WHEN STUDENTS ARE MATCHED TO SCHOOLS, WHO WINS?

Economics is changing how public schools and students choose each other

*Plus:* The jobs that reward deception

Why the big banks aren’t safe yet
“If I wanted to create a maximally dehumanizing medium for communicating with other people, I couldn’t do better than Twitter.”
The theory of unintended consequences has a rich history at the University of Chicago. In the 1960s and 1970s, George J. Stigler, who would go on to receive a Nobel Prize, developed his idea of regulatory capture, an unforeseen result of government oversight. Chicago Booth’s Sam Peltzman fleshed out similar ideas, using economic models to demonstrate how policy makers’ decisions can leave them blindsided by unexpected outcomes.

If every decision carries the risk of unanticipated outcomes, for those involved in public education, the task of matching students to schools is a minefield. Should they be automatically assigned to the school closest to their home? If not, how should seats in the most popular schools be allocated? What student traits should be considered when determining priority for admission to sought-after schools? Should students be encouraged to be strategic when expressing their preferences for schools? What algorithm should be used to do the matching?

Administrators of urban school districts are wrestling with these questions in an attempt to give families more choice over where children go to school. As our cover story (page 24) explains, one unintended consequence of some matching systems is that, because they’re so complicated, they leave students and their families vulnerable to making costly mistakes in reporting their preferences. Researchers such as Chicago Booth’s Jacob Leshno and Seth Zimmerman are exploring the effects of school-matching policies, and their insights will help guide policy makers hoping to avoid being surprised by unintended consequences.

Addressing obstacles to innovation
In his explorations of regulatory trade-offs, Peltzman found that the approval process for new drugs in the US was more harmful than helpful for patients in aggregate, as it delayed the availability of life-saving medications for some groups. Forty-five years later, economists are still discussing how we can encourage advancements in medicine.

Our feature (page 36) looks at what’s holding back medical innovation, and how to surmount those obstacles. Some steps, such as adjusting the US patent system to accommodate new drugs’ long road from the lab to the market, are public-policy changes. Others, such as enlisting life insurers to subsidize expensive treatments, would come from the private sector. However it is achieved, facilitating big new advances in medicine could benefit both patients and the economy.

New advances bring their own unintended consequences. Technology has changed the way we communicate—which affects how we treat each other. Chicago Booth’s Nicholas Epley has found that when people communicate over text-based media, they’re more likely to fail to recognize each other’s humanity. In an essay, Epley explains why the voice remains a critical element in human communication (page 49).

Whatever you think of these items and the rest of this issue, please share your feedback with us via email or social media. Our intended consequence? An informed, productive public conversation on policy, business, and markets.

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Eric Budish, the Steven G. Rothmeier Professor of Economics, uses game theory—and applied microeconomics tools more broadly—to study the design of markets, be they for high-frequency-traded securities, cryptocurrencies, or event tickets. This issue features his research on the forces that drive pharmaceutical companies to develop drugs and MBA students to select their courses. (Pages 24 and 36)

Nicholas Epley, the John Templeton Keller Professor of Behavioral Science and Neubauer Family Faculty Fellow, conducts research on social cognition, perspective taking, and intuitive human judgment. He is the author of the 2014 book Mindwise and a recipient of a Career Trajectory Award from the Society of Experimental Social Psychology, given to researchers demonstrating uniquely creative and influential scholarship. (Page 49)
Find the articles to which these comments refer at Review.ChicagoBooth.edu.

The High Cost of a College Degree

Who’s at fault for student-loan defaults? (Summer 2019)

This article doesn’t mention the huge debts carried by U of C students. The question is silly, as the answer is that education is a right, and should be free to all.

—Marshall Arnold

I believe that there are three at-fault parties. The schools act like a pimp to these young students, a lot of times telling them that they will have no problem getting a job in their degree field. Since 1990, while inflation has caused prices to go up 112 percent, the cost of higher education has gone up 437 percent. Professors’ wages have gone up 4 times. Then the students are at fault; they took the loans. But we, as a society, tell them they need a college degree to be “successful.” Then you have the government. They have made funds too easily available. Even when the funds are being used to buy useless degrees, the money flows. So just blaming 18- and 19-year-old kids is naive.

Solving this won’t be easy. The universities have grown rich off this easy money. If you look at many universities, they have endowments that run into the billions. I would make the universities themselves responsible for half of their students’ loans if the students can’t find a job that either is in their field or pays enough so they can pay back 10 percent of the loan a year without being economically crippled. The university is supposedly the adult in the room. I would punish these schools by making them use some of their endowment funds to cover their “bad” advice.

—Thomas Rice

Grappling with Plastic

Why banning plastic bags doesn’t work as intended (Published online, June 2019)

You are right to point out the dangerous consequences of ill-considered regulation. There now seems to be a veritable frenzy of “plastiphobia.” Plastic is immensely useful and is the best way to prevent food wastage and sickness, by protecting our food from contamination and damage. It is much better than paper, particularly when wet, but there is one fundamental problem: if it gets into the open environment as litter, it will lie and float around for decades, and perhaps 100 years. If that problem could be solved, there would be no need to ban plastic.

In fact, that shortcoming is already being tackled by a technology in use in more than 90 countries. Oxo-biodegradable technology was explicitly designed to address the issue at stake here, namely reducing the problem of harmful microplastics resulting from the use of ordinary plastics, which can persist for generations. It does this by making the plastic become biodegradable much faster than conventional plastics, and it does not create microplastics that accumulate in the environment.

Importantly, this is not intended to replace litter control, but to deal with the consequences of failure to control litter on the surface of land or water.

Before policy makers consider trade-offs, they should consider pragmatic, evidence-based solutions, including oxo-biodegradable technology, that can help address the pressing, global challenge presented by plastic waste.

—Michael Stephen
Chairman, Oxo-biodegradable Plastics Association
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How bookies can outwit clever bettors

Sports-betting markets are based entirely on predictions. A bettor has to pick a winning team or contestant, and a market maker—a bookie—bets on the opponent. The predictions rely on available information about both sides of the contest as well as conditions that might affect the outcome. As bookies have to take the other side of every bet, they have to know what they’re doing. But a bookie can be manipulated by a skillful bettor.

Chicago Booth’s John R. Birge, Booth PhD candidate Yifan Feng, Duke’s N. Bora Keskin, and Uber’s Adam Schultz explored the dynamics of how a bookie can keep from being manipulated. Because the sports-betting market shares features with financial markets that rely on spreads—including credit default swaps and options—the researchers’ findings have implications for how sports bettors and hedge-fund managers alike do business.
Market makers can deter manipulative bettors

Bookies and other market makers monitor betting patterns to assess what the public may know before a final outcome is settled. The researchers devised a set of policies to combat bettors with inside information who would try to deceive market makers.

Set the terms
Market makers establish a spread—for example, opening the betting on whether a favored basketball team will win a game by at least six points.

Learn what the public knows
Market makers monitor initial activity to see if an outsized share of bettors takes one side.

Maximize profit potential
Market makers then adjust the spread to encourage the next wave of activity to balance out the pool of bettors on either side.

Beware of manipulation
Market makers look out for bettors with private information about what the spread should really be. These bettors tend to place larger bets on the outcome they expect and smaller, bluff bets against this outcome—hoping to influence a spread adjustment that increases their profit.

Strike a balance
Following a set of policies devised by the researchers, market makers can adjust spreads dynamically in a way that maintains a balance of bettors on both sides and mathematically eliminates any incentive for bluffers, making it too costly for one person to place bets on both sides.

The researchers identify a key problem for bookies and financial market makers: they are vulnerable to being bluff by knowledgeable bettors. Some may have inside information, such as whether a star is able to play. The bets being placed are the bookie's best source of information—by analyzing betting patterns, a bookie can effectively crowdsource information about the expected outcome of an event. However, a clever bettor might place some phony bets to throw the bookie off. Through the application of a theoretical model, the researchers identified a set of policies, which they call inertial policies, that enable bookies to strike a balance between learning from market participants and bluff-proofing their business.

Say you want to place a bet on the Chicago Bulls, a National Basketball Association team. A sports bookie might take the bet on the condition that the Bulls would have to win by, say, six points, or else you lose the bet. If the bookie sets the spread right, you'll still place the bet, the Bulls can still win, and the bookie can still make money. As the bettor, you can't be happy with this because a bookie who never gets the spread wrong never loses. This dynamic is also at play in other predictions markets, including options markets, where investors pay a premium for the right to buy or sell stocks or commodities at a certain price, and the CDS market, where investors pay to bet on whether an event such as a corporate bankruptcy will happen.

Birge, Feng, Keskin, and Schultz imagine a bettor who knows more than the bookie, creating an interesting dilemma for both sides. The betting market is a prime source of information for the bookie. If everybody wants to bet on the Bulls, the bookie takes note and factors that into the calculation of the spread. If the bookie notices that particularly smart bettors are bullish on the Bulls, the bookie sets the spread even wider.

In the researchers' model, when a market maker accepts a transaction—whether it's a sports bet, an options contract, or a CDS contract—she has to estimate the likelihood of being forced to pay out and build in compensation for taking that risk: commission. For the bettor, the payoff can be summarized as betting $1 to win $1 minus the commission. If the bettor loses, he loses only the money he put up. If the bettor wins, the market maker is left with only the commission.

If a bettor has perfect knowledge of the statistical distribution of outcomes for the event he's betting on, and always bets according to this knowledge, he can make no money, the researchers reason, because the bookie will never bet with him on terms that allow him to win. This bettor's very act of placing a bet tips off the bookie, whose goal is to place the point spread in the median of the distribution of outcomes. The bettor may try to lie (or bluff) and take the losing side of a few smaller bets to trick the bookie into setting spreads too tightly later on, creating opportunities to exploit mispricing. If the bookie uses the standard rational economic model for setting point spreads (known as a Bayesian policy) without considering the possibility of such a clever bettor, the skillful bettor can fool the bookie into setting a spread that leads to big payouts for the bettor and losses for the bookie.

This is where the researchers' inertial policies come in. A key variable in these policies is the difference between “positive” and “negative” bets—that is, the difference between how many bets have been made in favor of a particular event (i.e., the Bulls winning by at least the current point spread) versus the number of bets against that event. Using this information, the bookie can set the spread close enough to the median of the outcome distribution that the informed bettor has no incentive to bluff, given the cost of commission.

“We propose a solution to the market maker’s problem by constructing a dynamic learning policy that collects information at a judiciously selected rate,” they write. “The spread converges in an ‘inertial’ way to make it too costly for the informed bettor to bluff, which resolves the tradeoff between learning and bluff-proofing.”–Michael Maiello

Low interest rates can hurt competition, and the economy

For small businesses, low interest rates are typically a good thing, making it cheap to borrow money and put it to work. The result is—or should be, at least—higher productivity.

But productivity growth in the US and many other developed countries is relatively low, even after a decade of ultralow interest rates. Princeton postdoctoral research associate Ernest Liu, Princeton’s Atif Mian, and Chicago Booth’s Amir Sufi have a theory to explain this conundrum—and it may also explain why low rates can hurt competition and hold back economic growth.

To understand their argument, imagine a small pipe-making company and its larger competitor. Conventional economic expectations have interest-rate declines leading to higher business spending. When rates are falling, both the small and large companies might borrow to upgrade equipment, invest in new technology, and improve their production lines. If big enough, they might buy out competitors.

The researchers’ model finds these expectations hold true in some cases, namely when the companies involved have roughly the same market share, or at least are on somewhat equal footing in terms of competition and productivity.

The issue is that while interest rates initially spark company spending, they then induce a productivity gap between dominant and smaller companies that ultimately discourages both groups from spending. As interest rates fall, dominant companies gain advantages. These companies typically invest the most—and gain the most too. When the big pipe-making company invests, it produces a better, cheaper product and becomes a larger competitive threat. It gets more productive and gains an ever larger share of industry profits.

By the time interest rates reach near zero, the productivity gap between the large and small companies has grown considerably. At this point, industries enter what the researchers call a monopolistic region, where smaller companies’ productivity is too far behind to make investment prudent. Small companies become too discouraged to invest because “these investments pay off only if you actually have a chance of getting to market leadership,” the researchers write. Eventually, if the pipe-making market is no longer truly competitive, the dominant company will stop investing too, because it sees no more threat from smaller competitors. It needs only to maintain its market position, not to innovate and improve to the same extent as before.

The researchers tested their findings by building a mock stock portfolio long on industry leaders and short on smaller followers. Looking at the performance in response to changes in the 10-year Treasury rate going back to 1962, the researchers find that the portfolio clocked higher returns when interest rates were declining, and the returns were largest at the lowest interest rates. “As in the model, the fall in long term rates has been associated with a rise in industry concentration, higher markups and corporate profit share, and a decline in business dynamism,” they write, defining dynamism as the likelihood of a follower company overtaking a leader.

Though central banks cut rates in the wake of the 2008–09 financial crisis, Liu, Mian, and Sufi note that productivity growth started sliding in 2005, before the Great Recession. Their model ties together a number of global trends, offering an explanation for why the decline in interest rates has been accompanied by falling competition, a decline in business openings and closings, and slower productivity growth. It also offers possible insights into the widening productivity gap within industries, in which fewer dominant companies now control more market share than they did before the recession.

Productivity growth has stagnated or declined throughout the advanced world. Giant companies have accrued massive wealth as their competitors fall behind. Two recent studies using Organisation for Economic Co-operation and Development data demonstrate that productivity gaps within industries have been rising, while there have been fewer exits by weak companies and fewer new entrants.

Liu, Mian, and Sufi don’t doubt that consumer issues were the impetus for the past decade of falling interest rates, but they suggest the persistent economic slowdown can be explained without relying on popular reasons for the consumer reaction. Rather, if companies have adjusted their spending in response to consolidation in the way that the researchers describe, higher concentration and less-competitive markets are why today’s economic recovery doesn’t look exactly the way many hoped it would.

—Dee Gill

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To explain wage trends, take a look at bonuses and job changes

The economic laws of supply and demand predict that when unemployment rises, wages will fall. But during the Great Recession—a deep and broad economic slowdown during which unemployment skyrocketed to as high as 10 percent, in October 2009—wages in the United States did not drop as economic models predicted they would. Economists attribute this to “wage stickiness” and have suggested that stickiness may also explain why wages have been slow to increase through the economic recovery.

But University of Chicago PhD candidate John Grigsby, Chicago Booth’s Erik Hurst, and ADP Research Institute’s Ahu Yildirmaz find that wages may be less sticky than they appear.

Past efforts to study wage stickiness have been stymied by data limitations. Most data sets rely on self-reported surveys that are vulnerable to measurement error, do not include earnings fluctuations resulting from nonbase pay (such as bonuses, commissions, and fringe benefits), and are unable to distinguish between workers who change jobs and those who remain in their current positions.

To overcome these limitations, Grigsby, Hurst, and Yildirmaz used a data set from payroll processing company ADP that details earnings information for 20 million workers. The data, from between 2008 and 2016, include nonbase pay and distinguish between workers who remained with their employers and those who changed jobs.

The researchers first examined the composition of compensation packages, finding that for most workers, base pay constituted the majority of their earnings. Bonus pay went up as a proportion of compensation as earnings increased, however. For households at the median, bonuses represented only 13.8% of all 12-month periods had salary increases of 2%–3%.

Among US workers who remained in their jobs, wage changes were largely positive, while those who switched jobs experienced a greater mix of increases and decreases.

Most pay decreases came from switching jobs

All workers who stayed

- 33.7% No change in wages, or increases of less than 1%
- 63.9% Wage increases

Salaried workers who switched to new employers

- 3% Salary decreases (to −50%)
- 2% Salary increases (1%–50%)

All workers who switched

- 56.8% Wage increases
- 5.2% No change in wages, or increases of less than 1%
- 38% Wage decreases (share of all 12-month periods)
3 percent of income, but bonus pay at the 99th percentile represented 16 percent of earnings.

Grigsby, Hurst, and Yildirmaz then turned their attention to wage-adjustment patterns, finding that wage cuts among workers who remained in their jobs were rare. Only 2 percent of these workers received a base-wage cut during the entire sample period studied. Approximately two-thirds of workers, meanwhile, received a base-wage increase in a typical year. Most of these increases were moderate but not small—27 percent of workers received at least one increase of 2–4 percent during the period studied. And about one-third of workers did not see any change in their base wages.

Most workers who changed employers, however, experienced a change in their base wage, with 38 percent of such workers seeing a decline. When the researchers pooled together workers who stayed and those who changed jobs, they found that base wages appeared considerably less sticky, meaning they adjusted more, although nominal wage increases were still more common than cuts.

“Twenty four percent of all workers experience a base wage change during a given quarter and 71 percent experience a base wage change during a given year,” the researchers conclude. “Including both the job-stayers and job-changers, 9 percent of workers experience a nominal base wage decline with most of the declines being driven by job-changers.”

Bonuses, for workers who received them, varied quite a bit through time—16 percent of job stayers experienced a pay cut in their total compensation, which included bonuses.

Wage reductions were more common during the Great Recess. Among salaried job stayers, 7 percent had their base wages cut. Companies in industries hardest hit by the recession, such as manufacturing and construction, as well as those with declining employment, were more likely to cut wages.

Grigsby, Hurst, and Yildirmaz’s research demonstrates that models relying solely on earnings data for job stayers, or that don’t include bonuses, commissions, and other nonbase-pay types of compensation, may miss important sources of wage flexibility in the labor market.—Dwyer Gunn

**WHY SOME COMPANIES DON’T MAXIMIZE TAX AVOIDANCE**

**ONE OF** the mysteries of corporate tax behavior is why companies don’t always do everything they can to avoid taxes. University of Chicago’s David Weisbach helped to identify this phenomenon, sometimes described as the “undersheltering puzzle.”

Using a model to explore how a business might strategically employ various tax-avoidance methods, Chicago Booth’s Charles McClure finds that trying to squeeze every possible penny out of Uncle Sam just costs too much for most companies.

One important factor is an official interpretation of US accounting rules known as FIN 48. Effective since late 2006, the interpretation means American companies have to analyze and disclose the risks of their decisions regarding federal taxes. The benefit of any tax-planning maneuver that is sufficiently likely to be overturned if it were examined by authorities must be recorded as a liability until its risk of being overturned has passed—which means that benefit won’t immediately be reflected in reported earnings. The rule, developed by the Financial Accounting Standards Board, has had a pronounced effect on businesses’ behavior, McClure finds.

Drawing on a sample of 2,583 companies with an average market cap of $74 billion, his model demonstrates that between 2007 and 2016, the disclosures required under FIN 48 had the effect of increasing the rate of corporate tax payment by 2.8 percent. This boosted the average company’s remittances by $27.3 million, compared with alternate scenarios under which businesses immediately captured all potential tax savings on their income.

McClure started from the assumption that companies need to balance maximizing reported earnings and minimizing tax payments. Financial-reporting incentives are integral to tax planning, but it’s difficult to isolate their effects from other competing factors. To do so, McClure focused on reporting of uncertain tax benefits—those that might be overturned in a future audit—which affect net income but not current tax payments.

Although tax avoidance can lower tax payments and increase after-tax cash flows, companies must weigh this benefit against three costs, McClure writes. First, riskier strategies carry smaller financial-reporting benefits, since the tax advantages can’t be recognized right away. Second, tax avoidance can impose operational frictions that lower pretax income—for instance, aggressive tax planning may create reputational concerns that could be expensive to mitigate. The final cost is a greater probability of audits and inspections resulting from risky tax strategies.

McClure’s model accounts for these factors. His findings suggest companies have significantly adjusted their tax strategies to comply with FIN 48, with negligible impact on corporate value. This is consistent with the market’s blasé reaction to the original announcement of FIN 48.

McClure also provides an analysis of how the Tax Cuts and Jobs Act of 2017 affects the tax-avoidance dynamic, predicting that the lower corporate rate of 21 percent will reduce companies’ incentive to pursue creative accounting techniques.—Ed Finkel


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PUNISHING SOME COMPANIES CAN MAKE THE REST BEHAVE BETTER

SEEING NEARBY companies getting punished for bad behavior may inspire the rest to behave better, research suggests. And that could have positive effects for shareholders, write Boston College’s Francesco D’Acunto, Chicago Booth’s Michael Weber, and Jin Xie of the Chinese University of Hong Kong.

To study this issue, the researchers looked to China, specifically at state-owned enterprises. Although China is transitioning to a more market-based economy, for many large corporations in strategic industries, the Chinese government is still their largest shareholder. This ownership structure makes SOEs less subject to the internal and external governance mechanisms that reign in wrongdoing. For example, senior executives or other shareholders might transfer company assets for personal gain, knowing that the government, as the main shareholder, can influence regulators to look the other way.

But public discipline could help, the study indicates. The researchers analyzed the effects of 254 instances between 1997 and 2014 of companies being punished for excessively guaranteeing the loans of related parties. Loan guarantees are legal, but it’s illegal for a company or an SOE to issue loans to borrowers who are likely or even certain to default on them.

SOEs in the same province as a listed company punished by authorities cut their loan guarantees to private parties, reducing the amount of their guaranteed loans over total assets by 2.4 percent, the researchers find. These companies were also 43 percent more likely to move to more-independent corporate board structures, the study finds. “These results suggest SOEs react to the punishment of local peers by aligning their actions with the interests of minority shareholders,” write the researchers.

Moreover, the change in governance led to an increase in shareholder value. Stock market returns increased 1.5 percent in the 15 days after news of a peer being disciplined. While the returns for non-SOEs remained insignificantly negative during this time frame, returns for SOEs “increase[d] significantly after the peer’s punishment and ke[pt] increasing,” write the researchers.

The crackdown also affected those private parties that were getting loans from SOEs; the research indicates that they cut their investments and reduced their bank borrowing by 5 percent of total assets.

The economic effects downstream suggest that SOEs aren’t likely to move to more-opaque forms of corporate malfeasance either—such as constructing a pyramidal scheme to transfer resources to a private, affiliated company—to get around regulators, the study indicates.

And the sobering effect of seeing a peer being punished may be a cost-effective way to contain fraud. “Regulators would only need to monitor and punish a small set of listed firms to obtain broad compliance, which reduces dramatically the costs of monitoring listed firms on the part of regulators and activist shareholders,” write the researchers. —Alex Verkhivker

Employment trends are shaping kids’ ideas about gender roles

T

he traditional American family of the 1950s—characterized by a homemaking mother and a father employed outside the home—represents a shrinking percentage of US households. Almost 60 percent of married mothers in 2011 were employed outside the home, up from 25 percent in 1960—and almost a quarter of married mothers earned more than their husbands did, up from 4 percent, according to the Pew Research Center. Census data indicate nearly a quarter of children lived with only their mother in 2016, up from just 8 percent in 1960.

Many researchers have been looking at how this cultural shift, and the changing balance of economic power between men and women, has affected attitudes among adults. But what are the effects of this social shift on children? Research by Chicago Booth’s Marianne Bertrand suggests it’s leading many children to develop more-liberal attitudes toward gender roles.

Researchers have in recent years amassed evidence that the changing nature of the American family is causing tension in some households. For example, a study by Bertrand, Chicago Booth’s Emir Kamenica, and National University of Singapore’s Jessica Pan, a graduate of Booth’s PhD Program, suggests that US women who earn more money than their husbands are less likely to report happy marriages and are more likely to divorce.

To examine how changing gender dynamics are affecting children’s notions of gender roles, Bertrand analyzed multigenerational data from the NLSY79, a long-running survey launched by the Bureau of Labor Statistics in 1979. The BLS polled a group of almost 13,000 youths (initially aged 15 to 22) annually between 1979 and 1994. Since then, it has continued to contact the participants biennially—plus the children of female respondents.

The survey has always asked its respondents to react to six statements about...
For the children of married, working mothers, the effect of having a mom who’s employed outside the home differed by gender. Girls’ gender-role attitudes didn’t appear to be meaningfully affected by having a working mom. For boys, however, having either a married, working mother or a mother who was the primary breadwinner did meaningfully move attitudes in a more liberal direction. Having a primary breadwinner mother, in fact, is reflected by an increase of 1.2 in the gender-role index—a magnitude that’s comparable to the average gap in attitudes between girls and boys.

Several other factors are also correlated with gender-role attitudes. For boys, growing up in a household with a higher and more-stable income was associated with more-liberal gender attitudes. A mother’s education levels and her own gender-role attitudes seemed to have a particularly strong effect on her daughters’ views.

Bertrand also finds that the family-work arrangements children experience from age 6 to 15 are more strongly correlated with gender-role attitudes than the arrangements they’re exposed to earlier in life. This finding provides support for the theory that mothers’ role modeling (their participation in the workforce, for example), rather than unobserved variables such as fathers’ gender-role attitudes, drove the results. Role modeling is likely to have a stronger effect as children grow older and are more aware of their mothers’ work lives, writes Bertrand.

Boys of working, married mothers who were employed in the formal labor market from economic necessity rather than personal preference displayed less of the liberal shift in gender-role attitudes, the research finds.—Dwyer Gunn

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What are artificial intelligence’s biggest advantages over human intelligence in terms of promoting equitable decisions? There’s a lot of press around algorithms being promoters of inequity or of bias. But we know from the behavioral-science literature that human beings are quite biased. We don’t just look at objective data; we also add our own internal biases. Study after study has demonstrated that when viewing a man and a woman doing a task at the same level of performance, people will make inferences about the woman they don’t make about the man. The mind just adds its own bias. The algorithms, while they may have other problems, tend not to add their own biases. They tend to reflect whatever is in the data.
bias of humans. The most potential to remove a lot of the bias, and we should worry about that the criminal-justice system might add that people are worried algorithms in as criminal justice. It’s reasonable is in the data. And that bias is in addition to whatever is also the place where humans add a tremendous amount of bias in terms of which résumés to look at, which person to hire conditional on the résumé, etc. And that bias is in addition to whatever is in the data.

The same is true of a setting such as criminal justice. It’s reasonable that people are worried algorithms in the criminal-justice system might add bias, and we should worry about that and find ways to deal with it. But it’s ironically the places where we worry algorithms will be biased that they have the most potential to remove a lot of the biases of humans.

TIME MAY BE THE BEST TREATMENT FOR JEALOUSY

IF YOU’RE consumed with envy over your neighbor’s coming vacation, just wait. The jealousy, or “sting of inferiority,” you feel today may well dissipate once the trip is over and done with, according to London Business School’s Alexander C. Kristal, Chicago Booth’s Ed O’Brien, and University of California at Los Angeles’s Eugene M. Caruso. Research findings on how people feel about others’ experiences have been somewhat mixed. Some studies suggest that the jealousy is worse once experiences are in the past, as they’re no longer theoretical and become real and “owned.” But other studies find that feelings about the future are generally more charged.

To analyze the temporal element of envy, Kristal, O’Brien, and Caruso first queried people about how they would feel if a friend enjoyed each of five enviable experiences: a dream vacation, a dream date, a dream job offer, a dream house, and a dream car. Some participants were asked to imagine the event was set to occur in the future, while others rated them as if the events had occurred in the past. Jealousy of future experiences was worse, the researchers find.

Next, they used an actual holiday—the envy-inspiring Valentine’s Day—as it came and went. They recruited groups of 100 people each day in February and asked participants how they felt about people with desirable Valentine’s Day plans. The level of envy rose as Valentine’s approached, and receded after it passed, the researchers find.

Finally, the researchers studied whether they could harness this phenomenon therapeutically by having people intentionally take a past perspective—or imagine how a particular event would feel if it were a year in the past. They find that participants felt not only less malicious jealousy when they imagined the event in the past, but also less stress and greater well-being, compared with people who were asked to imagine the jealousy-inducing event a year in the future.

The findings are relevant to virtual interactions as well as in-person meetings. Facebook-related depression has a lot to do with the jealousy that comes from social comparisons, research suggests. So framing updates as past rather than future events might be a kinder way to post. The same goes for professional situations, the researchers say. “A boss might be wise to announce that a competitive promotion ‘has gone to Ayelet’ [rather] than that the promotion ‘will go to Ayelet.’”–Alice G. Walton

What are the settings in which you think AI is most poised to improve equity?

The places where people are most worried about bias are actually where algorithms have the greatest potential to reduce bias. Take hiring— an issue where we’re worried that the underlying data may be biased, so the algorithm may be biased. And that’s fair. But hiring is also the place where humans add a tremendous amount of bias in terms of which résumés to look at, which person to hire conditional on the résumé, etc. And that bias is in addition to whatever is in the data.

The same is true of a setting such as criminal justice. It’s reasonable that people are worried algorithms in the criminal-justice system might add bias, and we should worry about that and find ways to deal with it. But it’s ironically the places where we worry algorithms will be biased that they have the most potential to remove a lot of the biases of humans.

Given humans’ role in the design and implementation of AI, do you think it’s likely to be an equity-promoting technology? People want to anthropomorphize technologies—especially AI technologies, I think in part because the term includes the word intelligence. People are going to imagine these tools will have their own intelligence, or humanity almost. But ultimately, they’re just tools. So whether in any given context AI promotes equity is simply going to be a consequence of the intentions of the people building these algorithms as well as their knowledge.

The science is moving forward, and that means we can make the builders of these tools knowledgeable enough about bias and how to fix it, so that in 10 years what we’ll be left with is intention. It’s not going to be a technological problem; it’s going to be a sociological problem.
You can ignore what you already know—if you choose to

When a courtroom judge instructs jury members to ignore potentially relevant testimony as they deliberate, can they? Chicago Booth’s Berkeley J. Dietvorst and Ramon Llull University’s Uri Simonsohn find that people can often ignore information—if they choose to.

This argument challenges a host of psychological research suggesting that people can’t ignore information after they have been exposed to it. The idea of hindsight bias, for example, suggests that once people learn the answer to a question, they tend to think that they knew it all along—and they predict that it is also more obvious to others.

However, this past body of work doesn’t make clear whether people are unable to or choose not to disregard what they’ve learned. In prior experimental setups, researchers presented participants with information the researchers thought was irrelevant and should be ignored, assuming that the participants would also recognize the information as irrelevant. If participants used the information, the researchers inferred that it was because they were unwillingly affected by it.

Dietvorst and Simonsohn returned to some of those setups to reevaluate that premise. In their first experiment, they had participants carry out a version of the exercise used in the seminal study on hindsight bias by Carnegie Mellon’s Baruch Fischhoff, in which they gave people the answer to a multiple-choice question about a historical event, a conflict in Nepal between the Gurkha and the British. (Gurkhas are Nepalese soldiers in the British or Indian armies.)

The researchers then asked participants to estimate how knowing the answer would affect their ability to predict how others who lacked this information would answer the same question. One might think that knowing the answer shouldn’t affect participants’ predictions at all—and that was a presumption made in the original research. However, the majority of participants, 73 percent, told Dietvorst and Simonsohn that knowing the answer would improve their accuracy, which suggests that people may attend to the information intentionally, violating the assumption of past work.

The next experiment built upon this finding by asking participants how two fictional people (Person A and Person B) would do at rating other people’s accuracy at projecting a company’s earnings, as was done in the seminal work on the curse of knowledge. Person A had been given more information about the company than Person B had, and once again the original researchers had assumed the additional information to be irrelevant to the prediction at hand. Yet participants in Dietvorst and Simonsohn’s study overwhelmingly said that Person A would be more accurate at estimating other people’s accuracy. The results again call into question a core premise of these earlier studies, according to the researchers.

In a third experiment, they looked at how common the desire is to use additional information, finding that hindsight bias is largely driven by a subset of people who want to use this information. Participants were asked whether they would use a correct answer if given it. Then some participants were randomly assigned to learn the answer—and only those who had indicated they would use the answer displayed hindsight bias.

“People’s use of information may be a lot more intentional than past research made it out to be,” says Dietvorst.

But he and Simonsohn also find that while some people intentionally use information they’re asked to ignore, it’s possible to convince them to do otherwise. The researchers devised a mock trial, telling their participant-jurors that a piece of evidence was deemed inadmissible because it had been illegally obtained. The mock jurors were more likely to ignore the evidence when the reasoning behind the inadmissibility was explained—and the more detailed the explanation, the more likely they were to disregard the evidence. People can often ignore learned information, the researchers argue, but do so only if they really want to. —Alice G. Walton
Why the power of TV advertising has been overstated

Television advertising may be considerably less effective than published studies suggest, according to Chicago Booth’s Bradley Shapiro and Günter J. Hitsch and Northwestern’s Anna E. Tuchman. Their findings may disappoint marketing executives responsible for spending billions of dollars a year on TV ads in the United States.

Drawing on the Nielsen Datasets at Booth’s Kilts Center for Marketing, the researchers devised a way to match up data on advertising with data on sales for the top 500 products sold at more than 12,000 stores from 2010 to 2014. The results demonstrate that television advertising’s effect on sales over the 52 weeks following the ads was about one-fifth as much as calculated when considering only data that showed statistically significant positive results—the only type of results typically included in published studies of advertising efficacy. A typical brand in the data sample, if doubling its television advertising, should expect about a 1 percent increase in sales, as compared to the 5 percent it might expect if it analyzed only successful campaigns, the research suggests.

“Even though advertising may have a small effect, it may still be profitable when you consider each company’s particular circumstances,” Shapiro says. “But television advertising is considerably less effective than the established research would have you believe.”

Shapiro, Hitsch, and Tuchman argue that while most brands in their sample would benefit from advertising less, many are still better off with their current advertising expenditure than if they weren’t advertising at all. However, for almost all brands, shutting off some advertising would increase profit.

So why has the established literature found larger average ad effects than Shapiro, Hitsch, and Tuchman find? The researchers suggest publication bias may be a big part of the answer. Academic journals are interested in studies that show statistically significant results, specifically increases in sales or returns on investment related to advertising. So when researchers find little or no effect, it’s likely that journal reviewers will reject their studies. “In particular, editors or reviewers may reject advertising-effect estimates that are not statistically significant or judged as small or ‘implausible,’ i.e., negative. Thus, false positives get published while true negatives get discarded,” the researchers write.

And that’s if the researchers even try to publish in the first place. The field has a documented “file drawer problem,” Shapiro, Hitsch, and Tuchman say, wherein research sometimes goes unfinished or unsubmitted to journals if the researchers recognize the findings are unlikely to be published. Including all the data, they argue, reveals that TV ads have a much smaller effect on sales than assumed. The researchers find that when they restricted their estimates to only brands that saw a positive and significant effect of advertising on sales, the average advertising effectiveness was much closer to that which is estimated in the established literature.

The researchers caution that all products are different, and ad campaigns can yield different results. They suggest their findings can provide a baseline that companies might use to determine whether television advertising will be worth the cost. Anyone starting from a baseline that omits small or negative results is making decisions based on bad information, Shapiro says. –Brian Wallheimer

Why some professions reward dishonesty

Most people don’t look favorably on acts of deception. Research finds that deception elicits all kinds of negative emotions in the perceiver and tends to signal incompetence in the deceiver. Why, then, is deception so prevalent in business and the world in general? And how can managers encourage employees to be more honest?

Johns Hopkins’s Brian C. Gunia and Chicago Booth’s Emma Levine had a hunch that deception might not be viewed so negatively for certain professions, such as sales. In occupations that are stereotyped as being what the researchers call “high in selling orientation,” which they define as the “use of high-pressure persuasion tactics to elicit immediate, self-interested economic transactions,” Gunia and Levine argue that deception might actually be seen as a signal of competence.

This perception occurs, they suggest, because people view deception as a particularly effective high-pressure persuasion tactic. As a result, a salesperson who deceives a customer in order to get her to buy a product might be seen as particularly competent at his job. In a series of experiments, Gunia and Levine find not only that participants associated deception with competence when deception was used to secure a sale, but also that the perceptual link between deception and selling orientation was so strong that even deception having nothing to do with selling was seen as a signal of competence. For example, the researchers find that in high-selling-orientation occupations, employees who lied on their expense reports—an act of deception that is costly for companies—were seen as competent.

Sales isn’t the only occupation where these skills are regarded as beneficial. The researchers suspected that many professions would be seen as high in selling orientation, and as a result, might reward deception. To figure out the set of occupations to which this association could apply, Gunia and Levine conducted a study in which they asked 204 participants to rate each of 32 professions including mechanic, doctor, and lawyer on a scale they devised to measure perceived selling orientation. Respondents placed occupations including salesperson, advertiser, and travel agent at the top for selling orientation, and librarian, machine operator, and chemist at the bottom.

Then the researchers studied whether people viewed deception differently in occupations stereotyped as high versus low in selling orientation. Online participants read about Julie, an individual on a business trip who exaggerated the cost of a company-reimbursed cab ride by $10. The participants were randomly informed that Julie was either an investment banker, a salesperson, an advertiser, a consultant, an accountant, a nonprofit employee, or a consultant.

Depending on your occupation, a little deception doesn’t hurt

Study participants faulted people less for acts of deception after learning that their jobs were more selling oriented than others.
a nonprofit employee, or an accountant. Participants rated Julie as more competent when she was from a high-sales-oriented occupation such as investment banker or salesperson than when she was from a low-sales-oriented profession such as nonprofit employee or accountant, the researchers find.

Another group of online participants read about James, who acted either dishonestly, agreeing with his boating-buff boss that sailing was great, or honestly, admitting he didn’t care for sailing. Participants rated how James would do when changing careers to a high- or a low-sales-oriented profession. The lying version of James would do better when switching to a high-sales-oriented profession than an honest James, the participants said. In other words, in certain occupations (namely sales, advertising, and investment banking), participants believed that deceivers would be more competent employees than honest people.

In a lab setting, Gunia and Levine had participants observe an individual playing the part of the sender in an economic game commonly used to measure the use of deception in laboratory studies. In this so-called deception game, the sender has the opportunity to either tell the truth or lie to the receiver, which affects how much money each party will take away. Lying benefits the sender but harms the receiver. In Gunia and Levine’s study, participants observed the sender either lying or telling the truth; after that, they had to say how likely they’d be to hire the sender into each of six occupations. Participants were more likely to hire deceptive senders than honest senders into high-sales-oriented jobs, but they were more likely to hire honest senders than deceptive senders into low-sales-oriented jobs.

Gunia and Levine say their findings may explain why deception is so prevalent in corporations: for those in sales-oriented positions, an inclination to deceive may be associated with competence and thereby be positively reinforced. The researchers suggest that managers who witness deceptive behavior “may wish to publicly admonish it and thus reinforce the need for deception-free competence, potentially supplementing such messages with training in alternative approaches to selling, like customer orientation. . . . This reframing could help to sever the link between deception and competence.”

—Alice G. Walton

Deep learning can play an important role in companies’ decision making.

HOW MACHINE LEARNING CAN IMPROVE MONEY MANAGEMENT

TWO DISCIPLINES familiar to econometricians, factor analysis of equities returns and machine learning, have grown up alongside each other. Used in tandem, these fields of study can build effective investment-management tools, according to City University of Hong Kong’s Guanhao Feng (a graduate of Chicago Booth’s PhD Program), Booth’s Nicholas Polson, and Booth PhD candidate Jianeng Xu.

The researchers set out to determine whether they could create a deep-learning model to automate the management of a portfolio built on buying stocks that are expected to rise and short selling those that are expected to fall, known as a long-short strategy. They created a machine-learning algorithm that built a long-short equity portfolio from the top and bottom 20 percent of a 3,000-stock universe.

They ranked the equities using the five-factor model of Nobel Laureate Eugene F. Fama of Chicago Booth and Dartmouth’s Kenneth R. French. Fama and French break down the components of stock returns over time into five factors: market risk, in which stocks with less risk relative to their benchmark outperform those with more risk; size, in which companies with small market capitalizations outperform larger companies; value, where a low price-to-book ratio outperforms high profitablity, where higher operating profits outperform; and reinvestment, in which companies that reinvest outperform those that don’t.

Deep learning is a form of machine learning that is typically based on an artificial neural network, so it mimics human thinking and relies on sensing and analyzing patterns and conditions rather than following task-based rules. Although the researchers’ deep-learning system started with the five factors, it quickly found others that were relevant to its task. So the system added characteristics such as dividend yield, leverage, liquidity, bid-ask spread, and even macroeconomic conditions. Using these deep-learning factors, the researchers’ portfolio outperformed a cap-weighted portfolio drawn from 3,000 stocks between the years 2011 and 2017.

“Our method is the first one that unifies all procedures of the characteristics-based asset pricing models with a clear optimization objective,” the researchers write.

The research further validates factor analysis of stock returns and offers the promise that if deep learning is set on the right path and given enough computational power, it can productively manage portfolios and gain new insights as conditions change. In this study, Feng, Polson, and Xu’s framework was able to generate superior returns not just to the market but also to more static approaches that relied on either the capital asset pricing model or the five Fama and French factors alone.

Implications of the research may not be limited to portfolio management. If deep learning can identify factors that are relevant to returns under certain market conditions, it may be able to assist in capital budgeting and product management. Such a system could inform corporate executives when it is time to pay down debt or increase spending on research and development.

—Michael Maiello

Why do analysts low-ball earnings forecasts?

The market-research company FactSet reports that for each quarter over the past five years, an average of 72 percent of companies in the S&P 500 beat earnings estimates. Past research, including by AQR’s Scott Richardson, University of California at Irvine’s Siew Hong Teoh, and Boston University’s Peter D. Wysocki has found that analysts’ forecasts become more pessimistic and thus beatable as the end of the quarter approaches, but an unaddressed question is how this walk-down affects clients. If analysts revise their forecasts downward every quarter to placate managers, wouldn’t this confuse the investors who ultimately pay for their services?

According to Chicago Booth’s Philip G. Berger and Washington University’s Charles G. Ham and Zachary R. Kaplan, analysts walk down forecasts by suppressing positive news from quarterly forecasts, not by issuing misleading negative revisions. When analysts have positive news, they will often revise the share price target upward or state explicitly that they expect companies to beat earnings estimates, while leaving the quarterly forecast unrevised. Suppressing positive news leads to beatable forecasts—behavior that benefits corporate executives but carries important implications for both the individual investors who rely on these predictions and researchers studying investor expectations.

When securities analysts receive updated information after issuing a quarterly forecast, they have three options: revise the current-quarter earnings forecast; issue an alternative forecast signal, such as a revision to the share price target or future-quarter earnings; or issue no additional forecast.

By not disseminating all information through the current-quarter earnings forecast, which is widely available through commercial databases, analysts provide an advantage to investment clients who have paid for access to the full breadth of their research product. “Analysts convey information in ways that enable them to be of service to clients, whom they care about, and, at the same time, to avoid displeasing corporate managers, whom they also care about,” Berger says. “Nonclients, who rely on earnings forecasts because they do not have access to the whole of an analyst’s work product, end up with skewed information, but this is not a primary concern for the analysts’ business.” The researchers demonstrate that a simple strategy based on buying companies expected to beat earnings, using share-price-target revisions and the text of reports, yields significant abnormal returns, suggesting the market does not see through the analysts’ strategy for conveying information selectively.

Previous research, including that of Stanford’s Maureen McNichols and University of Waterloo’s Patricia C. O’Brien, demonstrates that analysts issue forecasts selectively—not always revising them to fully incorporate the latest information. But the prior research has not been able to disentangle whether such omissions occur because analysts intentionally withhold information or unintentionally omit it, perhaps because they lack (or misunderstand) the new information. Berger and his colleagues solved this problem by focusing on analysts who published—in ways other than updating the current-quarter earnings forecast—information about the same company at the same time they chose not to update the current-quarter earnings forecast.

By showing that analysts’ options for responding to new information have distinct implications for the expected value of future earnings, the research design allowed the authors to shed light on the motives for—and consequences of—the decision to include or omit new information in the current-quarter earnings forecast. It did so by considering whether analysts choose forecasts to revise depending on the positive or negative direction of the news.

Using data from Thomson Reuters’s I/B/E/S forecast compiling system, the researchers analyzed 847,471 analyst reports from the first quarter of 1999 through the third quarter of 2016, representing 8,860 analysts and 7,933 companies. They find that analysts were more likely to issue alternative forecast signals rather than revise current-quarter earnings forecast reports for positive news, whereas they were more likely to revise their current-quarter estimates downward for negative news. This suggests analysts may be responding to incentives—such as continued access to top corporate executives—that encourage them to issue forecasts that managers will meet or beat.

Analysts were also less likely to revise their current-quarter earnings forecast when doing so would have moved them away from the consensus, an indication of herding behavior. And they issued alternative forecast signals in lieu of updating their current-quarter forecasts more frequently when the quantity of news was low, consistent with there being costs to analysts and the users of their reports in making such updates.

The work that analysts produce is complex and has multiple distribution outputs. Because analysts issue a variety of forecasts—including ones that don’t focus on current earnings, such as analyst reports, share-price target revisions, and revisions to future-quarter earnings forecasts—revising a subset, rather than all, of their reports can reduce processing costs for themselves and their clients. It also allows analysts to cater to managers’ preferences for current-quarter estimates that companies can beat.

The researchers’ findings support the idea that the high value that analysts place on access to management along with the low value that institutional clients attach to earnings-forecast accuracy may motivate analysts to selectively decrease the flow of information into the current-quarter earnings forecast. In addition to potentially influencing individual investors who rely on these reports, such behavior has critical implications for academic researchers who use analysts’ current-quarter forecasts to gauge investor expectations. —Martin Daks

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A plain way to cut smoking rates

Tobacco has been a known carcinogen for more than 50 years, yet cigarettes continue to attract new smokers to the harmful, addictive habit every day. Research suggests that marketing, including package labels and brand logos, plays an important role in encouraging young people to take up smoking and legitimizing the habit for many smokers who are trying to quit—and that policy makers may have a way to change that.

In recent years, some 120 countries have added mandatory pictorial health warnings to packaging, and a handful have passed plain-packaging laws. These efforts to discourage new smokers and reduce tobacco-related disease and deaths appear to be working. Australia, the first country to implement a plain-packaging mandate, in 2012, saw monthly cigarette sales decline after the mandate was introduced, according to research from Chicago Booth’s Pradeep K. Chintagunta, Deakin University’s André Bonfrer, University of New South Wales’s John Roberts, and University of South Australia’s David Corkindale.

The researchers analyzed sales data from before and after Australia implemented the plain-packaging mandate and compared these with data from New Zealand, where the mandate hadn’t yet been imposed (but was in 2018).

Across the world, tobacco products are subject to strict marketing and advertising regulations, but tobacco marketers still control packaging design in most respects. Australia’s plain-packaging mandate presented the researchers with an opportunity to study the role this packaging plays in influencing product sales.

Cigarette packages that were previously colorful and adorned with prominent brand names and visuals were required, under the new mandate, to use a brown background and standard font, as well as a graphic health warning that covered 75 percent of the package. “With plain packaging, the number of touch points with the company’s branding elements reduces dramatically,” the researchers write.

They studied retail transaction sales from the two largest distribution channels—grocery stores and convenience stores—between January 2011 and December 2013. The mandate reduced monthly sales by 7.5 percent, they find.

When branding is minimized

After Australia forced cigarette marketers to use plain, mostly uniform product packaging, higher-quality brands lost market share to lower-tier competitors.

### Cigarette-volume market share before and after the plain-packaging mandate

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<th>By brand-quality classification</th>
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<th>Mainstream</th>
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<td>Convenience stores 2012</td>
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<td>Store types combined 2012</td>
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Chintagunta et al.

Findings from the data are consistent with differentiation among brands declining following the mandate, and consumers becoming more sensitive to the product’s price in many parts of the market. The researchers compared data across 13 brands that accounted for 94 percent of sales. They classified the brands using three quality tiers consistent with the cigarette industry’s quality classifications: value, mainstream, and premium. Market share declined among premium and mainstream brands, but increased for value brands. Price sensitivity for mainstream and premium brands increased in the grocery channel. However, price sensitivity declined for all brands in the convenience channel.

Prior to the introduction of the mandate, premium and mainstream brands had distinct packaging and brand-name recognition, which made them more socially valuable among smokers—even those who wished to quit, the research suggests. Those same marketing advantages had also attracted new consumers to take up smoking. “Given the addictive nature of cigarettes, once consumers enter the market, it’s difficult for them to leave,” the researchers write.

But stripped of those packaging advantages, premium and mainstream brands may have become less attractive—as may have been the case for smoking overall. These findings can provide insight for policy makers and regulators tasked with determining the effectiveness of potential and existing public-policy interventions.

—Meredith Lidard Kleeman

To help people avoid overspending, engineer a little peer pressure

A rational economic actor would not spend more than she takes in. Yet, other factors—from limited income, to financial illiteracy, to the urge to keep up with friends or peers—all create frictions between the advice to spend and save wisely and the opposing reality.

Research by Boston College’s Francesco D’Acunto, Georgetown’s Alberto G. Rossi, and Chicago Booth’s Michael Weber suggests a way to bridge that gap, by using a combination of crowdsourced information and peer pressure.

The researchers made use of a free fintech application, Status, which requires users to plug in their age, location, income, credit score, and homeownership status. The app crunches these data and sorts users into peer groups of at least 5,000 other users who share similar financial profiles. The researchers analyzed data from almost 18,000 Status users between September 2017 and October 2018.

Exposure to the app’s crowdsourced information was so powerful that “all the users that overconsume relative to peers reduce their monthly spending, whereas all the users that underconsume relative to peers keep constant or increase slightly their monthly consumption spending,” the researchers write.
Financial information alongside your peers’

The app shows users how their average monthly spending stacks up against their peers’, with the intention of motivating people to improve their spending habits.

How people changed their spending after signing up

60 days before to 60 days after, US dollars

Initially learned that they spent less than peers

Initially learned that they spent more than peers

Groups farther from middle

Spending levels before sign-up were increasingly higher than peers’

Measure of people’s spending levels before sign-up

Standard deviations greater than peers’ average

Went on to spend less

- $2,500

- $2,000

- $1,500

- $1,000

- $500

+ $500

+ $1,000

Overall, those who learned that their peers were thriftier cut their own spending.

When students are matched to schools, who wins?

School-choice systems can help districts fight historical inequalities and de facto segregation—but the details of their design are critical to outcomes

BY ROSE JACOBS

ILLUSTRATIONS BY CHRIS GASH
Instead, as with an increasing number of children in urban school districts across the US and around the world, Claudia would earn a spot through an algorithm designed to match her with a school on the basis of her preferences, demographics, and the school’s open seats. As a result, deciding which schools to put on her wish list, and how to rank them, was a yearlong ordeal of background research, school visits, and endless discussion. “She faded in the process,” says Lauren. “She got tired of it before we were done.” Lauren lasted longer but still felt it was a “system designed to drive me crazy.”

Recent scandals and controversy around high-school and college admissions reflect the pressure parents can feel to get their children into coveted schools. The competitive landscape is fierce, as made clear by executives and celebrities spending hundreds of thousands of dollars on fraudulent schemes to secure their children university acceptance letters. And the stakes are high: part of the concern over New York City’s elite public high schools failing to represent the racial profile of the city stems from an understanding that good schools can confer lifelong advantages, offering a way up the socioeconomic ladder through both caliber of instruction and contact with high-achieving peers.

These controversies focus on admittees to selective schools, and yet similar dynamics are increasingly playing out for students such as Claudia, competing for places that are offered independent of aptitude tests and admissions officers—though often still with race and class in mind. Her district moved to nonselective placements for this year’s incoming sixth graders in an attempt to both simplify the admissions process and reduce the racial and socioeconomic segregation associated with selection on the basis of tests, grades, and recommendations. The placement system takes family income and language background into account, with schools aiming for socioeconomic-diversity targets that reflect the district: 52 percent of students should qualify for free or reduced-price lunch, live in temporary housing, or speak English as a second language.

Whether District 15’s plan succeeds is a matter of keen interest to other school districts, politicians, families, and educational researchers—but also to economists. Because while public education has long been a touchstone for debates about race, equality, and a society’s priorities, open-enrollment lotteries have more recently made schools a crucible for research into matching systems, behavioral economics, and game theory. Will more school choice mean greater overall welfare for students? Could it also reduce inequality in a system that currently favors wealthier, better-connected, and often racially homogenous families? Or do such systems require too much time, energy, and knowledge for parents and students to use them to their best advantage?

While considerable attention has been paid to the experiences of participants in these markets, often overlooked are the decisions that define the systems themselves. In each case, policymakers and other administrators hope to maximize particular outcomes, and use the details of market design to do so. It is here, in particular, where economic research is playing a role, revealing the benefits and drawbacks of different approaches—and producing insights that often lead to real-world change.
School-choice strategies can backfire

One type of school-assignment system, known as the Boston Mechanism, processes ranked lists of schools submitted by families along with schools’ lists of students they can best accommodate. The families can choose to rank their schools truthfully—hoping they’ll be matched with their No. 1 school—or strategically, ranking their top choice lower. These are the steps the system follows:

1. Analyze families’ and schools’ top-ranked choices

   Families’ ranking of schools
   
   Schools’ ranking of students
   
   One pair of No. 1 choices is a match.

   The next match—a school’s No. 1 student choice and a family’s No. 2 school choice—is not permitted in this scenario.

2. Reassess rankings as matches are made

   The remaining family is left with its No. 3 school choice, and the school must go with its No. 3 student choice.

3. Reconcile preferences of families and schools

   The system grants preference to another family’s No. 1 school choice, so the school must pass up its No. 1 student choice and go with its No. 2 student.

4. Continue until all matches are made

School-choice strategies can backfire

One type of school-assignment system, known as the Boston Mechanism, processes ranked lists of schools submitted by families along with schools’ lists of students they can best accommodate. The families can choose to rank their schools truthfully—hoping they’ll be matched with their No. 1 school—or strategically, ranking their top choice lower. These are the steps the system follows:
**An invitation to game**

Chicago Booth’s Seth Zimmerman got interested in school lotteries as an economics graduate student at Yale in the late 2000s. The public-school system in New Haven, Connecticut, where Yale is located, had embraced open enrollment since at least the late 1990s, following a landmark Connecticut Supreme Court ruling that the state was responsible for ensuring equal access to the best public schools. Under Connecticut’s Open Choice program, which the state established in 1997, children in urban school districts such as New Haven’s can attend school in nearby suburban districts, and suburban children can enroll in urban schools.

Other districts have been making similar moves. Since the late 1980s, 46 states have passed laws that either allow or mandate open-admissions policies, according to the nonprofit Education Commission of the States, with the idea of giving all students access to their area’s best schools, even if their families cannot afford to live in the neighborhoods that house those institutions. This impulse has been encouraged at times by government incentives, according to Diane Ravitch, a professor of education at NYU, such as the Obama administration’s Race to the Top, which distributed more than $4 billion across states that undertook significant educational reform. More broadly, the trend toward open admissions also aligns with two philosophies that have dominated US public education over the past 30 years: that schools should compete with one another for students (and therefore resources, since government funding tends to be linked to student numbers), and that schools should be held publicly accountable for student performance, at once facilitating and fueling this competition.

President George W. Bush’s 2001 No Child Left Behind Act enshrines both approaches in law, and has led to the expansion of a suite of programs and policies that give students and their families options apart from their nearest neighborhood school. Sometimes these involve the creation of new institutions entirely, such as charter schools, which are run by private organizations but are publicly funded, or magnet schools, which are public schools (or programs within public schools) with specialized offerings and selective-enrollment policies. Open enrollment, on the other hand, usually involves working with the schools a district already has, but expanding access to them—often with the intent of addressing school segregation when residential segregation has proven unyielding.

But researchers and policy makers alike have noted that the mechanism for transforming a captive-market system involving hard borders between school catchments into a fair and functioning free-market system is far from simple. In order to match open-enrollment students with available places, the New Haven Board of Education adopted a mechanism that encouraged students and their families to rank schools strategically, considering not only which schools they liked most, but also which schools they had the best chances of getting into after taking into account demand from other students.

Say Student 1 had found in School A his dream destination, but he also knew that School B—where his sister was enrolled—would be an adequate option. What he really wanted to avoid was School C. You might think he should rank the institutions in that order: A, B, C. But the way the New Haven algorithm worked, each student’s first-choice school was prioritized, meaning that if Student 1 missed out on School A in the first round of matching, he couldn’t count on School B either, despite having a sibling there (an advantage, according to the rules of that lottery). This was because anyone who had put School B at the top of her list would get priority over Student 1, who had ranked it lower; Student 1 would have squandered his sibling advantage. As a result, his chances of landing in School C could well have been higher if he had ranked his preferences honestly than if he had said School B was his first choice.

Research suggests that this system, versions of which school boards across the US have embraced, can increase overall welfare, on top of other advantages. For example, Duke’s Atila Abdulkadiroglu, whose seminal work in the early 2000s with Tayfun Sönmez of Boston College prompted Boston Public Schools to rethink the mechanism it employed (see “School Choice in Practice,” page 34), argued in a 2011 paper with Yeon-Koo Che of Columbia and Yosuke Yasuda of Osaka University that it may be preferable to some other school-assignment systems in part because it breaks ties between students who want the same school by rewarding the student who ranked it higher. In other systems, such decisions are usually determined by chance, using a random lottery. And these situations are common: even if siblings or residential proximity give some students greater priority over others, many students will still have equal claim on the same school. (This dilemma also occurs at the college level, where universities sometimes use early-acceptance policies to help them choose between equally qualified candidates on the basis of the candidates’ passion for the school.) Abdulkadiroglu and his coresearchers argue as well that a system that rewards strategizing might even benefit “naive” students ill-placed to game it, since strategic students would avoid putting popular schools at the top of their lists, leaving more spots for everyone else.

But the drawbacks are evident. First, there is significant room for regret if a student feels she has misjudged her chances at getting into one school or another. Second, the system rewards risk-taking, but for only select students: if you had a 1/100 chance of getting into your favorite school and a 1/10 chance at your second favorite, you should rank your second-favorite school at the top of your list unless you had the option of opting out of the system entirely should you miss your 1/100 chance. Students for whom private school is an option can take a chance on the most popular public schools and go private if they don’t get the outcome they want.

More fundamentally, there is no easy rule of thumb for understanding your chances. Even if you could effectively parse historical data on levels of demand for one school or another, others might be doing the same, meaning that how your fellow students are ranking their choices in the same year you are ranking yours—the only year that matters—will remain opaque.

The system leaves even sophisticated individuals befuddled. “Occasionally we’d get notes from Yale faculty with school-aged kids asking us how it worked,” says Zimmerman of the New Haven lottery.
Research finds that people consistently under- or overestimated their odds of getting into a school and strategized poorly as a result.

Even systems simpler than the so-called Boston Mechanism then being used by New Haven may be too complicated for many users. Research by Cornell’s Alex Rees-Jones and UPenn PhD candidate Samuel Skowronek finds that 23 percent of medical students mistakenly misrepresented their preferences in a strategy-proof system that mirrored the real-life residency match that they had only just taken part in. Chicago Booth’s Eric Budish and UPenn’s Judd Kessler have found similar results for course allocation at the Wharton School at the University of Pennsylvania (see “You can’t always say what you want,” next page). These findings and experiences raise concerns that families lacking time or statistical know-how would be least prepared to navigate algorithmic matching processes—and perhaps more fundamentally, that such processes may not be as effective as anticipated if students and their parents don’t understand them.

Is honesty the best policy?
Last September, Kirsten Youngren attached a handwritten list of 27 high schools to her refrigerator. Over the following six months, the slip of paper became crowded with amendments: dates and times for school visits, and long, wiggly arrows
You can’t always say what you want

When administrators at the Wharton School at the University of Pennsylvania started looking for a way to revamp their course-allocation system, Chicago Booth’s Eric Budish saw an opportunity to put his ideas about market design to the test.

Wharton’s system was based on a “fake money” auction model in use at many schools at the time, in which students were provided an endowment of points or other currency and used this endowment to bid strategically for the courses they hoped to enroll in. After the initial round of bidding, students could buy or sell course seats in subsequent auctions. Such systems have been criticized by some economists for driving participants to bid strategically, and thereby hide their true preferences, potentially leading to inefficient and unfair course allocations. At Wharton, the system worked poorly enough that only about a quarter of students thought it was fair.

In 2011, shortly before Wharton decided to change its system, Budish published research describing a mechanism he calls “approximate competitive equilibrium from equal incomes.” Following this mechanism, students report their preferences directly (rather than via bids) and are randomly assigned roughly (but not exactly) equal endowments of points. Prices for all of the courses are set by a computer, which searches for a set of prices that will result in each student getting the best schedule she can afford (given her budget and reported preferences) and also clear the market, or balance supply and demand for each course. The work for the computer is onerous—for a context as complex as Wharton’s, there are more possible sets of prices than there are atoms in the universe, Budish points out—but for students, who are no longer required to be strategic and canny bidders, the task is greatly simplified. Whereas the old Wharton system left room for students to regret their bidding strategy, Budish’s mechanism requires only that they truthfully express what they want.

Ordinarily, Budish might have tested the new approach by assigning study subjects—not necessarily Wharton students—certain preferences for course schedules and analyzing whether the mechanism created a fairer and more efficient distribution of the most popular classes. This is how the vast majority of market-design experiments are performed.

But economists have recognized that a common assumption in market-design research—that people are able to articulate what they want—is often untrue, particularly for complex decision-making problems. This was crucial for Budish, because the superiority of his mechanism over others hinged on its ability to get an accurate reading of market participants’ desires, even if those desires were complicated. At Wharton, for example, when MBA candidates consider courses, they are balancing the draw of star professors, the desire for manageable workloads, and the need to fulfill degree requirements. The number of courses on offer is vast, and the possible schedules vaster still—in the hundreds of millions.

So instead of studying a sample of subjects randomly assigned to certain preferences, Budish and Judd Kessler, an economist at Wharton, asked a sample of real Wharton students to report their real schedule preferences, used Budish’s mechanism to come up with hypothetical schedules, and then offered the students multiple possible schedules to see which more or less met their needs (a bit like what you might experience in an optometrist’s office: “Can you see more clearly with Schedule A or Schedule B?”). This allowed them to assess how effectively the students reported their own preferences.

While the researchers were expecting the difficulty of reporting preferences to reduce the method’s relative effectiveness to some extent, the degree to which it did surprised them. Budish’s mechanism outperformed Wharton’s incumbent system on fairness and efficiency, but students’ reporting mistakes—some of which likely stemmed, Budish notes, from the time constraints placed on them and the unfamiliarity of the lab setting in which the experiment took place—reduced that gap significantly. Moreover, no one type of mistake was particularly prevalent, meaning no easy fix presented itself.

Still, the improvements, as well as factors such as students’ favorable perceptions, persuaded Wharton to adopt the method, with some adjustments and significant user training and support to help maximize accurate reporting. In the first year of the new system, 65 percent of MBA candidates said they thought course allocation was fair.

Wharton’s move contributes to a tradition of market-design research making its way from theory to practice. “Al Roth championed the idea that economists act like engineers,” says Budish, who studied under the Nobel Prize–winning Stanford economist. “That requires a general engagement with problems, and being interdisciplinary in looking for solutions. It’s also meant there’s a great feedback loop between theoretical research and real-world problems, which is powerful—and fruitful.”

Go to Review.ChicagoBooth.edu to see citations for research mentioned in this article.
A district might accept lower student satisfaction if it sees a benefit in preventing swaps—for instance, to keep bussing costs down.

noting schedule changes; checks, strike-throughs, and stars to code experiences at the schools; and highlighting to indicate long commutes.

Youngren’s daughter, Bridget, is a rising ninth grader in Lower Manhattan who was navigating a wide variety of options for high school. She had taken the controversial test that determines placement at eight of New York’s elite, or “specialized,” high schools, mostly under the influence of her best friend, who wanted to go to Stuyvesant, the fourth-best public high school in the US, according to national school-ranking website Niche, and the school at the center of the recent debate in New York over admissions policies and race. Bridget was also interested in “screened” schools—that is, public schools that prioritize interested students on the basis of academic performance, attendance records, or art portfolios—as well as nonselective public schools, which would admit her on the basis of New York’s strategy-proof lottery system, which Atila Abdulkadiroğlu and his collaborators, MIT’s Parag Pathak and Harvard’s Alvin Roth, helped design. (The previous system left tens of thousands of students unmatched until late summer and then often assigned them to schools they didn’t want; the new design helped Roth win the Nobel Prize in Economic Sciences in 2012.) And Bridget was weighing three Catholic high schools.

The fact that Bridget’s parents could pay Catholic-school tuition—though not the much-higher fees at other New York private schools—gave her more options than many of her peers had. But her mother felt the advantage was even more deeply rooted than that: Kirsten, an architect who works from home for a firm that accommodates flexible hours, was able to invest a huge amount of time in the process, researching the schools and the system itself. “There’s something to be said about the amount of work that needs to be done,” she says. “It was sometimes awkward being one of the few parents at Bridget’s middle school who had the flexibility to put in that time.”

And even though the middle school—a public school on the Lower East Side with a high number of low-income students—and others like it offered help to students and families navigating the lottery process, sometimes that advice was ill-conceived: Kirsten recalls someone at a presentation last fall saying that students should think twice about applying to the most popular schools, since their chances of getting in were small. Kirsten ignored the suggestion, but parents who took the advice to heart might have needlessly given up their child’s chance, since New York’s matching system rewards “truth telling,” or honest ranking of a student’s favorite schools, over strategy games.

In their research on New Haven’s schools, Zimmerman and his coresearchers wanted to quantify the effects of this sort of inequality, and particularly to understand how it played out in a system even more strategically complicated than New York’s. Past research assumed either that students and their families were strategizing correctly or that they were making one of a limited number of possible mistakes, such as not knowing their own priority group or playing naively by simply listing their choices in order of their preferences. With Princeton’s Adam Kapor and Christopher Neilson, Zimmerman surveyed 417 families who took part in the New Haven high-school lottery in 2015 and 2017, asking how they ordered their rankings and why, and then analyzed the matches that had resulted.

They find that people consistently under- or overestimated their odds of getting into a school and strategized poorly as a result. Moreover, the researchers’ models showed that unless mistakes could be reduced by a third for ninth-grade matches and by almost two-thirds for elementary-school placements, a system that rewards strategic play would perform worse than one in which families simply rank their preferences honestly.

“It’s important to think about mistakes,” Zimmerman says. “If you could get people to play the system perfectly, that would be the better matching mechanism. But we were far from that.” The researchers tried developing an app that would increase families’ understanding of their odds and help them strategize accurately. But they soon saw that simply adopting a truth-telling approach made more sense. Their work found an audience in New Haven Public Schools, and for the 2019–20 school year, the city began employing a matching algorithm similar to New York’s.
Districts that want to strategy-proof their matching systems—remove the incentive for students to report anything but their true school preferences—typically choose between two types of algorithms, top trading cycles and deferred acceptance. A top-trading-cycles mechanism prioritizes efficiency: it allocates spots at various schools in such a way that no two students would both be made better off by swapping their school assignments. Deferred acceptance creates stable matches; a match is unstable if a student at one school prefers another, and has higher admissions priority (based on the hierarchy of student traits the district uses to determine priority at different schools) at her target school than any of its admitted students does.

Because DA produces stable matches, DA systems are more restricted by districts' priority structures than are TTC systems. This can prevent swaps of schools between students, even when both students would prefer the trade. The result may be lower student satisfaction, but the district might accept that cost if it sees a benefit in preventing swaps—for instance, to limit the average distance between students' homes and schools, to keep bussing costs down.

Chicago Booth's Jacob Leshno says that currently most districts don’t use TTC systems, and he suggests a potential reason many have opted for DA instead: TTC systems are harder to explain to students who don’t get the schools they want. In a DA system, when a student doesn’t get the match she wants, the explanation is straightforward: she didn’t have high enough priority at that school, based on whatever priority structure the district has created. But in TTC, it can be more difficult to explain in a nontechnical way why a student received a disappointing match, except that it was part of an efficient distribution of satisfactory matches overall.

However, Leshno and Stanford’s Irene Lo wanted to help administrators make full use of their options for school-matching systems by providing tools to help explain how TTC school-assignment algorithms work. Their research demonstrates it’s possible to explain matches under TTC systems to students and parents using the same palatable notion that applies to DA systems, removing a big impediment to their implementation.

In essence, a given student has an endowment based on her priority at each school, which the researchers represent as tokens. Her budget of tokens is different for each school, since some factors—such as whether she lives nearby—are school specific. Each school also has a “price,” or a minimum number of each token students need in order to afford admission. Because students can trade school assignments based on their preferences, a student with insufficient tokens for School A, her target school, could potentially still afford admission using tokens for School B, provided there was at least one student admitted to School A who preferred School B but didn’t have enough B tokens. After assignments are made, districts can even publish prices publicly, showing the minimum number of each token that was required for admission to each school, to help students and their families verify the student is matched to their favorite of all the schools they can afford. The researchers suggest that being able to frame outcomes in this way may make it easier for districts to adopt TTC mechanisms for school choice.

**Horizontal versus vertical variation**

One realization that struck Lauren Young periodically as she was considering Claudia’s middle-school options was that, for all the schools did to advertise their differences—art every day versus gym every day, a focus on math and science, a forward-thinking principal—they were ultimately more alike than not. “The system encouraged parents to overemphasize what’s special about a school, and you forget that they’re all teaching the same curriculum and they’re really only different at the margins,” she says. When she thought about it this way, the District 15 lottery was “a choice, but not a choice.”

In economics, vertical differentiation refers to variation within a set of goods such that all consumers have the same preferences—one product is of higher quality than the rest, and everyone prefers that product. Horizontal differentiation occurs when different consumers have preferences for different things. Generally speaking, school choice has the opportunity to make a bigger difference, Leshno says, when there’s greater horizontal differentiation—that is, when students don’t all want the same thing.
School choice in practice
Matching mechanisms in select US cities

Chicago
For the 2018–19 school year, Chicago rolled out a centralized application system for high schools. Students who want to attend a school other than their designated neighborhood high school can rank up to 20 schools, and the system matches students to their highest-ranked school on the basis of admissions criteria and available seats. Some assignments are made by lottery, others involve points. Admissions are different for the system’s 11 selective enrollment schools, which require testing in. For these, the top 30 percent of students who qualify receive an offer. The rest are broken into socioeconomic tiers, and assignment is made based on “simple serial dictatorship”: the top student in each tier is admitted to her highest-ranked school with an available spot, then the next-highest-scoring student, and so on.

Boston
From 1988 to 2005, school matching in Boston was done using the so-called Boston Mechanism, an algorithm—still in use in many cities—that rewards students for strategic ranking of schools. Following research by Duke’s Atila Abdulkadiroğlu and Boston College’s Tayfun Sönmez that revealed shortcomings of the Boston Mechanism, the city adopted a new system that included a deferred-acceptance algorithm. In 2013, for the 2014–15 school year, the city updated its matching system with a program known as Home-Based Assignment, with the aim of providing students “greater access to quality schools closer to home.”

New York
Prior to 2003, eighth graders could apply to up to five of the city’s more than 600 high-school programs, and offers of admission were not coordinated between schools, which meant students might receive offers to all their selected schools or none of them. More than a third of students were administratively assigned to schools near their homes by a central office, rather than by matching with a school. In 2003, New York adopted a school-choice system that included a deferred-acceptance algorithm and the opportunity to apply to up to 12 schools, which reduced administrative school assignments to about 10 percent of students. Students’ average commute grew longer, suggesting more students began venturing out from their neighborhoods, but diversity remains a concern. Several city schools have begun to implement “Diversity in Admissions” pilots to prioritize a certain percentage of seats for underserved students, and thus increase or maintain diversity at their school, says a system spokesperson.

New Orleans
Admissions to most of the city’s public schools, now all independent charter schools under the supervision of NOLA Public Schools, are administered through a centralized system called OneApp. In its first year, OneApp employed a top-trading-cycles (efficiency-prioritizing) algorithm but later moved to a deferred-acceptance algorithm, which avoids pairs in which a student prefers a different school to the one assigned, while her target school admits a lower-priority student. It did this because of a handful of factors, including the introduction of schools that required students to test in, making trading assignments impossible.

Denver
Students interested in attending a school other than their neighborhood school use a unified application system called SchoolChoice to apply to up to 12 schools. Assignments are made using a deferred-acceptance mechanism incorporating school-specific priority structures that may include factors such as residential geography, sibling attendance, and qualification for the Free and Reduced Meal Benefit Program.
But Leshno and Lo’s larger finding is that the debate over which algorithm to use risks obscuring a more powerful lever for student happiness: a school district’s priorities. Should the sibling of a current student get priority at a particular school? Should children have first dibs on their neighborhood school? Should attendance at a school open house give students an advantage in a lottery—a factor that diversity advocates argue hurts poorer, nonwhite families? As districts decide which traits to prioritize and how much relative weight to give to each, they determine, to a large extent, the set of schools available to each student to choose from. That makes the choice of priority structure hugely important, no matter the algorithm: generally speaking, student welfare will be higher in a district with a sensible priority structure than in a district with a poorly designed one, regardless of the mechanism either is using.

“When you have priorities that make sense, that’s where things change, and so that’s where the discussion should be,” Leshno says. He emphasizes that districts need to be transparent about not only their choices of priorities, but also how those choices affect which sets of schools are available to which students.

Nor should the debate over matching mechanisms disguise the limits of market design. “All of this only helps to the extent that we create better matches,” Zimmerman says. “We’re still allocating students to the schools we have: creating better matches doesn’t fix the problem of bad schools.”

Carol Burris, a former high-school principal, executive director of the Network for Public Education, and author of the book *On the Same Track: How Schools Can Join the Twenty-First-Century Struggle against Resegregation*, is even more critical. Lotteries as the primary vehicle for admissions do not decrease segregation, she argues. And in the meantime, they elide problems related to curriculum, disparities in which can exacerbate segregation. Schools try to distinguish themselves using their varying offerings, when in fact every student deserves to attend a school with a rich and varied curriculum. Choice, says Burris, often becomes a substitute for the hard (and more expensive) work of improving individual schools.

School matching is not necessarily a zero-sum pursuit, Leshno says. School choice does not create additional educational resources, but with a well-designed system, a district can make the most of the resources it does have. When they’re functioning as they should, school-matching systems have the potential to better pair what schools have to offer with what individual students need, “even if you accept the fact that there aren’t enough good seats for everybody.”

Choice only goes so far

Lauren Young felt good about the list of schools Claudia finally submitted to District 15, but more ambivalent about the process itself. They had left off two schools that Young and her husband felt were entirely wrong for their daughter, and ranked all nine others. Private school was not a consideration, for financial and philosophical reasons, but other ways of opting out of the system did cross Young’s mind from time to time: “The whole experience made me realize why people move to the suburbs,” she says. Kirsten Youngren felt similarly, visiting friends in New Jersey last year and wondering whether her family shouldn’t perhaps uproot from Manhattan and start building a life in a place where kids go to the local public school, and can count on that local public school being sound.

In April, Claudia found out where she will be starting sixth grade this fall: Brooklyn Collaborative, which had been fourth on her list. The three schools she ranked higher were historically white-majority institutions with affluent student bodies and the best academic reputations in the district. Meanwhile, very few affluent children—a group into which Claudia falls—attended Brooklyn Collaborative in the past; its incoming class of sixth-graders will now be the district’s most affluent, a product of the district’s diversity priorities and the way parents and students ranked their choices.

Lauren is happy with the school’s pedagogy. Claudia, meanwhile, was disappointed not to have gotten into the arts-focused school she had ranked No. 1, and appealed the decision unsuccessfully. Given the strength of her desire to get into her No. 1 school, a strategic-play mechanism might have worked in her favor, but it is impossible to know for certain.

A month earlier and across the East River, Kirsten Youngren’s daughter, Bridget, learned that she had been matched with the 12th-ranked school on her list of 12 New York City public high schools. Bridget decided to enroll in a Catholic school this fall. —CBR

School choice does not create additional educational resources. But with a well-designed system, a district can at least make the most of the resources it does have.
HOW TO SPEED UP THE NEXT MEDICAL BREAKTHROUGH

In some cases, life-saving medical treatments aren’t available because the science isn’t there. In others, the problem is that profits aren’t there. Research is uncovering policies that can encourage for-profit innovators to tackle high-impact problems.

BY BRIAN WALLHEIMER
PHOTO ILLUSTRATIONS BY GREGORY REID
A century ago, the average American could expect to live into his or her mid-50s, maybe long enough to bounce a grandchild on a knee for a few years—so long as that knee wasn’t wracked with arthritis pain.

Today, that same person can expect to reach the late 70s, and perhaps climb a set of auditorium stairs using a rebuilt knee to see that grandchild graduate from college. Older people take medications that lower blood pressure or cholesterol, stave off the onset of heart disease, or keep diabetes in check. They might receive dialysis, which filters out waste for kidneys that no longer can do the job themselves.

Countless people have benefited from medical innovations that not only prolong life but improve its quality. These innovations have significant value for patients and society, but they can be time-consuming and expensive to develop, which has prompted some economists to investigate how to speed up and streamline the process of research, development, and regulatory approval.
In a 2006 study, Chicago Booth’s Kevin M. Murphy and Robert H. Topel estimated that US life-expectancy gains from 1970 through 2000 added about $3.2 trillion per year to US national wealth. Gains over the 20th century were worth about $1.2 million per person—the value Americans put on the years and quality of life added over that time.

“A lot of people think that the value of having people live longer is that they work longer and add to the GDP,” Topel says. “But that’s not it at all. There is value to individuals for living a bit longer and a little bit healthier. As just one example of improved quality of life, advances in orthopedic surgery allow millions of people to walk around who might otherwise be suffering from disabling injuries.”

Even modest gains in life expectancy can be significant. Nearly 40 percent of Americans can expect to get some form of cancer over their lifetimes. In the 2006 study, Murphy and Topel calculated that even a 1 percent reduction in mortality from cancer would be worth $500 billion in the United States alone.

There is a significant societal benefit to ensuring that new treatments, devices, and procedures make it to the patients who need them. But many of these innovations come from private companies beholden to investors and profit margins. Improving some treatments simply may not be profitable.

**Countering short-term thinking**

Consider the development of a new pharmaceutical. From identifying a potentially important molecule or compound to making it through regulatory approval and getting their drug to market, companies can face more than a decadelong process. One estimate from an industry-funded center suggests that drugmakers can expect to spend about $2.7 billion to get a new product into pharmacies.

At every step, someone has to decide how much the company might still need to spend—and if that cost will be worth it. If it looks as though the company might not be able to earn a profit on a drug, the company may cut its losses, even if the technology stands a good chance of later obtaining approval and extending or improving patient lives.

Chicago Booth’s Eric Budish and MIT’s Benjamin N. Roin and Heidi Williams say that corporate short-term thinking and the structure of the patent system may promote short-term research-and-development projects. They find that pharmaceutical companies disproportionately invest in developing drugs that treat late-stage cancers, and they argue that this is at least in part because these drugs can be brought to market relatively quickly. They also find that companies underinvest in drugs that could prevent cancer or treat it in its early stages, and that take a comparatively long time to commercialize. Yet patients would benefit more, in terms of added years of life, from the early-stage treatments.

The researchers argue that short-termism and problems with patent law “may generate incentives that distort private research investments away from inventions that have both a

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**Underinvestment in cancer’s early stages**

Pharmaceutical companies devote fewer resources to studying treatments for early stages of cancer partly because such drugs can take longer to bring to market, the researchers argue.

**Total number of clinical trials for cancer treatments**
*By stage of cancer being targeted (1973–2011)*

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Budish et al., 2015

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**When companies choose which inventions to pursue, they look for those that can be commercialized as quickly as possible, lengthening the time they have to recoup their investments.**
Return on immunotherapy investment
Life insurers could profit if they opt to cover their customers’ costs for certain cancer treatments, research finds.

Benefit to life insurers after their customers receive life-saving cancer immunotherapy treatments

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<td>$343m</td>
<td>$92m</td>
</tr>
<tr>
<td>Acute lymphoblastic leukemia</td>
<td>$343m</td>
<td>$343m</td>
<td>$1m</td>
</tr>
<tr>
<td>Total per year</td>
<td>$7.7b</td>
<td>$7.7b</td>
<td>$1.6b</td>
</tr>
</tbody>
</table>

Key:
- Life insurers’ benefit
- Medical insurers’ cost for immunotherapy
- Patients’ copay for immunotherapy

Koijen and Van Nieuwerburgh, 2019

Addressing these problems would have clear value for patients. The researchers find that US cancer patients diagnosed in 2003 lost a total of 890,000 life years because of “missing R&D” that companies would have performed if not for this distortion in incentives.

One potential improvement they suggest would be for the US Food and Drug Administration to approve more drugs using “surrogate endpoints,” which are valid proxies for mortality that speed up clinical trials. For example, cholesterol and blood pressure are surrogates for heart disease. In a trial, if a drug were shown to lower blood pressure, that could be used as evidence it would also reduce death from heart disease. Surrogate endpoints are already used in clinical trials for some types of cancer, and the researchers find more R&D associated with those cancers, especially for early-stage disease.

These surrogate endpoints couldn’t be used in every situation. They can be controversial, since changes in surrogate endpoints may not always correlate with improvements in patient survival. But in some cases, companies that can use surrogate endpoints to gain swifter regulatory approval might be more willing to invest in drugs that would otherwise take too long to bring to market.

“Let’s say, as a pure hypothetical, that a company had an idea for a vaccine that could prevent prostate cancer in otherwise healthy, 20-something males,” Budish says. “It would take a long time to prove that it works statistically. By that time, a lot of your patent protection would have lapsed. The vaccine might never get to the market because of that. Surrogate endpoints, if they could be identified, would help in a case like that.”

Tweaks to patent laws also could help. Companies file patents at the point of discovery to protect their inventions. That’s when the clock starts ticking, giving the patent holder 20 years before a competitor is allowed to market a generic version of a drug. The company producing the generic doesn’t have to invest nearly as much in R&D or in the regulatory process, so its pricing can be much lower, siphoning business away from the company that originally discovered or patented the product.

As a result, when companies choose which inventions to pursue, they look for those that can be commercialized as quickly as possible, lengthening the time they have to recoup their investments. “The patent system provides, perhaps inadvertently, very little incentive for private firms to engage in long-term research,” Budish, Roin, and Williams write.

But if patent law instead offered protection from the date the drug received approval or went onto the market, companies might be more inclined to invest in treatments that would take longer to be ready for sale, the researchers suggest.
Another option, says Chicago Booth’s Andrew McClellan, could be for regulators to use a sliding scale to grant approvals. For example, the FDA might consider easing the requirements during clinical trials if a drug poses little risk to patients but has potential to treat a widespread disease such as Alzheimer’s, which is a serious public-health issue.

“The regulator might say, ‘Because there’s a need for this and we want you to keep developing this, we’ll give you a slightly lower standard and require less evidence to get you to approval,’” McClellan says. “Exactly how much you want to change a standard depends on what the need is and what the benefit of the drug is versus the side effects of putting something poor on the market.”

Creating a sliding scale could equalize the incentives for the companies developing new technologies, which want approval as quickly and as cheaply as possible, and the regulators, who prioritize product safety over time and money.

Expanding the pool of payers
The US federal government offers incentives to companies that develop “orphan drugs,” those that treat rare diseases or conditions. Without these incentives, companies might not be able to profit from developing a drug that treats a small pool of patients.

But even when the pool is large, some patients simply can’t afford a therapy. More than 27 million Americans still lack health insurance. And many who do have insurance face high copays or deductibles that can be financially crippling. About 26 percent of Americans have reported that they or someone in their household has had trouble paying healthcare bills in the past 12 months. These limitations lead to patients leaving prescriptions unfilled and declining medical procedures.

When companies develop innovative treatments, such as immunotherapies that use the body’s own immune system to fight cancers, many potential patients can’t afford them. Consider Kymriah, approved in 2017, which uses the body’s T cells to fight B-cell acute lymphoblastic leukemia. Treatments can cost nearly $500,000, and a patient’s copay might be tens of thousands of dollars—an expense that would be out of reach for many.

But Chicago Booth’s Ralph S. J. Koijen and Columbia’s Stijn G. Van Nieuwerburgh argue that there is another potential payer with an interest in keeping those patients alive, and which also could afford the high costs: life-insurance companies.

Life-insurance companies make money the longer a policyholder lives. If cancer immunotherapy treatments will extend a policyholder’s life, the insurance companies stand to gain.

“Life-insurance companies are sharing in that benefit if you get that treatment,” Koijen says. “They don’t have to pay out if you stay alive. And the longer you stay alive, the longer you pay into the policy.”

When immunotherapy is an option
Life insurers could benefit financially from cancer treatments extending the lives of more than 300,000 of their customers.

Annual number of US cancer cases for which immunotherapy treatment is available

<table>
<thead>
<tr>
<th>Type of Cancer</th>
<th>US Cancer Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-small cell lung cancer</td>
<td>122,282 cases</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>32,456</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>26,843</td>
</tr>
<tr>
<td>Myeloma</td>
<td>22,206</td>
</tr>
<tr>
<td>Head and neck</td>
<td>21,349</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>17,446</td>
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<tr>
<td>Kidney cancer</td>
<td>8,558</td>
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<tr>
<td>Gastric and gastroesophageal junction</td>
<td>18,117</td>
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<tr>
<td>Chronic lymphocytic leukemia</td>
<td>15,597</td>
</tr>
<tr>
<td>NHL*</td>
<td>8,454</td>
</tr>
<tr>
<td>Acute lymphoblastic leukemia</td>
<td>5,465</td>
</tr>
<tr>
<td>Other cancers</td>
<td>35,642</td>
</tr>
</tbody>
</table>

*Non-Hodgkin’s lymphoma (follicular lymphoma)
Koijen and Van Nieuwerburgh, 2019

Pharmaceutical companies have an incentive to purchase a rival that is developing competing drugs and then abandon the former rival’s projects.
Koijen and Van Nieuwerburgh find that the cancer immunotherapies on the market today are applicable to about 330,000 cases per year. If life insurance were to cover the copays for all those cases, the total cost would be about $4.1 billion per year. Life-insurance companies would stand to recover an estimated $7.7 billion annually as a result of being able to delay paying the death benefits for patients whose treatment was successful, as well as collecting additional premium payments from those patients. The treatment expenses could be financed by life insurers covering patient copays, insurers allowing patients to borrow against their death benefits for their copays, or other funding mechanisms, the researchers suggest.

Getting life-insurance companies in the payment mix would be good for patients and, when treatment adds years of life, good for the insurers too. But in other cases, where the gains to life expectancy from a given treatment are shorter, it’s reasonable to expect most of the costs of treatment will continue to be borne by health-insurance companies—an arrangement that Booth’s Topel suggests can skew decision-making about which treatments are worth the expense. Patients’ expectations that any and all treatments will be covered by health insurance creates significant inefficiencies that alter the types of innovations that come to market, he says.

For example, about a decade ago, eight new lung-cancer drugs came on the market, all of them targeting patients in the late stages of the disease. One drug, Avastin, increased patient lives by an average of only a few months and cost tens of thousands of dollars.

Topel argues the drugs that can gain cost-effective approvals aren’t necessarily the ones society most needs. Still, they will generally be covered by health insurers. “If I were paying directly for my own care, I’d look at the price and ask if it’s worth it,” he says. “We do that for other products that we consume, but we don’t do it for medical care because we consume those benefits mainly through insurance. If you invent a procedure for making victims of cancer live a little bit longer, it’s very difficult to deny that care downstream once that innovation is in our inventory. The way we allocate resources—build it and they will come—distorts incentives.”

In other words, Topel says, if health insurers could prioritize paying for treatments that provide the most-cost-effective improvements in life expectancy and quality of life—a big “if” in a world of third-party payers for medical care—innovators would in turn prioritize developing treatments that provide these outcomes.

**Competition matters**

A lack of competition in some corners of the health-care industry also decreases companies’ incentive to innovate. London Business School’s Colleen Cunningham and Yale’s Florian Ederer and Song Ma find evidence of this among drugmakers that initiate “killer acquisitions” to eliminate competition from rivals.

Pharmaceutical companies have an incentive to purchase a rival that is developing competing drugs and then abandon the former rival’s projects. Analyzing more than 16,000 drug projects originated by more than 4,000 companies, Cunningham, Ederer, and Ma demonstrate that a project acquired by a company that sells an overlapping drug is nearly 30 percent less likely to be continued in the development process than a project initiated by the acquiring company. “An incumbent firm may acquire an innovative entrepreneur simply to shut down the entrepreneur’s projects,” the researchers write.

These deals often evade review by the Federal Trade Commission since they aren’t large enough to trigger mandatory premerger notification requirements. The researchers observe that company acquisitions of rivals with competing drug projects often fall just below the transaction value required to notify regulators. Acquisitions of rivals without competing drugs do not display a similar pattern.

In fact, the problem of “stealth” deals in the health-care sector extends far beyond the pharmaceutical industry, according to Chicago Booth’s Thomas Wollmann. He used economy-wide merger and enforcement data to study a 2000 amendment to US law that abruptly increased the thresholds below which businesses are exempt from premerger reporting requirements.

Examining US premerger notifications from 1994 to 2011, Wollmann finds that after the amendment took effect, the number of premerger notifications received by the FTC and the US Department of Justice fell by nearly three-quarters. He also finds that among newly exempt deals, antitrust enforcement fell sharply while mergers between rival companies increased.

“These findings indicate that many companies, knowing that they are less likely to face antitrust scrutiny after the amendment, become more likely to propose deals with competitors,” says Wollmann.

His data also indicate that health-care-sector deals play a disproportionately large role in this phenomenon.

“Hospital systems, providers of ambulatory and home health-care services, medical device manufacturers, and dialysis facilities are all overrepresented,” he says. “These industries alone combined for thousands of mergers over the past two decades.”

Such evasions of notification thresholds underscore the importance of policy design in encouraging medical innovation: companies will seek to maximize their profits within the bounds set by regulators and policy makers, so it’s up to those individuals to craft a regulatory system that offers the incentive to innovate. Changes to the patent system, the treatment-approval process, and antitrust regulation—together with private-sector developments such as mutually beneficial subsidies for expensive treatments—could help medical science continue its progress toward longer, healthier human lives. —CBR

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Welcome to... The Efficient Market Casino!

Have you ever gambled before, Professor Fama?

Oh no, I like to play golf and go swimming.

Chicago Booth's Eugene F. Fama

This casino is different! Everyone chooses stocks and wins by 7 percent on average!

So what do you need me for?

You see, we have a pesky group of card counters, gangsters, and sharks who seem to be doing better than the rest of the market, and we want to know what their method is.
That's easy. They probably choose stocks based on the factors I outlined with Dartmouth's Kenneth R. French.

That certainly explains the usual suspects.

Victor Value – He knows that stocks valued higher by accountants but priced lower on the market perform well in the long run.

Smalls McKenzie – He knows that smaller companies do better than bigger companies.

And Ruthless Richie – He knows that profitable companies do better than the market. Better to buy something making money than to bet on growth.
I know all about those guys. In my research, I identified up to three more factors that perform better than the market.

But Professor Fama, we've caught hundreds of gangsters, each with a unique method for beating the market.

Well, let's take a look at one of these new models...

Haha! It was Victor Value all along!
Sometimes, a new method for beating the market is just a proxy for one of the factors we know about. The disguise might be complicated, but the underlying effect is still known.

I see. And a seemingly new model might be driven by a combination of the effects of multiple known factors.

My new research is about quantifying how much of a stock’s returns are explained by the six known factors. Any evidence of stock picking skill then focuses on what’s left over.

He’s onto us, boys! Must be a copper! Scatter!

I’m not the police. I just did the research!
November 1, Hyatt Regency Chicago

At Booth Women Connect, thought leaders come together in the spirit of openness and discourse to generate shared learning and true innovation. Join us for an extraordinary day of spirited discussion, practical insights, and powerful networking with a community of leading women professionals.

Register now at ChicagoBooth.edu/bwcc2019
Join the conversation at #BoothWomenConnect
Hard-thinking people have spent millennia trying to articulate what distinguishes us from all other creatures. Is it having opposable thumbs? Walking upright? Using tools? Thinking analytically? This question finally got a fairly clear answer several years ago thanks to researchers at the Max Planck Institute for Evolutionary Anthropology, in Germany, who brought in 105 human two-year-olds in order to compare their intellectual performance on essentially two different measures of IQ with that of 106 chimpanzees and, just for good measure, another 36 orangutans.

In tests that required reasoning about physical objects—things such as being able to track where a reward is placed under a cup, or being able to use a tool to solve a problem—the toddlers were basically neck and neck with the other primates in their performance. But in tasks where some social intelligence was involved, where subjects had to be able to track what was going on in someone else’s mind and respond accordingly—such as following the path of someone’s gaze, or understanding what someone was intending (but failed) to do—the human toddlers crushed the competition.

It makes sense that we’re good at this sort of social thinking: we are literally built for it. Our human brain stands out in the animal kingdom for its relatively gigantic neocortex—the fat part just above your eyes. What’s all that neural capacity
good for? Lots and lots of things, but what it really seems to be designated for is social stuff.

If you look across primate species, what you see is that the size of the neocortex relative to the rest of the brain is positively correlated with the size of the social group that primate species inhabits. The larger the social group, the larger the neocortex relative to the rest of the brain. Human beings are the most social of all primates, and we also have the largest neocortex relative to the rest of the brain. Living in large social groups requires having a tremendous amount of neural capacity to keep track of who knows what, who believes what, who likes what, who should be trusted and who should be avoided, and so on. Living in large social groups is also easier if you have some capacity to anticipate others’ actions before they make them, meaning that the ability to interpret somebody’s behavior in terms of an underlying mental state or goal is also invaluable. It’s our social intellect, not our thumbs, or our posture, or anything else, that makes human beings so special.

But while we are good at reading the mental states of others—relative to other animals—we are not perfect at it. Such states are, after all, invisible. For 2,500 years, the branch of philosophy known as solipsism has been teaching that one can’t really be sure that another’s mind (or anything else outside of one’s own mind) even exists. But assuming you can get past that question, as nearly everyone can, the intangible nature of mental activity still presents a real challenge in making accurate inferences about what’s going on in other people’s minds.

Two phenomena lead us to make a lot of mistakes in this regard. The first is anthropomorphism, or the humanization of a nonhuman agent. When psychologists ask people what separates humans from nonhumans, most do not start talking about their neocortices; instead, most people will describe capacities of the mind, particularly those related to thinking and feeling. When we anthropomorphize a nonhuman entity—whether it’s a pet, a car, or a consumer product in a marketing campaign—we attribute human thought and feeling to it, often in a subtle way.

The opposite also happens: cases of dehumanization. These are cases where we regard other people who presumably do have typical human capacities to think or to feel as though they don’t. Dehumanization typically involves treating other people as if they’re idiots, and so not capable of thinking, or as if they’re animals, unable to experience compassion, or empathy, or other sophisticated emotions that humans feel. You can see both phenomena in the world. Modern technology is pushing the boundaries of anthropomorphism. We now have devices that talk to us, that answer questions for us, that perform tasks for us. I don’t think it’s an accident that these tools are called smart technology, as if they can think and possess actual intelligence. Anthropomorphism is rampant in marketing and product design because it works. People who referred to their cars by name, in one series of studies, held onto them for longer than those who did not. Trading in a heap of mindless steel is one thing, but trading in your named family car is quite another.

We can find plenty of examples of the inverse as well. In the United States, when the National Football League was considering expanding its season from 16 games to 18, Ray Lewis—a linebacker many consider among the fiercest competitors the league has ever had—and other players were concerned about the toll that two extra games would take on their bodies. Lewis objected that players had essentially been dehumanized, treated as consumer products for other people’s enjoyment, and had thereby been made to be seen as unfeeling objects. He said, “I know the things that you have to go through just to keep your body functioning. We’re not automobiles. We’re not machines. We’re humans.” It’s nothing to send objects out onto the field for a couple more games of extreme violence, but it’s quite another thing to send out men already suffering through a grueling season.

But perhaps the most obvious context for dehumanization is politics. When one person sees the world one way and another person sees the world in a different way, rather than acknowledging that the other person has a different belief or attitude or thought, a natural tendency for many people is to question whether she is capable of thinking at all. We see it when the Left looks at the Right, and when the Right looks at the Left. When you use words such as monster, crazy, idiot, or madman, these are inherently concepts that suggest you’re not just questioning another person’s thoughts; you’re questioning another person’s capacity to think.

The general explanation for this goes back to the opacity of other people’s mental processes. After all, there’s only one mind you have access to, and that’s your own. You know all the thoughts and feelings that you have going on between your

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People tend to think they’re getting a lot of information from body language, when in fact, much of the information they’re using is actually coming from the voice.
ears. You know how much you agonized over the last election, for instance, or what your own experience of pride or shame or embarrassment or guilt is like. You can’t feel that in other people. You don’t have access to the mind of another person, so sometimes you may question whether another person actually has anything going on in his mind at all.

**Can thinking be heard?**

So how do we actually go about solving this problem of other minds? The solipsists are right that you can’t see the mind of another person, but my research suggests you can hear it. Hearing somebody talk is the closest you’re ever going to get to their ongoing mental experience, and it’s not just the content of the words that provides this. Paralinguistic cues of all sorts provide honest signals for the presence of thinking and feeling.

In research that University of California at Berkeley’s Juliana Schroeder (a Booth PhD graduate) and I did, we had 20 participants come into our lab and tell us two stories, which we recorded on video. One was a story about something that happened that was really emotionally positive for them, and the other was a story about something really emotionally negative that happened to them.

For each story, this left us with three basic components: the text of their story, stripped of all other information; the audio, which combined the information of the text with whatever information was conveyed by the storyteller’s voice; and the video, which combined the semantic and auditory information with the visual cues of body language and facial expressions. We had a couple hundred evaluators either watch, hear, or read one of these stories and then report their impressions of the person.

The findings were intriguing to us. For evaluators who saw only text, their perception of the storytellers’ capacity to think was dramatically lower than for those evaluators who received the story through audio or video. But it turned out that being able to see the storytellers, as opposed to just hearing them, didn’t substantially change participants’ impressions of the speakers. It appears that many cues that indicate capacity for thought—tone, volume, pace—come through the voice.

These data suggest that the voice may be doing a lot more work than you might think. In many contexts of daily life, the cues people pick up on can be confounded, because they often see others when they’re hearing them. We find, though, that people tend to think they’re getting a lot of information from body language, when in fact, much of the information they’re using is actually coming from the voice.

We then conducted a similar study, but instead of instructing them to discuss an emotional situation, we asked the storytellers to describe a mental situation—a thought, a decision they had—that turned out well or poorly. And again, we found a consistent effect of the text-only condition in which the storytellers seemed more mindless and less thoughtful than when evaluators heard them or watched them tell the story. Again, seeing the person tell the story didn’t make much difference for the evaluators’ impressions.

As I’ve noted, however, one of the easiest ways to observe dehumanization of this kind is to get people thinking about politics. So Julian Schroeder, Chicago Booth PhD candidate Michael Kardas, and I ran an experiment in our lab here in downtown Chicago in which we had six participants come in and explain their beliefs about one of three polarizing topics: abortion rights, support for the Afghan War (this was around 2013), and preference for rap or country music. They were then evaluated by several hundred other participants—whose own opinions represented both sides of these topics—who then reported their impressions of the speakers after watching, hearing, or reading them explain their positions.

As you might expect, it was the cases in which evaluators disagreed with the speakers that they tended to dehumanize them. But we found, again, that people seemed less refined, cultured, rational, logical, and sophisticated—all capacities having to do with thinking—when evaluators read what they had to say, but there was no statistically significant difference between hearing them and watching them. We didn’t see the same pattern of results for evaluators who agreed with the person. People tend to be egocentric and assume that if they agree, the other person is thinking in a way that’s similar to them, so the medium through which they’re communicating does not matter as much.

To test the robustness of this pattern of results, we ran similar experiments during the primaries for the 2016 US presidential election and on the weekend before the general election itself. Groups of people, representing support for different candidates, each explained whom they were voting for and why. Other people, across the political spectrum, watched, listened to, or read those explanations and reported their impressions. We again found the same pattern of results: spectators
dehumanized respondents they disagreed with, but this tendency was dramatically reduced when they could hear the respondents’ voices.

Most people aren’t mindless idiots. But when we read what someone has said, the cues that reveal the presence of a thoughtful and intelligent human being are stripped out of the interaction. And when it happens to be somebody we disagree with, people do not seem to readily put those cues back in.

Our tendency to dehumanize more or less according to the medium we’re using matters not just when we’re evaluating other people, but also when other people are evaluating us. All MBA students know how to give an elevator pitch, and most have rehearsed their personal pitch to recruiters—I suspect if you called one at 3 a.m. and asked for her pitch, she could recite it without lifting her head from the pillow—so Juliana Schroeder and I asked some Booth students to come in and give us theirs. Specifically, we asked for the pitch they’d give to their ideal employer, and then we again created video, audio, and written versions of each pitch. We also asked each student to write a pitch, because there could be meaningful differences between a pitch specifically composed to be read and one composed to be heard or watched.

We then asked evaluators to imagine that they were employers and report their impressions of how confident the person seemed, and how thoughtful, intelligent, and competent. They gave us their general impression, assessed how likable the person was, and indicated their interest in hiring the person.

It may not surprise you to learn that when the evaluators heard the students, as opposed to reading either their written pitch or a transcript of their spoken pitch, they described them as seeming more thoughtful, intelligent, and rational. They had a more favorable general impression of the participants, and they were more interested in hiring them. Again, adding video didn’t make much of a difference. What’s more, we got similar results when we repeated this experiment using actual Fortune 500 recruiters as evaluators instead of participants acting as employers.

**Media evolve faster than humans do**

Human history is long. Homo sapiens emerged on the planet somewhere around 300,000 years ago, but it took us about 295,000 years to start writing to each other. In all the intervening time, our brains evolved to communicate with each other in a particular way: face-to-face. We had physical interactions laced with voice or visual cues. As a species, we learned to communicate, to convey our states of mind, under those conditions.

And if writing is a recent innovation on the timeline of human history, electronic media are virtually brand new. It’s not surprising that we might find some gaps in our ability to use these tools especially effectively.

For instance, if I wanted to create a maximally dehumanizing medium for communicating with other people, I couldn’t do better than Twitter. Twitter is not only a largely text-based medium, but it is also a psychologically distancing medium. Other users are often identified by “handles” rather than by their own names, and the people you write to are “out there” on the internet somewhere rather than “right here” having a direct conversation with you. Add to that a character limit that makes it impossible even in text to communicate sophisticated or nuanced thought and you have the perfect platform for making other people seem like unthinking objects or unfeeling animals.

Facebook is a little more complicated. It was intended to connect people with each other. But it turns out that social connection is to Facebook what sugar is to Diet Coke: it seems like it’s there, but research again suggests not. My collaborators and I have found in experiments time and again that talking to others in person makes people feel better than they expect it will. It doesn’t even matter what they talk about—shallow stuff, deep stuff, whatever—they tend to love it more than they expect. But research on Facebook users finds that the more people use Facebook, the worse it seems to make them feel.

You might imagine that we’ll get better at using this technology over time. We’ll get better at using Twitter and Facebook and text-based media interaction in general over time. I don’t think so. Our data suggest that there’s something inherently dehumanizing about the cues that are present in text-only information. And you can’t artifically add cues, such as a person’s voice, into a text-based medium of communication that doesn’t include them to begin with. The only way you can do that is to use a voice-based medium instead.

Perhaps the most important question to ask is whether we are sufficiently media savvy to have a sense of these kinds of effects. Again, I think the answer is no. For one thing, avoiding the specific phenomenon I’ve been describing, the tendency to
dehumanize in text-based communication, appears not to be intuitive for many people. We asked about a thousand participants in an online survey: If you were making an elevator pitch and wanted to be perceived as most intelligent, how would you choose to express your thoughts to someone? Would you choose to write or would you choose to speak? Seventy percent said they’d opt for writing.

Moreover, the medium through which we communicate with other people is often overlooked; the idea that we could be interacting with somebody through a different medium often doesn’t occur to us when we are in the midst of an interaction. I did a study some years ago with Justin Kruger, Jason Parker, and Zhi-Wen Ng, all then at the University of Illinois, in which we compared voice recordings to email, with participants sending messages via each that were either sincere or sarcastic. Not surprisingly, email recipients were not great at detecting sarcasm: their accuracy rate was 56 percent, not significantly better than random guessing. When they heard the message spoken aloud, of course, they were much more accurate. But just as important, both senders and receivers overestimated how easily sarcasm would be detected over email. They had no sensitivity at all to how the medium was affecting the message being conveyed.

This is particularly important because people’s preferred mode of communication is not necessarily the most effective one. University of Texas at Austin’s Amit Kumar and I have found in recent experiments that people tend to prefer email over a phone call, at least when it comes to reaching out to an old friend. Specifically, they expect a phone call to be more awkward, but when we put these two modes of communication to the test, we find that it’s not. Again, I think this suggests a misunderstanding of how media affect interactions.

**Technology can continue to develop new and more innovative modes of text-based communication, but it may never recreate the cues to another’s mind contained in the human voice.**

The value of voice

The primacy of voice in communicating state of mind may not be completely intuitive when you communicate with all of your senses intact. But Hellen Keller, who lacked both hearing and sight, understood the importance of voice powerfully through her lived experience. Keller was once asked to speak at a conference advocating for kids who were also deaf and blind. In a letter to the organizer explaining why she was unable to attend, she wrote,

> I’m just as deaf as I am blind. The problems of deafness are deeper and more complex, if not more important than those of blindness. Deafness is a much worse misfortune, for it means the loss of the most vital stimulus—the sound of the voice that brings language, sets thought astir, and keeps us in the intellectual company of man. . . . I’ve received letters from the parents of children who are either deaf or feebleminded. The parents could not say which. The doctor did not know or else he did not tell them the truth.

We don’t speak of other people being feebleminded anymore, but I think the tendency to infer that someone who lacks a voice, whom we don’t hear from directly, might be less mentally capable than other people still shows up in all of the data that we’ve been collecting. Technology can continue to develop new and more innovative modes of text-based communication, but it may never recreate the cues to another’s mind contained in the human voice.

—CBR

Nicholas Epley is the John Templeton Keller Professor of Behavioral Science and the Neubauer Family Faculty Fellow at Chicago Booth. This essay is adapted from a presentation delivered at the Kilts Center’s Marketing Summit 2019.

Go to Review.ChicagoBooth.edu to see a complete list of citations for research mentioned in this essay.
How many of us have at some point fantasized about being a boss? While sitting in traffic, perhaps, or standing in the shower, have you ever thought about what it would be like if you were the one in charge?

I ask this question frequently. At parties, for example—to which, oddly, I’m often not invited back. Still, people answer, and their answer is generally yes. People fantasize quite a bit about being a boss. And invariably their fantasies have them being a GOOD boss: visionary and motivating, beloved and respected.

People want so much to do a good job of being in charge that in their free moments, when they could be fantasizing about much more fun things—say, having a flying car, sailing the Greek islands, or even just getting a full night’s sleep—they are instead noodling away about leadership and supervision.

What’s perhaps more stunning is not just that people are fantasizing about being a great boss; it’s that it is just that: a fantasy, about as likely as a flying car, or maybe even less so.

Studies across the world commonly reveal that the vast majority of employees are disengaged from their jobs in ways that are enormously costly to companies via low performance and high turnover. And the reason for people’s misery and poor performance? It’s not the work itself, it’s not the pay, and it’s not the open floor plan—although almost no one likes that.

Nope, it’s the boss.

So what on earth is going on? Why do people want to do well, so much so that they are fantasizing about it, yet fail so badly when they get the chance to lead? And how can you fix it? How can you avoid being that boss?

I will suggest two reasons people fall short.

One is that we are not very good psychologists. When you think about it, that seems odd: we observe people all our lives. In fact, we are people all our lives! You would think we would have inside knowledge about how to lead others.

But, alas, no. It turns out that our intuitions about human psychology aren’t great. For example, we berate employees for falling short, instead of praising them for doing well, because we mistakenly believe that punishing them for poor performance will put fire in their bellies and that cheering them on for doing well will make us seem soft or silly. The result is employees who are more afraid to do much of anything for fear of being yelled at than they are fired up to act.

Or we proffer more pay and expensive perks in an effort to retain our best people, thinking that’s all that matters in a transactional, serious work environment, when what people also want, what they want profoundly, is recognition and a sense that their work is meaningful.

Those incentives, incidentally, are not costly to give. We spend too much money with too little impact because of our flawed intuitions.

But I am also going to suggest a second, deeper problem that knowledge of human psychology won’t fix, because to apply human psychology, you first need to think of those working for you as human. And many bosses don’t—not fully, not consistently.

They, like all of us, dehumanize others. What do I mean?
Dehumanization involves thinking someone does not have the full range of mental capabilities we associate with people. Sometimes, we view others as being a bit like animals, who are able to feel things just fine but not to think effectively. This happens, for example, when we see laborers as akin to plow horses and are a little surprised when we see them reading. Other times, we view others as being a bit like robots, who can think, at least in a routinized way, but not feel.

No wonder we are such ineffective bosses, misaligned with how people are: we don’t think they are people.

What gets in the way of seeing others as fully human?

Well, of course, classism, sexism, and racism all carry with them a degree of dehumanization, usually of the animalistic sort. Think of the ways people treat women as lesser beings who are to be loved and protected, sort of like superpets, but not as people with agency and the capacity for leadership.

At work, though, there are also triggers that send us down the other path of dehumanization. I will highlight just two.

One trigger is smart technology, or artificial intelligence. In breakout work by Hye-young Kim, who received her PhD from Chicago Booth in June, we have learned that the more we engage with smart technology, the less we see others as fully human. The way this happens is a bit complex, but the simple explanation is that as we increasingly see machines as being similar to people, we begin seeing people as similar to machines. The machines gain capabilities in the comparison, but, interestingly, people lose.

This dehumanization can lead to mistaken expectations of robotic behavior from employees. Think about not only warehouse workers wearing diapers because bosses don’t view them as humans who need bathroom breaks, but also production workers asked to do mind-numbing, impossibly repetitive tasks, or frontline service employees who are expected to be relentlessly cheerful under circumstances in which no human possibly could. (Face it, the customer is not always right, much as we like to say so.

In fact, the customer can sometimes be maddeningly rude.)

Asking employees to function as robots in these ways or in these circumstances leads them to fall short and quit or, worse, to snap in ways that hurt our business and then quit.

Another working-world trigger of dehumanization is the lack of a distinct identity. Once people are seen as being generic, one just like the other, it’s only a short step to seeing them as being akin to robots. And that is exactly what happens at work, where we downplay individuality and difference. We put people in uniforms, or we ask them to adopt the uniform look of the company or industry. We ask them to be good team players, by which we too often mean “the same as everyone else.” We freak out and sputter in the face of diversity.

This forced or favored sameness leads us back again to having unrealistic and costly expectations of our “robot” employees. They’re not happy, and we stumble as bosses because we fail to see these people as, well, people.

So I will offer two pieces of advice to all the bosses out there, and to all who hope to be a boss.

First, to be a better boss, remember those folks who work for you are fully human.

To remind yourself of your employees’ humanity, ask questions about things only people, not technological devices, have or can do. Ask about their emotions, their experiences, and their aspirations.

Let your employees be whole, yes, even at work. Allow them to be individuals and not generic examples of a type.

Admittedly, you will need to be sophisticated about taking this advice—that is, to uncover and support others’ humanity without being creepy and intrusive, or worse. In a world where jerks have abused power, you might be tempted to step away from people, not toward them. You may think it safer to downplay anything resembling a human connection—especially with people who are different than you or for whom you are worried about “how it might look.”

Still, it is possible to balance respect and warmth with grace. Do not run scared from leadership by creating a cold and distant workplace. Seeing others as fully human should help.

Second, to be a better boss, remember your own humanity.

How? Be whole. Bring all of yourself to your working world, your competence and your kindness. Don’t playact at being that diminished person: the unfeeling, badass boss. That bit of self-dehumanization is make-believe, and it shows. Plus, to solve complex problems, to take wholly new opportunities, to read your customers and clients accurately, and to inspire those you lead, you will need the capabilities of a complete human mind. Don’t leave part of it at home each workday morning.

By taking this advice, by both seeing human and being human, you may become something almost mythical: the Great Boss.

Ann L. McGill is the Sears Roebuck Professor of General Management, Marketing, and Behavioral Science at Chicago Booth. This essay is adapted from her address given at the 2019 Chicago Booth Graduation Ceremony this past June.

One of his board members happened to know the executive chairman of a large US media group, and was able to help the entrepreneur secure a meeting with him to pitch his startup. This was a huge opportunity, but our entrepreneur was confident rather than nervous. First, this was not his first startup. He already had a few successful new ventures behind him. He knew his skills: he was a good salesperson, and a good entrepreneur. Secondly, he knew he had to do his homework. He prepared more diligently than he had for any other meeting. He had the most impressive slide deck known to PowerPoint, with every imaginable chart and data point for whatever questions the executive might ask.

He flew to New York, made his way to the company’s headquarters, and was whisked up to a beautiful office with an impressive view. He recalls that even the coffee he was served was remarkably good. The executive chairman came in and the two of them started chatting. The entrepreneur got into his slide deck, and the executive appeared to be lapping it up. He was listening intently, smiling and nodding enthusiastically. After about 20 minutes, the executive, by now visibly animated and excited, interrupted the entrepreneur’s presentation. “So tell me,” he said, “how big is your fleet?”
The entrepreneur looked back at him blankly, so the executive tried to rephrase his question. “How many trucks do you have?” he asked.

Suddenly, the entrepreneur came to a horrible realization. He had spent the whole time talking about mobile marketing. To the entrepreneur, that meant digital mobile marketing on phones. To the executive, “mobile marketing” meant advertising trucks driving around the streets.

It’s probably not unfair to say that our entrepreneur wasn’t as good a salesperson as he thought he was. Faced with a terrific opportunity, he had made at least two elementary selling mistakes.

First, he made a fundamental assumption that turned out to be faulty: that the executive would understand that “mobile” meant mobile phones. This may well have resulted from what social scientists term “the curse of knowledge.” The entrepreneur was immersed in the world of digital mobile. The idea that another person, particularly a senior executive in a media company, would interpret the word “mobile” differently probably never crossed the entrepreneur’s mind. This phenomenon is common among entrepreneurs. Effective salespeople have a balance of knowledge, discipline, and skill. Entrepreneurs tend to have a lot more knowledge than they possess discipline and skill—even, as our story shows, among those who have a good track record starting new ventures.

The second mistake was that the entrepreneur was telling rather than asking. Effective sales depends on asking good questions. Rather than jumping into his pitch, he should have asked the executive, “How do you think about mobile marketing?” “What challenges have you faced in this area?” This sort of approach might have made the meeting more productive, even if he didn’t have time to go through his entire carefully crafted slide deck.

The broader lesson is that honing your sales skills is essential to being an entrepreneur. I’m biased—I teach sales skills—but to my mind, effective sales is an undervalued component of a successful startup. In my MBA class, I show students a sample business plan that dedicates just two pages out of more than 44 to sales. And yet this is exactly the area that sinks most of the 80 percent of startups that fail, according to Bruce Cleveland and Wildcat Venture Partners, in their book, *Traversing the Traction Gap.***

Many entrepreneurs resist the idea that they should do the selling themselves. One reason may be that a sales role seems much less glamorous than other kinds of corporate leadership.

The four myths of entrepreneurial selling
In the startup world, we talk about the importance of creating strong business plans, building a team with industry experience, and tapping into big markets. All of these are important, but we undervalue what is really the most important thing: selling the product. As a result, we do a disservice to the entrepreneurial world by not giving startups the right priorities for success. Entrepreneurs often think that if they have a truly great product, sales will take care of itself—as they say: build a better mousetrap, and they will beat a path to your door. I think of this as the first great myth of entrepreneurial selling. In reality, if people don’t know about it, they can’t and won’t buy it. Selling helps to bridge that information gap.

Selling successfully is, of course, important for any business, but it is especially the case for startups. The data suggest that the smaller a company, the more focused it needs to be on the sales process. Yet, companies often downgrade sales in the structure of the organization: frequently the head of sales reports to the head of marketing, as if generating revenue were a subset of brand building. This, for me, is the second great myth about selling.

One common startup mistake is that new entrepreneurs often think they can hire a salesperson to solve the problem, and effectively make up for their lack of sales skills by delegating better. A startup isn’t doing well, so it hires one person, whose job it is to drive all the revenues. This is the third great myth about entrepreneurial selling: that a founder can simply pay a sales professional to take care of the top line.

This is the wrong way of thinking about it. Selling should be at the core of the business from the outset. Entrepreneurs have many constituents: investors, employees, channel partners, customers, media, analysts, and suppliers. Particularly for a new venture, the entrepreneur’s job is to convince each constituency to buy into the idea. This is especially true in an early-stage venture, where the sales prospects, messaging, references, positioning, and process have not yet been developed. The entrepreneur’s vision is critical to helping establish these things as well as to overcoming early objections. Moreover, in the early days, the venture doesn’t even exist. Investors and analysts need to be persuaded that the idea is viable and will
produce profit. Partners and suppliers have to be convinced to work with a new entity. Employees must be induced to leave their steady, well-paying, lower-risk jobs to work for less money and less job security. Customers need to see enough value in the product or service to use it and pay for it, and trust that the team will deliver. All these involve selling the idea in a way that will motivate and move people.

An entrepreneur, then, sells in 360 degrees. The idea that sales is a separate skill from entrepreneurship is, therefore, nonsensical. Effective entrepreneurs don’t hire the best early salespeople; they are the best early salespeople.

Yet many entrepreneurs resist the idea that they should do the selling themselves. One reason may be that a sales role seems much less glamorous than other kinds of corporate leadership. Another, related reason may be because many people associate the sales process with the caricature of the used-car salesman—a pushy, aggressive, duplicitous character solely focused on closing deals and screwing customers for every last penny.

In reality, sales is nothing like that, and there is nothing dirty or demeaning about showing customers the value of a service or product and asking them to pay for it if they agree that it is valuable. Sales is really just another word for persuasion.

A similar misconception is the fourth great myth about entrepreneurial selling: the notion that you are either born a salesperson or not. This approach holds that successful salespeople are glad-handing, extroverted, and gregarious, and that introverts are not good at sales.

Having taught all sorts of entrepreneurs how to sell for many years, I know that not to be true. With thought and practice, any founder can become her venture’s most effective salesperson. What entrepreneurs need to understand and master are the two distinct parts to successful selling: the process and the methodology.

By process, I mean the set of definable stages or measurable gates that define the steps to complete a sale. Think of companies’ sales pipelines or sales funnels and how they measure progress: what percentage of opportunities end in a closed sale, what percentage of leads result in an opportunity, and that kind of thing.

The process is important, but what’s even more important is the methodology, which is about how you can convince someone to bet his career on your product. This involves honing a set of learned behaviors and skills, used in a nonlinear, dynamic way to make decisions and take actions to support and execute the sales process.

In practical terms, this includes developing skills such as listening versus telling. It means qualifying leads and asking good questions that waste neither the entrepreneur’s nor the potential customer’s time. It means asking thoughtful questions that gain influence and reveal unusual information. It means learning how to earn the right to ask these discovery questions. It means using stories to communicate. It means improving presentation skills and framing the pitch better.

Having the self-discipline to practice skills such as listening is critically important in the early days of a business. Often companies project that their product will work for a certain target group, yet customers emerge from a completely different world, perhaps using the product in ways the founders never thought about. This is where asking good questions and listening create value for the startup, and can help win trust among potential customers.

These were, of course, the fundamental skills that the entrepreneur whose story we began with, who is usually a great salesperson and listener, forgot in his conversation with the media executive. A light bulb went off for him after the meeting—beyond the reminder to make sure he follows the sales skills he knows. He realized that his startup was directing its sales efforts at the wrong audience. His business was just another new, unproven channel for the big brands and media groups to allocate a portion of their existing advertising budget. And they had to be willing to give up spending somewhere else to spend with him. In contrast, in his meetings with mobile carriers, he discovered that his platform offered them a potential large, new source of revenue. Once he pivoted the business to sell his platform to the carriers who benefited most from his growth, instead of to advertisers and brands, revenues took off.

By recognizing that he needed to use more of his basic sales skills, the entrepreneur plotted a path to success. There’s a profound lesson here for all aspiring founders.—CBR

Michael D. Alter is clinical professor of entrepreneurship at Chicago Booth.

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Don’t underestimate China’s entrepreneurs—steal them

The US prides itself on innovation, but China is catching up

Former US vice president and Democratic presidential hopeful Joe Biden has dismissed the idea that China, the world’s second-largest economy, poses much of a threat to the United States. “China is going to eat our lunch? Come on, man,” he said at a campaign stop in May. “China isn’t in competition with us... They can’t figure out how they’re going to deal with the corruption that exists within the system. They’re not bad folks, folks. Guess what—they’re not competition for us.”

But Biden’s view of China certainly does not match what I observed on a recent trip to Hong Kong and Shenzhen, at least when it comes to entrepreneurship and innovation.

Shenzhen in particular astounded me. In 1979, just 40 years ago, Silicon Valley was already home to Apple and Oracle, and was busy populating its famous Sand Hill Road with the likes of Kleiner-Perkins, Sequoia Capital, and other VC companies. Shenzhen, meanwhile, across the Pacific Ocean, was a small city
dominated by the fishing industry, with just a few factories making cement, tractor parts, and fertilizer. Today, Shenzhen is China’s eighth-largest city, with 12 million inhabitants. It has the country’s third-largest GDP, behind only Shanghai and Beijing, and is in the top 20 cities worldwide for venture investment.

Technology and innovation have fueled this expansion. Home to Huawei, the world’s largest telecom-equipment maker, Shenzhen is known for electronics manufacturing—but it’s home to more than that. Shenzhen-based Tencent, one of the 10 largest tech companies in the world, is at the cutting edge of artificial-intelligence software. While visiting Shenzhen, I saw astounding evidence of innovation in facial recognition software, big-data analytics, and electric-automobile production.

Shenzhen is just one example of the expansion that has been happening in China over the past several decades. If we use patent filings as a proxy for innovation, Chinese innovators’ share of patent filings seeking broad international intellectual-property protection under the Patent Cooperation Treaty (PCT) of 1970 was a mere 4 percent in 2000, according to data from the World Intellectual Property Organization (WIPO). By 2018, their share was almost equal to that of innovators from the US and Japan, with residents of each country filing roughly one-fifth of all PCT applications. Domestic filings in China, patents for protection specifically in the Chinese market, soared over the same period, from about 200,000 to over 1.3 million. And, while US inventors still file the most patents for IP protection in one or more specific non-US countries, Chinese inventors are increasingly looking at markets abroad. China’s number of patent filings in other countries grew by 15 percent, compared with only 2 percent growth each for the US and Japan.

China’s inventors are getting the capital they need to commercialize their innovations. In 2008, nearly 60 percent of VC investments were made in the US and only 8 percent in China—but by 2018, China’s 39 percent share of the world venture pie nearly matched the US’s 42 percent, according to data from PwC, and data providers Statista and Preqin. China is now home to three of the top five cities for venture capital, reports the Center for American Entrepreneurship. VC investment in Beijing alone was nearly $73 billion in 2018, and experts expect it will surpass San Francisco as the No. 1 city for venture in 2019 or 2020.

In 2013, when the term unicorn was coined to refer to privately held companies with valuations of more than $1 billion, China had one such company, Alibaba. A mere six years later, more than a quarter of unicorn companies are founded in China, according to TechCrunch’s unicorn leaderboard.

### Competing with the largest nation on earth

Other data points tell a similar story. Back in 2008, the Global Innovation Index (GII), created by Cornell University, INSEAD, and WIPO, ranked the US as the most innovative country on earth—and that was the last time the US held the No. 1 position. After the financial crash that year, the US plummeted to the 11th position, gradually working its way back to the third spot in 2019. Meanwhile, China steadily climbed from the 37th most innovative country to the 14th.

What does this index measure? According to the GII website:

**Five input pillars capture elements of the national economy that enable innovative activities:** (1) Institutions, (2) Human capital and research, (3) Infrastructure, (4) Market sophistication, and (5) Business sophistication.

**Two output pillars capture actual evidence of innovation outputs:** (6) Knowledge and technology outputs and (7) Creative outputs.

The US ranks in the top 25 countries across all seven pillars and No. 1 in market sophistication. Notably, within the subcategories of the pillars, the US is also No. 1 in global research-and-development companies, VC deals, revenue generated by intellectual property as a percentage of its total trade, and entertainment-and-media market.

But China is tops in knowledge workers, patents by origin, high-tech net exports, and creative-goods exports, plus has the largest domestic market. And it’s close to overtaking the US in VC deals.

So it would behoove candidate Biden to take another look at China. The US has long considered innovation to be its primary market advantage, but China is a key competitor.
International talent creates US-based jobs

Beyond continuing to lead the world in R&D spending, the US should capitalize on one area in which China cannot compete: its appeal to the world’s top talent. Immigration is the US’s secret weapon in the innovation battle. Wellesley’s Sari Pekkala Kerr, Harvard’s William Kerr, the World Bank’s Çağlar Özden, and University of Western Australia’s Christopher Parsons looked at the flow of talent worldwide. Their data indicate that the US draws nearly eight times the number of immigrants holding patents as its nearest rival, Germany. Between 2000 and 2010, more than 194,000 patent owners immigrated to the US. Who loses the most patent holders to emigration? That’s right . . . China.

Immigrants make up 38 percent of US-based scientists and 27 percent of physicians. Immigrants are twice as likely to become entrepreneurs as native-born Americans, according to the Kauffman Foundation’s 2016 Startup Activity Index. In 1996, 13 percent of new entrepreneurs in the US were immigrants. By 2015, that had more than doubled to 27 percent. This is no secret in Silicon Valley, where in 2016, over half of US-based unicorn companies had one or more immigrant founders, and more than 70 percent relied on immigrants as key members of their management and/or product development teams, according to Cato Institute’s Stuart Anderson. These unicorns excel at job creation and are responsible for tens of thousands of sustainable, well-paying new jobs. How sustainable are these jobs? Nearly half of Fortune 500 companies were founded by either first- or second-generation immigrants—among them Jeff Bezos, the son of Cuban immigrants, who employs over half a billion people at Amazon; Sergey Brin, from Russia, who cofounded Google, which now has more than 80,000 employees; and Kumar Mahadeva, from Sri Lanka, founder of Cognizant Technology Solutions, which has a quarter of a million employees, according to Kleiner Perkins’s Internet Trends Report 2018.

Many of these entrepreneurs enter the country on student visas. More than 5 percent of US college enrollment is made up of international students, who numbered over 1 million in the 2016-17 academic year. International students disproportionately choose STEM fields, accounting for 35 percent of medical residents and 70 percent of

Rivaling US innovation

While the US remains an international innovation leader in terms of patent filings and venture capital, China has emerged as a key competitor.

Top five countries’ patent filings

<table>
<thead>
<tr>
<th>Country</th>
<th>2018</th>
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<tbody>
<tr>
<td>US</td>
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<tr>
<td>China</td>
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<td>Japan</td>
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<td>Germany</td>
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<td>South Korea</td>
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Countries’ top cities for VC investment

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<tr>
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<td>San Francisco</td>
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<td>New York</td>
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<td>Shenzhen</td>
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<td>Hong Kong</td>
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Pillars of innovation

The US placed among the top 25 countries across all seven major categories of the 2019 Global Innovation Index. But China tops the US in a number of subcategories.

Innovation rankings: US vs. China
Select highlights from the GII, 2019

<table>
<thead>
<tr>
<th>Institutions</th>
<th>11</th>
<th>60</th>
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<tr>
<td>Political environment</td>
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<td>Business environment</td>
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<td>Gross expenditure on R&amp;D as a percentage of GDP</td>
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<td>Ecological sustainability</td>
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<th>Market sophistication</th>
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<td>Credit</td>
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<td>Investment</td>
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<td>Trade, competition, and market scale</td>
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<th>Business sophistication</th>
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<td>Knowledge workers</td>
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<td>University/industry research collaboration</td>
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<tr>
<td>Knowledge absorption</td>
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<th>Knowledge and technology outputs</th>
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<tr>
<td>Patents by origin</td>
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<tr>
<td>High-tech net exports as a percentage of total trade</td>
<td>27</td>
<td>1</td>
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<tr>
<td>Intellectual property receipts as a percentage of total trade</td>
<td>1</td>
<td>56</td>
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<th>Creative outputs</th>
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<tr>
<td>Intangible assets</td>
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<td>Entertainment-and-media market</td>
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</tr>
<tr>
<td>Creative-goods exports as a percentage of total trade</td>
<td>17</td>
<td>1</td>
</tr>
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electrical-engineering, 63 percent of computer-science, and 55 percent of economics students. Often, they want to stay in the US to work for a corporate employer or to start their own businesses.

Dhiraj Rajaram is a prime example. Born in Chennai, India, Rajaram came to the US and gained a master’s degree in electrical engineering at Wayne State University followed by an MBA at Chicago Booth. He landed a job at PwC, which sponsored him for an H-1B work visa. Even with two advanced degrees and a sponsoring employer, Rajaram had just 40 percent odds of getting one of the 85,000 H-1B visas in a lottery, as the H-1B program is oversubscribed. After working for two large companies, Rajaram quit to build his startup, Mu Sigma, the world’s largest pure-play data-analytics firm. With dual headquarters in Northbrook, Illinois, and Bengaluru, India, the company is estimated to employ over 3,500 people.

There are many more potential Dhiraj Rajarams out there who are not able to contribute those well-paying jobs to the US economy, however. Over my years at Chicago Booth, I have worked with many great international entrepreneurs who struggle to launch their innovative companies in the US. Recently, two founders from Israel, with brilliant technology for the online-video-gaming market, had to take jobs that would give them a chance at qualifying for an H-1B visa, thus putting their company on hold and taking jobs rather than creating them. In another case, a Lebanese e-commerce entrepreneur relied on the common Optional Practical Training (OPT) extension to his student visa to gain another year in the US to work on his company, only to have the extension denied under new criteria imposed by the Trump administration. He is now in London, trying to get back to the US. These are innovative job creators the US should be courting, not rejecting.

Encourage, don’t discourage, immigrant entrepreneurs
The US immigration system is incredibly complex, with 185 different types of visas, each saddled with reams of arcane policies and regulations that are holding back entrepreneurs.

Take the OPT extension. According to Nitin Pachisia, one of the founding partners of Unshackled Ventures, a VC firm dedicated to helping immigrant entrepreneurs legally stay in the US, most of the job creators who enter the US
Unshackled has been able to help founders from 19 countries, using 11 kinds of visas and green cards, launch more than 30 companies that have collectively created hundreds of jobs in the past five years. But Pachisia has seen increased scrutiny of the OPT extension—and is concerned that some immigration policies are tilted in favor of larger companies.

For instance, H-1B visas, which allow companies to temporarily hire professional workers, are being gobbled up by the large tech giants and consulting companies, which can file thousands of applications, clog the lottery system, and make it harder for entrepreneurs to get an H-1B. This increases the odds that a critical cofounder might not be able to stay with her company. In April 2018, President Trump signed the Buy American and Hire American Executive Order, which added more hurdles for companies wanting to sponsor foreign workers, and reserved H-1B visas for only the most skilled foreigners. Denials of these visas have reportedly increased, while applicants and employers are subjected to more requests for information, according to a policy brief from the National Foundation for American Policy. Many small companies can’t afford the expense of sponsoring exceptional talent, even though companies with fewer than 30 employees create four times as many jobs when they sponsor a worker on an H-1B visa than large companies do.

Employment-based (EB) visas, created by the Immigration Act of 1990, could theoretically help—but often don’t. Unlike the nonimmigration H-1B visas, which are for temporary workers, EB visas were initially created to encourage people with special skills to stay in the US, and can lead to green cards. EB-1, or preference category 1, visas are granted to “persons of extraordinary ability,” who are typically scientists, artists, researchers, athletes, or senior executives of multinational companies. Three additional classes of preference include people holding advanced degrees, religious workers, translators, and employees of US foreign-service posts. The EB-5, or investor, category authorized 10,000 visas for immigrants able to invest $1 million in a new business that would create 10 or more jobs (or $500,000 if deployed in an economic development zone). Entrepreneurs in high tech and life sciences can rarely meet the pricey pre-immigration investment hurdle, and given the high-risk nature of these ventures, often can’t guarantee 10 jobs. Additionally, entrepreneurs often can’t handle the complex reporting requirements. As a result, 75 percent of EB-5 visas go to people who can invest in real-estate projects that immediately create construction jobs and can be audited for compliance.

The US should follow the example of Canada, Australia, and the United Kingdom and create a visa specifically for entrepreneurs, one that would allow people to start a company if they can raise the needed funding. In Australia and the UK, such visas require an entrepreneur to create two jobs within two years. Canada, for its part, has no job requirements. Part of the bipartisan-sponsored senate bill of the 116th Congress, S.328, known as the Startup Act, would offer 75,000 immigrants the chance to launch companies that employ two or more people full time.

This one step would help the US foster job creation, as it could create at least 150,000 jobs. It is a step that would help the US continue to be the top destination for the world’s best talent. And that is what is required for the US to stay competitive with China.

The US should follow the example of Canada, Australia, and the United Kingdom and create a visa specifically for entrepreneurs, one that would allow people to start a company if they can raise the needed funding.

Waverly Deutsch is clinical professor and academic director of university-wide entrepreneurship at Chicago Booth.
The next financial crisis will not come from the traditional banking sector. So goes conventional thinking among financial policy makers. The world’s biggest banks are now safer, according to the narrative, thanks to stricter capital requirements and frequent stress tests that have curbed the appetite for extreme risk and tightened up lax regulatory standards.

I wish I were completely reassured. But as an accountant, I know that the headline capital numbers result from a subjective calculation. Banking regulators typically spend too little time digging into how those figures are calculated. I also know that when the US financial system is healthy, as it is now, we should strive to do better at accounting for potential losses, because that might cushion the blow when the inevitable downturn arrives.

To be sure, the big banks have all passed the Federal Reserve’s stress tests with flying colors. And this reflects substantial increases in capital buffers: the 35 banks that underwent 2018’s stress test have added about $800 billion in the highest quality type of capital over the past decade, according to the Fed. The central bank has deemed that the banks would therefore be strong enough to continue lending if the economy were to plunge into another severe downturn.

But I am not the only observer who remains concerned. In a speech to Americans for Financial Reform in May, Georgetown’s Daniel Tarullo, who was a Fed governor...
from 2009 to 2017, questioned the robustness of the stress tests. Banks know what regulators are looking for, Tarullo observed, enabling them to “find clever ways to reshape their assets,” thereby reducing their capital levels without reducing their risk exposures. And he also cast doubt on a Fed proposal to create a “stress capital buffer” to stop banks from running down their capital cushions by using dividend payments. Such a buffer, Tarullo argued, could actually prompt banks to take on even more risk.

This raises the tricky question of how capital levels are calculated. At times, banking regulators could be accused of fixating on the level of capital requirements without adequately taking into account how loan losses are provisioned for in a bank’s financial statements.

At the simplest level, the amount of capital a bank has on its balance sheet is the value of its assets, net of the value of its liabilities. But the values of these assets and liabilities are driven by accounting valuations. This therefore raises the most fundamental question of accounting: How do you measure an asset? Some assets are marked to market, while others are not. All these decisions trickle down to make up the amount of capital that the bank has. That figure, in turn, affects how much lending the bank undertakes, meaning that it has microeconomic and macroeconomic consequences. So any real understanding of capital levels requires regulators to understand how assets and liabilities are being measured.

This demonstrates that accounting, finance, and economics are intrinsically interconnected. Sometimes accounting gets thought of as something of a veil, a dreary but necessary process of asset measurement that has no economic consequences. But the value placed on a bank’s assets and liabilities affects its capital levels, which, in turn, affect lending, borrowing, and interest rates in the economy.

Currently, however, regulation often proceeds as if setting rules for banking and setting rules for accounting were two unrelated, isolated activities. Banking regulators view accounting as something of a mechanical, back-office function, akin to the gears of a machine. Accounting standards setters view regulating banks’ abilities to withstand severe shocks as someone else’s problem. But improving oversight requires us to use insights from both to give a complete picture of a bank’s balance sheet. The focus should be on the interaction between accounting measurement and capital requirements.

On the accounting side of the equation, a key area to focus on is how banks measure the performance of their loan portfolios, because this determines the amount of capital they need to hold. Lenders that are proactive in recognizing losses on their balance sheets could potentially hold less capital without increasing risk. By contrast, those that are not proactive in accounting for losses should potentially be required to increase their capital requirements.

There are two implications. First, banking regulation needs to round out its focus on capital requirements with an equal focus on loan loss provisions and how those shape the bank’s capital level. Secondly, this challenges the idea of imposing a one-size-fits-all approach to capital requirements. There is some necessary flexibility in the interpretation of accounting rules, since each lender’s loan portfolio is unique. But there is no corresponding flexibility in our attitude about how much capital lenders should hold.

Given our one-sided approach to banking regulation, we should beware of complacency.

Given our one-sided approach to banking regulation, we should beware of complacency.

Given our one-sided approach to banking regulation, we should beware of complacency. It would be dangerous to assume that by simply setting higher capital requirements, we have resolved the issue of too-big-to-fail financial institutions. In fact, setting capital requirements without taking into account the type of loans that banks are originating could be dangerous. We might set high capital requirements, but banks might respond by originating riskier loans. Or lenders might originate loans that are not too risky but do not necessarily maximize the value of the bank. The effect would be to weaken rather than aid financial stability. Beyond the question of capital requirements, it is critical to understand whether banks are provisioning for loans appropriately.

There are some positive signs that accounting standards setters are prepared to allow greater discretion to lenders to allow them to be more proactive in taking losses, a move that could help both with capital requirements and overall stability.

This could prove useful in the next financial crisis. If banks become more proactive in recognizing losses in the boom years, they might not need to press on the brakes so hard when a crisis hits. This could enable capital requirements to become truly countercyclical rather than procyclical, as they were in 2008 and 2009. This is how accounting can help to reduce the amplification in the cycle.

All of this can happen only if regulators rethink how they operate. In the United States, the Securities and Exchange Commission has the sole authority on accounting standards. But the SEC has delegated that role to the accounting standards-setting bodies, such as the Financial Accounting Standards Board. Separately, the Fed monitors the big banks. This has created silos in which accounting is often left out in the cold on discussions of the overall stability of the financial system.

My research demonstrates that banking regulators should take accounting seriously, and accounting standards setters should take banking regulation seriously. The two are inherently linked. Only by considering both can we ensure that the big banks will not have to be bailed out by the government again. —HS

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How to develop a superstar strategy

Elite companies’ methodologies tend to share some common traits.

We live in an age of growing corporate inequality, with a few dominant companies and many underperformers.

The superstar archetype is Google, established in 1998 with the aim of rank-ordering web pages in what was then the nascent industry of search. By the beginning of the 21st century, Google had no revenues and no established business model. Fast-forward 18 years and a few hundred acquisitions, and Alphabet, Google’s parent company, has a market value in excess of US$750 billion.

In almost every industry, a small number of companies are capturing the lion’s share of profits. The top 10 percent of companies worldwide with more than $1 billion in revenues (when ranked by profit) earned 80 percent of all economic profits from 2014 to 2016, according to a recent study by the McKinsey Global Institute.

The 40 biggest companies in the Fortune 500 captured 52 percent of the total profit earned by all the corporations on that list, according to an analysis of the 2019 ranking by Fortune.

This leaves less and less for the smaller fish to feed on. The middle 60 percent of businesses earned close to zero economic profit from 2014 to 2016, according to McKinsey, while each of those in the bottom 10 percent recorded economic losses of $1.5 billion on average.

Why do some companies succeed so categorically while the majority struggle? This question drives much of the management-consulting industry. It has also inspired a library’s worth of management books with varying explanations. Is it because successful companies have visionary and disciplined leaders, as management consultant Jim Collins argues in his best seller Good to Great? Is it because successful companies have superior management systems and organizational cultures? Is it because of positional advantages, as Harvard’s Michael Porter might argue? Or is it all down to timing and luck?

Concluding that luck is a big factor would be unlikely to sell many paperbacks in an airport bookstore; yet, undoubtedly, chance events have played an important role in many successes and failures. For instance, the late Apple CEO Steve Jobs credited the success of the Macintosh (Apple’s personal computer) to a chance visit to the Xerox PARC laboratory in Palo Alto, California, in 1979, when Apple was still just a promising startup. As Malcolm Gladwell later recounted in the New Yorker, upon witnessing a Xerox engineer open and close “windows” on a Xerox Alto computer and move from one task to another, Jobs remarked, “Why aren’t you doing anything with this? This is the greatest thing. This is revolutionary.”

Returning to Apple’s offices, Jobs asked his engineers to change course: he wanted the Macintosh to have a graphical user interface and a mouse. The early Macintosh remains one of the most iconic products in Silicon Valley history, while Xerox, after some modest successes with the Alto, withdrew from the personal-computer market. Reflecting on his visit to PARC, Jobs said, “If Xerox had known what it had, and had taken advantage of its real opportunities, it could have been as big as IBM plus Microsoft plus Xerox combined and the largest high-technology company in the world.”

But chance events may be only part of the answer. Today’s superstar companies possess vastly superior capabilities, even without the scale and dominance of the incumbents, there is much that companies can do to improve their own chances of success.
especially in information technology and data analytics, than everyone else. Dominance in these two areas enabled them to acquire the killer combination of scale and scope, serving millions of consumers with a wide variety of offerings.

It is easy to bemoan the dominance of the superstars, and to blame concentration in some industries for the lack of innovation among smaller competitors. Yet even without the scale and dominance of the incumbents, there is much that companies can do to improve their own chances of success. Ultimately, what drives most of today’s superstar companies is that they have discovered the art and science of bottom-up innovation: lots of experiments, an emphasis on decentralization and learning, a tolerance for failure, and the application of leverage when the forces are with them. Nonsuperstar companies would do well to learn from this model.

And, of course, because capitalism is a dynamic process, success rarely continues forever. Business history offers a series of examples of a sobering lesson: superstar status today does not shield a company from failure tomorrow. That iconic companies of yesteryear such as Xerox, Kodak, Sony, Sears, and General Motors have lost their luster suggests that the economic and technological forces that propel superstar companies to the top of the heap are double-edged swords. Indeed, the destructiveness of these forces, often hidden by companies’ successes, may gain momentum just when superstar companies have hit their peak.

Lessons from ecology
Ecology provides an explanation for why some species survive and thrive while others do not. Consider the fitness-landscape model, developed by the University of Chicago geneticist Sewall Wright. Wright’s model assumes that the attributes of a species—let’s say, a gazelle—contribute to its fitness, and that individual members of the species differ in the quality and quantity of each attribute.

A fitness landscape measures fitness (reproductive ability) on the vertical axis and an attribute (for example, the thickness of a gazelle’s legs) on the horizontal axis. If a gazelle has no legs (a score of zero along the horizontal axis), it cannot survive, and its fitness score is zero. Gazelles with legs have better scores, and those with thick and robust legs have increasingly higher scores. But beyond some point, additional thickness begins to hurt a gazelle’s score. We can imagine a gazelle that has such thick legs that its mobility is fatally diminished, making its fitness score zero.

In the illustration above, the fitness landscape resembles Mount Fuji. Evolutionary scientists view Mount Fuji problems as easy to solve because adaptation and selection pressures converge on the optimal value for the attribute, in this case, the ideal leg thickness in gazelles (as a species). Viewed as an optimization problem, any hill-climbing algorithm will detect the peak.

So far, so good. But species have more than one attribute. When a fitness score depends on multiple attributes that interact with each other—such as the size of the gazelle’s body, the size and shape of its head, the sharpness of its teeth, etc.—the fitness landscape resembles a rugged landscape. The greater the interaction among the attributes, the more rugged the landscape.

The rugged fitness landscape
In a rugged fitness landscape, the peak of each hill corresponds to a particular combination of attributes. At a given point in time, there is considerable diversity within the species: some gazelles have thinner legs and smaller bodies, and some gazelles have bigger legs and bigger bodies.
In the illustration at the bottom of the facing page, Hill 5’s peak has the highest fitness score; other peaks have lower fitness scores.

In a 1997 paper, University of Pennsylvania’s Daniel Levinthal adapted Sewall Wright’s model to analyze the evolution of industries. Change in any given industry occurs because of organizational adaptation (the deliberate attempt by companies to acquire new attributes), Levinthal argued, as well as population-level selection effects (through the birth and death of companies).

To understand how this works, think of market value as a proxy for fitness. It’s clear that market value depends, among other things, on the attributes deliberately chosen by a company, such as the quality of its leaders and managers, its organizational culture, its management practices, its products and services, and so on. The collection of attributes chosen by the company provides a snapshot of its strategy.

The challenge for corporate leaders is that companies have to navigate the rugged landscape without an aerial view of it. Consequently, the character of the company, including its aspirations, purpose, and strategy, is shaped by the limited view that managers and entrepreneurs have of their landscape. For instance, each of the 37 health-care companies in the 2018 Inc. 500 list (of the fastest-growing US companies) operates in distinct product, service, and geographic markets. These are very varied. They include supplements and superfoods, surgeries, retinal eye exams, yoga classes, animal hospitals, surgical implants, gene delivery, telemedicine, dental impressions, and autism therapy. Evidently, the entrepreneurs at the 37 companies had distinct assessments of the opportunities in the health sector.

Our illustration of the rugged landscape highlights that where one starts matters. Companies that start with attributes close to the origin will more than likely choose to climb Hills 1 or 2 and find it difficult to alter their strategy sufficiently to climb Hill 5. Some companies that start with attributes much further away from the origin will more than likely choose to climb Hills 5 or 6. The ruggedness of the landscape implies diversity in strategies, with some companies settling on strategies that are less risky and yield modest market value (smaller hills that are easier to climb), and a few companies going for strategies that are more risky and yield high market value (bigger, harder-to-ascend hills).

**The dancing rugged landscape**

There is another complication. The rugged landscape keeps shifting; it’s a dancing rugged landscape. The shape of the landscape depends on the choices of all companies: as companies within an industry alter their strategies, the rugged landscape alters. A company that finds itself on the highest peak today may find itself on a smaller hill tomorrow, while today’s startup may be at the top of the highest peak tomorrow. This is what happened to Research In Motion, the pioneer in smartphones, whose CEOs in 2007 dismissed the potential of the Apple iPhone and Android phones to threaten BlackBerry’s primacy. From a market share of 44 percent in 2007 (when the iPhone was first introduced), BlackBerry’s market share today is zero.

**Why companies fail**

Failure in the rugged-landscape model shows up in two ways: companies are unable to climb a hill, or they pick the wrong hill to ascend.

Typically, companies are unable to climb a hill (or to move from one hill to a neighboring hill) because they lack the required competencies and management systems. In a 2013 paper analyzing the quality of management practices at over 6,000 companies in a dozen countries across the world, Stanford’s Nicholas Bloom and MIT’s John Van Reenen find that there is substantial variation within and across countries. In a separate study, they and their coauthors find that even in the United States, whose management scores on average are among the highest in the world, 27 percent of organizations (from a sample of 70,000) made use of fewer than half of the structured management practices identified by the researchers. In a 2013 paper on which
An approach that embraces discovery, failure, learning, and adaptation generates better answers faster.

Bloom is the lead researcher, interviews with personnel at textile manufacturers in India who received poor management scores revealed that managers were often unaware of modern management practices. And even when managers are aware of these practices, history and experience have shown that they are often unable to execute.

The other reason companies falter in rugged landscapes is their discovery that there is little or no reward for having reached the top of a hill. The company may have done all the little things right but got the big thing wrong: it has climbed the wrong hill. Such strategic failures can be devastating, and often prompt much soul-searching about what went wrong, and when.

The slow-motion failure of Sears, which filed for bankruptcy in 2018, illustrates the cumulative effect of poor decisions that stretch across decades. From the 1940s to the ‘80s, Sears was the biggest retailer in the world. Looking back, it is evident that the ‘60s were the apex years. In 1969, two-thirds of the US population shopped at Sears, and half of US households had a Sears credit card, according to Fortune. Sears’s market value (measured in 2019 dollars) peaked in 1965, when it was worth $92.1 billion.

The company’s first strategic error was that Sears’s planners viewed the landscape and concluded that retailing was not the future, and that they could reap bigger rewards in financial services. The plan was for Sears to cross-sell financial services to its increasingly affluent and large customer base.

In 1981, Sears bought Coldwell Banker, the residential real-estate brokerage company, and Dean Witter Reynolds, the stock-brokerage company. Both acquisitions failed, and by the mid-’80s, both Coldwell Banker and Dean Witter remained unprofitable. Damningly, the focus toward financial services meant that the retail business was now a second-class citizen. While Sears had been embarking on this path, rival retailers such as Walmart, Target, Home Depot, and Best Buy had been rapidly expanding across the US.

By 1991, it was evident that the corporate diversification strategy had failed: Sears’s market value had fallen by 80 percent from its 1965 peak. There would be no way back. The retail momentum was now on the side of Walmart and other new competitors.

The following year, Sears spun off Coldwell Banker, Dean Witter, and Allstate.

**Why companies succeed**

Companies that successfully climb, and stay, on the highest peaks clearly do the routine things as well as the occasional-but-significant things better than others. By mastering data analytics and information technology, today’s leading companies employ a bottom-up, experimental approach to discovering the best answers to a range of management questions. What do consumers want? What is the optimal size of work groups? What composition of work groups is most effective? What incentive schemes elicit the best effort from individuals and groups? Theory and knowledge alone may provide poor answers to these questions. An approach that embraces discovery, failure, learning, and adaptation generates better answers faster.

Alphabet epitomizes the data-driven approach to decision-making. According to Matthew Syed’s book *Black Box Thinking*, to discover the “optimal” color on the Google toolbar, the one that produces the maximum number of clicks, Google conducted a randomized control trial in which it randomly assigned Gmail users to one of 40 groups, with each group being exposed to a toolbar with a different color. The result: Google discovered that optimal color for the toolbar without resorting to theory or gut feeling.

Google has employed this experimental approach in pursuing big-bang strategic projects as well. Products such as Gmail, Google News, and Adsense started as modest experiments that were expanded only after each product achieved milestones. The willingness to explore widely to discover the best ideas is reflected in the more than 225 firms that Google has acquired since 2001. To be sure, many of these acquisitions have been failures; but some, such as YouTube and Android, have been spectacular successes.

Navigating the dancing rugged landscape is part art and part science, and there is no formula for climbing and staying on the top of the biggest peaks. But there are four things worth bearing in mind as your organization plots its path through the terrain ahead: the importance of listening and engaging with a wide variety of models and people; being ready to change one’s opinion; cultivating an opportunistic decision-making style; and doubting down on what is proven to have worked. Successful organizations do not always progress in a linear fashion, but they tend to come back to a methodology that is open, flexible, and experimental.

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Three strategy lessons from GE’s decline
A case study in what can happen to a conglomerate that fails to adapt quickly when its success falters

It may be too early to write an obituary for General Electric, but only just. In the past few years, the company has gone from iconic American corporate titan and darling of Wall Street to a humbled, awkward, oversized giant. In June 2018, GE was kicked out of the Dow Jones Industrial Average, the blue-chip club of the United States’ largest public companies. It had been a member since the stock gauge was launched in 1896. Some analysts have GE on bankruptcy watch.

To those who have been paying attention, this has been a long, slow decline. In fact, GE never had much of a chance once Jack Welch retired as chairman and CEO in 2001. That wasn’t because of bad luck or lackluster management. Instead, Welch’s perfectly brilliant growth strategy had simply run its course.

Welch’s great mistake was to fail to plan for the “end of history”–what happens when the golden goose stops laying. The story is worth revisiting not just because it explains the deterioration of GE. It also holds three powerful lessons about corporate strategy:

1. All growth from any single market or technology will end. Companies that endure are those that plan for this reality.
2. If you are successful, many will copy your success. Companies that continue to prosper update and adapt their strategies.
3. Smart corporate strategies are flexible and nimble, enabling action rather than constraining it.

The Welch era
Upon taking over as CEO in 1981, Welch reorganized GE’s structure in the face of trenchant resistance from an overgrown and constraining bureaucracy at the company’s Boston headquarters. He shed excess corporate staff and pushed decision-making down into the field. This had wondrous effects but required keeping a scrupulously close eye on emerging trouble spots.

One positive outcome of this management realignment was that it helped spawn a well-rounded group of division presidents able to handle much more responsibility than in a typical large, heavily layered, diversified conglomerate. To train these newly empowered executives, GE created a series of management education programs. In its heyday, roughly 1985 to 2005, GE’s management academy was in many ways the equal of first-rate graduate schools of business in its ability to train management teams that were able to execute its plans.

But there was a downside to this management upheaval. Because managers were empowered to problem solve in their own divisions, less information flowed up to corporate headquarters. This was the trade-off of devolving decision-making down: Welch understood that much of the bureaucracy was tasked to uncover small problems out in the vast divisional expanses before these could fester into large headaches.

Welch did not want to lose touch with what might become big issues. With so many communication ties broken, he instructed his division presidents that their jobs depended on ensuring that immediate assessments of potentially damaging issues found their way, posthaste, to the CEO’s desk.
Jack Welch saw in GE’s future an unlimited supply of large, interesting companies to buy at fair prices, delivering seemingly endless growth possibilities along with operational results. He had a great run. We should take nothing away from him.

He was interested in buying companies with dominant positions at or near the top of their markets.

Once a newly acquired company became a part of GE, Welch’s management structure was often a welcome relief for those working inside the companies he purchased. This allowed him to get a preferred position when large and attractive businesses were on the block. His successful growth strategy became well known. Admirers were justifiably impressed at what Welch had accomplished, especially given the raw ingredients he had started with: a sleepy mishmash of low-growth businesses.

Lesson 1: Plan the next big thing
Welch’s long view was the same as his short view. What he saw in GE’s future was an unlimited supply of large, interesting companies to buy at fair prices, delivering seemingly endless growth possibilities along with operational results. And Welch had a great run. We should take nothing away from him.

But by the time Welch handed over the reins to Jeff Immelt in 2001, the world was a much different place. Many in the business world had listened carefully to Welch’s widely told story of GE’s stellar results. Naturally, they wanted to inhale...
the wisdom and earn a piece of the action for themselves. Jack Welch was flattered to be imitated, but by making his approach well known to all, he hastened the time when GE’s strategy would lose its luster.

Welch got out before his lack of strategic, long-term planning was exposed, but his final act as CEO hinted at his awareness that without acquisitions, GE would be in trouble. Welch was supposed to retire, but he asked the board for time to undertake one more big acquisition. The target was Honeywell, and ultimately the takeover bid failed. It was a foretaste of the troubles that would befall GE.

The lesson here is clear. However big you are, however successful you are today, however thoroughly you dominate your sector, plan for a time when your current strategy no longer works. Change always happens, and this means that strategies must be renewed and revised. Corporate leaders need to ask themselves: What is the pipeline? What is driving growth? What are we going to run out of?

GE is not unique in having failed to pose and respond to these questions. Chrysler lost its minivan advantage to Honda over reliability and durability issues. Sears never updated its strategy to account for discount retail. The steel company Nucor never planned for the day when scrap steel would be more expensive than iron ore; but demand from China drove scrap prices to record levels, causing harm to Nucor’s prized status as a low-cost producer.

By contrast, Walmart had a strategic pipeline. Although it ran out of places to locate stores in the rural southern US, it expanded north to keep growing. Sam Walton was not short of ideas for what to try next. He tested drugstores, hardware stores, a warehouse club, and other retail formats. Walton moved Walmart into the high-volume grocery business to drive traffic into his stores. He pioneered expansion outside of the US as well, fully understanding that he needed growth to continue. He was able to do so because he knew he must think beyond the “end of history.”

**Lesson 2: Expect competition**

GE pioneered its particular approach to mergers and acquisitions, but it was imitated. In many ways, today’s private-equity industry, with billions of dollars on call and ready to deploy, is testament to Welch’s clever growth strategy. Other large public companies also became engaged with buying companies. This left Jeff Immelt looking at an entirely different chessboard.

In the days of building GE, the company was one of the few players big enough, fast enough, successful enough, and with enough access to capital to make the deals work. It earned a gold-plated level of acceptance at all levels of business, from being one of the best places to work and a company with among the highest stock market values to having the best growth record and the best trained management teams, and so on.

Immelt was serious about acquisitions. He had learned his lessons well, and spent about $175 billion buying more than 300 companies. He used the full set of GE-trained managers onboard, and deployed the principles honed in the Jack Welch era in order to make the acquisitions work. Immelt was the handpicked successor, the best of the best. But it wasn’t enough.

Once private-equity firms became able in the 1990s to raise vast sums of capital, as well as to establish generous bank lines to fund their acquisitions, every juicy acquisition suddenly had too many bidders. This pushed prices ever higher, forcing increasingly risky bets. When the strategy of buying the right companies at fair prices no longer worked, applying GE’s strategy of buying the right companies at fair prices no longer worked, applying GE’s superior management attributes did not have the same effect.

The lesson here is that no market stands still. Successful companies spawn competitors; rivals will replicate winning strategies and may do so cheaper, faster, or smarter. A robust strategist will expect this competition from the outset, identify its likely sources, and plan how to stay ahead.

**Lesson 3: Be nimble**

GE’s current CEO, Larry Culp, took over in October 2018, and came from a sort-of GE clone, Danaher Corporation. Danaher had followed many of GE’s management tenets except for one big difference, plucked from the private-equity playbook. Danaher was free to sell companies—as well as buy them—when that was the smart move. This open-minded approach brought the private-equity firms’ biggest profit weapon back to a publicly traded conglomerate: the ability to take advantage of frothy markets when appropriate to cash out, rather than always forcing a long-term hold position.

With this background, GE under Culp has belatedly moved to sell off its assets and focus its business. This new strategy has exposed the weaknesses of the traditional buy-and-hold mentality that saw GE cling to divisions that were more of a burden than a boon in the past.

One of these is GE Finance, which started as a captive bank to finance only purchases of industrial products made in house. From there, it grew wildly into all sorts of things and crashed hard in the 2008-09 financial crisis. In some ways, GE Finance was the tail wagging the dog, and unwinding it has proven to be costly for the parent company, as previously-hidden liabilities have emerged as GE shuts this division.

Another example is GE’s growth in the Internet of Things sector with their Current Division, which never quite found its footing as an internal startup, and was sold to a private-equity group. The same is true of its Distributed Power Division, which resulted from the melding of two acquisitions that appeared not to meet their targets in the small, transportable power-generator industry.

There is a bigger lesson here than just knowing when to sell. Strategies should not be straightjackets that constrain action so much as frameworks for decision-making. The most successful corporate strategies are those that enable companies to be nimble and flexible, and to pivot when things are not working or when unexpected opportunities arise.

Will GE survive? Ironically, perhaps one of the few factors keeping GE out of bankruptcy is that, like the conglomerate itself, a good portion of its stock investors are unable and unwilling to bring themselves to sell. Perhaps they simply cannot believe that a former industrial behemoth could really be on its knees. It seems the shareholders, like GE itself, display difficulty thinking beyond the end of history.

James E. Schrager is clinical professor of entrepreneurship and strategic management at Chicago Booth.
You've learned your coworker outearns you. Now what?

The fifth installment of our quarterly Business Practice feature involves a perceived salary inequity:

Your coworker Robert is a great guy and a very good analyst—you've known him since you started together at McFarland Media several years ago. He recently made a casual reference to his salary, and to your dismay, it's 20 percent higher than yours. He's good, but as far as you're aware, his career path has more or less mirrored your own. You started at the same time, in the same role, and neither of you has received a formal promotion since.

This revelation is eating at you, so you've tried to divine some reasoning for it by comparing your performance to what you can observe of Robert's. But on any measure you can think of, your performance isn't notably different. In fact, your manager recently gave you some encouraging feedback on your work. At wit's end, you've requested a special one-on-one with her this afternoon. But what do you say?

Write a script.

Business Practice has already explored what to do when a potential employer asks you about your current salary. But for most of us, negotiating a raise is even trickier than bargaining for an initial salary, because you generally have less leverage when you are already on the job than when you are being recruited to join a company.
Why is this question difficult?
Negotiating a pay increase is aversive for most of us, even under the best of circumstances. A survey conducted by the compensation-data website PayScale finds that 57 percent of respondents have never requested a raise. The PayScale study identifies two big reasons for this: discomfort with negotiating salary and fear of being perceived as pushy. Not surprisingly, women respondents were even less likely to ask for a raise, a result consistent with well-documented gender differences in negotiation.

The perceived gap between your salary and Robert’s provides an impetus for having a conversation with your manager. Short of an outside offer, there isn’t much better ammunition for a salary conversation than unequal pay for equal performance. However, there are some factors to consider: Maybe Robert isn’t actually being paid more than you? Perhaps you misunderstood what Robert said, or he wasn’t telling the truth. Or there might be a good reason for the salary discrepancy that you don’t understand. What if, contrary to what you’ve been thinking all along, Robert is actually a better performer than you are? Yikes.

Top-rated responses
Now for the top three responses, as rated by Business Practice participants on a 1 (“Strongly disapprove”) to 7 (“Strongly approve”) scale. I’ve listed names and background when I’ve gotten permission to do so. All responses included in this article were subject to light editing for grammar and style.

1 Response: “Before—think about what it would take for you to feel as if your job were compensating you fairly. Think long term. Know what you want. Know how you feel. Are there other perks? Is this role laying the foundation for even better opportunities? Is it all about the money? Have a plan in mind to get you where you want to be.

“During—be direct. ‘I’ve been in role X for Y years. My reviews are consistently favorable. And I’ve recently become aware that similar roles pay more in this industry and I’d like to bring my compensation up to that level. Can we make a plan to get me there?’

“After—be prepared for an answer you don’t want to hear. Be prepared to work the plan you asked for.”
Average rating: 4.88
Participant: Terrence H. Cathey
Background: Unknown

2 Response: “I would want to start by framing my inquiry as a check-up on my job performance, rather than a complaint about my salary. My question isn’t, ‘Why aren’t I getting paid more?’ but rather ‘Am I doing as well as I think I am?’ So with that in mind:

‘I learned recently that there are members of our team—whose job responsibilities and performance aren’t obviously different from mine—whose compensation is significantly higher than mine. I wanted to speak with you to determine whether that was an indication that there are problems with my work that we haven’t discussed. What do I need to work on in order to be regarded, and compensated, as one of the high performers on our team?’

Average rating: 4.83
Participant: Thomas Parker
Background: Media

3 Response: “Thanks for taking the time to meet with me. Recently, another member of the team shared information on his salary, and I noted that it is approximately 20 percent higher than mine. As far as I can tell, the two of us are comparable on experience, tenure, and performance, and I would like to request a parity raise to bring my compensation to an equitable level.

‘Would you be willing to discuss this, and consider advocating for a parity raise with leadership and HR? I have prepared an overview of my work at the company, as well as some industry salary comparisons and a fresh CV. If there are additional considerations you’d like to take into account, I would be happy to hear them.”

Average rating: 4.5
Participant: Molly McKenzie
Background: Education

In contrast to stock market investments, the best responses have high return and low risk, and some of the worst responses have the opposite profile.
Sample responses
To give you a sense of the range of ratings, I’ve listed a few responses spanning from unfavorably rated (5 percent in the distribution, meaning that 95 percent of responses are rated better), to average (50 percent in the distribution), to favorably rated (90 percent in the distribution).

5 percent response
Answer: “I thought I was a valued member of this team, but it doesn’t appear I’m compensated as such. Robert isn’t doing anything I’m not. How do you explain the disparity in our salaries?”
Average rating: 2.26

50 percent response
Answer: “I recently became aware that there are large salary discrepancies between people on the team. I would like to better understand the salary range for my role, where I fall within that range, and the rationale behind that.”
Average rating: 3.7

90 percent response
Answer: “Thank you for taking the time to meet with me today. I wanted to discuss my career path and performance trends relative to my compensation. Based on my personal research, I have noticed that my pay tends to be on the lower compensation end compared to others within the organization. My hope in today’s conversation is to work with you to determine a plan with HR to reevaluate my current salary rate [and bring it to a level] that will reflect my experience and abilities within this organization.”
Average rating: 4.38

To examine more systematically which elements lead to more favorable evaluations, I coded the responses on various dimensions:

- The tone of the responses varied from direct (“I have a hard time motivating myself knowing that my coworker earns significantly more than I do for the same work.”) to subtle (“I was also hoping you could tell me how the company ensures that salaries are fair and balanced.”). Even though a direct approach was used more than twice as often as a subtle approach, subtler discussions were rated considerably more positively (4.17) than neutral (3.5) and direct (3.43) responses.

- Responses also varied in whether there was a direct request for a raise and/or feedback. A request for feedback (3.86) was evaluated considerably more favorably than a no-feedback-request response (3.41), while a direct request for a raise (3.68) was judged only modestly more positively than responses without a request (3.51).
- Just over half the responses mentioned Robert, with 31 percent of all respondents doing so by name (“I recently learned that Robert is being paid 20 percent more.”) and 30 percent doing so more vaguely (“My understanding is that I’m being paid less than market value for this position.”). Vague responses were judged much more favorably (4.03) than either direct mentions (3.51) or no mentions (3.42). Responses that mentioned Robert also differed in whether Robert was discussed neutrally or positively (“I would like to benchmark against the high performers to see where I stand, and plan for promotion.”) or negatively (“[I] am unable to comprehend how Robert is able to see different growth compared to me.”). Positive mentions (4.0) were rated higher than negative mentions (3.6).
- Finally, I examined how responses framed the conversation about salary. A discussion of a pay discrepancy (“I would ask my manager to research the pay gap.”) (3.87) was rated considerably more positively than a focus on a pay raise (“I would like a salary increase.”) (3.13).

Ratings from a manager’s perspective

To examine how responses framed the conversation about salary, we analyzed the responses from a manager’s perspective. Business Practice crowdsources ratings of responses from individuals who have scripted a response of their own—and usually have just finished doing so. Although this design is pragmatic and useful in many ways, there are two obvious shortcomings with this approach. First, it requires that you initially embody the role of the employee and then switch into manager mode to assess other responses. It may be hard to shake that initial role for the one of manager, the person whose judgment ultimately matters. Psychological research studies, including some by my Booth colleagues Ayelet Fishbach, Nicholas Epley, and Emma Levine, have documented frequent and sometimes substantial differences in perspective taking between one role and another. Second, your manager is likely to have different information than you. In this case, your manager knows what you and Robert are actually paid, how the two of you have actually performed, the cause of the pay disparity, if there is one, etc.

To address these issues, we took responses for which we had permission to conduct further research and created a second set of raters using 331 paid participants from Amazon’s Mechanical Turk. We divided raters into four groups, in each case providing them with a different background scenario to understand the situation.

- Scenario 1: “But it’s not true. You know that Robert lied, and their salaries are closer than he led his coworker to believe.”
- Scenario 2: “It’s true, but it’s an unfortunate mistake that your predecessor made (and got fired for). Unfortunately, you’d like to correct this injustice, but your budget does not have the funds right now and you feel awful about this.”
- Scenario 3: “It’s true, but you know that this person is not nearly as good at the job as Robert is. You’ve tried to give this employee related feedback before, so you’re a bit surprised.”
- Scenario 4: “It’s true, but it’s because Robert was recruited to another company a year ago. Robert was on a critical project and you had to offer him a better salary at the time. You had plans to correct this injustice with this employee, but your budget does not have the funds right now.”

These scenarios were not intended to be comprehensive, but they nevertheless span a relatively broad range of possible organizational realities.

Those who rated through Mechanical Turk shared largely consistent views of the responses with those who rated through the Chicago Booth Review website. In other words, both groups tend to agree on which responses are the strongest and which are the weakest. Intuitively, however, some responses work well in some cases, but may be disastrous in others. Consider the following response: “I would like a salary increase. I’m a very good analyst, my performance is excellent, and I feel it would be fair. This is what I would like to discuss with you.” This response is direct and presumes that your performance is equal to Robert’s. This response was rated relatively well when...
raters were told that Robert lied (4.8; Scenario 1). However, the evaluation was predictably much worse (2.5) when raters were told that the employee’s performance was not as strong as Robert’s (Scenario 3).

Perhaps all responses are “tuned” to work well for some realities and poorly for others? This isn’t the case. Other responses are more robust, scoring well across all scenarios. One example is the second-highest rated response (see “Top-rated responses” on page 77). This response averaged 5.44, 5.3, 5.57, and 5.33 across the four scenarios, a relatively narrow range of 0.27 points. In general, the responses most highly evaluated by Business Practice participants also were rated positively across all four scenarios by our Mechanical Turk raters. In contrast to stock market investments, the best responses have high return and low risk, and some of the worst responses have the opposite profile!

**Strategic takeaways**

This scenario offers the kind of frustrating ambiguity that exists in many professional situations. Is Robert really paid better than you are? Are you really performing at Robert’s level? It’s difficult to confirm these things, or anticipate the rationale for a perceived inequality, which makes asking for a raise based on Robert’s information tricky.

- The highest-rated responses had a subtle rather than a direct tone and discussed Robert in a neutral or positive rather than a negative fashion. The data from our Mechanical Turk raters shed light on one reason that subtle and positive discussion is seen more favorably: these responses tend to work fairly well across a wide range of scenarios.
- Although you suspect that there is unequal pay for equal work, you don’t know all the facts. In other words, there’s uncertainty about what’s going on. When you face a situation like this, think widely about what could be going on. The best course of action is one that balances the costs and benefits across the potential scenarios. —CBR

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**Evaluators favored responses with a considered tone**

Responses that used subtle language and focused on discussing the pay discrepancy rather than demanding a raise were rated higher.

<table>
<thead>
<tr>
<th>Tone of participants’ responses</th>
<th>Direct</th>
<th>Neutral</th>
<th>Subtle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>53.75% of all responses</strong></td>
<td>20%</td>
<td>26.25%</td>
<td></td>
</tr>
<tr>
<td>Average Business Practice rating for each grouping</td>
<td>3.2 4.2</td>
<td>4.2</td>
<td></td>
</tr>
</tbody>
</table>

**Whether responses included requests for the manager**

<table>
<thead>
<tr>
<th>Requested feedback</th>
<th>Did not request feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>46.25%</td>
<td>53.75%</td>
</tr>
<tr>
<td>Average rating</td>
<td>3.2 4.2</td>
</tr>
</tbody>
</table>

**Whether responses referred to the coworker with the higher salary**

<table>
<thead>
<tr>
<th>Direct mention</th>
<th>Subtle mention</th>
<th>No mention</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.25%</td>
<td>30%</td>
<td>38.75%</td>
</tr>
<tr>
<td>Average rating</td>
<td>3.2 4.2</td>
<td>4.2</td>
</tr>
</tbody>
</table>

**How respondents framed the salary issue**

<table>
<thead>
<tr>
<th>Focused on requesting a raise</th>
<th>Focused on the pay discrepancy</th>
<th>Did not mention</th>
</tr>
</thead>
<tbody>
<tr>
<td>35%</td>
<td>51.25%</td>
<td>13.75%</td>
</tr>
<tr>
<td>Average rating</td>
<td>3.2 4.2</td>
<td>4.2</td>
</tr>
</tbody>
</table>

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*George Wu is the John P. and Lillian A. Gould Professor of Behavioral Science at Chicago Booth.*
What the success of rock climbing tells us about economic growth

Machines are not the only engines of greater productivity

I recently watched Free Solo, the great movie about rock climber Alex Honnold's free solo (no aids, no ropes, no protection at all) climb of El Capitan in Yosemite National Park. Among many other things, it got me thinking about economic growth.

The abilities of contemporary rock climbers are far beyond those of climbers just a generation ago. The Wikipedia history of El Capitan starts with a 47-day climb in 1958—which used pitons, ropes, and all sorts of equipment—and continues through development of routes and techniques to Alex's three-hour romp up the face.

Why weren't such climbs done long ago? There is essentially no technology involved. OK, Honnold wears modern climbing boots, which have very sticky rubber. But that's about it. And reasonably sticky rubber has been around for a hundred years or so too.

There is nothing technological that stopped human beings from climbing in much this way centuries ago. Honnold, transported to 1890, might not have free soloed El Capitan without his current boots, but he would have climbed a lot more big walls than anyone else.

Clearly, there has been an explosion in human ability to climb rocks, just as there has been in human productivity, or our knowledge of how to do things, in more prosaic and more economic activities.

In studying economic growth, we (and especially those of us in Silicon Valley) focus way too much on gadgets and too little on simple human knowledge. Southwest Airlines' ability to get an airliner back in the air in half the time it took in the 1970s (and still does at many larger airlines) is as much about an increase in productivity as it is about installing the latest gadget. Growth is about the knowledge of how to do things, knowledge that is only sometimes embodied in machines. Free Solo is a great example of the expansion of ability, driven purely by advances in knowledge, untethered from machines.

How did it happen? The radical improvements in rock climbing that led to Honnold's achievement display the same patterns as economic growth theorists tell us about.

Knowledge externalities: When one person learns how to do something, and when he or she can and does communicate that knowledge to others, the others can quickly benefit from that knowledge, and the group advances.

Honnold, like Isaac Newton, climbed on the shoulders of giants. Just how do you get up El Capitan? There are now many established routes—successions of incredibly tiny holes, cracks, and ledges in a 3,000-foot face of rock that experienced climbers figured out how to stitch together. Honnold didn't have to figure all that out, as he chose an established route.

Likewise, nobody in 1958 had any idea that you could hang by your thumbs and
fingers to exploit little pieces of rock. This knowledge, demonstrated in the movie, emerged from the community of rock climbers and boulderers over time. Honnold is incredibly good at it, but he learned from others.

Knowledge transmission: Everyone is all upset about intellectual property (IP) these days, but nobody patents rock-climbing techniques. (There is some patentable technology in the devices people use to climb with ropes, and that has enabled free climbing, but it’s really not central.) The knowledge gets produced, which is costly to the individual producing it, and then passed on, where it is much easier to learn than it is to innovate, and the whole group gets better.

Once a piece of knowledge is produced, it is in society’s interest to pass it on as quickly as possible. We tend to forget this in today’s IP kerfuffles with tech and with China, and people seem to think it’s vitally important to keep secrets. But restrictions on IP, including patents, are, in the short run, harmful. The patent and IP protection system accepts this immediate harm—slowing adoption while the innovator gets to earn some rents—to give people an incentive to produce new knowledge. But lots and lots of productivity-increasing knowledge—most, I would hazard—is created as new handholds, or new routes, or new economics papers are: for free. There are other social institutions that promote the creation and dissemination of knowledge, and rock climbing is full of them: Honnold got fame and some fortune from his innovations, but he didn’t have to patent anything to do it.

Group size and the cost of transmitting information: The key insight of modern growth theory is that, in the process described above, the larger the group studying any problem, the faster the knowledge advances. If 1,000 people are figuring out how to climb, and all of their good ideas disseminate through the group, each member of the group gets to use new ideas more quickly than if there are 100 people doing it.

Our economic models don’t pay enough attention to the dissemination question. They tend to assume that producing new knowledge is costly, but then using it is free. Most new ideas are bad, so the process of sifting through new ideas, figuring out which are good and bad, and refining them is a lot of what a group does, and all that learning takes time and effort. Academics, who spend a lot of time reading hard papers, writing referee reports and comments that distill the ideas, throwing most new ideas out, and distilling again to teach, see this every day.

The film makes it clear that the world of rock climbing has expanded vastly since the 1950s. Bouldering is a weekend recreation for millions. Mountain climbing in the ’50s was a pastime for a small handful. No surprise, then, that the rate of knowledge creation is higher.

The size of the group is limited also by its ability to communicate. I locate the beginning of growth and the scientific revolution with Johannes Gutenberg (whose big idea, movable type, was also unpatented, and therefore quickly improved upon and copied). Printing means that if you run a costly experiment, you can share that with a much larger group, and a much larger group can discuss and refine the idea. If you can only share it by word of mouth or handwritten note, few will learn of it and be able to use it.

Similarly, rock climbing is much more advanced than before because of technology—the technology of communication. Each new idea in rock climbing is accessible quickly all over the world. Without that large group of interested people, this communal knowledge would not have advanced so far.

Which gives me hope, in the end, for economic growth. A debate rages in economics: Are we at the end of growth? Have we run out of ideas? I think not. With the internet, we have reduced the cost of communication even more drastically than Gutenberg did. The group of people studying any problem is much larger, the number of problems that can be effectively studied by groups of efficient scale has grown, and the fraction of the human population that can work together on any one problem has exploded.

At least the possibility is there. It still took 200 years to get from Gutenberg to the scientific revolution, and lots can go wrong along the way.—CCB

John H. Cochrane is a senior fellow at the Hoover Institution at Stanford University and distinguished senior fellow at Chicago Booth. This essay is adapted from a post on his blog, The Grumpy Economist.

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How does work change when your supervisor is an app?

The ideas driving “algorithmic management” are hardly new

They know what you’re doing. They know where you’re going. They know everything,” Maurice tells me. “Once the app is on, they know. They know.”

Maurice has driven for Uber for three years now. He reckons that, on average, he spends 30 hours a week behind the wheel, starting his orbit between either of Chicago’s airports and destinations downtown at around 4 a.m. most days. “It’s nice little money,” he says of the work. “I’d rather ride around and make money than, you know, ride around and don’t make money.”

It’s hard to argue with that logic. Maurice isn’t drilling into bedrock, clearing a virgin forest, or carrying bags of feed. He’s making a few bucks cruising around town. At times, I’m sure, it can almost feel like it isn’t even work at all. (“I’m just driving right now. Dropping you off, that’s it. Nobody to answer to. Just going with the flow.”)

But it is work, of course, and if Maurice ever forgets that, he merely needs to look over at the phone that’s mounted to the center of his dash.

They know. They know. What no one knows is how many people there are like Maurice. I don’t mean Uber drivers specifically—of whom there were nearly 4 million by the end of 2018, according to the Securities and Exchange Commission report the company filed in advance of its May 2019 initial public offering—but all of the workers who qualify as members of the so-called gig economy. The uncertainty is partly explained by the fact that there is no broad agreement on what counts as gig work. Side hustles are as American as political acrimony and apple pie, so if you define gig work to include everything from babysitting to hawking heirlooms, you might find, as the Federal Reserve did for a recent survey, that nearly three out of 10 Americans are so engaged.

If, however, we narrow the focus to the revolution in economic life by which work is almost entirely mediated by handheld devices, we discover a smaller but rapidly expanding universe. Consider that when the JPMorgan Chase Institute began studying what it calls the “online platform economy” in the first quarter of 2013, it found that only 0.3 percent of all Chase checking accounts received regular payments from what it deemed online platform companies such as Uber or Airbnb. By the first quarter of 2018, that number had grown to 1.6 percent, with 4.5 percent of all Chase accounts receiving income from at least one such company in the past year.

Alex Rosenblat, author of the recently released Uberland, calls the dynamic between Uber high command and its legion of drivers an exercise in “algorithmic management,” a fine term, at once futuristic and sterile. It highlights the fact that Uber and other companies like it are exploring a brave new world of workplace superintendence done almost entirely by machines, while also reminding us that the algorithmically tailored interaction between labor and management is never more than an innovation on an age-old relationship. With apologies to The Who, it may not exactly be a case of “Meet the new boss. Same as the old boss.” But for drivers like Maurice, when the Uber app is on, it’s still a boss nonetheless.
If a company pushed any employee to the very edge of his capabilities, it would cause him to soon break down, the company’s investment in him squandered.

Bosses have always been a tricky matter in the ideological debates over capitalism. Champions of the system are keen to underscore the individual liberty assumed by free markets and, therein, the power of individuals to determine their destiny apart from the visible hand of government. At the same time, however, no less than Adam Smith emphasized the discipline assumed by the division of labor. No child nurtures the ambition of spending her adulthood grinding the edge of a pin, but such stultifying attention to detail is what is assumed by specialization, and a pin manufacturer is well advised to have a foreman looking over her shoulder to make sure the young woman is busy filing.

It is one of the great infelicities in the history of political economy that Smith, the man whose work did so much to augur and accelerate the Industrial Revolution, did not live long enough to see its ferocious bloom. He died in 1790, as another revolution, that in France, burst into view. Wrestling with the moral and practical implications of a commercial world typified by heavy industry and a growing horde of wage workers was left to others, most notably Karl Marx. “Owing to the extensive use of machinery and to division of labor, the work of the proletarians has lost all individual character, and consequently, all charm for the workman,” Marx and Friedrich Engels wrote in
As Frederick Winslow Taylor understood, a superior example of workplace management didn’t involve the breaking of a worker’s spirit any more than it did her back.

The cardinal concern, therefore, was not to break the individual laborer, or at least only to break him the way you would break a beast of burden rather than a bowstring. Then again, as Taylor understood, a superior example of workplace management didn’t involve the breaking of a worker’s spirit any more than it did her back. It required “another type of scientific investigation,” he said, one that went well beyond research into particular task techniques and the skeletonmuscular system to include “the accurate study of the motives which influence men.”

More from John Paul Rollert
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The Manifesto of the Communist Party in 1848. “He becomes an appendage of the machine, and it is only the most simple, most monotonous, and most easily acquired knack, that is required of him.”

While Marx took such conditions as a gross affront to our fundamental humanity, others regarded the transformation of men into pistons, spindles, and pulleys as the principal challenge for managers in an industrial setting. Frederick Winslow Taylor’s proposed solution was presented in The Principles of Scientific Management, a pioneering work of workplace rationalization that was first published in 1911 and is now regarded as the foundational text for management consulting. “Under scientific management,” Taylor boasted, “the ‘initiative’ of the workmen (that is, their hard work, their good-will, and their ingenuity) is obtained with absolute uniformity.”

The principles outlined in his book promise this eventuality. Key among them is the decoupling of effort from understanding. “[I]n almost all of the mechanic arts the science which underlies each act of each workman is so great and amounts to so much that the workman who is best suited to actually doing the work is incapable of fully understanding the science,” Taylor wrote. And thus, he believed, there was no reason to bother explaining it to him. Indeed, doing so was not only a waste of time; it was counterproductive because it invited dissension and second-guessing. The point of a science of management was to furnish any workplace with “many rules, laws, and formula which replace the judgment of the individual workman.” A factory was most efficient when managers did the thinking, and workers did what they were told. As a factory hand described one such workplace to the journalist Edmund Wilson in the early 1930s, more than a decade after Taylor’s death, “a man checks ‘is brains and ‘is freedom at the door when he goes to work at Ford’s.”

More than any of his industrial peers, Henry Ford embraced the logic and aim of scientific management, though he came by his particular practices through trial and error in the laboratory of his factories rather than through the writing of Taylor. “We expect men to do what they are told,” Ford wrote in his memoir, My Life and Work. “The organization is so highly specialized and one part is so dependent upon another that we could not for a moment consider allowing men to have their own way.” Workers were vetted by the Ford Motor Company for jobs that best fit their mental and physical aptitudes and then “scientifically arranged” along the assembly line, “not only in the sequence of operations, but to give every man and every machine every square inch that he requires and, if possible, not a square inch, and certainly not a square foot, more.”

Such exactitude in the production process was not merely a matter of determining which worker did what best—and, for that matter, how a particular task might be done most efficiently. It was also concerned with conserving the most expensive investment any company makes: its workforce. Much like the careless driver who races his Ferrari in first gear, if a company pushed any employee to the very edge of his capabilities, it would cause him to soon break down, the company’s investment in him squandered.

In certain respects, Marx failed to price in this possibility when he conceived the fate of the proletariat. Rather than the gears of some great machine, their destiny seems more akin to a lump of coal dropped into the belly of an insatiable furnace, the vitality soon consumed in pursuit of the clinical promise of more units per minute. For Taylor, Ford, and other oracles of industrial management, this was a category mistake. Workers’ purpose was not fuel but function, and insofar as considerable investments had to be made to harness their full potential, you wanted their services for a lifetime, not a fortnight.

The cardinal concern, therefore, was not to break the individual laborer, or at least only to break him the way you would break a beast of burden rather than a bowstring. Then again, as Taylor understood, a superior example of workplace management didn’t involve the breaking of a worker’s spirit any more than it did her back. It required “another type of scientific investigation,” he said, one that went well beyond research into particular task techniques and the skeletonmuscular system to include “the accurate study of the motives which influence men.”
Riders are constantly wielding carrots and sticks in the form of feedback, the consequences of which can be the difference between drivers making more money or losing their jobs entirely.

Economists will sometimes conflate the discussion of motives with that of incentives, and one incentive in particular: money. No doubt, a longing for money is a common motive, and a powerful one at that, but in addition to being expensive to appeal to, it hardly encompasses what Taylor had in mind. If individuals only do what you want them to do because you will pay them for their efforts, they will hardly be enthusiastic employees, and you will be left to constantly reach for either a carrot or a stick to keep them honest and dependable.

Accordingly, especially as the focus of modern management has shifted from the conveyer belt to the cubicle, from jobs where one risked his body to those where he feared selling his soul, the science of management shifted from a concern for precise physical arrangements to a study of the subtle art of persuasion.

“The formal aim, implemented by the latest psychological equipment, is to have men internalize what the managerial cadres would have them do, without their knowing their own motives, but nevertheless having them,” the late sociologist C. Wright Mills wrote in *White Collar*, his mid-century treatment of the American middle class. Under such a regime, he continued, “[m]any whips are inside men, who do not know how they got there, or indeed that they are there.”

Notwithstanding its ominous tone, Mills’s vision of the science of middle management is still a matter of “easier said than done.” Indeed, valiant efforts to embed these whips have long made for scabrous satire precisely because they are typically impotent and lame. Take *Office Space*, a film that depends for so much of its humor on abortive attempts by bosses to elicit even a scintilla of esprit de corps from the spreadsheet servants encaged in their cubicles. Whether through the banal entreaties of office banners (“Is This Good for the Company?”), patronizing invitations to self-expression (“Friday is Hawaiian Shirt Day”), or intra-office social events with all the charm of a root canal (“Happy birthday, Mister Lumbergh”), a movie such as *Office Space* provides a useful reminder that it is far easier to cajole a worker’s body than control his mind.

That’s a good thing, too, for the great promise of algorithmic management, when combined with the power of big data, is the ability to harvest untold information from gig workers that may be used to make sense of, and best appeal to, their individual motives. And given the centrality of the app to everything a driver does, the opportunity is one uniquely afforded to Uber.

“Drivers are the subjects of constant experiments,” Uberland’s Rosenblat told me. “In much the same way that [a news publication] A/B tests what headline works better for a news story, drivers have constant A/B testing on their working conditions.”

It is inevitable that some of these tests concern what a driver takes home at the end of a shift. Rosenblat gives the example of the “destination filter,” a feature on the app that Maurice complained to me about. Uber had previously introduced a twice-a-day option drivers could select that would give them rides in a chosen direction, home typically, a perk of sorts whose luster dimmed when the company further introduced a 30 percent rate cut for any ride so offered. (As one driver described his impression of Uber’s decision on RideGuru, a popular online forum, “They are basically saying, ‘OK, we are going to rob drivers on at least two rides a day.’”)

The pay cut has since been suspended, and an Uber spokesperson told me that its intention was to redistribute the fees it withheld from drivers for using the feature to others in the same area who abstained, though the company did not make clear whether it actually succeeded in its efforts. Regardless, the course of events underscores the fact that, while drivers can protest changes foisted upon them and pop a trial balloon or two, they have little say in whether those changes are released in the first place.

Not driving—the most abrupt form of protest—is always an option, but hardly a viable one for the increasing number of workers whose gigs don’t complement their income so much as compose it. These drivers depend on Uber as much as anyone depends on a primary employer, so they are especially vulnerable to a steady diet
of nudges, newfound constraints, and systematic surveillance by means of the all-seeing app mounted to the middle of their dashboards.

In fairness to Uber, on its face, most of this activity seems benign, with much of it ostensibly designed for the worthy end of passenger protection. For example, consider the way in which Uber compels “best practices” when it comes to behavior behind the wheel: “If I start going over 55 miles an hour, that goes red, and it starts listing my speed per hour,” one driver explained to me, pointing to her phone, as we hurtled down the highway. “If I went, like, over 80 mph, it would start dinging.” Or there is the way in which Uber prevents the kind of profiling that cab drivers have long been notorious for. Rather than identifying the destination and passenger the instant the ride is requested, in the US at least, Uber keeps passenger information hidden until the ride is accepted and destination information hidden until the driver arrives for the pickup, effectively preventing drivers from vetting their fares.

Whatever one makes of these policies, let’s not confuse the moral nature of these management techniques for the laudable aims to which they aspire. Badgering someone to slow down or withholding essential details of a ride she has agreed to until she cannot easily back out of it are instances, however trivial, of coercion and manipulation. They compel a driver to do what Uber wants her to do regardless of the driver’s opinions.

There are other practices, of course, that are far more morally ambiguous. Riders are constantly wielding carrots and sticks in the form of feedback, the consequences of which can be the difference between drivers making more money or losing their jobs entirely. At the same time, the company offers an array of incentive opportunities for completing so many trips in certain periods or for driving at certain specific times and places (respectively, a quest and a boost in Ubberspeak). Such features help the company to ensure that, notwithstanding the endless encomiums to work flexibility, Uber has drivers driving whenever, and wherever, it needs them.

For capitalism to work, we had to be as free to leave the conveyor belt, or turn over the keys, as to start a venture or strike a deal.

To be sure, humans have used similar techniques for millennia to command, govern, and control one another. Scientific management merely codified such practices within a commercial realm that assumed individual liberty for its efficient functioning. For capitalism to work, we had to be as free to leave the conveyor belt, or turn over the keys, as to start a venture or strike a deal. And yet it is precisely because of this freedom, and the unrelenting and unpredictability it allows for, that working men and women must be strictly controlled.

The gig economy, and the decentralized workforce it assumes, therefore presents an asymmetrical set of hazards and hopes. For companies such as Uber, it affords the opportunity to harvest the time and talent of countless individuals without ever having to house or hover over them, or even honor many of the commitments, legal and customary, that have long structured the work of full-time employees. Indeed, with cutting-edge behavioral-science insights and the steady stream of information available to them through the personal devices that mediate such work, these companies have the opportunity to harness the power of algorithmic management with the kind of efficiency that Taylor could only have dreamed of.

For gig workers, on the other hand, beyond the possibility of moral restraint on the part of employers or worker protections put in place by an evolving regulatory scheme, there is the hope that maybe the science fails, that the cussedness of the human spirit is such that one will never be able to create a legion of flesh-and-bone automatons cheerfully dispatching tasks—or else, if the science does succeed, that it only does so in a fashion that ensures the experiences of individuals such as Maurice are consistent not only with a superficial sense of freedom but with the latitude of greater opportunity and deeper fulfillment as well. Forget a few more rides per hour. That is a brave new world worth working toward.–CJR

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HOW SHOULD ECONOMICS SHAPE POLICY?

Chicago Booth and University of Chicago’s Lars Peter Hansen and Kevin M. Murphy discuss the challenges of translating academic research into policy advice.

What is the difficulty with evidence-based policy making?

Hansen: Of course evidence is important, but evidence never speaks for itself. It requires a conceptual framework, and that is just as important as the evidence. The conceptual framework has an impact on the policy recommendations. So it’s very important to clarify the rules both for the conceptual framework and for the evidence itself. There’s always a danger that policy makers can use evidence to support different policy platforms. It’s not a neutral playing ground in terms of scientific discourse. It’s very easy to use the political arena to distort what knowledge is really telling us.

Murphy: One of the reasons to understand the underlying framework is to understand what is evidence on a given question. Evidence is not just an experiment or something we ran on that specific question, but our experience with related and similar events historically as well as other policy and non-policy outcomes. If we’re interested in a particular tax, we don’t want to just look at that one tax as an example of how people would respond. Other taxes can be very informative, and knowing which other cases are similar or not requires understanding the underlying theory. Evidence-based policy is sometimes focused too narrowly on what the relevant set of evidence is. It doesn’t draw on our broader knowledge as economists. For example, we have a wealth of evidence that when prices rise, people buy less. If, in a given situation, prices went up and people didn’t buy less, we’d say, “Am I looking at these data correctly, or is there something I’m missing?” I like to give this analogy: You don’t want to say, “I’ve never thrown a bowling ball off the roof of my garage. I don’t know whether it’s going to fall to the ground or float in the air.” The theory of gravity probably applies to bowling balls. There’s a very slim possibility that it doesn’t. The same is true in economics. If there’s a goofy result, we need to look at a broader set of evidence.
Hansen: One of the aims of econometric models is to take situations with lots of data and extrapolate to where we don’t. If we stick to requiring in-depth evidence on the exact question we want to ask, we’ll be limited in terms of what we can provide. Any hopes of trying to draw on a bigger pool of knowledge requires conceptual frameworks. That’s a big part of understanding what the evidence tells us.

Murphy: One of the problems with specific evidence is that it’s often focused on short-term responses. One thing we know in economics is that long-term and short-term responses tend to be different. People and markets can make lots more adjustments given time. Those are the hardest things to run experiments on, so experimental evidence often is limited.

Policy makers typically prefer certainty to uncertainty, and specific numbers to ranges. How much of a challenge is that for economists who want to influence policy?

Hansen: On the one hand, economists who want to influence policy often make statements with great confidence about outcomes. And then different economists will make conflicting statements, also with great confidence. So the public thinks there’s no agreement on some of the fundamental questions. That undermines our long-term impact in terms of policy. On the other hand, politicians want to tell the public exactly why they’re doing things, based on full knowledge and understanding, so they gravitate toward people who’re more certain. When the evidence is uncertain and there’s a range of possible outcomes, these politicians tend to tilt it in the direction that supports a particular policy outcome. It’s important to understand when that tilt is taking place, because it comes from prior beliefs or policy aims. And that’s where things get really muddy.

“The rush to the media is not the best way to communicate scientific evidence.”
— LARS PETER HANSEN

Murphy: As economists, we want to broaden the set of evidence, but temper our predictions. Most of the time, when we predict a response, if it’s plus or minus 50 percent, that’s not a terrible prediction. Economists have had a big effect, for example, in improving macroeconomic policy around the world. A lot of that involved learning that we didn’t know as much as we thought. Probably the greatest improvement in macroeconomic policy has been the recognition that our ability to understand and manipulate the economy is a lot weaker than we thought. We’ve responded accordingly, with largely positive results. So, often, less message can actually be helpful because it discourages people from doing things that are out-and-out harmful.

Is the economics research process problematic—the way that early drafts of working papers get a lot of attention and are seized on by the media and policy makers?

Hansen: I find that potentially problematic. What we want to avoid is the cold-fusion phenomenon that happened in physics, where there was a premature announcement of some incredible advance that was undermined very quickly. Gary Becker used to say that we should communicate some things about the stock of knowledge—things that have accumulated, things that have been replicated, things that are basic, for which we have lots of supporting evidence from a variety of sources. By contrast, the latest working papers are part of the flow of knowledge. Sometimes that flow is a bit flimsy. Sometimes all-important nuggets come out, but it takes time to distill them. The rush to the media is not the best way to communicate scientific evidence.

Murphy: I wouldn’t limit it to working papers. The stock of knowledge is valuable. We’ve learned a lot in economics that can help business people,
individuals, and policy makers. The flow of knowledge is essentially toxic. You would not want to consume it until it gets filtered to the point where it ultimately becomes valuable. Most of what comes out is either not correctly interpreted or wrong. I include my own research in that. I’ve changed my mind on things over the years. I’ve learned a lot, but it took years of filtering my own research, let alone the research that’s going on more broadly. And it’s not just working papers, but even published papers. If you go back and read past journals, there are a number of articles that turned out to be profound and stand the test of time, but a lot have been forgotten, overturned, or had an interpretation that has been superseded. So we want to work with the stock of knowledge and leave the flow to percolate and become part of the stock before we really use it.

It’s also incumbent on those economists who get involved in policy to actually step back and say, “What is it that I can say with confidence, and how can I communicate the degree of confidence I have?” If they do that, I think they can be very helpful to people. They’ll find themselves making much less bold statements. They’ll find themselves saying, “Here’s what economics teaches us. It doesn’t give us the full answer, but it helps us understand.” Policy makers will value that. You need to resist the temptation to be the latest sensational news outlet. I think that’s the biggest problem.

Hansen: Part of this is about how we define having influence: whether your work is in the newspaper in the next couple of years versus what impact your ideas have 10 or 20 years down the road. In a scientific discipline such as economics, the longer-term impacts are really the important ones.

Murphy: The channel is important. I’ve had really great experiences with professional policy people at the Congressional Budget Office and at central banks. Where people have to live with the consequences of bad policy, there’s much more interest in getting that valuable input. Those are the places where economists can have the most positive impact.

What are the challenges in translating research to issues such as the minimum wage and policies to tackle inequality?

“It took us a long time to get into the situation we are in now, and it’s going to take a long time to get out, because human capital is one of the most durable assets in the economy.”

— KEVIN M. MURPHY

Murphy: This is where a framework really helps. You can talk about inequality in terms of the outcomes, winners and losers. But that’s not very helpful for thinking about why it happened, and what a logical policy response is. What’s driving up the wages of one group and pushing down the wages of another? We have lots of information to help understand that—for example, the relative demand for different skills. But the supply side is also important. There’s overwhelming evidence from the United States and elsewhere that if you reduce the supply of people in a group for which wages are depressed, that will push up wages. So supply responses to the growth and changes in demand are the natural response. It took us a long time to get into the situation we are in now, and it’s going to take a long time to get out, because human capital is one of the most durable assets in the economy. There aren’t that many assets we produce today that are still going to be around and still be an important part of the economy half a century from now. People are one of those. And if we’re not investing in people the way we should, we’re going to suffer the consequences of that for decades to come.

What about putting a price on carbon?

Hansen: The price of carbon has been a somewhat naive conversation in many respects. The way economists deal with it, myself included, is that we have ignored the implications of other taxes, so we envisioned that all countries would have somehow coordinated on this. And it’s not necessarily the best policy lever or the most realistic policy. The more basic question has to do with framing. Here’s where uncertainty becomes important and where empirical evidence is of limited value. We’re talking about moving economies potentially in regions in which we’ve had very little experience, so we can’t just do some regressions and magically get credible numbers using evidence from climate science. Climate-science models are elaborate and sophisticated, and they need inputs from economics. And there are divergences across the different model predictions, so to imagine we’re going to come up with some single number for the social cost of carbon that we can use to design policy is naive. Even the academic
literature on this has numbers all over the map. You need to combine economic and geophysical frameworks to get any type of sound policies.

Murphy: There are two big issues here. One is the uncertainty over what the number is, or if there even is a number. The second is understanding what that number means and how you would actually go about using it. For example, the idea was that all policy decisions would have to account for the price of carbon. The problem is that the price of carbon only exists in a world in which carbon is priced. To talk about the price of carbon in a world in which carbon is not priced is economically not valid. If you haven’t priced carbon, the different margins on which you’re using carbon are going to have different social impacts. I can cut carbon emissions, but that carbon is going to flow to somebody else, and if he or she puts it into the atmosphere, I haven’t really saved anything. When other alternative uses are not priced, the idea that I should act as if carbon is priced is just not supported by economics. It’s an example where people took one framework and said, “Somehow, magically, that’s going to tell me how to act in this very different world.” It doesn’t, unfortunately.

Hansen: A lot of the academic literature computing the social cost of carbon does it as a Pigouvian tax rate, figuring out the right way to tax an externality. It comes out as a price when evaluated at a socially efficient outcome, taking into account that externality. That conceptual framework isn’t the one we’re dealing with on a day-to-day basis. So you can’t just extract the number computed in that fashion and pretend it’s going to be valuable in this other setting.

Murphy: You might not just be a little bit off. You could be miles off—not even close. It may be the right number in the “but for” world where we have a Pigouvian tax, but it isn’t going to be the number in the world that we actually have. That doesn’t mean you can’t do anything. You just have to say, “For this experiment, is something like that number likely to be close?” It’s going to vary depending on the experiment whether that prediction’s going to be close or far from that number. But you can’t just grab a number from one situation and throw it into another. That’s where understanding the theory is important. You don’t just hand this number over to policy makers to use however they want.

Could machine learning help policy makers process the flow of information?

Hansen: I think of machine learning as a combination of some clever computer algorithms designed for us to go find patterns in large-scale data sets. In the private sector, these methods have been successful for short-term forecasting and not for more basic policy questions. What could be attractive to economists would be to use some of the computational tractability that has come out of computer science, and to put an explicit economic structure on things, to actually integrate in a formal economic framework. Without that, we’re back to the “let the data speak”-type mentality, and you can be stuck answering very short-term-prediction-type questions at best.

Murphy: Machine-learning tools as inputs into economic analysis that tries to combine an underlying framework with data could be very helpful. One of the problems we’ve always had with explicit models that people write down is: To what extent are those really helping us because they capture the things we are competent in, and to what extent do they appear to help us because they impose some very ad hoc restrictions on the data? In some ways, machine learning can help with that, but not as it’s typically applied now, which is much more framework free. A lot of ways people apply machine learning today is basically for prediction—“I don’t care why it works, but it works.” For policy questions, that’s rarely that helpful, because the way it works is probably going to change when you change policy. But similarly, econometrics was a very useful tool for helping us understand data. There were tremendous mistakes we were making before we made progress on econometrics. But it’s not an input; it’s not really a substitute for the overall process. It added to the tool kit we have. Economics is fundamentally about concepts and principles and data combined, usefully, together. If you want to know how to do that, go read Milton Friedman. He was one of the best at combining data and empirical evidence.—CBR
SHOULD ELITE SCHOOLS END LEGACY ADMISSIONS?

The recent scandal in the United States of rich and famous people buying places for their children at elite colleges has led to a renewed public conversation about the system of legacy preference in admissions at many top US universities. Chicago Booth’s Initiative on Global Markets invited its US Economic Experts Panel to express views on the likely effects of legacies, both on applicants from less advantaged backgrounds who have the potential to be high-achieving admittees as well as on society.

A substantial majority of respondents—nearly 90 percent, weighted by their confidence in their responses—consider that applicants with greater academic potential are being crowded out by the legacy system. But opinions were mixed on the system’s broader societal effects: the most popular answer was uncertainty.

—Romesh Vaitilingam

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 expert economists, all senior faculty at the most elite research universities in the United States and Europe. The panels include Nobel laureates and John Bates Clark medalists, among others. Polls are emailed individually to the panel members, and panelists may consult whatever resources they like before answering. Members of the public are free to suggest questions.
**Statement A:** The admission of children of alumni and donors at elite private colleges and universities crowds out applicants with greater academic potential.

**Joseph Altonji,** Yale

“Crowds out students with greater academic potential, but not necessarily greater potential to impact society.”

Response: Agree

**Robert Shimer,** University of Chicago

“Class size is not fixed. Without donors, class sizes may well be smaller.”

Response: Uncertain

**Christopher Udry,** Northwestern

“This is almost by definition. Of course, we don’t know what would actually happen in the absence of these preferences.”

Response: Strongly agree

**Statement B:** The net effect of admitting children of alumni and donors (including any impact on donations and any losses of other high potential applicants) is likely to be a reduction in the contribution of colleges and universities to society.

**Robert Hall,** Stanford

“One could also think about the much larger effect of the big fraction of capacity allocated to athletes.”

Response: Uncertain

**David Autor,** MIT

“There are clear costs and benefits, but the optics are terrible, which degrades public faith in ostensibly meritocratic institutions.”

Response: Uncertain

**Judith Chevalier,** Yale

“Obviously, lots of unknowns. For example, elasticity of donations with respect to child admission is unknown.”

Response: Agree

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Share of full IGM panel

Responses weighted by experts’ confidence

Respondents reporting “No opinion”: 0%
One of my ancient and mighty ancestors preached with irresistible persuasiveness that a laborer who specializes in one type of work acquires astonishing knowledge and dexterity in performing that work. By and large we Chicago economists have accepted Adam Smith’s argument.

This argument implies, to be more specific, that you businessmen and businesswomen invest appropriately large amounts of resources in learning the facts relevant to your problems, and that you possess a large store of specialized, current information. It asserts that you employ this information to design programs that on balance will pay off for both you and your company. In short, you know more about your business than anyone else (except possibly a few rivals or colleagues), certainly more than your superiors! Of course, you know more than Washington knows. And here is my lament: you know more than an economist knows.

An occasion such as this almost demands that I gently reprimand you for follies such as seeking tariffs, or point out the correct way to deal with the next crazy proposal, if you will excuse the redundancy, coming out of Washington. Yet I have just said that you are much better qualified than me or economists as a whole to deal with such issues.

Many of my fellow economists have been less modest in this respect than they should be. Milton Friedman has felt free to advise you on how much to give to colleges and universities—a sum not calculated to strain the resources of the smallest business. John K. Galbraith has complained for years of so technical a matter as the design of American automobiles, and for all I know he has actually been designing automobiles in recent years for Chrysler. But I must repeat: my disavowal of business expertise is sincere, and you will not receive advice today.
Consider whether our ocean of regulations could possibly have been achieved under high capitalism except by the consent of the capitalists. American business likes what it is getting and complains publicly only because so many intellectuals take affront at the sight of a happy businessman.
it began requesting loans from local governments and land from the federal government, and it has now advanced to such eleemosynary forms as Amtrak and Conrail.

A golden age for business
If the lamented Joseph Schumpeter, that alternately profoundly wise and infinitely clever economist, were here, he would tell you that I am quite wrong in my explanation for the luxuriant growth of public regulation. He would tell you that despite the immense contributions of the private enterprise system to the economic prosperity of the Western world, the system is being undermined by its critics. Some are intellectuals; some are activists, meaning that their mouths, not their minds, are active; some are simply people who will gain power by increasing governmental controls. All view the unregulated private enterprise system as their primary enemy.

I am not prepared to deny that there are more than enough of such critics of private enterprise and that they have achieved a good deal of public attention for many years. However, I do deny that they would be remotely a match for the American business community if that community were united in its opposition to public intervention in economic life. The American business community has ample financial resources, even in these days of onerous taxation. What the American business community lacks is the will to eliminate most business regulation. The fact that the intellectuals were the chief pleaders for regulation and the business community was verbally opposed to regulation in general may well underlie the illusion that the intellectuals have been responsible for the regulatory policies that were adopted. If mine is a correct reading of history, the intellectuals, miserable souls, were basically serving the business community they profess to dislike by creating a facade of public interest for the regulatory regime.

The recent actions of the new [Reagan] administration, dedicated as it is to deregulation, are instructive with respect to the desires of the business community. The financial community does not wish to see a serious curtailment of the Securities and Exchange Commission’s powers, and an informed and responsible figure in that industry is named the new chairman of the SEC. The opening demand that the Federal Trade Commission withdraw from antitrust enforcement is hastily modified in response to small-business pressures. The Interstate Commerce Commission is apparently moving back from an antiregulatory to a proreregulatory stance and so, too, the FCC. I am even in genuine doubt that the attack on environmental protection laws will gain the widespread support of the business community.

I must hasten to add that it is not only the business community, as we commonly understand that phrase, that has urged and obtained those bountiful regulatory favors. The agricultural industries have secured many regulatory boons, especially in the past 50 years. The labor unions, and particularly groups such as the employees of railroads and coal mines, have done very well in Washington. It would be more precise if I said that most regulatory policies have been sought by producer groups, of whom the business community is the most important and the academic community, by no means the least important. Thus I have argued for two propositions: (1) consumers are opposed to most regulations and (2) businessmen are selectively in favor of most regulations.

If I add to these propositions the commonplace that regulations are both pervasive and perhaps increasing, should I conclude that we are in the golden age of business? Should we tell people who write of the twilight of American capitalism that they are mistaken and in fact it is really the high noon of capitalism?

At this point, some of you will say that I have achieved a misreading of the American scene with my perverse arguments: American business wishes to be freed of its regulations. I hope that you will reexamine my arguments at your leisure and consider whether our ocean of regulations could possibly have been achieved under high capitalism except by the consent of the capitalists. American business likes what it is getting and complains publicly only because so many intellectuals take affront at the sight of a happy businessman. Since I promised not to tell you how to run your business, I am compelled to applaud this state of affairs.

Indeed, I am not at all tempted to reproach the business community for accepting and even seizing the opportunities that the political system offers to business to improve its profitability or to ward off the attacks of other groups. It is the duty of a businessman to conduct his enterprise efficiently, devoting efforts and resources in every direction which is legally permissible and economically rewarding. To ask a company to oppose a protective tariff that would increase the value of its stock by 10 percent is to make a most arbitrary assignment of the costs, and the benefits, of achieving a public policy that Chicago economists have traditionally sought. If you tell me that you are successfully repelling an offer of government assistance, I will write you a most sincerely admiring letter—and sell your stock short.

There are economists (some of them are my best friends) who will say that these governmental favors that you take today will be paid for tenfold and more by the costs that will be imposed on you by other industries’ favors. But note three things about this advice: first, it may assume a greater knowledge of politics than economists really possess; second, these economists have not shown that many industries would do better under free, unregulated competition; and third, even if you reject your favors, you will still pay for those of others.

If you tell me that you are successfully repelling an offer of government assistance, I will write you a most sincerely admiring letter—and sell your stock short.

Where we go from here
The fundamental question remains: Where is the American economy headed?
Will business continue to enjoy its present high noon, or will the spread of public control become so extensive as to bring us to an essentially different type of economy?

One source of difficulty in answering these questions is that we really do not know what the pace of regulation has been in America in recent decades. If we put aside the consumer-oriented regulations such as rent control and environmental protection (and perhaps if we do not), we do not know whether the economy is regulated more in 1981 than it was in 1971. One can count up regulatory statutes and the areas of the economy to which they pertain (although no one has seriously undertaken that simple but vast task), but a statute and its regulations are hardly a measure of effective regulation. Effective regulation changes the course of events and is much more than a legal rule.

As this question about measurement implies, there are forces working for deregulation as well as for regulation. The rise of an industry that makes a good substitute for the product of a regulated industry may wreak havoc with the regulated industry and its regulations. Thus, the money-market funds have restored competition to the market for personal savings, and it may well be that the essential deregulation of the savings-and-loan industry will emerge—unless the current drive to regulate the money-market funds succeeds. The railroad industry lost control of the ICC to the trucking industry; it is a rule of life that dogs wag tails; tails do not wag dogs. The far-reaching changes in American agriculture and in synthetic fibers have demoted cotton from king to earl or count.

Some organizational changes in American businesses take on new significance in this light. One pervasive concern with the age of political regulation is that it seems calculated to accommodate the interests of established companies and industries. How can I, who would perhaps one day enter the widget industry if it is not expensively regulated into near or complete nonexistence, find the other prospective entrants and form an effective political lobby?

Clearly, those who are already on the scene have large advantages in politics: the system of regulation is hostile to industrial mavericks. Nevertheless, the answer I give for new industries holds here: the computer has become so overwhelmingly efficient as a compositor that the International Typographical Union eventually will be swept away by it.

**Until and unless we devise political reforms that are appealing to the nation, we have American capitalism, and we had better love it.**

Another response is the conglomerate corporation, which is equipped with ready access to capital and extensive experience in dealing with legislators and bureaucrats. These conglomerates are eager searchers for the new industry and the small company with an excellent idea. Are they not an efficient tool for restoring the receptivity of the economy to new industries and new methods of operating old industries?

I suspect that a full canvass of modern industrial and financial trends would reveal methods of political action to assist business that have so far escaped academic attention, but it would also reveal new methods of circumventing the obstacles that regulations put in the way of economic progress and its inseparable friend, large profits. There is no sound evidence that high noon is rapidly passing for semiprivate enterprise.

**Love US capitalism, warts and all**

I wish to address some concluding remarks to my fellow economists. They may well have become restive at my praise of a world so different from that which Chicago economists have customarily honored. They will even begin to suspect that I have come to recant a fundamental article of faith: that the open, competitive economy is considerably more efficient, and not obviously less fair in its distribution of income, than the heavily regulated economy that constitutes American capitalism today.

The standard case for a free, competitive economy, I freely grant, is valid: it has a solid theoretical structure, and it rests on a vast amount of empirical evidence. If I and my likes could design the American economy, it would have a national income larger by possibly 10 to 20 percent, without forfeiting any social goals that are widely desired. If I employed Milton Friedman as an independent contractor—that’s the only kind he ever is—we would also do a good job on inflation.

But notice: these good things come only because you turned dictatorial powers over to me. We have a political system that presently has only modest defenses against use of the state’s power to help politically cohesive groups.

Moreover, we cannot presently devise a set of political institutions that would prevent the uses of regulatory powers that help some groups but reduce the nation’s income. I do not despair of finding political reforms that will mitigate our problems in this respect: after all, hardly anybody has been looking for such changes. We economists in particular have been content to preach self-restraint to businessmen and tenants and farmers—when we are not writing strong letters to Washington to deplore the catastrophic effects of the reduction in the appropriations that are proposed for the National Science Foundation.

Until and unless we devise political reforms that are appealing to the nation, we have American capitalism, and we had better love it. It has warts and even an occasional boil, but for all of that, it is a magnificently productive economy, providing ample livelihoods and a variety of choices of livelihood greater than history has previously seen, as well as the armament of defense against the forces of totalitarianism. And all this with no more impropriety than this world should have become accustomed to. I for one salute American capitalism at high noon.

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How to make school choice work better for families

In some US cities, students can attend a public school other than the one they’re assigned to based on their neighborhood. Families submit a ranking of preferred schools and the city uses an algorithm to match each student to a school. However, not all matching algorithms will benefit households equally, according to Princeton’s Adam Kapor and Christopher Neillson and Chicago Booth’s Seth Zimmerman. One type of mechanism, for example, gives families an incentive to rank a school not only based on preferences but also on their perceived chances of getting in. But if this mechanism is too complex and if families lack the information or sophistication to strategize, it could lead to costly errors and inequitable outcomes. The researchers identified and estimated these errors and find that if some mistakes can be eliminated, such as by helping families understand the consequences of ranking a school first or second on their list, students can improve their chances of getting into the schools they really want. To learn more about the benefits and drawbacks of school-choice systems, turn to page 24.

\[
\text{shift}_{ijr} = \eta_i^0 + \eta_i^r \left( r - \bar{r}_j \right) + \eta_i^\text{priority} \left( \text{priority}_{ij} - \text{priority}_j \right) + \eta_i^\text{error} + \eta_{ijr}
\]

1. Student i’s optimism or pessimism
2. Student i’s misunderstanding of how ranking affects admissions chances
3. Student i’s misunderstanding of school j’s priority/ students
4. Student i’s mistake in estimating demand at school j

Sum of student i’s errors in ranking school j in rth place

Illustration by Peter Arkle
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