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# CONTENTS

JANUARY 1, 2019

FEATURES



The Buena Vista Mobile Home Park: a working-class enclave in pricey Palo Alto.

SPECIAL REPORT

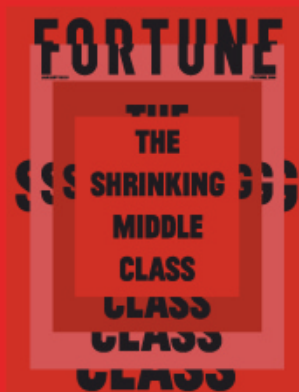
## The Shrinking Middle Class

Chasing the American dream used to be exhilarating. Now it's exhausting. How did our vision of prosperity get so out of whack? And how can we fix it?

PAGE NO.

52

VOLUME 179 /// NUMBER 1



▲ ON THE COVER: ILLUSTRATION BY MIKE MCQUADE

## The Ghosn Show

By DORON LEVIN

One of the most talented automotive executives of his generation is behind bars in Japan. What now for the alliance he forged?

PAGE NO.

80

## Biochipping: Sci-Fi No More

By VIVIENNE WALT

Injecting chips into humans is not only possible, it's looking like a practical business application that means never losing your keys or forgetting your passwords again.

86



80

86



GHOSN: YURIKO NAKAO — REUTERS

## DEPARTMENTS

## FOREWORD

**4 ▶ Unfinished Business**

Why deploying 51 people to cover the struggles of the middle class is part and parcel of *Fortune's* mission. By CLIFTON LEAF

## BRIEFING

**7 ▶ Hot Under the White Collar**

Around the globe, prosecutors seem to have a growing appetite for holding corporate leaders accountable. By ADAM LASHINSKY

**10 ▶ On Macron vs. the Gilets Jaunes**

Was France due for an insurrection? By LINDSEY TRAMUTA

**11 ▶ Billion-Dollar Babies**

Retailers need to cultivate hip brands, not reinvent core offerings. By PHIL WAHBA

**12 ▶ Your Money Is No Good Here**

The rise of cashless retail is pushing legislators to help those without bank accounts. By DANIEL BENTLEY

**14 ▶ Revealing Leaves Us Reeling**

In the age of Instagram, baby showers get taken to the next level. By DANIEL BENTLEY AND LUCAS LAURSEN

**18 ▶ The Best Workplaces for Diversity**

*Fortune* and research partner Great Place to Work based this list on responses from women, people of color, the LGBTQ community, those with disabilities, and older employees. By RADHIKA MARYA



## FOCUS

## DESIGN

**21 ▶ The Dean of Dallas Design**

Billionaire Tim Headington is trying to breathe more life into downtown Dallas by giving it a hipper aesthetic. By SHEILA MARIKAR

## TECH

**27 ▶ VR Gets Real in the OR**

Doctors and medical students are increasingly using virtual reality to prepare for surgery. By ANDREW ZALESKI

**37 ▶ Tackling "Tough Tech"**

Unlike many venture capitalists, Katie Rae is a fan of startups that take on big and complicated problems. Interview by RENAE REINTS

## VENTURE

**40 ▶ Forget Pie in the Sky, Drones Are Saving Lives**

Drones may one day make your life easier by delivering pizza, but today—in Rwanda—they are playing a vital role in emergency medical services. By TOM JACKSON

## INVEST

**42 ▶ When Workers and Investors Share the Wealth**

Being stingy with pay and benefits can boost profits in the short term. But companies—and their stocks—may do better when they're generous. By RYAN DEROUSSEAU

## THE BIG IDEA

**45 ▶ Why Business Must Step Up to Shape the Next Industrial Revolution**

Technological disruption threatens to create a gap between business's priorities and society's. By KLAUS SCHWAB

## PASSIONS

**49 ▶ Beautiful and Sustainable**

Big players in one of the planet's most polluting industries are finally getting serious about their environmental responsibilities. By LINDSEY TRAMUTA

## BACK PAGE

## LAST BYTE

**96 ▶ Underperforming Asset**

Americans keep investing in the laggard enterprise known as U.S. health care. Life expectancy, meanwhile, has barely budged. Text by CLIFTON LEAF; graphics by NICOLAS RAPP

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# UNFINISHED BUSINESS

**IN MARCH 1961, JOHN DAVENPORT**, a venerable writer who for years sat on *Fortune's* erstwhile “board of editors,” wrote a nearly 6,000-word feature for the magazine titled, “In the Midst of Plenty.” Its premise was straightforward: Although poverty in the U.S. had been eased substantially in the previous generations, there were still 32 million Americans living “below the line,” as Davenport put it.

“To diminish poverty has always been the American business—the business of the individual, the corporation, private philanthropy, and, by changing means, the business of government,” he wrote. Such a mission was very much in the service of the nation’s ideals, and also of *Fortune's*.

This is the publication, after all, that dispatched writer James Agee and photographer Walker Evans to chronicle the hardscrabble life of sharecroppers in Alabama—the story that ultimately became the book *Let Us Now Praise Famous Men*, though it never appeared in the magazine’s pages. This is the brand that sent a writer in 1932 to investigate a nationwide epidemic of dilapidated housing; and that, in 1989, assigned John Huey—a charismatic Southern journalist who would later sit atop *Fortune's* masthead and, thankfully, hire me some years later—to write a thoughtful and enterprising feature on how to win the war on poverty. The notion that “American poverty” persisted, in spite of what was then the longest peacetime economic

expansion in history, “stands as the nation’s most conspicuous failing,” Huey wrote.

Funny how history repeats itself.

These stories were neither “left” nor “right”; for all the shock of the subject matter, *Fortune's* frequently conservative writers and editors offered (mostly) nongovernment remedies and feared the specters of regulation and aggressive redistribution. The magazine’s primary roles, rather, were to probe, to scrutinize, and to stand witness.

That, indeed, is the spirit that motivates this issue’s

powerful special report on the shrinking middle class (please see page 52). The effort brought together the talents of 19 writers, five editors, three copy editors, 12 photographers (in 12 different cities), three photo editors, four video producers, two illustrators, two designers, and one data visualization artist—51 people in all.

But in that phenomenally talented and tireless crowd, there is one who stands out—and that’s *Fortune's* digital editor Andrew Nusca, who conceived of this important editorial conversation months ago and, with a keen eye and intellectual rigor, guided the army of journalists above from start to finish.

The story, at its heart—as with all the other great features cited above—isn’t really about the dividing lines of class and wealth; it’s about a nation’s soul. As John Davenport wrote in 1961, “the continuing struggle against distress is still the great ‘unfinished business’ of America.”

I’m so grateful I can count on my brilliant *Fortune* colleagues to carry on the work.

**CLIFTON LEAF**  
Editor-in-Chief, *Fortune*  
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THE  
WORLD IN  
8  
PAGES

# BRIEFING



## Hot Under the White Collar

**Around the globe, prosecutors seem to have a growing appetite for holding corporate leaders accountable. What's driving the shift?**

**By Adam Lashinsky**

### LEGAL WOES

**THE DECEMBER ARREST** of Huawei chief financial officer Meng Wanzhou at an airport in Vancouver was shocking in its own right. Here was a top-ranking executive of a global technology company—and the daughter of the founding chairman, no less—being hauled off like a common criminal on nonspecific charges related to alleged violations of laws involving U.S. sanctions against doing business in Iran.

More shocking still was that Meng, now out on bail pending a U.S. extradition request, was just one of many high-profile executives who lately found >>

▷▷ themselves incarcerated for various white-collar crimes around the world. Two weeks earlier, the Brazilian-born automotive titan Carlos Ghosn was arrested in Tokyo, also nabbed at an airport, accused of underreporting his income and thus evading taxes. [See “The Ghosn Show” in this issue.] Days after Meng’s arrest, a top Alibaba executive, Yang Weidong, formerly head of the Internet giant’s music-streaming business, was apprehended by police “for alleged acceptance of improper payments,” according to an Alibaba securities filing in the U.S., where its shares trade.

Each case is different, of course, as are the jurisdictions in which the various big-wigs have been locked up. Taken together, however, the arrests give the impression of an executive class suddenly less safe from criminal prosecution while otherwise jetting around the globe doing their jobs. And yet, the anti-corporate crowd ought not abandon their pitchforks just yet. While it may seem that white-collar criminals are finally getting their just deserts, evidence suggests the prosecutions remain relative rarities in the

realm of corporate malfeasance.

The U.S., at least theoretically, aspires to put more executives behind bars. Indeed, a heightened focus on prosecuting individual corporate miscreants is an official policy goal. In 2015, then Deputy Attorney General Sally Yates issued a much-discussed seven-page memorandum on “individual accountability for corporate wrongdoing,” commonly known in criminal and civil legal circles as the Yates Memo. (Yates would achieve broader fame in 2017 when, during a brief stint as acting attorney general, she instructed Justice Department lawyers to not enforce President Trump’s travel ban on several majority-Muslim countries, an act for which she was promptly fired.) Yates’s guidance, a response to widespread anger that not one banking executive was locked up after the financial crisis of 2008–2009, noted that determining criminal intent can be tough in large corporations, particularly with “high-level executives, who may be insulated from the day-to-day activity in which the misconduct occurs.” Yet only by “seeking accountability,” she wrote, could

proper deterrence be established.

The memo got the legal community’s attention. Barbara Linney, a lawyer specializing in export-control compliance and economic sanctions with the Washington, D.C., firm Miller & Chevalier, calls it “a high-profile statement that kicked off this view in the Department of Justice that individuals should not be immune from charges.”

The government has gone after individuals, in particular regarding sanctions-law violations. Although the instance of the Huawei CFO has become a flash point in the trade war between the U.S. and China, hers is not an isolated case. “When a senior executive from a global company is detained, that catches headlines,” says Linney, also an adjunct professor at Georgetown University’s law school. “But there’s been a steady stream of cases in which individuals have been charged.” For example, in 2017 a banker with Turkey’s state-controlled Halkbank was convicted in federal court in New York for his role in evading sanctions on Iran and sentenced to nearly three years in jail.

Still, the new policy

## NO LONGER ‘TOO BIG TO JAIL’?

**IT MAY BE TOO EARLY** to call it a trend, but it does appear to be less safe these days to be a C-suite jet-setter suspected of a serious crime. A few recent, startling arrests of corporate executives for white-collar crimes have highlighted the willingness of prosecutors, in the U.S. and abroad, to seek criminal accountability for corporate misconduct.

direction is not making a significant impact when it comes to prosecution of U.S. corporate officers. “People thought the Yates Memo would change that,” says Brandon Garrett, a law professor at Duke University and author of the 2014 book *Too Big to Jail: How Prosecutors Compromise With Corporations*. “But I haven’t seen numbers to suggest it has.”

In Japan, where Ghosn’s arrest trig-



**YANG WEIDONG**  
President  
**Alibaba's Youku**

Formerly the head of Alibaba's music-streaming affiliate and a onetime Nokia executive, Yang was arrested in China for "alleged acceptance of illegal payments." Little else is known about his situation.



**OLIVER SCHMIDT**  
General Manager  
**Volkswagen**

A German citizen, he worked in Michigan for Volkswagen. Schmidt pleaded guilty in 2017 to violating the Clean Air Act in the course of his company's emissions-fraud scandal. He is serving a seven-year prison term.



**MENG WANZHOU**  
Chief financial officer, **Huawei**

The Huawei executive's arrest in Canada for alleged violations of U.S. sanctions on Iran has become linked to the U.S.-China trade dispute. She is free on bail in Canada, awaiting extradition.



**CARLOS GHOSN**  
Chairman  
**Nissan**

Japanese authorities have charged Ghosn with underreporting his income; he remains in jail as of this writing. The auto executive is reviled by some in Japan as a symbol of corporate greed and revered by others for saving Nissan.

lounge. It smacks of getting the *gaijin*—the Japanese word for foreigner, literally 'outside person'—out of Japan."

China is arguably a special case. Executives routinely go missing, typically caught up in the "anti-corruption" dragnet initiated by the country's President, Xi Jinping. Alibaba, which noted in its securities filing that its executive Yang had been removed from his position the week before he was taken into custody, says it is cooperating with authorities—and little else.

If criminal convictions aren't necessarily on the rise, there at least is a sense that prosecutors and legislators are beginning to take the subject more seriously. "There's a global conversation about the right way to approach corporate crime," says Garrett, the *Too Big to Jail* author. He notes in particular legislative activity in Canada, France, Ireland, and the U.K. around corporate crime, and kernels of interest in countries like Taiwan, Spain, and Brazil, where his book has been translated.

The incarcerated CEO remains a rare bird, in other words—but he or she may soon be less of a black swan.

gered international headlines, prosecution of CEOs is rare—even rarer than in the U.S., which in past decades convicted executives like Jeffrey Skilling of Enron, Michael Milken of Drexel Burnham Lambert, and Bernard Ebbers of WorldCom. "In fact, it would be easier to make a list of people who *weren't* prosecuted for white-collar crime," says Ulrike Schaede, professor of Japanese business at the University of Cali-

fornia at San Diego's School of Global Policy and Strategy.

Examples abound of Japanese scandals in which executives resign but aren't punished. No one went to jail in Toshiba's \$1.2 billion accounting scandal, for instance. At the regional Suruga Bank, executives weren't prosecuted for a scheme last year that forced unwanted accounts on unwitting customers. (The case has been likened to the imbroglio

at Wells Fargo where, you guessed it, no one has gone to jail.) And in a 2011 scandal at camera maker Olympus, a newly installed British CEO blew the whistle on a massive fraud. He was fired, but his predecessor wasn't charged with wrongdoing.

Says Schaede of the Ghosn and Olympus scandals, "The worry is that this means Japan will have trouble attracting foreign talent in the executive

# On Macron vs. the Gilets Jaunes

Was France due for an insurrection?

By Lindsey Tramuta

## POLITICS

AMID THE ERUPTION of indignation and violent demonstrations in this months-old Gilets Jaunes (yellow vests) movement, few in France are surprised by the rejection of President Emmanuel Macron's intellectualized method of governing and the wider French establishment. In the 18 months since he took office, Macron has gone from being hailed as the French Obama (establishing a host of unmanageable expectations) to being vilified as a modern Louis XVI, accused of aligning his interests squarely with big business and blaming the misfortunes of the "forgotten" middle class on its lack of gumption.

Macron's efforts to woo companies to Paris, a rising startup hub, and demonstrate his progressive values, particularly on the environment, have made him political eye candy on an international stage—a foil to the populist politics of Trump, Putin, and Erdogan. At home, however, those stances have coincided with a perceived neglect of the everyday French citizen. Deepening the wound are what critics call an elitist attitude and a barely veiled con-

tempt for the working class. Unsurprisingly, the centrist leader's lack of empathy and friend-to-the-wealthy image has sent his approval rating into free fall. A fuel-tax increase, which he later canceled to quell the protests, was the final straw.

It's worth remembering Macron inherited a rudderless state fraught by high unemployment, and these protesters' frustrations run 40 years deep. His grave error, however, was dismissing warning signs of how rapidly the anger was mounting and remaining silent as the country came under siege by this unprecedented nonpartisan group.

His short-term battle is to convince the republic that he's not a leader who cedes to demands under duress, both domestically and internationally, like his predecessors. Then, it won't merely be about overcoming bureaucratic inertia to deliver lasting change. Macron will have to reconnect with the optimism and forward-thinking ideologies that made his entry as a political maverick so compelling—though it may be too late to reset the tone.

## REAL ESTATE

### AMAZON'S HOUSING BOOM

ADD RESIDENTIAL real estate to the list of markets that Amazon has disrupted—not that realtors are complaining. The company's November announcement that it will be splitting its vaunted "HQ2" project between Long Island City, N.Y., and the Crystal City district in Arlington, Va., has already significantly

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ramped up activity in their housing markets. In November, there were 32 contracts signed for condo units in Long Island City—up from 13 in the same period in 2017, per brokerage Stribling & Associates. Arlington, meanwhile, saw a 158% year-on-year increase in new contracts signed in November—to 178 from only 69 in 2017, according to brokerage TTR Sotheby's International Realty. —REY MASHAYEKHI



## CAREERS

## YOU'RE THE CHIEF OF WHAT NOW?

WE'VE SEEN SOME *creative* additions to the C-suite in the past decade. Chief storyteller, chief evangelist, chief flavor officer [at beverage maker Bai Brands]. They are easy to make fun of, but they do serve a purpose: reflecting what the company finds important to both employees and shareholders. [For instance, Apple's only "chief" title outside of CEO, COO, and CFO is chief design officer, imparting the importance of design, and Jony Ive himself, within the organization.] Analyz-



ing millions of job postings, executive search firm Ladders found that hyperspecific C-level titles are on the increase, such as chief digestive health officer at Georgia's WellStar Health System and chief workout officer at Santander. [This doesn't involve putting bankers on a treadmill; it's a subset of risk management.] Also trending: words like "equity," "learning," "ethical," and "community," suggesting businesses are taking employee well-being more seriously.—DANIEL BENTLEY



## Billion-Dollar Babies

Retailers need to cultivate hip brands, not reinvent core offerings. By Phil Wahba

## RETAIL

ANYONE WHO THINKS buying clothes at the mall is passé need only look at the blockbuster results of three booming brands to know that isn't true. J. Crew recently said its Madewell business, whose comparable sales jumped 27% last quarter, is well on its way to hitting the \$1 billion-a-year threshold. Gap Inc. has said the same of its popular Athleta chain. Meanwhile, American Eagle Outfitters' Aerie lingerie brand is proving to be

a Victoria's Secret killer, clocking growth of 32% last quarter. Those three store chains have all tapped into something in the zeitgeist, even as the bigger brands at their respective parent companies struggle to find a place in the shopping habits of younger customers. Merely doing a 180-degree turn to win new customers can be perilous. Ask Chico's. That retailer offended its core clientele of older women in 2018 by abruptly focusing on millennial-focused fashion, to disastrous results. The likes of Chico's would be better off building and nurturing a new concept organically rather than trying to turn a storied brand into something it's not.



## BREXIT

## MAY SURVIVES TO MARCH

IS THERE a worse job in politics right now than British Prime Minister? [John Kelly, put your hand down.] After a no-confidence vote, Theresa May survives in the job knowing 117 members of her own party want to see her gone and that no plan she can agree to with the EU will get the backing of both the pro-Europe and the hard-line Brexiteer factions in her party.

So far, May has rejected calls for a second referendum. That could change as the Brexit deadline approaches, with the pound and Britain's economy on the line.

# Your Money Is No Good Here

The rise of cashless retail is pushing legislators to help those without bank accounts.

By Daniel Bentley



**FINTECH**

**AS MORE AND MORE** businesses go “cashless”—that is, they accept only electronic forms of payment—questions inevitably arise about the impact it will have on the “unbanked.”

It’s a bigger issue than you might think. The latest FDIC survey estimates there are 8.4 million (6.5%) unbanked households—those lacking a checking or savings account at an insured institution—in the U.S.

Most of the businesses that have gone cashless are less likely to cater to the unbanked to begin with: Think \$10 salad spot Sweetgreen. But it seems inevitable the

practice will catch on further down the chain.

Currently, Massachusetts is the only state in the union with explicit legislation prohibiting discrimination against cash-carrying customers. But a similar bill is making its way through the New Jersey legislature.

This solves only a smaller part of the bigger problem regarding the unbanked. Many low-income Americans rely on check-cashing shops, which charge hefty fees, to get access to their paychecks. This amounts to an effective additional tax on the poor.

A big idea to solve the problem of the unbanked, proposed by Sen. Kirsten Gillibrand (D-N.Y.), involves creating postal banks—which are common in Europe—that offer basic banking services such as checking and savings accounts. This would create an immediate network of 30,000 branches and allow every American to participate in an increasingly paperless economy.

## DELL'S GAMING UNIT IS OUT OF THIS WORLD

**GAMING**

**IT'S NO SECRET** that PC sales have been in decline for the past decade. But one bright spot is gaming hardware driven by the continued popularity of competitive e-sports. In the driver's seat is Dell subsidiary Alienware, a company it bought in 2006 for an undisclosed amount. Dell's gaming hardware is now making \$3 billion a year—dwarfing its rivals. Something to bear in mind as Dell reenters public markets.



**PAGES**

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It's a girl! A Marine captain punts a football filled with pink powder.



## Revealing Leaves Us Reeling

In the age of Instagram, baby showers get taken to the next level.

By Daniel Bentley & Lucas Laursen

**BABIES**

**ONE BLUE-COLORED SPARK** is all it took. After off-duty Border Patrol agent Dennis Dickey fired his gun at a package of colored explosives, grasses and shrubs lit up, and flames spread across a mountainside in southern Arizona. The Sawmill Fire, which began April 23, 2017, scorched 45,000 acres of land, costing more than \$8 million in damage and firefighting.

Dickey was partaking in the recent trend of grand “gender reveal” stunts, where expectant parents learn the gender of their baby. What

started off as parties involving a cake with a blue or pink filling or balloons filled with colored confetti has grown increasingly elaborate and expensive. One Australian company even makes a \$100 car tire that gives off colored smoke when doing a burnout.

The parties have their critics, but that hasn't diminished demand. On craft marketplace Etsy, there were over 3.6 million searches for gender-reveal decorations in 2018, a 59% increase over the prior year. What does that reveal about us?

**MONEY**

## MOST AMERICANS AREN'T GETTING RAISES

**DESPITE A TAX PLAN** promising a new era of prosperity for the middle class, a new poll from personal finance site Bankrate suggests Americans are having trouble getting raises. In a survey conducted in November of 1,000 American workers, Bankrate found that 62% hadn't received a pay raise in their current jobs in the past 12 months. Just 27% of Americans received a raise in their current jobs, and 6% moved to another job to increase their earnings. The findings were sobering when combined with the prior year, when 52% of Americans said they hadn't received a pay raise in the past year.

Despite the majority of Americans experiencing stagnating wages, they're not necessarily frustrated, says the study. Ninety-one percent of respondents told Bankrate that they have the “same or greater confidence” in the job market this year as they had in the previous year. —DON REISINGER

**EMPLOYEES WHO GOT A PAY RAISE IN THE PAST YEAR**

27%

**EMPLOYEES WHO GOT A BETTER-PAYING JOB**

6%

**EMPLOYEES WHO GOT BOTH**

5%

**EMPLOYEES WHO GOT NEITHER**

62%

SOURCE: BANKRATE



Ursula Burns, Executive Chairman, VEON; Director, Uber and Diageo



The Right Honourable Justin Trudeau, Prime Minister of Canada, and Alan Murray, President and CEO, Fortune



Kevin Johnson, President and Chief Executive Officer, Starbucks



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# Changing the Path for Diversity and Inclusion

Media and telecom giant **AT&T** is using the power of its brand to improve the way women and diverse communities are portrayed in its advertisements and beyond.



**WHEN IT COMES TO HOW WOMEN AND** diverse communities are portrayed in advertising, AT&T thinks there's plenty of room for improvement. That's why the media and telecom giant is using its scale and reach to not only change its own messaging but also bring about a shift in how women and other underrepresented groups are portrayed in society.

Fiona Carter is the chief brand officer for AT&T Communications. When she joined the Dallas-based company three years ago, she knew its commitment to diversity and inclusion was well established. The company was one of

the first to prohibit discrimination against employees based on sexual orientation, and it was the first to start an employee resource group for women, back in 1972. It began its supplier diversity program 50 years ago.

The exciting opportunity today, Carter says, is using AT&T's scale and brand power to shift the narrative of diversity and inclusion in a much broader way. "A lot of companies talk about corporate social responsibility," she says. "We look at it more like corporate social action. As one of the largest advertisers in the country, when we make a change, it has a significant impact."

Among those changes: using a Gender Equality Measure (GEM) score. The company is one of the first advertisers to integrate this measurement into all of its ad testing. Carter says the score reflects the perception by men and women of how well women are portrayed in AT&T's advertising. So far, she claims ads with higher GEM scores have better brand recall among consumers and result in a higher brand opinion of AT&T overall. "We're using data to show that this isn't just something for which we feel an obligation—it's also good business," Carter says.

As a modern media company, AT&T is addressing representation in content too. For example, *AT&T Presents: Untold Stories*, a film initiative it created with the Tribeca Film Festival, gives money and opportunities to a diverse slate of filmmakers. AT&T was also one of the first companies to invest in actress Reese Witherspoon's production company, Hello Sunshine, which seeks to get female-centric content produced.

What's notable about these diversity and inclusion efforts, says Carter, is that they're becoming a grassroots movement across the company and, she believes, beyond AT&T. "I do think it's a societal shift as well," Carter adds. "Consumers are demanding it, and when it becomes good business that's when it really gathers momentum." ■



**"A lot of companies talk about corporate social responsibility. We look at it more like corporate social action. As one of the largest advertisers in the country, when we make a change, it has a significant impact."**

AT&T's **FIONA CARTER**  
Chief Brand Officer



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01

HILTON

HQ ..... McLean, Va.  
**WOMEN** ..... 53%  
**MINORITIES** ..... 69%

An employee of the global hospitality chain says, "It has given me the opportunity to develop and grow on a professional and personal level."

02

COMCAST  
 NBCUNIVERSAL

HQ ..... Philadelphia  
**WOMEN** ..... 37%  
**MINORITIES** ..... 45%

"In any team or division you work for, there are people from all walks of life," says a staffer at the telecommunications conglomerate.

03

PUBLIX SUPER  
 MARKETS

HQ ..... Lakeland, Fla.  
**WOMEN** ..... 49%  
**MINORITIES** ..... 43%

"This company is truly dedicated to the dignity, value, and employment security of all associates," a worker says of the supermarket chain.

04

WEGMANS FOOD  
 MARKETS

HQ ..... Rochester, N.Y.  
**WOMEN** ..... 54%  
**MINORITIES** ..... 24%

What one staffer likes most is "all the different types of people hired, from race to gender to religion and even to the quirky personalities."

# The Best Workplaces for Diversity

This annual list from *Fortune* and research partner Great Place to Work is based on survey responses from women, the LGBTQ community, people of color, employees with disabilities, and older workers. The diversity at these companies is even more notable considering at least seven out of 10 listed here employ 20,000 or more people. For the full list of 100 workplaces, visit [Fortune.com](http://Fortune.com). **By Radhika Marya**



05

ULTIMATE SOFTWARE

HQ ..... Weston, Fla.  
**WOMEN** ..... 49%  
**MINORITIES** ..... 44%

"Every employee, no matter their role, gender, racial/ethnic/sexual identity, has an equal voice to suggest change," a staffer says.

06

MARRIOTT  
 INTERNATIONAL

HQ ..... Bethesda, Md.  
**WOMEN** ..... 54%  
**MINORITIES** ..... 66%

"Without this job, I would have probably been living in my car, or worse," a disabled veteran says, praising the hotel chain's caring environment.

07

CISCO

HQ ..... San Jose  
**WOMEN** ..... 27%  
**MINORITIES** ..... 47%

The IT innovator understands that "diversity in all its forms" and how differently people think "are good for the company," a staffer says.

08

TEXAS HEALTH  
 RESOURCES

HQ ..... Arlington, Texas  
**WOMEN** ..... 79%  
**MINORITIES** ..... 43%

"There are people from all faiths, ethnicities, sexual orientations, and nationalities in our employee pool," says a worker at the health system.

09

KIMPTON HOTELS &  
 RESTAURANTS

HQ ..... San Francisco  
**WOMEN** ..... 47%  
**MINORITIES** ..... 61%

Unlike at companies that simply claim to value diversity as part of a mission statement, a team member says, "we live it every single day."

10

PROGRESSIVE  
 INSURANCE

HQ .. Mayfield Village, Ohio  
**WOMEN** ..... 55%  
**MINORITIES** ..... 32%

"We celebrate diversity that you can see and what you can't see below the surface," says a staffer, crediting this with being able to do better work.

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# FOCUS

Headington  
in the lobby of  
the Joule, his  
Dallas hotel.

DESIGN

## THE DEAN OF DALLAS DESIGN

Billionaire Tim Headington is trying to breathe more life into downtown Dallas by giving it a hipper aesthetic. By Sheila Marikar



**DESIGN** WHEN TIM HEADINGTON was 13 years old, his father proposed that he skip school and accompany him on a business trip to Dallas, a four-hour drive from their Oklahoma City home. Like many other teenagers, Tim didn't need much convincing.

Approaching the city, on Interstate 35, they saw a sign that read, "Welcome President and Mrs. Kennedy." They diverted downtown to see the parade. "At that time, the city was just vibrant," Headington recalls on a recent morning, standing on the same block of Main Street where he had watched John F. Kennedy's motorcade pass by 55 years ago. "It was 10 people deep on all sides."

Of course, that day ended in tragedy. But watching the parade and observing the street life it fomented gave Headington an indelible impression of what a city could be. By the time he settled in Dallas, in 1984, the crowds he once saw were gone. The city's well-heeled denizens had relocated to the suburbs and deigned to come downtown only to shop at the flagship Neiman Marcus department store, with its swift valet parking service.

Headington wondered if he could revive downtown's grandeur. In 2004, the Dallas National Bank building, a neo-Gothic tower on the National Register of Historic Places, came on the market. It stood across the street from where Headington had watched the 1963 parade. As with playing hooky, he didn't need to be talked into it.

"I thought, How cool would it be to just have this building," Headington says, "to create something that gives people a reason to come downtown and stay?"

That building is now the Joule hotel, the cornerstone of an artful, cosmopolitan downtown that Headington has been quietly building for the past 15 years. While the Joule retains its 1927 facade, its interior melds museum and fun house, with Murano glass mosaics and edgy works of art: engines corroded in copper sulfate and then painted blue; a pop art painting of parted lips.

Since opening the Joule in 2008, Headington has had a hand in more than a dozen design-centric destinations in downtown Dallas, including restaurants, bars, shops, another hotel, an apartment building, and, most arrestingly, a public park with a 30-foot-tall bloodshot eyeball by the sculptor Tony Tasset.

"We didn't know whether people would like it or hate it, but we knew they would have a reaction to it," Headington says.

Tall and burly, with shaggy hair, ruddy cheeks, and a warm drawl, Headington may not fit the stereotype of a champion for art, design, and thoughtful urbanity. He can be one thanks to his day job: cofounder of Headington Energy Partners, the oil and gas company that made him a billionaire. But his aesthetic and his vision are changing Dallas for the better, says Dallas Mayor Mike Rawlings, and ushering in a wave of fellow developers bent on bringing the suburban masses back downtown.

"Tim, in some ways, is a modern-day Stanley Marcus," says Rawlings, referencing the late president of Neiman Marcus.



**Commissary (above), a Headington-owned foodie mecca in Dallas that's covered in blue ceramic tile; Forty Five Ten (right), a trendy downtown Dallas boutique, restaurant, and café that also belongs to Headington's company.**

"He does everything with such quality, panache, and taste, and he does it thinking about the future. He does it not expecting to flip his properties. He wants to own them for the long term."

Headington, 68, initially wanted to be a clinical psychologist. But his life took a big detour as he was pursuing a Ph.D. at the Fuller Theological Seminary in Pasadena. His father, who ran a small oil and gas operation in Oklahoma City with Headington's uncle, had an acute form of leukemia diagnosed. Headington rushed home; his father died within six weeks. "Not knowing anything, I figured maybe if I can understand this business, I can help," Headington says.

Trial and error led him to Dallas, and by 2004, Headington had made enough money that he could explore passion projects: not just revitalizing Dallas but also learning about and collecting art and financing Hollywood films like *The Aviator* and *The Departed* through GK Films, a production company he co-owns. In 2008 he sold land in North Dakota's oil shale field to XTO Energy, now



part of Exxon Mobil, for \$1.85 billion.

“It’s really the success that I’ve had in the energy business that’s enabled me to take a risk on these things and to take a longer-term horizon,” he says.

Over the years, Headington Companies has invested more than half-a-billion dollars in redeveloping downtown Dallas. Two blocks from the Joule, there’s Commissary, a bustling café and market whose facade is covered with 27,857 ceramic tiles in shades of blue. Across the street from the hotel is Forty Five Ten, a trendy boutique that sells things like \$585 canvas pants and coffee mugs with oversize handles that recall the work of avant-garde sculptor Claes Oldenburg. The fourth-floor restaurant Mirador serves high-end renditions of deviled eggs (topped with caviar) and Tater Tots. “You have to give rich people reasons to come down, and if they come down, they have to want to come back,” Headington says.

Not all of his design ideas have come to pass. One reject involved the Joule’s rooftop swimming pool, which juts out over Main Street. “We had a very wicked idea,” he says, “of running a little pipe that would drip water so that people underneath would go, ‘Oh, my God, the pool’s leaking!’”

The prank is too out-there for now, but if Headington keeps pushing the envelope, maybe Dallas will be ready for it one day. **F**

## DESTINATION DESIGN

**When listing the nation’s top design hubs, people invariably include New York City, Los Angeles, and San Francisco. But, in fact, a number of smaller cities also have sizable communities of “designers,” a nebulous catchall term that applies to architects, product designers, graphic designers, interior designers, and industrial designers. Here are some of those designer-friendly cities:**

**COLUMBUS, IND.** This small town, pop. 48,000, is home to diesel-engine maker Cummins, which has an army of workers designing its traditional motors, along with ones powered by electricity, natural gas, and fuel cells. Oh, and by the way, the city also happens to be a mecca for modernist architecture, much of it funded by the company’s foundation.

**MINNEAPOLIS/ST. PAUL** The Twin Cities area is a hotbed of graphic design, a likely legacy of its large number of ad and marketing companies.

**CINCINNATI** The city is home to a number of design firms, like ad agency Rockfish Digital and Jack Rouse, which designs public attractions including museum exhibits and waterslides. Graduates of the University of Cincinnati’s art and design programs help fill the demand for talent.



Motif image of a seamless experience across the TV, refrigerator, mobile phone and watch

# Designing Experiences for a Connected World

“Be bold. Resonate with soul.”

**AS CONSUMERS SEEK** greater fulfillment from their electronic devices, companies are focusing more on product and user-experience design. Samsung Electronics is at the forefront of this effort, and it is striving to meet consumer demand for added value from their purchases.

With an eye toward 2019, the company released its latest design philosophy to signify its dedication to innovative design: “Be bold. Resonate with soul.” The new maxim aims to challenge the status quo and help Samsung develop products that will enable people to interact with technology in new ways, says Lee Don-Tae, executive vice president and head of the Corporate Design Center.

“Samsung is a massive consumer electronics brand. Millions interact with our products—phones, TVs, and appliances like refrigerators

and air conditioners. So we have a responsibility to think about the user experience with every one of these products,” Lee says.

For technology companies, the word “design” conveys more than just external appearance; it also represents the formation of the user experience. That’s why Samsung’s design team makes it a goal to provide consumers with unified, seamless experiences when they use Samsung products.

The One UI (User Interface) that Samsung recently announced at Samsung Developer Conference in San Francisco is one approach. The core of One UI is to provide a simplified and comfortable experience, so that users can focus on what really matters to them, and to apply this experience consistently across devices for an integrated experience.

Lee says that this seamless experience might result in something visible, including fonts or icons, or something invisible, like an intuitive experience when someone uses a refrigerator or smartphone.

### KEEPING IN TUNE WITH TRENDS

Samsung's Corporate Design Center oversees the promotion of design innovation throughout the company, but in order to keep up with fast-changing consumer trends, each business division has its own dedicated design team. There are seven design studios across the globe, in San Francisco, São Paulo, London, Seoul, New Delhi, Beijing, and Tokyo, and the designers take advantage of their various locations by researching and delving into the local cultures and values: It's the best way to incorporate these aspects into product concepts and enrich the consumer experience.

"We design experiences. Design is, nowadays more than ever, a vehicle to support local cultures, education, and health at individual and social levels, and in that sense, it is becoming a critical function of our societies," says Federico Casalegno, head of the Samsung Design Innovation Center in San Francisco.

In fact, tracking the preferences of different generations is one of the designers' core responsibilities. Millennials, in particular, have emerged as an important demographic to follow, because their consumption patterns and design preferences drive trends.

### ONWARD AND UPWARD

While Samsung plans to focus on improving its designs, the company's design teams acknowledge that they will face challenges. The rise of a new generation, ever-shifting markets, and the global race for technological superiority are creating a new landscape that designers must factor into their work.

To manage these changes, Samsung design has recruited experts in humanities, engineering, industrial design, and other areas. Samsung says that these experts and their diverse backgrounds will enable the company to think more creatively. In addition to recruiting from outside Samsung, the company runs various training programs to help current staff strengthen and build upon their capabilities.

In the end, Samsung designers are working to give consumers enhanced integrated experiences that go beyond simply providing a good product.

"It's more than just the hardware, and it's more than just the user interface," says Lee. "It's about how all of those come together to actually create a product with a soul." ●

## ABOUT SAMSUNG DESIGN

**Samsung hired its first designer in 1971—it now has approximately 1,500.**

**About 40% of the designers at Samsung have non-design backgrounds, including engineering, music, the humanities and social studies.**

**There are seven global design studios, in Seoul, San Francisco, London, Beijing, New Delhi, Tokyo and São Paulo.**

**For more information, please visit [design.samsung.com](https://design.samsung.com)**

# SAMSUNG

Samsung One UI  
(User Interface)



FORTUNE Wallpaper\*

BRAINSTORM  
DESIGN



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CEO and President  
IDEO



**Miriam Daniel**  
Vice President of Echo  
and Alexa Devices  
Amazon.com



**Llisa Demetrios**  
Registrar  
The Eames Collection



**Shohei Shigematsu**  
Partner; Director,  
New York Office  
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**Helle Søholt**  
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Stanford Medicine's Neurosurgical Simulation Center is home to a cutting-edge training program involving virtual reality.



# VR GETS REAL IN THE OR

Doctors and medical students are increasingly using virtual reality to prepare for surgery.

By Andrew Zaleski

**TECH** A FEW DAYS BEFORE tugging on surgical gloves to slice open a patient's brain, doctors at Stanford University slip on virtual reality goggles to help prepare for the risky procedure. Conventional MRI or CT scans can reveal only so much about what a patient's brain looks like. But feed those images into VR technology, and surgeons can see the brain—all the ridges and fissures, lobes and veins—in 3D, so they can simulate surgery before stepping into the operating room.

"It's as if we have been there before, and it's not a surprise," says Gary Steinberg, a Stanford Medicine neurosurgeon who





▷▷ helped create the school's two-year-old Neurosurgical Simulation and Virtual Reality Center.

Stanford Medicine is just one of a growing number of hospitals and medical schools embracing virtual technology. The goal is to provide better and faster training for resident doctors and surgeons, whose skill can mean the difference between life and death for their patients.

Virtual reality's adoption in medicine comes after major improvements to the technology over the past few years. Early headsets and software provided jerky imagery that nauseated some users, ruling it out for medical training.

Since then, the technology has improved so much that medical students can learn anatomy by walking around a lifelike digital hologram of a lung and transport themselves inside a heart to see the valves and pumping blood.

Mark Griswold, radiology professor at Case Western Reserve University's Case Center for Imaging Research in Cleveland, says virtual technology is a big help in teaching the next generation of doctors. Students who used Microsoft HoloLens VR headsets to learn part of the human anatomy—an arm, for example—acquired that knowledge in nearly half the time compared with students who studied the same area solely on cadavers.

Speedier learning is especially important in countries like China and India, which,

**By using VR, doctors can get a more lifelike view of the work necessary for upcoming surgeries, as opposed to merely reviewing MRIs and CAT scans.**

combined, will need 6 million new physicians by 2020. Meanwhile, the U.S. needs an additional 20,000 surgeons to treat its aging population. The question is how to train all of them. Virtual reality may be the answer, although it comes with a hefty price tag.

Pharmaceutical giant Johnson & Johnson has spent millions of dollars on an initiative it began in 2017 to establish 24 virtual reality training centers worldwide for surgeons. Though off-the-shelf virtual reality hardware is becoming cheaper, it's still expensive to integrate with the necessary software that translates conventional medical images into 3D.

It costs Johnson & Johnson nearly \$10,000 per VR unit on average. Stanford's Neurosurgical Simulation Center, funded by its parent hospital and outside donors, cost \$750,000.

Virtual technology comes in two flavors: a fully immersive experience, in which users see only a computer-generated environment; and mixed reality, in which 3D images are projected onto the physical world.

Physicians already use virtual technology for a variety of medical procedures, including cancer treatment, by creating interactive maps of tumors; and physical therapy, by having patients play games that encourage movement. But in surgery, it has perhaps the greatest potential.

Traditionally, medical students are judged by how long it takes them to perform a procedure. Instead, with VR, medical students can be graded on whether they make a mistake.

"It gives us a way to judge whether the medical student has learned what they are supposed to learn," says Richard Satava, professor emeritus of surgery at the University of Washington in Seattle.

At Stanford, the Neurosurgical Simulation Center resembles a miniature movie theater, including four cinema-quality seats (complete with cup holders) for students and surgeons to sit in while using VR. Spectators can watch on large TV screens mounted on the wall.

In addition to doctors and students, 400 neurosurgery patients have viewed their surgeries in virtual reality before their procedures. "They can immerse themselves in their brain," Stanford's Steinberg says. "It puts them at ease and shows them exactly what we're going to do." ■

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*Warren Boyd,  
Founder and CEO of Wavelengths  
Huntington Beach, CA*

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Rae's fund, The Engine, provides its startups with office space, equipment, and connections.



## Q+A

## TACKLING 'TOUGH TECH'

Unlike many venture capitalists, Katie Rae is a fan of startups that take on big and complicated problems. Interview by Renae Reints

**TECH** VENTURE CAPITALIST KATIE RAE is trying to prove that “tough tech” is worth the tough work. The Engine, the \$200 million fund she leads, invests in startups whose products require years of research and development before they're ready.

In short, they're startups that many other venture capitalists avoid—like one firm that's pursuing a viable form of fusion energy—because they require more time to get off the ground than the typical photo app and more time to pay off, if ever.

Rae's three-year-old fund is an independent offshoot of MIT, in Cambridge, Mass. The school, a hotbed for tough tech, wanted to help founders make their potentially world-changing ideas a reality.

Since its inception, The Engine has invested in over a dozen startups focused on energy, agriculture, and health. The fund takes a holistic approach, providing its startups with space, equipment, and business connections along with long-term capital.

Rae is a veteran of the Boston tech scene: She cofounded venture capital firm Project 11 and Boston's chapter of the Startup Institute, and served as managing director at Techstars Boston, a startup accelerator program. *Fortune* spoke with Rae about The Engine and the ethical challenges some tech companies face. The following has been edited for length and clarity. ▷▷



▷▷ **FORTUNE: How is The Engine different from other venture capital firms?**

**KATIE RAE:** We have a real focus on what we call tough tech, and we also have a mission to grow such startups in the Boston region. We do a bunch of things that most venture funds don't do.

Right now we have 30,000 square feet of space. Over the next few years, we will have 10 times that amount. We help companies get access to equipment—very high-end, high-tech equipment. We have a deep relationship with MIT, and we think of that as an incredible network for these founders to join. The Engine also sets a longer time frame. We have an investing horizon of up to 18 years, which allows us to think about bigger, longer-term bets—and these could be world-changing.

**How does The Engine choose which startups to fund?**

The first way we choose is to say, "Is there an incredible team that not only understands the technology but knows the market they're going after and how they want to approach it?" We really want to make sure that it's a group of people on its own mission. And do they have the team to do it that will have staying power?

Then, after that, we say, "Okay, let's dive into the market. Are we creating a market, or are we disrupting a market? And does this team have a plan to do that?" Obviously, we're early-stage investors, so that plan evolves over time.

**What are some investments that you're most excited about?**

It's hard to choose a favorite. Commonwealth Fusion Systems is such an exciting startup. If it can prove that it can develop the world's biggest superconducting magnet that



The Engine has invested in over a dozen startups in areas like health and energy.

could create fusion energy, then it's a world-changing company.

Then there's Cellino [a startup that uses lasers and nanotechnology to program a certain type of stem cell's growth]. The four founders—they're a mix of physicists, biologists, and mechanical engineers.

Another one that we're excited about: Zapata Computing. This team is working with some of the biggest industrial players to solve true problems that only quantum computing [a complicated computing process that enables faster calculations] can solve.

**How has The Engine affected the tech scene in Boston?**

In October we held our first Tough Tech Summit, which gathered many people whom we work with in Boston—whether it's different institutions, academic institutions, venture capitalists, or manufacturers. Yes, some of it is for our companies. But it's also for this whole Boston ecosystem.

**Some startups in The Engine's portfolio involve genetic engineering or artificial intelligence. How do you handle the ethical concerns?**

I've been working with former Defense Secretary Ash Carter over the last year to gather some

incredible people to talk through these ethical concerns: What are we unleashing in the world, and how can that be for good?

We really engage with the people who think through this, and we also engage with our companies to think through how they're going to use their technology. There's a bunch we haven't invested in because we didn't believe that they'd thought through the ethical ramifications of what they were doing. These things are often tricky and in gray areas.

**As a female CEO in the tech industry, what's your view on the status of women in tech, and how do you think the #MeToo movement has affected it?**

What's exciting is that a lot of people have woken up to the fact that there are problems. It's a conversation that's now out in the open.

But I don't think it's just women. I think if you look at where capital goes, a very small percentage goes to women, but an even smaller percentage goes to African-Americans and Latinos. I think most people realize we have a problem hiring equitably in tech. We have a problem with capital allocation. I think we have to go fix that problem, and I think a lot of people want that to happen. ■



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Lab technician Prosper Uzabakiriho collects a Zipline delivery in Rwanda.

# FORGET PIE IN THE SKY, DRONES ARE SAVING LIVES

Drones may one day make your life easier by delivering pizza, but today—in Rwanda—they are already playing a vital role in emergency medical services. **By Tom Jackson**

**BACK IN 2014** Keller Rinaudo met a graduate student at the Ifakara Health Institute in Tanzania. The student had built a mobile alert system for health workers to text emergency requests for medicine and vaccines. Health workers made thousands of emergency requests, which had never before been possible. Unfortunately, there was no way for the government to fulfill these requests.

“I realized then that I was looking at a database of death with thousands of names, addresses, ages, phone numbers,” says Rinaudo.

Having already founded Silicon Valley-based drone startup Zipline, Rinaudo had discovered its mission. “Zipline could build the other half of that system and save the majority of those people’s lives,” he says.

○ JASON FLORIO — REDUX



**A Zipline employee prepares a delivery drone.**

Better known for their use in warfare or for buzzing overhead in urban areas taking photographs, unmanned aerial vehicles, or drones, are often tightly regulated. The small African nation of Rwanda, however, has taken a more positive attitude toward their application.

The country's President, Paul Kagame, is feared and feted in equal quantities, accused of co-opting Rwanda's democratic system but also praised for presiding over a regime that has put technology at the heart of the landlocked country's development.

Mountainous Rwanda has 3,000 miles of road, but only 25% of that is paved, and much of it is washed away during rainy seasons. This makes transportation tough, and hospitals struggle to procure blood and vaccines in emergency situations. It was in conversations with Rinaudo in 2015 that the government suggested Zipline try to fix the problem.

Rwandan airspace was opened to the company, and Zipline started its delivery service in October 2016. Remote clinics can now place orders for lifesaving blood via text message, with drones dispatched from fulfillment centers dotted around the country to deliver it. Since its launch, Zipline drones have flown over 300,000 miles on more than 10,000 flights, delivering thousands of units of blood.

Timothy Reuter, head of the civil drones program at the World Economic Forum, says the impact is significant. "Drone delivery can help prevent stock-outs of critical medical items and eliminate wastage from expiration by providing just-in-time delivery from a cen-

tral location," he says. "In practical terms, this can mean the difference between a mother bleeding to death during childbirth or receiving the transfusion she needs."

This is just the start for Zipline, however, and Rwanda is just its first market. In April, the company unveiled what it claims is the world's fastest delivery drone. The next-generation drone can reach a top speed of 80 miles per hour with a roundtrip range covering 100 miles, carrying up to 1.75 kilograms of cargo (one blood pack typically weighs 0.5 kg).

Rinaudo says Zipline has decreased the amount of time between receiving an order and launching a flight from 10 minutes to one, and increased the number of possible daily delivery flights from each fulfillment center to 500. The increased radius of each center means the company can now serve populations of up to 10 million people.

In 2017, Zipline made neighboring Tanzania, almost 40 times the size of Rwanda and with almost 70% of its people living in rural areas, its second market, and it has received the backing of venture capital firms—securing over \$40 million in funding. It is also set to launch back home in the U.S.

Reuter says the impact the company has had in Rwanda is exceptional, but its value goes even beyond that. "Zipline is playing an important role not just in the markets it currently operates but also in demonstrating to countries around the world that drone delivery can be a reality today and provide a socially impactful service," he says.

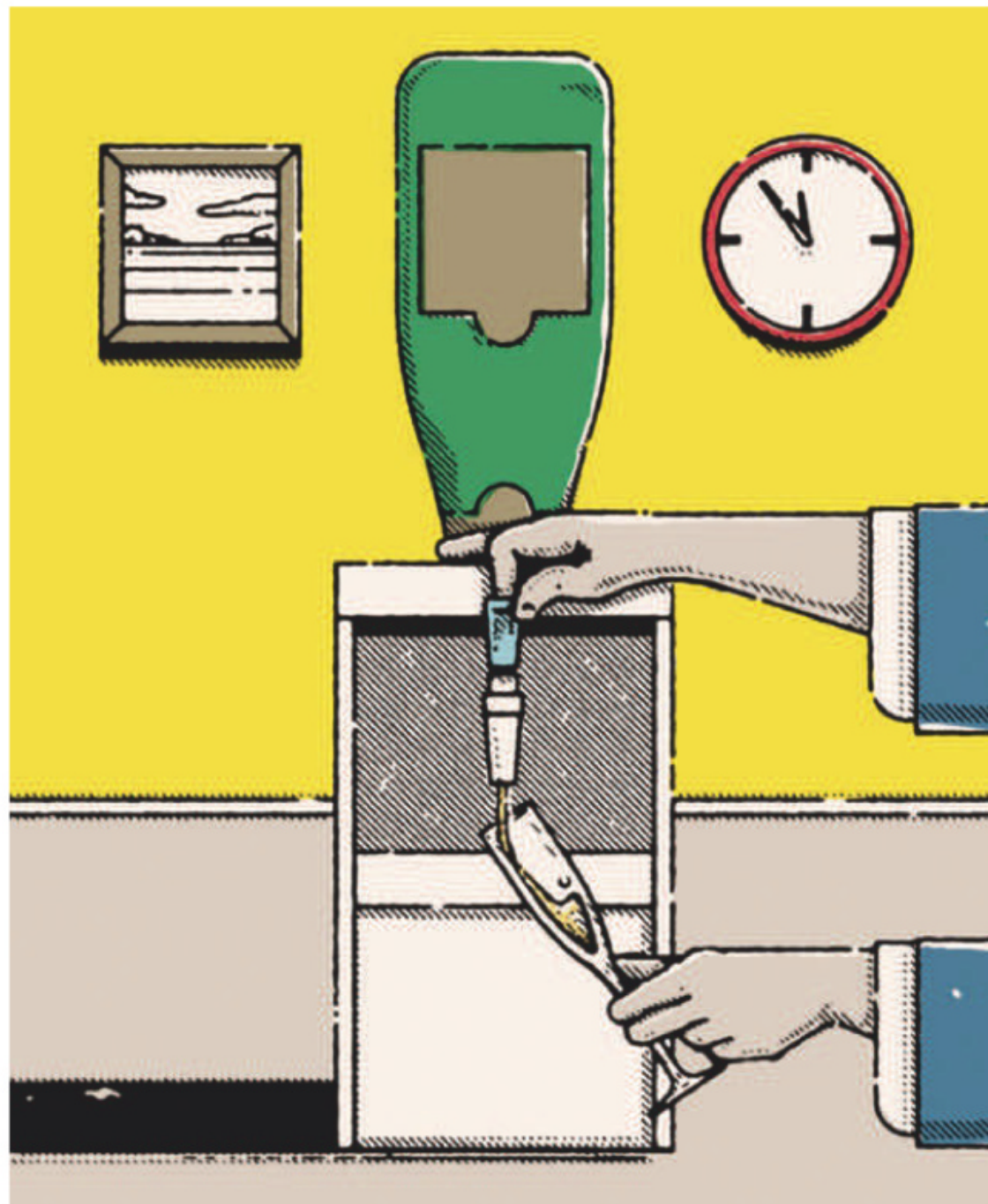
"As drone technology evolves from carrying small, lightweight items to a heavier lift capacity and goes down in cost, we expect to see drone delivery used for a greater variety of commercial activities," Reuter says. "In the African context, this could include transport of agricultural goods that are often damaged during long journeys on trucks."

Though these commercial-use cases are clear and the opportunities sizable, Rinaudo is more focused on the job currently at hand. "Billions of people across the world lack access to adequate health care. This isn't an African problem; it's a global problem," he says. "The difference is that African countries are leading the way in developing cutting-edge solutions." ■

# WHEN WORKERS AND INVESTORS SHARE THE WEALTH

Being stingy with pay and benefits can boost profits in the short term. But companies—and their stocks—may do better when they're generous.

By Ryan Derousseau



## INVEST

**INVESTING WITH THE HEART**, while still earning a strong return, is the equilibrium that every socially conscious shareholder aims for. To achieve that balance, investors are in constant search of strong data—specifically, environmental, social, and governance (ESG) metrics that can help them screen out bad actors and identify the good.

For some of those metrics, the data has steadily improved. There is now research that shows a correlation between reduction of waste and stock returns, for example. The same depth of data has been elusive, however, for many social issues—including how companies treat their employees. That's a conundrum in a society marked by growing wealth

inequality, in which some investors are eager to back companies whose leaders share the fruits of success with the rank and file.

One group striving to close the worker-treatment data gap is Just Capital. Just, a nonprofit founded in 2013 by a group that includes billionaire investor Paul Tudor Jones, has surveyed some 81,000 people since then to determine which corporate-behavior issues the public cares most about. It ranks the companies in the Russell 1000 based on their performance on those issues. (The rankings are available online; they're also the basis for the **Just U.S. Large Cap Equity ETF**, which launched in June.) In Just's surveys, worker pay and benefits consistently rank at the top of respondents' priorities.

To develop a rating system for employee well-being, Just looked beyond salary and perks, says CEO Martin Whittaker; training and career development opportunities, health care, retirement plans, and other factors all fall into this bucket. Layoffs don't necessarily count against a company if it provides, say, good severance and access to job-placement services. Just Capital also measures work/life balance, gathering data through outside groups and giving credit to companies that actively encourage

and remind employees to use vacation days and parental leave.

The encouraging result of this research: What's good for employees appears to be good for shareholders. Just's top-ranked companies overall have consistently outperformed the Russell 1000 over the past several years. And companies that scored in the top 50% on its work/life balance metrics, for example, have earned an average annual return on equity of 19.4% over the past five years, more than two percentage points higher than those in the bottom half. The explanation for that superior performance may come down to simple human nature: A better-rewarded workforce produces at higher levels, Whittaker explains. Other groups are registering similar results; the ESG-oriented firm Parnassus Investments, for example, has found that as a group, the companies on *Fortune's* Best Companies to Work For list consistently beat the market.

**WITH THAT CORRELATION IN MIND,** *Fortune* explored Just Capital's most recent rankings to find generous employers that also have promising outlooks for the years ahead.

**Ultimate Software (ULTI, \$251)** specializes in cloud-based human resources platforms, and it brought in nearly \$1 billion in revenue last year. It's known for paying Silicon Valley-esque salaries to workers in the comparatively affordable environs of its headquarters in Weston, in South Florida. Ultimate also tops Just's lists for work/life balance and career development, offering tuition reimbursement, day-care services, and unlimited personal time off.

On the business front, it's Ultimate's revenue growth, which has hit 20% every year since 2012, that investors find righteous. True, the stock has fallen 24% from its summer peak on concerns that software firms will take a cyclical hit if the U.S. economy sputters. But to sustain growth, Ultimate has looked toward Europe, buying Paris-based PeopleDoc for \$300 million this year. With a price-to-expected-2019-earnings ratio of 41, Ultimate trades in line with other fast-growing software companies. Needham analyst Scott Berg says it actually deserves to trade at a premium because of its consistent growth.

Online real estate platform **Zillow Group (ZG, \$35)** is another top performer on the work/life

## WHAT GOES AROUND COMES AROUND

Research by Just Capital suggests that worker pay and benefits and shareholder gains aren't mutually exclusive.

26%

Amount above the national average that the 100 "most just" companies in the Russell 1000 paid their median employee in 2018.

78%

Share of U.S. survey respondents who say they've taken at least one action—such as buying more of a company's product, mentioning a company on social media, or investing in a company—to reward its "positive behavior."

19.4%

Average annual return on equity over the past five years for companies that rank in the top half of Russell 1000 companies on work/life balance metrics. That's 2.3 percentage points higher than the bottom half.

SOURCE: JUST CAPITAL

balance front, offering benefits like 16-week maternal and eight-week paternal leave. A variety of factors shaved 18% off its share price this year. A tweak in how Zillow distributes real estate leads upset some of the agents who pay to use the platform, and rising interest rates and slowing home sales have put its industry's growth at risk.

But Zillow, with its \$1.1 billion in annual revenue, remains the dominant player in online home-listing, owning "the vast majority of time" people spend looking at homes on the web, says Deutsche Bank analyst Lloyd Walmsley. And despite the hiccup with its agent customers, the company registered a 22% jump in total revenues over the past year.

Zillow's newest effort, purchasing unloved homes and flipping them for profit, could also become a growth engine; the company's August purchase of Mortgage Lenders of America could make that business line more cost-efficient.

**Intuitive Surgical (ISRG, \$516)** focuses on robot-assisted surgeries, and "there's nothing like it in the med-tech industry," says Lee Hambright, a Bernstein analyst. Intuitive's da Vinci Surgical System dominates this field, providing a tool that enables doctors to perform hysterectomies, some prostate procedures, and other surgeries in more efficient, less invasive ways. The total number of operations using robotic systems rose 20% over the past year. But competitors have been slow to embrace robotics, giving Intuitive, which brought in \$3.1 billion in revenue in 2017, more than a decade's head start. It leads its industry in another way: According to Just, ratings from current and former Intuitive employees gave the company's benefits, such as its 401(k), higher marks than those of any other health care equipment maker. ■

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# WHY BUSINESS MUST STEP UP TO SHAPE THE NEXT INDUSTRIAL REVOLUTION

Technological disruption threatens to create a gap between business's priorities and society's. Here's how business leaders can harness the "Fourth Industrial Revolution" for everyone's benefit. BY KLAUS SCHWAB

**WE'VE JUST CONCLUDED A YEAR** in which countless events demonstrated how rapidly and profoundly new technologies are changing our world—in ways both promising and threatening.

In recent months, to give just a few examples, Alphabet's Waymo division launched America's first commercial self-driving taxi service; China's Xinhua News introduced the world's first A.I.-powered news anchor; and Lockheed Martin began 3D-printing parts for its F-35 fighter jets.

At the same time, social media companies came under scrutiny, as bad actors misused their platforms to hijack elections and incite violence. Some of the world's largest consumer-facing companies fell victim to data breaches affecting hundreds of millions of customers. And as new technologies helped the world's richest people become wealthier than ever, inequality increased, and a disaffected "precariat"—racked by economic and social insecurity—turned its back on elites.

These events remind us that the changes we're experiencing go beyond business as usual. Indeed, they represent a Fourth Industrial Revolution.

This revolution is transforming the world as thoroughly as the 19th- and 20th-century Industrial Revolutions did. Back then, the cutting-edge technologies were steam technology and electricity, trains and cars. Beginning in the 1960s, we saw a third such >>





▷▷ revolution, with computing at its center.

From the first two revolutions, which led to the Gilded Age in America, we know that truly transformative technologies are far more than sets of machinery or tools. They are powerful actors that can change the very core of society.

In hindsight, one can see those transformative eras as smooth evolutionary journeys and forget the rough and even violent disruptions that came with them. But each revolution generated pain and conflict along with progress, and the Fourth Revolution will do the same. The changes it is creating are fast-moving and global, and they will affect governments, civil society, and huge swaths of the population.

Going into 2019, it is in businesses' self-interest and for the greater good that we shape this Fourth Industrial Revolution more actively. Left unmanaged, technologies will shape us, and in the age of A.I. and malicious "lone wolves," the risk of harm is greater than ever. To counteract it, I propose four points of action.

First, businesses must proactively collaborate to create new norms around technology. Whether in forming agreements about customer-data ownership, the right way to unleash driverless cars in city streets, or rules around A.I., gene editing, or intellectual property, businesses must engage with other stakeholders. Principles of freedom and autonomy can underpin those norms: Users should own their data and be able to transfer it without restrictions, for example, and A.I. and ad targeting should respect certain privacy boundaries.

Companies that fail to act risk shooting themselves in the foot. Already, governments and civil society are showing they will no longer accept business behavior that treats the Fourth Industrial Revolution as a latter-day Wild West. Expect more regulation if companies don't move to sensible self-regulation. That said, state actors and private individuals have important roles to play. Only legislatures, for example, can enact laws that ensure a fairer redistribution of the riches new technologies bring. Workers and employers together need to find the balance between implementing tech that displaces jobs and investing in retraining for new ones.

Governments and international organizations also need to reinvent the United Nations and Bretton Woods framework that shaped the world we live in. Much of that interna-

## HOW TO LEAD A BUSINESS IN A REVOLUTIONARY ERA

### COLLABORATE ON NEW RULES

Much of the public fears that companies have a Wild West mentality on such issues as consumer-data sharing and the use of artificial intelligence. Business can restore confidence by collaborating on norms that protect privacy and recognize customers' rights.

### PLAN FOR YOUR IMPACT

Powerful technologies usually have a profound environmental and social impact. Companies must get better at planning for such an impact—and mitigating it when it's harmful. The recent move toward 100% carbon neutrality on the part of some industrial companies is an example worth emulating.

### SHORTEN THE CYCLE

New tools like machine learning and 3D printing can help business leaders more quickly develop and test products, services, and business models—while familiarizing them with the potential and pitfalls of leading-edge tech.

### MAKE NEW ALLIES

Governments, civil-society groups, and workers are all stakeholders when it comes to adaptation to new technology. Business is better off treating them as partners than as adversaries.

tional rules-based order needs a reboot. This will be a major topic at the annual meeting of the World Economic Forum (WEF) in Davos, later in January.

Cooperation doesn't absolve companies of the need to compete, innovate, and evolve. Hence, my second point of action: Now's the time for business leaders of all stripes to experiment more and faster. Companies have a tremendous opportunity to continuously test and adapt new products and technologies because they can utilize data and feedback gathered in real time—with the help of new tools like machine learning and 3D printing.

Third, businesses need to adopt adequate strategies to respond to technology-driven risks. The WEF's Global Risks Report has shown time and again that widespread cyberattacks are both likely and very impactful, for example, but most companies aren't well equipped to handle them. In 2019, companies may well regret it if they don't address such risks in a thorough, structural way.

Last, business leaders must do more to understand the wider context in which they operate and the unintended consequences their actions may have, and revise their strategies accordingly. No longer can businesses act as if externalities such as environmental damage or social unrest don't exist or aren't their responsibility.

Through it all, we should understand that the Fourth Industrial Revolution will affect not just our industries but also society and the lives of people everywhere. Businesses need to make sure society benefits from technological innovations. Let 2019 be a new dawn on this front. Let this be our joint pledge for a new era. ■

*Klaus Schwab is the founder and chairman of the World Economic Forum.*

# UNLOCKING **IOT** POTENTIAL

Combining technology and human intelligence is helping companies realize the full scope of IoT possibilities.



**DRIVEN BY DIGITALIZATION**, the Internet of Things (IoT) is revolutionizing business across industries. And as its adoption continues to accelerate, it is unlocking new business opportunities and improving the customer experience.

With IoT data, for example, companies can quickly respond to customer issues in almost real-time and deliver more personalized experiences across a variety of digital touchpoints.

According to the World Economic Forum, the IoT will power the Fourth Industrial Revolution. Machines and devices are continuously communicating in ever greater numbers, it says, and “the promise of real-time enterprise—organizations that can respond to need and demand instantaneously—is finally becoming a reality.”

IoT also has the potential to improve quality of life for citizens around the world. For instance, smart cities are deploying IoT devices to create safer, cleaner, more efficient communities.

Despite the boundless opportunities presented by IoT, however, its implementation isn’t without challenges—particularly in relation to data security, considering the potential for nefarious behavior when so many connected devices are exchanging enormous volumes of data at any moment.

“Hackers aren’t sitting idly by; they’re becoming more sophisticated,” using technology such as artificial intelligence (AI) to break into systems, says Craig Hinkley, CEO of WhiteHat Security.

The problem is, many companies lack the expertise to fully grasp these risks to security. And when organizations don’t understand the subject well enough, they tend to overlook problems.

This is where the work of companies such as WhiteHat is crucial. WhiteHat’s cloud-based platform provides a powerful solution that can be embedded throughout the product-development life cycle and leverages scanning technologies, AI, and threat-research expertise to help customers bolster their IoT security.

In addition to adopting this type of technology for IoT security, organizations should work to implement best practices that include maintaining an inventory of all IoT technology, performing comprehensive risk assessments, providing security assurance throughout the software development life cycle, and ensuring that the people creating the technology have the right tools, data, and training to make intelligent choices as they go about their work.

With these practices in place, each company can truly realize the full potential of IoT. ●

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# PASSIONS

LUXURY



## BEAUTIFUL AND SUSTAINABLE

**Big players in one of the planet's most polluting industries are finally getting serious about their environmental responsibilities.**

**By Lindsey Tramuta**

**THE ENDURING APPEAL OF FASHION** is that it can be whatever consumers want it to be—a means of self-expression, a celebration of originality and fine craftsmanship, or a temporary pleasure. But today, there's no escaping that it comes with the burden of knowing it's among the world's most polluting and wasteful industries.

According to recent reports by the Ellen MacArthur Foundation, global textile production has more than doubled in the past 15 years, while the average shopper holds on to clothing for half that long. Over 85% of discarded clothing in the U.S. ends up in landfills, and this cycle of make/use/waste comes at a considerable cost—the >>

▷▷ industry generates more greenhouse gas emissions than do international maritime shipping and aviation combined, says the UN Framework Convention on Climate Change. And that's saying nothing of the unethical labor practices that have plagued many of the world's fast-fashion and luxury brands.

It's partly this colossal irresponsibility that sparked the idea for Veja, the footwear industry's Parisian darling that has been at the vanguard of the sustainable fashion sphere long before "sustainable" was even a buzzword. In 2005, while other brands were being born online, François-Ghislain Morillion and Sébastien Kopp saw opportunity with a physical emblem of their generation: the sneaker. Unlike the big names in the category that spend 70% on advertising and 30% on raw materials and production, they devoted all their resources to a sustainably manufactured product (that costs five to seven times as much to make as other sneakers cost) and the people who make it. This happens in Brazil, where they have access to fair-trade cotton and wild rubber from Amazonia, and factories that pay their workers fair wages. Today, they also use upcycled tilapia hides; recycled plastic bottles; and flannel, silk, and other eco-friendly materials for their shoes—that are as good-looking as they are well made.

Thirteen years later, with nearly 2 million pairs sold around the world, the founders continue to push the message that sustainable business is ultimately good business.

This works for Veja because it was built as a sustainable brand at its onset. But legacy brands, with embedded supply chains and manufacturing facilities, face a bigger challenge.

Few in the industry are rising to the task quite like Kering, for whom sustainability has become a moral lodestar. In 2017, just before being named the top sustainable textile, apparel, and luxury goods corporation by the Corporate Knights Global 100 Index, the conglomerate publicly announced its quantitative objectives in sustainability through 2025. Chief among them: reducing its environmental footprint overall by 40%. The rest of its actions, which touch every step of the supply chain, as well as manufacturing, distribution, and R&D, are explicitly outlined online, sug-



**Veja works directly with organic cotton producers in Brazil (above) and Peru.**

**"FOR GOOD TO TRIUMPH, THE PRODUCT HAS TO BE BEAUTIFUL."**

gesting transparency is no longer an enemy to luxury's aura of exclusivity.

"We are sharing the knowledge we gain and open-sourcing the innovations we develop," explains Marie-Claire Daveu, Kering's chief sustainability officer.

And as unlikely as change may once have been in the rarefied world of high-end jewelry, disruption has also found its way to Place Vendôme, the Parisian mecca of the world's most prestigious watch and jewelry brands. Courbet launched in May as the scene's first 100% ethical and sustainable line, using recycled, traceable gold and lab-grown diamonds of the highest color grade. These are 30% less expensive than mined diamonds—the latter producing 15,000 times the pollution of lab-grown ones, which are made with solar-powered machines. Department stores worldwide have already started calling to place orders, and local interest was instantaneous. Ethics are a big part of it, says cofounder Manuel Mallen, but aesthetics matter equally—which is why so many eco-only brands have failed to win over consumers. "For good to triumph, the product has to be beautiful," he says. ■



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# THE SHRINKING

# MIDDLE

BY CLIFTON LEAF



A JOURNEY INTERRUPTED  
American workers are increasingly unlikely to attain the same incomes and living standards that their parents did.

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**THE VAST MAJORITY OF AMERICANS** consider themselves “middle class.” No one can quite agree, though, on what that means.

Richard Reeves, along with colleagues at the Brookings Institution, has cataloged no fewer than a dozen economic formulas that seek to define this elastic cohort largely by what people earn each year: household income between X and Y; personal income that’s within some percentage of the national median; distance from the poverty line; and so on. Combine the lot, and the range of who might be considered middle class is extraordinarily expansive—including anyone from a single, part-time bartender scratching by on \$13,000 a year to a suburban power couple pulling in \$230,000, or 90% of American households in all.

Other economists and social scientists stretch the boundaries of membership in different dimensions, based on degrees of wealth or spending power, professional status or education level, what neighborhood you live in, or even on that very American of conceits, self-determination—which is to say, if you think you’re middle class, you are.

“I sometimes think there are as many definitions of the middle class as there are Americans claiming to be middle class,” says Reeves, a senior fellow at Brookings and director of its Future of the Middle Class Initiative, who quickly throws in one of his favorite noneconomic definitions: “You’re middle class if you have two refrigerators. You have a new one in your kitchen, and you have your old one in the garage or basement, where you keep your beer.”

The U.S. is a middle-class nation—it was founded on middle-class ideals, he continues. And so defining one’s self as middle class is, perhaps counterintuitively, aspirational in some ways. “Americans don’t like the idea of seeing themselves as upper crust, snobs, snooty, aristocrats, upper class, et cetera,” says Reeves, an economist and self-described “recovered Brit” who has written a new book, *Dream Hoarders*, precisely on that rarefied American upper crust. “People also don’t like to think of themselves as poor, or even as working class. To the extent that the U.S. has a class consciousness, it tends to be around the middle class.”

All of which creates a challenge of measurement. If sizing up the middle class is difficult enough, it’s that much harder to say that circumstances within this group have changed. And yet that is precisely what we’ve devoted the 28 pages in this special report





to saying—and showing. Life has gotten harder in recent years for millions of people within the middle class. Put simply: For too many, the American dream has been fading.

Such an assertion may seem to fly in the face of recent economic data and even the long upward slope of history. Between 2013 and 2016, after all, the median income for U.S. families grew 10%, according to the Federal Reserve Board's oft-cited Survey of Consumer Finances. The unemployment rate, meanwhile, is at its lowest level since 1969—the year of the moon landing—as the private sector has generated some 20 million new jobs since 2010. Wages, too, are at last starting to climb after a long stretch of stagnation. All really good signs, no?

And yet for nearly every rah-rah measure in the economy of late, there is an asterisk: a footnote that suggests that a huge and perhaps growing subset of Americans is being left off the dance floor. Consider the most basic: wages. For non-supervisors, average hourly earnings hit nearly \$23 in November—a fact that, according to data from the Pew Research Center, gives today's workers slightly less purchasing power than those in January 1973, once inflation is factored in (\$23.68 in 2018 dollars).

For years, the company CareerBuilder has conducted, via the Harris poll, a large survey of U.S. workers across the business landscape. In 2017, a striking 40% of the nearly 3,500 respondents said they either always or usually live

“paycheck to paycheck”—a level that was up four percentage points from the company's 2013 poll.

Such data is explained in part by recent research by the Federal Reserve Bank of New York, which reveals the \$13.5 trillion IOU that American families have kept locked inside their desk drawers. This past September, aggregate household debt balances jumped for the 17th straight quarter, with the debt now more than \$800 billion higher than it was at its previous peak in 2008. The loan comparison site LendingTree, drawing on data from the Federal Reserve, reports that as a percentage of disposable income, Americans' non-housing-related debt is higher than it has been since measurement began a half-century ago. Collectively speaking, our outstanding consumer debt, says the site, is equivalent to more than 26% of our income.

With interest rates low, that burden is still a pinch for many, rather than a gouging bite—but unlike with our skyrocketing federal debt, this cascading obligation is still achingly personal, with reminders coming in the mail month after month. In December, the personal finance site NerdWallet reported that average revolving credit card balances for households with debt—the “You Owe This Amount” figure that carries over from one billing statement to the next—totaled \$6,929.

Even those without a credit card overhang, or massive student loan debt, find themselves facing a gauntlet of recurring charges each month. The cost of health insurance and medical care have each risen much faster than paychecks have. Over the past decade, out-of-pocket costs to workers from higher insurance deductibles have climbed eight times as much as wages, notes the Kaiser Family Foundation. More than a quarter of adults did without needed medical care in 2017 because they couldn't afford it, says the Fed.

Yes, housing costs nationwide have moderated—but, importantly, not in the places where the jobs are. Want to work for a Silicon Valley startup or a biotech firm in Boston? Six in 10 renters making up to \$75,000 a year will pay upwards of 30% of their income in rent in San Jose; four in 10 will do so in Boston, according to Harvard's Joint Center for Housing Studies (see “The Math of a Vanishing Class” in this issue).

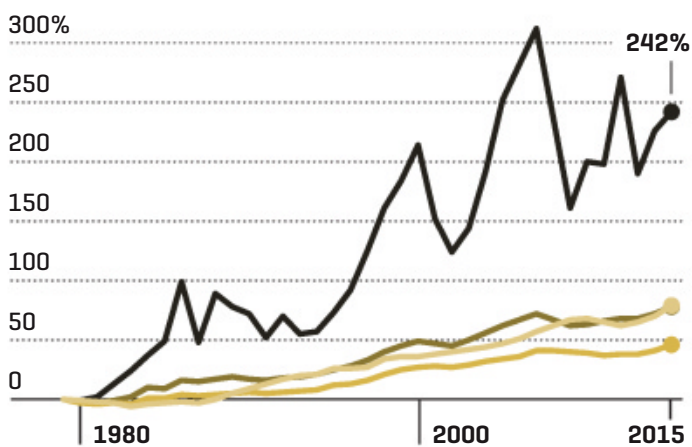
Here—in housing, health care, and the cost of college, too—is where the super-inflation hits hardest for a significant share of the nation today. “And it's quite hard to find three areas of consumption that define the middle class standard of living more than affording a decent home, or being able to send your kids to college or cover health care costs should any of your family fall sick,” says Reeves of Brookings. This tripartite gap, in particular, may well be what has convinced many younger Americans that they won't ever reach one critical milestone in the Great American Journey—living better than their parents did. (Only half of the 15- to 26-year-olds in a recent poll by the Associated Press–NORC Center for Public Affairs Research thought they would.)

Harvard economist Raj Chetty has done some of the most acclaimed work on this historic decline. In 2016, Chetty and col-

## CUMULATIVE GROWTH IN INCOME

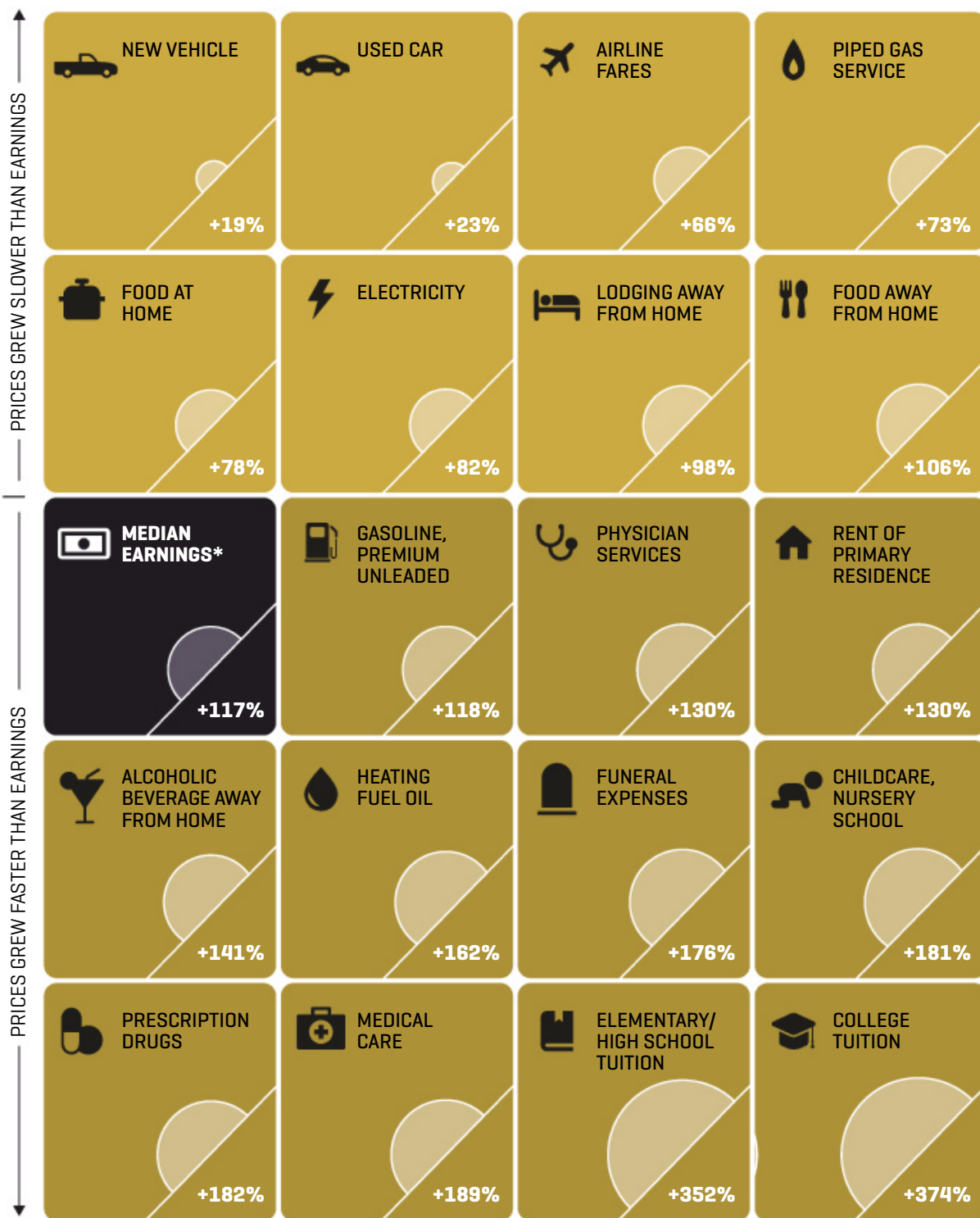
AFTER TRANSFERS AND TAXES

— TOP 1% — MIDDLE THREE QUINTILES  
— 81ST-99TH PERCENTILES — LOWEST QUINTILE



SOURCE: CONGRESSIONAL BUDGET OFFICE

## GROWTH IN PRICES COMPARED WITH EARNINGS, 1990–2018



SOURCE: BUREAU OF LABOR STATISTICS, PRICE CHANGES AS OF NOVEMBER OF EACH YEAR

\* MEDIAN USUAL WEEKLY EARNINGS, AS OF Q3, 2018, FOR FULL-TIME WAGE AND SALARY WORKERS

leagues showed that fewer than half of those born in the 1980s earned more than their parents had at the same age, adjusting for inflation. By contrast, of those born in 1940, more than 90% had accomplished the feat. “We can see that there has been a collapse of intergenerational mobility,” says Claudia Goldin, a leading economic historian and labor economist at Harvard.

It’s all part of the feeling, for millions of Americans, of falling behind—a feeling made all the more frustrating by the sense that the gap between the middle class and the superrich keeps

widening... that the laws of economic gravity no longer seem to apply.

And compounding that is one more nagging concern: that the breakneck speed of technological change now disrupting one industry after another—a revolution of A.I.-infused automation—will uproot the one thing that, according to the folks at Pew, virtually everyone agrees is critical to middle-class membership: a secure job.

Each previous era’s industrial revolution has, of course, raised the same fears. Reeves thinks “a good starting position is to be skeptical about the claim that this time is different.” But the two things worth asking about the current revolution, he says, are: “One, will it be differently quick this time? And two, will it be differently different?”

It’s question No. 1 that makes him a little nervous: Yeah, sure, with every grand sweep of automation, business models change and new positions get created, and there’s a transitional time in between them. “So surely the economy will adjust and new jobs will be created,” he says, “but will those people who are displaced be the ones to get those jobs? And will they get them fast enough?”

You’re not talking about 20, 30, 40, 50 years of transition between approach A and approach B. You’re talking about two, three years. What it means is people need to reskill, retool at a pace that has never before been witnessed in human history.”

The closest thing to it, says Reeves, would be like a mobilization during war. So be it: Many Americans feel like they’re already in one.



# THE CURRENT STATE OF AFFAIRS

STORIES FROM PEOPLE CHASING THE AMERICAN DREAM

## TRAILER PARK LIVING IN TECHTOPIA

BY MICHAL LEV-RAM

**WHEN UMBELINA** Martinez's family first came to the United States decades ago, from Michoacan, Mexico, they settled in a three-bedroom house in Redwood City, Calif. It wasn't all theirs; 25 people lived on the property, sharing a single bathroom. Martinez's

family of eight squeezed into one bedroom. "My mom and dad had to step over us kids to get to the door," she recalls.

Today, the 46-year-old single mother of three has much more spacious accommodations: a 200-square-foot mobile home in a trailer park in Palo Alto, the heart of the technology industry and one of the most expensive cities in the country. She has lived there 13 years.

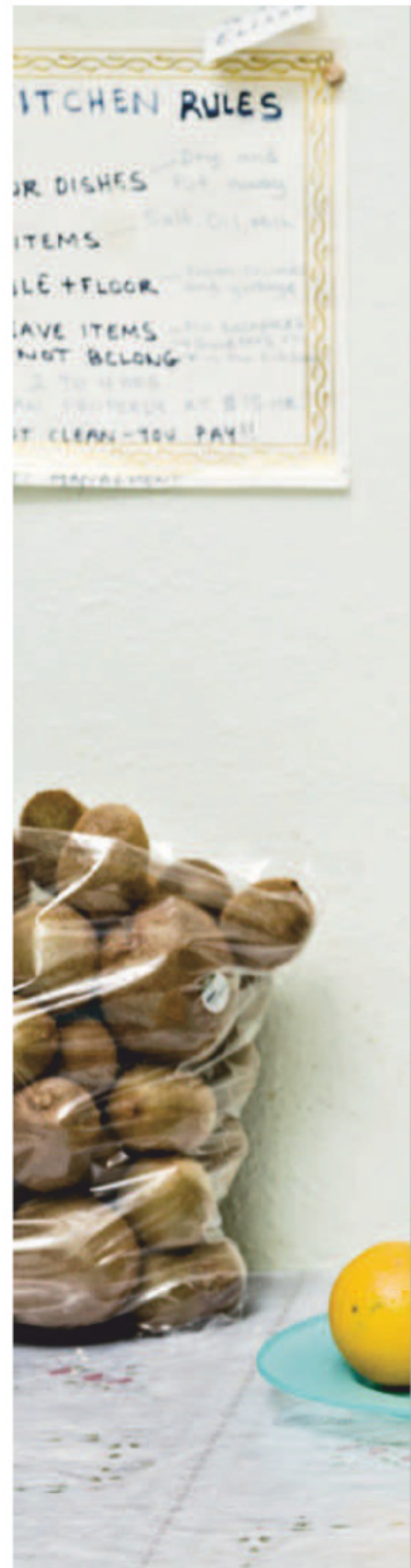
"Who wouldn't wish to live in Palo Alto?" she asks, seated in her kitchen, which doubles as a living room, dining room, and storage space.

Its thin walls are painted pale green, and there is a black refrigerator set against one wall, topped with a TV monitor. (The small quarters call for some creative design.) Kiwis and oranges rest on a tiny table pushed so close to the door that it almost touches.

Most of Martinez's neighbors live in two- or three-room trailers with their families. Many keep pets. Their homes come in an array of colors, and some feature tiny gardens blooming with flowers and hot peppers.

If Palo Alto, with its many Silicon Valley billionaires, seems like an unlikely location for trailer living, that's because it is. The Buena Vista Mobile Home Park, tucked behind a Valero gas station on one of the city's busiest streets, is home to just over 100 trailers and about 400 residents, including Martinez and her kids; her mother, sister, and brother; and his family. (Her mother lives with her; her sister and brother have separate mobile homes.) The residents of the park are mostly working-class immigrants who hold jobs in nearby restaurants, hair salons, and construction sites. They pay around \$1,400 a month for rent and utilities in an area where the median home price is \$3.2 million.

"For my family and →





**GIMME SHELTER**  
Umbelina Martinez  
in the kitchen of her  
home at the Buena  
Vista Mobile Home  
Park in Palo Alto,  
one of the priciest  
cities in the  
U.S. to live in.



TECHTOPIA [CONT.]

→ me, it would be impossible to live anywhere else in Palo Alto,” says Martinez, who works as a banquet server at the nearby Four Seasons Hotel.

Buena Vista started out as a road-stop general store and motel in the 1920s. Over the years, it grew into one of the last sources of low-income housing in Palo Alto. In 2012 its then owners informed the residents of the mobile home park that they wanted to sell the property to an apartment complex developer. The plan included some restitution for residents, who would be evicted.

“I didn’t want the money,” says Don Roberto Munoz, one of Martinez’s neighbors. “I wanted my daughters to stay in the schools here.”

Martinez and others echoed the sentiment. So they banded together, aided by supporters from Palo Alto. In 2017 the Santa Clara County Housing Authority purchased the property for \$40 million, allowing tenants to stay put.

Martinez’s sister Maria now serves as the president of Buena Vista’s residents association. “It is important to show that there isn’t just one way of thinking,” Maria says. Just a few miles west of her one-room trailer, the founder of Sun Microsystems is selling his four-story mansion. The price? \$96.8 million.



INCOME GROWTH FOR MIDDLE CLASS BETWEEN 1979 AND 2015, SLOWER THAN UPPER MIDDLE CLASS (78%) AND POOR (79%)

BROOKINGS INSTITUTION



HOUSEHOLDS IN 25 ADVANCED ECONOMIES WITH FLAT OR FALLING INCOMES DURING 2005 TO 2014

MCKINSEY & COMPANY



## A fight to preserve his public pension

Louisville teacher Matthew Kaufmann, 39, stands his ground.

AS TOLD TO RICHARD MORGAN

● I DO FINE—for now. I’m a high school English teacher. I have a condo, a girlfriend, and \$70,000 a year. We glamp. But sitting in comfort isn’t comfortable if you’re doing it only because standing up marks you as an enemy. In 2018, I stood up.

The governor of Kentucky rushed a bad pension reform bill through the leg-



ADKINS: COURTESY OF NICOLE ADKINS

islature in a day. In April, teachers from all 120 counties called in sick to protest in Frankfort. Every public school district was closed. The governor's response was to say that because of us not doing our jobs that day, kids were getting molested and using drugs for the first time. He called us thugs. He said we weren't sophisticated enough to understand our own pension plan. They all think of us as babysitters, but I don't know any babysitters who are required by law

to do professional development every year or who need multiple master's degrees. I have to do my job while I defend my profession. It's exhausting.

Used to be we could retire in 25 years. Now it's 27. They move the goalposts. I don't mind failing as long as I'm failing forward, but this is sabotage. We used to be a country of opportunity. Now we're a country of hope. Hope is the tax they're always raising.

People in the margins are being pushed off the page.

If you're not vigilant, you get taken advantage of. We have to be alchemists, turning nothing into something, forcing a system built to fight us into something that somehow works. It's not democracy; it's oligarchy.

I see a lot of politicians in this country thinking the point of power is to see how they can use laws to make money. Citizens exist only as donors or lobbyists. The powers that be define America by control, not freedom. I question

often that I'm even a person to them.

It's not a poverty you feel in your bank. You feel it in your mirror. There's wealth that's not monetary. It's in community, culture, knowledge, experience, and engagement. As long as we measure a person or our nation by the stock market, we will always be poorer than we realize.

VIEW



**NICOLE ADKINS**

Executive Director  
& Founder  
God's Grace Mobile  
Food Pantry  
Dayton

In our area, a lot of the jobs that were coming in are going out. The pay rate is not as high as it used to be. Many of our factories have been outsourced to other locations. Businesses that closed have left families searching for jobs. The jobs they do find are giving lower amounts than before. People have to figure out if they are going to pay their monthly bills or buy food for their families.

A lot of people don't realize that many of the homeless have jobs. The more you work, the more you get punished for trying to better yourself. We see families that were getting food stamps suddenly get a raise that puts them over that margin. They now have no choice but to come to a pantry to get food for their families.

—As told to  
Carson Kessler

**KNOCK THE HUSTLE**  
Larrilou Carumba walks the picket line in front of the San Francisco Marriott Marquis. A new union contract includes a wage increase.



**UNITED STATES  
OF DIVISIONS:  
A GLOSSARY**

**MIDDLE CLASS**

The class to which most Americans think they belong, this group lost its status as the U.S. economic majority in 2015. The term was first used in the 18th century to describe people who were neither nobles nor peasants.

**AMERICAN DREAM**

Though this specific term was popularized by historian James Truslow Adams in 1931, the concept of opportunity (often through meritocracy) in the New World predates the founding of the United States itself.



○ COURTESY OF UNITE HERE; CHRISTENSEN: COURTESY OF JANELLE CHRISTENSEN

## JUGGLING SERVICE JOBS IN THE SAN FRANCISCO BAY AREA

BY JONATHAN VANIAN

● **FOR MORE THAN SIX YEARS**, Larrilou Carumba has been tirelessly cleaning rooms at the luxurious San Francisco Marriott Marquis hotel, which hosts thousands of executives each year who congregate to the Bay Area's lavish tech conferences. Carumba, a single mother and an immigrant from the Philippines, works full-time. She also has several side hustles. Still, she barely has enough money to provide for her children, who get meals from their school's free lunch programs.

In addition to her housekeeping, Carumba has been working at a laundromat, where she's paid under the table. She recently began delivering meals for DoorDash too. The extra cash helps pay bills for her family of four, who all sleep in the same cramped bedroom of her sister's home in San Leandro, outside of Oakland. Her sibling took her in after Carumba's family was evicted from their one-bedroom apartment. The landlord renovated the place, then increased the rent—an all-too-common practice in one of the world's most expensive places to live.

During her most difficult times, Carumba says, she was working 70 hours a week. A typical day: Clean hotel rooms for hours, sleep after work from exhaustion, reawaken to work at the laundromat. Her children often woke her so she wouldn't miss her night job. "I felt burned out with my life because all I do is work, work, work," she says. "I cannot see my kids. I don't have a life anymore. I cannot take care of myself." The only quality time she would have with her children was when they would accompany her on her DoorDash deliveries.

There is hope. As a union leader, Carumba recently helped score a new contract for Marriott hotel workers that includes a wage increase. Soon, she says, she may finally quit one of her after-work jobs.



**JANELLE CHRISTENSEN**

Executive Director  
The Family Support  
& Treatment  
Center  
Drem, Utah

There is stigma around assistance programs. Many of the [child and parent counseling] programs we offer are subsidized by government grants, private foundations, things like that. We get asked a lot: "Are people gaming the system?" It doesn't happen very often.

Most of the time, it's hard for these families to ask for help. Parents feel like they're failures because they are unable to take care of their family because of their lack of connections or resources.

It shouldn't be an us-vs.-them mentality. It shouldn't be a handout, but a hand up. As a society we can do a better job of supporting people so they don't feel like they have to choose between a job or kids.

—As told to C.K.

### WORKING POOR

According to the U.S. Bureau of Labor Statistics, this population—which totaled 8.6 million Americans in 2015—works at least half the year but makes less than poverty-level income.

### SAFETY NET

Designed to prevent individuals from falling into hardship, the American safety net consists of support from employers (i.e., benefits) and the government (including Social Security, Medicare, and food stamps). —Erika Fry





VIEW

**BEAU G. HEYEN**President and CEO  
NourishKC  
Kansas City, Mo.

**We put the poor in a box, we put the rich in a box, and then we want a middle box because we're nervous to commit to which one we belong. We want to pretend that the middle class exists.**

**Poverty is when you don't have enough. Maybe we need to talk about more than just low wages. We're doing a disservice to those we're trying to help when we label which programs are for people in poverty. For our flagship program, the Kansas City Community Kitchen, we serve breakfast and lunch five days a week for free. It's designed for anyone who doesn't know where their next meal is going to be. We are all one moment away from food insecurity. We as a community have to look at what we can do to lift people up. We just have to be willing.**

—As told to C.K.

## STRUGGLING AT THE SUPERSTORE

AS TOLD TO **CARSON KESSLER**

● **MY NAME IS** Dio Gourley. I'm a 19-year-old trans man of the he/him variety who lives and works in coastal Mississippi as a door greeter at Walmart.

I work between 23 and 35 hours a week at \$11 an hour. I can't have a second job because of how unpredictable my schedule is. If I request certain days off, I'd lose hours. Walmart is the best-paying job in town in the poorest state. If we went on strike, they wouldn't bat an eye at firing us. We can't organize without risking getting fired.

I get to work with a ride from my great-aunt. If I have time to meal prep, I can eat for two weeks on \$60 or less. If I have money and don't bring something from home, I eat at Waffle House right across from us. I try to tip more than 15%, but that's not much when you only have triple hash browns and a coffee. Some of them need it more than I do. We're all in this together.

My mom stays up until 11 p.m. to bring me home, even though she gets up for work at 5:30 a.m. When I was a kid, before Hurricane Katrina, my dad worked offshore, and my mom painted houses. We were living with my grandmother and great-aunt for four years. After that, we lived in a trailer. Dad ended up dying of alcohol withdrawal—he didn't realize

he had pneumonia. Government checks kept us afloat while Mom was between jobs. And by afloat, I mean picking and choosing which bill gets paid that month.

I now live with my mom again, after a brief stint with a boyfriend and a roommate. Honestly, we weren't making it. Money is part of why I returned home. Both of my siblings have moved back at various points. It saved them money on babysitting, but to be completely honest, I didn't eat to make sure my nephews could. Mom was the same way. A meal of grits and some cheap junk food every day and lots of sweet tea to keep the blood sugar up high enough to get things done.

We put our bills in a bag and draw one or two at random when the money's tight. My plan isn't to move out; it's to build a cabin on the lot next to us for Mom to live in, so we can take care of each other for as long as she's still here. Less rent and mortgage that way.

If there is an "American dream," it's really a nightmare. Two jobs to keep up, three to get ahead. Everyone around me keeps getting poorer. I've got friends who haven't been able to catch up on bills enough to save \$400 to go visit family, while the people working us to death are buying third and fourth yachts. How is that a dream?

22

NUMBER OF TIMES FEDERAL MINIMUM WAGE HAS BEEN RAISED SINCE IT WAS ESTABLISHED IN 1938.

IT'S CURRENTLY \$7.25, SET IN 2009

1968

PEAK YEAR FOR REAL VALUE OF FEDERAL MINIMUM WAGE, AT ALMOST \$20,000 ANNUALLY IN CURRENT DOLLARS. TODAY'S IS ABOUT \$15,000

OXFAM AMERICA



## Work/life balance? Not a chance

Caregiver Mary Lou Angel's top customer is her 92-year-old mother, Lois.

**FAMILY AFFAIR**  
Lois Carbajal (left) in her Fresno home with her daughter Mary Lou Angel.

● I HAD my own business: Mary Lou's Hair Salon. With three employees! It was a dream. It was hard, but I'd say, Okay, so it's a hard day or a hard week—but one day I'll retire and take that cruise. I had to retire early, at 62, to take care of my mother. Those first three years were hard because I waited until 65 to collect Social Security. And, really, it just stayed hard. No cruise now. No cruise ever. Not

anymore. Best we did awhile back was a day trip to Morro Bay. It was pretty, but it wasn't much time.

My mother is 92 years old. She worked in the fields, picking tomatoes or cotton. She's illiterate. She never thought she'd make it much past 60 or 70. Now here she is, 92, in denial about needing a hearing aid. She's diabetic and about \$300 of her monthly \$928 goes to medicine. I get \$11 an hour

through Medicaid for being her caregiver—about \$400 every two weeks, after taxes and dues—but we're trying to get it to \$15.

Every other day, I come over to her apartment. We each live alone, but we get to be alone together, if that makes sense. I'll cook for her and feed her and bathe her. Maybe we watch an old John Wayne cowboy movie together. A few months ago, she had a minor stroke. I thought she might die. I realized how much my life has jumped ahead. I'm 72 but I feel kinda 90 now.

I'm very thankful for the 99¢ store. And I go to a church

where God welcomes you as you are. I don't buy new clothes anymore. Best I'll do, splurge-wise, is buy makeup for my mom. Pink lipstick. I don't know what kind of pink—there are lots of fancy pinks at real stores, but when it's from the 99¢ store, it's just plain old pink. We'll put that on and feel 50 again. That's enough. Not that we have choice about it, but it's enough in the heart. It's not about what you have. It's what you bring.

—As told to R.M.



# THE MATH OF A VANISHING CLASS

GRAPHICS BY NICOLAS RAPP TEXT BY MATT HEIMER

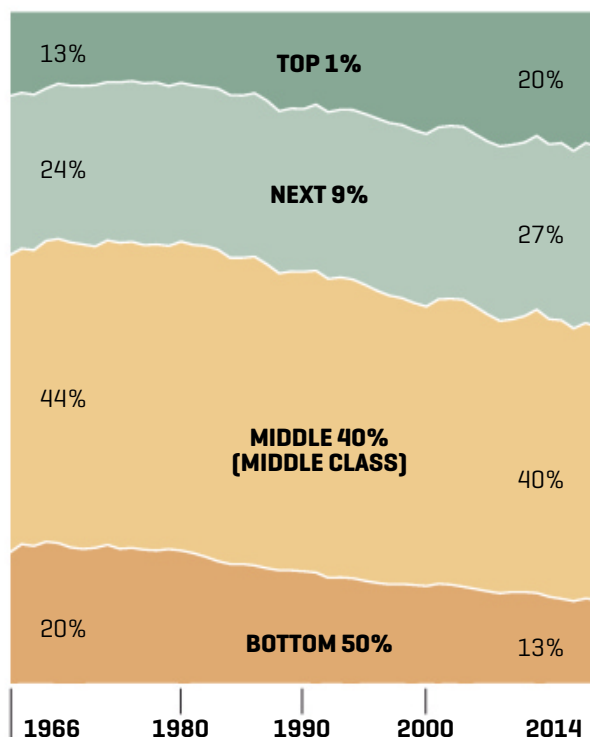
**THE AMERICAN MIDDLE-CLASS IDEAL** was forged in the decades after World War II, when economic growth and wage increases climbed in lockstep for nearly 30 years. That pairing dissolved abruptly in the 1970s. Between 1973 and 2017, according to the Economic Policy Institute, the productivity of the economy grew 77%—but average compensation rose only 12.4%, adjusted for inflation.

This divergence coincided with a shift in economic gravity, away from manufacturing and toward services and “knowledge industries.” That shift weakened the labor unions that had helped rank-and-file workers in many professions claim a bigger share of the bounty. Just as important were tax reforms that favored investment and real estate earnings over wage income. (See chart, below left.) The upshot: an economic order in which the capital-owning class enjoys great advantages—and the costs of admission to and exclusion from that class grow ever higher.

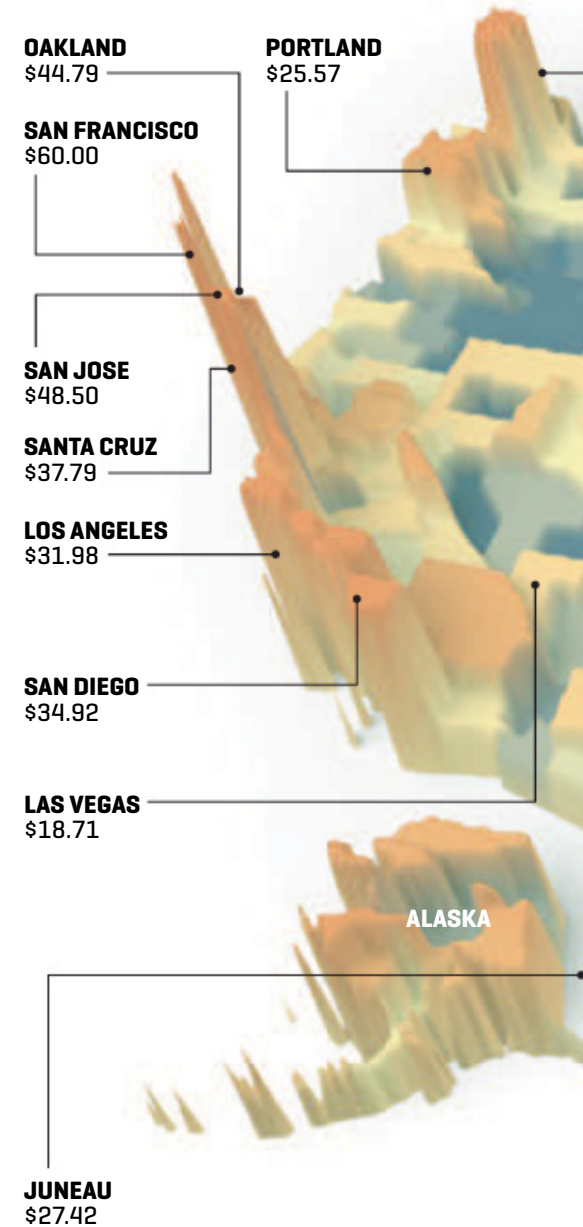
## TO THE VICTORS GO THE SPOILS

Tax breaks for investors and property owners have helped concentrate wealth among the top 10%. The growing impact of higher education on earnings has had a similar effect. Since 1995, average income for graduate degree holders has risen 28%; for those with only a high-school diploma, that figure is 5%.

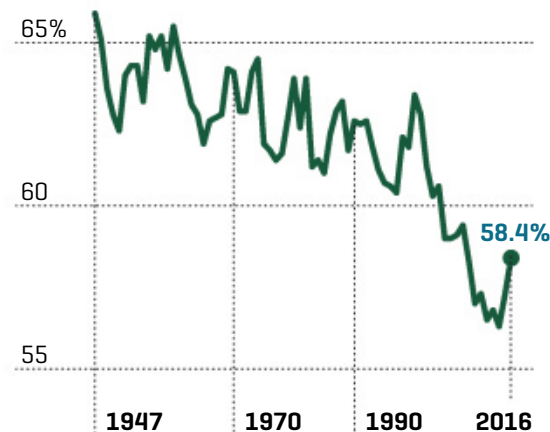
DISTRIBUTION OF U.S. NATIONAL INCOME (PRETAX)



## THE TIGHTENING SQUEEZE OF CITY LIVING



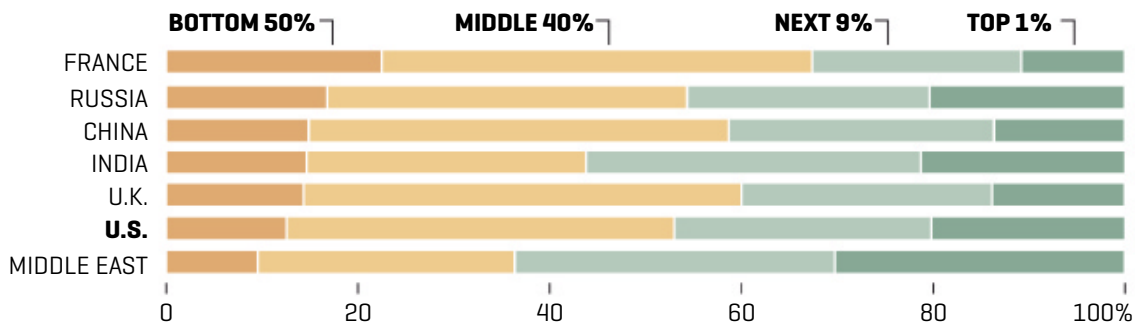
LABOR'S SHARE OF OUTPUT (NONFARM)



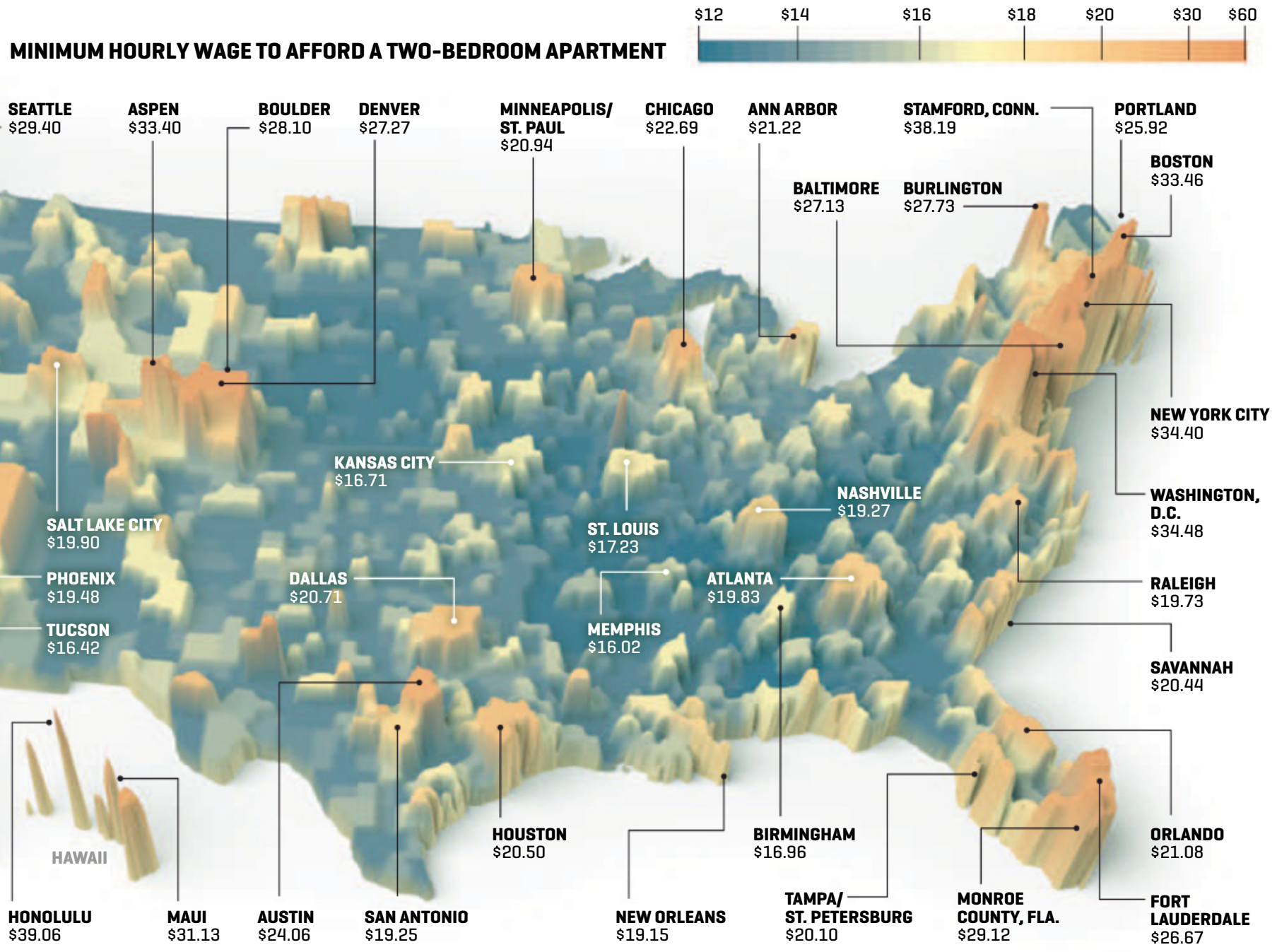
## IN AWKWARD GLOBAL COMPANY

The bottom 90% of U.S. earners take home a smaller share of income than do their counterparts in most industrial economies—including in far less free societies like China's.

DISTRIBUTION OF NATIONAL INCOME (PRETAX)



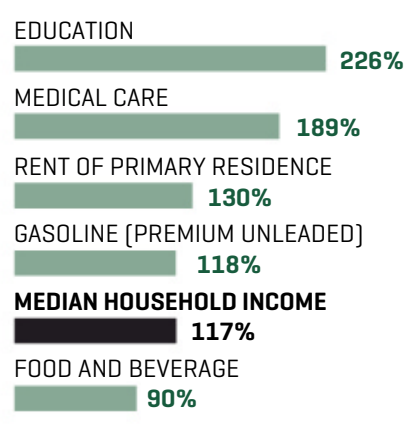
The information revolution has increased the concentration of jobs in certain U.S. cities, especially in a few hotly competitive coastal metro areas. That dynamic has driven housing costs beyond what many middle-class earners can afford, making it harder for them to save for home ownership or other financial goals. (The median U.S. hourly wage was \$27.35 in November; it's lower in most of the Midwest and South.)



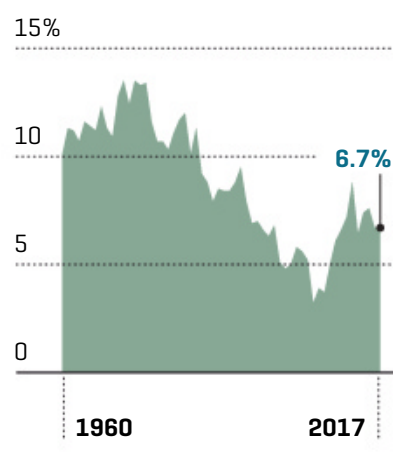
## PURCHASING POWER AND SAVINGS WANE

Incomes haven't risen as fast as rent, medical costs, or tuition—three of the biggest burdens for U.S. households. As a result, savings rates have declined, leaving middle-class earners more vulnerable to being bankrupted by an emergency or a job loss—and less able to put away money for retirement or for future generations.

### GROWTH IN PRICES, 1990–2018 (CURRENT \$, U.S. CITIES)

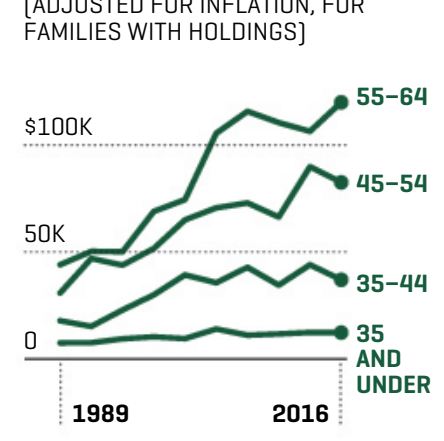


### U.S. PERSONAL SAVINGS RATE



### MEDIAN VALUE OF RETIREMENT ACCOUNTS BY AGE

(ADJUSTED FOR INFLATION, FOR FAMILIES WITH HOLDINGS)





# 2

## HOW WE GOT HERE AND WHY

DISSECTING THE FORCES BEHIND THE GROWING INCOME GAP



**Our neighborhoods are failing us.** Dying business corridors hurt the middle class.

**THE SOUTH Shore neighborhood** boasts a lakeside park with commanding views of Chicago's skyline. It's only a 25-minute commute by train from the downtown Loop. It features stately brick homes that sell for \$500,000 and up, magnets for professors and doctors.

What South Shore doesn't have, however, is a supermarket. It hasn't had one since 2013, when grocery giant Safeway shuttered its Dominick's subsidiary and closed all its stores. More than five years later, the hulking storefront at Jeffery Plaza that neighbors still call "the Dominick's" remains vacant. For

many residents, its emptiness is a dual affront: It's a symbol of the hollowing-out of the local middle class and an obstacle to working people struggling to get ahead.

"This has always been a 'first house' neighborhood," says Carlo Rotella, a Boston College professor and South

Shore native whose history of the area, *The World Is Always Coming to an End*, will be published in April. Its orderly brick bungalows were financial cornerstones for thousands of middle-income families—including those of Oracle cofounder Larry Ellison and Michelle Obama. But Rotella estimates that

3,000 South Shore residents lost factory jobs in the 1960s and 1970s. And the Great Recession hammered the area's teachers, managers, and service workers, leaving many upside-down on their mortgages.

As families left town or slipped down the economic ladder, household income in South Shore dropped; it's now about 40% below the national average. That helps explain why Jeffery Plaza is the only one of 11 former Dominick's in



**GOING SOUTH**  
In Chicago's South Shore neighborhood, residents have to travel 2.9 miles on average for groceries.

Chicago that hasn't been acquired and reopened by another grocery chain. Not coincidentally, South Shore residents travel an average of 2.9 miles to buy groceries, a greater distance than residents of any other Chicago neighborhood, according to research by the JPMorgan Chase Institute.

That's a modest inconvenience for upper-income professionals. But it's been "the biggest disruption to our middle-class and

working families," says Val Free of the Neighborhood Network Alliance, a community development group. A six-mile roundtrip can be a prohibitive time suck for hourly-wage earners, especially if they're juggling childcare or depending on public transit. So more households shop at local bodegas,

whose higher prices eat into lean budgets.

A city commission approved a \$10 million tax subsidy to bring a retailer here, but a deal remains elusive. To local activists, getting a grocer is an existential necessity. To nurture the middle class, Free says, "you need strong business corridors."

—Matt Heimer

## THE GIG ECONOMY SQUEEZES WORKERS

BY JEFF JOHN ROBERTS

● FOR MILLIONS of Americans, work brings income but none of the secondary benefits—such as health insurance, paid holidays, or retirement contributions—associated with employment. Though many folks who forgo benefits do so by choice for the autonomy and flexibility (and some are able to plan for retirement independently), a recent McKinsey survey of 162 million non-payroll workers in the U.S. and Europe classified 23 million as "reluctants," who would prefer to be in the regular workforce (26 million more were characterized as "financially strapped").

App-based gig employers like Uber and TaskRabbit have helped drive the ratio of payroll workers to contract or freelance workers from 8.3 to one in 1997 to six to one today. This arrangement often overlaps with hardship. A 2018 study of California gig-economy workers conducted by the Public Religion Research Institute found that →



## GIG ECONOMY (CONT.)

→ 48% struggled with poverty. It also found that gig workers reported higher rates of abusive labor practices and racial discrimination than those who worked as employees.

There is also anecdotal evidence the gig economy is taking a punishing toll on workers. In New York City, eight cabbies have committed suicide in 2018 alone—spurring some to highlight the fact that Uber and Lyft have driven down wages.

As the gig economy has expanded, so, too, have initiatives to improve the labor conditions that go with it. Most notably, there are calls for a “portable benefits” regime that would oblige companies like Uber to make mandatory contributions to a health or 401(k) pool that would follow workers across different gig jobs. There is support for such a regime in Congress, notably a bipartisan bill from Senators Mark Warner (D-Va.) and Todd Young (R-Ind.), but the initiative is currently stalled. According to the Brookings Institution, the best hope for workers is now with state and city governments, including a Washington State proposal that would require companies that rely on workers taxed under 1099 status to make contributions to nonprofit “benefit providers.” Still, there’s a long way to go before these “gigs” equate to jobs.

## BECAUSE BEING STRAPPED IS EXHAUSTING

BY LISA MARIE SEGARRA

● LINDA TIRADO caused a firestorm in 2013 after a blog post detailing her experience trying to make ends meet went viral—and some conservative critics accused her of not being poor enough. It led to the publication of her book, *Hand to Mouth: Living in Bootstrap America*, which details the contradictions that many Americans bouncing back and forth between technically “poor” and barely middle class are facing: You can go to private school and end up not making enough to live on. You can be married to a veteran and not be able to afford dental care. You can work 16 hours a day and struggle to keep the lights on. We asked Tirado what three things she wishes people better understood about this increasingly common existence:

### LOW-WAGE WORK IS CHRONICALLY STRESSFUL:

“People can very easily imagine having to stand 20 hours in a row one day. But they can’t imagine what it’s like to be on day 14 of that, or then to get a one-day break and go back to another 16 days. The cumulative impact is that you’re more and more exhausted as time goes on.”

**IT’S EXPENSIVE:** “If you’re buying a roll of toilet paper for 99¢, you’re paying an insanely inflated price. But upfront, you only have to pay 99¢. Now if you’ve got \$50 and you can go to Target and get a multipack, you’re buying it at 19¢ a roll. And that same economy of scale applies to everything else.”

**IT DEFIES LABELS:** “There’s this genteel poor that we’re seeing more and more of. This middle-class poor where they don’t have \$400 in the bank for emergencies. But they do have access to \$50,000 on a credit card, so they’re keeping up appearances, and they wouldn’t think of themselves as poor.”

6.6X

WEALTH GAP BETWEEN AMERICA’S UPPER-INCOME AND MIDDLE-INCOME FAMILIES IN 2013, THE HIGHEST LEVEL ON RECORD

PEW RESEARCH CENTER

43%

AMERICAN HOUSEHOLDS IN 2016 THAT COULDN’T AFFORD BASICS LIKE HOUSING, FOOD, CHILDCARE, OR HEALTH CARE

UNITED WAY ALICE PROJECT

## BLAME PRIVATE EQUITY

BY RICHARD MORGAN

● SINCE 2008, PRIVATE equity has quintupled to \$5 trillion. As with the opioid crisis, America is addicted to its quick fix of financial painkiller—despite the pain it also causes. “Their superpower is obscurity,” says Diane Standaert of the Center for Responsible Lending. Apartments, colleges, hospitals, prisons—it’s often “private equity behind the curtain,” borrowing heavily to buy companies, then wringing cash from holdings to repay the loans and pay dividends to investors. That can leave workers last in line. Toys “R” Us, Claire’s, Radio Shack, and Sears were all gutted by private equity this year. Indeed, labor leaders made headlines for securing a \$20 million severance fund for Toys “R” Us’s 30,000-plus workers, but that was out of \$75 million owed. “It’s not a condemnation of profit,” says Standaert. “It’s a condemnation of the basic business practice.” Adds Jim Baker of the Private Equity Stakeholder Project: “These are people’s lives reduced to lines in ledgers.”

VIEW



**TIM CHEN**

CEO and Cofounder,  
NerdWallet

For the 40% of Americans who don't have the cash reserves to cover a \$400 emergency expense, payday and other high-cost loans may be the only options when they face an unexpected cost. But these loans quickly drain pocketbooks, as interest rates balloon into the triple digits.

Fortunately, the Office of the Comptroller of the Currency has proposed a solution: national banks and federal savings associations could offer short-term, small-dollar installment loans. These loans, for \$300 to \$5,000, are now a \$90 billion market. If banks follow the OCC's advice, consumers could have new options with trustworthy lenders that enable them to pay their bills, build credit, and return to the road of financial solvency.

CHEN: COURTESY OF NERDWALLET



## Luxuries? They aren't on the menu

Memphis cook Bobby Hagebusch, 43, rises at 5 a.m. for work—and eats alone.

**I'M A PREP COOK ON BEALE STREET.** Been doing it eight years. At \$13.50 an hour. I didn't want to ask for more than that. I'm not greedy. Every day three alarms wake me up at 5 a.m., and I ride my bicycle five miles to work. I make sauces, soups, pastas, salad dressings, six desserts—an important job but low on the totem pole. I bring home \$1,400 a month after taxes, but \$650 goes straight to rent, even though I have a roommate. Money is so awful. What luxuries do you choose? My luxuries are my friends. No dates, though. They'd have to be okay with a beer and a shared app. And who is okay with that? —AS TOLD TO **R.M.**





## Looking for opportunity, finding little *Walter Ware, 40, relocated for a better life—and found it just didn't add up.*

**I STARTED IN RESIDENTIAL TRASH** in 1998, riding on the back of garbage trucks in eastern Michigan when I was 22. Eventually, I went to get my commercial certification and started driving. Last fall I moved with my girlfriend to Georgia. With five kids in the house, we thought our money would go further. I transferred to a driver position serving affluent communities like Alpharetta. But the pay was less than two-thirds what I had been making. I bring home \$188 a day. We're struggling. It takes three of my checks for us to meet the rent. This was like setting me back 20 years. —AS TOLD TO **GRACE DONNELLY**

VIEW



### RASHIDA TLAIB

Democratic  
Congresswoman-  
elect for Michigan's  
13th Congressional  
District

The rate at which leaders roll over and beg corporations to set up shop is alarming. Just four years after Detroit's bankruptcy, we've had two billionaires and one megacorporation ask for millions of dollars in public money for private developments.

So more working-class communities are creating community-benefits movements requiring corporations that want public handouts to enter into legally binding agreements demanding sustainable resources for host communities. From capitalizing housing trust funds, which allow low-income people to fix up and stay in homes, to creating job training programs in schools, these economic stimuli will give families the opportunity to thrive.

TLAIB: CAROLYN KASTER—AP/REX/SHUTTERSTOCK



## BLUE-COLLAR WOES ...

BY EMMA HINCHLIFFE

● **SINCE THE RECESSION** of 2008, blue-collar work has been booming. One problem: These workers are still mostly men. Men hold three-quarters of the 15.4 million U.S. manufacturing jobs, leading to what economists refer to as “occupational segregation.” Meanwhile, women are overrepresented in other “middle-skill” industries that don’t require a degree (such as health care and eldercare) and that provide less security and fewer opportunities for full-time work. The Institute for Women’s Policy Research reports that in 2016, women represented 83% of workers in middle-skill jobs paying less than \$30,000 a year—but only 36% of workers in occupations requiring similar levels of training and paying at least \$35,000 a year. Experts say societal bias plays a part in this type of job segregation, but a study from the National Partnership for Women and Families also reported that 74% of low-income (non-welfare) women said childcare was a barrier to employment—one factor among many leading women toward part-time, lower-security work.

## ... HEALTH CARE WORRIES ...

BY SY MUKHERJEE

● **43.3 MILLION.** That is the number of working Americans living in families that struggled to pay medical bills in 2017, according to the Centers for Disease Control. And while that figure is actually an improvement over many previous years, it still means that some 16% of U.S. residents under the age of 65 had trouble paying their medical bills—including more than 12% of people classified as “not poor” by the government.

Consider: Employer-sponsored private health plans—which covered 56% of Americans younger than 65 in 2017—saw average premiums rise 5.5% for family plans last year, while out-of-pocket deductibles now siphon off 4.8% of all workers’ median income.

That last bit might be the most revealing when it comes to the health care crunch. Premiums, deductibles, and medical costs generally have been rising, but income hasn’t kept pace for the middle class. With Obamacare under fresh attack in the courts, experts don’t see downward pressure on costs for individual consumers anytime soon. The bottom line? Even if you’re lucky enough to be covered by an employer plan, you’re still feeling the squeeze.

## ... AND DEBT BURDENS

BY DAN REILLY

● **THE STUDENT DEBT** crisis may soon force another generation to subsist on ramen: parents. Given the elimination of caps for federal Parent PLUS loans, rising college tuition, and changes in the tax code, typical parent borrower liability rose from \$6,200 in 1990 to \$38,800 in 2014. For 3.4 million Americans, PLUS loans can fund the dream of higher education, but if the parent or student can’t repay, they can cascade into a nightmare of accruing interest, ruined credit, and depleted emergency funds. PLUS borrowers can be approved even if they have existing debt, and payment plans are eligible to be capped monthly at 20% of the parents’ discretionary income—so that can mean more money, for now, and a bigger burden later. Another minus: Under Trump administration changes, if your child withdraws, the loan will be forgiven, but the balance is taxed as income. Sadly, parent loan repayment tends to be the worst at shady, for-profit institutions, which often overpromise and underdeliver when it comes to giving kids degrees that pay off in the real world.

VIEW



**JOSH HOXIE**

Director, Project on Opportunity and Taxation, Institute for Policy Studies

Even black and Latino families who have achieved the traditional markers of middle-class life—a good-paying job and a college degree—still lag far behind their white counterparts in terms of wealth. Changing our priorities around tax incentives, as well as investments in bold new programs like Children’s Savings Accounts (CSAs) and a federal jobs guarantee, could reverse the decades-long rise in the racial wealth divide. Had Congress instituted a robust universal CSA program in 1979—seeding small savings and investment accounts for all children, which could mature—the white-Latino wealth gap would have disappeared by now, and the white-black gap would have dropped by 82%.



## 3

## HOW WE CAN FIX IT

COMPELLING IDEAS FOR NARROWING THE ECONOMIC DIVIDE

## RAISE WAGES (OR SHOULD WE?)

BY PHIL WAHBA

● **IF THE BIG PROBLEM** with low-wage jobs is that they don't pay enough to live on, the answer seems obvious: Mandate wage raises. Many local governments such as Chicago and Oakland and Seattle have done just that—in Amazon's hometown, the minimum wage

will rise to \$15 by 2021, well above the federal minimum wage of \$7.25 an hour. Some corporations, grappling with a shortage of employees, are following suit: In October, Amazon said it would raise its minimum hourly wage to \$15 nationwide. At Walmart, it's \$11, the result of three hikes since 2015 for its 1.3 million U.S. workers. Target has pledged to lift starting wages to \$15 by 2020.

But is it helping workers? The answer is... complicated. A number of new studies, released last fall, show a decidedly mixed picture. In Califor-

nia, a team from UCLA studied the restaurant industry and found that when the minimum wage was gradually bumped up to \$8 in 2008, earnings rose more than 10% at fast-food chains, but employment fell by about 12%. Another move, this time up to \$10.50 in 2017, lifted earnings 20%, but employment fell another 10%. And a group of University of Washington researchers found earlier this year that the net effect of a two-part minimum-wage increase in Seattle was fewer hours, effectively meaning that low-wage workers brought home \$125 less per month, with the hit to their pocketbook much more pronounced on the second increase. By contrast, a UC-Berkeley study looking at seven U.S. cities that had implemented higher minimum wages found a benefit to wages, with little effect on employment levels.

There's little question that as wages rise, companies are redoubling efforts to automate. Target, CVS, and Kohl's are deploying more self-checkout machines, while Walmart is reportedly testing floor-cleaning robots. This holiday season, Walmart is also bucking convention by not hiring more seasonal workers. Further analysis is required, but for workers, higher wages may be a double-edged sword.

## FIND OUT WHETHER UNIVERSAL INCOME WORKS

BY RICHARD MORGAN

● **AMEYA PAWAR**, a puckish 38-year-old second-term Democratic city councilman in Chicago, has a master's degree in threat and response management and is channeling that expertise unusually: He's running for city treasurer in hopes of mending the poverty crisis the old-fashioned way—with wads of no-strings-attached cash. He aims to pilot a universal basic income program by giving 1,000 needy families \$500 a month.

Pawar, who says he spends 80% of his \$108,000 salary on a combination of childcare and paying off his more than \$200,000 of student debt, is following in decades-old Republican footsteps.

"Thanks to Republicans' Alaska Permanent Fund, we already have universal basic income in this country and have had it since 1977," he says. The fund, which is now around \$65 billion, pays annual oil revenue dividends [typically around \$1,000] to every Alaska resident as an incentive to live there. Pawar wants to set up something similar with Chicago's →

VIEW



**TIM SCOTT**

Republican  
Senator,  
South Carolina

Growing up, my single mother—my rock and biggest supporter—worked 16-hour days as a nurse’s assistant to keep a roof over our heads. I failed four classes in high school and almost didn’t graduate. So when people talk about the “working poor” in America, I have a first-hand account. We need to make sure that folks who grew up in poverty like I did have open doors. My Opportunity Zones legislation aims to help economically underdeveloped communities realize their full potential. Investors and philanthropists who fund projects in these areas can defer capital gains taxes, allowing for job creation and economic growth.

—As told to  
Jake Meth



## Bright lights, big bills in New York City

Her nine-to-five medical billing job doesn’t pay enough, so mom of two Kamik Chin drives for Uber.

**BY DAY I’M DEALING WITH** crying kids and irate parents, and by night I’m dealing with drunks and crazy people. Each year we get a raise, but for the past two years, we haven’t. My kids are getting bigger. My bills are more. And my income [about \$42,500] is staying the same. Now when my kids are home with me on the weekends, it’s during the day, and I’m sleeping because I’ve worked all night. And by the time I wake up, it’s time to feed them, bathe them, and then take them back to their dad’s. I love my job, but I want to find something where I can work a straight nine-to-five and be okay. —AS TOLD TO **ARIC JENKINS**



UNIVERSAL INCOME [CONT.]

→ freshwater supply from Lake Michigan, which the city currently sells to suburbs. “The moral sickness in American politics is the idea that some people are more deserving of help than others. I want to break the narrative of deserving and undeserving. We all deserve to share America’s promise.”

Y Combinator, which funds startups, has its own universal basic income experiment, which it plans to launch this summer with the University of Michigan after several delays. Critics argue a well-worn refrain that more research is needed. Pawar agrees—with a catch. “The research can’t ask, ‘Will people cheat?’ or ‘Will people lie?’” he says. Instead, he asks, “‘Can we strengthen familial networks? Can we build more social flexibility? Does money help?’ We haven’t done anything big since the Great Society in the ‘60s. We’re stuck worrying about cures or preventions.”

If elected treasurer, Pawar plans to work with the likes of incoming Rep. Alexandria Ocasio-Cortez for guidance on investment (and divestment). He also wants to persuade treasury counterparts in Cleveland, Detroit, and Milwaukee to join his UBI experiment and serve as a national model. Surprisingly, he says, some of his biggest supporters are the wealthy and privileged. “They know their wealth is based on the system working,” he says. “For too many of us, it’s not.”

## TIE POLITICIAN PAY TO VOTER INCOME

● **BILL DE BLASIO**, the mayor of New York City, campaigned as a fighter against income inequality back in 2013. But once in office, he gave himself a 15% raise, to \$258,750. The ostensibly liberal City Council followed suit with their own 32% raise, to \$148,500. The council’s \$36,000 raise alone is more than the average individual income citywide. Fast-forward to last year, when the enriched mayor and council courted Amazon (owned by Jeff Bezos, the richest man in the world) with \$3 billion in subsidies.

On the flip side are lowly state legislators. In 44 states, they are paid far less than the median household income for their state. (In New Hampshire, they’re paid just \$100 a year.) It means only the wealthy can afford such posts. Then they trickle up into higher office. A 2014 analysis by Peverill Squire, a political science professor at the University of Missouri who has studied American →



## The future of Coal Country

The long road back for a one-industry town.

PHOTOGRAPHS BY BRUNO SILVA

For the full video, visit [Fortune.com](https://www.fortune.com).



● **WHEN SCOTT SHOUBE** was growing up in Hazard, Ky., the playgrounds and streets were teeming with people, and the town had country clubs and golf courses.

But now his hometown, a burg of 5,000 people some 120 miles southeast of Lexington in the heart of Kentucky's Coal Country, is a shadow of itself. "Today, there's no downtown business," says Shoupe, a fourth-generation coal miner who now works at the local economic development agency, Mountain Association for Community Economic Development

(MACED). "The homes are falling down because they've been vacant for so long," he says. "There are no jobs here."

Perry County, home to Hazard, now has about 29,000 people, down from 50,000 in the early 1950s. And some 27.4% of the population lives below the poverty line, far more than the national average. Peter Hille, president of the MACED, says 2012 was a tipping point, when many coal-mining jobs in Eastern Kentucky evaporated as natural gas prices fell below those of coal. Employment in the sector fell by half

"almost overnight," he says. Unemployment in the broader region has stood at about 10% for years. These days, the top employers include a group of regional hospitals, a rehab center, a UPS sorting facility, and a call center. For Shoupe, a wage of \$16 to \$20 an hour now qualifies as good money—"but it's still not like making coal-mining money," he says, when he earned almost twice that.

The town faces an uphill battle in diversifying its economy. But residents are trying.

Hazard entrepreneur Joey McKenney founded Appalachian

Apparel Co. in 2017, designing and making products himself. He recently opened a store in downtown Hazard, hoping to be the spark that revitalizes a once-vibrant city center.

McKenney says he's been told that he wouldn't be successful because the coal industry is fading. His response? "There are people here who refuse to give up." —P.W.

**HAZARD PAY** Residents of this Kentucky town seek a post-coal revival. Among them are former miner turned nonprofit worker Scott Shoupe [center row, left] and entrepreneur Joey McKenney [bottom row, center].



VIEW



**CHUCK ROBBINS**  
CEO, Cisco

Those who are completely destitute and those who work full-time still need the same thing: housing they can afford. Our country is facing a nationwide affordable housing crisis. There is not a single state, county, or metropolitan area in the country where a person with a full-time minimum-wage job can afford a modest two-bedroom apartment. We recognize that there is an affordable housing crisis in Silicon Valley, and that housing is desperately needed for both low- and moderate-income families as well as the homeless. Our five-year, \$50 million commitment to Destination: Home complements public funds made available through Santa Clara County's Measure A to build more supportive housing units, faster.

—As told to J.V.

POLITICIAN PAY (CONT.)

→ legislator pay back to 1619, determined that the best way to align elected officials' interests with the public's is to tie state legislators' salaries to the state's median household income. In 2018, he found median nationwide income for state legislators was \$32,611, despite a national median household income of \$59,039.

"Voters think they save money by keeping salaries low. But it actually guarantees they'll be ruled by the rich, who tend to legislate by lining their own pockets and ignoring or even hurting those who have less," says Squire. If pay were changed, he argues, it would make state and citywide legislative roles more viable for average citizens, who would be more empathetic to people like themselves.

In Congress, 40% of which is populated by millionaires, incoming Rep. Alexandria Ocasio-Cortez has vowed to "walk the walk" by becoming one of four congressional liberals to pay interns \$15 an hour. She's taking the lead from Republicans; a 2017 study by Pay Our Interns found 51% of Senate Republicans paid interns vs. 31% of Senate Democrats. Another fair-pay bastion? Alabama. In 2015, it became the first (and only) state to tie state legislators' salaries to median household income. —R.M.

## TAKE A PAGE FROM DENMARK'S PLAYBOOK

BY CLAIRE ZILLMAN

REWIND TO the 2015 U.S. presidential debates, and you may recall Denmark's unexpected moment in the spotlight, when Democratic candidate Bernie Sanders extolled the nation's "accomplishments" for "working people." Rival Hillary Clinton, shot back: "We are not Denmark."

No, but with the fourth-worst poverty rate in the Organization for Economic Cooperation and Development, it may be worth looking at what Denmark, with the lowest rate of poverty among wealthy nations, is doing. While it's obvious that a high-tax, high-benefit "comprehensive welfare state" is excellent at eradicating true poverty, what's interesting about Denmark is that spending is not reserved for just the poorest. "The middle class also benefits," says Michael Förster, an OECD senior policy analyst. Indeed, Denmark directs more social spending toward working-age people than any other OECD country.

What does that look like exactly? All told, 98% of households with children 15 and under in Denmark receive financial assistance. And that's just the beginning. Other benefits that fall to the middle class include free college tuition and health care, job-training, as well as a robust system of subsidized childcare. Students over 18 who live on their own receive a monthly subsidy of around \$933 [even those living with their parents receive \$145]. Danish corporations utilize a model known as "Flexicurity"—when layoffs are necessary, a system of training and job assistance kicks in. Denmark's system, then, is more like a safety harness: The goal is to prevent people from falling into poverty in the first place. In that sense, we're certainly not Denmark, but perhaps it's time to reconsider whether our "safety net" approach is enough.

### POVERTY LEVEL IN SELECTED OECD COUNTRIES

COUNTRY	POVERTY LEVEL (%)
DENMARK	5.5% OF THE POPULATION
FRANCE	8.1
NETHERLANDS	8.3
GERMANY	10.1
U.K.	11.1
CANADA	14.2
MEXICO	16.7
U.S.	17.8
BRAZIL	20
SOUTH AFRICA	26.6

NOTE: MOST RECENT NUMBERS AVAILABLE, COLLECTED BETWEEN 2013 AND 2016; SOURCE: OECD



#### THE LIBERAL TAKE

## Pramila Jayapal thinks we all need to do better by workers.

**SYSTEM FAILURE**  
U.S. Rep. Pramila Jayapal (D-Wash.) wants to even the playing field.

● **TOO MANY PUNDITS** and economists want to join the White House in saying that our economy is strong because unemployment is down and GDP is growing. But the 8.9 million Americans who work full-time and still live in poverty certainly don't think the economy is booming. Neither do the 40% of Americans who struggle to meet a basic need, such as buying food or covering rent, or the 62% who don't even have \$1,000 in their savings account for an emergency.

The fact is, GDP growth means nothing when 90% of it goes to the top 1%, as is true today. And while unemployment is low, wage growth has been stubbornly slow and not keeping pace with inflation. It's past time that we acknowledge a simple truth: an economy in which workers don't benefit from the profits they help produce isn't strong—it's broken.

Congress needs to take action to restore

the power imbalance between workers and employers. First, Congress should pass the Raise the Wage bill and immediately lift wages for 41 million workers. The bill would raise the minimum wage to \$15 an hour and index it to growth in the median wage. Because of government inaction, the real value of the minimum wage has steadily eroded for decades and is now 25% lower than it was at its inflation-adjusted peak in 1968. Poverty rates for African-Americans and Hispanics in particular would be almost 20% lower if the minimum wage had kept up with inflation.

Second, Congress can restore the broken link between corporate profits and wages by putting a stop to the growing practice of corporate executives handing their profits to shareholders rather than to workers. Before the Securities and Exchange Commission made it easier for companies to buy back their stock in 1982, S&P 500 companies spent only about 2% of their profits on buybacks. Last year, those same companies spent 59% of their profits on buybacks. Congress should pass the Reward Work bill, which could result in billions of dollars in increased wages by putting a stop to open-market stock buybacks and ensure that workers have a seat at the table to fight for their fair share of the value they create.

The American people are demanding this as well. This past election brought a historic wave of the most diverse candidates from red and blue districts across the country, sent to fight for the people. They don't want a handout. They just want us to even the playing field and give them a fair shot. Democrats control only one legislative body, but this is the moment for us to put forward a bold vision and stand up to the biggest corporate interests that stand in the way of ensuring that we all move forward—together.

TURN THE PAGE to read U.S. Senator from Florida Marco Rubio's take on these issues.



**THE CONSERVATIVE TAKE****Marco Rubio** believes business can do better—but so can government.

**DREAM DEFERRED**  
Senator Rubio (R-Fla.) says his own parents' rise would not be possible today.

**FOR TOO LONG,** Washington and New York have presented American workers with a false choice: economic growth for the few *with* redistribution, or economic growth for the few *without* redistribution. Neither framework results in an economy in which regular Americans can provide for a family with their own labor. They deserve a different option.

My parents came to this country as immigrants and built lives worthy of the American dream. But since I was born in the 1970s, the share of men between ages 25 and 34 earning less than \$30,000 a year has almost doubled. Like my father, most of these men do not have an education beyond the equivalent of a high school degree. My mother worked most of her life as a maid, a profession with a median annual income of less than \$23,000.

The solution cannot be simply to get

a degree or retrain every time a job is outsourced or eliminated. Workers are not machines that can be broken down, upgraded, reassembled, and shipped across the country to the next area of high demand. They are moms and dads who pay rent, with kids who have friends in their schools and on sports teams, and grandparents or family nearby. Building a life is as much about stability as it is about pay.

The solution also cannot be a new round of government checks designed to buy off the financial security of the working poor. Work is about creating value. There's a connection between the dirty shirt or aching feet at the end of the day and the paycheck that fulfills a deeply human need for purpose.

The kind of stability that comes from a good job is only truly possible when Americans work for productive businesses that grow, innovate, and invest. Part of what our country lacks is a consensus on how to create more of these stable and high-paying jobs. While the work of developing one is just beginning, some general goals are clear: more corporate investment in products and R&D over financial engineering; a more balanced system of international trade that makes the U.S. the unquestioned home of next-generation technologies; and a more pro-family system of social insurance. While not all of these require government solutions, some policies I have proposed will help. Expanding the immediate deduction for capital expenses from the 2017 tax law, pursuing a strategy to compete directly with the Made in China 2025 industrial plan, and passing national paid parental leave and an expanded child tax credit are all projects that I will continue to dedicate my time to.

There is no economic future for American workers without productive businesses. It should be the work of politicians and businesses alike to build an economy that boldly creates the American products and jobs of the 21st century.

## ASK AN ECONOMIST: HOW CAN WE SAVE THE AMERICAN DREAM?

BY ERIKA FRY



**JAMES ZILIAK**  
Professor of Economics, University of Kentucky

● **FOCUS ON CHILDCARE**, says Ziliak. Its price has skyrocketed, outpaced only by the cost of higher education in recent years—out-of-pocket childcare consumes, on average, 16% and up to 25% of incomes—and it’s a major reason behind the nation’s declining labor participation rates, says Ziliak. He proposes overhauling the childcare tax credit, limiting eligibility to families with incomes below \$70,000, and making the credit refundable and more generous. [The idea got attention from the Obama administration and a handful of senators but never made it out of committee.]



**JEFFREY SACHS**  
Professor of Sustainable Development, Columbia University

● **HEALTH CARE MUST BE A PRIORITY**, says Sachs. We could emulate Canada or Australia by adopting a single-payer system. Sachs also recommends empowering workers to organize, providing better school-to-work transition programs [e.g., Germany’s apprenticeship model], and overhauling the economics of higher education so they don’t constrain the choices of future workers. He advocates a 21st-century land grant program that would slash the cost of education. Also on his list: a wealth tax and a serious infrastructure program that would equip the labor force with new skills and jobs.



**ESTHER DUFLO**,  
Professor of Economics, MIT

● **FOLLOW THE DATA**. Duflo has shaken up the economics world with a radical premise: Aid programs should be tested and evaluated with the same rigor as prescription drugs, through randomized controlled trials. She thinks we could see big gains by taking small steps to stop the poor from falling through the existing safety net. Many schoolchildren missed out on free lunch programs until the Bush and Obama administrations simplified the sign-up process, she explains. The same could be done for food stamps and disability benefits, which are often overly complicated to access.

## ADDRESS THIS GULF BEFORE IT KEEPS GROWING

BY LISA MARIE SEGARRA

● **SHE WROTE** the book on working poverty—literally. Barbara Ehrenreich’s *Nickel and Dimed: On (Not) Getting By in America* gave many middle- and upper-middle-class Americans their first raw glimpse of what it’s like to survive on the wages of a waitress, sales clerk, maid, or other low-paying job in various states.

Since the book’s publication in 2001, a lot has changed, including how Ehrenreich tells the stories of those in poverty. As a journalist in the ’80s and ’90s, she felt like a respected part of the middle class, making a comfortable living to support her family. That’s changed. “At a certain point around 2009, I realized that I could keep doing this only because I had savings from the royalties of the book *Nickel and Dimed*, and I thought, ‘Okay, that’s wonderful. I can do this.’ Then I said, ‘Wait a minute: What am I saying? You have to be rich

to write about poverty? That’s sick.’”

Indeed, in the past two decades, she’s seen the stress and uncertainty that dogged hourly workers 20 years ago spread. Things got worse, both for the so-called middle class but also for lots of other people working in lower-wage jobs, she says. “One of the strikingly bad developments is the rise of ‘just-in-time employment,’ where you just wait and get a call from your boss to come in. So you don’t know from one day to the next what you’re going to be earning.”

Though she cites some improvements here and there (more access to health care, movements to raise the minimum wage), she’s worried—both by street protests in countries like France and by the increase in anger toward immigrants all over. As she puts it, people don’t always act rationally when they “see their own life chances diminishing.”

More and more, she says, the economic choices of the few have left a huge swath of Americans living with a “tremendous amount of anxiety.” And it’s not just maids and hourly workers, she warns. It’s contract workers, shift workers, teachers, Uber drivers, small-business owners, the middle class. It might even be you. ■

# The Ghosn Show

**One of the most talented automotive executives of his generation is behind bars in Japan.**

What now for the alliance he forged?

**By DORON LEVIN**

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**Carlos Ghosn, 64, has been stripped of his chairmanship of Nissan and Mitsubishi.**

# W

**WHY BUSINESS MERGERS FAIL** is a topic of endless study. And the \$5 billion rescue of Nissan by French automaker Renault in 1999 looked like one more folly in the making, what skeptics at the time analogized as “tying two rocks together to make them float.”

In this case, the skeptics were mistaken. The Renault Nissan Alliance has proven itself to be a vibrant, stable, competitive, and profitable global mobility business—neck and neck with Volkswagen Group to be the largest automaker on the planet by number of cars sold. But now the future of Renault Nissan (with Russian automaker AvtoVAZ and Mitsubishi Motors added to the alliance) is suddenly in doubt, owing to the incarceration in Japan of the alliance’s architect and theoretician, chairman, and chief executive: Carlos Ghosn. Since his arrest on Nov. 19, the 64-year-old occupies a small cell in Tokyo where he is fed rice three times a day, indicted on charges of underreporting his income from Nissan to Japanese authorities.

Whether the charges have merit is not yet known, though Japanese prosecutors have a conviction rate that exceeds 99%—one of the highest in the G20. But the fallout has already been felt in the alliance and across the wider automotive industry. Within a week of Ghosn’s arrest, the boards of Nissan and Mitsubishi voted to strip him of his chairmanship. As this issue went to press, he remained CEO and chairman of Renault.

The worst outcome for the alliance would be a prolonged period of uncertainty without resolution. For GM, Toyota, Volkswagen, and other top automakers, every day of uncertainty for Renault Nissan potentially translates into more competitive advantage.

“Vehicle projects are multiyear affairs, sometimes costing billions of dollars,” says Karl Brauer, executive publisher of Kelley Blue Book. “Not knowing who is running the company or what the company will look like freezes everything,” Brauer says. “A week lost isn’t good; months lost are awful and will come back to haunt them.”

Ghosn was a relatively unknown Renault executive vice president who had earned the nickname “Le Cost Killer” when he was handed the mission of leading several dozen French executives to find a way to fuse two automakers—nearly bankrupt Nissan and chronically underperforming Renault—into one

healthy enterprise. Typically, the stronger company, in this case Renault, might have simply acquired Nissan, eliminated redundancies, and merged the two companies into a larger one that could benefit from global efficiencies of scale. But Renault was cautious, having earlier burned its fingers in a disastrous transatlantic acquisition of a big stake in American Motors and an abandoned attempt to merge with Volvo.

Nissan, with 140,000 employees and a pillar of the Japanese economy, was leery of takeover as well. It had already passed on a proposal from DaimlerChrysler. In lieu of acquisition, Renault’s Paris brain trust suggested an exchange of equity in which each automaker would own a minority of the other, allowing both to keep their independent identities, albeit under the strong influence of Renault, itself owned in part by the French government.

Ghosn, tasked with making the relationship work, decided that Nissan’s Japanese business practices—lifetime employment, promotion by seniority, loyalty to longtime suppliers—were obsolete and had to be scrapped. Thanks to his own multiethnic background, he also realized that Japanese and French business cultures were too dissimilar to meld forcibly. (Born in Brazil, educated in Lebanon and later in Paris, Ghosn speaks five languages.)

At the 1999 Tokyo Motor Show he presented a three-year Nissan revival plan: reduce debt, close five plants, eliminate 21,000 jobs, and introduce new vehicle models around the world, taking advantage of shared platforms that could vastly reduce development and production costs. Ghosn promised to quit his position as Nissan COO if the company failed to return to profitability the following year.

“The top management first and the management will be accountable for delivering the committed performance—all of it,” he said. “I know and I measure how much effort, how much sacrifice, and how much pain we will have to endure for the success of the Nissan revival plan. But believe me, we don’t have a choice, and it will be worth it.”

The task of figuring out what was redundant, whose architecture to use, and where vehicles should be built was complex and often accompanied by tense debate. Under Ghosn’s style of management, projects designed to reduce costs had to be agreed upon by both manufacturers. The goal was consensus: If a project doesn’t work for both sides, it doesn’t work at all.

“When managers would reach an impasse

and turn to Ghosn for a decision, he pushed the decision back to them,” says Rachel Konrad, who served as the alliance’s director of marketing communications until 2016. “People have this inaccurate belief that he’s this powerful executive issuing directives and firing off orders. He’s not like that at all. He almost always forces managers and directors to consider the bigger picture and to accept responsibility.”

Their backs to the wall, Ghosn and his globe-trotting management team delivered, and by 2003 Nissan was one of the most profitable carmakers in the world. He was named Renault CEO in 2005 and Nissan CEO in 2008, the first executive to lead two *Fortune* Global 500 companies simultaneously. A superhero in Japan, his accomplishments were celebrated by the media, including a starring role in a Japanese comic book. By accomplishing what many had deemed impossible, Ghosn established himself in the auto industry as a miracle man.

Ford Motor Co. twice attempted to hire him, first as chief operating officer in 2003. Ghosn rejected the offer, insisting that he required complete authority: “Just tell Bill (Ford Jr.) that I’m his man—provided I’m CEO and chairman,” Ghosn told Ford’s human resources chief, according to author Bryce Hoffman in his 2012 book *American Icon*.

Billionaire investor Kirk Kerkorian was so impressed with Ghosn’s execution of the Nissan turnaround and management of the alliance that in 2006 he persuaded Ghosn over dinner in Nashville to pursue an alliance with General Motors, the nose-diving auto giant in which Kerkorian owned a 9.9% stake. Kerkorian’s hidden agenda appeared to be the insertion of Ghosn and his cost-saving ideas into GM’s executive suite. Talks with GM management fizzled after three months.

One of Ghosn’s few command directives, issued to silence squabbling and resolve indecision among executives, concerned the Leaf battery-powered vehicle. (Some in the company believed that their relatively short range, high cost, and charging concerns would deter potential customers from EVs.) He ordered the go-ahead for the \$5 billion project in 2007 and introduced a prototype in 2010. But EV sales have fallen short of his projections.

As Ghosn proved himself again and again to be the linchpin of the alliance, he also failed to persuade investors, the media, and competitors that he had a plan—as all mortal CEOs must—

## Carlos Ghosn by the Numbers...

2017 cars sold

**10.6**

**MILLION**

11% OF ALL GLOBAL CAR SALES

**3.8M**

RENAULT

**5.8M**

NISSAN

Ghosn annual salary

**\$16.9M**

SECOND-BEST-PAID AUTO EXEC, BEHIND GM’S MARY BARRA

Car companies responsible for:

**10**

1

10

NISSAN, RENAULT, MITSUBISHI, DACIA, LADA, INFINITI, DATSUN, RENAULT SAMSUNG, CMC, AND ZNA

Languages spoken

★★★★★

French, Portuguese, English, Arabic, and some Japanese

Continents worked in

★★★

North America, Europe, Asia

### March 1999

Alliance is inaugurated under principles set forth by Carlos Ghosn with Renault’s \$5 billion financial rescue of Nissan, the former buying 36.8% of the latter’s stock.

### October 2001

Renault increases its stake in Nissan to 44.4%, while Nissan buys a 15% stake in Renault.

### 2002

Renault and Nissan create Renault-Nissan BV, a strategic management company owned 50-50 by the two automakers and based in the Netherlands.

### April 2006

With encouragement from General Motors shareholder Kirk Kerkorian, the alliance and GM

explore the possibility of strategic cooperation. The talks fail.

### April 2010

Alliance announces strategic cooperation with Daimler AG worth 2 billion euros over five years.

### July 2012

Alliance announces investment of \$160 million in Renault Samsung Motors of South Korea for production of Nissan Rogue.

### December 2012

Alliance becomes controlling shareholder of AvtoVAZ, Russia’s largest carmaker.

### July 2013

Ghosn confirms development of a modular vehicle platform to be designed in India. It

becomes the first all-new platform designed from scratch by Renault and Nissan.

### October 2016

Nissan buys a one-third stake in troubled Japanese automaker Mitsubishi Motors, effectively adding the automaker to the alliance.

### September 2017

Ghosn announces “Alliance 2022,” a six-year plan to double annual synergies among alliance partners to 10 billion euros annually.

### February 2018

Alliance announces it has sold 10.6 million vehicles during the previous year, claiming top status as seller of light vehicles globally.



Ghosn faced suspicion from Nissan employees that he favored the French partners in the alliance.

for a future without him. One after another of potential successors left the alliance for various reasons. Nissan, in the meantime, evolved into the stronger of the two partners in financial terms, which inevitably led to grumbling in Japan that power, authority, and prestige remained disproportionately on the side of Renault and France.

As controlling shareholder of Nissan, Renault has the power to appoint the Japanese automaker's CEO. Ghosn may have hoped that giving up the top executive post and appointing Hiroto Saikawa to the job in April 2017 would defuse complaints from some at Nissan that the Japanese brand lacked a voice in the alliance. But it did little to dispel the perception in Yokohama that important decisions were being made by Ghosn and Ghosn appointees, with a bias toward France.

"The recurring rumor was that Ghosn had a secret plan to merge the two companies as a way of stamping out the tension," said one former Nissan executive, who asked not to be named for contractual reasons. "You would have to conclude that the only option to maintaining the advantages of working together would be to reframe the business relationship and the power relationship between the two entities."

A second former Nissan executive, who also declined to be named, opined that dissolving the alliance, while complicated

and susceptible to legal wrangling, might achieve the best outcome for shareholders.

"Building a global entity based on three automakers [including Mitsubishi] is a difficult thing to do because the size of the entire enterprise has become too unwieldy," he said. "The world changes around you, all the chaos of trade, CO<sub>2</sub> rules, and politics means you have to be flexible—it's not so easy at the alliance's current size.

"Much better are partnerships between automakers based on specific projects—a transmission or a vehicle architecture—rather than a relationship based on mutual ownership of shares," he continues. "Once you have a marriage, it's very hard to get divorced."

How, precisely, the tension between the alliance partners and the state actions of their home countries played a role in the downfall of Carlos Ghosn remains to be spelled out. What's sure is that he remains a singular CEO who during his tenure accomplished what many had believed to be impossible. ■

# Making Diversity Part of the Business Equation

At **Keysight Technologies**, creating an inclusive environment, working as one across boundaries, and fostering a broad range of talent generates a multiplier effect on success.



## SILICON VALLEY HAS BEEN CRITICIZED

in recent years for a lack of female representation within its ranks. At Santa Rosa, Calif.-based Keysight Technologies, however, promoting the advancement of women dates back to the 1970s, thanks to the strong relationship forged by its legacy company, Hewlett-Packard, and the Society of Women Engineers (SWE), dedicated then and now to helping women succeed in engineering and leadership.

Today, Keysight, the world's leading electronic measurement company, continues to support SWE in developing the female STEM leaders of tomorrow,



**“Over and over, we see the incredible value of bringing together a diversity of backgrounds, experiences, styles, perspectives, values, and beliefs. It’s a key asset to us.”**

**INGRID ESTRADA**  
Chief People and Administrative Officer  
Keysight Technologies

particularly among female collegiate engineering students. But that’s just part of its broader commitment to diversity and inclusion. “The key to our employees’ career satisfaction is our dynamic working environment and focus on One Keysight—that is, working together across functions, geographies, and backgrounds to create customer solutions,” says Ingrid Estrada, chief people and administrative officer. “The diversity, inclusiveness, and respect inherent in our work environment energize this One Keysight approach. Over and over, we see the incredible value of bringing together a diversity of backgrounds, experiences, styles, perspectives, values, and beliefs. It’s a key asset to us.”

The company has made frequent appearances on local, national, and even international Best Places to Work lists. While the company offers competitive benefits and compensation, Estrada says that what really makes it a great workplace is “our culture, without a doubt.” Keysight’s strong emphasis on work-life integration is often praised by its employees, who are “driven and passionate,” says Estrada, “and empowered by the trust we put in them to drive results and the flexibility to meet their obligations outside of work when necessary.”

Keysight’s efforts to promote diversity have also gained recognition. Last year, SWE awarded sales and marketing executive Liz Reutsch its Global Leadership Award, citing her roles in programs including Keysight’s Introduce a Girl to Engineering Day. And in March 2018, Keysight Technologies Malaysia received an Inaugural Career Comeback ReIGNITE Award from TalentCorp and Malaysia’s Ministry of Women, Family and Community Development. The award honors employers in that country who raise the bar in supporting women who are returning to the workforce after a career break.

While Estrada is proud of the recognition Keysight has received for its workplace diversity, she acknowledges there’s still work to be done. “Workplace diversity will always be a key component of our operating model,” she says. “Our success as an innovation company depends on it.” ■



# BIOCHIPPING:

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■ Biohax microchips are injected at a piercing parlor (above)—making chip-enabled locker rental (right) a seamless task.

# SCI-FI NO MORE

A black and white photograph showing a person's hand with a tattoo on the back, holding a small, rectangular device. The hand is positioned near a scanner or sensor on a dark surface. The scanner has a circular logo with a stylized figure. The background is blurred, showing what appears to be a control panel with buttons and a screen.

INJECTING CHIPS INTO HUMANS IS NOT ONLY POSSIBLE, IT'S ALSO INCREASINGLY LOOKING LIKE A PRACTICAL BUSINESS APPLICATION THAT MEANS NEVER LOSING YOUR KEYS OR FORGETTING YOUR PASSWORDS AGAIN.

BY VIVIENNE WALT



**DOWN A NARROW SIDE STREET** in the Swedish city of Gothenburg sits the Barbarella piercing parlor, a regular haunt for locals who decorate their bodies with piercings and tattoos, and which claims to offer the area's finest collection of ear discs and nose rings. But on a frigid evening in November, the shop is the setting for a very different kind of body enhancement: biochips. As darkness falls on the port town of nearly 600,000 people, Jowan Österlund wanders in, wearing a baseball cap and T-shirt, to meet two new clients for his small startup, Biohax International. From his backpack, he pulls plastic-wrapped syringes, each containing a tiny, dark microchip that is barely visible from the outside. Inside the unassuming package is Österlund's prized product, a window into what today is a fringe tech obsession but which, he believes, will one day be a giant industry. "You are creating an entirely new type of behavior and entirely new types of data that will be massively more valuable than what we have now," Österlund says. "It is kind of a moonshot. But in the long run, this is what is going to happen."

Perched on a stool in one of the piercing rooms, Österlund jams the needle into Claes Radojewski and pulls it out again, leaving a one-kilobyte microchip inside him, in the fleshy part between his left thumb and index finger. In a matter of seconds, Radojewski has become a trailblazing biohacker, much to his own surprise. "I have never even been inside a tattoo parlor," says the program manager for MobilityXLab, an innovation center in Gothenburg for the auto industry, run in partnership with Ericsson, Volvo, and others. "My girlfriend asked if it was some kind of crisis because I was turning 30 soon." In fact, Radojewski says he has wanted a biochip since he learned of the technology a few years ago: "In Sweden, we like to use new tech in our daily lives."

Österlund, the needle-wielding entrepreneur, is convinced that there are millions more around the world who will soon want chips implanted into their bodies. As proof, he points to his Facebook messaging app, which is jammed with unbidden requests every day from people as far away as Australia and Mexico. He also receives emails, he says, from curious investors "on every continent except Antarctica."

The enthusiasm of the curious notwithstanding, Österlund's progress has been slow. He began the company in 2013, committing to it full-time only in 2016, and its revenues remain minimal. At the moment, he says, "I get by. I am not getting rich." Will he, I ask? "Yeah. Oh, yeah," he says. In fact, Österlund, 38, could be at the groundswell of a big wave, in which more and more of the functions we perform on our external devices will shift to implants that we insert into ourselves. In November, a report by MarketsandMarkets Research in India estimated that the global biochip market would be worth about \$17.75 billion by 2020. And earlier in 2018, no less a futurist than Elon Musk announced he was backing a California company called Neuralink, which would implant electrodes in the brain to monitor thoughts.

Österlund's Biohax is already making progress on a small scale. It has "chipped" more than 4,000 people in Sweden as well as others across Europe. Though many biochip projects are focused on health uses like heart-rate or blood-sugar monitoring, Österlund is so far marketing his chips to people with no medical ailments. Applications range from making purchases to opening locks to passing through security barriers—anything, really, that we're already doing with chips on plastic



Jowan Österlund, the heavily tattooed founder of Biohax International, thinks one day it will be commonplace to inject chips into people's bodies. "This is what is going to happen," he says.

implanted about 150 microchips into people around Britain, the British business organization BCI said, "It makes for distinctly uncomfortable reading." The country's Trades Union Congress warned that biochips "would give bosses even more power and control over their workers." Recent problems suggest the need for careful oversight: A report by the International Consortium for Investigative Journalists revealed that medical patients in numerous countries had been injured by "poorly tested implants" (not all of them biochips) because of a lack of regulations for new devices.

And yet individuals enchanted by the technology are driving its early adoption. Among those who arrive at Barbarella wanting a Biohax chip is Annie Kjellson, 29, a structural engineer, who wheels her 18-month-old son through the door in his stroller and sits down to receive her injection. "I have been thinking about this for years," she says.

**D**ESPITE THE UNCOMFORTABLE SCI-FI oddity it represents, there is an inevitability around biochipping, if for no other reason than the sheer convenience it promises. The wallet in my purse slung over my shoulder is jammed with pieces of plastic, declaring me a gym member, a journalist, and a customer of two banks and a credit card company, all of whose passwords I occasionally forget. There are also cards giving details of my health insurance, which airlines I fly on, where I shop for groceries, and where I get my hair cut. Then there is my bunch of keys—primitive tools that have opened doors, chests, and lockers for thousands of years, and to which we somehow remain closely attached. The morning after I return from Sweden, I lock myself out of my apartment while racing to go play tennis. That requires a complicated handoff, by way of a taxi from five miles away, where another set of keys sits idling in my husband's pocket.

For biohackers, these antiquated habits are senseless. "I used to lose my keys all the time. Now I unlock the door to my house with my hand," says Aric Dromi, an Israeli-Swedish futurologist who has a Biohax chip implanted

cards. "Tech will move into the body," he says. "I am sure of that."

First, Österlund and other "chippers" will have to overcome understandable doubters, from privacy advocates to medical ethicists. Though the chips are inert and, therefore, theoretically harmless, for many people the very idea of having a permanent connectable device inside them evokes notions of losing control over the one sphere where they can still truly be themselves: their bodies. Invariably, even minor reports of companies using biochips ignite outrage. When BioTeq Ltd., a biochip company in England, said in November that it had

**"YOU ARE CREATING AN ENTIRELY NEW TYPE OF BEHAVIOR AND ENTIRELY NEW TYPES OF DATA."**



in his hand, and who sits on the advisory board of Hack for Sweden, the Swedish government's organization aiming to embed big data into all the country's public services. I saw that effort in action when I hopped aboard a Gothenburg-bound train with Österlund from the seaside city of Helsingborg, where Biohax is based. As the conductor came down the aisle, Österlund held out his hand, in which his ticket was embedded on his biochip. She swiped it without a thought: Sweden's entire national rail network is now biochip-capable. So too are many of the 172 gyms run by Nordic Wellness in Sweden, where gym members and staff can open the secure turnstiles and lockers with their hands and view their exercise profiles on monitors. Of course, electronic cards do the same thing in gyms around the world, but the biochip enables members to exercise without carrying anything on them.

Over espressos in Gothenburg, Dromi tells me he is convinced that millions of people will eventually have microchips in their bodies—perhaps in the near future—simply because it makes sense, at the very least in order to store their passwords and make keys redundant. Plus, he says, it is more secure than the items we currently lug around in our wallets and purses. I protest, telling

**GUINEA PIGS: Claes Radojewski and Annie Kjellson got "chipped," fulfilling longtime dreams of being on the cutting edge of technology. "In Sweden we like to use new tech in our daily lives," says Radojewski.**

him that an electronic fob unlocks my apartment building in Paris. "Yeah? Let's see it," he says. When I fish it out of my purse, he swipes it across the near-field-communication (NFC) reader embedded in his smartphone and then holds up the screen to show the string of data that unlocks both sets of doors to my building, 950 miles away. "I can clone this in five minutes," he says.

Biochips are far more secure in some ways. To break into Dromi's nearby house, for example, you would need to physically drag him there, demand to know where on his body his biochip is implanted, and move his hand across the NFC reader mounted on the doorpost.

NFC readers, effectively the enabling devices for biochips, are proliferating. Last June, the Car Connectivity Consortium, which includes the world's major automakers as well as tech companies like Apple and Samsung, agreed to a standard digital key system, allowing drivers to open their car doors and start the engine from an app on their smartphones. The agreement does not mention customers being able to insert the data for their car keys on a chip inside their bodies. But it would require almost no extra effort to do so, and every biohacker I meet in Sweden tells me that losing keys was one of the main motivations for being chipped. The chip is encased in medical glass, and it has a tiny antenna and integrated circuit that transmit data when close to an electronic reader. So far, Biohax chips have only one kilobyte of memory, but that will increase as the possibilities of what chips can do expand.

In fact, once you start viewing the world through the eyes of biohackers, more and more aspects of current life begin to seem absurd: the doctor's receptionist, for example, who digs out your personal medical record from a filing cabinet; the bus driver who sells you a paper ticket when you board; or the times you scrounge for change for a restaurant tip. All those things, and thousands more, could be managed with a biochip the size of a grain of rice. Biohackers call these endless, biochip-less actions "friction"—moments that divert our attention and hog space in our brains that could be better used for, say, writing poetry or playing with the kids.

The possibility of biochipping—and not just in science fiction books and films—has been around for years. As far back as 2004, the U.S. Food and Drug Administration approved an implantable chip for Applied Digital Solutions in Delray Beach, Fla., which aimed to have people store their medical records on a chip in their upper arm. The device could be lifesaving: If you were rushed unconscious to a hospital with no identification, doctors would instantly be able to scan your blood type, medical history, and organ-donor status. Yet three years after the FDA approval, the company said in a securities filing that it had failed to find a market for its chips, and that it "may never achieve market acceptance or more than nominal or modest sales." The company explained the failure by saying that physicians were skittish about discussing the device with their patients, who remained suspicious about invasion of privacy.

Biohackers say the criticism is uninformed.

## WHAT IT IS AND HOW IT WORKS

◦ **Similar to a chip in a credit card, a biochip has a tiny antenna and transmitter and works with near-field-communication (NFC) readers to unlock doors, buy train tickets, monitor gym workouts, and more.**

## WHERE IT GOES

◦ **Biochips are implanted under the skin. Biohax, for example, injects them into the fleshy part of the hand between the thumb and index finger. The chips are inert and transmit only when close to a reader.**

## WHAT IT CAN REPLACE

◦ **Anything that a plastic card does now: keys, ATM cards, gym-locker cards, bus tickets, office identification, and so on.**



They point out that because biochips are inert and passive they pose fewer privacy risks than smartphones, which continually transmit our whereabouts. Such logic hasn't stopped a drumbeat of scary stories about biochips ushering in an Orwellian system of control. Fictional portrayals of biohacking have also promoted a dystopian view of the future. "Every implant in any sci-fi movie is a tracker or an explosive device," Österlund says. "Look at *The Matrix* or *Blade Runner* or *Johnny Mnemonic*. The implant is always connected to something really creepy or bad."

There are probably few better places than Sweden to try to break those stereotypes. Engineers in Sweden, whose population is slightly bigger than New York City's, have invented the world's first Internet calling app, Skype; the largest music-streaming platform, Spotify; and one of the first mobile phone companies, Ericsson. Sweden is also almost cashless, with less than 1% of purchases paid for with banknotes and coins. "It is a cultural thing," Österlund says. "We have a faster adoption rate in Sweden, and there is probably a higher level of trust in our government than [in] many other countries. We aren't scared that we will be taken advantage of."

In some respects, biochipping is already well accepted. Swedes and others have long inserted biochips into their pets to find them when they get lost. And heart pacemakers, another type of biochip implant, have been in wide use for decades. Yet many people remain unconvinced about being chipped for digital convenience. "From a business perspective, it looks like technology for technology's sake," says Richard Oglesby, president of AZ Payments Group, a global consulting firm in Mesa, Ariz., that specializes in payments. "Implanting chips is invasive, unnecessary, and not particularly useful. There are wearable solutions that can easily and conveniently accomplish the same things."

Then again, it may be that biochipping hasn't yet caught on at scale because some of its adherents have sprung from the counter-culture universe of piercing parlors and tattoo artists, not from corporate engineering labs. Biohax's Österlund, for example, founded his first company, Cutting Edge, in 2004, as a body-piercing business that specialized in some far-out practices, like hot-steel skin

branding and septum piercing. In fact, almost every biohacker I met in Sweden was heavily tattooed, including Österlund, who lifted his shirt one night to show me a large inkwor of a woman stretched clear across his belly. (“You should see the rest of it,” he chuckled.) For many bodyhackers, it is an easy extension from tattoos and piercing to implants. “People find themselves extremely fascinated that you can alter body functions,” he tells me, as we zip up Sweden’s west coast on a high-speed train. “I am allowing my body to speak to machines. And it is a lot better being digital in a digital world than analog in a digital world.”

**I** F BIOCHIPPING IS EVER TO TAKE OFF, of course, it will need to become a real business. Österlund is doing what he can, starting with attempting to raise capital for Biohax. He says a Swedish investor, who remains unnamed, made a “six-figure” investment in Biohax in December. And Österlund claims that he has lined up about 100 doctors and nurses to work with Biohax to implant chips, once he has formally commercialized the business beyond its current tattoo-parlor stage.

In late November, Biohax signed a partnership deal with Verisec, an information technology security company in Stockholm, to provide an electronic-identity platform for Österlund’s biochips. That would allow Biohax chips to be used for regular electronic payments, not just for those within closed environments like a staff cafeteria, and to store documents like driver’s licenses and passports. Österlund calls the deal “the beginning of the big time.”

In the U.S., the use of implants to measure glucose, heart murmurs, and other conditions has risen steeply in the past few years, all devices that until recently were available only as external monitors. “It is a short leap to having that on a chip that’s inside you,” says Raj Denhoy, a medical technology analyst for Jefferies Financial Group in New York City, who believes the growth trajectory for biochips will be steep. “The use of clinical data to drive better treatment outcomes is something that is going to get much, much bigger,” he says. “To the extent that biosensors allow medical interventions to be better, that is undeniable.”

Little by little, biochips are going main-

**“WE WANT TO HAVE AN INSANELY ROBUST PLATFORM AND SAFEGUARD EVERYONE’S INTEGRITY AND PRIVACY. IT CANNOT TURN INTO THE WILD WEST.”**

stream. Three Square Market, a tech company in River Falls, Wis., claims to have chipped 673 people in the U.S., including 85 of its employees, who are using the device for “personal data retention and some for door access also,” according to CEO Todd Westby, who first tested the technology on Biohax chips. “At this point, we are still developing and learning its capabilities,” he says. Last summer, reps from Japanese companies working on the Tokyo Olympics committee visited Österlund to see how they might use biochips for the smooth running of the Games.

Across Sweden, too, Österlund has become a featured attraction at corporate events, where he shows up with a stock of syringes, ready to inject anyone who wants to be chipped. Last March, he demonstrated Biohax chips to PricewaterhouseCoopers executives in Malmö, on Sweden’s border with Denmark. Måns Liljenlov, PwC’s regional marketing chief, immediately signed up and now unlocks his office and locker and buys lunch at work with a wave of his hand. He says he is planning to renovate his house this year and install chip readers instead of keyholes. When I reach him in late November at a gathering for clients in Helsingborg, he tells me his

1: SUMMIT ENTERTAINMENT/COURTESY EVERETT COLLECTION; 2: WARNER BROS./COURTESY EVERETT COLLECTION; 3: TRISTAR PICTURES/COURTESY EVERETT COLLECTION; 4: CHANNEL 4/NETFLIX; 5: WARNER BROS./PHOTOFEST; 6: UNIVERSAL PICTURES

## GHOSTS IN THE MACHINE

The idea of biochipping may seem outlandish in real life, but



Biohax chip has proved a valuable conversation topic with clients. “People keep asking me for my business card,” he says. “I tell them I don’t have business cards, but they can swipe my LinkedIn profile, which is in my biochip.” The profile pops up on someone’s smartphone when he brushes his hand against the screen. “People say, ‘What? You’re joking!’” he says. “Then they all want to feel my hand.” (They can feel all they like, but they won’t detect the chip buried beneath his flesh.)

Other established companies also are calling. In October 2017, Tui Group, the world’s biggest travel company, invited Österlund to Stockholm, where it has its regional headquarters, for a demonstration of his wares. Österlund was overwhelmed with requests and returned twice to fulfill all the orders; now about 100 out of 500 staffers are chipped. “I think I was the very first to get chipped in the office,” says Alex Huber, managing director of Tui Nordic, which oversees Sweden, Denmark, Norway, and Finland. Now chipped staff can wave their hands to enter their offices in Stockholm, buy lunch, and print documents on office printers. Huber says he is baffled by the resistance to biochips. “This is a mental barrier we have to get over,” he says. “Our phones do a lot more.”

For Österlund, the challenge now is to try to seize some of the market share for biochips before being trampled underfoot by bigger companies, which could begin mass-producing their own. Though he knows of efforts to launch biochips in Britain and Germany, he believes that Biohax is “way out in front.” Biohax chips are made by NXP Semiconductors in Hamburg and assembled in Shenzhen, China. But Österlund aims to manufacture in Sweden starting this year. Dromi likens this stage to the very start of electric vehicles: “Is Biohax going to be the biggest in the market? No one can know that. Are they going to pave the way for mass acceptance? Yes.” One single decision could turn Biohax into a major player, Dromi says—for example, if the Swedish military or Ikea begins to use them. “From day one, it would be a really big thing.”

For now, Biohax is testing its systems and installing better security and privacy provisions on the platform. “We could roll out in 26 countries next week and sell and sell and sell, but it would not be a very responsible thing to do,” Österlund says. “We want to have an insanely robust platform and safeguard everyone’s integrity and privacy. The most important thing is that this does not turn into the Wild West.” I suggest to Österlund that an even worse outcome would be an authoritarian government, or company, compelling people to be chipped in order to control them. “Oh, no,” he says. “Please, I hope that will not happen.” Better to leave that possibility to sci-fi movies. ■

it’s old news for fans of science fiction. Here, some highlights from the past few decades. **By ARIC JENKINS**

### 1 ENDER’S GAME [1985]

• Young children in author Orson Scott Card’s envisioned future of Earth [the 2013 film adaptation, left] are equipped with “monitors” on the backs of their necks to gauge their potential for Battle School—a necessary training for humankind in the face of a looming alien invasion. The devices survey nerve impulses to determine a child’s mental and physiological fitness for the grueling war-preparatory academy.

### 2 DEMOLITION MAN [1993]

• Twenty-two years after the “Great Earthquake” of 2010, San Angeles—the combined metropolis that emerges from the rubble of L.A., San Diego, and Santa Barbara—is seemingly crime-free. How? Radio-frequency identification chips implanted in the hand track the exact location of residents at all times. The chips have also replaced paper currency, as residents use credits to complete transactions.

### 3 JOHNNY MNEMONIC [1995]

• Before Keanu Reeves navigated *The Matrix*, he played a “mnemonic courier” with a cybernetic data storage device implanted in his brain. The implant enables him to deliver secret information too sensitive for standard computer networks. But it comes at a price: His childhood memories are excised from his brain to make room for the implant. When Johnny decides to surgically remove the device to recover his missing past, things get complicated.

### 4 BLACK MIRROR: “THE ENTIRE HISTORY OF YOU” [2011]

• The final episode of the British anthology’s first season depicts an alternate reality in which “grains” implanted behind the ear can record audiovisual memories. Users can rewind and replay memories from any point in their lives. While that sounds useful, it proves to be exhausting for a couple (played by Toby Kebbell and Jodie Whittaker) who struggle to reconcile the past and live happily in the present.

### 5 BLADE RUNNER 2049 [2017]

• A glimpse of the tiny glowing orb perched below Jared Leto’s ear suggests his character, Niander Wallace, could be robotic, like the “replicants” Wallace manufactures as a scientist and businessman. But Wallace is actually human, and blind: He uses the chip implant to see via flying drones controlled by the device. Perhaps not the most realistic application of microchip technology, but it certainly makes a great trait for a villain.

### UPGRADE [2018]

• A critical darling at 2018’s SXSW film festival, *Upgrade* tells the story of a mechanic (Logan Marshall-Green) implanted with an A.I. chip that enables him to regain control of his body after he’s paralyzed as a result of a mugging. But the device, dubbed “STEM,” does more than let him walk. It gives the protagonist superhuman strength, which—you guessed it—he uses to exact revenge on his assailants.





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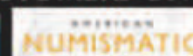
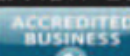


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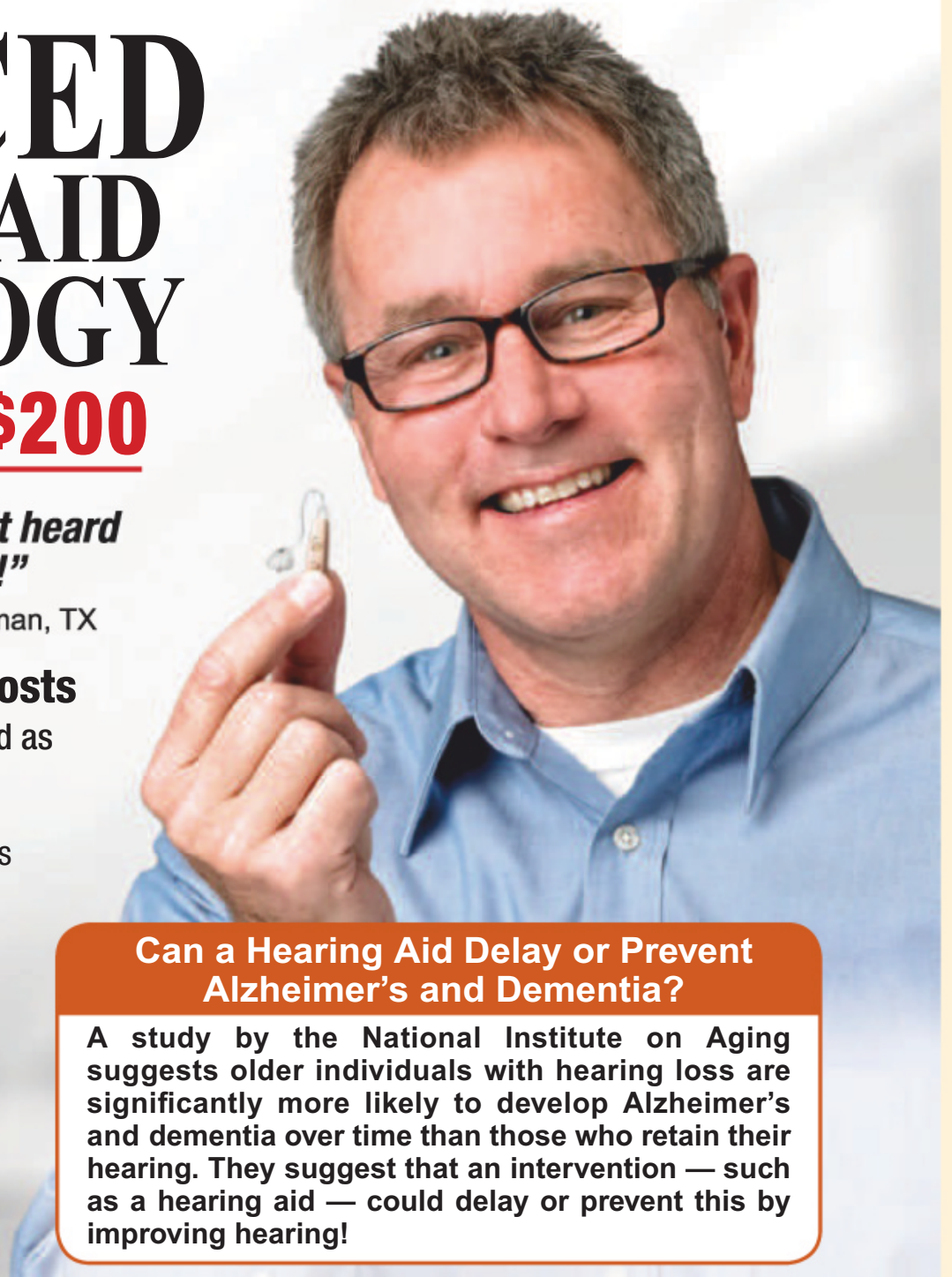
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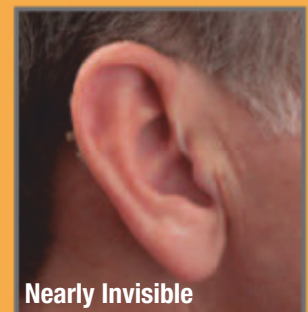
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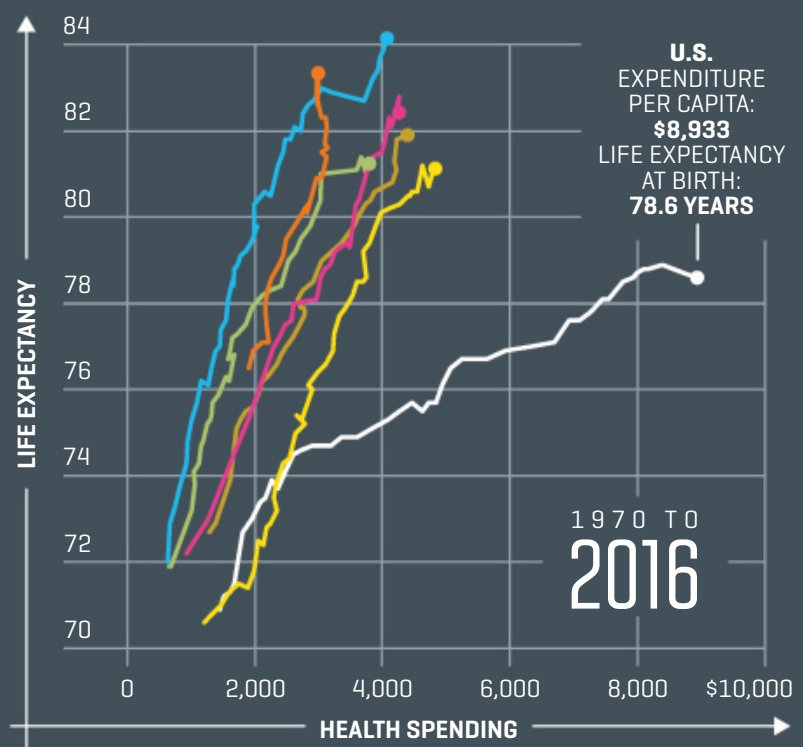
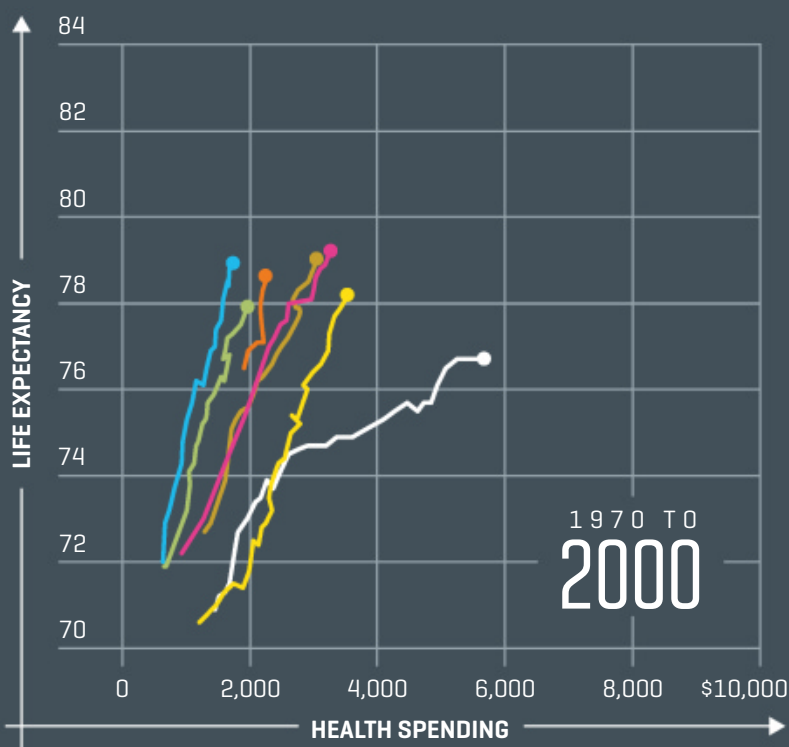
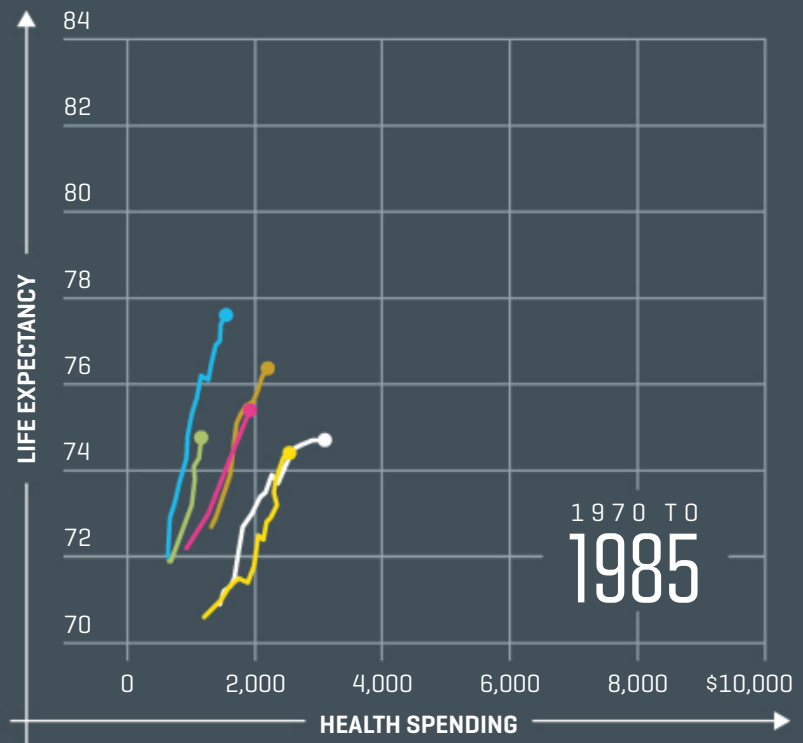
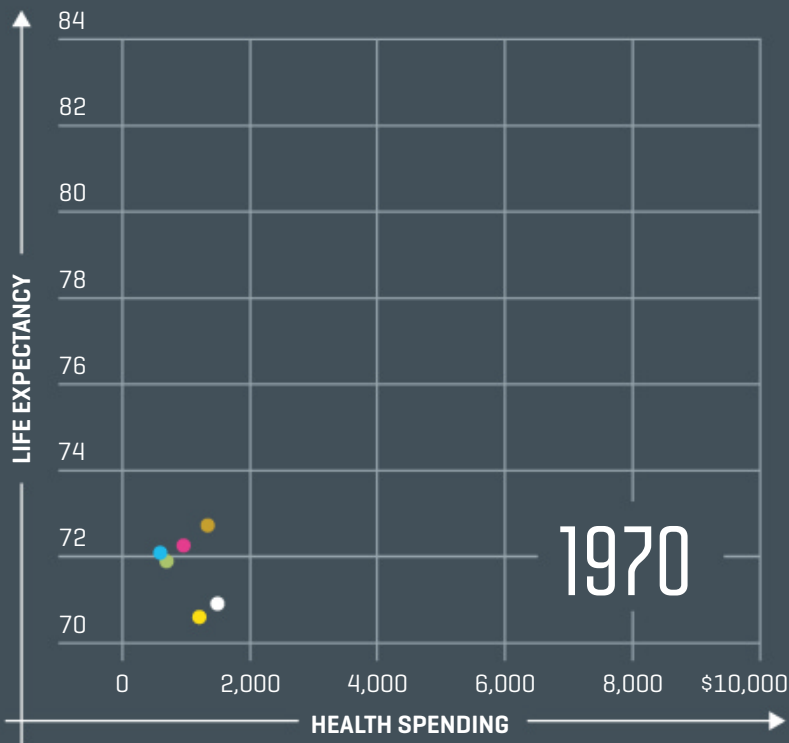
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A woman with long dark hair, wearing a light blue jacket and dark pants, is smiling and walking towards the camera in a factory setting. In the background, other workers in white jackets are working at machinery. The scene is lit with bright overhead lights.

**Mami Ito**  
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