Will algorithms fix what’s wrong with American justice, or make things worse?

Law and order and data

Plus:
What should the US do about student debt?
Lower fines could lead to higher revenues
“People are going to be returning to jobs, but they’re going to be different kinds of jobs and different kinds of employers.”
The US prison system is the biggest in the world. At 655 prisoners for every 100,000 people living in the country, the United States leads the world in both total number of people in prison and prison population per capita, according to World Prison Brief’s 2018 World Prison Population List.

The system is also incredibly expensive—one estimate puts the total cost of incarcerations at $1 trillion annually. And the racial composition of the US prison population is skewed relative to the general population: Black people make up 12 percent of the adult population but one-third of all prisoners. And the high financial and social cost of the current system is failing to produce good results. The US ranks 26th of 40 countries in the safety category of the Organisation for Economic Co-operation and Development’s Better Life Index, which factors in both homicide rates and people’s likelihood of reporting they feel safe walking alone at night.

There is no shortage of proposals aimed at improving the situation. President Joe Biden’s governing plan includes pushing a reform bill, as well as taking “bold action to reduce our prison population, create a more just society, and make our communities safer.”

New technologies may help shape efforts at reform. As our cover story explains (page 30), machine learning can be used to analyze huge masses of data and make predictions relevant to criminal outcomes. It is already being used by many police departments for patrolling and crime solving, and judges are using it to guide their decisions. In theory, it could be an important piece of a more efficient and equitable justice system. But could there be a trade-off, even the germ of another problem?

The answer depends not only on coders, but principally on the key decision makers in cities, states, police departments, and other agencies. They will both select what technologies are used, and create the framework in which they operate. “The biggest gains in public governance that we’ve had in any country come from transparency and accountability, and we simply do not have that” when it comes to public-sector use of artificial intelligence, says Chicago Booth’s Sendhil Mullainathan.

Elsewhere in this issue, we catalog how researchers are analyzing other topics of great concern to policy makers, such as the effects of COVID-19 lockdowns (pages 19 and 28), the $1.6 trillion US student-loan crisis (pages 7 and 66), and bankruptcy reform (page 12). We also highlight research that finds measurable evidence of how political uncertainty in Hong Kong hurt asset prices (page 14). And in a column, Booth’s Jean-Pierre Dubé suggests that a policy at work in Switzerland, of assessing fines on the basis of income, should be more widely adopted (page 49).

As always, please do let us know what you think of this issue, as well as the articles, charts, and videos on our website. Tweet us, comment on our Facebook or LinkedIn pages, or send us an email.
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Constantine Yannelis, assistant professor of finance and an FMC Faculty Scholar, conducts research in finance and applied microeconomics. This issue features some of his most recent work on student loans, which he says became an area of interest when he saw “a dearth of economic analysis grounded in both empiricism and theory.” (Page 7)

Yueran Ma, assistant professor of finance and a Liew Family Junior Faculty Fellow, conducts empirical studies at the intersection of finance and macroeconomics, exploring topics such as the effects of interest rates on financial markets, the macroeconomic implications of debt markets, and the effects of financial frictions. (Page 19)
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Lubos Pastor, the Charles P. McQuaid Professor of Finance and the Robert King Steel Faculty Fellow, is a director of Booth’s Center for Research in Security Prices, and a member of the Bank Board of the National Bank of Slovakia. He has written on a broad range of topics including sustainable investing, income inequality, populism, and many other aspects of financial markets and asset management. (Pages 18, 27, and 42)

Jean-Pierre Dubé, the Sigmund E. Edelstone Professor of Marketing and a Charles E. Merrill Faculty Scholar, directs Booth’s Kilts Center for Marketing, is a faculty research fellow at the National Bureau of Economic Research and is an academic trustee at the Marketing Science Institute. He has published numerous papers on quantitative marketing and empirical industrial organization. (Page 49)
FEEDBACK

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SO MUCH FOR THE FACTS, WHERE’S THE THEORY?

The downfall (and possible salvation) of expertise (Winter 2020/21)

[Lars Peter] Hansen points to a major problem. Everyone wants to speak on the basis of facts, at least in appearance. But the facts have no language. The reality must be examined with the help of a theoretical framework or on the basis of models.

—@mrjahan49

To understand the world, it is not enough to look at data on a graph or run a regression. You need a theory (model) to know what data to look at to answer a question and how to interpret regressions and other statistical methods.

—@andyneumeyer

Experts have their limits, but more and broader inputs can help.

—@brandongiella

The mistrust comes from the far right in every country. . .

—Chris Lir Hawley

I think these corrupt bureaucrats need to come up with a better word than science. Like a lawyer shopping for an expert witness, they too can pay scientists to validate their agendas.

—Kelly Nelson Metke

LISTEN TO BLACK PEOPLE; DON’T JUST READ THEIR TWEETS

How should companies respond to Black Lives Matter? (Winter 2020/21)

If companies and institutions historically were more open minded to collecting and listening to the experiences and perspectives of minorities (including underrepresented minorities), we might not need to analyze social media channels for sentiment. Since openly discussing the challenges and issues minorities face is on paper accepted but in reality frowned upon, I guess Twitter is the next best source. And keep in mind, Black experiences are extremely diverse, far more so than television portrays.

—Lawrence W. Flack

DON’T DILUTE DIVERSITY

What actually helps women at work (Winter 2020/21)

I agree with Marianne Bertrand that including African Americans in the mainstream of our social and economic fabric is a special intractable issue. My observation is, though, that by bringing the legitimate disaffections of all groups together under the umbrella of diversity, we generalize, as both individual Americans and as the business community, become lax about fixing this big issue. We all must do more to focus on meeting this single great challenge.

—Andrew Jacknain
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Canceling all student debt mostly helps high earners

Tying repayments to income could provide more-targeted relief for US borrowers

During this year’s Democratic presidential primaries, numerous candidates championed the idea of forgiving some or all of the student debt held by the federal government. Massachusetts senator Elizabeth Warren proposed canceling up to $50,000 in debt for nearly all borrowers, and Vermont senator Bernie Sanders advocated wiping away all student debt. Now that President Joe Biden, who has endorsed some measure of debt forgiveness, has taken office, the notion of canceling student debt has only gained momentum.

But who benefits from such forgiveness would depend largely on how it’s structured. Some policy approaches could chiefly benefit the highest earners, suggests research by University of Pennsylvania’s Sylvain Catherine and Chicago Booth’s Constantine Yannelis.

In the United States, about 43 million borrowers collectively owe nearly $1.6 trillion in outstanding federal student debt, according to the Department of Education’s office of Federal Student Aid. That balance has more than tripled since 2007, while the number of borrowers has only increased by about 50 percent.
There are a number of ways policymakers could go about relieving some of this burden, and Catherine and Yannelis focus on three broad approaches to debt cancellation: universal forgiveness (canceling all student debt for everyone), capped forgiveness (canceling up to $10,000 or $50,000 of every borrower’s student debt), and targeted forgiveness (wherein borrowers’ relief is tied to their income). Using data from the Federal Reserve Board of Governors’ 2019 Survey of Consumer Finances, the researchers examine how student debt is distributed throughout the income spectrum, and how that would define the beneficiaries of various debt-relief plans.

They find that under universal student-debt forgiveness, the average person in the top decile of the earnings distribution would receive more than five times as much relief as the average person in the bottom decile, and almost half of all relief would go to people in the top 30 percent of the distribution. “Patterns are similar under policies forgiving debt up to $10,000 or $50,000,” they write, “with higher-income households seeing significantly more loan forgiveness.”

There are two primary reasons why those who are better off would benefit most, Catherine and Yannelis explain. First, as prior analyses have demonstrated, loan balances are correlated with income. Broadly speaking, before surgeons, lawyers, and executives embark on their lucrative careers, they tend to amass large amounts of debt from advanced-degree programs. But just looking at balances understates the degree to which the benefits of student-debt forgiveness would pool at the top of the income distribution, the researchers say.

Canceling student-loan debt could exacerbate US economic inequality

While the highest-income groups have about twice the student debt as the lowest-income groups, research finds that across-the-board loan forgiveness would disproportionately benefit the rich, saving them well more than twice as much money.

Note: Per capita dollar amounts and income deciles are calculated for the full population, not just those with student loans. Catherine and Yannelis, 2020

Benefit imbalance: While the bottom group had $3,028 in loans, the researchers find that only $1,085 was going to be repaid over time, thanks to existing loan-forgiveness programs.
the income distribution relative to
the top.”

Catherine and Yannelis find
that targeted forgiveness policies
known as income-driven repayment
programs are much more effective at
concentrating debt relief toward the
bottom and middle of the income
distribution. IDRs, as the name
suggests, tie monthly loan payments
to borrowers’ income: under typical
terms, an IDR participant might
pay 10 percent of whatever income
she has that falls above 150 percent
of the poverty line. After a certain
number of years—20 or 25, depend-
ing on the plan—her remaining
balance is forgiven.

Enrolling all borrowers in an IDR
program would result in the bottom
earnings decile receiving four times
as much forgiveness (in terms of
dollars forgiven) as those in the top
decile, the researchers calculate,
with 69 percent of benefits going
to borrowers in the third through
seventh deciles. Increasing the
threshold below which individuals
don’t pay any of their income—to
300 percent of the poverty line, up
from 150 percent—would produce
similar distributional results, but
with more relief going to middle-
income borrowers.

The analysis also suggests that
IDR-based forgiveness would have a
smaller fiscal impact than universal
or capped forgiveness. Enrolling
all borrowers in an IDR program
with a 300 percent threshold would
entail slightly less forgiveness—as
measured by present values—as
a $10,000-capped policy, and far
less than a $50,000-capped plan. But
under that same IDR policy, the bottom
60 percent of the income distribution
would receive more forgiveness
than with a $10,000-capped policy, and
the bottom 30 percent would
see more forgiveness than with a
$50,000-capped policy.

Calls for debt relief are likely
to continue. But Yannelis says that the
policy discussion about student-debt
forgiveness often misses the “simple
point that we’re not really forgiving
debt. We’re simply transferring debt
from student borrowers to taxpayers,
which makes it important to think
about the distributional effects of this
transfer.”—Jeff Cockrell

GOVERNMENT POLICY CREATED
THE STUDENT-LOAN CRISIS

IN THE PAST couple of
decades, student-loan debt in
the United States ballooned to
$1.5 trillion. It is now the larg-
est nonmortgage source of
US household debt, ahead of
credit-card or auto-loan debt.
The average student-loan
debt is $35,000. And those
loans have the highest default
rate of any form of household
debt, according to the Federal
Reserve.

This problem reflects
decades of government
policy, according to
Brookings Institution’s Adam
Looney and Chicago Booth’s
Constantine Yannelis.

The researchers tapped into
three decades of data from the
US Department of the Treasury
and the National Student Loan
Data System, assembling a
data set representing almost
12,000 institutions in the
US that were eligible for
student-loan programs

To access most student
loans, students have to be en-
rolled in qualified educational
institutions. Federal policy
has alternately expanded
and contracted institutional
eligibility, contributing to the
current student-loan situa-
tion, the analysis suggests.

In the 1980s and 2000s,
education policy increased
eligibility for loan programs
and raised borrowing limits
for older students. This drove
a surge in new institutions,
especially for-profit schools,
the researchers argue. About
85 percent of the increase
in student-loan defaults
between 1980 and 1990
was driven by new schools
entering loan programs, the
researchers find.

Then a change in federal
policy imposing restrictions
on high-default schools in
1992 led a significant number
of these institutions to leave
the student-loan programs.
This tightening of credit
accounted for as much as 95
percent of the subsequent
decrease in loan defaults, the
researchers estimate.

“Between 1981 and 1992,
credit gets expanded and
then tightened, leading
to a high exit rate among
for-profit institutions from
loan programs,” Yannelis says.
“After 1992, the cycle repeats,
however, with credit access
loosening up again as pre-
1992 reforms get rolled back.”

By 2011, he says, borrowers at
these high-default, for-profit
schools accounted for almost
half of all student-loan
defaults in the US.

For-profit schools typically
market themselves to non-
traditional students, offering
to- four-year degree
programs, or diplomas in
fields such as health adminis-
tration, culinary arts, or beauty
treatments. The students they
attract tend to be people over
the age of 25, often without
a high-school degree, from
minority backgrounds. They’re
more likely to be women or
single parents with families or
a job to balance.

These borrowers face two
problems after enrollment
that increase their risk of
default, Yannelis says. First,
they’re saddled with more
debt. Secondly, they have a
harder time finding a job once
the loans need to be repaid.

Virtually all the peaks in
student-loan defaults are
driven by changes in federal
policy that expand access
to the high-risk, for-profit
institutions, the researchers
argue. Addressing this means
working through the complex
trade-off between enabling
access to credit—and edu-
cational opportunities—and
attenuating default risks for
borrowers and taxpayers
alike.—Aïne Doris

Sylvain Catherine and Constantine Yannelis, “The Distributional

Adam Looney and Constantine Yannelis,
“The Consequences of Student Loan Credit
Expansions: Evidence from Three Decades of
Inventors are eyeing your home office

Within weeks of the first pandemic-related US lockdowns in early 2020, the number of patent applications referencing work-from-home technology surged.

Patent filers see promise in a remote-work economy

Working from home will outlast the pandemic—at least, that’s what US patent applications suggest. The lockdowns triggered by the COVID-19 pandemic set off a significant shift in new patent applications toward technologies that support working remotely, according to Stanford’s Nicholas Bloom, Chicago Booth’s Steven J. Davis, and Booth PhD candidate Yulia Zhestkova.

The researchers parsed the text of US patent applications to spot any trends in innovation related to working from home. Through a review of news articles, they built a dictionary of relevant terms and phrases including telework, video conferencing, telecommuting, flexible workplace, distance work, virtual office, nomadic employee, and working from anywhere. They then created an algorithm to analyze the more than 3.5 million patent applications filed from January 7, 2010, through September 3, 2020.

Share of US patent applications related to advancements in remote work

Bloom et al., 2020
Without Commutes, How Are Americans Spending Their Extra Time?

Due to the COVID-19 pandemic, millions of Americans have swapped commuting for working from home. The WFH phenomenon is saving Americans more than 60 million hours of commuting time a day, according to Mexico Autonomous Institute of Technology’s Jose Maria Barrero, Stanford’s Nicholas Bloom, and Chicago Booth’s Steven J. Davis. “The time savings are approaching 10 billion hours as of mid-September [2020] for American workers alone. The global reduction in time spent commuting is surely many times larger,” they write.

So what are people doing with the 54 minutes a day, on average, that they’re saving? Devoting 35 percent to more work on their primary jobs and 8 percent to more work on secondary jobs, the researchers suggest. Household chores, childcare, and other work activities at home eat up another 25 percent. The rest of their time savings go to indoor and outdoor leisure activities, including exercise. “The picture, then, is one in which those [who] WFH devote most of their savings in commuting time to non-leisure activities—work for pay, but also chores, home improvement, and childcare,” the researchers write.

They draw their conclusions from three surveys of 10,000 Americans between the ages of 20 and 64 who earned at least $20,000 in 2019. The researchers took the soundings in May, July, and August 2020, and reweighted the sampling to match the Census Bureau’s Current Population Survey data by state, industry, and earnings.

Thirty-seven percent of respondents said they worked from home, almost 35 percent still went to business premises, and the rest were not working at all. The researchers’ estimates of time savings apply just to those who were actually working from home.

Those without children were far more likely to devote newly freed-up time to leisure activities such as reading, watching TV, and being outdoors. The researchers find that those with children devoted 18 percent of their time savings to their kids.

Analyzing the survey responses, Barrero, Bloom, and Davis find that employees who are able to work from home tend to be in jobs that require more education and pay higher wages. People who are saving the most time by not commuting during the pandemic tend be those who were doing well before the pandemic.

They also find no large differences on the basis of gender or race, but they do observe that workers with less education are likely to devote more extra time to work. Those with a high-school diploma or less poured 32 percent of time savings into their primary jobs and an additional 15 percent into a second job, the researchers find. That’s almost twice as much as among people with more education, according to the research.

The surveys turned up one anomaly. Those working from home reported an average of 32 hours a week on the job, compared with 36.4 hours before the pandemic. The researchers suggest respondents were considering how they used their former specific commuting time slot without accounting for additional off-hours work.

Go to Review.ChicagoBooth.edu to see citations for research mentioned in this article.
Matthew Notowidigdo: Revisit bankruptcy reform

Professor of Economics

What’s something that you think will or should be a priority for the Biden administration? I’m looking forward to renewing the debate about bankruptcy reform. Right now the focus is on student loans, which to my knowledge are the only debt that can’t be discharged in bankruptcy. But [Massachusetts] senator Elizabeth Warren, toward the end of her presidential campaign, produced a detailed policy brief about how she would reform the bankruptcy system, and that is a template for what I imagine the progressive wing of the Democratic party would view as a starting point.

Warren, who was then a Harvard law professor, and President Biden, then a senator from Delaware, were on opposite sides of the 2005 Bankruptcy Abuse Prevention and Consumer Protection Act, which made it harder to file for bankruptcy. Filing used to be a rare occurrence, but in the 1980s and ’90s, bankruptcy rates started to take off. Around the early 2000s, about 1 percent of households every year were filing, plus there were a couple of high-profile examples of abuse. Policy makers started to feel like the system was being used by people who didn’t need it, and their concern was that the bankruptcy rate was spiraling out of control. The bill made it costlier, more
of an ordeal, and less financially beneficial to file for bankruptcy.

Biden supported it. Warren was a critic of it, and its passage inspired her to run for senate. My research with Boston University’s Tal Gross, Harvard’s Ray Kluender, the Consumer Financial Protection Bureau’s Feng Liu, and University of Illinois’s Jialan Wang examines what bankruptcy reform actually did—and who was right about the BAPCPA.

In different ways, both of them were: Biden was right in that consumers benefited. Some of the cost savings got passed along as lower credit-card interest rates and lower borrowing costs. But Warren was right in that the law was titled abuse prevention, and it’s hard to prevent abuse.

Our research suggests that reductions in filings have happened across the board, and even people who have had some adverse event such as an illness or injury have had a much harder time filing for bankruptcy. It is unfortunate that the BAPCPA passed in 2005, and just a few years later we had a financial crisis. Many people affected by the crisis ended up facing insolvency and foreclosure. But even now, many people whom we would expect to file for bankruptcy don’t, and they aren’t able to get a fresh start.

I don’t think that’s what the proponents intended. The administration should start there and roll back parts of the law so that people can get back on their feet after they experience adverse shocks. Now a lot of people suffering from illness, injury, or divorce aren’t able to repay their debts.

The idea of targeting people who are abusing the system is a good one. It’s just a hard problem to solve. Using income as a basis to determine who can file didn’t work well. Maybe, 15 years after that initial stab at it, we can find other ways of looking at this.

FOR BETTER OUTPUT, TURN DOWN THE VOLUME

MANY PEOPLE working from home have become perhaps acutely aware of noise in and around their environments—and in many places in the world, such noise is increasing. In India, for example, the number of cars per capita tripled between 2001 and 2015. Not only has engine noise risen accordingly but drivers are purchasing custom-built car horns to cut through the din.

The European Union has taken steps to restrict noise pollution. There may be a compelling economic incentive for doing so: increased productivity.

To better understand how noise affects productivity and cognitive function, Chicago Booth’s Joshua Dean conducted two randomized experiments in Kenya. In one, he selected 128 people to participate in a 10-day sewing course outside Nairobi, recruiting day laborers who were waiting for work at the gates of local textile factories.

Sewing can be done independently and doesn’t require people to communicate with each other. Yet Dean wondered if noise could still disrupt key tasks that require strong cognitive functions, such as sewing in a straight line or moving fabric through a machine with both hands.

While participants sewed pockets, Dean randomly exposed them to noise. The study participants were assigned a randomly generated schedule that had them working sometimes in a quiet room and other times near a car engine that was otherwise used for auto-mechanic training classes. Dean manipulated the level of noise exposure, staying well below the amount that would cause hearing loss.

Participants working in the noisy room sewed 3 percent fewer pockets compared with those stationed in the quieter setting, he finds. Productivity declined 5 percent for every 10-deci-bel increase in (or perceived doubling of) noise. In a second experiment, involving a similar group of participants, Dean confirms that the noise specifically affected tasks that involve cognitive function.

Workers don’t fully understand how noisy environments affect them, the research demonstrates. Participants were willing to give up only a small fraction of their pay for a quieter, more productive environment. If workers don’t understand how much noise is costing them, it seems unlikely they’ll take steps to mitigate its effects.

If people are unable or unwilling to take such steps, there may be unnecessary economic costs, Dean warns. A growing academic literature argues that various things associated with poverty—such as the amount of sleep people get, the temperatures to which they’re exposed, and the amount they worry about money—can impair task-management skills. If people prove to be as unaware of these threats to their productivity as they are of the harm from noise, the unnecessary costs could be significant, according to Dean.

“Future research,” he writes, “should provide estimates of these costs and how policies can be designed that account for these cognitive constraints.”

—Meena Thiruvengadam

Political uncertainty hurt Hong Kong property values

Investors widely believe that political and social unrest, including the threat of revolution, drives down asset values. Because so many interrelated economic and social factors are always at play, isolating the influence of political uncertainty on asset prices can be difficult.

Hong Kong, however, provides a laboratory for doing so. Chicago Booth’s Zhiguo He, Booth postdoctoral scholar Zhenping Wang, Chinese University of Hong Kong’s Maggie Hu, and Georgia State University’s Vincent Yao, by comparing property valuations before and after the political authority is set to change in 2047, find that rising uncertainty in Hong Kong has significantly lowered property values.

Uncertainty is a feature of life in Hong Kong now because, as the researchers explain, the region, “caught in the middle of the conflict between China and the western world, has become a political battleground for the fate of the unprecedented political experiment ‘One Country, Two Systems,’ especially since its ongoing 2019-20 social unrest.” In 1997, the United Kingdom transferred the former colony back to China, and both governments agreed to temporarily make Hong Kong a special administrative region that would maintain a capitalist system. That agreement expires on June 30, 2047, when the Hong Kong Special Administrative Region (HKSAR) will cease to exist, and Beijing will have authority.

The researchers seized upon this predetermined transition date to calculate the effects of political uncertainty on long-term asset values, residential properties in this case, which lend themselves to a natural experiment. In Hong Kong, land tenure is granted by the government for a fixed term. As a result, residential property owners will need to apply for extensions when their leases end. Currently the government provides a 50-year lease extension with no additional charge.

What’s more, the leases that have been granted by one government, say the British colonial government or the HKSAR, can be renewed by another, such as the government that takes over in 2047. This exposes many lessees to substantial political risk—namely, will current leases that expire after 2047 be extended at no additional cost, as has been the case?

He, Hu, Wang, and Yao tracked housing values from January 1998 through February 2020, a period of increasing political tensions, and built a model for property values on the basis of the 2047 transition date. In Hong Kong, the colonial government owned all of the land, leasing out the rights to use it under long-term contracts, a practice that the special administrative region continued. The researchers used as a control group land leases that expire the day before the current political system is set to end, and they measured whether those properties traded at a premium compared with real estate that had later expirations.

“We exploit a unique feature in Hong Kong’s housing market: Land leases expiring on June 30, 2047, have been promised a 50-year extension protection, while those expiring immediately after that date are left unprotected legally,” the researchers write. When it comes to leases that expire after the transition to mainland law—say in 2050 or 2055—the government may extend those leases under the current terms, change the terms, or not extend them at all.

By tracking real-estate transactions, the researchers demonstrate that housing with land leases that expire immediately after June 30, 2047, sold at an 8 percent discount compared with properties belonging to the control group, whose leases are guaranteed to be extended until 2097. They also find that properties that still have land leases granted by the British colonial government sold at a further discount of about 8.5 percent compared with similar leases granted by the successor Hong Kong government. Moreover, the discounts appear to have widened since 2004, as confidence in Hong Kong’s future as an autonomous region has declined.

Recent demonstrations and controversial moves by the mainland government might further lower housing values, as Hong Kong’s political and social future is top of mind for residents. The researchers’ data, running through February 2020, don’t include the effects of Beijing’s imposition of a national security law in June 2020 that expanded government powers and limited civil rights.

“Political uncertainty regarding the fate of Hong Kong has been lingering throughout society” for decades, the researchers write. “But its severity and gravity have been evolving over time and often manifest more significantly when public sentiment rises.”

Hong Kong’s near- and long-term future will tell a social and human-rights story that will resonate worldwide. For now, they also provide a rare glimpse into how political unrest can interact with asset valuations. And the finding that uncertainty has a measurable cost on asset prices may apply more broadly as social unrest and ideological divisions intensify in many parts of the world.”

Home buyers hedged against Beijing’s takeover

Buyers paid more for Hong Kong homes whose land leases will become eligible for a 50-year extension before Beijing assumes control of the region in 2047.

Home sale prices

Index: 100 = price levels in 2004

COVID-19 stimulus checks spurred debt payment and saving

When the US Congress rushed through the $2 trillion Coronavirus Aid, Relief, and Economic Security (CARES) Act in March 2020, they were trying to stave off the potentially devastating economic consequences of COVID-19 shutdowns. They hoped that issuing Treasury checks would help people with immediate needs, such as food, but also spur spending by businesses and individuals.

But the stimulative boost was likely less than intended, according to University of Texas’s Yuriy Gorodnichenko, and Chicago Booth’s Michael Weber, who find that the vast majority of Americans saved the bulk of their checks or used the money to pay down debt. Only 40 percent of the money went toward purchases, and most in industries that needed the least help.

However, the research also finds that the stimulus payments helped some people without jobs search harder for work.

The researchers base their findings on an analysis of a detailed, 16-question national survey in July 2020 of 12,000 participants in the Nielsen Homescan panel, a long-running representative sampling of consumers who track their daily purchases.

Their study reveals that only one in seven Americans—or just under 15 percent—reported spending or planning to spend most or all of their government checks. Half said they were using them to pay off debt, and 33 percent put the money into savings.

When people spent or planned to spend the funds, it was in sectors that least needed additional support, such as food or personal-care products. By summer 2020, these industries had already experienced fillips from Americans stocking up in response to lockdowns. The stimulus checks did little to prompt people to buy bigger-ticket items such as cars or appliances or to book flights or hotels.

The proportion of spenders to savers and debt payers was roughly consistent with past stimulus efforts, the researchers find. For example, with the 2001 tax rebates, between a fifth and a quarter of Americans said they mostly spent the money, according to a study by University of Michigan’s Matthew D. Shapiro and Joel Slemrod. In research on the 2008 tax rebates, Claudia Sahm, formerly at the Federal Reserve, along with Shapiro and Slemrod, also finds that only a fifth of survey respondents said they spent the funds.

The July 2020 survey revealed Americans planned to spend an average of 40 percent of their relief checks—lower than the 50-90 percent of the 2008 tax rebates. At the same time, there were stark differences among households, the researchers report.

“Many spent their entire stimulus payment, and just as many saved their entire check or used it to pay off debt,” they write. Men and Hispanics were more likely than the average respondent to spend. Black respondents were more likely to pay off debt. That was also true of liquidity-constrained respondents, defined as people who said they would struggle to cover an unexpected bill equal to one month of their after-tax salary. People whose earnings fell because of COVID-19 tended to use more of their checks on spending.

Gorodnichenko, Weber also investigated how the checks might affect the labor market. They find that 20 percent of people out of work reported that the check led them to search harder for a job.

Part of the argument against another relief act has been that giving people money deters them from looking for work. However, “contrary to demotivating this group, the checks might have meant they now had money for babysitters or transportation, the sort of things you might need in order to find a job,” Weber says.

As for the checks’ limited success in spurring spending, the relief measures were up against a big challenge in the form of lockdowns, which damped the ability to, say, dine out or the desire to book a holiday package. But uncertainty related to the pandemic may have also played a role—as might have the mechanism of one-off payments itself.

There may be a limit, the researchers write, “on how much stimulus can be generated through direct transfers to households. In the face of large crises, government may want to consider a broad range of policies targeting aggregate demand.”—Rose Jacobs

Go to Review.ChicagoBooth.edu to see citations for research mentioned in this article.

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How to spot an overconfident CEO

Business leaders need to be confident in their decisions, but having too much confidence can lead them to make poor decisions, such as ill-timed investments and ill-fated corporate mergers. So being able to sniff out an overconfident CEO could save investors some pain.

One common, albeit indirect, bellwether of overconfidence is the tendency to hold deep “in-the-money” stock options rather than exercise them and pocket the gain, research suggests. So-called longholder CEOs—who hold options that are at least 40 percent in the money—tend to have personality traits associated with overconfidence and lesser managerial ability, observe Chicago Booth’s Steve Kaplan and Anastasia A. Zakolyukina and Dartmouth’s Morten Sørensen.

Executive stock options generally offer the right but not the obligation to buy shares at a defined price by a certain date. An option is “in the money” when the current stock price is greater than an option’s exercise price. From that point until the contract’s expiration date, the option can be exercised and converted to cash, allowing the holder to pocket the difference between the market price and the exercise price.

In theory, risk-averse CEOs looking to diversify their portfolios would exercise in-the-money options well before their expiration date, while more-confident CEOs might hold their options nearly to expiration, believing the shares will rise further. But confidence isn’t the only reason to hold an in-the-money option; tax considerations, board rules, and other variables come into play.

To confirm a connection between overconfidence and longholding behavior, the researchers analyzed personality assessments of more than 2,600 aspiring CEO candidates, drawn from four-hour interviews performed by ghSMART, a management consulting company, between 2001 and 2012. The
assessments rated each candidate on 30 specific personality traits and abilities. Of the 67 candidates who later became CEOs of public companies, 58 were not longholders and nine were longholders, allowing the researchers to compare the personalities of both groups.

Longholders tended to score lower than nonlongholders in a number of areas—from analytical ability and organizational skills to acceptance of feedback and calmness under pressure. Many of those characteristics are typically associated with overconfidence, according to various psychology studies, the researchers note.

Those traits also tend to move in sync and, taken together, paint a useful picture of a CEO’s “general ability,” argue Kaplan, Sørensen, and Zakolyukina. Using a regression analysis, the researchers find that longholding is “significantly negatively related” to overall ability—implying that longholders tend to be not only overconfident, but also less talented than nonlongholders. “Combined, then, our findings are consistent with overconfidence being associated with lower general ability,” they write.

The researchers also fleshed out the connection between overconfidence and managerial talent by looking at patterns in earnings forecasts. Using a sample of 31 CEOs of public companies who provided a total of 216 quarterly forecasts, they find that rosier predictions (relative to actual earnings figures) were correlated with lower ability, further suggesting overconfident CEOs are less talented than those who aren’t.

Finally, the researchers studied the link between short-term operating performance and corporate investment decisions. Longholder CEOs are more likely to boost capital expenditures when cash flows are strong and pull back harder when they’re weak, Kaplan, Sørensen, and Zakolyukina suggest.

“We confirm that investments by firms with longholder CEOs are significantly more sensitive to cashflows,” the researchers write. “Moreover, we find investments by firms with less talented CEOs are also significantly more sensitive to cash flows.”

—Brett Nelson

**WHY AUDITORS HIRE GRADUATES OF LOCAL COLLEGES**

**PEDIGREE** degrees are great, but so is hiring locally. The Big Four audit firms often hire graduates from feeder schools that are nearby, according to research by University of Melbourne’s Gladys Lee and Vic Naiker and Chicago Booth’s Christopher Stewart. They also find that offices close to universities produce higher-quality work.

Finding and hiring talented auditors is a priority for accounting firms in the United States, where some research has suggested that many certified public accountants leave the profession after just their first few years. And when it comes to recruiting, the Big Four accounting enterprises apparently focus on colleges close to their offices.

The researchers obtained a US campus map for PwC, which shows that the firm has recruiters stationed at 256 colleges, or 6 percent of all US universities. All these generally have recognized, well-ranked accounting programs. More than two-thirds of Big Four recruits came from these same 256 feeders, and 22 percent more came from accredited business programs, the researchers find.

Using LinkedIn, Lee, Naiker, and Stewart tracked almost 12,000 people who graduated from the feeder colleges in 2016. Almost half who were recruited by the Big Four went to offices within 60 miles.

There’s a practical reason for hiring locally: in the US, accounting requires state licensing. Big Four companies generally want graduates to sit for state exams soon after joining, and local graduates are better prepared to do so.

But the research also identifies a measurable advantage: local recruits are associated with higher-quality audits. Using 2000–16 data from Audit Analytics and Compustat databases, the researchers find that around 17 percent of their observations involved client misstatements, and having a feeder school within 60 miles reduced the likelihood of a misstatement by 9 percent.

Local hires may also be less likely to leave, which could reduce significant turnover costs. While the researchers didn’t have data to study turnover, it can be hard to acculturate to a new city or to be far from friends and family, Stewart conjectures. And when offices are near colleges, there are more opportunities—through networking and recruiting events and the like—for a firm to meet and assess graduates.

Granted, in the COVID-19 era, many such events have been canceled, and interviews are often conducted online rather than in person—meaning local graduates may not have the same leg up. Stewart predicts that when candidate searches are done via Zoom, hiring managers may revert to pedigree to distinguish between candidates. “I wonder if turnover will be higher,” he adds, noting that because applicants come across differently in person than they do online, new hires may fail to meet managers’ expectations.

—Emily Lambert


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Active-fund managers didn’t shine during the COVID-19 crisis

Market volatility is supposed to give sophisticated, active traders an edge over passive investors—an opportunity to shine and prove that active managers are worth the fees they charge. But that’s not how things panned out during the COVID-19 crisis, according to Chicago Booth’s Lubos Pastor and Booth PhD student M. Blair Vorsatz. The researchers document crisis-period underperformance, which creates an additional headwind for the active-management industry.

Many active managers have been struggling to justify their services. Low-cost index investing has been gaining ground for years, and in August 2019, passively managed assets hit $4.27 trillion, edging out actively managed assets for the first time.

One explanation for the continued prevalence of active management is that while active funds underperform passive funds on average, this average underperformance is tolerated because active funds do better in bear markets, when investors value better performance the most.

However, this explanation does not hold up for the COVID-19 crisis. Pastor and Vorsatz analyzed daily returns from 3,626 equity funds between February 20 and April 30—a tumultuous 10 weeks when the S&P 500 index collapsed by a third before gaining nearly all of it back. The researchers find that, net of management fees, a broad index isn’t a suitable gauge for performance during the COVID-19 crisis but also benchmark indexes with comparable holdings.

Three-quarters of active-fund managers underperformed the S&P 500, with average underperformance of 5.6 percent during the period, or 29 percent on an annualized basis, the researchers find. The broad index isn’t a suitable gauge for every fund, but active funds also trailed a variety of better-tailored benchmarks, though by smaller margins.

Depending on which valuation model they chose, the researchers find that between 60 percent and 80 percent of active managers lost money on a risk-adjusted basis relative to their passive benchmarks. “Regardless of how we look at the data, we see active funds underperforming during the crisis,” write Pastor and Vorsatz.

While active funds underperformed on average, some fared better than others—specifically those with higher sustainability scores and performance ratings, both measured by Morningstar. Sustainable investing looks beyond raw financial returns by including environmental, social, and corporate governance (ESG) factors in the security-selection process. Morningstar assigns each fund a sustainability score, measured in “globes,” with more globes denoting greater sustainability. Funds with more globes generated higher benchmark-adjusted returns than those with fewer globes, the researchers find. In particular, four- and five-globe funds had a 14 percent better average annualized benchmark-adjusted return than similarly styled funds with fewer globes. (For more, see “When green investments pay off,” page 42.)

Morningstar’s performance ratings—scored in stars, not globes—were another harbinger of returns. “It is not clear a priori why Morningstar’s star ratings, which are computed before the crisis from historical risk-adjusted returns, should have such strong predictive power for fund performance during the crisis,” the researchers observe.

Nevertheless, they demonstrate that each extra star corresponded to a higher crisis-period annualized benchmark-adjusted return of nearly 6 percent—meaning that a five-star fund outpaced a one-star fund with the same investment style by 23 percent a year.

Globes and stars were also reliable predictors of changes in funds’ assets under management. One-globe funds shed 2.6 percent of their assets as customers withdrew funds, while five-globe funds suffered no net leakage, the researchers find.

“A popular perspective in traditional neoclassical economics is that sustainability issues, such as environmental quality, are ‘luxury goods’ that are likely to be of concern only to those whose more basic needs for food, housing, and survival are adequately met,” the researchers write. “That investors retain their focus on sustainability during a major crisis indicates that they view sustainability as a necessity, not a luxury.” As usual, funds with more stars also attracted more assets on the whole than those with fewer stars.

If most pricey money managers don’t add value, even in a crisis, why are so many still in business? One reason, the researchers suggest, is that investors believe active managers “face decreasing returns to scale”—that is, as funds underperform, they shed assets, which in turn improves their future performance. Whether active funds’ performance improves after the COVID-19 crisis remains to be seen.—Brett Nelson

Little safety as pandemic assailed the markets

Active-fund managers underperformed not only the S&P 500 over the early months of the COVID-19 crisis but also benchmark indexes with comparable holdings.

Actively managed funds’ performance compared with benchmark indexes assigned by Morningstar

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<th>March</th>
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Cumulative percentage difference for the average fund from February 19, 2020

1.5% below benchmark by the end of April

Pastor and Vorsatz, 2020

Local lockdowns may help contain COVID-19

Local lockdowns offer a promising solution in the effort to contain the virus that causes COVID-19, suggests research by Nottingham University’s John Gathergood and Chicago Booth PhD candidate Benedict Guttmann-Kenney, which finds that local lockdowns are less damaging to the economy than uniform national shutdowns.

In March 2020, after the pandemic struck, UK prime minister Boris Johnson ordered a lockdown for England, which shut shops, restaurants, and pubs and limited travel except for essential work and grocery runs. By contrast, local lockdowns, implemented later, after the national lockdown had been lifted, aimed to restrict personal interactions without hampering overall commerce—for example, by keeping restaurants open but having patrons dine outside and only in small groups. Each household had to keep to itself as well.

“You couldn’t invite your neighbor ’round for tea,” says Guttman-Kenney.

Unlike the initial national lockdown, local lockdowns—also orchestrated by the national government—went into effect in different places and at different times, depending on the rise in cases. By September, about one in four people in the United Kingdom was subject to a local lockdown, according to the researchers, who find that these lockdowns slowed the spread of the virus while allowing the economy to chug along.

“We do not find large spending declines in response to these local lockdowns,” the researchers write. “Instead, we find little (if any) decline in local spending—and any declines appear to be temporary.”

The researchers combined COVID-19 case reports with spending figures provided by Fable Data, an information provider that records hundreds of millions of credit-card transactions and checking-account flows. Those data—tracked by postal code and available in real time—are highly correlated with official aggregated statistics published months later, and the faster availability of useful information gives policy makers valuable time to make adjustments.

One caveat to relying on local lockdowns is the need for a better-coordinated national testing effort to isolate new cases and mitigate any spread.—Brett Nelson

DON’T KILL A COMPANY TO COLLECT A DEBT

THERE’S A SIZABLE gap between what a company is worth in liquidation and what it’s worth while still operating, according to University of California at Berkeley’s Amir Kermani and Chicago Booth’s Yueran Ma. Companies going through Chapter 11 restructuring are worth about twice as much when they are going concerns rather than liquidated, they write.

The finding is part of a larger study of corporate debt, in which Kermani and Ma examine the size and composition of the debt loads held by nonfinancial companies. They distinguish between asset-based debt (issued against discrete assets) and cash flow–based debt (issued against the operating value of a company). In doing so, they explore companies’ cash-flow and asset values—essentially, how much more a company might be worth alive rather than dead.

It took the researchers more than a year to amass the data needed to answer the question. They hand-collected information from 387 public, nonfinancial companies that filed for Chapter 11 restructuring between 2000 and 2016, plus pulled from other databases including Compustat.

Assessing the value of assets took quite a bit of effort, Ma says. She and Kermani were able to find comprehensive appraisals that were disclosed in court cases. They also performed extensive checks using data from other sources.

Nonfinancial companies’ assets may fetch little value on a stand-alone basis if liquidated, they conclude. Some specialized equipment—for example, a machine used to manufacture pharmaceuticals—might not have much of a market outside of that industry and can’t be easily repurposed. Even if there is a willing buyer, moving the equipment can be costly and eat up value. Some assets, such as restaurant inventory, may also have short shelf lives and depreciate quickly.

The researchers estimate that, on average, the combined liquidation value of fixed assets, inventory, and receivables is 23 percent of the total book value of a nonfinancial company—or 44 percent if cash holdings are included. Either way, it’s far less than 81 percent, which is the average amount recovered in Chapter 11 for going concerns.

The gap varies across industries. Companies’ liquidation values are higher in industries such as transportation, wholesale/retail, and hotels than they are in most other sectors.

Liquidation values tend to be much lower in other industries because not only may some companies’ assets be immobile and specialized, but those companies may benefit from organizational capital, such as employees’ ability to innovate, that would be lost in liquidation.

To realize the full value of a company that continues operating, creditors need to understand the business and be able to oversee it effectively and possibly discipline its managers, the researchers argue. To some extent, this can happen with financial covenants that give creditors the right to intervene in business decisions, often depending on company performance.

“For most industries, there’s a substantial loss to killing a firm,” says Ma. “That’s not to say it makes sense to keep all distressed companies alive if they have no hope of turning a profit. But in most cases, there is substantial value to doing so.”—Emily Lambert


SHARING EXPERIENCES, EVEN FROM AFAR, CAN BRING PEOPLE CLOSER

As social creatures, people tend to want to experience good times—and get through the tough times—in the presence of others. But we also prefer to experience separate events, good or bad, at the same time, suggesting University of California at Los Angeles' Franklin Shaddy and University of Florida's Yanping Tu, both recent graduates of the Chicago Booth PhD Program, and Booth's Ayelet Fishbach. For example, knowing that your friend is having a root canal on the same day as you may make it feel like a shared experience—and make it a little easier to handle.

In one study, the researchers arranged for participants, all UCLA students, to receive a personalized video message from a local celebrity, the school's men's basketball coach. Each participant then had to choose a friend to receive a similar message, and decide whether the message should be sent on the same day or a different day. Almost all participants, 88 percent, wanted the video message sent on the same day.

In another experiment, Shaddy, Tu, and Fishbach asked participants to consider a pair of events, such as winning $50 and $100 in an office lottery. Some participants were asked about winning both awards themselves—would they prefer to win the two prizes on the same day or different days? But others were asked about a situation where they win $50 and their friend wins $100. Again, would they want the wins to occur on the same day or different days?

Participants wanted to experience an event on the same day as a friend—but when it was a matter of experiencing two events on their own, they didn’t care as much whether the events happened on the same day, the researchers find. The same trend was on display when the researchers modified the circumstances, making the monetary amounts larger or smaller and considering both wins and losses. Participants showed a consistent preference for experiencing similar—but-separate events on the same day as other people, but the preference was weaker when they didn’t share the experience.

A desire to connect with other people drives the phenomenon, the researchers indicate. In follow-up experiments, the desire for integration faded when participants were asked to think of a person they disliked. And the wish for integration diminished when events were more emotionally charged, such as when large sums of money were involved.

The COVID-19 pandemic has forced people to physically separate, but this work suggests that many of the same benefits of experiencing events with others in person can manifest even when the events happen at the same time rather than in the same place. For example, in summer 2020, many organized races switched to a virtual format whereby runners started at the same time on the same day (as in previous years) but ran alone, in different locations. A New York Times article explained that these races exploded in popularity because runners could “still feel as if they’re part of a larger group.”

Luckily for those socially distancing, it turns out that doing things at the same time as others can increase social connection, just as doing things in the same place as others does.—Alice G. Walton

How people ‘mentally launder’ unethical income

Numerous experiments have demonstrated that people are more generous with money they’ve earned unethically. For instance, a salesperson who earns a big commission by misleading a client may mentally cordon off that money and be more willing to spend it on others.

But research by Chicago Booth’s Alex Imas, Carnegie Mellon’s George Loewenstein, and Carey K. Morewedge of Boston University finds that there’s a way to avoid this self-imposed penalty: psychologically “launder” the money by obfuscating its source.

Researchers of behavioral finance have spent decades documenting how mental accounting—our propensity to treat money differently depending on things such as where it came from or how we intend to use it—affects decision-making. Mental accounting violates the economic tenet that money is fungible, or perfectly exchangeable: people may treat some of their money more frivolously than the rest of it, for example, if they acquired it easily or by chance. Imas, Loewenstein, and Morewedge’s findings hint at the complicated effects this informal bookkeeping can have, as it can cause people to be generous with dirty money but also to find ways to avoid such generosity.

In a series of experiments, the researchers explored how participants treated ill-gotten gains under various conditions. In one, they set up a game in which some participants were given a monetary incentive to lie to an anonymous and randomly assigned partner. Lying, in these cases, meant maximizing the participants’ own earnings from the experiment but diminishing how much their partners would receive. The researchers then gave all participants the option to donate some of their earnings to charity. The experiment confirmed the finding established in past research that people tend to be more generous with earnings that they have procured unethically.

People tend to be more generous with earnings that they have procured unethically.

Franklin Shaddy, Yanping Tu, and Ayelet Fishbach, “Social Hedonic Editing: People Prefer to Experience Events at the Same Time as Others,” Social Psychological and Personality Science, in press.
Imas, Loewenstein, and Morewedge then took the experiment a step further, entering a subset of participants into a lottery in which they risked their experimental earnings but had a high probability of receiving an identical sum in return. For those whose earnings had come in part through lying, processing the money through this lottery effectively sanitized it: they donated significantly less than those who lied but didn’t play the lottery, and their donation behavior was similar to those who told the truth and then participated in the lottery.

“Internal psychological constraints, such as negative emotions and associations with moral violations, are some of the most effective deterrents to unethical behavior,” says Imas. “Strategies and techniques that eliminate these constraints can potentially make unethical behavior more likely, which is something that institutions and policy makers would want to prevent.”

In further experiments, Imas, Loewenstein, and Morewedge find evidence that mental money laundering also applied to situations in which ethically and unethically earned money was pooled. When “dirty” money mixed with clean, participants tended to treat the entire pool of money as though it were ethically earned. Moreover, people recognize their tendency to treat laundered money differently than unlaundered money, and seek out opportunities to sanitize it, the research suggests.

The study’s findings have implications for both individuals and businesses. “Most people . . . that are engaged in morally questionable activities are also engaged in legal, ethical ventures,” the researchers write. New technologies for payments and budgeting, such as Venmo and Mint, “offer novel opportunities for creatively pooling resources” and “may also provide a tool aiding mental money laundering and encouraging behaviors with social costs.”

Mental money laundering may also be a boon to companies whose practices or products have negative social effects. Such companies—which, prior research has shown, often have to pay workers a wage premium to overcome their qualms about the detrimental nature of their labor—may be able to reduce that premium through “greenwashing,” or putting some portion of their revenue toward a prosocial purpose. Doing so could allow employees to mentally launder the company’s revenue, and their role in generating it, by pooling the company’s harmful impact with its positive works.—Jeff Cockrell and Eric Butterman

How online retailers can fulfill orders better

A mid the pandemic, online retailers face a massive and rapidly expanding problem: their costs have been spiraling as they struggle to fill millions of orders from relatively few warehouses. Some are responding with a warehouse-building spree: Amazon reportedly plans to open 1,000 of them in cities and suburbs across the United States.

But rather than build more warehouses, online retailers should focus on reducing costs by routing orders more cheaply, according to Chicago Booth PhD candidate Yanyang Zhao, Alibaba Group’s Xinshang Wang, and Booth’s Linwei Xin. Their research findings could boost profitability for such companies.

US online retail sales of physical goods in 2019 totaled $365.2 billion, write the researchers, and the cost of filling orders is taking a big bite. Amazon’s shipping and warehouse costs surged to almost 28 percent of net sales in 2019 from less than 16 percent in 2009, they note.

Some of the growing cost reflects the often-complicated calculations faced by online retailers, including Amazon. Should they take more time deciding how to fill orders most efficiently at the cost of slower deliveries? Should they try to factor in demand forecasts? Should they just ship goods out as orders come in, even if they have to eat the higher costs of splitting orders into two or more shipments from multiple warehouses?

E-tailing giants such as Amazon and China’s Alibaba use a two-layer distribution system that involves forward distribution centers and regional distribution centers. FDCs are closer to customers but tend to have lower inventories and carry fewer items. This makes it “notoriously challenging to make effective real-time fulfillment decisions” when an FDC can fill only part of an order right away and the retailer has to determine how to split up the shipments, the researchers write. Amazon’s reported building spree is of smaller warehouses, or FDCs.

Zhao, Wang, and Xin constructed a model assuming multi-item orders, no demand forecasts, and a two-layer RDC-FDC distribution system. Their model also allows orders to be split into two shipments at most, which aligns industry practice. They then conducted a series of numerical experiments using the model to analyze solutions for different situations. They find that companies should go with the least expensive fulfillment option in the moment without considering the impact on future orders, a strategy they call a “myopic policy.”

Consider a hypothetical customer in Maryland who orders two best-selling items used for remote learning amid the pandemic: a Blue Yeti microphone and a Logitech C920s webcam. In a perfect world, the distribution center closest to the customer would carry both items, and the cheapest option would be for the retailer to bundle and ship the products together.

However, it’s possible that the nearby distribution center carries the microphone but not the webcam. Meanwhile, a distribution center in California carries both, but bundling and shipping the items cross-country would be expensive. If it’s cheaper for the retailer to split the order so that the microphone ships from the center in Maryland and the webcam travels from California, the retailer should do that, the research suggests.

For many e-tail scenarios, the model achieved consistent performance results comparable with more-complex algorithms that rely on demand forecasts. The findings may offer a key for keeping large retailers in the black, and helping smaller ones to stay open, Zhao says. That could be especially meaningful for retailers struggling to cope with unreliable demand forecasts.

“How many businesses will survive as just traditional stores?” he asks. “The margins are thin, so it may sadly be efficiency or close your doors.”—Eric Buttermann


DO INVESTORS VIEW STOCKS AS INSURANCE?

ACCORDING to many studies, people treat their investments like insurance policies. Those who want insurance against a tanking economy or the threat of unemployment are willing to pay more for an asset if they think it’s less likely to have bad returns in the future times that coincide with these bad events.

This insurance mindset has been a longstanding tenet of financial models—yet research by University of Illinois’s Alex Chinco, along with Chicago Booth’s Samuel Hartzmark and Abigail Sussman, finds that it’s wrong.

The idea of linking investment decisions to future economic performance dates to the 1970s. University of Chicago’s Robert E. Lucas Jr. presented theories—for which he later won the Nobel Prize for Economic Sciences—that tied investing to fundamental economic risk, the premise being that rational investors treat a portfolio like a hedge against future economic events.

But people haven’t typically talked about investing in terms of hedging economic moves, and neither has the industry, note Chinco, Hartzmark, and Sussman. Mutual-fund prospectuses and news reports often discuss credit risk, market risk, and the risk that interest rates could change—but not broader economic risk.

With this contradiction in mind, the researchers designed a survey to compare investors’ thought processes with financial theory. In a simple experiment, they asked a wide range of investors, including sophisticated finance professionals, how they would invest a hypothetical $1,000 in the market.
Participants typically invested more in stocks when average stock returns were higher, and less when stocks were more volatile, which the researchers took as evidence that investors were considering risk and return. “Their reactions to changes in these two parameters are consistent with textbook logic,” the researchers write. “Participants understand their investment task and respond to some parameters in our experimental setup exactly as expected.”

However, the same textbook logic suggests that participants would notice and care about links between the timing of their investment returns and the economy’s health, which they did not. When asked why they invested the way they did, most participants said that they hadn’t considered the correlation between stock returns and consumption growth. Among those who did report thinking about this, three out of four wanted more stocks when returns were more correlated with consumption growth. Thus, there was more demand for stocks that were worse insurance and were more likely to lose value in a recession. That’s not in line with the theory of investors having an insurance mindset.

“Almost no one seems to pay attention to what academic finance has said is arguably the most important variable,” Hartzmark says.

Even with this fundamental premise of economic models in question, standard asset pricing models remain useful, the researchers write. A model doesn’t need to explain exactly how the world works to still make helpful predictions. Moreover, if investors aren’t using their portfolio as a hedge against a future downturn, it might be a good idea for them to consider.

—Emily Lambert


Why exclusivity works—in marketing and policy making

The idea of exclusivity has long been used to jack up prices on luxury cars, liquors, and fashion, but exactly how much do people value exclusive goods? Enough to pay a premium of 50 percent or more, according to Chicago Booth’s Alex Imas and London School of Economics’ Kristóf Madarász. The reason reflects a deep-seated aspect of human nature: we put greater value on things that other people want but can’t have, just because they can’t have them.

“It isn’t intentional meanness,” Imas says. “The desire to possess something that others want exclusively is an intrinsic part of human nature.”

Related ideas on the human quest for dominance and superiority have been around for centuries in philosophy and religion. Traditional economic models, however, have yet to consider such motives as driving important aspects of both individual behavior and markets. So Imas and Madarász developed a theoretical framework and conducted two experiments involving almost 400 participants to explore the impact and value of exclusion and exclusivity.

The findings could have broad implications not only for marketing products but also for explaining exclusionary policies by businesses and governments. The motive they identify can potentially rationalize political attitudes on redistribution, immigration, and trade.

The researchers argue that the quest for superiority through exclusion, which they call “mimetic dominance-seeking,” may be a fundamental psychological force. Mimetic basically means “imitative” or “reflective”; they argue that a person’s desire for something is a reflection of how much others want it. The dominance-seeking comes from wanting what others can’t have.

For the first experiment, 274 participants took part in an unrelated study for which they were paid $15. The participants were told they could bid as much as $15 in an auction for a custom T-shirt created exclusively for the study. Imas and Madarász split the participants into three groups. In one, a certain number were randomly excluded. In another, they were permitted to bid only if they signaled they wanted the T-shirt. In the third group, anyone could bid.

Average bids in the random-exclusion group were nearly double what they were in the other groups, supporting the theory that the perception of exclusivity—that some people who wanted it couldn’t have it—elevated people’s desire for the T-shirt.

In a second experiment involving 95 participants, the researchers created two groups. In the first, everyone wrote down how much they’d be willing to pay for the T-shirt, and those who bid more than a certain price were allowed to buy it. In the other group, some participants were randomly excluded, and the remainder wrote down how much they’d be willing to pay. The median bid in the random-exclusion group was $5, twice the median in the first group, the researchers find.

“These results provide direct support for the role of mimetic dominance in private valuations,” they write. “People significantly increase their willingness to pay for a good if they know that there are others whose intrinsic tastes for the good may well be in excess of theirs, but . . . they cannot obtain the good.”

The findings may help explain some situations that vex economists and political scientists, the researchers suggest. For example, mimetic dominance can explain the decision by some companies to artificially restrict supply in the face of surging demand. In these cases, exclusion may be a feature rather than a bug—increasing supply would eliminate the gratification people get from knowing that others want what they have but cannot get it, which would decrease their valuation of the product.

Imas and Madarász also point to research from Princeton’s Ilyana Kuziemko, Harvard’s Ryan W. Buell and Michael I. Norton, and Yale’s Taly Reich that finds some of the fiercest opposition to raising the American minimum wage comes from people earning just over the minimum. The mimetic-domiance motive suggests that this could be because higher pay for those at the bottom would eliminate the advantage that the next-lowest group perceives having, Imas and Madarász write.

“A policy which sustains exclusion and inequality may be more popular than a redistributive policy even for those who would gain materially from greater social insurance because it may lead to a loss of mimetic dominance,” they write. They argue that this idea also applies to policies on immigration, economic nationalism, and barriers to trade.—Bob Simison

Go to Review.ChicagoBooth.edu to see citations for research mentioned in this article.
When stock prices fluctuate, commentators often attribute the moves to demand from certain groups of investors. A radio report might attribute a daily rise in the S&P 500 to sentiment-driven retail investors—or maybe hedge funds, pension funds, or sovereign-wealth funds.

But some investors drive valuations more than others do, suggests research by Chicago Booth’s Ralph S. J. Koijen, NYU’s Robert J. Richmond, and Princeton’s Motohiro Yogo. In traditional stock-valuation methods, it doesn’t matter who owns a stock. Indeed, someone valuing a company’s stock typically estimates the company’s expected profits, and then discounts these profits using an appropriate discount rate as implied by, for instance, the capital asset pricing model (CAPM). The latter assume that markets are highly elastic, Koijen explains—if prices deviate slightly from their fair values, investors rush in to arbitrage such small mispricings away. But the market is far less elastic than thought, a growing literature demonstrates. In this case, differences in investor demand have a meaningful impact on prices.

The demand of a particular group of investors matters only to the extent that it affects the market risk premium and therefore the discount rate, producing a typically small effect. But some research is starting to chip away at the gap between narratives about investor-driven market swings and traditional finance models.

The latter assume that markets are highly elastic, Koijen explains—if prices deviate slightly from their fair values, investors rush in to arbitrage such small mispricings away. But the market is far less elastic than thought, a growing literature demonstrates. In this case, differences in investor demand have a meaningful impact on prices.

If asset prices reflect differences in demand for the shares, who is driving that? Koijen, Richmond, and Yogo developed a framework to trace back differences in valuation ratios and expected returns to various investors. They assembled investors into eight groups, from passively managed behemoths such as the Vanguard Group, to smaller, actively managed investment advisers and hedge funds. They then modeled how valuations would shift if all the assets of one group were to be redistributed to other institutional investors in proportion to their assets—if all hedge fund assets, for example, were held instead by other institutions in the market. The effect of that would depend on an investor’s size and strategy compared with others in the market, the researchers show.

The effect of that would depend on an investor’s size and strategy compared with others in the market, the researchers show.

Overall, small, active investment advisers have the largest influence on valuations, according to the researchers. Controlling for size, they find that hedge funds tend to be the most influential. “Per dollar of capital, they are much more influential than pension funds and insurance companies,” says Koijen.

In addition to seeing who has the most influence in the market overall, the researchers zoomed in to see who has the most influence in specific areas of the market. When it comes to green stocks—so called because they are associated with the environment—foreign investors have the most influence and are driving stock valuations, they find. Meanwhile, for companies associated with good governance, smaller and active asset managers take the lead.

For asset managers, understanding how specific investors—or groups of them—influence the $38 trillion US stock market is illuminating. Koijen and his collaborators are now turning their attention to the $40 trillion bond market, expecting that a similar effect is at work there.—Emily Lambert

Go to Review.ChicagoBooth.edu to see citations for research mentioned in this article.
The investors with the most influence over companies’ market capitalization

In a study of stocks at the close of the third quarter in 2020, the researchers calculated how much a company’s market cap would have changed if any investor had lost 10 percent of its assets. They ranked the results to identify those with the most individual power to alter a company’s value.

Apple
Market cap at Q3 close: $1,966 trillion

<table>
<thead>
<tr>
<th>Investor</th>
<th>Effect on the company’s market cap if the investor were to lose 10% of its assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Berkshire Hathaway</td>
<td>-2.17%</td>
</tr>
<tr>
<td>2. BlackRock</td>
<td>-0.97%</td>
</tr>
<tr>
<td>3. Vanguard</td>
<td>-0.87%</td>
</tr>
<tr>
<td>4. State Street</td>
<td>-0.84%</td>
</tr>
<tr>
<td>5. Capital World Investors</td>
<td>0.29%</td>
</tr>
</tbody>
</table>

Microsoft
Market cap: $1,591 trillion

<table>
<thead>
<tr>
<th>Investor</th>
<th>Effect on the company’s market cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BlackRock</td>
<td>-0.79%</td>
</tr>
<tr>
<td>2. Vanguard</td>
<td>-0.71%</td>
</tr>
<tr>
<td>3. State Street</td>
<td>-0.69%</td>
</tr>
<tr>
<td>4. FMR</td>
<td>-0.51%</td>
</tr>
<tr>
<td>5. Royal Bank of Canada</td>
<td>0.3%</td>
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Facebook
Market cap: $630.1 billion

<table>
<thead>
<tr>
<th>Investor</th>
<th>Effect on the company’s market cap</th>
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</thead>
<tbody>
<tr>
<td>1. FMR</td>
<td>-1.52%</td>
</tr>
<tr>
<td>2. T. Rowe Price</td>
<td>-1.13%</td>
</tr>
<tr>
<td>3. Capital Research Global Investors</td>
<td>-0.71%</td>
</tr>
<tr>
<td>4. Capital International Investors</td>
<td>-0.69%</td>
</tr>
<tr>
<td>5. State Street</td>
<td>-0.42%</td>
</tr>
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</table>

Alphabet (Class A)
Market cap: $440.6 billion

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<thead>
<tr>
<th>Investor</th>
<th>Effect on the company’s market cap</th>
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</thead>
<tbody>
<tr>
<td>1. FMR</td>
<td>-1.01%</td>
</tr>
<tr>
<td>2. BlackRock</td>
<td>-0.44%</td>
</tr>
<tr>
<td>3. State Street</td>
<td>-0.41%</td>
</tr>
<tr>
<td>4. Capital World Investors</td>
<td>0.34%</td>
</tr>
<tr>
<td>5. Royal Bank of Canada</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

Walmart
Market cap: $396.5 billion

<table>
<thead>
<tr>
<th>Investor</th>
<th>Effect on the company’s market cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vanguard</td>
<td>-0.77%</td>
</tr>
<tr>
<td>2. State Street</td>
<td>-0.7%</td>
</tr>
<tr>
<td>3. BlackRock</td>
<td>-0.69%</td>
</tr>
<tr>
<td>4. Royal Bank of Canada</td>
<td>0.24%</td>
</tr>
<tr>
<td>5. Bank of America</td>
<td>-0.18%</td>
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</table>

Amazon
Market cap: $1,581 trillion

<table>
<thead>
<tr>
<th>Investor</th>
<th>Effect on the company’s market cap</th>
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</thead>
<tbody>
<tr>
<td>1. BlackRock</td>
<td>-0.7%</td>
</tr>
<tr>
<td>2. T. Rowe Price</td>
<td>-0.61%</td>
</tr>
<tr>
<td>3. FMR</td>
<td>-0.59%</td>
</tr>
<tr>
<td>4. State Street</td>
<td>-0.59%</td>
</tr>
<tr>
<td>5. Vanguard</td>
<td>-0.53%</td>
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</tbody>
</table>

Alphabet (Class C)
Market cap: $486.7 billion

<table>
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<tr>
<th>Investor</th>
<th>Effect on the company’s market cap</th>
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</thead>
<tbody>
<tr>
<td>1. T. Rowe Price</td>
<td>-0.93%</td>
</tr>
<tr>
<td>2. BlackRock</td>
<td>-0.58%</td>
</tr>
<tr>
<td>3. State Street</td>
<td>-0.5%</td>
</tr>
<tr>
<td>4. Wellington Management</td>
<td>0.32%</td>
</tr>
<tr>
<td>5. TCI Fund Management</td>
<td>-0.32%</td>
</tr>
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</table>

Tesla
Market cap: $406.7 billion

<table>
<thead>
<tr>
<th>Investor</th>
<th>Effect on the company’s market cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Capital World Investors</td>
<td>-1.33%</td>
</tr>
<tr>
<td>2. Baillie Gifford</td>
<td>-0.9%</td>
</tr>
<tr>
<td>3. BlackRock</td>
<td>-0.65%</td>
</tr>
<tr>
<td>4. Jennison Associates</td>
<td>-0.51%</td>
</tr>
<tr>
<td>5. Vanguard</td>
<td>-0.4%</td>
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</table>

Johnson & Johnson
Market cap: $392 billion

<table>
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<tr>
<th>Investor</th>
<th>Effect on the company’s market cap</th>
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</thead>
<tbody>
<tr>
<td>1. State Street</td>
<td>-1.42%</td>
</tr>
<tr>
<td>2. BlackRock</td>
<td>-1.12%</td>
</tr>
<tr>
<td>3. Vanguard</td>
<td>-1.01%</td>
</tr>
<tr>
<td>4. FMR</td>
<td>0.6%</td>
</tr>
<tr>
<td>5. State Farm Mutual Auto Insurance</td>
<td>-0.55%</td>
</tr>
</tbody>
</table>

Koijen and Yogo, 2019; Koijen et al., 2020
Central bankers misjudge forward guidance . . .

One of the best ways to spur an economy is to get people spending, and policy makers have a number of tools to do that. Yet growing evidence suggests a favored approach of late—forward guidance by central banks—doesn’t work. Such guidance, usually focusing on the outlook for interest rates, is meant to make clear to consumers that prices are likely to rise soon, so buying big items now would be smart.

While people may agree with the buy-now logic, they still may not react as economists and policy makers expect, according to Boston College’s Francesco D’Acunto, Karlsruhe Institute of Technology’s Daniel Hoang, and Chicago Booth’s Michael Weber. That’s because they don’t understand the signal, the researchers find.

“If you’re an economist too much stuck in your model world, this is very surprising to you,” Weber says. On the other hand, he acknowledges that not everyone can follow the logic chain that leads from a central banker predicting depressed interest rates, to lower borrowing costs, to higher inflation, to the urgency of buying now. “If you’re not too detached from reality, it’s not surprising,” Weber says.

The researchers analyzed two events in which governments or central banks signaled that prices were set to rise. One was a 2005 announcement by the German government that the country’s value-added tax (similar to the US sales tax) would increase from 16 percent to 19 percent for a six-month period as part of government spending. Germany’s VAT was trickling down via financial institutions or markets.

Both the German government and the ECB were forced into the moves, though for different reasons. Berlin realized it faced fines from the European Union unless it rapidly decreased its deficit, so it sought to raise revenue as well as cut government spending. Germany’s VAT remained at 19 percent until July 2020, when the government reduced it to 16 percent for a six-month period as part of a response to the pandemic.

Draghi, meanwhile, was facing a problem shared by many central bankers since the 2008–09 financial crisis. Normally, central banks can stimulate consumer spending simply by cutting interest rates. But with rates hovering at or near zero for many years after the crisis, this became impossible, and unconventional tools such as forward guidance emerged as a possible solution.

Clearly, that hasn’t worked. Economists at the New York Fed talked in 2012 about a “forward guidance puzzle,” contrasting the theoretical promise of such guidance with the subdued empirical results. More recently, studies by D’Acunto, Hoang, Weber, and another researcher, Maritta Paloviita of the Bank of Finland, suggest that only people with a higher-than-average IQ can correctly translate central-bank utterances into astute personal financial decision-making.

Weber warns that the public’s nonresponse to forward guidance could cast a shadow over another policy idea currently on the table: price-level targeting, which also relies on nonexperts understanding the mechanisms by which central-bank targets affect consumer prices—and acting on that understanding.

The German VAT experience suggests that a US national sales tax could be a fast-acting and effective alternative, during the current pandemic or any other time, Weber says. Preannounced tax increases could do the work that central bankers hoped forward guidance would do, he says. Whether politicians would be eager to employ such a tool is another question.

“You can pretty much only do it if you’ve just been elected,” Weber says. “You lose a lot of voter goodwill right away, and it will take some time for the economy to grow enough to earn that back.”

A more general lesson would be to translate opaque Fed speak into a language that large swathes of the population can grasp. Failing that, it may be time to stop placing much hope in forward guidance as a way to spur consumer spending.—Rose Jacobs

One way to make it obvious that prices are set to rise

Consumers clearly detected the inflation implications of a tax-hike announcement in 2005, but not the message encoded in forward-guidance statements in 2013–14.

Share of Germans who said they expect higher inflation

Case A: Unconventional signal
Germany announces VAT hike 14 months in advance

Case B: Formal policy
European Central Bank issues forward-guidance statements

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and their economists may be overstating QE’s effectiveness

A student asked to grade her own work might give herself all As, or at least higher grades than a teacher would. A similar thing is happening with central bankers, research suggests—and with potentially significant economic consequences.

When researchers at central banks evaluated quantitative easing, one of the banks’ key responses to the 2008-09 financial crisis, they found a bigger impact than did independent economists from academia, according to the National Bank of Slovakia’s Brian Fabo, the European Central Bank’s Martina Jančoková, and Chicago Booth’s Elisabeth Kempf and Lubos Pastor.

Conflicts of interest may explain the rosier conclusions of the bank researchers. “Central bankers evaluating their own policies is not unlike pharmaceutical firms evaluating their own drugs,” the researchers write. “Both have skin in the game.”

Fabo, Jančoková, Kempf, and Pastor examined 54 research articles released between 2000 and 2018 about the effects of QE, in which central banks buy securities in the open market to help bolster the economy during and after a financial crisis. Research studies that included central-bank officials among their authors found QE to have a higher impact on economic output and inflation than articles written solely by academicians, the researchers find.

Articles with central-bank authors found the peak impact of QE on economic output to be about 0.7 percentage points higher than articles without central-bank authors, the researchers find. The cumulative impact of QE at the end of 2018 was found in central-bank research to be half a percentage point higher, Fabo, Jančoková, Kempf, and Pastor report. Those are significant differences, they write. All of the research with central-bank authors reported a statistically significant effect of QE on output; only half of the academic papers did so.

Central-bank papers tended to find QE to be more effective at boosting prices, the researchers find. On inflation, the central-bank articles found that QE had a peak effect 1 percentage point higher than all-academic articles reported, and a cumulative effect that was around the same.

And articles with central-bank researchers used more favorable language in the abstracts of the papers than those by academics, with more positive adjectives and fewer negative adjectives, according to the study.

Managerial influence at central banks could be the reason. Bank management both influences the research process and decides who gets promoted. Central-bank researchers who found larger effects of QE on output were more likely to get promotions, the study finds, and there’s some evidence that the connection was strongest for senior researchers—those who may be especially reliant on the support of the bank’s top management to be promoted.

Fabo, Jančoková, Kempf, and Pastor report one counterexample: researchers at Germany’s Bundesbank suggested that QE had less of an impact on output than did articles by academics. However, the Bundesbank’s top brass has been critical of QE, suggesting its researchers may have been operating under a different line of scrutiny.

When a central bank evaluates its own policies, that can lead to overly optimistic research outcomes, which in turn can shape the public’s perception of how effective the central bank’s policy was, the study indicates. This is particularly relevant as central-bank efforts play a key role in bolstering the economy amid the COVID-19 recession.

However, the researchers stop short of concluding that central-bank studies are tainted by bias, calling it “an important but messy question.” Central banks may have an incentive to view their own policies favorably, but they also want to preserve their credibility. The researchers write that they hope their study will help central banks “think through the implications of this conflict for their research processes.” —Michael Rapoport

India’s economic recovery from its COVID-19 lockdown

In response to COVID-19’s rise, India ordered most of the country’s 1.3 billion residents to stop working and remain indoors starting in March 2020—the world’s largest lockdown. The government began relaxing restrictions in June, and research finds that while India’s economy improved rapidly in the following months, the outlook for a return to prelockdown levels remained unclear.

In a report for Chicago Booth’s Rustandy Center for Social Sector Innovation, Booth’s Marianne Bertrand and Rebecca Dizon-Ross, Centre for Monitoring Indian Economy’s Kaushik Krishnan, and University of Pennsylvania’s Heather Schofield examined household-level survey data to establish a more comprehensive view of India’s initial recovery than national economic indicators could provide. These charts and maps highlight a selection of their main findings.—CBR

The lockdown affected income differently across states

Per capita income in states and union territories compared with the same month in 2019

Percentage difference

<table>
<thead>
<tr>
<th>Percentage difference</th>
<th>Per capita income change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase</td>
<td>0% to -20%</td>
</tr>
<tr>
<td>-20% to -40%</td>
<td>-40% to -60%</td>
</tr>
<tr>
<td>-40% to -60%</td>
<td>-60% to -80%</td>
</tr>
<tr>
<td>No data</td>
<td></td>
</tr>
</tbody>
</table>

**Employment remained down as the economy opened back up**

Share of entire population who were employed

- **Employed**
- **Employed, but worked 0 hours**

*Data unavailable for portion of employees working 0 hours in September and October*

**Income levels remained depressed as the lockdown was initially lifted**

Monthly income per capita

*In 2019 rupees (5,000 = approximately US$70)*

**Top earners’ income didn’t drop as sharply during the lockdown months**

Change in monthly household income per capita

*Percentage difference from January 2020 levels*

Grouped by monthly income before lockdown

- **Top group** (10,800+ rupees)
- About 70% of population

**Spending on basic food items remained down after the reopening**

Monthly spending per capita

*In 2019 rupees (7 = approximately US$1)*
LAW AND ORDER AND DATA

Will algorithms fix what’s wrong with American justice, or make things worse?

BY JEFF COCKRELL  ILLUSTRATIONS BY NOMA BAR
As it was for so many things, 2020 was a strange year for crime. Cities around the United States saw their overall crime rates drop considerably, according to data collected by University of Pennsylvania’s David S. Abrams, a trend perhaps driven by the general decline of economic activity and face-to-face interaction amid the COVID-19 pandemic. At the same time, Abrams’s data also show rates of shootings and homicides in many cities that were at or even well above historical averages.

But one aspect of criminal justice in the US was disturbingly familiar in 2020: the deaths of Black Americans at the hands of police. The murder of George Floyd in May and a series of other high-profile incidents fueled nationwide protests and calls for change, including from then presidential candidate Joe Biden, whose platform included expanding the powers of the Department of Justice “to address systemic misconduct in police departments and prosecutors’ offices.”
President Biden’s platform also included aspirations to reduce the prison population and “root out the racial, gender, and income-based disparities in the [criminal justice] system,” reflecting a sense that even apart from policing, America’s justice system is bloated and unfair.

These demands for reform intersect with advancements in technology, namely software that uses algorithms and, in particular, machine learning to analyze huge masses of data and make predictions relevant to criminal outcomes. Many police departments, municipalities, and states are adopting these tools, or increasing their use of them. Some observers hope such tools will reduce the kind of racial inequity that has historically plagued justice in the US, but others worry they will only exacerbate those problems.

Algorithms are already being used in criminal-justice applications in many places, helping decide where police departments should send officers for patrol, as well as which defendants should be released on bail and how judges should hand out sentences. Research is exploring the potential benefits and dangers of these tools, highlighting where they can go wrong and how they can be prevented from becoming a new source of inequality. The findings of these studies prompt some important questions such as: Should artificial intelligence play some role in policing and the courts? If so, what role should it play? The answers, it appears, depend in large part on small details.

**A persistently flawed system**

Even before the pandemic, crime in the US had broadly been on the decline for decades. Data from the Federal Bureau of Investigation show a 49 percent drop in the violent crime rate from 1993 to 2019 and a 55 percent drop in the property crime rate. Survey data from the Bureau of Justice Statistics, which include both reported and unreported crimes, show even steeper downward trends.

But however encouraging some aggregate trends may be, criminal justice in the US suffers from massive shortcomings—in terms of both keeping people safe and treating people fairly. Despite the improvement in its crime rates, relative to other developed countries, the US still faces significant crime-related challenges, especially when it comes to its homicide rate: according to the Organisation for Economic Co-operation and Development, the US had 5.5 reported homicides per 100,000 people in the latest year for which data are available, as compared with other wealthy countries such as Canada (1.3 reported homicides per 100,000 people), Germany (0.5), and the United Kingdom (0.2).

Meanwhile, police departments in many US cities have been found to engage in practices that discriminate against people of color or other groups, and police brutality in the US, particularly against Black people, is a source of persistent social upheaval. Add to this the fact that among countries for which data are available, the US maintains what is by far the world’s biggest prison system, numerically dominated by prisoners of color.
Such tools work by analyzing massive stores of data, including data about past criminal events and outcomes, to predict where crimes will occur, who’s most likely to fail to appear in court, and who’s most likely to be a repeat or violent offender. The promise of these tools is better outcomes using less resources while locking up fewer people. The risk is that they will make existing inequalities even more pervasive and difficult to address.

The academic literature contains support for both notions: cautionary tales and warnings about unintended consequences, as well as promising glimpses of new possibilities. These widely varying outcomes hint at the heterogeneity that underlies the broad banner of machine learning.

University of Chicago Harris School of Public Policy’s Jens Ludwig illustrates this point by contrasting algorithms with vaccines. Unlike a vaccine—which is a single, clearly defined thing—A.I. is not a “thing” but rather an umbrella term for a collection of tools that are heterogeneous in their design and in their implications for crime, fairness, and the harm the justice system can inflict. “In practice, A.I. algorithms actually vary enormously,” he says, including in their overall quality and in the amount of attention that gets paid to anticipating and addressing concerns that may be general (such as discrimination) or specific to their use. “The key challenge for the field,” he says, “is figuring out how we can get more of the good ones and fewer of the bad ones.”

**Predictive policing and its risks**
The criminal-justice pipeline starts with policing, where machine learning is being deployed in some cases to detect or solve crimes. Noise sensors installed throughout many cities feed ML algorithms trained on audio data to listen for and report gunshots—a significant task, as research by Purdue’s Jillian B. Carr and Texas A&M’s Jennifer L. Doleac has found that the vast majority of gunshots go unreported. Some departments also use ML-powered facial recognition systems to help identify the perpetrators of crimes.

ML is widely used for crime prediction too. The Chicago Police Department is using products sold by the policing-technology company ShotSpotter, including gunshot sensors but also a patrol management software called ShotSpotter Connect. Connect uses a combination of local crime and gunshot-detection data, as well as other data such as weather information, census data, and the locations of schools and parks, to identify discrete zones for police patrol on the basis of the likelihood of a crime occurring there. The system creates risk assessments for numerous types of crime, from homicide to auto theft, and even suggests tactics officers should use on their patrol.

There are various concerns about algorithms in policing, and one is bias. The American Civil Liberties Union, among others, worries that because ML policing tools rely in part on historical data, they will be influenced by human bias and will exacerbate and further entrench historical patterns of inequality and disparate treatment in the justice system. This has some backing in research.

“It is a common fallacy that police data is objective and reflects actual criminal behavior, patterns, or other indicators of concern to public safety in a given jurisdiction,” write Rutgers’s Rashida Richardson, NYU’s Jason M. Schultz, and Microsoft Research’s Kate Crawford. “In reality, police data reflects the practices, policies, biases, and political and financial accounting needs of a given department.”

Richardson, Schultz, and Crawford examined 13 jurisdictions in the US that adopted or used predictive-policing tools while subject to investigations, court-monitored settlements, memorandum of agreement, or consent decrees related to corrupt, biased, or otherwise illegal police practices. They find that in nine of those jurisdictions—including Chicago, New Orleans, and Maricopa County, Arizona—data that may have been shaped by such practices were available to train or otherwise affect the algorithms. “In these jurisdictions, this overlap presented at least some risk that these predictive systems could be influenced by or in some cases perpetuate the illegal and biased police practices reflected in dirty data,” the researchers write.

And if predictive-policing algorithms work in part by analyzing data on past police actions, they seem bound to absorb whatever bias shaped those data. As expressed by the ACLU and 16 other organizations in a 2016 joint statement on predictive policing, “the data driving predictive enforcement activities—such as the location and timing of previously reported crimes, or patterns of community- and officer-initiated 911 calls—is profoundly limited and biased.”

Richardson says that algorithms used to predict criminal outcomes will face inherent problems until we can trust the data used to fuel them. “I think if there is to be a future with automation in government decision-making and policy implementation, there also needs to be fundamental changes around
ML COULD HELP IDENTIFY AT-RISK OFFICERS

Early-intervention systems, designed to identify officers likely to use excessive violence or engage in other behaviors harmful to others or themselves, have been popular with police departments across the country for decades. Both academic researchers and private-sector businesses have begun exploring machine learning’s potential to perform this task.

In 2017, a research team led by the Center for Data Science and Public Policy—formerly housed at the University of Chicago, now at Carnegie Mellon University—published the results of work it had conducted in North Carolina in collaboration with the Charlotte-Mecklenburg Police Department, in which it had used an ML system to identify at-risk officers. The department’s existing early-intervention system was triggered when “behavioral thresholds” were met; if officers were involved in complaints or use-of-force events a certain number of times within a given time period, they would be flagged for possible intervention. The thresholds were chosen on the basis of expert intuition, and the decision to intervene was subject to supervisor approval.

The researchers’ ML-based approach factored in events related to officer behaviors—things such as the discharge of a firearm, vehicle accidents, or citizen complaints—as well, but also drew upon the department’s millions of records related to its officers’ training, the traffic stops and arrests they made, the citations they issued, and their secondary employment. It factored in details about the neighborhoods in which the officers worked, as well as incidents that may have been particularly stressful, such as those involving young children or gang violence.

Using historical data to analyze the results of both the existing approach and the ML model, the researchers find the department’s existing system was only slightly better than chance at distinguishing high-risk officers from low-risk ones, but that the ML system could improve the true-positive rate (the rate at which it correctly identifies high-risk officers) by 75 percent while cutting down on false positives (the rate at which it flags low-risk officers) by 22 percent.

The University of Chicago has licensed the technology developed in the study of the Charlotte-Mecklenburg Police Department to Benchmark Analytics, a data-science company of which the university is part owner, and which specializes in helping police forces collect and analyze data about their officers. Benchmark’s early-intervention system, First Sign, is being used or tested in cities including Albuquerque, New Mexico; Dallas, Texas; Nashville, Tennessee; and San Jose, California.

In September 2020, the City of Chicago launched its own early-intervention system, this one created in partnership with the police department and the University of Chicago Crime Lab. Like the Mecklenburg system, the Officer Support System also leverages ML to help flag high-risk officers—with the goal of then connecting them with resources and support to prevent future problems. The system is being implemented gradually across the city.

This is an area of focus where ML proponents and critics appear to agree. “Police could use predictive tools to anticipate which officers might engage in misconduct, but most departments have not done so,” write the ACLU and 16 other organizations in a 2016 joint statement.

Early experiences from Chicago and elsewhere show that police misconduct follows consistent patterns, and that offering further training and support to officers who are at risk can help to avert problems. Police should be at least as eager to pilot new, data-driven approaches in the search for misconduct as they are in the search for crime, particularly given that interventions designed to reduce the chances of misconduct do not themselves pose risk to life and limb.

According to Jay Stanley, a senior policy analyst at the ACLU, the fact that some departments are experimenting with using algorithms to flag potential trouble spots is an encouraging development. He says that because of management practices, union contracts, and other factors, there haven’t been robust systems in place to identify problem officers. He cautions, however, that if algorithms are involved, “all the same fairness issues” that the organization has raised about algorithms in predictive policing still apply, for the protection of the police officers. “Decisions should not be made [entirely] algorithmically but subject to human review.”

Greater predictive power could help focus pretrial detention on individuals who pose the greatest risk, and thereby minimize the number of people who have to endure this disruptive experience.

Student Scott Neville, University of Arizona’s Carlos Scheidegger, and University of Utah’s Suresh Venkatasubramanian analyzed a model based on PredPol, a widely used policing platform, and find that it is vulnerable to such feedback loops.

They also find that by filtering the data used to update the algorithm over time, it’s possible to mitigate the problem. Under their proposed solution, the probability that a crime is fed back into the algorithm goes down as the probability of the area being patrolled goes up, thereby counteracting the tendency toward overpolicing. However, the findings underscore the threat posed by feedback, Venkatasubramanian says, “because we have to throttle the feedback to prevent the system from drifting away.”

Encouraging evidence on bias
To investigate whether predictive policing in Los Angeles resulted in more arrests of Black and Latinx people, University of California at Los Angeles’ P. Jeffrey Brantingham, Louisiana State University’s Matthew Valasik, and George O. Mohler of Indiana University-Purdue University Indianapolis reviewed the data from a randomized controlled experiment conducted earlier by Mohler, Brantingham, and five coauthors. (Brantingham and Mohler are cofounders of PredPol.) In that 2014 experiment, officers in select divisions of the Los Angeles Police Department were given a list of 20 target areas to patrol and told that crime was expected to be highest in those locations. Some lists were generated by human crime analysts using “all of the technological and intelligence assets at their disposal,” and some were generated by an algorithmic forecasting tool. Whether officers received a human-generated list or an algorithm-generated list varied randomly by day.

The algorithm outperformed the human analysts in terms of its impact on crime: for patrols of average duration, the algorithmically generated ones resulted in a 7.4 percent drop in crime, as compared with a 3.5 percent drop for human-directed patrols. Furthermore, in their follow-up analysis, Brantingham, Valasik, and Mohler find that “there is no significant difference in the arrest proportions of minority individuals” between the human and algorithmic patrols.

ML could even make policing less biased, other research suggests. Stanford’s Sharad Goel, Booking.com’s Justin M. Rao, and NYU’s Ravi Shroff used ML to derive more effective guidelines for New York City’s controversial stop-and-frisk policy. Data from 2008 to 2012 show that the overwhelming majority of stop-and-frisk incidents involved people of color and didn’t result in any further action. Goel, Rao, and Shroff developed an algorithm that, had it been used, would have enabled the police to recover 90 percent of the weapons they had confiscated using only 58 percent of the stops. The algorithm would also have improved the equity of the racial balance of stops.

In Chicago, ML is used in Strategic Decision Support Centers, which were introduced in 2017 following a civil-rights investigation into the police department by the Obama administration’s Department of Justice. The centers were meant to provide a way to combine better integration and use of technology with new management and deployment policies and procedures. District 7, in the Englewood neighborhood on the city’s south side, was one of the first to receive an SDSC; there, police leaders and analysts trained by the University of Chicago Crime Lab work side by side, using ShotSpotter products in real time to create more targeted deployment strategies for the district. Though gun violence in the city fell generally in 2017 after an exceptionally brutal 2016, it fell almost twice as steeply in District 7. The CPD has so far rolled out SDSCs to 21 of its 22 police districts.

The deployment recommendations made in each SDSC don’t divert resources from other districts—they are used to determine how to allocate patrols within districts, not across them. Therefore, even if the people who live in a particular district are overwhelmingly Black—many neighborhoods in Chicago, as in other cities, are highly segregated by race—there’s reason to think the algorithm isn’t moving the needle much on the racial balance of police exposure. And to the extent the SDSC helps reduce crime within that district, ML is helping to reduce disparities in public safety within Chicago.

Jay Stanley, a senior policy analyst at the ACLU, agrees that the narrower that predictive policing is used, the less concern there is. “It’s reasonable that changing the area reduces the concerns,” he says, “but I don’t think it eliminates them.”

Algorithms and the prison system
Algorithms’ reach into criminal justice goes beyond policing, extending into the US’s large and expensive prison system, and into decisions about who goes into it.

Some judges use algorithmic tools to help them decide who should await trial at home. This decision—often come to on the basis of the defendant’s flight risk, risk of recidivism, or both—has enormous consequences, as Chicago Harris’s Ludwig explained in a 2018 presentation as part of the Talks at
Who is Most Likely to Commit Another Crime?

In sentencing defendants, judges often factor in how likely a person is to commit another crime in the future. And as technology advances, this assessment sometimes involves algorithms.

Criminal-justice nonprofit Recidiviz’s Julia Dressel and University of California at Berkeley’s Hany Farid studied COMPAS, an algorithmic tool that predicts defendants’ risk of recidivism. Using a database of defendants from Broward County, Florida, the researchers find that COMPAS achieved roughly 65 percent accuracy in its predictions of who would commit another crime. However, a set of human predictors with no criminal-justice expertise was almost as accurate: participants the researchers recruited through Amazon Mechanical Turk averaged 62 percent accuracy. Dressel and Farid further find that an algorithm using only two variables—age and number of past convictions—performed slightly better than COMPAS.

Stanford PhD student Zhiyuan “Jerry” Lin, data scientist Jongbin Jung, and Stanford’s Sharad Goel, with University of California at Berkeley’s Jennifer Skeem, replicated the experiment by Dressel and Farid and find similar results.

However, further experimentation suggests algorithms may still have an advantage over human predictors, or at least nonexperts. In Dressel and Farid’s experiment, human predictors were given feedback after each prediction—whether they were right about the defendant they’d just evaluated, as well as an update on their overall accuracy; when Lin, Jung, Goel, and Skeem didn’t offer predictors this instantaneous feedback, depriving them of the chance to learn from their errors and more closely mimicking the conditions faced by real-life judges, human performance fell well below that of both COMPAS and the researchers’ own statistical model.

Parole decisions are another area where the risk of recidivism is considered, and where algorithms have been called into use. In Pennsylvania, the state parole board began using ML-generated forecasts of future criminal behavior in 2013 to inform decisions about which prisoners to release on parole. Each of these forecasts, which came from a custom-built assessment tool developed by University of Pennsylvania’s Richard Berk, was accompanied by an assessment of the prediction’s reliability, which varied from case to case. Research by Berk finds that recidivism among parolees declined significantly after the board began considering the ML forecasts, particularly when it came to violent crimes. In late 2019, the board ceased using the tool after analysis by the Pennsylvania Department of Corrections raised concerns about possible racial bias in the risk forecasts. Berk says those concerns reflect a misinterpretation of the results, and that the data in fact show that “the risk instrument was implemented properly such that Black and white parolees were rearrested at comparable rates.”

Google lecture series. “If the judge jails you, on average you’ll spend two to four months in a place like the Cook County Jail,” he said. “You can imagine what that does to your job prospects. You can imagine what that does to your family.”

Greater predictive power could help focus pretrial detention on individuals who pose the greatest risk, and thereby minimize the number of people who have to endure this disruptive experience.

In 2017, Cornell’s Jon Kleinberg, Harvard’s Himabindu Lakkaraju, and Stanford’s Jure Leskovec, with Ludwig and Chicago Booth’s Sendhil Mullainathan, constructed an algorithm to explore whether they could improve on the results of the pretrial-release system then being used in New York City, in which judges could reference risk assessments made by an older predictive tool (rolled out in 2003) as part of their decision-making. They find that, had their algorithm been used during the date range they studied, it could have offered substantial benefits over the existing system.

Kleinberg and his coresearchers examined arrest and bail data in New York between 2008 and 2013, and their findings indicate that pretrial judges were out of sync with the predictions of the researchers’ new algorithm. The judges released nearly half of the defendants the new algorithm picked out as most risky—more than 56 percent of whom then failed to appear in court. With the new algorithm’s help, the researchers find, the judges could have maintained the same failure-to-appear rate while jailing 40 percent fewer people, or lowered the failure-to-appear rate by 25 percent without jailing a greater number of people. And they could have done all this while reducing racial disparities.

That research served as a proof of concept that a new algorithm could potentially improve on pretrial judgments in practice. Following that study, New York City engaged the University of Chicago Crime Lab and a private company called Luminosity to develop a new algorithmic pretrial assessment tool, which it began using in 2019. The algorithm uses eight factors to generate a 26-point risk score judges can consider in their bail decisions—higher scores correspond to a greater
predicted likelihood that defendants will appear in court. Data from November 2019 to March 2020 (at which time New York suspended pretrial court appearances due to COVID-19) indicate that these risk scores predicted defendants’ behavior with a high degree of accuracy: appearance rates tracked risk scores closely, with nearly 98 percent of those who received the highest possible score—a group that included roughly four in 10 defendants represented in the data—subsequently appearing in court.

The algorithm recommended defendants in 85 percent of cases be “released on their own recognizance,” or without paying bail, in contrast to the city’s previous pretrial-release tool, which recommended such release in just 34 percent of cases. What’s more, the rate at which the new algorithm suggested ROR varied little across races: 83.5 percent of white defendants, 83.9 percent of Black defendants, and 85.8 percent of Hispanic defendants were recommended for ROR—in contrast with recommendations made by the old tool, which recommended ROR 30 percent more frequently for white defendants than Black defendants. The early evidence suggests judges’ decisions generally aligned with the new algorithm’s recommendations: nearly 90 percent of defendants recommended for ROR were ultimately released without bail.

Just as pretrial judges are often asked to predict defendants’ future behavior, trial judges may be asked during sentencing to forecast defendants’ risk of recidivism and future harm to the community. This opens another window for algorithmic involvement. (See “Who is most likely to commit another crime?” on the facing page.)

In 2013, a Wisconsin judge relied on COMPAS—an algorithmic tool, also sometimes used in pretrial-release decisions, that predicts the risk that a criminal defendant will commit another crime in the future—in his sentencing of Eric Loomis for attempting to flee from the police after being found driving a car that had been used in a shooting. Loomis argued that the sentencing violated his due process. The Wisconsin Supreme Court disagreed, and the US Supreme Court declined to hear the case.

The risks of allowing algorithms to weigh in on judicial decision-making—whether in pretrial decisions, sentencing, or parole decisions, where they’ve also been used—are obvious. Just as with predictive policing, biased data pose a threat to the equitability of outcomes.

### Potential benefits

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<th>Benefit</th>
<th>Bias Risk</th>
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<td>Greater predictive accuracy based on data rather than human intuition</td>
<td>Biased predictions based on historical data tainted by discrimination</td>
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<tr>
<td>Greater racial equity in policing and judicial decisions</td>
<td>Veneer of objectivity covering systems susceptible to error and bias</td>
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<td>More efficient policing and fewer unnecessary incarcerations</td>
<td>Feedback loops in which systems ingest data generated by their own predictions</td>
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<tr>
<td>Greater ability to regulate transparency in decision processes</td>
<td>Lack of transparency and technical understanding of how algorithms work</td>
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A 2016 ProPublica analysis of COMPAS risk scores highlights that concern: the results indicate that the tool was more likely to misidentify Black defendants as high risk than white defendants, and more likely to mislabel white defendants as low risk. The company that owns COMPAS has disputed those findings, and other analyses have called the broader conclusion that COMPAS produces racially biased results into question.

“A lot of what we’re seeing is in the form of commercial products that are proprietary and opaque by design, and also probably way oversold.”

— JAY STANLEY
But Loomis’s case highlighted a concern beyond bias: transparency. He argued that it violated his constitutional right to due process for a trial court to rely on the results of a proprietary instrument. He couldn’t challenge the accuracy or science of COMPAS because he couldn’t see it, much less analyze its results. And what he did know about it concerned him: Loomis alleged that it unjustly took gender and race into account.

Transparency is another issue that the ACLU and other watchdogs have raised in terms of predictive policing—transparency about the algorithmic systems themselves, and about the procurement processes by which those systems are selected. “A lack of transparency about predictive policing systems prevents a meaningful, well-informed public debate,” they write in a 2016 letter.

Whenever automated predictions are considered for policing, all stakeholders must understand what data is being used, what the system aims to predict, the design of the algorithm that creates the predictions, how predictions will be used in practice, and what relevant factors are not being measured or analyzed. The natural tendency to rush to adopt new technologies should be resisted until a true understanding is reached as to their short and long term effects.

They further argue that products and vendors need to be subject to independent, ongoing scrutiny—and currently are not getting that, and in fact too often claim trade secrets.

“A lot of what we’re seeing is in the form of commercial products that are proprietary and opaque by design, and also probably way oversold,” says the ACLU’s Stanley. “I think some of the commercial products have relatively simple nuts and bolts but use secrecy to evoke magical results that aren’t really reflecting what’s going on under the hood.”

And he warns that algorithms could aggravate discriminatory patterns by giving biased police and judges the appearance of digitally sanitized objectivity. “There’s a problem of people reifying the data and algorithms, and both obscuring and reifying decisions that are in fact highly questionable, but making them seem as though they’re objective,” he says. “That is the fundamental problem: a bunch of people running around playing with data and algorithms in all kinds of ways that have the potential for enormous destructivity. People are fast, loose, and out of control here.”

Regulation is the factor

This, then, is the crux of algorithms and ML in criminal-justice applications: they’re tools that, like any other, can be well made or poorly made, used for good or used for harm. Concerns about bias, transparency, and more boil down to the contents of individual algorithms, some of which are better than others—and how those algorithms are implemented. In theory, those contents and that implementation could be strongly guided by a robust set of rules.

“Part of the problem is that this technology is still so new, we haven’t yet developed the right regulations for guiding its use in public-sector policy applications,” says Ludwig. “We need to get those regulations right.”

Kleinberg, Ludwig, Mullainathan, and Harvard’s Cass R. Sunstein argue in 2019 research that algorithms have the advantage of being explicit in a way human decision-making can never be—as long as regulation is in place that encourages transparency. The researchers suggest that such regulation would require the producers of algorithms to store the data used to train their algorithms; to make the algorithms available for regulators to test in order to see how changing certain factors, such as a job applicant’s or criminal defendant’s race or gender, would affect the algorithms’ predictions; and to make clear the algorithms’ “objective function,” or the specific outcome they’re asked to predict, to scrutinize whether that outcome is fair and reasonable.

Access to those things, the researchers argue, would bring much-needed clarity to some of the questions that are often unanswerable in cases of suspected discrimination: What factors were considered in making a particular decision, and why were those factors chosen? Algorithmic bias, under these conditions, becomes easier to detect than human bias.

Kleinberg, Ludwig, Mullainathan, and Sunstein note that when it comes to the elements that regulators need to scrutinize an algorithm, “at a minimum, these records and data should be stored for purposes of discovery.” In other words, they should be available to resolve legal questions, even if they’re not made public.

But for algorithms used in the public sector, transparency can go well beyond storing information for private inspection. The New York Criminal Justice Agency, which administers the pretrial-release algorithm developed in part by the University of Chicago Crime Lab, maintains a website where the general public can access details about the algorithm and how it works. But for many other algorithms, the information is far less accessible.

“We should be wary about the government procuring algorithms the same way we procure phones for the police department.”

— JENS LUDWIG
If algorithms are to help improve American justice, the people adopting and using the tools must be fully aware of the potential dangers in order to avoid them.

public can see data about its performance, read about how it’s used in practice, and even use the tool themselves. The site also describes the agency’s plan for assessing and updating the algorithm over time.

Given that public-sector use of algorithms is an issue of not only technical and regulatory competence but also popular acceptance, this kind of visibility into the function, performance, and maintenance of algorithms could play a key role in making them palatable to a skeptical public. Another key could be greater public oversight of how algorithmic products are selected for use. Given these tools’ potentially high impact, susceptibility to negative unintended consequences, and variation in quality, a thorough and transparent process for deciding which algorithm to use, and how to use it, may be appropriate. “We should be wary about the government procuring algorithms the same way we procure phones for the police department,” Ludwig says. “Having a private company say, ‘We can’t tell you how the algorithm works—that’s our [intellectual property]’ is not an acceptable answer for algorithms.”

The 2016 joint statement issued by the ACLU and its 16 cosigners echoes this sentiment:

Vendors must provide transparency, and the police and other users of these systems must fully and publicly inform public officials, civil society, community stakeholders, and the broader public on each of these points. Vendors must be subject to in-depth, independent, and ongoing scrutiny of their techniques, goals, and performance. Today, instead, many departments are rolling out these tools with little if any public input, and often, little if any disclosure.

Ludwig says one solution may be to rely less on the private sector and more on in-house or nonprofit development of algorithms. Mullainathan agrees that there’s still too little oversight of how AI-driven tools, from facial recognition systems to pretrial-decision algorithms, are selected by public decision makers, and that there should be far greater transparency about the performance of algorithms purchased by police departments and other public agencies. “The biggest gains in public governance that we’ve had in any country come from transparency and accountability, and we simply do not have that” when it comes to public-sector use of AI, Mullainathan says.

Algorithms aren’t everything

As machine learning and other algorithms become more pervasive, their presence in and influence on criminal justice will likely continue to grow. Of course, it’s only part of the increasingly complicated picture of law and order in the US. Embracing algorithms, or abolishing them, will not take the place of broad and thoughtful reconsideration of how the police should function within a community, what sort of equipment and tactics they should use, and how they should be held accountable for their actions.

The question, then, is whether ML and other algorithms can be part of the future. If algorithms are to help improve American justice, the people adopting and using the tools must be fully aware of the potential dangers in order to avoid them.

Stanley concludes that while predictive policing and other examples of ML in criminal justice hold promise, it could take decades to work through the problems. Regulation is necessary, he says, but it is also a blunt tool, and legislators are rarely tech savvy.

He compares implementing ML to building the US transcontinental railroad system in the 19th century, which took many years and involved many train wrecks. “There’s no question there are ways that this could be socially useful and helpful, but it’s something that needs to be approached with great caution, great humility, and better transparency,” he says, adding that “a lot of the institutional patterns and incentives and cultures in law enforcement don’t lend themselves especially well to the kind of transparency that’s necessary. . . . It’s not foreordained that data and algorithms are going to bring some big social benefit compared to the nuts and bolts that need to be addressed to fix American policing.”

Kleinberg, Ludwig, Mullainathan, and Sunstein acknowledge that algorithms are fallible because the humans who build them are fallible. “The Achilles’ heel of all algorithms is the humans who build them and the choices they make about outcomes, candidate predictors for the algorithm to consider, and the training sample,” they write. “A critical element of regulating algorithms is regulating humans.”

Getting this regulation right could be the key to realizing the often striking performance benefits of algorithmic systems without aggravating existing inequalities—and perhaps even while reducing them. But it remains to be seen whether regulatory structures will develop that can meet this goal. Such structures are, after all, maintained by humans.—CBR

Go to Review.ChicagoBooth.edu to see citations for research mentioned in this article.
In building a portfolio, sustainability is no longer a luxury good. But it’s not a slam dunk either.

BY EMILY LAMBERT ILLUSTRATIONS BY GARY NEILL
When the COVID-19 pandemic prompted global stock markets to plunge in March 2020, Chicago Booth’s Lubos Pastor and Booth PhD student M. Blair Vorsatz set out to see if active managers outperformed stock indexes in choppy markets. But they stumbled on an unexpected insight.

Most active funds underperformed passive benchmarks during the crisis, they find, but what surprised them is funds that had high sustainability ratings had higher benchmark-adjusted returns. Morningstar, the investment research company, rates a fund’s sustainability according to environmental, social, and governance (ESG) factors, and it assigns each fund a globe rating—with funds that earn five globes being the most sustainable. Five-globe funds outperformed four-globe ones, which in turn outperformed three-globe ones, and so on, Pastor and Vorsatz observe. “This result is driven largely by environmental sustainability,” the researchers write, emphasizing the E in ESG.

And fund flows matched performance. Between February 20 (the day after the stock market peaked) and April 30 (after the market had largely recovered), active funds recorded fund outflows of 1.3 percent of assets under management as nervous investors pulled out. But the net flows for five-globe funds were around zero. Those with the lowest Morningstar sustainability score had net outflows of almost $7 billion (2.7 percent of assets), and those with the highest sustainability rating received net inflows of $460 million (0.1 percent of assets). Similarly, funds that apply exclusion criteria on the basis of ESG factors in their investment process, by screening out certain companies or industries, such as oil producers, also generated net inflows, of $1 billion (1.2 percent of assets).

“Our finding that investors remain focused on sustainability during this major crisis suggests they view sustainability as a necessity rather than a luxury good,” write Pastor and Vorsatz.

Sustainability is a new twist on an old theme in investing. Socially responsible investing has been around in some form for decades, if not millennia, explains Jon Lukomnik, senior fellow at High Meadows Institute, and author of a forthcoming book examining modern portfolio theory and systemic risk. Muslims have long created investments to comply with sharia, and some churches have similarly preferred investment vehicles that screen out companies in alcohol, tobacco, and gambling.

The concept of sustainability has gone mainstream more recently, often associated with a subset of it, which integrates ESG into investing decisions. Funds across the globe have begun including ESG factors in the security-selection process. Several companies, including Morningstar and MSCI, score stocks and assets according to ESG, and BlackRock, the world’s largest asset manager, is integrating ESG into its risk analyses and is working to make more sustainable options available to clients.

As the E in ESG, green investing is not without controversy, in part due to a lack of clarity surrounding what companies do or should report. But like climate change, green investing may be at a tipping point, and research suggests their trajectories are closely related.

Investors prefer sustainability

In 2016, Morningstar launched sustainability ratings for 20,000 funds in its database—an action that took sustainability from something that was opaque for investors “to being clearly displayed and touted by one of the leading financial research websites,” observe Chicago
Booth’s Samuel Hartzmark and Abigail Sussman, who in a 2019 paper analyzed the ratings’ effect.

Simply calling attention to sustainability prompted changes in how investors allocated their assets. Money flowed out of mutual funds with the lowest rating and into those with the highest rating. The researchers estimate that in the 11 months after the ratings were issued, between $12 billion and $15 billion flowed out of funds that received just one globe out of five, while between $24 billion and $32 billion flowed into funds awarded five globes.

In a follow-up experiment, Hartzmark and Sussman teased apart investors’ reasoning and find that the investment decisions were motivated both by performance expectations and what appeared to be altruistic and environmental motives. Investors tend to believe that more-sustainable companies will outperform the market—and they place a high value on social responsibility when investing.

Yet the evidence is mixed on whether sustainable investments pay off. Several papers have made the case that investments made with ESG in mind underperform. Perhaps the best-known example is a 2009 paper by Columbia’s Harrison Hong and Imperial College London’s Marcin Kacperczyk, who looked at “sin stocks,” those of companies in the alcohol, tobacco, and gaming industries. Sin stocks create negative externalities, costs that are borne by society, and some investors avoid these companies on moral grounds or as a result of the higher legal risk. Hong and Kacperczyk find that in doing so, investors depress the prices of sin stocks, which less-constrained investors then pick up on the cheap. Thus sin stocks outperform comparable stocks by about 0.3 percentage points per month, or around 3.6 percent per year.

But other research arrives at a different conclusion, arguing that in at least some time periods, investments that are more socially responsible outperform. For example, Illinois State University’s Abhishek Varma and University of Alaska’s John R. Nofsinger studied domestic equity mutual funds between 2000 and 2011 and find that socially responsible mutual funds tend to outperform during market crises. They also find that such funds underperform

**Sustainable funds were a decent place to be when COVID-19 hit the markets**

After stocks began to plunge in February 2020, funds with higher sustainability ratings outperformed those with lower ratings.

**Actively managed funds’ performance compared with benchmark indexes assigned by Morningstar**

*Cumulative percentage difference from February 19, 2020*

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<th>Month</th>
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during noncrisis periods and that the performance of socially responsible funds and conventional funds is roughly the same over time.

Pastor and Vorsatz analyzed a shorter time frame but more funds—over 3,600 of them, representing nearly $5 trillion in net assets—in arriving at their conclusion that funds with higher sustainability ratings posted higher returns in the COVID-19 crisis period.

**When green investments can outperform**

Theory may help explain these seemingly contrasting results. Seeing little in the academic finance literature on this front, particularly when it comes to investments that are specifically environmentally sustainable, Pastor and University of Pennsylvania’s Lucian A. Taylor and Robert F. Stambaugh have developed a model to explain what going green could mean for investors and society. The model formalizes Hong and Kacperczyk’s observation that sustainable assets have lower expected returns. In the model, if a group of investors wants to hold green assets, they bid up the prices for those stocks. The risk-adjusted returns will be lower for those more-expensive, green stocks and higher for the less-expensive, nongreen ones.

However, the researchers also find that investors who prefer green assets are prepared to earn lower financial returns. The model explains that, in order to get their desired portfolio, they earn lower financial returns than non-ESG investors. But they are willing to sacrifice more than they actually do, and thus earn what the researchers term an “investor surplus.” In addition, the nonfinancial benefits they earn from green investing more than compensate for the lower financial returns.

Even investors focused only on profits have some reason to embrace green assets, the model predicts. The researchers consider climate risk and news associated with it. When a giant iceberg splits from an Antarctic ice shelf, it is unlikely to have a direct or immediate impact on society or the stock market. However, as a dramatic example of the effects of climate change, it can attract attention and make the news. That can in turn compel consumers to buy green products, push governments to pass the kind of environmental legislation that the researchers expect to benefit green companies and hurt brown ones (those that generate negative externalities), and prompt regulators to take action. Politicians, notes Pastor, “always juggle multiple agendas. For the environment to rise to the top, something needs to happen.”

So whenever there’s bad climate news, green stocks benefit, and such stocks effectively become a hedge against headlines about climate change. Even if investors think global warming is a hoax, it represents a risk, and they will want to hold stocks that hedge market-moving bad news.

In some cases, the model suggests, green stocks will outperform brown stocks, which could explain Pastor and Vorsatz’s observations during the COVID-19 crisis. If consumers decide, unexpectedly, that there is value in going green—whether that means buying electric cars or seeking out plastic-free products—green stocks can outperform in the short run, even though they generally have lower risk-adjusted returns. Thus, green assets can outperform brown ones in periods when investors’ tastes are becoming greener. This of course assumes that some investors will continue to prefer polluters and other brown stocks. If all investors were to move green, the entire market would adjust, and green would become the new benchmark.

**Focused on sustainability**

Amid the COVID-19 crisis, investors were more likely to stick with funds with higher sustainability ratings and drop those with lower ratings.

**Investors’ buying and selling of actively managed funds**

*Cumulative percentage difference in flows from February 19, 2020*

<table>
<thead>
<tr>
<th>Month</th>
<th>One-globe funds</th>
<th>Five-globe funds</th>
<th>Funds grouped by Morningstar’s sustainability ratings</th>
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<td>-3%</td>
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<tr>
<td>May</td>
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**Good for society too**

A move to ESG investments can also be good for society, write Pastor, Taylor, and Stambaugh. This may seem obvious, until you look at their underlying reasoning. Milton Friedman, the late University of Chicago professor and 1976 Nobel laureate, famously argued in a 1970 *New York Times* article that companies should focus on profits and let shareholders direct their portion to social programs if they choose to. Managers have a responsibility to shareholders—and only shareholders, Friedman argued. “That responsibility is to conduct the business in accordance with their desires, which
will generally be to make as much money as possible while conforming to the basic rules of the society, both those embodied in law and those embodied in ethical custom,” he wrote.

Harvard’s Oliver Hart and Chicago Booth’s Luigi Zingales have since argued that company managers should instead maximize shareholder welfare, which they see as broader than shareholder value. Shareholders care about more than money, Hart and Zingales write—they also have ethical and social concerns. While it might be possible in some cases for a company to separate its moneymaking from its do-gooding, in other cases it’s more complicated. How do you untangle an issue such as Walmart selling high-capacity ammunition magazines if some of its shareholders favor gun control, for example? (For more, read the essay “It’s time to rethink Milton Friedman’s ‘shareholder value’ argument,” in our December 2017 issue and online at Review. ChicagoBooth.edu.)

Pastor, Taylor, and Stambaugh stick with the Friedman way of looking at the world. In their model, managers couldn’t care less about ESG or being green and simply focus on maximizing market value. But ESG investing has a positive social impact nevertheless. If outside investors care about being socially responsible, managers may follow suit purely to increase the company’s market value. And when investors have a taste for green stocks, the companies they buy develop a lower cost of capital. Managers end up gravitating to ESG, enticed by higher stock prices and that lower cost of capital.

The net effects are good for society, the researchers conclude. When there are more investors who care about ESG, this boosts the price of greener stocks, which in turn induces ESG companies to invest more in their operations. The result is greater positive social impact, whether in the form of cleaner rivers, happier employees, or healthier markets.

**Who decides what’s green?**

This theory on green investing is simple and breaks new ground. That’s because while green investing may be established and close to mainstream, academic research on the subject, and on ESG more generally, is only just getting going.

Perhaps because of that lag, ESG is a woolly term. In the investment market, it’s not at all clear what it actually means. For some investors, ESG is evolving into just another investing style, a way to find an edge by including material factors not yet priced by the market, such as employee satisfaction, that can deliver outperformance. Others focus on ESG factors that highlight systemic, societal risks, such as environmental degradation, which have an impact on companies across an investor’s portfolio. And it gets complicated: a company could be a great employer for working mothers but also a large emitter of greenhouse gases. A corporation might be favored by environmentalists but attacked for poor labor practices.

Although ESG ratings make more information salient for investors, ESG investing risks becoming diluted, says Kimberly Gladman, senior associate at ValueEdge Advisers and a lecturer at Boston University. “The number of people who claim they’re doing it now is vastly expanded,” she says. “But the definition is so weakened that it is very, very far from the original intent.”

This concern is one reason many researchers and investors, among others, have pushed to standardize key metrics of sustainability for different industries and develop a reporting framework. Chicago Booth’s Hans B. Christensen and Christian Leuz and University of Pennsylvania’s Luzi Hail have collected various arguments and compiled them in a report and an accompanying working paper. (For more, read “Should sustainability disclosures be standardized?” Winter 2019/20 and online.)

Despite the unanswered questions, investors seem to be piling on board—particularly investors from outside the United States, research suggests. Booth’s Ralph S. J. Koijen, NYU’s Robert J. Richmond, and Princeton’s Motohiro Yogo find that demand for green companies in the US stock market is coming at least in part from foreign investors, including sovereign wealth funds. “Larger, passive, and foreign investors have a stronger demand for greener firms,” they write, noting that State Street, PRIMECAP, and Vanguard are the most influential among US investors, and the Norwegian sovereign wealth fund is most so among foreign investors.

Under the Trump administration, the US relaxed environmental regulations, but that trend may reverse under President Joe Biden. And at least in theory, stricter environmental rules could benefit green stocks—and their investors.—*With Brett Nelson*
Is capitalism the engine of destruction or the engine of prosperity?

Hosts Luigi Zingales, a world-renowned economics professor, and Bethany McLean, a *Vanity Fair* contributing editor, explain how capitalism can go wrong, and what we can do to fix it.

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In January 2010, Swiss officials handed down what was briefly the most expensive speeding ticket on record: 299,000 Swiss francs (US$290,000), the penalty for the driver of a red Ferrari Testarossa caught going up to 137 kph (85 mph) through the town of St. Gallen, where the limit was 80 kph. The fine was based not on the driver’s speed but on his ability to pay: he was reportedly worth more than 20 million francs, and had four other luxury cars besides the Ferrari. Later that year, officials ticketed another driver, this time in a Mercedes, about 1 million Swiss francs.

One takeaway here is to slow down on picturesque roads, at least while driving in the Swiss Alps. But there is also a lesson for US policy makers in the form of personalized fines. Other countries including Finland also base fines on income. By contrast, the way municipalities in the United States issue most fines is neither progressive nor effective. It hurts poor people and fails to bring in revenue. We can do better.

Consider the current situation: more than a decade of economic volatility has led to budget shortfalls for governments at every level. Politicians are reluctant to hike taxes, and there are few other options for raising revenue. Many local governments have turned to fines to fill their coffers. Fines are convenient and politically expedient, as elected officials can say that the budget will be balanced not by taxpayers as a whole but on the backs of people who break the law. If you don’t want to pay more, all you have to do is follow the rules.

Lower fines could lead to higher revenues

Personalized fines would be a win-win for municipalities and their residents

JEAN-PIERRE DUBÉ
Chicago mayor Lori Lightfoot is using this playbook. Until recently, anyone caught on camera driving 10 mph over the speed limit was fined $35 and up. But the city will soon also ticket drivers who are 6–9 mph over the limit. This plan is reminiscent of one from 2012, when then mayor Rahm Emanuel attempted to raise $16 million by hiking the fine for not having a vehicle sticker from $120 to $200.

This phenomenon goes beyond Chicago, as other cities across the US, facing shrinking tax bases, are also relying on fines to balance their budgets. A 2019 investigation by Governing magazine finds that while the vast majority of local US governments earned less than 5 percent of their general fund revenue from fines, nearly 600 local jurisdictions collected more than 10 percent that way, and 284 governments collected more than 20 percent. (I believe these are conservative estimates since some municipalities put money in places difficult to track, and the report doesn’t include locales that collect less than $100,000 per year in fines.)

But if Chicago’s experience is any indication, plans to raise money this way won’t garner as much as expected—and will bury some of the poorest people in debt. As of 2018, Chicago drivers have racked up more than $275 million in unpaid fines for city-sticker violations since 2012, far more than the initial revenue goal, and it’s causing many of them financial ruin. According to ProPublica, 1,000 Chicago residents who claimed chapter 13 bankruptcy protection in 2007 included unpaid city tickets in their debt. By 2017, however, 10,000 people filing chapter 13 listed city fines among their unpayable debt. The amount they owed jumped from $1,000 to $3,900.

Charging everyone the same fine is regressive. Fines, plus related fees and costs, can devastate someone who is financially struggling. Dartmouth’s Steven Mello finds that for people in Florida’s poorest quartile, a $175 traffic ticket causes a degree of financial distress similar to that caused by a significant earnings decline. A ticket often comes with processing fees and administrative costs, plus failure to pay on time can lead to a bigger fine. Someone unable to pay $175 on time could find herself thousands of dollars in debt within just a few months. The Conference of State Court Administrators (COSCA) reports that 10 million Americans owe more than $50 billion to the criminal justice system.

Mello linked data on traffic tickets issued in Florida between 2011 and 2015 to recipients’ monthly credit reports and payroll records from a large set of employers. In the year after a traffic stop, he finds, poor drivers experienced a one percentage point drop in the probability of having any payroll earnings, which suggests an increased likelihood of unemployment or a job change. Did some of those people have their licenses suspended because they were unable to pay the traffic ticket? More than 7 million Americans may have lost their licenses due to unpaid court or administrative debt, according to a 2018 Washington Post estimate.

Without the ability to drive, many people can’t work. In New Jersey, according to COSCA, 42 percent of people whose licenses were suspended lost their jobs because of the suspensions, and 45 percent of those regained employment only when they regained driving privileges.

Needless to say, when a person can’t drive or work, it becomes less likely that a city will be able to collect a fine. The unintended consequence of disproportionate delinquencies among the poor exacerbates preexisting symptoms of poverty—and fails to generate revenues for the city. Without measures that account for an individual’s ability to pay, those with the lowest incomes will be the most prone to continue accumulating debt and penalties and paying higher fines. I recently reviewed 2018-19 data from the City of Chicago on individuals with delinquent traffic fines that had been assigned to a collection agency. Ninety percent of these fines were concentrated in 20 zip codes populated predominantly by Black Americans and Hispanics.

And there’s one more problem with uniform fines: they may not deter many people from the behavior at issue. A $175 ticket is unlikely to have stopped Switzerland’s joyrider. For wealthy people, a six-figure fine might be required to deter behavior, whereas a $175 readily deters someone in poverty.

**There’s a better way**

There is another option, however, a win-win strategy that would help cities collect more while keeping the poorest from suffering the financial consequences of the current system. The answer is personalized fines, setting the prices for individuals on the basis of their ability to pay. Personalized fines can be low enough for people to pay them but high enough to become deterrents even for more affluent citizens. This is how some fines are already set in Switzerland, as well as in Finland, which in 2002 issued its own then-record-breaking 116,000 euro (US$103,000) speeding ticket. These countries are more likely to collect on their tickets because they realize that an individual’s propensity to pay a fine, just like the demand for goods and services, is elastic.

Consider how a company comes up with a one-size-fits-all price for a product. When a price is low, more consumers can afford the product, but profit margins per paying consumer are thin. When a price is higher, margins per paying consumer rise, but the number of potential buyers falls. The company wants to find the sweet spot, where it optimally balances the number of paying customers at the margins per paying consumer.

This uniform-pricing strategy knowingly excludes some potential consumers who might like to purchase the company’s product, but not at the current price. The same is true with one-size-fits-all fines. There are many people who want to pay the fine, but they simply can’t afford it. A company that instead sets prices on the basis of what a customer is willing to pay can make far more money. Movie theaters have for decades been charging lower prices to children and seniors. Similarly, most B2B companies that use a sales force authorize their sales reps to negotiate discounts off the regular prices. Even many public mass transit services, such as city buses, adopted such

**Personalized fines can be low enough for people to pay them but high enough to become deterrents even for more affluent citizens.**
segmented pricing long ago by offering student and senior fares. A similar tactic is used in places such as Chicago, where people demonstrating financial distress can meet with a city representative to obtain payment plans and waivers on portions of late fees. San Francisco recently implemented waivers of up to 80 percent of the original fine amount. However, these systems do not scale and are prone to human error.

The advent of data and artificial intelligence enables us to implement scalable solutions that optimize the manner in which we target differential prices. I proved this concept with my Booth colleague Sanjog Misra. We ran experiments with ZipRecruiter, a company that charges a monthly fee to simplify and accelerate the process of finding and screening qualified job candidates. ZipRecruiter had been doing well charging a uniform price to all its clients, but we thought it might be able to serve more clients if it offered them different prices.

For one month, when new clients signed up for ZipRecruiter, we charged random amounts between $19 and $399. We collected data on the companies that accepted and rejected the offers. Then we used these data to build an algorithm that would determine the price a company would be willing to pay. In a second experiment that tested the optimized personalized prices, revenues increased 84 percent from the baseline. (For more, read the Spring 2018 feature “Are you ready for personalized pricing?” online at Review. ChicagoBooth.edu.)

Fine payments, too, are elastic in the sense that individuals have some discretion over their choice of whether or not to pay. If a fine is affordable, it’s likely that a person will pay it, either out of a sense of duty or to avoid penalties. Since few people have disposable income, wealthier scofflaws won’t have much trouble coming up with a few hundred dollars to pay off a ticket, but less affluent offenders may already be struggling to pay for basic necessities, let alone a fine. The person receiving a city-sticker fine might not have had the money for the renewal sticker initially, much less for the fine. And nearly 40 percent of Americans have said they couldn’t come up with $400 in case of an emergency, according to a 2018 Federal Reserve report.

The choice for many at this point is to borrow the money needed at a high interest rate or to take it from other budget items. It’s a choice between paying the fine or paying rent, the water bill, and the grocery tab. It has become abundantly clear that people in this position choose to house, clothe, and feed themselves and their families.

A flat fine is even more regressive than a flat income-tax rate. In Illinois, all residents are expected to pay the state 4.95 percent of earnings no matter their income. A $200 ticket represents 0.13 percent of the income of a person making $150,000 per year, but it’s more than 10 times the financial burden for an individual at the federal poverty level. Nearly one in five Chicagoans live at or below the poverty level.

The major difference between products and fine payments in terms of the elasticity of demand is the ramifications. If a new blender costs more than you’re willing to spend, don’t buy one. An unpaid fine, however, leads to more costs.

If a fine were based on the ability to pay it, both the person fined and the city would benefit. If an offender who cannot afford $200 can come up with $50, the amount remains a deterrent, the person ticketed isn’t saddled with insurmountable debt, and the city collects money.

I’m hoping to test the personalized-fine theory soon by working with a company, SERVUS, that uses artificial intelligence to create payment options for individuals. Its goal is to help collect as much as possible for a city, health-care facility, or utility while keeping payments manageable. It may be illegal in some states to charge a personalized fine on each ticket, but a city can forgive a portion due, which would be equivalent to personalizing for people with financial difficulties.

SERVUS currently uses ability to pay as a basis for determining a person’s obligation, but the system could benefit from more data. Together with SERVUS, if we were to get the go-ahead from a city to conduct research, we would randomize fine amounts for people unable to pay. We would test how much a person who demonstrates financial distress would be able to pay. This information would be used to inform an algorithm that could then offer data-driven relief to individuals who get fines that are above their means to pay.

This represents an incredible opportunity. After implementing fine forgiveness, San Francisco saw an almost immediate increase in fine revenues. ZipRecruiter found that it could nearly double its profits if it were to adopt such a personalized model for its business. (It didn’t end up doing so for a variety of reasons, including a shift in its product offerings and a change in its competitive landscape.)

SERVUS has a relationship with a company that Chicago uses to collect fines. Considering that the City of Chicago collected $272 million from parking and automated camera tickets in 2018, a sizable bump in fine collection would go a long way toward closing its budget gap. Even if Chicago decided not to adopt personalized fines or fine forgiveness for whatever reason, the proposed research could help determine an optimal fine rate to maximize the amount collected—or perhaps two optimal rates, which would allow the city to use a different rate for citizens who can demonstrate financial need.

Above all, this plan would take better care of the most financially vulnerable of the city’s residents. Beyond Chicago, there are many places that could benefit from a plan that brings in additional revenue but that doesn’t lead its most financially vulnerable citizens toward bankruptcy. We need one city to sign off on this idea, and the research could begin.

Jean-Pierre Dubé is the Sigmund E. Edelstone Professor of Marketing and a Charles E. Merrill Faculty Scholar.

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It may be illegal in some states to charge a personalized fine on each ticket, but a city can forgive a portion due, which would be equivalent to personalizing for people with financial difficulties.

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Entrepreneurs trying to build big companies turn to equity investors to raise capital. If a company is an established ongoing concern, investors can look at cash flows, growth rates, customer retention, capital assets, leverage, and other hard metrics to determine whether to invest and how to value the company. An early-stage company has few if any hard metrics, however. Startups are often just emerging from the idea stage into market trials, and the minimum viable products and services they offer are being tested by beta customers.

This presents a challenge for the entrepreneur. What will convince angel and early-stage venture investors that what she is building is not only a feasible company but one that has the potential to generate a large return on investment, and maybe even become one of those rare unicorn companies that will make its investors rich?

If she were to Google “what investors look for before funding a startup,” she would find myriad guides, many written by angel investors and venture capitalists. Most of these guides include some variation of the four M’s outlined by entrepreneur and investor Mark Suster in his blog Both Sides of the Table.

- Momentum: some traction metrics in terms of users, customers, recurring revenue, etc.
- Management team: an entrepreneur’s education, industry credentials, and entrepreneurial experience
- Market size: enough demand that there is the potential to build a really big company
- Money: how much an entrepreneur will need to build the company, and the percentage of ownership that the investor will be able to maintain in the process of getting to an exit

Early-stage investors following this guide, or one like it, may believe they are objectively evaluating startups on factors such as management team credentials, sustainability of the business model, evidence of traction in the market, and large-company potential. However, new research indicates that regardless of what investors think they’re doing, the reality is subtly different. Investors, these findings suggest, are more influenced by an entrepreneur’s likability, positivity, and happiness than they are aware of. One implication of this for entrepreneurs is that your smile matters very much, which is a revelation that I find to be surprising—and somewhat disappointing.
Team is No. 1

Suster’s four-M framework is largely echoed in extensive research by Chicago Booth’s Steve Kaplan, Harvard’s Paul Gompers, University of British Columbia’s Will Gornall, and Stanford’s Ilya Strebulaev. In a study published in the Journal of Financial Economics, this team sought to answer the question: How do venture capitalists make decisions? They surveyed 885 institutional VCs at 681 companies worldwide from November 2015 through March 2016, asking them to rate their top three investment criteria. Nearly all the respondents said the target company’s leadership team was one of the top factors. The researchers narrowed in on the 241 venture capitalists who focused on seed and early-stage investment, and 96 percent in this group included leadership team in their top three criteria. The other popular criteria were the company’s business model (84 percent), product offering (81 percent), potential market opportunity (74 percent), and fit within the VC’s existing portfolio (48 percent). However, when asked to identify the single most important investment criterion, more than half the investors chose the founding team, demonstrating even more clearly their reliance on founder credentials in assessing early-stage companies. Asked to define the qualities they looked for in a startup team, the investors cited ability, followed by industry experience, passion, entrepreneurial experience, and teamwork.

A research experiment conducted in summer 2013 by Harvard’s Shai Bernstein, University of Southern California’s Arthur Korteweg, and AngelList’s Kevin Laws further validates this dependence by early-stage investors on the characteristics and experiences of the founding team, which serve as a quality signal. The researchers used AngelList, an online platform created to match startups with accredited investors, and randomly selected a cohort of companies seeking funding. At the time, when investors joined AngelList, they specified what kinds of startups they were interested in, and then AngelList periodically sent them an email of “featured” companies, with the intention of attracting them back to the website to learn more.

AngelList’s emails included information covering three areas: team credentials, current investors, and market traction. Bernstein, Korteweg, and Laws decided to mimic these emails to see which of the data categories most influenced an investor’s decision to learn more about a particular company. Because AngelList often included information from just one or two of the categories rather than all three, the researchers were able to send out experimental emails that randomized the categories included, and they could see which ones made an investor more likely to click through to learn more about a company. They sent 16,981 emails about 21 startups to 4,494 active investors. Recipients opened 48 percent of the emails, and in 16.5 percent of these opened emails they clicked on the View button, an indication that the investor wanted more information about the featured company. The researchers also collected data on how often the investor then requested an introduction to the company, a further sign of interest.

Not surprisingly, as it supports the findings of Kaplan and his coresearchers, emails that included information about the team saw 13 percent higher-than-average click-through on the View button, with a click rate of 18.7 percent. This bump was even bigger when the investor’s area of interest and expertise coincided with the industry of the startup company—then there was a 20.4 percent click-through rate. The presence or absence of information in the other categories did not significantly alter the click rate.

What VCs look for in a startup

Institutional venture capitalists who focused on seed and early-stage startups said the target company’s leadership team was the most important factor in their decision to invest.

Survey responses from seed and early-stage VCs

241 respondents, 2015–16 survey

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<th>Share who included the factor among their top three criteria for investing in a startup</th>
<th>Most important consideration in an investment decision</th>
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Deutsch, 2021; Gompers et al., 2017

When asked to identify their single most important investment criterion, more than half of investors surveyed chose the founding team.
But investors can be fooled
Investors are smart in prioritizing team over other criteria in their investment decisions, research suggests. Numerous studies over the decades have found a correlation between human capital—education, experience, knowledge, and skills—and entrepreneurial success, and more recent research by University of La Verne’s Byungku Lee suggests that founders’ hard work is a significant predictor of new venture success. There is little doubt that a great team is critical to startup success. But how exactly are investors evaluating teams?

Research conducted in 2020 by Yale PhD candidate Allen Hu and Yale’s Song Ma reveals that investors may be sucked in by a smile. Hu and Ma created an experiment to use a new methodological framework to identify what features in human interactions matter in economic decision-making and to utilize cutting-edge technology to empirically represent, measure, and analyze those features across vocal clues, facial expressions, and language choices. They selected a random set of short startup video pitches created by 1,139 entrepreneurial teams as part of the process of applying to top accelerator programs including Y Combinator, MassChallenge, and Techstars, among others. Eight and a half percent of the teams were accepted into the accelerator program for which they applied.

Hu and Ma used voice and facial recognition software to deconstruct the videos—capturing facial expressions at 0.1-second intervals and tone of voice and inflection on a sentence-by-sentence basis, as well as word-by-word content. This created an enormous data set which they then analyzed via machine learning. Using well-established frameworks from psychology, finance, and linguistics, they were able to create 10 distinct metrics—six quantifying emotion in voice and facial expression and four analyzing the content. (See “How to turn voices and facial expressions into data” on the following page.) They examined how much time during each video a team displayed positivity or negativity according to the visual, vocal, and content metrics. Weighting each of these measurements, they created an overall pitch score that represented the “positivity” of the team’s presentation.

Not at all surprisingly, investors preferred teams that looked and sounded positive. In fact, a 1-standard-deviation increase in overall positivity improved a team’s chance of being selected into the accelerator by 35 percent, up from 8.5 percent to 11.5 percent.

But Hu and Ma also found that investors prioritized this positivity over all other factors in the pitch, to their detriment. A higher score on the verbal-ability dimension was actually negatively correlated with selection. When the researchers controlled for both the teams’ education and work experience—characteristics that in practice correlate with entrepreneurial success—they found that this did not change the results. Hu and Ma then tracked down the companies to see what happened to them. Looking at survival rates, jobs created, and the results of later funding rounds as a way to determine the success of the companies in their sample, they discovered that more-positive entrepreneurs, indicated by happier facial expressions and vocal emotions, built companies that raised less follow-on funding and hired fewer employees than the average of the cohort, while those who exhibited higher verbal ability were likely to employ more people at their ventures—even though they were less likely to have obtained funding. This suggests that entrepreneurs who use the kind of technical, content-rich language the algorithm picked up on are less likely to appear friendly and happy, and therefore to appeal to funders, even though their language correlates with more competent teams that build better businesses.

The study also suggests that first impressions disproportionately affect investor decisions. When Hu and Ma limited their analysis to the first five seconds of the pitch, an amount of time during which little of substance about the business could be communicated, the results were similar—the more positive the beginning of the pitch, the more likely the company was to be selected.

Implications for entrepreneurs and investors
Many years ago, I was coaching an entrepreneur through Chicago Booth’s own accelerator program, the New Venture Challenge. The young man was an exceptionally talented and experienced engineer and presented
How to turn voices and facial expressions into data

Researchers created a set of metrics to measure a startup pitch’s persuasiveness.

**EMOTION MEASURES**

- Visual positive (Facial expressions)
- Visual negative

- Vocal positive (Tone and energy)
- Vocal negative

- Vocal valance (Range of emotional quality)
- Vocal arousal (Excitement level and intensity)

**CONTENT MEASURES**

- Verbal positive (Use of language)
- Verbal negative

- Verbal warmth (Socially perceptive positivity (words such as “together” or “help”))
- Verbal ability (Industry and execution (words such as “intelligence” or “design”))

Deutsch, 2021; Hu and Ma, 2020

**Being happy and positive about your startup is a huge subconscious signal to investors that your team includes people they want to invest in.**

Waverly Deutsch is clinical professor at Chicago Booth and the Polsky Director of the UChicago Global Entrepreneurs Network.

Go to Review.ChicagoBooth.edu to see citations for research mentioned in this essay.
Don’t lose sight of suffering

Awareness of hardship is fine; understanding it is better

I earned $4.25 an hour at my first job. It was at Sagebrush, a now-defunct clothing chain that sold cheap jeans to working-class Midwesterners. In the 1990s, when I worked there, $4.25 was the minimum wage, a callous phrase that aptly captures employers’ intention to do the very least they can by you. I took home about 70 bucks a week after taxes—until I was held up while working the register. If you can’t put a price on life, you certainly can on labor: after reassuring me that my safety was all that really mattered, the regional manager reassessed my value to the company and gave me a 10 cent raise. Now I made $4.35 an hour, or nearly $72 for an 18-hour weekend.

My second job was cleaning dorms as an undergraduate at Harvard. The pay was considerably better, $9.65 an hour, but it was beastly work. If retail is a never-ending war against the tedium of monotonous tasks and the temerity of capricious customers, cleaning is an all-out assault on corporeality. You are constantly straining or squatting or sprinting up stairs. The work was especially gruesome in June after school let out; a month of 80-hour weeks left my body hurting in ways that make me cringe now.

But once those four weeks were over, I often had two grand in my pocket, enough to fund an unpaid internship, a summer ritual for academic overachievers that, in the status-conscious precincts of higher ed, is the antithesis of scrubbing toilets. In many respects, passing between these workplaces was jarring—so jarring as to seem slightly grotesque. Work is a curse, or at least that’s what I learned in Bible study. When Adam and Eve were driven out of Eden, they finally had to work for a living. We all do—well, nearly all of us—but not all jobs are created equal. That’s certainly the lesson I’ve learned, though at times it seems more like a dirty secret. In fact, some jobs can be so rewarding (monetarily, intellectually, even morally) that we lose sight of the burdens others shoulder. Their work becomes invisible to us—even when they are toiling on our behalf.

Decadence and drudgery

“What you don’t necessarily realize when you start selling your time by the hour is that what you’re actually selling is your life,” Barbara Ehrenreich notes in Nickel and Dimed, her best-selling account of trying to make ends meet on low-wage work. Ehrenreich was writing her blue-collar correspondence right about the time I was pulling double shifts scrubbing steel showers. What united our efforts—in addition, of course, to scrawny pay stubs and occupational hazards—was their transitory nature. Over three months, Ehrenreich tried various jobs that all paid less than $10 an hour, knowing full well she was a tourist in the penal colony of the working poor, whereas my hard labor might be regarded as either a stepping stone or even a rite of passage and, thus, a way station in the work world rather than a terminal.

In either case, it wasn’t where we “belonged,” an invidious description that often sits comfortably on the tongues of those who tend to sentimentalize manual labor as conducive to “building character.” Certainly, in terms of a moral education, there is much to commend an extended engagement with hard, repetitive, and deeply unglamorous work, but only if the ultimate lesson more closely approximates “There but for the grace of God go I” than the bootstrapping bunkum of “Anyone can do it!” The enthusiasm of the second lesson treats such work as a kind of...
crucible of capitalist advancement, a challenging experience, to be sure, but one that individuals pass through on their way to bigger and better things—unless, of course, they suffer from some kind of personal failing.

The truth is that most tasks of a menial variety do not constitute “starter jobs.” They are just jobs, the work that people do to make ends meet. This is not to say that the individuals who work them don’t want more, simply that the “more” in question tends to be “more pay.” They don’t view the jobs they have as merely another rung on some endless career ladder. That idea is essential to the striver’s ethic and, perhaps, necessary to progress in a competitive enterprise system, but it can create the impression that the waitress, the janitor, or the field hand—or, for that matter, the Uber driver, the floorwalker at Walmart, or a member of the invisible army packing boxes at Amazon—are undeserving of any larger consideration than the invisible hand already grants them.

The danger of an ever-widening circle of wealth, the late John Kenneth Galbraith wrote in 1958 in his most famous book, The Affluent Society, is that “we will settle into a comfortable disregard for those excluded from its benefits and culture.” What’s more, he continued, “there is the likelihood that, as so often in the past, we will develop a doctrine to justify the neglect.”

Willful neglect of the working poor may be odious, but it does have the benefit of its being self-aware. If often giving little evidence of being especially informed, the opinions sanctioning such neglect, whether or not they congeal into a proper “doctrine,” are still susceptible to principled engagement and possible change. The greater danger, far greater, is a mere oblivion. Ehrenreich warns of it in the conclusion to her book. “Some odd optical property of our highly polarized and unequal society makes the poor almost invisible to their economic superiors,” she writes. “The poor can see the invisible army packing boxes at Amazon—are undeserving of any larger consideration than the invisible hand already grants them.

The lives of others
Three generations now stand between us and the debut of Galbraith’s book, and affluence in the US has only grown. The “New Class,” a charmed group of individuals whose work included “exemption from manual toil; escape from boredom and confining and severe routine; the chance to spend one’s life in clean and physically comfortable surroundings; and some opportunity for applying one’s thoughts to the day’s work.” This class of individuals was “new” for Galbraith insofar as the ghosts of the Great Depression still haunted Eisenhower’s America, and it should be emphasized that what characterized these people as a class was not only that work was its own reward for them, but that it was rewarded, too, at least well enough to afford the upper-middle-class comforts and bourgeois peace of mind we associate with affluence.

Galbraith was born in 1908 and therefore was old enough to remember not only both World Wars and a Great Depression but also a time before child labor laws, central air, and the polio vaccine. He, like everyone else of his generation, was intimately familiar with a world that could be cruel and unforgiving regardless of one’s position in society. Cash and connections could no doubt insulate one from a considerable degree of grief and suffering, but in a world where one out of every 10 children died as infants, as they did in the US at the dawn of the 20th century, and no amount of money could replace a bum hip, suffering was far more democratic. No one escaped the gallows of despair.

But the world of 1950s America not only afforded the opportunities for a far more humane existence, there also seemed to be a growing community of people, Galbraith contended, who had escaped old Adam’s curse altogether. They could take for granted that work “will be enjoyable,” and if not, that it was a “legitimate source of dissatisfaction, even frustration.” It wasn’t so much that work need not be drudgery; it should not be drudgery. It should be an activity, however demanding, that is filled with personal satisfaction and even pleasure, a condition that involved the very nature of work as well as its reward.

To forget that someone is doing some terrible task on our behalf relieves us of the trouble of taking any responsibility for it.

What is drudgery? It’s not merely tedious or time-consuming tasks. Many first-year analysts at investment banks spend enough time staring at spreadsheets to long for the consolations of a jackhammer. No, as a society we tend to valorize overwork and deprecate leisure in a manner that would have stunned our forebears after a summer day bent double in the fields, those who bumptiously embrace work-life imbalance aren’t at the head of the queue for sympathetic consideration, even if one might think they should seriously get their heads checked.

Drudgery, according to Galbraith, is work for which the only thing that commends it is a paycheck. “It is fatiguing or monotonous or, at a minimum, a source of no particular pleasure,” he says. “The reward rests not in the task but in the pay.”

In contrast to those who do labor, Galbraith described members of a “New Class,” a charmed group of individuals whose work included “exemption from manual toil; escape from boredom and confining and severe routine; the chance to spend one’s life in clean and physically comfortable surroundings; and some opportunity for applying one’s thoughts to the day’s work.” This class of individuals was “new” for Galbraith insofar as the ghosts of the Great Depression still haunted Eisenhower’s America, and it should be emphasized that what characterized these people as a class was not only that work was its own reward for them, but that it was rewarded, too, at least well enough to afford the upper-middle-class comforts and bourgeois peace of mind we associate with affluence.
touchstones of toil and economic turmoil, and for those fortunate enough to grow up in such blessed conditions, they live and work at a kind of experiential remove that makes a life of drudgery, and the mishaps of poverty that so often attend it, at best a kind of academic phenomenon, something one can identify and even opine on but hardly understand.

I see this in my own classes at Chicago Booth, disproportionately attended by young people who are familiar with upper-middle-class comforts. A statistic that seems to catch my students especially off guard is the median household income in the US, which, according to the Census Bureau, was just over $63,000 in 2018. Given that many of these students have already enjoyed annual salaries double this amount and have done so without also discharging any of the obligations of parenthood or even partnership, the number is a shock to them. (“People live on this?”) And immediately on the heels of this shock is the bracing realization that half of American households get by on less, often far less. Indeed, in 2018, for those under 65, the federal poverty line was set at individuals making $13,064 or less—or, for a family of four, a maximum income of $25,900. That year, 38 million people made the cut, a number slightly smaller than the combined population of the 23 smallest states.

“Most of the people I write about in this book do not have the luxury of rage,” David Shipler contends in the opening of his best-selling book, The Working Poor: Invisible in America. “They are caught in exhausting struggles. Their wages do not lift them far enough from poverty to improve their lives, and their lives, in turn, hold them back.” If such individuals do not have “the luxury of rage,” that is because luxuries of any sort, material or emotional, are well out of their reach. Whether they are entitled to feelings of rage, however—or, more to the point, whether those of us a bit more blessed should vicariously indulge them on their behalf—is a moral question, one with substantial social and political implications.

As an ethics professor, I have strong feelings on such matters, while also strongly believing that the lectern is not a pulpit. Students are welcome to come to any conclusions they like. They might, like Galbraith, resolve that, when people “cannot have what the larger community regards as the minimum necessary for decency,” they are therefore “degraded[,] for, in the literal sense, they live outside the grades or categories which the community regards as acceptable,” a belief that led him to conclude that “one of the central economic goals” of a civilized society is “to eliminate toil as a required economic institution.”

On the other hand, they might conclude that rage is only a proper response to manifest injustice, and insofar as the price of one’s labor is determined like the price of any good or service in a free market, by the intersection of supply and demand, if the market determines one’s labor is only worth $15,080 (the annual salary for someone working 40 hours a week for a full 52 weeks at a minimum-wage job), well, there’s nothing unjust about that. You are no more required to take such a job than I am required to pay you a penny more than I must for your services. In the spirit of Milton Friedman, we are both free to choose.

But choice, of either a moral or professional variety, is only meaningful if it is informed. That requires, at least among members of Galbraith’s “New Class,” a kind of curiosity about the lives of those less fortunate, a patient inquisitiveness that imparts a sense of moral perspicacity.

Such an engagement recalls an observation by George Orwell in The Road to Wigan Pier. “I had read the unemployment figures,” he wrote, “but I had no notion of what they implied.” Orwell meant that such figures were meaningless to him in a moral sense if he knew nothing about the lives they intimated. He set about remediating his ignorance by undertaking an experiential regimen that, if more involved, approximates the advice I give to my own students: seek to understand the lives of those who suffer on your behalf.

As he chronicled in The Road to Wigan Pier, Orwell went to observe the lives of coal miners in England, at least as they appeared in the mid-1930s. The second chapter of his book is extraordinary, a literary Grand Guignol of the grimmest working conditions. Orwell concluded it by reflecting on what had changed for the miners in recent years, and what remained the same for his readers, in addition to the connection between them. “It is not long since conditions in the mines were worse than they are now,” he wrote.

There are still living a few very old women who in their youth have worked underground, with the harness round their waists, and a chain that passed between their legs, crawling on all fours and dragging tubs of coal. They used to go on doing this even when they were pregnant. And even now, if coal could not be produced without pregnant women dragging it to and fro, I fancy we should let them do it rather than deprive ourselves of coal. But most of the time, of course, we should prefer to forget that they were doing it.

To forget that someone is doing some terrible task on our behalf relieves us of the trouble of taking any responsibility for it. The work is absorbed into some wonderful, mysterious world whose benefits, like manna from heaven, seem to appear from nowhere and drop right into our laps.

Ignorance is undoubtedly bliss, but it is always morally unbecoming.

Choice, of either a moral or professional variety, is only meaningful if it is informed.

John Paul Rollert is adjunct assistant professor of behavioral science at Chicago Booth.
In late December, a new, more transmissible strain of the virus that causes COVID-19—B.1.1.7, often called simply the “UK variant”—appeared in the United States. As this strain becomes more and more dominant in the US, it will mean the virus’s reproduction rate, popularly known as $R$, will be higher. If or where $R$ was a bit below 1 (meaning that each infected person spread the virus to fewer than one other person, on average) and the virus was contracting, the virus will begin moving toward exponential growth again. And the virus has already been spreading quickly in our second wave.

As Zeynep Tufekci explained in the Atlantic, “a more transmissible variant is in some ways much more dangerous than a more severe variant. That’s because higher transmissibility subjects us to a more contagious virus spreading with exponential growth, whereas the risk from increased severity would have increased in a linear manner, affecting only those infected.”

If you want to stop a pandemic, there is one rule for public-health policy: lower $R$, the reproduction rate. With $R$ below 1, the virus fades away. With $R$ above 1, it grows exponentially until “herd immunity” stops it, meaning in this case that most Americans have caught the disease. It follows, then, that now that we have a vaccine for COVID-19, there should be one rule guiding its distribution: give it fast to the people most likely to get the virus and spread it to others. (There is some uncertainty how much the vaccines help to stop transmission. I assume here that they do, at least to a significant degree.) It may seem intuitive that vaccines should go first to those most vulnerable to the disease, but by targeting instead those most likely to spread the virus, we can end the pandemic and, in so doing, provide even greater protection to those vulnerable groups.

Nothing matters but the reproduction rate. That is not, however, the tack US public-health officials have taken throughout the pandemic, including in their approach to who should be inoculated first.

The recurring failure of our government response to this pandemic has been to fall behind the pace of the virus’s spread—to permit it to reach and sustain exponential growth. The US Food and Drug Administration wasted months when the vaccines were known to be safe, and wasted weeks over Thanksgiving delaying approval in a public-relations gambit. We have snafu after snafu in vaccine distribution. And we have vaccine rationing that is designed to do just about nothing to stop the spread.

In fact, the reproduction rate has been about the last criterion in the allocation scheme. The first allotments of the vaccines are going to protect old folks in nursing homes. And this approach isn’t unique to the US: the UK gave its first dose to a 90-year-old. Germany to a 101-year-old.

It appears kindhearted to protect those who are most likely to die if they get the virus. It is a purely private benefit, so one might wonder why the recipients aren’t asked to pay anything for it. A policy that prioritizes the elderly is really an income transfer to old people in the form of a vaccine.

If those same vaccines were given to frontline health-care workers, or to young partiers who just can’t seem to help themselves from giving it to 25 other people, including three grandparents, we’d curb the disease, we’d address the externality that one sick person can create many new
sick people, and we’d protect old people, all much more effectively.

This is a hard choice, but it is one that competent public-health (and military) bureaucracies are supposed to know how to handle. It’s a classic trolley problem with one person on the left track and thousands on the right. Do you first give a vaccine to old people who are likely to die if they get sick with COVID-19—freeing them to go out a bit and freeing nursing homes from having to implement stringent protection requirements—but, in so doing, let the disease run rampant and the economy tank for another six months? Or do you give it in a way that stops the pandemic, to people who individually are less likely to die but, by being vaccinated, will not spread the disease? The overall death rate is lower in the latter case, but only because of reduced secondary infections, which makes it harder for the CDC to claim to have saved those lives.

Public health knows how to do this—or used to. When we were eradicating smallpox, the response to an outbreak was to ring-fence the outbreak and vaccinate in order to contain the spread of the disease. They did not give the vaccine randomly to the whole population of a country, taking six months to a year to get everyone, protecting people by age, and meanwhile letting the disease spread exponentially.

When combating exponential growth and heterogeneous spreaders, targeting matters, and speed matters even more. George Mason University’s Alex Tabarrok noted on the blog *Marginal Revolution*:

> The FDA should have approved the Pfizer vaccine, on a revocable basis, as soon as the data on the safety and efficacy of its vaccine were made available, around Nov. 20. But the FDA scheduled its meeting of experts for weeks later and didn’t approve until Dec. 11, even as thousands of people were dying daily. We could have been weeks ahead of where we are today. Now the epidemiologists are telling us that weeks are critical.

The issue is not just that thousands were dying daily, tragic as those deaths are. It’s that the disease was growing exponentially in this crucial 20-day period, and thousands upon thousands may die as a result of the delay. That’s a lesson that should have been painfully obvious from the January-March delays in addressing travel, not allowing tests to be used, not ramping up tracing while it could do any good, and so on.

In a year, our bureaucracies have not wrapped their heads around a simple fact: the point is to stop the exponential spread of a disease, not (just) to protect individuals. Tests should be evaluated by their usefulness in stopping spread—and there, imperfect is far better than nothing—not only by their usefulness in diagnosing a given patient for treatment. Vaccines, used right, can stop the exponential spread of a disease, not just protect individuals—or, more accurately, enable them greater social interaction.

One way to distribute vaccines that would target the reproduction rate \( R \) would be to create a free market for them on top of government distribution—a suggestion I have made previously, and been lambasted for. Only the government can artfully offset externalities and information problems, the critics say. Every single dose must be requisitioned to the government’s majestic planning effort; not one may be sold in order to allow willingness to pay guide the usefulness of the vaccine. Not even a hospital emergency room treating COVID-19 patients may spring money and butt the line.

What good has been achieved by banning a private market for vaccines on top of government allocation? The government is really not even thinking about the prime market failure—the externality that if I get the virus I might give it to you. In ignoring that, it is mostly just achieving an income transfer to favored groups.

Suppose there were a free market in vaccines. The only difference is, the government would have to buy at market prices. How would this world look different from ours? First, I think we would see much quicker allocation to health workers. Even if the government were not willing to buy and give it to them, hospitals would pay whatever it takes to give it to staff in their COVID-19 units immediately. They are forbidden from doing that now.

Second, people and businesses that know they are hosts to spreading events could buy the vaccine. There is a lot of private incentive to combat an externality!

Third, the government could do exactly what it is doing now. It just might have to pay more. Is a huge fan of the CDC’s allocation scheme and its brilliant targeting of externalities, public goods, information problems, and every other fable from Econ 101, along with its new social justice and equity goals, fine. It can keep doing that. The Treasury just might have to pay a bit more.

So the ban on private sales comes down to one thing only: money. The government is keeping down the price it has to pay. The ban on private sales comes down to one thing only: money. The government is keeping down the price it has to pay.
HOW HAS THE PANDEMIC CHANGED THE LABOR MARKET?

Chicago Booth’s Marianne Bertrand, Steven J. Davis, and Matthew Notowidigdo discuss the impact of COVID-19, and policies created to counter it, on the US workforce

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Has the pandemic exacerbated trends that were already in the labor market or introduced a new range of issues?

Davis: It’s exacerbated some trends and reversed others. First, it’s been a sharp negative blow to less-educated workers. That’s both a continuation of a decades-long trend, but also something of a reversal of the past 2–3 years, in which they had been seeing a better labor market. Second, we’ve had agglomeration in cities for more than a century, and that has been reversed, at least temporarily. People are eager to get out of really densely populated areas for fear of infection risk. Thirdly, we had some slow trends toward interacting remotely and working from home before the pandemic, but they were greatly accelerated by the pandemic.

Bertrand: At the beginning of the recession, people were talking about COVID being an economic equalizer, but it’s been exactly the opposite. It has increased inequality across income, across socioeconomic groups, and between genders. There’s no doubt that the lower-wage sector of the labor market is bearing, so far, the brunt. It’s somewhat different from what we’ve seen historically in terms of industrial composition: most recent recessions were more focused on manufacturing and construction. This time, it’s service-sector workers, gig workers, and self-employed workers who have been heavily impacted and were not covered by a safety net prior to the CARES [Coronavirus Aid, Relief, and Economic Security] Act. What the new administration does with regard to these workers is a big, outstanding issue. The other factor is that this recession has been more of a “shecession” than a “mancession.” And that raises issues about women’s continued engagement with the labor force.

Notowidigdo: In terms of the gendered aspect of the COVID recession, some of this could reflect preexisting trends. The United States has been somewhat of an outlier among developed countries. At the start of the 2000s, women worked about as much in the US as in Germany, France, and the United Kingdom, and in the past couple of decades, those labor-force participation rates have diverged. Some of what’s going on in the COVID recession could just be a continuation of these trends, although, of course, there’s childcare and other issues that might be disproportionately affecting women during the pandemic.

Davis: I agree on how the gender impact of COVID has played out so far, but there are potentially important differences over the longer run and possibly big benefits for women, especially more-educated women. My survey work with [Stanford’s] Nick Bloom and [Mexico Autonomous Institute of Technology’s] Jose Maria Barrero shows a tremendous decline in the stigma associated with working from home. There’s also been a lot of investment in making work from home better, and improving remote interactivity through technological advances. When we ask people whether they would like to work from home, it’s quite uniform across demographic groups—a lot of people would like to work from home two days a week. Working from home is more attractive for those who can. That’s mainly better-educated, professional people. That could be favorable for more-educated women.

Bertrand: I very much agree. The other silver lining is that among the higher educated who have been working from home, there are more fathers engaging in childcare who might not
do so otherwise. I’m worried, though, about what’s happening to the current generation of women who may be really missing out on a valuable time in their career and how they are going to recover from that. Also, flexibility can take very different forms. Working on the weekend and late at night is more of a norm, and that, again, is going to be harder for women, no matter what.

How effective was the US federal government’s initial support for small businesses?

Bertrand: It’s too early to tell whether the Paycheck Protection Program has been effective. It has helped, but whether it was money well spent is still up in the air. Especially for very small businesses—retail, food, restaurants—the situation is dire. There was a quick recovery up until the middle of June, but the data suggest that nothing much has improved since then. A lot of small businesses might be sitting on overdue rental payments.

Davis: If your metric was “spend a lot of money quickly,” the PPP succeeded. How much better did it make things than they would have been without policy of that particular form? You could have had more generous funds for low-income families or a broader coverage of unemployed workers. Would small businesses have been better off if the federal government had spent more money on trying to get a handle on the dimensions of the coronavirus itself by establishing mass testing and contact regimes? Just knowing how big the risks are, and where they are, and what types of nonpharmaceutical interventions are most effective could be helpful to all businesses. Small businesses suffered so much because we made most of them shut down. If we had figured out some way to deal with the virus while not hamstringing small businesses so hard, that would have been a better outcome than just giving them funds to tide them over.

“We spent trillions in combating the economic effects of the pandemic. For a few billion or even tens of billions, we could have established large-scale randomized testing.”

— STEVEN J. DAVIS

Bertrand: My sense of the research on nonpharmaceutical interventions is that they do not explain much of what happened with small businesses.

Davis: It’s still an open question. Either way, it doesn’t address the counterfactual. We spent trillions in combating the economic effects of the pandemic. For a few billion or even tens of billions, we could have established large-scale randomized testing, both for antibodies and infections, in the population. You can imagine randomly sampling census tracts, and paying people $500 to take the test. What would we have learned if we had done that? We’d have learned about the prevalence of infection at a point in time, and related it to the tests that were done for health-care diagnostic reasons. We could have informed people about their actual risk. We could have learned about the infection mortality rate more quickly. We’d have learned about how far we were from herd immunity. If we’d tested for several months, we’d have learned about the duration of immunity. We’d have learned more directly about the effectiveness of these nonpharmaceutical interventions. I’m disappointed that as part of the CARES Act, we didn’t set aside resources to do that. There’s also the public infrastructure to implement contact tracing. That’s a bigger investment, but it would benefit us tremendously as we go forward with this pandemic and with future pandemics.

What have we learned about the US unemployment safety net?

Davis: One thing that the whole COVID pandemic has revealed quite starkly is how inadequate our unemployment-insurance system is as a claims-processing entity. First, in many states, the system fell way behind in processing claims or in verifying that claims were legitimate. People who lost their jobs had to wait weeks to get anything. That’s extreme hardship, and it’s an insult. Secondly, there were
suggestions—about which I’m dubious—that there’s no way to provide additional unemployment benefits, except by a fixed amount. That’s such an easy problem to fix. What does it take for a state to send an unemployment-insurance benefit payment to somebody? They’ve either got to know the bank account, the name, and the social-security number—they already know that—for an electronic transfer—or they have to have a physical address, a name, and a social-security number to send a check. Even if the state can’t do a finely tailored expansion of unemployment-insurance benefits, it can send that information to the federal government, which already sends out checks to tens of millions of people. This seems like a fixable billion-dollar problem, to revamp the IT infrastructure of all the UI [unemployment-insurance] systems.

Thirdly, there are other administrative shortcomings. Like Marianne, I’m sympathetic to providing some UI benefits to gig workers, but that part of the CARES Act is especially prone to fraud, so we need some investment in systems to deter fraud and abuse, both because they’re costly and a misuse of the system, but also because fraud undermines political support for the system. There’s a lot of missed opportunities in improving the back end of our unemployment benefit system.

Bertrand: Many have been calling for building in more automatic stabilizers within our UI or safety-net system. Seeing the gridlock that we have in Washington, with people having to wait and fearing the uncertainty of what will happen to them, it’s high time we had more of these automatic stabilizers built into the systems. The triggers could be based on the unemployment rates in a particular community, which could automatically change the level of unemployment benefits—something that would not rely on an act of Congress. Think about how much the well-being of all the people who have been affected would have increased if they had not had to wait for Congress to get its act together.

Notowidigdo: I agree. I was involved in a project in which we surveyed countries during the Great Recession. We found that in many countries, unemployment benefits became more generous during recessions, exactly when the unemployment rate crossed a specific threshold, and that benefit extension happened automatically. I certainly think this is something the US could do. We should also think about future stimulus as income maintenance or income replacement. The unemployment rate is continuing to drop, the labor market is recovering, and it may not be clear that we need more stimulus. But many Americans are still struggling, and this relates to the disparate impact of the COVID recession. That’s a good argument for targeted income relief.

What are the labor-market challenges facing the Biden administration?

Davis: There are parts of the labor market that are doing quite well. At the same time, there are parts of the labor market defined by skill groups, demographics, and geographic areas where things are really quite bad. We talked a little bit about service jobs in business districts—people working at restaurants, baristas in coffee shops, people providing personal services to office workers. That part of the economy is pretty devastated. So there’s both a skill aspect and a spatial aspect. Part of the job for Congress, the president, and local officials is, for those people who aren’t going back to the jobs they used to have, how can we create new job opportunities for them quickly? That strikes me as the central challenge from a labor-market perspective. A lot of this is going to happen on the ground level. If you look at cities such as Detroit, or Gary, Indiana, they basically failed to adjust to a massive demand collapse. And of course, the massive demand collapse in steel, in the case of Gary, or the auto industry, in the case of Detroit, was the triggering event. But then the local officials in a city have to recognize, “Look, we’ve got to repurpose our commercial space, our local economies, and we’ve got to do it expeditiously.” That involves business licensing, zoning, new ways of organizing residences and businesses. Some cities do that well; some don’t. I worry a lot about the left-behind people, the left-behind places, and the left-behind people in the left-behind

“Many Americans are still struggling, and this relates to the disparate impact of the COVID recession. That’s a good argument for targeted income relief.”

— MATTHEW J. NOTOWIDIGDO
places. That is partly a consequence of policy, not just at the national level but also at the local level.

Notowidigdo: I’m optimistic we’ll return to an era of incremental reforms. What would that look like in terms of tackling inequality? I’m guessing that it would be a modest increase in progressive taxes, and I doubt we’ll go anywhere close to what Biden had promised during the campaign, or any of the major changes that were suggested during the Democratic primary, in terms of things like large wealth taxes. But I think we’ll make small steps to returning to what tax rates looked like under Obama and under Clinton. Is that going to make a huge dent in inequality? Maybe a little bit.

Davis: There’s opportunity for bipartisan agreement. For example, in our working-from-home research, when we ask people about how productive they are when working from home, how efficient they are, there’s a lot of heterogeneity. There’s two main reasons for that. For those who are living in a confined space with kids and feel they’re less productive working from home, that’s pretty hard for policy to address. But some people feel they’re less productive because they’ve got poor-quality internet connections. And not surprisingly, those are concentrated among lower- or middle-income, less-educated folks. We hear all this desire for spending on public infrastructure, and this is a big gap in the quality of public infrastructure. Here’s an opportunity both to improve the distribution of outcomes and to do it in a way that is actually productivity enhancing. There aren’t many of those, so hopefully we’ll take advantage of that. I can imagine Republicans and Democrats coalescing around an infrastructure investment program of that sort.

What is the most enduring effect the pandemic will have on the US labor market?

Davis: The working-from-home phenomenon is huge. At the peak of pandemic-induced lockdowns in April and May, more than half of all paid hours worked were done at home—more than 60 percent by our estimates, if you weight by earnings, because higher income people were more likely to work from home. Even in November, it was still at 35–40 percent. When we ask individuals, “What does your employer plan for you to do after the pandemic’s over?” they say they’ll be able to do about 23 percent of their work from home. In another survey, where we’ve asked employers directly, they give a number closer to 20 percent. Before the pandemic, it was more like 5 percent of all paid workdays. So that’s a huge, persistent shift in the structure of working arrangements that I expect will endure.

Bertrand: I agree about working from home. The crisis has also dramatically accelerated the continued reshaping of our retail sector, a trend we’ve seen for a long time. That’s more a product-market development, but it’s going to have implications for the labor market as well. Independent restaurants have been badly damaged by the pandemic, while chains appear to have held up better. So people are going to be returning to jobs, but they’re going to be different kinds of jobs and different kinds of employers. That’s going to be fascinating to study.

Notowidigdo: We’re not just going to be working from home, but we’re also going to be consuming at home more—watching movies at home instead of going to movie theaters, for example. That’s going to be another enduring impact. If you think about that in the context of health care, a lot of states almost immediately started experimenting with telemedicine at the start of the COVID recession—they were reimbursing providers to offer telemedicine visits. This is a sort of forced experimentation that we’re going to keep with us for at least several years after the pandemic ends. We’re going to figure out what kinds of health care you can consume at home without having to go to the doctor’s office or a hospital. There could be some real positives to come out of that. It could increase access for people who, prior to the COVID recession, had difficulty making it to a doctor’s office or going to the hospital. Telemedicine could provide a way for them to get the health care that they need. 

“People are going to be returning to jobs, but they’re going to be different kinds of jobs and different kinds of employers.”
— MARIANNE BERTRAND

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WHAT SHOULD THE US DO ABOUT STUDENT DEBT?

The balance of outstanding student debt in the United States is large—nearly $1.6 trillion—and growing. Some policy makers have suggested the US government should forgive all federally held student debt, while others have advocated forgiving a capped amount per borrower. In January, an aide to then president-elect Joe Biden revealed that Biden planned to ask Congress to forgive up to $10,000 per borrower and extend the pause on loan payments that the federal government had offered borrowers throughout most of 2020. Are debt-forgiveness policies regressive (with more benefits accruing to high earners) or progressive (with more benefits accruing to low earners)? And is extending the payment pause an efficient way to encourage pandemic recovery? To investigate these questions, Chicago Booth’s Initiative on Global Markets polled its US Economic Experts Panel. (For more on student-debt relief, see “Canceling all student debt mostly helps high earners,” page 7.)

See more online
All responses to these polls can be seen at igmchicago.org.

About the IGM Economic Experts Panels
To assess the extent to which economists agree or disagree on major public-policy issues, Booth’s Initiative on Global Markets has assembled and regularly polls two diverse panels of economists, all senior faculty at the most elite research universities in the United States and Europe. The panels include Nobel laureates and John Bates Clark medalists, among others. Polls are emailed individually to the panel members, and panelists may consult whatever resources they like before answering. Members of the public are free to suggest questions.
Statement A: Having the government issue additional debt to pay off all current outstanding student loans would be net regressive.

David Autor, MIT
“Alongside my kids’ student loans, I’d like the government to pay off my mortgage. If the latter idea shocks you, the first one should too.”
Response: Strongly agree

Eric Maskin, Harvard
“Blanket loan forgiveness would help those who went to college at the expense of those who didn’t.”
Response: Agree

Emmanuel Saez, University of California at Berkeley
“Depends on how the government debt is going to be repaid: progressive versus regressive taxation, or implicit inflation tax.”
Response: Uncertain

Statement B: Having the government issue enough additional debt to pay off student loans up to a threshold, for borrowers whose income is below a certain level, could be progressive.

Daron Acemoglu, MIT
“Yes, this would be much better. Student debt is a problem for low- and middle-income households, not those earning more than $100k or $150k.”
Response: Agree

Judith Chevalier, Yale
“There is evidence that extant income-driven repayment plans are underutilized. Some form of ex post IDR strategy is likely sensible.”
Response: Agree

Jonathan Levin, Stanford
“Perhaps, but it seems unlikely if you’re providing funds only to people who have attended college.”
Response: Uncertain

Statement C: Extension of the suspension of payments on student loans after the end of the year [2020] would support the recovery more effectively than devoting equivalent resources to general income-based transfer payments.

Steve Kaplan, Chicago Booth
“I suspect you could target aid to those more in need than the typical student-loan recipient.”
Response: Disagree

Larry Samuelson, Yale
“Both would support recovery, but would be most effective if targeted to those in most need, and it’s not clear which would do this better.”
Response: Uncertain

Richard H. Thaler, Chicago Booth
“Seems like a weak stimulus. College grads are already saving a lot. It’s the bottom quartile that needs help the most and will spend it.”
Response: Disagree

Percentages are weighted by confidence ratings panelists assigned to their own responses.
Philosophers have long mused about people’s craving for dominance and tendency to engage in activities to assert their superiority over others. In consumer choice, this manifests itself as a person’s tendency to want what others desire and the feeling of superiority that comes from possessing what others cannot have, according to Chicago Booth’s Alex Imas and London School of Economics’ Kristóf Madarász. This pursuit of “mimetic dominance” over others can raise people’s valuation of a product above their own intrinsic taste for it. In the researchers’ model, a consumer’s willingness to pay grows as the product’s appeal to others increases, but only if others are excluded from purchasing the product. Setting the price of an item above what many consumers can afford—as luxury brands typically do—is one way to exclude potential customers, as is restricting supply, which results in long queues, for example, to get into restaurants or events. Either way, making a product exclusive allows businesses to charge higher prices and extract greater revenues from consumers. To learn more about this research, turn to page 23.
See you online

While COVID-19 has changed the location of many events, conferences, and programs, Chicago Booth and the University of Chicago continue to sponsor many opportunities for inquiry and for participants to gain insights. The events below will all be held virtually, and more information can be found at the sites listed.

MARCH 29–APRIL 9
MERGERS AND ACQUISITIONS
ChicagoBooth.edu/ma
In this interdisciplinary program, learn the analytical framework and tools necessary to execute mergers, acquisitions, and corporate restructurings successfully.

APRIL 5–14
STRATEGIC THINKING FOR TURBULENT TIMES
ChicagoBooth.edu/sttt
Learn the foundational skills in strategic thinking that are needed to effectively navigate organizations through turbulent times. Disruptive forces were underway before the COVID-19 pandemic and have accelerated amid significant market uncertainty that will persist for some time.

APRIL 12–21
HIGH-STAKES STRATEGIES: EXECUTIVE-LEVEL STRATEGIES TO MANAGE SYSTEMIC RISKS FOR COMPETITIVE ADVANTAGE
ChicagoBooth.edu/hss
Move beyond traditional risk-management approaches to uncover fragile interconnections, anticipate potential shock waves, and develop a proactive risk-and-reward management strategy for your organization. Gain high-performance leadership and communication frameworks to protect and manage your organization's reputation.

APRIL 29–MAY 1
RECONNECT 2021
ChicagoBooth.edu/reconnect
Celebrate your time at Chicago Booth at our reunion event.

APRIL 30
MANAGEMENT CONFERENCE
ChicagoBooth.edu/managementconference
Join fellow alumni and business leaders to share best practices, gain new insights, and discover solutions for today's management issues.

MAY 3–13
EXECUTIVE PROGRAM IN CORPORATE STRATEGY
ChicagoBooth.edu/epcs
Strengthen yourself as a leader by adding strategic value to your organization. Learn techniques to understand the competitive structure of an industry and a company's competitive advantage.

MAY 11–20
RESILIENT LEADERSHIP FOR HIGH-PERFORMING ORGANIZATIONS
ChicagoBooth.edu/rlhpo
Tap into your inner gumption, and gain the tools to lead with courage to create an agile, high-performance environment.

ONGOING
D&I DIALOGUES
ChicagoBooth.edu/alumni/diversity-and-inclusion-dialogues
Explore diversity and inclusion-related topics in this event series.

EXECUTIVE MBA ADMISSIONS EVENTS
ChicagoBooth.edu/exec-events
Meet students and alumni, and hear from Booth's Admissions team, at regionally focused events.

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