag?

Students in the United States who attend different colleges go on to earn vastly different amounts. The US Department of Education’s College Scorecard shows that students who attend MIT earn a median annual income of $111,222 10 years after enrolling, while those who attend Alabama State make only $32,084.

According to research by Chicago Booth’s Jack Mountjoy and Washington University in St. Louis’s Brent Hickman, these publicly available income statistics overwhelmingly reflect preexisting differences in the earnings potential of incoming students, rather than substantial variation in the value added by a school itself. Analyzing 10 years of data on 30 diverse state-supported universities in Texas, they demonstrate that better indicators of a college’s real benefit for students are its spending on instruction, emphasis on STEM majors, and graduation rates.

“These results suggest that both the ordering and the magnitudes of the raw outcome comparisons often highlighted in college guides, the popular press, and state funding formulas are driven largely by selection bias,” or the ability of top schools to enroll students who would do well no matter where they attend, the researchers write. This leaves “a smaller and more nuanced role” for the contributions of the educational institutions themselves.

Calculating the value-added of colleges and universities is a hot topic among students, parents, and policy makers. “With state legislators increasingly exploring funding models that directly tie public college appropriations to student outcomes, it [value-added] is also an important consideration for policy-makers deciding where and how much to invest,” Mountjoy and Hickman observe.

Carrying out such an analysis is no simple matter, the researchers argue. The obstacles include finding a big enough sample to estimate the educational benefits conferred by each institution, following a series of individual-level data linkages from student characteristics to enrollment to degree completion and earnings, and creating a research design that takes into account the decentralized, idiosyncratic nature of college admissions and enrollment in the US.
No big boost

When researchers compared students who applied to and were accepted by the same set of Texas universities, the flagship university’s earnings premium mostly vanished.

Difference in real annualized earnings from students who attended the University of Texas at Austin

- Raw average earnings
- After controlling for students’ precollege characteristics
- After controlling for students’ potential as indicated by college acceptances

They addressed these challenges by tapping into several administrative registries in Texas, the second-largest US state by population, behind California. This enabled them to track 422,949 students in 10 high-school graduating classes from 1999 through 2008 who enrolled in the state’s 30 public universities. Mountjoy and Hickman then employed a “matched applicant” research design that compared the outcomes of students who enrolled at different colleges but applied to and were admitted by the same set of institutions. This approach, they explain, succeeded in balancing precollege predictors of future outcomes, such as high-school test scores and family income, across the different colleges that students ended up attending, yielding fairer institutional comparisons than the raw, uncontrolled statistics.

As with the MIT-Alabama State example, the raw data show huge outcome gaps across students who attended different Texas universities. The state’s public flagship institution, the University of Texas at Austin, has a 6-year graduation rate of 82 percent, compared with just 15 percent at Texas Southern, a historically Black university in Houston. Texas Southern students made $27,000 less each year on average compared with UT Austin students, who earned an average of $55,975 8–10 years after starting college.

But then Mountjoy and Hickman took into account preexisting differences in student potential across these colleges, using their matched applicant approach. The adjusted data show a tenfold reduction in the graduation gap between UT Austin and Texas Southern, and no significant difference in earnings value-added. The state’s other historically Black public university, Prairie View A&M, posted meaningfully higher value-added results than UT Austin on both graduation rates and earnings, the researchers find. Part of the story may be Prairie View’s strong focus on STEM majors, as colleges with higher value-added in producing STEM degrees also tend to have higher value-added on earnings.

The study suggests that admissions selectivity—a staple in popular rankings of colleges—is a poor indicator of value-added. Colleges with higher instructional expenditures and higher completion rates, however, produce durable earnings gains. A 10 percentage point increase in value-added on degree completion predicts a $3,000 increase in earnings value-added, they find.—Bob Simison

Mountjoy and Hickman, 2021


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UT Austin benchmark (mean=$55,975)
Sending stimulus checks to the poor can boost the US economy

In response to the COVID-19 shock, Congress pumped trillions of dollars into the economy in the form of stimulus checks, expanded unemployment benefits, and targeted spending to bolster specific industries such as airlines. The massive package apparently staved off a long, deep recession. But which elements were the most effective in the complicated, intertwined modern American economy?

Some research, involving pre-pandemic data, suggests that stimulus directed to households is most effective—when it’s targeted to people who need it most. MIT PhD students Joel P. Flynn and John Sturm and Chicago Booth’s Christina Patterson find that to get the maximum bang for the buck in spurring the economy, lawmakers should give the money to the people who will spend the most of it rather than sock it away in savings, as many Americans did with COVID-19 relief checks. Technically, these are the groups with the highest marginal propensity to consume, or MPC.

Targeting makes a difference

Researchers paired industries or demographic groups with their states, then looked at the effects of government support on each pair. Those effects varied widely.

**Change in aggregate output from a dollar of government purchases**
*Sorted from smallest to largest*

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<th>Change in aggregate output</th>
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**Change in aggregate output from a dollar of government transfers**
*Sorted from smallest to largest*

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“Our estimates suggest that government transfers of $1,000 to each employed worker would increase GDP by 69 cents per dollar spent,” they write, “whereas transfers of $2,000 to each worker with above-median MPC would increase GDP by 96 cents per dollar spent.”

Flynn, Patterson, and Sturm built a model taking into account economic linkages through supply chains and regional trade as well as the dramatic differences in household spending tendencies.

“Policy makers must consider the cascades of expenditure they set off, as expenditures in one industry and region reach not only its workers but also others in its supply chain, those at firms where workers spend their marginal income, and so on,” they write.

They fed the model 2012 data covering the 50 US states plus the District of Columbia, 55 sectors, and 80 demographic groups, then assessed how each industry, region, and demographic group responded to a $1 change in income. Virtually all of the differences boiled down to where households ranked on the MPC continuum, they find.

So what groups had the highest MPC scores? Those who were the most vulnerable to economic catastrophes, the researchers find: people who were younger than 35, didn’t have college educations, made less than $35,000 a year, or were Black. Relatively poor Arkansas, Mississippi, and South Dakota had the highest MPCs among states, the researchers find. Connecticut, the District of Columbia, and New Jersey had the lowest.

“We show that concentrating transfers among the highest MPC households can increase the effect of the policy on GDP by up to 130 percent,” the researchers write. “Governments should understand the opportunity costs associated with untargeted fiscal spending. . . . [Such] policies responding to the Great Recession and COVID-19 may have left substantial gains on the table—on the order of several hundred billions of dollars.”

—Bob Simison


IN GERMANY, A TEMPORARY VAT CUT PUSHED PEOPLE TO SPEND

OVER THE past decade and a half, central bankers and governments have been forced to experiment with assorted unconventional policy alternatives. One of them was Germany’s reduction of the national value-added tax as part of an economic stimulus package during the COVID-19 pandemic–driven downturn.

The government’s surprise move drove an additional €34 billion (US$38.5 billion) of consumer spending, according to the study. It not only helped stabilize the economy but also showed that such a temporary tax reduction can work as a piece of unconventional fiscal policy, the research suggests.

“Higher expected future prices are tantamount to lower current real interest rates, which should incentivize spending today,” write the researchers, including Chicago Booth’s Michael Weber.

A VAT accumulates at each production stage of a good or service and is the world’s most common form of consumption tax, levied almost everywhere except in the United States. In Germany, it adds up to 19 percent for consumers—although that was cut to 16 percent for six months in 2020.

To gauge the effects of this change, the researchers added questions to a monthly consumer survey initiated by the German central bank in April 2020, commissioned a separate independent survey of about 10,000 German consumers in early 2021, and analyzed retail sales data. The significantly lower prices from the VAT reduction gave consumers an incentive to spend before taxes went back up at year-end. Granted, only 60 percent of survey respondents understood the short-term incentive involved, while 40 percent did not. This allowed the researchers to compare the responses of the two groups.

They find that consumers aware of the temporary incentive spent 36 percent more on durable goods (think cars and furniture), 11 percent more on semidurable goods (such as clothing and footwear), and 2 percent more on nondurables (including food, beverages, and gasoline) in the second half of 2020.

Bargain hunters and younger households were the most likely to take advantage of the tax savings. The straightforward nature of the program was easy for many consumers to understand, which contributed to the policy’s success, the researchers write.

As a tool, the VAT cut had advantages over other measures, such as the direct cash payments rolled out by the US government, the study finds. German consumers had to spend money to fully benefit from the lower VAT, so they couldn’t stash it away in savings as many Americans did with pandemic relief funds. In Germany, the opportunity to save money on purchases added an incentive for families to spend the €300 per child in cash transfers that they also received under the stimulus package, the researchers argue, noting that people’s intentions to buy things increased as the expiration of the VAT cut approached.

The researchers allow for the possibility that there could be even better options available. “We do show, however, that . . . an unexpected temporary VAT cut operates indeed like conventional monetary policy and can be an effective stabilization tool,” they write. —Meena Thiruvengadam

COVID-19 hurt supply chains. Will conflict in Ukraine stress them further?

It is obviously having a huge effect on a number of sectors, most notoriously on energy markets, which have an immediate impact on logistics costs. More broadly, it is not just war but the fact that the geopolitical environment of countries and regions changes the way companies run their supply chains. The challenge, of course, is whether you have the capabilities as a company to manage the interaction between politics and business. The political environment is one more risk you have to deal with.

COVID shocked supply-chain managers, and in response they’ve been building up contingency plans. Some plans are long term, having to do with multisourcing and geopolitically distributing supply chains across the world in ways that make them much more resilient.

This is expensive though. It’s much easier to deal with a small pool of suppliers so that you get to know each other’s practices better and can fine-tune operational efficiency. But as you emphasize more quantifiable and measurable operational metrics, such as sourcing and logistics costs, you can also find yourself lowering your guard and quickly end up having a limited and riskier pool of suppliers sourcing your business.
These past few years have been a reminder that you need to make contingency plans at all levels. What happens if ports are closed? Have contracts in place with airlines to airfreight your products. COVID hit the container-ship industry dramatically, so companies moved to other transportation. For example, rail traffic from Asia to Europe was growing, until it became too risky to send trains on those routes through Russia, Ukraine, and Belarus.

This underscores the idea behind having a portfolio of options. Are you disciplined enough to understand that there are risks out there you can’t control? If we move again to a phase of 3-6 years where everything is stable, will supply-chain managers keep operating with those contingency plans? History tells us that people have short memories.

**Q2** How can a company develop plans for countless unknown risks? Over the past few decades, supply-chain managers have thought a lot about how to create flexible supply chains that can react in real time to changing demand and consumer needs, including through quick response and vendor-managed initiatives. Now they need to bring some of that flexibility to other parts of their businesses, such as logistics and transportation. They can take some of the metrics they have used in one portion of their supply chain and move them to other areas.

The modern supply chain relies less on forecasting and more on reliability, flexibility, and infrastructure. The way you assess performance and compensate supply-chain managers will help too. The emphasis has been on cost. If you have different types of performance metrics, including reliability, risk management, and sustainability, you are going to create the right environment to have more resilient supply chains.

You don’t need to predict the future; you just need to be ready to react. The more you can do that, the more you can be successful in managing and navigating all these challenges that are going to keep happening, whether they’re climate-related disruptions, pandemics, or geopolitical risks.

**MAKING YOURSELF UNCOMFORTABLE CAN BE MOTIVATING**

**DISCOMFORT**, both physical and emotional, can be a major deterrent to self-growth. That’s why plenty of behavioral researchers treat it as an obstacle to maneuver around. But could it also be an important tool for self-development? Cornell’s Kaitylin Woolley and Chicago Booth’s Ayelet Fishbach tested this idea in a series of experiments, and they find that discomfort can be a motivator rather than an obstacle.

“Instead of seeing discomfort as unrelated to the goal or as a signal to stop, people will start perceiving it as a sign of progress,” the researchers suggest.

Across a field experiment involving the famous Chicago improvisational comedy enterprise the Second City and four online experiments, the researchers asked some participants to seek out discomfort and take it as a measure of progress toward their goal.

In the field experiment, Woolley and Fishbach partnered with the Second City Training Center. They recruited 557 improv students from 55 classes and tested whether instructing the participants to lean into awkwardness or discomfort led them to take more risks. The students in the discomfort group were told that “feeling uncomfortable is a sign that the exercise is working” and that “your goal is to push past your comfort zone.”

Two other groups got different instructions, with one told simply to “see if the exercise is working” and another to “push yourself to develop new skills and feel yourself improving.” The researchers then watched each class play a game called “Give Focus,” in which one person who “has focus” moves around the room and acts at will while other players are frozen in place. The person who has focus can pass it to someone else after some duration, short or long. Most learning happens when people are holding focus, says Woolley, so the longer they hold it, the more they learn.

Woolley and Fishbach analyzed video recordings of each class. They find that those who were asked to seek discomfort inhabited the focus role longer and took more risks—for example, by walking fast and jumping around rather than walking normally.

The researchers replicated the findings in four follow-up experiments involving participants they recruited online. As with the improv setup, the follow-up experiments demonstrate that participants who were asked to seek discomfort were more motivated to continue whatever emotionally difficult task they were asked to do.

People are highly motivated by immediate gratification. But many paths to self-growth involve short-term discomfort and long-term gains. So when people can find a positive spin on otherwise negative cues, those cues should become more motivating, the researchers argue.

Woolley and Fishbach make sure to point out the danger of taking it too far. Just like sharp and unexpected pain can be a cue to stop exercising, emotional pain can be a signal to take care with your mental health, they write.

But taken cautiously, adopting a “no pain, no gain” mentality when you know something will make you feel awkward, sad, scared, or uncomfortable can boost your motivation to stick with it.

—Kasandra Brabaw


Researchers instructed improv students to push past their comfort zone.
A mixed bag

While some personal-care items for women were priced higher than they were for men, other products sold for less—even ones made with the same leading ingredients.

Average price premium or discount for women’s vs. men’s products

<table>
<thead>
<tr>
<th>Product</th>
<th>Shelf price</th>
<th>Price per unit for products with similar ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar soap</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Deodorant</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>Body wash</td>
<td>20%</td>
<td>15%</td>
</tr>
<tr>
<td>Shaving cream</td>
<td>-5%</td>
<td>0%</td>
</tr>
<tr>
<td>Shampoo</td>
<td>-10%</td>
<td>-5%</td>
</tr>
<tr>
<td>Average</td>
<td>-15%</td>
<td>-10%</td>
</tr>
</tbody>
</table>

“When you’re actually looking at men’s or women’s products that are similar—not exactly the same, but at least the first few ingredients are the same—the price differences are much smaller,” Moshary says.

She acknowledges that the findings raise more questions about gender-targeted products. “We’re interested in trying to better understand what drives these differences in characteristics of products that are targeted at men or women,” she says. “We’re also interested in whether there are differences over time in the share of unisex products.”

As for legislation to repeal the pink tax, “our finding that women’s personal care products are not systematically more expensive calls into question the role of government intervention,” the researchers write. —Sarah Kuta

Regulators should focus on on-screen smoking

Every time Don Draper lit up a Lucky Strike on Mad Men, the hit series that ran from 2007 to 2015 on AMC, it lent a cool, Madison Avenue vibe to the cigarette brand.

Instances of cigarette product placements such as those in Mad Men boost consumer demand in the United States for cigarettes, according to an analysis by University of Washington’s Ali Goli (a graduate of Chicago Booth’s PhD Program) and Simha Mummalaneni and Booth’s Pradeep K. Chintagunta and Sanjay K. Dhar. The researchers’ findings illustrate why product placement on TV and in movies poses a challenge for regulators concerned with keeping cigarette sales from rising.

Roughly 14 percent of adult Americans smoked cigarettes regularly in 2018, down from 42 percent in 1965, according to the American Lung Association. Public-health initiatives discouraging tobacco use have been in place since the 1960s, and a ban on cigarette advertising on TV followed in 1998.

But the rise of streaming services that enable viewers to skip through commercials has increased the popularity of product placement and allowed tobacco companies a new way in. These on-screen moments can be arranged in conjunction with brands, or happen independently of them. Producers like the realistic effect everyday brands lend to a story line, and companies love the exposure. Though it’s illegal in the US for tobacco companies to pay for such appearances in movies and TV shows, unpaid placements, in-kind donations, and payments from foreign affiliates are permitted.

Anti-smoking groups have called for limiting cigarette appearances on TV and in movies, but they and trade groups have for years debated the effect of these appearances on cigarette demand. One back-of-the-envelope estimate from marketing consultants and anti-smoking advocates indicates that Mad Men goosed Lucky Strike sales by 43 percent, a figure that producers have dismissed as speculative.

To find out how much such placement affects retail cigarette sales, the researchers analyzed data on TV-show cigarette product placements, the viewership of the shows, and cigarette sales in 92 market areas from December 2003 to July 2006. They tapped into store scanner data compiled by market-research company IRI for sales of 15 cigarette brands at more than 2,700 stores in 41 US states, then merged these with all instances of branded cigarette product placement on US network TV.

Advertising data from Nielsen Ad Intel indicated how many people saw the shows featuring product placements. “We needed to see the extent to which placement was viewed by the people in each geographic market,” Chintagunta says.

Finally, the researchers developed a demand model to measure how product placement affected sales. They find a small but positive and statistically significant effect: every 1 percent increase in exposure to cigarette product placement increased sales by 0.02 percent.

What’s more, product placement by one brand seems to increase sales for the entire cigarette category. “One thing that surprised us—other than that we actually found an effect in the first place—was the extent to which a brand’s own product placement had a similar effect on competitor sales,” Chintagunta says.

This bounce is roughly in line with the effects of TV advertising, the researchers write, and may justify regulating product placement just as strictly. A blanket ban on brand names and logos would lead to a fall in cigarette sales of less than 2 percent, they calculate, but banning all on-screen smoking would reduce sales by up to 7 percent.

“Regulators would benefit from shifting their focus from cigarette brands to TV producers,” the researchers suggest.

—Sally Parker


Go to chicago Booth.edu/review to see a video about this research.
Why automatic payments can lead to mounting debts

To help protect credit-card borrowers from forgetting to make a payment or defaulting, lenders enable them to schedule automatic payments. A common automatic payment option tends to be paying the minimum each month, an amount that is low—typically just 1 percent of a balance.

Chicago Booth PhD candidate Benedict Guttman-Kenney worked on two teams that studied how costly the use of automatic minimum payments are in the United Kingdom. The results are discouraging. One study finds that enrolling in automatic minimum payments deflated any pressure on consumers to pay up. The other suggests that nudges encouraging people to kick in more each month have little to no effect.

“We calculate that 8 percent of all interest ever paid on credit cards is due to using automatic minimum payments,” says Guttman-Kenney.

In the first of the studies, the researchers analyzed the effects of automatic minimum payment options on a random sample of credit-card holders from January 2013 to December 2014. The anonymized data, provided by Argus Information and Advisory Services, included card identifiers, balances, required minimum amounts, purchase amounts, purchase types, repayment amounts, fees, and finance charges.

Only a minority of UK consumers use automatic minimum payments, says Guttman-Kenney. However, if you take all cardholders who pay the minimum nine or more times in a year, 75 percent of them make automatic minimum payments. These consumers are barely reducing their debt balance and meanwhile are incurring high interest.

In the study sample, 29 percent of cardholders used automatic payments as of January 2013, and another 5 percent changed from manual to automatic payments over the next two years. For those who switched, the proportion of missed payments fell from 12 percent a month to 1 percent.

But while these cardholders avoided late payment charges, the benefit was far outweighed by the extra interest charges they racked up: 20 percent more in combined interest and fees. These extra charges occurred because after switching, cardholders neglected to make the occasional larger payments they previously had, the researchers find. While previously cardholders had made larger (more than the minimum) payments 40 percent of the time, that dropped to 20 percent. Meanwhile, the proportion of monthly payments made in full dropped from 29 percent to 25 percent.

And it’s hard to nudge consumers using automatic minimum payment plans to make choices that would reduce their debt. In the second study, researchers investigated why people make minimum payments and tested whether certain disclosures and nudges could help reduce the debt of such cardholders.

In one experiment conducted between 2016 and 2018, they presented enhanced versions of the disclosures required on US credit-card statements, which specify how many years it would take to pay off debt under alternative payment scenarios. While these disclosures have been found to be ineffective in the United States, the researchers wanted to test their effects in the UK, where they’re not mandated. They collaborated with a UK lender to create nudges that went beyond the US disclosures by explicitly encouraging cardholders to reduce their debt. The nudges, which appeared on the first page of each billing statement for almost 30,000 cardholders, had no effects on changing credit-card debt, the researchers find.

A second experiment involved about 150,000 UK credit-card holders making
**SELF-DRIVING-CAR TECHNOLOGY CAN HELP MACHINES TRADE STOCKS**

**TRADERS HAVE** long used price charts to predict future investment returns. Patterns such as the “head and shoulders,” “double top,” or “ascending triangle” form a visual shorthand for investors looking for repeatable shapes and figures that suggest profitable trades. Now artificial intelligence, using the same pattern-recognition techniques that factor into programming self-driving cars, is proving adept at technical investing as well.

University of Chicago PhD student Jingwen Jiang, Yale’s Bryan Kelly, and Chicago Booth’s Dacheng Xiu built a machine learning–based program that can recognize the patterns in stock-price charts and use them to generate profitable trading strategies. The findings support the idea that visual representations of stock prices contain valuable and actionable information.

“We have heard that traders can translate price charts into signals,” Xiu says. “Our findings suggest that the shape of the data contains enough information for trading. This justifies what technical traders do.”

Jiang, Kelly, and Xiu find that using past prices and momentum, expressed graphically, can generate profitable trading strategies over short time periods. The effect wanes the longer a position is held. As the holding periods grow to months and quarters, fundamental issues such as financial reporting and corporate events begin to hold more sway over future prices. They find that their chart-reading ML system’s predictions delivered higher returns with less risk than trades made using other methods for predicting returns.

The A.I. methodology the researchers employ is called a convolutional neural network (CNN). It’s the same type of ML that programmers are using to help autonomous vehicles identify pedestrians, stop signs, and sidewalk curbs. Its performance in recognizing investment patterns suggests that computers can reliably predict returns without relying on the intuitions, hunches, and judgments that human investors develop over years of trading.

“A technical trader uses prior knowledge to define patterns,” Xiu says. “A CNN has no prior knowledge. Without using any existing chart, I am going to ask the CNN to learn from the price curve to extract useful information for prediction.”

The findings also suggest that a CNN can make useful predictions even when data sets are incomplete or small. The researchers find that they can use patterns observed in data-rich US-based markets to make predictions about stock-price performance in foreign markets with shorter track records.

Suppose you have two data sets, Xiu says. One is high quality and can be used to train a computer to recognize a cat. The other, more limited one contains data about tigers. Essentially, the researchers find that they can use lower-level features associated with both cats and tigers, primarily learned from the first data set, to teach a computer to recognize a tiger, with little or even no information from the second data set.

Through this transfer learning, the researchers say, a CNN system might be able to analyze newer and emerging asset classes if they share features with more mature markets.

—Michael Maiello

**Machine learning can make useful predictions even when data sets are incomplete or small.**

How to make rooftop solar energy a better business

Americans’ surging investments in rooftop solar panels, small natural gas-fueled generators, wall-mounted batteries, and wind turbines are starting to add up to a lot of power—more of it, at times, than the owners of these technologies can use themselves.

These small-scale producers can go through third-party aggregators to sell back to the grid, but the industry needs an efficient business model to make this work. Chicago Booth PhD student Zuguang Gao, King Fahd University of Petroleum & Minerals’s Khaled Alshehri, and Booth’s John R. Birge suggest a two-part pricing model that they say would result in more energy efficiency and less market power for traditional energy generators.

Electricity producer-consumers are prosumers in the coinage of the late futurist Alvin Toffler, and their localized investments are known as distributed energy resources, or DERs. Collectively, these small producers could be a boon for the clean-energy economy and, by producing electricity cheaply, lower electricity prices. The capacity they generate in the United States may reach 387 gigawatts by 2025, according to global research and consulting firm Wood Mackenzie. That would be enough to power 290 million houses.

Production levels are too small for individual owners to participate directly in the wholesale electricity market, however. Prosumers in many cases can sell their power to an aggregating company, which in turn bids directly with the system operators that oversee state wholesale energy markets. But aggregating retail energy has in the past two decades been a largely money-losing proposition. What business model would work best for prosumers and aggregators?

As policy makers, regulators, and industry participants hammer this out, the researchers argue that the most efficient model would include two-part pricing, entailing a fee for DER owners to participate in the program and a per-unit price at which the aggregator would purchase the prosumers’ energy.

Aggregators are typically both profit seeking and monopolistic within a specific location, write Gao, Alshehri, and Birge. The price offered to DER owners needs to be high enough for prosumers to want to participate but still low enough that the aggregators can make money.

Currently, in the prevailing one-part pricing model, the aggregator charges a fixed marginal price per energy unit and doesn’t include a participation fee. A two-part pricing model is more economical, Birge says, because it enables prosumers to enter the market in a way that leads to the lowest total overall cost.
and it allows both the aggregator and the producer to profit.

“Since we need the aggregator to act as an intermediary in order to bring thousands and perhaps someday millions of small producers into the market, some form of two-part pricing would be necessary to ensure that the market operates efficiently,” he says.

Additionally, such aggregators could help promote energy efficiency, not simply by offering the cleaner power provided by the DERs but also in the manner by which they administer the energy. Consider multiple residences with rooftop solar panels that include battery backups. An aggregator could ensure that power stored in the prosumers’ batteries is released to the grid at an optimal time—for example, in the early evening, when demand often peaks. In the same manner, the aggregator could potentially determine when to charge an electric vehicle—likely in the early morning when loads are lowest—although details such as whether this power cycling would void the EV manufacturer’s warrant would be important.

Aggregators could also help offset the actions of traditional generators, such as large electric power companies, that might have an incentive to reduce output to drive up prices. “The aggregator can compete against these generators to lower the price and keep the traditional generators from exercising as much market power,” Birge says.

States such as California and New York have adopted energy aggregation programs, including Southern California’s Clean Power Alliance, which began enrolling residential customers in February 2019, and the sonnenCommunity New York Virtual Power Plant, a solar plus battery program, which launched in July 2021. New York’s aggregation system includes a two-part pricing model similar to that put forward by the researchers: a subscription fee plus a payment for the remaining credits.

“Hopefully, we will be able to see results from New York’s experience that will show efficiency improvements,” Birge says. Overall, the researchers argue, this type of policy could be beneficial to all consumers and should be adopted more broadly.

—Rebecca Stropoli

SOCIAL MEDIA ADDED TO THE COSTS OF THE FLINT WATER CRISIS

INFORMATION and misinformation travel faster and farther than ever online. In looking at bottled-water sales in the wake of the drinking-water crisis in Flint, Michigan, University of Connecticut PhD student Binod Khanal argues that this social media spread had a measurable cost.

Americans thousands of miles away who had Facebook connections to the Flint area spent heavily on bottled water as they took measures to safeguard their own health, according to the study. The findings, he writes, suggest “the need for careful investigation of the spillover effect of the incidents that can arise due to (mis)information spread via social media networks.” Khanal used Facebook’s Social Connectedness Index (SCI) to analyze the response of people across the country who had ties through social media to Genesee County, where Flint is located. He also tapped into the NielsenIQ Retail Scanner Data housed at Chicago Booth’s Kilts Center for Marketing for bottled-water sales.

Using an economic model, he calculates that people in counties with 10 percent higher SCI scores with respect to Genesee County spent, in aggregate, about $20,000 more per month on bottled water after the crisis.

Other studies, including those focusing on Flint, have demonstrated that people exposed to water-quality news tend to respond by buying more bottled water and water filters. Less known has been how consumers across the country would respond to a crisis situation and what the effect of social networks might be on their behavior.

The crisis developed after Flint authorities switched the city’s drinking water source from the Detroit system, which drew from the Detroit River and Lake Huron, to the Flint River in 2014, resulting in elevated lead levels and severe pathogens in the water. The situation gained national attention when Flint’s mayor and then-President Barack Obama declared a state of emergency in January 2016.

For his study, Khanal compared the 24 months before the declarations with the 12 months after. He finds that people in Genesee County had strong social media ties to residents of counties in the east north central, east south central, and south Atlantic regions of the United States. There were also significant links to counties as far away as Arizona, Nevada, and Wyoming. Sales of bottled water in socially connected areas rose significantly after the states of emergency were declared, he finds.

Sales of bottled water were even higher in socially connected counties that had experienced at least one health-related water-quality violation, Khanal finds. He also demonstrates that high-income counties drove much of the increase.

Outside of Michigan, the closer a county was to Flint, the stronger the response was to avoid potential water-quality problems by buying bottled water. That wasn’t the case in the state—perhaps because residents heard about the crisis earlier from local news sources, Khanal says. Also, the government started distributing bottled water in Flint in 2016, when the crisis was recognized as an official emergency.—Sally Parker


TOO MANY ‘SHADOW BANKS’ CAN LIMIT OVERALL ACCESS TO CREDIT

CONNECTING borrowers and lenders can involve a long chain of financial intermediaries. While these go-betweens can benefit the broader economy by smoothing the flow of credit, there are now probably too many links in the credit chain, argue Chicago Booth’s Zhiguo He and Columbia’s Jian Li (a graduate of Booth’s PhD Program). A shorter chain could reduce both borrowing costs and overall financial risk, they suggest.

Rather than quantify the optimal number of intermediaries, the researchers developed a holistic framework for modeling the entire credit chain. This approach, they suggest, could help regulators target policies that promote overall access to capital while avoiding dangerous credit bubbles, such as the one that triggered the 2008–09 financial crisis.

Suppose a small manufacturer takes out a six-month loan, but when that debt comes due, the economy has soured and the company is hurting for cash. Worse, it can’t find a new lender to pay off its old loan. Strapped, the company is forced to unload its factories under duress after six months.

Smaller potential losses boost the fund’s theoretical ability to refinance its own debt, in turn emboldening its investors and ultimately maintaining the flow of credit throughout the system, the researchers find.

But as demand for—and profits from—such securitization grew in the 1990s, so too did the number of players in the credit chain. Today, each dollar originally invested flows through 2.3 layers before reaching the final borrower, up from 1.8 in 1960, the researchers find.

“Shadow banks serve an important function by spreading credit more efficiently,” Li says. “However, it is likely there are too many layers in the chain to maximize overall access to credit.”

He and Li designed their model to aid regulators in understanding how individual policies might ripple throughout the economy. For example, legislation that specifically curbs lending by commercial banks might induce riskier activity by other intermediaries elsewhere in the system.

“If we zoom out and look at the whole credit chain, the fundamental mismatch between the long-term nature of entrepreneurial projects and short-term needs of investors is still there,” He says. “That could lead to more instability outside of what regulators can see.”—Brett Nelson

How is IT spending changing banking?

Which banks have invested more in tech—and what exactly they’ve invested in—has big implications for the financial system, and for consumers and businesses around the world, according to Chicago Booth’s Zhiguo He, University of Florida’s Sheila Jiang and Douglas Xu (both PhD graduates of the University of Chicago), and University of California at Berkeley PhD student Xiaoyi Yin.

In 2012, IT outlays accounted for an average of between 4.7 percent and 9.4 percent of banks’ operating income worldwide, according to a McKinsey report cited by the researchers. But in 2021, that figure stood at 17 percent for the biggest banks, on par with tech behemoths Apple (12 percent) and Google parent Alphabet (20 percent), per J.P. Morgan analysts.

How exactly are banks directing those outlays? To better understand the spending patterns, He, Jiang, Xu, and Yin focus on two fundamental banking activities: gathering and distributing data, and processing data. For the former, communication technology such as networking hardware enables smooth interactions with borrowers. For the latter, software such as Microsoft Office as well as more specialized tools facilitate fund transfers, loan processing, and risk management.

The analysis demonstrates a strong correlation between IT spending and banks’ underwriting decisions. This finding stood to reason, the researchers hypothesize, because serving different customers naturally requires different information capabilities.

For example, assessing the creditworthiness of small businesses with shorter track records might require gathering more “soft” data through face-to-face interactions with entrepreneurs. Refinancing home mortgages, by contrast, might demand more horsepower to crunch “hard” data such as credit scores. “As a consequence,” He, Jiang, Xu, and Yin write, “if banks specialize in different types of loan making, one should expect them to differ in their IT investment profiles.”

To explore these links in the United States, the researchers tapped a
database—from marketing-services company Harte Hanks—that tracks technology adoption. They gathered details on more than 3 million IT purchases between 2010 and 2019 by 1,800 US commercial banks, or about 80 percent of the US banking sector. Loan data came from Federal Financial Institutions Examination Council call reports and other federal sources, as well as disclosures by banks following the Community Reinvestment Act and the Home Mortgage Disclosure Act.

Banks specializing in commercial and industrial loans—especially small-business loans—shelled out more for communication hardware than software, the researchers find. “If a bank is spending a lot on communication technology, that might be a good indicator as to whether it is committed to serving small businesses,” Jiang says. On the other hand, more underwriting of personal loans and mortgages correlated with larger investments in software, the researchers observe.

They studied changes in demand for small-business credit spurred by a provision in the Affordable Care Act that began offering tax credits starting in 2014 to small employers that pay for employees’ health insurance. Sure enough, banks located in counties that contained more small businesses eligible for the tax credit spent 26 percent more on communication-related IT than did banks in counties with fewer small businesses. Software-related spending, by comparison, barely budged.

Likewise, the data show that in the aftermath of the 2008 housing crisis, banks spent more on software than communication IT—presumably so they could crank out more credit calculations as interest rates plunged and homeowners scrambled to refinance mortgages.

Finally, the researchers investigated the connection between technology investment and bank payrolls. They examined whether banks’ access to skilled labor—instrumented by the number of local land-grant colleges—affect ed their technology spending. When skilled labor was relatively scarce, the researchers find, the cost of attracting IT talent rose, inducing banks to spend more on software than on communication hardware.

“Our study takes the first step toward understanding the basic pattern of these banking IT expenditures,” the researchers write, “and explores the connections and underlying mechanisms between these expenditures and the core functioning of the banking system.”—Brett Nelson

‘Human frictions’ can hinder economic policy

With little room to cut interest rates over the past two decades, central banks have tried instead to spur economies by speaking directly to consumers. Bank chiefs divulge plans to raise interest rates and hope this translates into clear personal-finance advice: make your big purchases now because credit-card debt and mortgages aren’t getting any cheaper.

Whether the message gets through is an open question, and the answer might hinge on the sophistication of the audience, according to Boston College’s Francesco D’Acunto, Karlsruhe Institute of Technology’s Daniel Hoang, the Bank of Finland’s Maritta Paloviita, and Chicago Booth’s Michael Weber. Their research suggests that policy makers need to account for the fact that some people either don’t understand how certain programs or policy moves could influence their choices, or lack the time and wherewithal to react.

The findings add a new dimension to economists’ study of the frictions that limit the transmission of fiscal and monetary policy to the real world, according to the study. The researchers call these challenges human frictions and argue that uneven sophistication among consumers limits the effectiveness of policy interventions targeting households. For instance, people in the bottom half of the IQ spectrum, even when facing no financial constraints, rarely take advantage of policies such as subsidies, “possibly because they are not aware of the policy changes or do not understand how policy measures affect economic incentives,” the researchers write.

“The ball is in the turf of policy makers, who should design policies in such a way that they are accessible to everyone, not just a handful of expert financial-market participants,” says Weber. Otherwise, policies and guidance can end up redistributing wealth from people who don’t understand the policies to those who do, he adds.

The researchers tapped into the results of IQ testing conducted when Finnish men enter mandatory national service, and have been mining the data for a series of studies correlating cognitive ability with economic behavior. (For more, read “How studies correlating cognitive ability with economic behavior,” the researchers write.) The findings add a new dimension to the transmission of fiscal and monetary policy, analyzing detailed data about decisions of individuals by IQ scores vs. nominal interest rates.

Did they understand the message?

Compared with higher-scoring peers, Finns who scored lower on an IQ test were less likely to change their views on borrowing when short-term rates changed.

Borrowing decisions of individuals by IQ scores vs. nominal interest rates

In many countries including the United States, scores on intelligence tests and other standardized exams such as those required for college are correlated with education and income. But in Finland, education is free through college and the social safety net is stronger, Weber says. The researchers find in their data only a small correlation at the individual level between IQ test scores and income, and their results took differences in income into account.

In their human frictions study, they analyzed the response to a car trade-in program run by the Finnish government, probing records of car purchases and registrations. The results demonstrate that individuals with intelligence scores of 1-5 on a 9-point scale were less likely than those with scores of 6-9 to benefit from the program, in which the government offered new-car buyers €1,500 (US$1,700) if they bought a model that met certain energy-efficiency standards. Controlling for income, wealth, and debt, the researchers find that only one in 10 of the buyers with lower scores purchased a car that qualified for the subsidy, compared with four in 10 among the group with higher scores. And, after surveying the same consumers whose choices they observed from public records, they find that most of the differential reaction was due to the lack of awareness and understanding of the policy.

For a second part of the study, and with the same IQ data as a backdrop, the researchers investigated consumers’ awareness of and response to monetary policy, analyzing detailed data about Finn’s opinions concerning the economy and the consumer climate. They find that lower-scoring individuals were less likely to change their answers to questions including “Is now a good time to borrow money?” in response to changes in the interest-rate environment. These differences on paper also translated into real life: respondents with higher scores were more likely to increase borrowing when interest rates were low than lower-scoring peers.

“Irrespective of financial or liquidity constraints, many households do not react to the policy because they do not develop an intention to react, perhaps because they are unaware of the policy and/or do not fully understand its functioning,” the researchers write.

They urge economists and policy makers to consider human frictions in their models and programs.—Rose Jacobs

The hidden costs of interest-free payment plans

When online shoppers are considering a purchase, many see an option on their screen to pay in installments, without incurring interest charges or fees. This fintech credit option is called buy now, pay later (BNPL)—offered by firms such as Affirm, Afterpay, and Klarna—and allows retailers to notch up sales while shoppers essentially get interest-free loans as long as they make payments on time.

But though this innovation may sound good, it may not always be prudently used by consumers. The rapidly expanding, relatively new, and largely unregulated form of financial services has barely been studied to assess the risks, warn Chicago Booth PhD candidate Benedict Guttman-Kenney and University of Nottingham’s Chris Firth and John Gathergood. They analyzed credit-card data and find that many consumers, in particular those who were younger and in poorer areas, transferred one or more of these “interest free” payments to credit cards, incurring annual interest rates of up to 20 percent. The pattern they observed “raises doubts on consumers’ ability to pay for BNPL,” the researchers write.

BNPL transactions have become widespread, totaling £2.7 billion (US$3.7 billion) in the United Kingdom in 2020, according to the Financial Conduct Authority (FCA), the United Kingdom’s financial services regulator. There isn’t yet an equivalent official estimate for US BNPL transactions, but professional services company Accenture put it at $21 billion in 2021. FIS, a technology provider, estimates BNPL accounted for 3 percent of global e-commerce transaction value in 2021, or about $160 billion.

The researchers examined anonymized data on about 1 million credit cards held by UK consumers and the associated BNPL and non-BNPL transactions from January 1, 2019, through December 31, 2021. Each credit-card transaction included the amount of spending and information on where the spending occurred. Each cardholder’s age range was also recorded, along with the postal code of the cardholder’s address.

“We find it is common for UK credit cardholders to charge BNPL transactions to their credit card: 19.5 percent of active credit cards in December 2021 had at least one transaction by a BNPL firm on their credit card during 2021,” says Guttman-Kenney. “This itself is a potential warning flag for regulators as it indicates cardholders may be paying off debt with debt: with a 0 percent interest BNPL debt potentially leading to a debt spiral incurring 20 percent credit card interest rates,” the researchers write.

What fraction of BNPL is put on credit cards? One UK BNPL lender reported that less than 10 percent of its customers repay using a credit card, but the researchers note it may be higher for other lenders in the UK and the US.

Their study finds that it’s more common for vulnerable consumers—including young ones, and those in poorer areas. BNPL, being unregulated, does not require lenders to consider whether customers can repay their debts without further borrowing. The promise of interest-free payments may cause consumers to act impulsively and splurge on items as simple as cake and pizzas, the researchers observe. Individual BNPL purchases are typically for small amounts, with a median value of a BNPL installment just £19.65 in 2021.

But the amount owed adds up quickly with multiple installments and repeat purchases. The researchers find that during 2021, among individuals who transferred any BNPL payments to their credit cards, the median value of their transfers was £157. If consumers end up making minimum payments on the transferred debt, it can take years to pay off what they owe.

Guttman-Kenney, Firth, and Gathergood’s research is informing discussions about how to oversee BNPL, which is mostly unregulated in the UK, even though it is now larger than the country’s payday loan sector at its peak. It is similarly exempt from most credit regulations in the EU and the US. In the UK, the FCA has expressed some concern that BNPL could encourage consumers to spend beyond their ability to repay and in February told four companies to redraft service terms that risked hurting consumers. In the US, the Consumer Financial Protection Bureau has also recently started gathering evidence for an inquiry into this sector.

More generally, the researchers add, this research is a proof of concept for how financial-services regulators can use real-time transaction data to monitor the growth and risks of regulated and unregulated products.—Marty Oaks

———AYELET FISHBACH, of Chicago Booth, in Get It Done: The Science of Motivation, a Tiny Course available at chicagobooth.edu/review/tiny-course.
How small households contribute to food’s high carbon footprint

Moving to a plant-based diet may be one way to reduce the food system’s carbon emissions, but in many societies, such a change may be unrealistic, according to Purdue PhD student Li Song and Purdue’s Hua Cai and Ting Zhu. Their analysis of household grocery purchases in the US, conducted using the NielsenIQ Consumer Panel Data housed at Chicago Booth’s Kilts Center for Marketing, suggests there may be more practical steps. Looking back at households’ grocery choices in 2010, the researchers find that one- and two-person households had much higher carbon footprints than larger ones because they tended to overbuy. Food sold in bulk is cheaper on a per-unit product basis than the same food in smaller packages, thus many small households seeking savings end up buying more than what they need.

Examining the amount of food purchased per adult male equivalent (AME)—a measure that accounts for the composition and size of different households—compared with the average household, the researchers find that smaller households purchased more food than larger households, which could mean that smaller households ended up consuming too much or wasting much of it.

Households’ food carbon footprint per AME depends on the carbon intensity of a food item and the amount purchased. This measure declined with household size, according to the research.

Reducing overbuying in one- and two-person households could achieve two-thirds of the researchers’ estimated carbon footprint reduction potential.

1-person household: 11 metric tons of CO₂ equivalent/yr
2-person: 19 metric tons
3-person: 8 metric tons
4-person: 5 metric tons
+5-person: 3 metric tons
Do shoppers have too many choices?
US consumer goods are proliferating rapidly, with implications for consumers and companies

BY ÁINE DORIS / ILLUSTRATIONS BY FEDERICO GASTALDI
Walk down the aisles of any US convenience store and you could easily feel assailed by rows of similar—but different—products competing for attention. Bags of Tostitos Scoops! tortilla chips share shelf space with bags of Tostitos Scoops! Multigrain or Tostitos Hint of Lime, while cans of Diet Coke vie with those of Coca-Cola California Raspberry and Coca-Cola Cherry Vanilla Zero Sugar. The seemingly endless options stretch beyond the food and drink aisles to shelves offering diapers, detergents, stationery, soaps, coffee, cosmetics, and more.

“We see all these new brands or new varieties appearing in people’s shopping carts over the past decade or so, which speaks to the fact that companies are putting them out there for shoppers to buy,” says Chicago Booth’s Joseph Vavra. The number of “niche” alternative products increased by 4.5 percent a year from 2004 to 2016, according to a study of consumer packaged goods Vavra conducted with Booth’s Brent Neiman in which they analyzed data on almost 700 million transactions involving 118 different product groups.

US households appear to have welcomed this product explosion. As new flavors fill store shelves, consumers are buying them, often at the expense of the original product’s market share. There has also been a growing diversity in household consumption. Among Tostitos buyers, one family prefers Crispy Rounds, another Scoops!, and another the Artisan Recipes Baked Three Cheese Queso variety.

Difference itself may be the one thing that people have in common. “When you look at the data, this increase in niche consumption in the US is happening across all kinds of demographic groups, across all ages, incomes, races, and education levels,” says Vavra.

He sees all this choice as good for consumers. If what you really like is a chip flavored with lime, your life is better when you can choose that rather than having to settle for plain or nacho flavor instead. Some delight at the red, white, and blue Oreo (with a layer of popping candy) that is released around Independence Day, or generally prefer that their Cheez-It crackers be both puffed and delivered with “scorchin’ hot cheddar” flavor.

But this segmentation represents a significant step away from how marketers have traditionally operated, and it comes with risks. Among them, there must be a limit to the amount of variety that companies are willing and able to supply consumers. For brands, niche products are great, unless they become a drag on profits. Will that ever happen?

**A price paradox**

Growing variety, when all else is equal, creates what economists call positive welfare effects for consumers. As companies fragment their products more and more, consumers are able to buy the things that they really like—getting closer to their optimal choice.

Even better for consumers, we haven’t been paying more for the additional choice. Tailoring products to preferences should give companies the potential to charge higher prices. But Vavra and Neiman find that product markups remained largely flat over the period of their study.

What’s even weirder about this is that the CPG industry has been consolidating, so a handful of big manufacturers now have the majority of market share. Stanford’s C. Lanier Benkard and Ali Yurukoglu and Chicago Booth’s Anthony Zhang looked at concentration in product markets in the US from 1994 to 2019 and find strong evidence that small groups of megacorporations are effectively enjoying monopolies at the industry or ownership level—much more so, in fact, than previously thought.

Exploiting data from MRI-Simmons, a provider of attitudinal and behavioral US consumer insights, the researchers determine that almost half of US product markets—including
food and beverages, health care, apparel, and electronics, as well as a slew of nonmanufacturing markets, such as insurance and financial services—were “highly concentrated” or dominated by two or three multinationals. Over time, the likes of General Mills, Nestlé, Procter & Gamble, and Unilever have systematically acquired and subsumed other consumer brands. This trend notionally gives them not only market share but also the lion’s share of market power by which to influence or even set prices.

But the researchers find that this trend is being offset by another: an upswing in competition at the individual product level. Although there are fewer companies offering products in a certain sector (say, food products), there are more companies offering them in a specific market (such as chips). That is creating more competition at the level of individual products, which keeps prices low.

The Herfindahl-Hirschman Index is a standard measure of market concentration, and it’s typically used before and after mergers and acquisitions to determine the level of competitiveness that exists in a market. A market’s HHI is the sum of the squared share of every competitor in the market. If there are three companies dominating a market with shares of 20 percent, 30 percent, and 50 percent, respectively, the HHI would be 3,800 (20^2 + 30^2 + 50^2). Markets that have an HHI of 2,500 or higher are considered highly concentrated, or noncompetitive. HHIs that are lower—between 1,500 and 2,500—are considered to be moderately concentrated, or more competitive.

Rather than look solely at the sector-level situation—as in, how many companies are making food products—Benkard, Yurukoglu, and Zhang applied the measure to specific product markets. They find that the median HHI among US consumer product markets fell from about 2,250 in 1994 to about 1,950 in 2019, indicating an upswing in competition.

The rivalry seems to be robust across the board and for all consumer markets. They find that craft’s growing market share was driven between 2004 and 2018 by about 100,000 US households. Dallas’s Joonhwi Joo looked at the beer purchases made in just 15 years,” says Dubé. “It literally went from being a way around: the upswing in demand for craft beer was driven by supply-side forces, namely the availability of craft beer.

It helps that as companies grow, it costs less to meet demand. Larger companies may leverage economies of scale as they acquire smaller players and ramp up new products, brands, and varieties. Economies of scale lower production costs which, in turn, can be passed through to consumers as lower prices.

These large conglomerates are able to consolidate their presence and integrated know-how and expertise for the firms they acquire,” says Zhang. “And in doing so, they’re likely benefiting from all the advantages that accrue to size—enhanced capabilities and efficiency gains, from production to logistics and inventory management to marketing—which reduces their costs.”

A break with the past

Variety seems like a win for companies and consumers alike, and yet this is—to some extent—uncharted territory. All this choice could be less an elegant example of the market supplying what consumers want and more a reflection of shifts in the tectonic plates underlying consumer markets.

Unpacking the dynamics underpinning product fragmentation, Chicago Booth’s Jean-Pierre Dubé looked at the US beer industry, which in 1980 was dominated by just two players and their pale lagers: Miller Brewing and Anheuser-Busch.

But today, shopping carts are stocked with pale ales, wheat beers, porters, stouts, red ales, and more from a variety of brewers, some of which have been bought up by bigger players. (Miller Brewing and Anheuser-Busch have themselves been acquired.) Craft brews made up just 5 percent of the US take-home market and about the same in terms of total revenue in 2005. By 2018, this sector had more than doubled its share to 12 percent, with revenues quadrupling to 20 percent. “It literally went from being something tiny to being a significant portion of the industry in just 15 years,” says Dubé.

To understand how that happened, Tilburg University’s Bart J. Bronnenberg, Dubé, and University of Texas at Dallas’s Joonhwi Joo looked at the beer purchases made between 2004 and 2018 by about 100,000 US households. They find that craft’s growing market share was driven by one demographic group, millennials, who accounted for more than a third of all craft-beer purchases. Baby boomers and the Greatest Generation constituted just 20 percent and 13 percent of craft-beer consumption, respectively.

Is this all an issue of taste? As these younger people came of age and exercised their spending power, did they have new preferences and choices that created demand for new types of beer? Dubé says it was actually the other way around: the upswing in demand for craft beer was driven by supply-side forces, namely the availability of craft beer.

**All this choice could be a reflection of shifts in the tectonic plates underlying consumer markets.**
“When you look at the timeline, you see a convergence of factors,” he says. “In the 1980s, we had the sudden deregulation of craft beer, and by the end of the 1990s, we had the internet as an increasingly viable advertising and distribution platform. These two factors made it possible for a raft of new players to enter the market. As more craft beers entered the market during the early 2000s, a new generation—the millennials—turned 21 and were legally allowed to buy beer. What happened is that these new consumers came into the market and started forming their beer brand preferences at the exact point that product variety increased. They had more choice than their predecessors and therefore formed different beer-buying habits and preferences.”

Habits are built over time and hard to break, says Dubé. Older generations stuck with the national brands of pale lagers that they grew up drinking. “What the craft beer example shows us is that shopping habits are formed not because one generation is intrinsically different from another,” he adds. “Rather, these habits are being driven by suppliers’ ability and strategic decision to offer variety.” (For more on the topic, read “Why craft beer’s rise is a warning flag for all sorts of big brands,” in the Fall 2021 issue and online at chicagobooth.edu/review.)

This makes sense in the context of a company’s growth strategy. Catering to more tastes, as Vavra suggests, can help a brand secure a greater number of loyal customers. Historically companies haven’t supplied variety because they’ve been held back by organizational and operational capabilities, not to mention budgets. But Dubé says that has changed in the 21st century, thanks in large part to technology.

**Advertising and online distribution**

At the time that Americans favored Budweiser and Miller, only one or two brands also dominated many other product categories. People who wanted cereal for breakfast generally reached for a box with a Kellogg’s label. When they wanted carbonated beverages, they chose between Coke and Pepsi. Historically, the budget required to build a new brand through television and other mass media created barriers to entry, sustaining the dominance of the established national names.

And the internet has helped change that, with Google and keyword searches, and then social media and targeted advertising. Using Facebook, companies developed the ability to identify the consumers who liked content corresponding to a particular product, and perhaps liked a product other than what had long dominated. Digital advertising was cheaper and more efficient than mass advertising, making it an accessible and effective tool for smaller players looking to get a foothold at a time when a new generation of consumers also wanted their brands to better align with their own political and social views. All this allowed companies to find their market.

And just as barriers to entry in advertising were eradicated, so too were many of the restrictions and challenges related to distributing goods. Suddenly consumers were not only hearing about new brands, but they also had access to them because they weren’t limited to the stores around them.

“There was a time when the idea of having your laundry detergent FedExed to you was ridiculous,” says Dubé, who has
published extensive research on the historically persistent structure of consumer product industries. “Today’s consumers can go to a website, click on a laundry product, and have it shipped to them within 24 hours—sometimes within a couple of hours, thanks to Amazon Fresh and other grocery delivery platforms. And by the way, that detergent no longer has to be Tide. It can be a regional brand that is locally sourced and has sustainable packaging.”

The upshot is that it got easier for newcomers to disrupt markets. The internet eradicated the need for a huge marketing budget or even a physical store. Warby Parker started advertising and selling affordable glasses online, then upturned the eyeglass industry. In apparel, Bonobos set about redefining the retail experience in men’s apparel by blending physical and online platforms; consumers can secure a good fit in a store but do their actual shopping online. (Walmart took notice and bought the company in 2018.) Dollar Shave Club, known for its viral video advertisements on social media, destroyed Gillette’s stranglehold by creating an alternative to expensive razors and selling them online, giving users the option to purchase upgrades or add-ons. Unilever purchased it in 2016. Diapers.com, founded in 2005, was scooped up by Amazon five years later.

These brands were able to start up fast, buy a website, and bring consumers to the point of sale online, says Dubé. The savviest players exploited social media to identify their customers, determine what they needed, and offer products and experiences that created pull-through demand (drawing customers in with search engine optimization, social media marketing, and word of mouth). Lacking a network of physical stores and dedicated sales staff, their overheads remained low, even as they offered more things that consumers wanted.

“Startups with new, differentiated brands are offering us more and more variety—more than we’ve had before,” says Dubé. “We’re being sold choice and we’re buying it.”
Brands buy innovators. Could it be a win-win?

As consumers bought up choice, the CPG conglomerates were busily buying up the competition. Management consulting firm Kearney’s 2021 Consumer and Retail M&A Report catalogs $58 billion in M&A deals made in the first quarter of 2021 alone, and its poll of 100 of the world’s largest CPGs indicates that 60 percent of them were looking to acquire smaller ventures (worth $500 million or less) heading into 2022.

Possibly the “new normal,” says Dubé, is for large CPG companies to buy newcomers to stay ahead of disruption and grow their product portfolio. They may also look to startups for innovative ideas.

Many big CPGs have tried and failed to launch viable competitor brands to their best-selling products, he notes. In the US, neither Miller nor Anheuser-Busch was able to launch a pale ale alternative or a craft beer on its own, instead pursuing newcomers. Certainly the incentives are clearer for an outsider to take on a best-selling product than for its manufacturer to set out to cannibalize itself.

The system that has developed seems to satisfy the needs of big and small companies—and entrepreneurs—while consumers get more choice at lower cost. Large CPGs use their resources to maintain and grow the companies they buy, while smaller companies focus on innovation and are busy “searching for the magic,” as Dubé puts it. For entrepreneurs, selling their business offers the double drawcard of a handsome payday and the chance to move quickly to another project. It’s an attitude that Dubé has picked up among his MBA students. Younger entrepreneurs are less tied to the idea of starting long-term businesses and are more interested in having “fast impact” before pivoting to something different, he says.

This would seem to be good news all around, except that it’s at odds with the late economist Joseph Schumpeter’s notion of creative destruction, as he described it in his 1942 book, *Capitalism, Socialism, and Democracy*. Schumpeter held that as companies get big, they become complacent, and flabby incumbents are replaced by hungry newcomers. What seems more so the case now is that incumbents are acquiring newcomers, which in turn divest their innovation, expertise, and know-how and move on to the next idea or challenge.

This doesn’t bother Dubé, particularly if there are clear benefits for both parties. And he says that when products with the same parent company are fighting for dominance, “it could also indicate creative destruction in the sense that the incumbent brand is getting supplanted after a long period of dominance.” But it still challenges much of the established thinking around the risks—and the potential advantages—of monopolies. US legislators have historically sought to limit the market power of large corporations. Congress passed three major antitrust laws in the past century, all aimed at preventing monopolies, prohibiting price-fixing, and driving free competition. The discussion about concentration has traditionally centered on the number of companies operating and competing in different segments—and that remains a focus for regulators, including the current head of the Federal Trade Commission and for one industry in particular, which a *New Yorker* headline describes as “Lina Khan’s Battle to Rein in Big Tech.”

Zhang argues that his findings raise the question of whether regulators should pay more attention to competition at the level of individual products and services. “There is some subtlety required to understand the big picture of what’s going on in product markets right now, 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,” he says.

But he stops short of saying that Schumpeter needs a rethink and the current situation is a win-win-win. The risks attached to big market power still prevail, and much depends on the intentions of incumbent players.

The biopharma and tech industries are highly prone to innovation and disruption, he adds. “What we’re seeing in these industries in particular is a lot of ventures getting into the early stages of innovation—phases one and two, where it’s all about concept and prototyping.” But when a new pharma or tech idea gets developed, in phase three, these products—unlike many other consumer goods or services—face specific barriers to entry. Getting new pharma products to market costs a lot, and app developers have to navigate a market dominated by a handful of megaplayers. Users tend to flock to a product only once it has been integrated into an incumbent platform—think YouTube or Instagram, which saw their user bases grow exponentially after they’d been acquired by Google and Facebook, respectively.

In tech and pharma, then, a lot of startups sell at phase three to incumbents with the resources and financial clout to take their products to market, says Zhang, who agrees that this is at odds with the Schumpeterian idea of creative destruction. And in these industries particularly, phase-three acquisitions posit a risk to innovation.

London Business School’s Colleen Cunningham and Yale’s Florian Ederer and Song Ma looked at 20 years of acquisitions data from the pharmaceutical industry and find evidence that the big pharma corporations are buying up newcomers, in certain instances in order to destroy them. These so-called killer acquisitions may account for as much as 7 percent of all
WHY MORE CHOICE CAN BE BETTER, OR NOT

More product choice can be great for consumers, in theory, but also overwhelming. Consider inexperienced investors trying to pick between hundreds of stock and bond funds. Without a clear path, some could get fed up and put their retirement accounts in a slow-growing money market fund instead.

There’s an argument for limiting choice to avoid overwhelming investors—and customers of all sorts of products—but research suggests that a crucial factor lies with the consumer audience. If a company is marketing to shoppers who know exactly what they’re looking for, more choice is better—but if it’s people who don’t, less choice is optimal.

Chicago Booth’s Emir Kamenica uses an example to explain why. “Say you walk into a store, looking for a jar of jam, and for some reason, there are 100 jars, and they’re all labeled in Catalan or another language you don’t speak,” he says. “Now say those jars are opaque so you can’t see color or consistency. Your choice is going to be random.”

One of those opaque jars might hold raspberry jam, which you’re likely to enjoy. But when making a random choice, you might end up going home with pumpkin jam instead—and odds are that you’ll be less excited to spread that on bread. “So here is an instance where more choice is not going to be good for you,” he says.

Kamenica and Columbia’s Sheena S. Iyengar ran laboratory experiments offering participants a different number of gambles, including sure bets and high-risk ones. They also examined a large data set covering the real-world investment decisions of more than 500,000 employees at about 600 US firms.

The researchers’ working hypothesis was that when people are offered options that are inherently complex, they will be more likely to settle for the thing they understand best, even if it’s not the optimal choice. Their results support this idea.

In the experiments, as the choices increased, participants overwhelmingly picked the sure bet. Meanwhile, with the investment funds, employees with fewer options were willing to invest in a stock fund, which is riskier than a bond fund but more likely to grow money over time. Employees presented with more options increasingly chose to stick with safer bets, despite the likely lower returns. “They’re opting for the thing they understand and walking away from the more complex or risky choice,” Kamenica says.

What about choices that are less complex? When it comes to shopping for laundry detergents, the same findings apply, he says. When we select one brand of detergent over others, it’s hard to know if the choice we make is optimal. He argues that we choose a brand more or less randomly and then stick with the choice, even if it’s not the best. The main difference is that the stakes are lower when we’re deciding between Cheer or Tide than when we’re choosing between investment funds.

But there’s also the fact that certain brands can be found on the shelf in the first place. “In boutiques, we have some indication about what sells well and is popular simply because it’s there,” says Kamenica. “The retailer has performed a curation service that has reduced the choice to an extent. That said, things do get more complex when you have consumers who are informed about different products, and others less so—trickier still when you intermix those customers and offer them the same set of choices.”

Ultimately, an abundance of choice can be good or bad for consumers and brands, but which one it is depends on the product and the consumer. Increasing choice seems to bring consumers closer to what they want, and it would seem smart for a company with diverse brands to satisfy diverse preferences. On the flip side, companies should avoid offering so many choices that they turn consumers off a brand for good.


buyouts in the pharmaceutical space in any given year, and this is a conservative estimate, according to the study.

When it comes to the tech sector, Columbia PhD student Sai Krishna Kamepalli and Booth’s Raghuram G. Rajan and Luigi Zingales argue that when the likes of Google and Facebook acquire new companies, they can effectively use their power of incumbency and the tremendous importance of network externalities in the tech space to prevent entrants from gaining an adequate foothold. This allows them to reduce what they need to pay to acquire the entrant. This is a worry, write Kamepalli, Rajan, and Zingales. In tech, entry is hard to finance, and the prospect of acquisition is a major draw. By lowering the likely acquisition price, Google, Facebook, and other incumbents are effectively creating a kill zone in the startup space, they argue. (For more, read “Why big-tech mergers stifle innovation,” Fall 2020 and online.)

Killer acquisitions and kill zones in tech and pharma represent significant risks to competition and to innovation in those areas,
Where market power is growing

While concentration has decreased overall in US product markets since 1994, it has increased in certain areas (such as car rentals) and declined in others (such as glue).

**Products with the largest change in market concentration between 1994 and 2019**

*Herfindahl-Hirschman Index (lower values = less market concentration)*

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<td>Meal supplements</td>
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<td>Glue</td>
<td>Car rental: business use</td>
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<td>Flavored instant coffee</td>
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Zhang. They are risks that are very much front of mind for the FTC, and they may apply to other product sectors, including CPGs. “On the one hand, we do see that the proliferation of variety at the product level translates into choice and price benefits for consumers—even if we have more monopolies and less competition at the market level,” Zhang says. “But if a lot of product choice is coming from acquisitions, what’s to stop big CPGs doing the same as the pharma and tech giants and using their market power to cap buyout prices for startups or kill off competitor brands? And what might that mean in terms of markups for consumers?”

More on the risks

Long-term market competition could be in peril, but CPGs run some shorter-term risks too. Yes, they’re enjoying economies of scale, synergies, and innovation that they’ve acquired—but it’s challenging to preserve the credibility and authenticity of the brands they buy. Take Nantucket Nectars, a craft beverage brand acquired by Ocean Spray in the 1990s. The appeal was in its identity, says Dubé. Company founders Tom First and Tom Scott originally sold drinks from their boat in Nantucket Harbor, Massachusetts, and in recycled bottles, and the story of the brand was unique, local, small, and fun. But it lost its luster as part of a larger company. Ocean Spray ended up selling it a few years later at a discount.

A judge in 2016 dismissed a potential class-action lawsuit against Molson Coors over its marketing of Blue Moon. Described on its website as a craft beer, Blue Moon was developed not in an independent craft brewery but at one owned by Molson Coors Brewing.
“A big part of these craft brands—whether it’s a beer, a pair of eyeglasses, or a pair of pants—is that people believe these products to be more natural, and that’s especially true of the food and beverage industry,” says Dubé. Consumers are increasingly tuned into locally sourced ingredients and similar considerations, and even if a company moves in that direction, shoppers are skeptical. “When things are mass produced, it’s hard to be credible about where ingredients are sourced. And this is a global trend, so the question becomes: Does the person who’s been managing Oreo cookies have the right expertise to market a cookie that is the ‘anti-Oreo cookie?’ A cookie made with no palm oil, or with natural sweeteners and sustainable packaging?”

It’s also hard to measure authenticity, until that’s necessary in court. There has been an upward trend in class-action consumer lawsuits in the US, with businesses from food and beverages, household cleaning products, cosmetics, personal-care products, and more coming under fire for alleged unethical marketing practices mostly related to the labeling of their products, for instance about a brand bestowing certain health benefits, deriving from a desirable origin, or being “all natural.” This trend hit an all-time high in 2021, when 325 class-action lawsuits were filed against food and beverage companies, according to law firm Perkins Coie.

And while choice may be good, it has costs for consumers, who might spend more time, effort, and in some cases money in order to find what they want. Companies run the risk of overwhelming consumers with too many options. University of California at Berkeley’s Olivia R. Natan (a graduate of Booth’s PhD Program) studied a restaurant delivery platform as more and more options were added. The additional variety was intriguing and brought more people to the platform for the first time, but they ended up ordering less often as sorting through options became more difficult.

“Choice overload is real—we just don’t fully understand when and why it happens yet,” says Chicago Booth’s Daniel Bartels, who explains that human beings have cognitive limitations that complicate decision-making. “Say we have to choose between two options, and each option has three salient attributes or characteristics, so there are six pieces of information that we will need to take into account. Now increase those options to five or more, and suddenly there are 15 or more pieces of information that need our attention. The chances are suddenly much higher that I will make a suboptimal decision, or that I simply fail to make one at all.”

There is no “magic number” with choice overload, so it’s unclear to a marketer whether that next new offering is the one that will end up frustrating the customer. “We don’t know for sure how many options are just enough or how many are too many,” says Bartels. “A lot, too, depends on the complexity of the choice facing us, that and the costs we incur in getting it wrong.”

The stakes are relatively low if you face too many options when choosing a bag of chips or a six-pack of soda—if the flavor turns out not to be for you, you haven’t wasted all that much time or money on it. But say you’re shopping for a laptop, a car, a health-insurance plan, or an investment fund for retirement savings. In these instances, you might find more choices to be intimidating, and making the wrong choice could be costly.

Tools can help make decisions simpler. Aggregators or screeners sort or filter options in terms of key features or characteristics. KAYAK, Booking.com, Autolist, LappyList, and other online platforms use algorithms to process large quantities of variables, whittling them down to just a few choices.

But these aggregators are themselves multiplying. “We may get to a point where we have too many tools,” says Bartels, listing Yelp, Thrillist, Eater, and Tripadvisor as only some of the sources of information people turn to. “It’s not just the choice options themselves, but the array of places to go for input into those choices that is also proliferating.” (See “Why more choice can be better, or not,” page 35.)

Offerings are set to keep on expanding, at least in the CPG industry. Pharma and tech aside, as long as the barriers to market entry for certain products and services remain low—or lower than they were in the 1990s—we are likely to see brands continue to fragment and variety proliferate even more, argues Dubé.

“Back in the ‘90s, mass media was all we had. Today, CPG brands have alternative means of engaging with customers that are cheaper and more efficient. Marketers have all kinds of online and social tools at their disposal to create communities of engagement and loyalty around their products,” he says.

The resulting landscape may work for entrepreneurs, consumers, and CPG manufacturers—but it’s evolving. Many entrepreneurs get their start by circumventing stores, but consumers might get fed up with all the cardboard and packaging involved in getting products sent to their doorsteps. Regulation or taxes could emerge that change the current approach. Small brands could once again have to compete for shelf space in physical stores.

But consumers have become accustomed to having more choice, and the demand for variety is likely to remain robust, Dubé says. In that case, the question may not be whether there can be too many flavors of tortilla chips but whether your favorite flavor has yet been produced—and if it hasn’t been, whether the stars will remain aligned long enough for the market to deliver the exact product you didn’t even know you needed.—CBR

Consumers have become accustomed to having more choice, and the demand for variety is likely to remain robust.
HOW TO VACCINATE THE WORLD

(next time)

Four lessons in supply and demand to help combat global pandemics

BY HAL WEITZMAN / ILLUSTRATIONS BY EDMON DE HARO
ince the first COVID-19 vaccine was approved, the world has witnessed the fastest and most ambitious immunization campaign in human history. Scientists developed the vaccines at an unheard-of pace, and regulators approved their use with unprecedented speed.

Yet the production, distribution, and uptake of vaccinations has proceeded more slowly. While almost 65 percent of the global population had been inoculated, as of April, swathes of the world remained largely unvaccinated. Only 15 percent of people in low-income countries had received at least one dose. In the Democratic Republic of the Congo—the second-largest country in Africa, with 90 million citizens—less than 1 percent of the population was vaccinated. In Nigeria and Burkina Faso, the figure was about 10 percent. In Guatemala and Egypt, most people remained unvaccinated. Even in the United States, the world’s most powerful economy and the home to some of the biggest global pharmaceutical companies, almost one in five eligible people had not yet received a shot. In some areas of the US, this has delayed the national aim of achieving herd immunity, meaning that continued flare-ups may be more likely.

The challenges relate to both the supply of vaccines and the demand for them. While they were rolled out relatively quickly, they nevertheless had to be rationed at first, and production took some months to ramp up—which in part explains why it has taken so long to get poorer countries vaccinated. On the other hand, vaccine hesitancy, anti-vaccination campaigns, and misinformation have combined to suppress demand for vaccinations from those who are eligible.

The pandemic is still very much with us, but four critical lessons related to supply and demand have already emerged that could help us better respond to future outbreaks. Many of the data producing the underlying research come from the US and other rich economies, which have the resources to address a global pandemic. The lessons, if implemented, could improve our response to the next global public-health challenge.

**LESSON #1**

**Speed up the drug approvals process**

Developing a drug in the US—from the lab to final approval—typically takes about 10 years. For example, Humira, the world’s best-selling prescription drug, traces its origins to a lab in Cambridge, United Kingdom, in 1991, and won approval in 2002 from the US Food and Drug Administration. Even an accelerated timetable, which has become more common in recent years, usually takes five to six years.

By contrast, the first COVID vaccine was approved, with Emergency Use Authorization, in less than a year, in part because researchers were already working on mRNA vaccine technology to combat coronaviruses. But it mainly reflects how authorities in the US, UK, and European Union slashed their traditional approvals timelines. Review and authorization times were rushed from months to days, waiting times between trials were scrapped, and ethics reviews were moved earlier in the process.
The anomaly between 10 years and one year raises eyebrows among many who are familiar with the traditional process and question not so much the safety of the COVID vaccines but the length of time it takes to get drugs approved, says Joshua P. Fairbank, an adjunct professor at Chicago Booth who cofounded a series of pharmaceutical companies.

“If the FDA and public-health officials believe that 9 months of safety data were enough to authorize the vaccine, and 15 months of data were enough to support mandates requiring vaccination, it would follow that the current system is inefficient, with significant room for improvement,” he says. “The spread between months and a decade is difficult to rationalize. We can use the COVID experience to improve the standard regulatory process. We should also use our decades of drug approval experience, including tragic mistakes, to rationally design an emergency authorization process now, before the next pandemic strikes.”

Booth’s John R. Birge has been researching the drug development process in the US for more than a decade with an eye toward speeding it up. In research published in 2016, he and Southern Methodist University’s Vishal Ahuja (a graduate of Booth’s PhD Program) recommended cutting the drug approvals timeline by using adaptive trials, which would adjust the number of patients randomly assigned to treatment groups as information emerged about a drug’s effectiveness. (To learn more, read “How math can improve drug trials and save lives,” in our Summer 2013 issue and online at chicagobooth.edu/review.)

But the expedited greenlighting of the COVID vaccine indicates that the conventional final stage of approvals could be scaled back and combined with better post-market surveillance after a drug’s public release, some of their more recent work suggests. Ahuja, Texas Tech’s Carlos Alvarez, Birge, and Booth’s Chad Syverson find that the relative lack of data collection that is necessary to speed vaccine approval could be remedied by conducting more rigorous surveys. “The FDA should be exhaustively canvassing vaccinated people to see what the severe adverse events have been, as opposed to the voluntary system we have now,” Birge says.

Their study looks at the diabetes drug rosiglitazone to determine whether the method that the FDA uses to assess and announce safety risks that arise after the agency has already approved a drug for use can hurt patients by scaring them away from treatment unnecessarily. In the case of rosiglitazone, after it was approved and released, studies linked the drug to heart problems. The FDA, in line with its current practice, kept the drug on the market but issued a warning designed to call attention to life-threatening risks. Consequently, most doctors and patients dropped the drug, and few resumed using it even after additional studies indicated the drug was safe and the FDA eliminated its warning.

While the FDA was seeking to keep patients apprised of newly identified health risks, it ended up deterring many people who would have benefited from using the drug, argue the researchers, who identify several weaknesses in the agency’s postmarket surveillance systems that can cause high error rates. They propose an approach grounded in statistics and economics that the FDA could use to independently validate any safety signals and better catch and assess risks that do turn up. (For more about this research, read “A new approach to ensuring drugs are safe,” Fall 2021 and online.)

The same issues surrounding data collection apply to the rollout of the COVID vaccine, Birge notes. The FDA is not currently collecting information needed to adequately assess the side effects of each COVID vaccine, even though the safety bar was lowered significantly in order to expedite vaccine approvals. “The current system is effectively anecdotal and does not systematically try to assess whether serious adverse events are occurring in those who are treated,” he says.

And beyond the coronavirus, combining long-term data collection with adaptive trials conducted before a drug’s release could cut years from the approvals process, he adds. It could slash the cost of development and save untold lives by bringing critical medicines to market faster. Thus, some regulatory changes inspired by this pandemic could potentially lead to better outcomes in a future pandemic, and in more normal times too.
LESSON #2

Partner with pharma companies to build capacity faster

After COVID vaccines began to be approved in late 2020, the industry responded quickly, producing 11.2 billion doses in 2021. Today, wealthy countries have more than 1 billion surplus vaccine doses.

But had the industry increased supply even faster, the US might have achieved widespread vaccination four months earlier than it did (in March 2021 rather than July 2021), and more of the rest of the world might be vaccinated too, according to research by a team including Chicago Booth’s Eric Budish and Canice Prendergast. (For more, read “Why the world needs a lot more vaccine capacity,” Summer 2021 and online.) A few months may sound insignificant, but the researchers, drawing on calculations by Harvard’s David M. Cutler and Lawrence H. Summers, estimate the global harm wrought by the pandemic to have been about $1 trillion a month until vaccination started.

The key to a better ramp-up, Budish says, is more government outlay and a genuine partnership with the companies that invent vaccines. Essentially, Budish thinks the world, and rich countries in particular, should have invested more, earlier in working with companies to construct production facilities that might never have come online. Early on in the pandemic, the US initially headed in this direction but was ultimately too timid and invested only around one-tenth of what was likely necessary, he says, while other countries did even less. Had governments put more money into this “capacity at risk,” pharmaceutical companies could have had more factories ready to go as soon as their vaccine was approved. Given the high price of the pandemic, this added speed would have warranted the cost to the US and other governments of potentially paying for redundant capacity.

Then, says Budish, once vaccines were shown to work, governments should have invested exponentially more in production and distribution. Rather than discussing whether to seize intellectual property and waive patents—a conversation that he views as an excuse to avoid spending—countries should have been challenging companies to work with them to vaccinate the world fast. Budish notes that at a rough price of $50 per shot, vaccinating 5 billion people worldwide costs $250 billion. As governments have to spend that money anyway, he would have preferred that figure to have been used up front as an incentive to pharmaceutical companies to build production capacity on an industrial scale.

“The conversation I wish had happened was, ‘We would like to vaccinate the world in six months, with 5 billion courses of mRNA. Please submit some proposals—and we’re willing to pay up to $250 billion for it,’” he says. “You might get nothing credible, but then you at least learn what’s possible.”

Adopting a problem-solving partnership with pharmaceutical companies could, Budish suggests, prove a more efficient and effective path to vaccinating large numbers of people next time we need to do so.

LESSON #3

Focus on the social benefits

During the pandemic, vaccines took on a political significance in the US as never before. While some Americans posted images of their vaccination cards online, others railed against vaccine mandates. Some expounded elaborate conspiracy theories about government tracking devices being implanted in unwary people.

But vaccine hesitancy, rather than vaccine rejection, perhaps better explains the slow uptake of inoculation. Only 12–16 percent of US residents said over the past year that they would “definitely not” get vaccinated, according to an ongoing monthly Kaiser Family Foundation survey. Many people found themselves in the middle, wary of fake news but unsure about the vaccine’s safety.

One reason for vaccine hesitancy cited by many scholars is higher-than-average levels of distrust in the government and medical profession among the US’s Black and Hispanic communities. Many observers trace this to unethical medical episodes such as the infamous Tuskegee experiments of 1932–72, in which Black men infected with syphilis were recruited on the promise of free medical care but were then deliberately denied treatment.
and given placebos. Vaccine hesitancy among historically marginalized groups is particularly concerning since COVID disproportionately hits these communities in the US.

More generally, elevated concerns about vaccine safety were perhaps predictable given the accelerated approvals process. Omission bias is a behavioral tendency that favors doing nothing over taking an action that is potentially harmful, even when doing nothing is also harmful. Worried that getting inoculated for COVID is riskier than taking a medicine approved via the conventional route, many people have opted to go unvaccinated.

Identifying and addressing the appetite for risk in this context could help reduce vaccine hesitancy, according to research by Vanderbilt’s Jennifer S. Trueblood, Booth’s Abigail Sussman, and Booth postdoctoral scholar Daniel O’Leary. The researchers find a correlation between financial-risk aversion and vaccine hesitancy. The more appetite participants in their study had for financial risk, the more likely they were to be open to getting vaccinated. (For more on this research, read “Financial-risk preferences predict vaccine acceptance,” Fall 2021 and online.)

In the second part of their paper, the researchers found a way to sway more risk-averse people—by reframing the issue in terms of the social and communal benefits of vaccines rather than as one of individual risk. They randomly assigned 1,003 online participants, recruited from Amazon’s Mechanical Turk, to read one of four messages about a hypothetical COVID vaccine. Participants in a control group received general information about the FDA’s vaccine approval process and the vaccine’s efficacy and potential side effects. Those in the other groups received the same information, as well as further details that stressed either the individual benefit of getting vaccinated, the social benefit, or both.

After reading, participants reported how soon they would be willing to take the vaccine once it became available. Those whose attention had been focused on the community were willing to get the shot significantly sooner.

Smaller worked better

In Sweden, a small incentive paid to anyone who received the COVID-19 vaccine significantly increased uptake. But in Philadelphia, a lottery offering large prizes did not.

**Incentive A: Large prizes**

In a lottery drawing every two weeks, two $50,000 grand prizes were awarded to Philadelphia adults who received a first dose of the COVID-19 vaccine. Three randomly selected zip codes were given a 50 to 100 times higher probability of winning than other zip codes.

**Effect of a lottery prize on COVID-19 vaccinations in zip codes that were given a higher probability of winning**

<table>
<thead>
<tr>
<th>Weekly change in first-dose vaccinations per 100,000 adults</th>
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<tbody>
<tr>
<td>1st drawing</td>
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<tr>
<td>2nd drawing</td>
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<tr>
<td>3rd drawing</td>
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<tr>
<td>Pooled</td>
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<td>2nd drawing</td>
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<tr>
<td></td>
<td>3rd drawing</td>
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<td></td>
<td>Pooled</td>
</tr>
<tr>
<td>Control</td>
<td>Control</td>
</tr>
<tr>
<td>Incentives</td>
<td>75.6%</td>
</tr>
<tr>
<td>Proportion of participants who got vaccinated</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>Incentives                                                  76.6%</td>
<td></td>
</tr>
<tr>
<td>Proportion of participants with an intention to get vaccinated</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>Incentives                                                  83.2%</td>
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</tbody>
</table>

Sussman says that while the researchers didn’t track official public-health announcements during the pandemic, her sense is that messaging campaigns tended to focus on individual rather than social benefits. For example, the Centers for Disease Control and Prevention page explaining the benefits of vaccination focuses on communicating that the COVID vaccine is a safe and effective way to build protection against the virus for oneself. Sussman says, “For the most part, they’re trying to solve for community-level outcomes, but they’re talking about individual-level risk. There’s a mismatch between the solution they are targeting and what they are communicating.”
The research suggests that focusing more on social benefits in public-health messaging could help to reduce vaccine hesitancy when we face future outbreaks.

**LESSON #4**

**Pay people to take the shot**

Aside from tweaking the message, a key way to help people overcome their fears may simply be to pay them to receive the vaccine, as many countries, cities, and states have done around the globe.

Early on in the pandemic, economists suggested paying people a significant sum to get vaccinated. Robert E. Litan, a nonresident senior fellow at the Brookings Institution, proposed giving Americans $1,000 each to get vaccinated. His proposal was backed by Harvard’s N. Gregory Mankiw in a *New York Times* op-ed.

But critics said the plan would be perverse and coercive. “It is deeply problematic that the government would offer cash incentives to promote vaccination when it has failed, in numerous instances throughout this pandemic, to offer money or other supports needed to ensure that the basic needs of many people are being met,” argued Emily A. Largent of the University of Pennsylvania Perelman School of Medicine and Franklin G. Miller of Weill Cornell Medical College in January 2021.

While the $1,000 payment was never implemented, a patchwork of pay-to-vaccinate schemes developed across the US. West Virginia paid some of its residents $100 to get a shot, Maryland did the same for state employees, and Colorado paid $500 to Department of Corrections employees who got fully vaccinated. Dozens of states offered tickets for lotteries with prizes ranging from millions of dollars in cash to free college tuition and luxury vacations.

Research by a team including Chicago Booth’s Devin G. Pope suggests that these large sum payments would have been effective and, in fact, even a small amount of money can demonstrably increase willingness to be vaccinated. Among a group of 8,300 participants in Sweden from May to July 2021, vaccination rates went from 72 percent to 76 percent after a 200 kronor payment (approximately US$24) incentivizing participants to get one shot. The increase was seen across socioeconomic groups. The research also tested whether behavioral “nudges” could boost rates and find that although these increased participants’ intention to get vaccinated, they didn’t have a meaningful effect on actual vaccination rates. (For more on this research, read “Does paying people to get vaccinated work?” Spring 2022 and online.)

Pope’s research touches on a long-standing debate in psychology and economics over the use of financial incentives to shape behavior. Essentially, critics of paying people to perform an action have argued that these payments could backfire by damaging people’s intrinsic motivation. Once people start to associate an activity with earning money, they think about it in a different way, and if the money is removed, they may be reluctant to continue the activity unless they are paid again, a critique psychologists term motivation crowding theory. Donors paid to give blood, for example, may stop doing so if the payments are halted, even if they might have previously given blood without getting paid.

But others argue the situation is more nuanced—for example, it’s possible a person donating blood may stop doing so, but only temporarily. (For more on this concept, read “Short-term rewards don’t sap long-term motivation,” Summer 2018 and online.)

In further research that studies paying people to get vaccinated, Pope and his coauthors quash any concerns about crowding out the desire to get a second shot. The researchers find that the people who were paid to get vaccinated in the first Swedish study were even more likely than average to receive a second vaccination shot, even though they were no longer paid for it.

To Pope, this is evidence that concerns over the unintended consequences of paying people to get vaccinated may be overblown. “My take from both our paper and the broader literature on using financial incentives to motivate healthy and prosocial behavior is that it almost never backfires,” Pope says.

This is not to say that financial incentives always work. Pope and Booth’s Richard H. Thaler (a Nobel laureate) were part of a team of researchers led by University of Pennsylvania’s Katherine L. Milkman that tested whether offering lottery tickets for vaccinations could raise inoculation rates. They set up three geographically targeted lotteries of up to $50,000, but find that the prizes did not significantly nor sustainably raise vaccination rates.

Instead, Pope says, consistent and relatively small universal payments could help keep the coronavirus under control, since regular booster shots are certain to be part of the solution. “Offering people $100 every year if they take their booster, that would have a pretty big effect,” he says. “It’s a strategy officials could implement in the future—or right now.”

Go to chicagobooth.edu/review to see a list of citations for research mentioned in this article.
Consistently ranked high among the top global offerings, Executive Education programs at Chicago Booth are where intellectual rigor, engaging teaching, and cutting-edge research meet. We work collaboratively with organizations to create custom-designed executive education programs and virtual learning solutions tailored to meet unique needs and objectives. Partner with us and empower your organization with The Chicago Approach™.
Job vacancies are at historically high levels. Employers are struggling to fill open positions across the country. Amid such tight labor markets, how do remote and hybrid working arrangements factor into employer efforts to recruit workers? How do they factor into their efforts to retain talent? 

Continuing our line of research into recruiting methods and practices around the Fifth Federal Reserve District, we sampled 224 employers from November 17 through December 22, 2021, oversampling manufacturers and midsize firms with 51-500 employees. We asked employers about the incidence of remote work in their organizations, and whether they are offering remote work options to help recruit and retain employees.
Remote work seems here (or there) to stay

While the prevalence of remote work varied greatly by industry and firm size, many employers surveyed expected to continue offering remote and hybrid work options.

Currently, how often do your full-time employees work from home?

<table>
<thead>
<tr>
<th>Percentage of employees</th>
<th>Rarely/never</th>
<th>1-4 days</th>
<th>5+ days</th>
</tr>
</thead>
<tbody>
<tr>
<td>By industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>86.7%</td>
<td>8%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Natural resources, construction, utilities</td>
<td>57.8%</td>
<td>32.2%</td>
<td>10.1%</td>
</tr>
<tr>
<td>Professional services</td>
<td>54.2%</td>
<td>25.4%</td>
<td>20.5%</td>
</tr>
<tr>
<td>Retail/wholesale, transportation/warehousing, and leisure/hospitality</td>
<td>84.1%</td>
<td>9%</td>
<td>6.9%</td>
</tr>
</tbody>
</table>

Note: Data reflect 73 firms in manufacturing; 12 firms in natural resources, construction, and utilities; 77 firms in professional services; and 76 firms in retail/wholesale, transportation/warehousing, and leisure/hospitality.

By firm size

<table>
<thead>
<tr>
<th>Percentage of employees</th>
<th>Rarely/never</th>
<th>1-4 days</th>
<th>5+ days</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–50 employees</td>
<td>66.5%</td>
<td>20.7%</td>
<td>12.8%</td>
</tr>
<tr>
<td>51–500 employees</td>
<td>79.2%</td>
<td>12.2%</td>
<td>8.6%</td>
</tr>
<tr>
<td>501+ employees</td>
<td>58.9%</td>
<td>16.8%</td>
<td>24.3%</td>
</tr>
</tbody>
</table>

Note: Data reflect 88 firms with 0–50 full-time employees, 93 firms with 51–500 full-time employees, and 17 firms with 501+ full-time employees.

Are you offering remote or hybrid work arrangements as a way to recruit new full-time employees?

<table>
<thead>
<tr>
<th>Percentage of respondents</th>
<th>Not offering a work-from-home arrangement to recruit new employees</th>
<th>Offering a work-from-home arrangement to recruit new employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>By industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>13.1%</td>
<td>81.1%</td>
</tr>
<tr>
<td>Natural resources, construction, utilities</td>
<td>13.3%</td>
<td>86.7%</td>
</tr>
<tr>
<td>Professional services</td>
<td>13.3%</td>
<td>86.7%</td>
</tr>
<tr>
<td>Retail/wholesale, transportation/warehousing, and leisure/hospitality</td>
<td>13.1%</td>
<td>86.7%</td>
</tr>
</tbody>
</table>

Note: Data reflect 73 firms with 0–50 full-time employees, 100 firms with 51–500 full-time employees, and 19 firms with 501+ full-time employees.

By firm size

<table>
<thead>
<tr>
<th>Percentage of employees</th>
<th>Not offering a work-from-home arrangement to recruit new employees</th>
<th>Offering a work-from-home arrangement to recruit new employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–50 employees</td>
<td>13.1%</td>
<td>81.1%</td>
</tr>
<tr>
<td>51–500 employees</td>
<td>13.3%</td>
<td>86.7%</td>
</tr>
<tr>
<td>501+ employees</td>
<td>13.3%</td>
<td>86.7%</td>
</tr>
</tbody>
</table>

Note: Data reflect 73 firms with 0–50 full-time employees, 100 firms with 51–500 full-time employees, and 19 firms with 501+ full-time employees.

Do you expect that your share of fully remote workers will change in the next year?

<table>
<thead>
<tr>
<th>Percentage of respondents</th>
<th>Have more remote workers</th>
<th>Have same remote workers</th>
<th>Have fewer remote workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>By industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>8.9%</td>
<td>12.7%</td>
<td>78.5%</td>
</tr>
<tr>
<td>Natural resources, construction, utilities</td>
<td>17.6%</td>
<td>82.4%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Professional services</td>
<td>14.8%</td>
<td>25.9%</td>
<td>59.3%</td>
</tr>
<tr>
<td>Retail/wholesale, transportation/warehousing, and leisure/hospitality</td>
<td>9.5%</td>
<td>2.4%</td>
<td>88.1%</td>
</tr>
</tbody>
</table>

Note: Data reflect 73 firms in manufacturing; 17 firms in natural resources, construction, and utilities; 77 firms in professional services; and 76 firms in retail/wholesale, transportation/warehousing, and leisure/hospitality.

By firm size

<table>
<thead>
<tr>
<th>Percentage of employees</th>
<th>Have more remote workers</th>
<th>Have same remote workers</th>
<th>Have fewer remote workers</th>
</tr>
</thead>
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<td>501+ employees</td>
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</tr>
</tbody>
</table>

Note: Data reflect 79 firms in manufacturing; 17 firms in natural resources, construction, and utilities; 77 firms in professional services; and 42 firms in retail/wholesale, transportation/warehousing, and leisure/hospitality.

By firm size

<table>
<thead>
<tr>
<th>Percentage of employees</th>
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<th>Have same remote workers</th>
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</tr>
<tr>
<td>501+ employees</td>
<td>9.5%</td>
<td>2.4%</td>
<td>88.1%</td>
</tr>
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</table>

Note: Data reflect 99 firms with 0–50 full-time employees, 98 firms with 51–500 full-time employees, and 22 firms with 501+ full-time employees.
Not surprisingly, the incidence of remote work differed greatly by industry: 84 percent of full-time employees always worked on-site in the supersector comprising trade, transportation, warehousing, leisure, and hospitality—as compared with 54 percent in professional services. This cross-industry pattern aligns well with evidence from other business surveys, including the Atlanta Fed’s Survey of Business Uncertainty.

Large firms in our sample reported that on average 41 percent of full-time employees worked from home one or more days per week. The corresponding figure was 21 percent for midsize firms and 33 percent for smaller ones. The largest firms were also more likely to offer remote and hybrid working options in their efforts to recruit and retain employees. Well-developed governance and human-resource policies, together with the capacity to quickly exploit the latest technologies, may explain why large employers offered more scope for nontraditional work arrangements.

Employers that offered remote work options to attract new employees also showed a stronger propensity to expand the geographic reach of their recruitment efforts. Thus, remote work and an expansive geographic reach seem to be complementary features of the overall recruitment strategy for many employers. This finding points to the potential for flexible working arrangements to gradually, and perhaps profoundly, alter the locational choices of workers and their families.

Among firms that offered remote work options to at least some employees, on average 47 percent of full-time employees worked from home “rarely or never.” But that could change over time due to the expanded geographic reach of hiring, particularly if some current employees choose to relocate in reaction to newly flexible working arrangements. In other words, the incidence of remote work could rise even if current recruitment and retention strategies stay fixed. In addition, the incidence of remote work is likely to surge, at least temporarily, in reaction to major infectious disease outbreaks in the future.

Smaller firms and those in industries with less remote work experience may be slower to adopt the cultural, managerial, and technological changes required. Perhaps such firms will gradually become more amenable to remote work. Our evidence on this score is rather mixed. We asked firms directly how they expected their use of fully remote workers to change during the coming year. Most expected no change, but there was a slight tilt overall toward greater use of remote workers, more so among the largest employers. Expectations in this regard differed more sharply across major industry sectors. Professional-services firms, for example, expected a sizable net shift toward fully remote workers. Even in the professional-services sector, however, some saw greater reliance on fully remote workers, and others saw less.

In short, the dust has yet to settle with respect to remote work. Our data say that some employers expect to cut back on fully remote workers, while others expect to move in the opposite direction. Many employers now offer hybrid and remote work options as part of their recruitment and retention strategies.

As we also demonstrate, remote work options go hand in hand with greater geographic reach in recruitment efforts. The effects of these developments on the residential location choices of households and the geography of employment will play out over many years. Perhaps they will also bring new employment and earnings opportunities for people in out-of-the-way and left-behind places.

In short, the dust has yet to settle with respect to remote work. Our data say that some employers expect to cut back on fully remote workers, while others expect to move in the opposite direction.
IS IT ETHICAL TO USE FACIAL IMAGING IN DECISION-MAKING?

Chicago Booth’s Alexander Todorov and University of Chicago’s Wilma A. Bainbridge and Ben Zhao discuss biases relating to faces and the implications of facial-recognition technology.

Alexander Todorov
Leon Carroll Marshall Professor of Behavioral Science and Rosett Faculty Fellow, Chicago Booth

Wilma A. Bainbridge
Assistant Professor, Department of Psychology, University of Chicago

Ben Zhao
Neubauer Professor of Computer Science, University of Chicago

How do businesses use facial imaging in their decision-making?

Alexander Todorov: One use has to do with facial recognition. I’m particularly concerned with the issue of using facial images to profile people, to try to infer stable personality characteristics such as competence, extraversion—attributes that can help you get a job or not. This is deeply problematic, but the technology is very accessible and will become more and more accessible. A lot of my research has been on what colloquially we call “first impressions.” When people look at a specific image of a person, they actually arrive at consensual judgments, whether the person looks competent or trustworthy—complex, stable personality characteristics. You can extract the visual features from the face, so you can create a fake, hyperrealistic face and manipulate its perceived trustworthiness, competence, attractiveness, any attribute you like. That’s problematic because we can confuse our impression of the face with what the person is really like. We tend to overweight subjective impressions when making a decision. Imagine you’re interviewing a job candidate. You have the résumé, past history, and letters of recommendation. All these count for much more than your subjective impression, yet the subjective impression often features prominently and is weighted more heavily than these more objective criteria.

What makes some faces more memorable than others?

Wilma A. Bainbridge: One surprising finding from our research is that there are some faces that really stick in memory and some that are easily forgotten, so you can ascribe a memorability score as an attribute to a facial image. As humans, we’re pretty bad at guessing how memorable a face is. But we have computational methods that can predict how memorable a facial image will be and predict how many people would remember that face. We actually have a neural network on our website where you can upload a picture of anything (not just a face) and it will tell you the memorability score of that picture. And it will do a good job at predicting how likely you are to remember it, no matter who you are.

Todorov: That demonstrates that there’s a big mismatch between people’s intuitions and objective memorability. You get the same thing with impressions. Often, the correlation between how good you think you are at judging the characteristics of others and how good you actually are is essentially zero.

Is the greater use of facial-recognition software inevitable?

Ben Zhao: Most of us have a significant internet footprint, so our images are online in all sorts of formats. To try to think about the privacy of facial recognition, corralling those images and limiting access is very difficult. Companies can easily scrape billions of images without us knowing about it because they are in the public domain, build detailed facial profiles of us, and make a business out of it. Whether it’s inevitable is something that hopefully is not decided yet. We are developing tools to try to push back the tide. One allows you to digitally alter your images in subtle ways that are imperceptible to the human eye, so that when someone takes these photos and builds a facial-recognition profile of you, the person will actually get a wrong impression of what you look like. If someone were to give this database a true photo of you, it would actually cause a mismatch and return an error and misclassify you as someone else. We made that tool available online, and about 1 million people have downloaded it.

How should we regulate the use of facial-recognition software?

Zhao: There are so many ways regulators could approach this. You could look at it from a data providence and control perspective, where there’s more explicit ownership of images and we can control things that way. You could put permissions or watermarks over your images to control
where they spread. That’s difficult because of what is already on the internet. Another approach would be to put the onus on the model creators to prove that they have obtained permission to use these images. That would have some effect, but actors who are intentionally skirting the law and avoiding regulation would likely ignore these kinds of practices. It’s challenging, very cloudy, and not at all clear there are good solutions out there. And trying to future-proof this type of technology is always hard.

Todorov: One issue is privacy: what’s being done with our images, what kind of information is being collected, and who is using it. An even more pernicious use of images is where, in fact, they simply perpetuate bias. Imagine you built a model that predicts trustworthiness, but imagine that model happens to correlate with ethnicities for deep social reasons and histories—you could end up aggravating discrimination.

Machine-learning algorithms are a black box. You don’t know what factors the algorithms use to make predictions. And if you’re making predictions in terms of hiring, deciding who gets a loan, you should be able to justify your decision. In the old days, people could cite the criteria they used to make a decision. Those could be questioned if you suspected that there was prejudice behind the decision. But it gets much harder when you outsource these sorts of decisions to technology that works with millions of parameters. That is deeply problematic.

Ideally, this should be regulated by the companies, but I doubt that all companies would actually regulate themselves. If you had government regulation, it wouldn’t be clear what the trade-offs should be between how deep the regulation goes across different technologies. Law-enforcement agencies have used a lot of facial recognition, but every now and then there are errors, particularly with faces of people from ethnic minorities—partly because algorithms are often insufficiently trained in images representing ethnic minorities. And that’s a deep problem. These algorithms cannot be treated as the “truth.”

Zhao: Black-box machine-learning models are obviously problematic, especially the bigger they get. But is there any validity to the argument that humans are inherently flawed and biased, so why not outsource it to the other biased model, where at least we have some tools that can quantify the level of bias and perhaps point out its direction? Whereas for human decisions, it’s difficult to understand the bias and where it’s coming from, and when you do point it out, people can get defensive and react badly.

Todorov: I agree. There’s decades of research in psychology that takes simple algorithms with, say, five predictors and compares the accuracy with a human. And the computer algorithms are better on average, largely because they are consistent. They don’t get hungry, tired, or upset. But [with those simple algorithms], we could understand what the predictors were and how they were being used. So now we have this added layer of complexity with no understanding of the predictors. But on the positive side, there might be algorithms that can avoid some of these biases. I mean, the big issue is, how do you build these algorithms that can actually overpass the bad biases and lead to better decisions?

Bainbridge: One important consideration is what we’re training these algorithms with. It’s still us humans choosing what images to feed into them, and often those images are biased. If we use prior photographs of criminals, there’s a bias built in by the legal decisions we’ve made in the past. So it’s tricky to come up with a totally unbiased set of data to give these models.

What are the positive aspects of facial-recognition technology?

Bainbridge: Machine-learning models can help us counteract these biases in some ways. We’ve found that there are faces that cause lots of false memories. You might see someone and feel like you’ve met them before, but you never have. There are some faces that cause that consistently for many people.

“Algorithms are often insufficiently trained in images representing ethnic minorities. And that’s a deep problem. These algorithms cannot be treated as the ‘truth.’”

— ALEXANDER TODOROV
This can be really problematic for eyewitness testimony, where we’re relying on an accurate memory from a witness. Say you have a suspect of a crime who turns out to be innocent, but has a face that causes a lot of false memories. Witnesses will tend to say, “I saw that face at the crime,” even though it’s because that face causes a lot of false memories. Using algorithmic models, if we can identify the sort of bias that might exist in that suspect’s face to begin with, we could choose faces in a lineup that equalize the bias for false memories across all the faces. That would make it more likely that if a witness picks out a photo, it’s an accurate memory and not a false memory.

Zhao: Given the ubiquity of these algorithms and models, a lot of things are much easier, whether it’s authentication or just simplifying your daily passwords, for example. It does help in terms of security, and it certainly simplifies some of the other challenges we have with security. For certain types of authentication purposes, simple facial recognition will make life a lot easier. And in certain contexts, such as on your phone, for example, it could provide reasonable security, in the sense that you would have to compromise someone’s phone before compromising their facial recognition for a particular app.

Todorov: Clearly, the technology is just going to get better and better. But as Wilma brought up, there are always two things. One is the ever-greater power of computational algorithms. The other is, what are you training the system on? That is just as essential. If you introduce biases in a training set, they’re going to be there and you’re going to perpetuate them. Improving awareness is absolutely not enough. There’s a lot of work in psychology about awareness of bias, stereotypes, and prejudice, and awareness on its own is not sufficient. It’s the first step, but you need to have incentives and specific criteria. It’s not sufficient to say, “I’m being aware.” Often people will say, “Well, I’m aware, but it’s not me.” That’s natural. We call it the bias blind spot in social psychology: “Everybody’s biased, but I’m not.”

So awareness alone is not enough. You need to have some other protections with respect to preventing biases from popping up in these algorithms. This was particularly the problem in the early days of using machine learning,

“There’s hope that once we as a society understand more about the responsible application of A.I. and demand it from big tech, they will turn around and make that a priority.”

— BEN ZHAO

because people used to say, “Oh look, it’s just mapped. I put in a set of inputs and here’s a set of numbers. And guess what? It can tell you whether a person has a criminal inclination or not.” But if you asked, “How did you train your algorithm?” a bunch of things would suddenly come up that explained the amazing performance of the algorithm—not because there was no bias, but because they were incorporating bias inside.

I think that now, people are much more sophisticated about these issues. It starts from the human researchers. Often, they introduce bias completely unintentionally. Even in everyday life, it’s not like most people are biased and blatantly prejudiced. Most of the time, people want to do the right thing but the information is ambiguous, and a bias can nudge you one way or another. It’s those types of situations where biases really play a role. Similarly, when you’re training an algorithm, if you don’t have a sufficient number of examples that represent the parts that may be missing—parts that are important in the real world but missing in your model—that is going to be reproduced in the decisions of the model.

Zhao: When we’re talking about the role of awareness, I draw an analogy to some of the changes that we’ve seen in privacy. For a long time, users were not aware of the value of privacy and the sense of what privacy leaks meant to them. Back in the early days of Facebook, people were even selling photos of themselves for pennies. Then you saw more awareness.

For a long time, we were pessimistic about the role of companies and the ways they would address privacy because it was always seen as a limitation, a drawback that you would have to penalize your revenue stream for. Then lo and behold, years later, Apple takes this role and changes that around and says, “OK, now we understand that users value privacy. And therefore we’re going to offer it as a feature rather than a bug.”

And that, I think, offers some hope. I look at that and say, if we are aware of the role of ethics and bias and deep-learning machine models and how they’re misused, there’s hope that once we as a society understand more about the responsible application of A.I. and demand it from big tech, they will turn around and make that a priority, thereby helping their revenue, but also aligning their interests with ours. — CBR.
Flash forward to 1975, when my adroit University of Chicago colleague Sam Peltzman published a paper titled “The Effects of Automobile Safety Regulation.” The unassuming title belied Peltzman’s striking conclusion: the decade of measures spearheaded by Nader to increase automotive safety hadn’t actually made people safer at all. As Peltzman put it, “The one result of this study that can be put forward most confidently is that auto safety regulation has not affected the highway death rate.” More surprising than this, perhaps, was his explanation for why. Drivers felt safer because of the legislated measures put in place to protect them, so they took more risks while driving, and in turn had more accidents. Since I’m so safe with my seat belt, a driver might reason (consciously or not), why not lay the pedal to the metal? Seat belts make any individual driver safer in the event of an accident, but at scale, they also appeared to lead to more total accidents. It was as if one voltage gain had been wiped out by a consequent voltage drop—an unintended and shocking consequence.

While Peltzman’s paper was controversial at the time—unsurprisingly, it was politicized by pro- and anti-regulation advocates—much research in the intervening years has borne out similar conclusions in other domains. It turns out people have a tendency to engage in riskier behaviors when measures are imposed to keep them safer. Give a biker a safety helmet and he rides more recklessly—and, even worse, cars around him drive more haphazardly. And a 2009 study directly following the line of research pioneered by Peltzman found that NASCAR drivers who used a new head and neck restraint system experienced fewer serious injuries but saw a rise in accidents and car damage. In short, safety measures have the potential to undermine their own purpose.

This phenomenon—which came to be known as the Peltzman effect—is often used as a lens for studying risk compensation, the theory that we make different choices depending on how secure we feel in any given situation (i.e., we take more risk when we feel more protected and less when we perceive that we are vulnerable). This is why, in the wake of the 9/11 attacks and the rise in fear of terrorists gaining access to nuclear weapons, Stanford political scientist Scott Sagan argued that increasing security forces to guard nuclear facilities might actually make them less secure. The Peltzman effect also reaches into insurance markets, whereby people who have coverage engage in riskier behavior than those without coverage, a phenomenon known as moral hazard. Clearly, this pattern of human behavior has potentially huge implications when taken to scale.

The most obvious takeaway here is that seemingly free-will choices we make every day may in fact be shaped by hidden effects we are not aware of. (Also, you should wear a seat belt and drive safely!) But in the context of scaling, this illuminates another cause of voltage drops that we must avoid: the spillover effect. This is the unintended impact one event or outcome can have on another event or outcome, a classic example being when a city opens a new factory and the air pollution it produces impacts the health of residents in the surrounding area. That this effect occurs speaks to the inescapable web linking events, the things humans create, and the natural world. The term “spillover effect” has been applied in fields as far-ranging as psychology, sociology, marine biology, ornithology, and nanotechnology, but we will define it in a human sense, as the unintended impact of one group of people’s actions on another group. And nothing makes spillovers more likely and visible than scaling an endeavor to a wide swath of people. Remember the Murphy’s law of scaling: anything that can go wrong will go wrong at scale. Or to put it slightly less memorably, something unexpected has a much higher probability of occurring at scale than not at scale. —ca

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Why hasn’t the Fed done more to fight inflation?

A simple explanation for the bank’s muted response to rising prices

Inflation has been with the United States for a year. It was 8.5 percent in March and trending up. On March 15, the Federal Reserve finally budged the federal funds rate from 0 to 0.33 percent, with slow rate rises to come.

A third of a percent is a lot less than 8.5 percent. The usual wisdom says that to reduce inflation, the Fed must raise the nominal interest rate by more than the inflation rate. In that way, the real interest rate rises, cooling the economy.

At a minimum, then, according to the usual wisdom, the interest rate should be above 8.5 percent. Now. The Taylor rule says the interest rate should be 2 percent (the Fed’s inflation target), plus 1.5 times how much inflation exceeds 2 percent, plus the long-term real rate. That means an interest rate of around 12 percent. Yet the Fed sits, and contemplates at most a percent or two by the end of the year.

This reaction is also unusually slow by historical precedent. In early 2017, unemployment got below 5 percent, inflation got up to and just barely breached the Fed’s 2 percent target, and the Fed promptly started raising interest rates. Inflation batted around the Fed’s 2 percent target. March 2022 unemployment is 3.6 percent, lower than it has been since December 1969. Fear of high unemployment does not explain the Fed’s much slower response.

The 2017 episode is curious. The Fed seems to regard it as a big failure—it raised rates on fear of inflation to come, and inflation did not come. I would expect a self-interested institution to loudly proclaim success: it raised rates on fear of inflation to come, just enough to keep inflation right at target without starting a recession. It executed a beautiful soft landing. The Fed has never before been shy about “but for us things would have been much worse” self-congratulation. Instead, the event sparked the whole shift to the Fed’s current explicit wait-and-see policies.

The Fed’s current inaction is even more curious if we look at a longer history. In each spurt of inflation in the 1970s, the Fed did, promptly, raise interest rates, about one for one with inflation. Not even in the 1970s did the Fed wait a whole year to do anything. Interest rates rose just ahead of inflation in 1974, and close to one to one with inflation from 1977 to 1980. Today’s Fed is much, much slower to act than the reviled inflationary Fed of the 1970s. And that Fed had unemployment on which to blame a slow response. This one does not.

The conventional story is that the 1970s one-to-one response was not enough. A one-to-one pace keeps the real rate constant, but does not raise real rates as inflation rises. Only in 1980 and 1982, when the interest rate rose substantially above inflation and stayed there, did inflation decline. You have to repeat that painful experience, conventional wisdom goes, to squash inflation.

What is the Fed thinking?
The Fed’s forecasts for the next year, taken from its March 16 projections, are at the top of the facing page. (I plot “longer run” as 2030. The Fed’s “actual” is end of 2021 quarterly personal consumption expenditures inflation, 5.5 percent.)
As you can see, this forecast scenario is dramatically different from a repetition of 1980. The Fed believes inflation will almost entirely disappear on its own, without the need for any period of high real interest rates.

An astute reader will notice that above I referred to the “real” interest rate as the nominal interest rate less current inflation. In fact, the real interest rate is the nominal interest rate less expected future inflation. So we might excuse the Fed’s inaction by its belief that inflation will melt away on its own, and its view that everyone else agrees. But the Fed’s projections do not defend that view either. Expected inflation is higher, just not so much as past inflation; real rates measured by nominal rates less expected future inflation remain negative throughout until we return to the long-term trend.

By any measure, in these projections real rates remain negative, yet inflation dies away all on its own. Why?

Various Fed speeches and commentary I have read do not shed much light on this question. Much of the talk about inflation still revolves around a “supply” shock that will go away on its own. To my mind, it’s evident that widespread inflation, including wage increases, comes from demand rather than supply, so I see a large fiscal shock. But a one-time shock, no matter its nature, does not necessarily lead to a one-time inflation. When the shock ends, the inflation does not necessarily end.

Whatever the shock was, the question before us now is this: Suppose the shock is over. (New shocks may come, but one cannot, by definition, predict future shocks.) Inflation is 8.5 percent. The fed funds rate is still very low. Will inflation go away on its own, will it persist, or will it get worse?

Will inflation persist?

It always helps to think first in the simplest terms, and then add complications as needed. If the economy has no frictions— if prices move instantly with economic conditions—and if the Fed does nothing to interest rates, the price level rises proportional to the size of a permanent shock to the fiscal deficit— how much money or debt is issued that will not be eventually repaid. A fiscal shock equal to 1 percent of the debt raises the price level by 1 percent, resulting in a period of inflation. But then the price level stops rising, and inflation stops. The figure below illustrates this simple scenario:

Now, we had a 30 percent shock: the $5 trillion cumulative deficit thus far during the pandemic was almost 30 percent of the $17 trillion in debt outstanding at the beginning of the pandemic. We have seen only about 8 percent inflation so far. But the inflationary fiscal shock is the shock to the discounted sum of deficits and surpluses, not just the shock to today’s deficit. So if people expect most of the deficit to be repaid—if the 30 percent deficit shock comes with a 21.5 percent rise in expected future surpluses— then we have only an 8.5 percent shock to the discounted stream of surpluses, resulting in the 8.5 percent price-level rise we have just seen. And it’s over, at least until there is another shock to deficits, to people’s expectations about that future partial repayment, or to monetary policy.

But prices don’t change instantly—they are “sticky.” How much do sticky prices draw a one-time 1 percent deficit shock out to a long-lasting inflation? Quite a bit.

Inputting a modest value for price stickiness into a standard New Keynesian model produces a graph that illustrates just how much difference price stickiness makes:
The total rise in the price level is the same, 1 percent, but it is spread over time. If this graph is right, we have a good deal of inflation left to go. The first year only produces about 40 percent of the total eventual price-level rise.

With price stickiness, the fundamental story changes. In a frictionless model, we digest the story simply: The government is borrowing or printing money, and people do not expect repayment. They try to get rid of the debt or money, but more sellers than buyers means they just push up prices and push down the value of debt. In the frictionless model, we might say that unexpected inflation, an unexpected one-time price level increase, lowers the real value of outstanding debt, just as would a partial default. But this model with sticky prices still maintains one-period debt, so a slow expected inflation cannot devalue debt in the same way. Instead, there is a long period of negative real interest rates—as we are observing in reality. This period of negative real interest rates slowly lowers the real value of government debt. With sticky prices, even short-term bondholders cannot escape.

That price stickiness draws out the inflationary response to a fiscal shock is perhaps not surprising. Many stories feature such stickiness, and suggest substantial inflationary momentum. Price hikes take time to work through to wages, which then lead to additional price hikes. Housing prices take time to feed in to rents. Input price rises take time to lead to output price rises.

**Modeling the Fed**

Let’s return to the Fed’s relatively muted response to the inflation the US has experienced thus far, the Fed’s projections that inflation will largely go away on its own without a period of high real interest rates, and its consequent very sluggish interest-rate reaction. Many economists just criticize, but it is more productive to ask: What implicit view of the economy lies behind the Fed’s forecasts? Is that model logically consistent and consistent with data? If one disagrees, one disagrees about how the economy works. Rather than argue about results, it is more productive to examine and argue about assumptions.

To address this question, I consider a simple model and give it two versions: adaptive expectations and rational expectations. Adaptive expectations captures traditional views of monetary policy, and rational expectations captures the New Keynesian view. Their crucial difference lies in the famous Phillips curve, the relation between inflation and unemployment or output. In both models, higher output and lower unemployment come with higher inflation. In the traditional view, higher output comes with more inflation relative to past inflation. In the New Keynesian, rational-expectations view, higher output comes with more inflation relative to expected future inflation.

Fire up each model, starting with 5.5 percent inflation as in the Fed’s March 16 projections. Put in the Fed’s projected interest-rate path, and let’s see what inflation and unemployment rate comes out:

**Amid the chorus of opinion that the Fed is blowing it, let us acknowledge a possibility: the Fed may be right.**

The traditional adaptive-expectations model predicts an explosive inflation spiral, and also an explosive unemployment decline. The New Keynesian model, by contrast, fits the Fed’s inflation and unemployment forecasts well. There is a model that captures the Fed’s views. The Fed is New Keynesian—or, at least, the Fed acts as if it is New Keynesian.

In the traditional model, the inflationary shock we just experienced, whatever its source, together with today’s low interest rate, gives us a large negative real interest rate. That negative rate is itself additional “stimulus”: it raises output and lowers unemployment. Higher output and lower unemployment, however, raise inflation even more, relative to the past inflation. Higher inflation means an even lower real interest rate, and more inflation still, in a never-ending spiral—until the Fed gives in, raises interest rates to much above inflation, and contains the mess with a large recession.

In the New Keynesian model, we tell the same story, except that the higher output and lower unemployment raise inflation relative to expected future inflation, not relative to past inflation. Given today’s inflation, that means expected future inflation must be lower. Logically, inflation last year was only 5.5 percent, despite low interest rates and a booming economy, because people expect inflation to subside. That minor distinction of how the reference point of inflation enters the Phillips curve changes everything.

We can gain a lot of intuition by asking a related question. Rather than take the interest-rate path as given and simulate inflation and unemployment, let us ask: What interest-rate path would it take to produce the Fed’s inflation forecast? And what unemployment rate does that path produce?
Interest-rate path needed to produce the Fed’s inflation forecast

**ADAPTIVE EXPECTATIONS**

- Forecast
- Needed rate
- Inflation
- Unemployment
- Federal funds rate

*0 '21 '22 '23 '24 '25 '26 '27 '28 '29 '30*

**RATIONAL EXPECTATIONS**

- Forecast
- Needed rate
- Inflation
- Unemployment
- Federal funds rate

*0 '21 '22 '23 '24 '25 '26 '27 '28 '29 '30*

By contrast, the New Keynesian model says that in order to hit the Fed’s inflation forecast, interest rates can stay low, and indeed a bit lower than the Fed projects. And that path is perfectly consistent with unemployment slowly reverting to the natural rate.

Again, the difference in this little model comes down to whether output and unemployment are related to inflation relative to future inflation, or relative to past inflation. More generally, the issue is if people are forward looking in forming their expectations of the future, or if they mechanically think that the future will look like the recent past. You might guess this would be easy to tell apart in the data, but it isn’t.

**How did the Fed get here?**

The proposition that once the shock is over inflation will go away on its own may not seem so radical. Put that way, I think it does capture what’s on the Fed’s mind. But it comes inextricably with the uncomfortable implication (a “Fisherian” implication, for the late economist Irving Fisher) that if inflation converges to interest rates on its own, higher interest rates eventually *raise* inflation, and vice versa.

I square this circle by thinking there is a short-term negative effect of interest rates on inflation, which central banks normally use, and a much longer-term positive effect, which they generally don’t know about or exploit. Such a short-term negative effect can coexist with rational expectations, though this little model does not include that negative effect. So relative to my priors, the surprise is that the Fed seems to believe so little in the (short-term) negative effect, and the Fed seems to think the Fisherian long run comes so quickly, i.e. that prices are so flexible.

Why might the Fed have come to this view? Perhaps the clear lessons of the zero-bound era have sunk in. The adaptive-expectations model works in reverse too: If you wake up in mid-2009 with 1.5 percent deflation and a zero interest rate, the adaptive-expectations model predicts a *deflation* spiral, the mirror image of the inflation trajectory plotted in the first chart on the preceding page. *It did not happen.* The failure of the deflation spiral to emerge is a hard piece of evidence against the traditional model. The rational-expectations model makes sense of the zero-bound era. Perhaps the Fed has incorporated that experience in its thinking. Perhaps the Fed has also lost faith in the power of interest-rate hikes to lower inflation. Or perhaps the negative effect comes with a recession, which the Fed wishes to avoid, and so the bank would rather wait for a longer-term Fisherian stabilization. That part of 1980 is less attractive for sure!

**The Fed may be right**

Amid the chorus of opinion that the Fed is blowing it, let us acknowledge a possibility: the Fed may be right. There is a model in which inflation goes away as the Fed forecasts. It’s a simple model, with attractive ingredients: rational expectations. It survives the zero-bound era, which the traditional model does not do. There is also a model, more likely, in my view, that inflation persists and goes away slowly, because prices are stickier than the Fed thinks. There is also some momentum to inflation, induced by some backward-looking parts of pricing, which could lead to inflation still increasing for a while before the forces of these simple models kick in. But the key point is that inflation may not spiral away as the standard model suggests, even if the Fed is somewhat sluggish to adapt.

If inflation does not spiral away, despite sluggish interest-rate adjustment, we will learn a good deal. The next few years could be revealing, as were the 2010s. Or we may get more bad shocks, or the Fed may change its mind and sharply raise rates to replay 1980, interrupting the experiment.

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**The failure of the deflation spiral to emerge [in the zero-bound era] is a hard piece of evidence against the traditional model.**

**In the traditional, adaptive-expectations version of the model, we need sharply higher, Taylor rule–style interest rates now. Those higher nominal rates create higher real rates, which bring inflation down. They also cause a recession—notice unemployment rising over the 4 percent natural rate. The recession is not so bad, because the simulation starts at last year’s PCE inflation, 5.5 percent, not March’s CPI inflation, 8.5 percent, and not (perhaps) this fall’s 10 percent or more inflation, because the model is incredibly simplified, and because I chose a fairly mild price-stickiness parameter. Serious models can easily deliver a much worse recession.**

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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 three posts on his blog, The Grumpy Economist, which provide the equations and numbers for the simulations presented here.
The ethics of a ‘passive’ investment

Modern economies have severed surplus from work

Ethics is not without accusation—a world where no one is blame-worthy is either a utopia or a nightmare—so its practice can put people on the defensive.

Take Connor Chung, a senior at Harvard College and one of the leaders of a nearly decade-long effort to get the university to divest fossil fuel interests from its $53 billion endowment. “As I got situated on campus my first year,” Chung told Slate in January, a few months after the university finally capitulated, “it was both amazing to be part of the Harvard community and really quite painful to learn that the school was actively working against my and my peers’ future through its multitude of investments in the fossil fuel industry.”

“Actively working against” is a phrase that surely grates, at least among those who opposed the public confrontations, vocal protests, and blockades of university spaces favored by Chung’s organization, Divest Harvard. Such individuals might be the first to question whether it is really fair to say that the university is actively working against its students when the investments that comprise Harvard’s endowment subsidize educational opportunities and underwrite scholarly endeavors. Research and instruction are the chief responsibilities of a university. How can it be actively hurting students when they are all benefiting from a passive investment?

The work of hands

Passive investment—this is a tricky term, isn’t it? It implies that a successful speculation is somewhat like manna from heaven, a benefit that magically appears from nowhere, dropping into our laps without any real work on our parts, or the responsibilities that come with it.

This severing of surplus from ethics or even endeavor may be the necessity of an age marked by hopelessly complex, capital-intensive enterprises, but it would have seemed strange and slightly perverse to those who first championed a strong notion of property rights as an indispensable asset of free people.

Take the most famous of these figures, John Locke, a 17th-century British philosopher whose Second Treatise of Government offered one of the most famous accounts of the origin of private property. Starting with the Biblical assumption that God gave the earth to human beings “in common,” Locke wanted to show how, notwithstanding this starting point, “Men might come to have a property in several parts” without the “express consent” of others.

To do so, Locke famously appealed to our instincts about what qualifies as just acquisition by taking us back to the state of nature, a thought experiment philosophers of the 17th and 18th centuries turned to when they wanted to draw lessons about human nature by looking to a time before the emergence of society.

Of course, such lessons were the fruits of creative hypotheticals rather than matters of anthropology or evolutionary biology, so their success depended mainly on how convincing they sounded to readers. Locke’s proved fairly persuasive, at least with respect to private property. He began with the seemingly straightforward observation that we are our own property—“every Man has a Property in his own Person”—and drew the corollary that the “Labour of his Body, and the Work of his Hands” are, therefore, “properly his.”
What does this mean in practice? Consider a violation of Locke’s axiom by means of another hypothetical. Let’s say that the two of us, after a long voyage at sea, arrive on a distant shore. When we disembark, we venture into the wilderness and soon discover a grove of apple trees. We are both quite hungry, so you step forward and pick a single piece of fruit from one of the branches. While you take a moment to admire it, I snatch it out of your hands. “MINE!” I cry and greedily devour the apple.

Now you may laugh at such swinishness, but not because you endorse it. As Locke made plain, the act is an obvious transgression, for it violates an instinctive sense of what fairly constitutes private property. “Whatsoever” someone “removes out of the State that Nature hath provided,” he wrote, that person has thereby “mixed his Labour with, and joyned to it something that is his own, and thereby makes it his Property.” Simply by virtue of plucking the apple from the tree, Locke said, you imbue it with a sense of possession such that my taking it from you triggers a feeling of injustice. When I can just as well appropriate another apple from another tree, grabbing the first one seems wrong. To use a word that captures the idea that possession alone does not constitute private property, it feels like theft.

The nexus between surplus, ethics, and endeavor
Whatever you make of a philosophical argument that assumes a world in which land is not only synonymous with wealth but ripe for the taking, Locke’s theory of property illustrates the nexus between surplus, ethics, and endeavor. By virtue of some undertaking, I gain the benefit of the endeavor. The surplus is fairly mine, and no one can simply seize it without committing an injustice.

Seen in this light, the accumulation of private property becomes an extended exercise in just desserts.

This conception of private property, the significance of which went well beyond revenue streams and financial security, both assumed and encouraged a broader vision of a well-ordered society.

I get property and the benefits it confers not because I take it by force (the Genghis Khan approach to wealth accumulation), nor because of divine right (the feudal account), but because I have earned it.

Still, these benefits do not come cheaply. “There are no gains without pains,” Father Abraham warns in “The Way to Wealth,” perhaps the most famous entry in Poor Richard’s Almanack, the gallowaflury of poems, essays, proverbial wisdom, weather forecasts, mathematical exercises, and stargazing schedules that Benjamin Franklin published annually from 1732 to 1758.

Franklin is a paragon of sorts for the Lockean notion of property accumulation, a vision encapsulated by another chestnut from Father Abraham: “Help hands, for I have no lands.” A runaway printer’s apprentice, Franklin famously made his way to Philadelphia and eventually found his fortune by dint of hard work, careful study, and, by his own account as well as those of his admirers, the cultivation of what is sometimes called the bourgeois virtues.

As one such admirer, Franklin’s occasional pen pal Adam Smith, wrote of the commercial promise of such virtues: “In all the middling and inferior professions, real and solid professional abilities, joined to prudent, just, firm, and temperate conduct, can very seldom fail of success.” For Smith as for Franklin, it wasn’t enough to work hard. If one wanted to accumulate property and underwrite a long-term plan for success, hard work and careful study, the prerequisites of any “professional abilities,” had to be complemented by a suite of virtues that supported personal responsibility and public spiritedness. “The success of such people, too, almost always depends upon the favour and good opinion of their neighbours and equals,” Smith continued, “and without a tolerably regular conduct these can very seldom be obtained.”
Property, on this account, was something owned, operated, and maintained within the scrupulous expectations of a well-defined community. Having a horse to plow your land was all well and good, but you were the one who had to follow the plow in planting season and run all over the neighborhood if the horse escaped the barn.

This conception of private property, the significance of which went well beyond revenue streams and financial security, both assumed and encouraged a broader vision of a well-ordered society. The philosopher David Hume, another of Franklin’s correspondents, wrote in one of his most famous essays that broadly distributing private property and the rights and responsibilities that attend it creates social conditions that are conducive to what today we would call a liberal democratic order. “Where luxury nourishes commerce and industry,” Hume declared, “the peasants, by a proper cultivation of the land, become rich and independent; while the tradesmen and merchants acquire a share of the property, and draw authority and consideration to that middling rank of men, who are the best and firmest basis of public liberty.”

Like his friends Smith and Franklin, Hume believed the very practice of accumulating and maintaining private property was not only a sustained exercise in prudence and careful management, but also the foundation for a stable, responsible society and an education in citizenship.

Absentee ownership
Notably, Hume, Smith, and Franklin exchanged their trans-Atlantic letters more than 50 years before the full flowering of the Industrial Revolution. Even then, the nexus of surplus, ethics, and endeavor so central to the Lockean vision of private property was already imperiled by the rise of wage labor. Smith’s celebrated account of how a pin is made in the opening pages of The Wealth of Nations—“One man draws out the wire, another straightens it, a third cuts it”—shows that he well understood that the division of labor (what he termed “the greatest improvement in the productive powers of labour”) would fracture this nexus. True, the workers who helped make a pin would certainly collect a wage, but they could work their entire lives in the factory without ever even owning the stools they sat on.

Still, if wage labor did not sit neatly in the worldview implied by Locke’s theory of property, it hardly rendered that theory null and void. “The prudent, penniless beginner in the world, labors for wages awhile, saves a surplus with which to buy tools or land, for himself,” Abraham Lincoln declared in 1859, “then labors on his own account another while, and at length hires another new beginner to help him.” A rising star of the newly incorporated Republican Party, which was then only five years old, Lincoln captured a kind of hopeful ambivalence about how wage labor might shape society. Yes, insofar as one worked principally with another’s property, the experience did not lend itself to the kind of moral education figures such as Hume envisioned, but so long as it eventually enabled one to become a property owner, wage labor was something like a way station between abject servitude and a substantial sense of self-reliance.

But absentee ownership, a phenomenon that went hand in glove with the rise of wage labor, was a different matter. That term, popularized in the second half of the 19th century, represented a different and far more lethal threat to Locke’s vision. With the advent of highly complex, capital-intensive industries, modern economies came increasingly to rely on an army of nameless, faceless stockholders. Most often at great distances from the enterprises they supported, these investors allocated capital without ever exercising in any meaningful or direct way the power it conferred or, for that matter, shouldering the responsibilities that attended it.

This extraordinary change in the structure of capitalism amounted to nothing less than the “dissolution of the old atom of ownership,” Adolf Berle and Gardiner Means declared in The Modern Corporation and Private Property, their seminal study of the corporate form. “Stockholders toil not, neither do they spin” to earn their rewards, they wrote. “They are beneficiaries by position only.”

Berle and Means’s book was first published in 1932, making the duo part of a group of economists, historians, and other close observers of capitalism who had watched large corporations become the “dominant
The “institution” of modern economic life. The men and women of their generation knew firsthand what had been gained by the modern company but also what had been lost. “The capitalist process, by substituting a mere parcel of shares for the walls of and the machines in a factory, takes the life out of the idea of property,” the economist Joseph Schumpeter wrote not long after Berle and Means. “This evaporation of what we may term the material substance of property—its visible and touchable reality—affects not only the attitude of holders but also that of the workmen and of the public in general.”

**No pains, all gains**
Schumpeter assumed that the severing of surplus from ethics and endeavor, though a necessary requirement for complex enterprises underwritten by shareholders, would inevitably change the way we thought about property in general as well as the wealth it comprises and creates. “Dematerialized, defunctionalized and absentee ownership does not impress and call forth moral allegiance as the vital form of property did,” he wrote. “Eventually there will be nobody left who really cares to stand for it.”

Berle and Means went even further. “The owners of passive property, by surrendering control and responsibility over the active property, have surrendered the right that the corporation should be operated in their sole interest,” they contended. “They have released the community from the obligation to protect them to the full extent implied in the doctrine of strict property rights.”

Schumpeter didn’t rejoice in this possibility, but as predictions went, the withering of these rights seemed inevitable. Great imbalances in wealth are a difficult thing to defend. The Lockean vision explained them by a plausible theory of just desserts. Those who had more got it by hard work and responsible behavior. Passive investments, by contrast, assumed that others would do the real work of wealth creation and assume the responsibilities related to it. The sweat of the stockholder’s brow would only come from risk calculation, not a shoulder to the plow.

Of course, Schumpeter, Berle, and Means were all wrong in what they assumed would be the moral and legal response to passive investment severing surplus from ethics and endeavor. Rather than being released from protections accorded the type of property implied by the Lockean vision, nearly a century later passive investments continue to enjoy power without responsibility. That is one reason why, when someone like a Connor Chung says Harvard has been actively working against its own students through its multitude of fossil fuel investments, it rankles those who conveniently assume a contemporary view about the moral permissiveness of a passive investment.

Harvard “exists to serve an academic mission,” Drew Faust, the former president of Harvard wrote in a 2013 letter, a year after Divest Harvard was founded. She continued:

_The funds in the endowment have been given to us by generous benefactors over many years to advance academic aims, not to serve other purposes, however worthy. As such, we maintain a strong presumption against divesting investment assets for reasons unrelated to the endowment’s financial strength and its ability to advance our academic goals._

Another way of putting this is that Harvard has the right to prosper passively from the active efforts of entities in which it invests and bears no real responsibility for how they use the power granted them by these investments. Furthermore, even to acknowledge the possibility that such investments might have any moral import beyond Harvard’s stated academic mission would be to add terms of stewardship that go well beyond what the university desires as well as what is conventionally expected of a passive investment.

Fair enough, but if such a view—which might be described as “no pains, all gains”—is hardly anachronistic, it does not (in Schumpeter’s words) “call forth moral allegiance.” If accusations such as Connor Chung’s strike us as somehow missing the mark, at the end of the day it may say less about his understanding of the responsibilities of great wealth than it does about ours.

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Cryptocurrencies are famous for exposing investors to wild price changes. Bitcoin, for example, appreciated more than 70 percent during the first quarter of 2021, but on May 19 of that year, dropped by 30 percent in the course of the day before recovering some of its value. Do such dramatic climbs and falls reflect changes in fundamental information about crypto assets? Or are they driven by investor sentiment? And as cryptocurrencies become more salient to the financial system, does their price volatility pose a risk to broader financial stability?

To explore these questions, Chicago Booth’s Initiative on Global Markets polled its US and European experts panels on the roots and possible consequences of crypto’s ups and downs.
**Statement A:** High volatility in the prices of crypto assets such as Bitcoin, Dogecoin, and Ethereum largely reflects movements in investor sentiment rather than news about potential sources of fundamental value (such as possible applications, or use in illicit transactions).

**Statement B:** Given existing regulations, as crypto assets grow in value and become more connected to the rest of the financial system, the fluctuations in their valuations pose a serious risk to financial stability in advanced economies.

**US PANEL**

**Judith Chevalier,** Yale  
“I would also have agreed if the question asked about the value of gold bullion.”  
Response: Agree

**Darrell Duffie,** Stanford  
“Despite use cases such as remittances and illegal payments, total dollar volatility seems out of proportion to the value of such services.”  
Response: Strongly agree

**EUROPEAN PANEL**

**Jan Pieter Krahnen,** Goethe University Frankfurt  
“There is a rising risk of contagion into the regulated banking sector if crypto assets become part of the asset universe held by banks.”  
Response: Agree

**Lubos Pastor,** Chicago Booth  
“Perhaps one day, but today we are still very far from such a situation. Moreover, regulation is already happening, at least in Europe.”  
Response: Disagree

**US PANEL**

**Richard Schmalensee,** MIT  
“If they become a serious risk, one would hope that regulations would be changed.”  
Response: Uncertain

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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.
Does success depend on where a student attends college?

Every year, many students compete to gain admission to a relatively small group of selective colleges. Going to one of these top-tier colleges may carry with it the promise of good prospects after graduation, but when Chicago Booth’s Jack Mountjoy and Washington University in St. Louis’s Brent Hickman analyzed the value in attending one college in Texas over another, they find that going to a more selective school provided only a small, temporary earnings premium. What seemed to matter more was a student’s preexisting individual potential. Among high schoolers who applied to and were accepted by the same set of colleges—a useful signal of ability, ambition, and other unobserved advantages—earnings were fairly similar regardless of where they ended up enrolling, the researchers find. Even so, some colleges do add more value than others. While a school’s selectivity may not significantly affect how much its graduates make, other factors such as instructional spending and faculty characteristics tend to.

Turn to page 10 to learn more.
See you soon

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.

JUNE 1, CHICAGO
JOHN EDWARDSON, ’72, SOCIAL NEW VENTURE CHALLENGE FINALS
polsky.uchicago.edu/event
Watch University of Chicago’s newest social entrepreneurs compete for $150,000 in cash prizes. RSVP to attend or livestream.

JUNE 2, CHICAGO
EDWARD L. KAPLAN, ’71, NEW VENTURE CHALLENGE FINALS
polsky.uchicago.edu/event
Join the Polsky Center for Entrepreneurship and Innovation at the University of Chicago as teams present to a panel of judges at the 26th anniversary of this top-ranked US accelerator program. RSVP to attend or livestream.

JUNE 15, LONDON
MATTERS THAT MATTER—CAREER TRANSITIONS
chicagobooth.edu/alumni/events
Prepare to participate at this leadership event aimed at women and focused on various common transition points.

JUNE 15, ONLINE
A MEETING OF THE MINDS
chicagobooth.edu/meeting-of-the-minds
Hear Chicago Booth’s Hal Weitzman and University of Chicago’s Kimberly Kay Hoang discuss the role of transparency in corporate behavior, investing, and accounting. This event series brings together faculty to explore commonalities and differences in separate spheres.

JUNE 16–18, ONLINE
INFORMS MARKETING SCIENCE VIRTUAL CONFERENCE
chicagobooth.edu/research/kiits/events
Log on to hear leading marketing scholars, practitioners, and policy makers who have a shared interest in using rigorous scientific research to tackle marketing problems.

JUNE 21, LONDON
BOOTH SOCIAL
chicagobooth.edu/alumni/events
Meet fellow alumni from a variety of industries for informal drinks.

JUNE 22, ONLINE
CHICAGO BOOTH ANGELS NETWORK VIRTUAL PITCH/DEMO EVENT
chicagobooth.edu/alumni/events
Pitch your idea to an audience of seasoned angel investors and Booth alumni looking to make their first or next investment. Startups will be selected ahead of time.

AUGUST 10, CHICAGO
SUMMER REAL ESTATE MIXER
chicagobooth.edu/summer-real-estate-mixer
Connect with alumni of Kellogg and Booth at this mixer, which will include an open bar and light appetizers. Tickets are limited.
HOW SMALL HOUSEHOLDS CONTRIBUTE TO FOOD'S HIGH CARBON FOOTPRINT
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