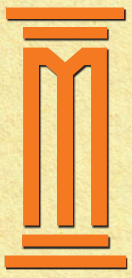


MILKEN INSTITUTE

Review

A Journal Of Economic Policy

Seconds Count

THE HIGH-FREQUENCY BATTLE FOR YOUR CYBER-ATTENTION

Review

THE MILKEN INSTITUTE REVIEW • THIRD QUARTER 2015

VOLUME 17, NUMBER 3

THE MILKEN INSTITUTE
Michael Milken, *Chairman*
Michael L. Klowden, *President and CEO*

PUBLISHER
Conrad Kiechel

EDITOR IN CHIEF
Peter Passell

ART DIRECTOR
Joannah Ralston, Insight Design
www.insightdesignvt.com

MANAGING EDITOR
Larry Yu

ISSN 1523-4282
Copyright 2015
The Milken Institute
Santa Monica, California

MILKEN INSTITUTE

The Milken Institute Review is published quarterly by the Milken Institute to encourage discussion of current issues of public policy relating to economic growth, job creation and capital formation. Topics and authors are selected to represent a diversity of views. The opinions expressed are solely those of the authors and do not necessarily represent the views of the Institute.

The Milken Institute's mission is to improve lives around the world by advancing innovative economic and policy solutions that create jobs, widen access to capital and enhance health.

Requests for additional copies should be sent directly to:

The Milken Institute
The Milken Institute Review
1250 Fourth Street, Second Floor
Santa Monica, CA 90401-1353
310-570-4600 telephone
310-570-4627 fax
info@milkeninstitute.org
www.milkeninstitute.org

Cover: Kotryna Zukauskaite

THE MILKEN INSTITUTE REVIEW
ADVISORY BOARD

Robert J. Barro
Jagdish Bhagwati
George J. Borjas
Daniel J. Dudek
Georges de Menil
Claudia D. Goldin
Robert Hahn
Robert E. Litan
Burton G. Malkiel
Van Doorn Ooms
Paul R. Portney
Stephen Ross
Richard Sandor
Isabel Sawhill
Morton O. Schapiro
John B. Shoven
Robert Solow

CONTENTS

2 **FROM THE CEO**

3 **EDITOR'S NOTE**

5 **TRENDS**
Hydrogen dreams.
by Lawrence M. Fisher

84 **PASTIMES, SERIOUSLY**
Down with the NCAA.
Allen R. Sanderson and John J. Siegfried

93 **CURRENCY OF IDEAS**
Sample the MI blog.

95 **INSTITUTE NEWS**
A little bragging.

96 **LISTS**

page 60

67 **BOOK EXCERPT**
Diversity Explosion
William H. Frey explains how immigration is helping to desegregate neighborhoods.

14 **INDIA AND INDONESIA**
Separated at birth.
by Pallavi Aiyar and Chin Hwee Tan

24 **HOW TO ACHIEVE GENDER EQUALITY IN PAY**
Giving women a break.
by Claudia Goldin

34 **CHINA AT THE CROSSROADS**
Can reform be postponed?
by Marsha Vande Berg

42 **THE ATTENTION ECONOMY 3.0**
The digital popularity contest.
by Frank Rose

52 **RETIREES: THE NEW GLOBAL SECURITY THREAT**
It's much worse than you think.
by Thomas J. Healey and Catherine M. Reilly

60 **MANAGING RISK IN DRUG DEVELOPMENT**
Financial engineering to the rescue?
by Tomas J. Philipson

FROM THE CEO

In *Democracy in America*, Alexis de Tocqueville described the habit of "Americans of all ages, conditions and dispositions" to "constantly unite together." The French chronicler of the young republic noted "the endless skill with which the inhabitants of the United States manage to set a common aim to the efforts of a great number of men and to persuade them to pursue it voluntarily."

Fast forward 180 years. The philanthropic impulse that de Tocqueville witnessed has grown apace with the country. Today, Americans give some $350 billion each year to nonprofit groups. But contributions don't always translate into effective programs. And, in light of the demonstrated potential of efforts ranging from advancing medical technology to increasing social mobility, it's more critical than ever that we apply the sorts of performance standards to philanthropy that are routinely applied to business investments. This will both stretch the value of charitable resources and assure donors that their funds are truly making a difference. That's why the Milken Institute recently established the Center for Strategic Philanthropy, bringing under one metaphoric roof our existing efforts to advance more strategic, informed and creative giving.

The new structure draws on the success of FasterCures' Philanthropy Advisory Service. For nearly a decade, PAS has been evaluating the root causes of the problems donors hope to solve and using that information to create a roadmap for effective giving. With its focus on medical philanthropy, PAS has catalyzed investments in several disease areas. Among its accomplishments: incubating a nonprofit foundation that is now the single largest private funder of melanoma research; fostering cancer immunotherapy research that has rapidly advanced therapeutic options for glioblastoma multiforme, an aggressive malignant brain tumor; and identifying opportunities to expand near-term clinical options for Alzheimer's patients. Building on this foundation, our Center for Strategic Philanthropy is expanding into other areas in which philanthropic capital is poised to make a difference, notably in education and public health.

We're excited to be broadening our horizons because we know there's a huge need here. In the coming decade, it's estimated that Americans will donate more than $30 trillion, and it would be a tragedy if much of it were wasted. We look forward to helping those who seek to help others.

Mike Klowden

Michael Klowden, CEO and President

Correspondent JG of Passadumkeag, Maine (who has apparently forgiven me for making light of her hometown), wonders whether the *Milken Institute Review* has been affected by California's drought. Not yet, JG – though some have speculated that, in a pinch, we could always move our offices to the MI's Singapore branch. I, for one, am a water glass half-filled kinda guy. I have my eye on beachfront property on Alaska's North Slope.

Meanwhile, we've braved sunny, sunny skies to bring you this 67th bang-up issue of the *Review*.

Frank Rose, a writer and consultant on digital culture, turns a gimlet eye on the "attention economy" – and, in particular, on how efforts to measure the impact of Internet content are undermining the medium. "Metrics have so distorted the economics of the Internet that we find ourselves awash in information that is useless, even predatory," he writes, "while information that actually deserves our attention often goes begging (in some cases, literally)."

Claudia Goldin of Harvard explains why the gender gap in pay persists in spite of decisive gains in women's skills and experience. "Like many others, I think convergence is possible," she writes. "However … the solution does not have to involve government intervention, and it does not depend on the improvement of women's bargaining skills or heightened will to compete."

Tomas Philipson of the University of Chicago and the Milken Institute proposes two new sorts of financial derivatives to manage

©RANDY BRANDON/ALASKASTOCK.COM

risk and increase capital for drug development: "The first I call an FDA swap, which in many ways imitates the form and function of the credit default swaps already widely used to hedge risk in bond markets. The second I call an FDA annuity, which hedges against approval delays by paying the investors an agreed-upon sum during the life of the testing process."

Larry Fisher, a former business reporter for *The New York Times*, decides that the future of hydrogen-powered cars is (almost) now. "Head-to-head," Fisher says, "hydrogen may prove a match for battery-powered cars. Fuel-cell vehicles deliver the same instant torque, seamless power and near silence that delight drivers of Teslas and Nissan Leafs alike, with the added advantage of 300-mile range and fueling that takes five minutes."

Pallavi Aiyar, a Jakarta-based journalist, and **Chin Hwee Tan** of Apollo Global Management, argue that comparisons between India and China distract from India's more relevant match-up. "A list of the most fundamental challenges confronting India today could just as well be Indonesia's," they write. "Both nations need to boost manufacturing competiveness to create the millions of jobs required to ensure their young and growing populations become a demographic dividend rather than a Malthusian disaster. Both must attract foreign investment and fix creaky infrastructure, even as they assuage protectionist lobbies and battle entrenched corruption."

Thomas Healey, a former assistant secretary of the Treasury, and **Catherine Reilly**, a grad student at the Harvard Kennedy School, outline the impending global pension disaster and what could be done to save the Baby Boomers' retirement. "Despite the political and economic complications of changing entrenched public pension systems," they say, "extensive reforms have in fact been achieved by a small circle of progressive nations. … For most countries, though, the move will be considerably more difficult. To stand any chance of survival over the long term, sponsors must step up now."

Marsha Vande Berg at the Harvard Law Program on International Financial Systems reviews China's struggle to rekindle growth without losing momentum on reform. "Some way, some day (preferably soon) the economy must be rebalanced in ways that diversify output and put services in place as the lead driver," she concludes, adding, "That will require more-sophisticated regulation of an economy that now awkwardly mixes ebullient private markets with what might be called crony socialism."

Allen Sanderson of the University of Chicago and **John Siegfried** of Vanderbilt expose the inequity and inefficiency of the NCAA's monopoly on college sports. "Americans inadvertently created a monster long ago when they integrated big-time spectator sports with higher education," they write. "Taming the beast – forcing it to live by the rules we've set for other commercial enterprises – will not be a walk in the park."

Last but hardly least, we've included a chapter from *The Diversity Explosion*, **William Frey**'s new book in which he explains how immigration is prying open segregated neighborhoods. And, while you're at it, check out Lists, in which your 'umble editor explores the UN's venerable Human Development Index and new variations thereon.

—Peter Passell

Correction: The reference to the German national anthem in Philippe Legrain's article in the prior issue of the Review *is in error. The phrase "Deutschland über alles" is no longer part of the anthem, nor is there evidence that Germans sang the line in celebrating their World Cup victory in 2014.*

BY LAWRENCE M. FISHER

Remember how Bullwinkle (the cartoon moose in the *Rocky & Bullwinkle Show*) used to offer to pull a rabbit out of his hat just before the commercial break? “But that trick never works,” Rocky (his faithful squirrel companion) would scoff, to which Bullwinkle would gamely reply, “This time for sure.”

Pardon the author and his nostalgia for a TV era in which irony was still a novelty. But that routine came to mind on first glimpsing the latest round of hype for hydrogen-powered fuel-cell vehicles.

There has always been an element of magic to the hydrogen-fueled automobile: here’s a car that would run in near silence on the most common element in the universe, emitting only pure water vapor from its tailpipe. Hydrogen enthusiasm ran high during the administration of George W. Bush, who predicted in his 2003 State of the Union speech that “the first car driven by a child born today could be powered by hydrogen, and pollution-free.”

But then Steven Chu, President Obama’s first Secretary of Energy (and a Nobel Prize winner in physics), brought the dreamers back to earth. For the hydrogen car to be viable, Chu said, four miracles would be needed – better ways to produce, store and distribute hydrogen, along with sharp cuts in the cost of fuel cells. Chu deemed this combination unlikely, at least in the following two decades. Federal research funding was subsequently slashed in favor of technologies thought more promising, presumably putting the miracle quartet even farther out of reach.

DAVID MAREUIL/ANADOLU AGENCY/GETTY IMAGES

Yet automakers, fuel-cell manufacturers and hydrogen producers never stopped working on the technology. And at last fall’s Los Angeles Motor Show, hydrogen fuel-cell vehicles were displayed by Honda, Toyota, Hyundai, Volkswagen/Audi and Daimler-Benz.

LAWRENCE FISHER writes about business for *The New York Times* and other publications.

Moreover, these were not the chimerical concepts that automakers unveil to test the marketing waters or just to show they're cool. Some of them are poised to appear in showrooms.

You can already lease a hydrogen fuel-cell-powered Hyundai Tucson compact SUV in Southern California for $2,999 down and $499 a month, including the hydrogen fuel and all maintenance. Toyota will offer its edgy Mirai hydrogen cars for $58,325 later this year, with Honda's as-yet-unnamed FCV sedan to follow in 2016.

In fact, the hydrogen trail has already been blazed, albeit lightly: Honda produced a handful of FCX Clarity sedans for public use from 2008-14. Analysts estimated each one cost at least $1 million to build, and only 43 of them were leased at $600 a month. Nevertheless, the BBC's *Top Gear* called it "the most important car for 100 years."

So what has changed? Perhaps nothing. Hydrogen skeptics still decry the technology as an expensive boondoggle, or even a cynical ploy by automakers to establish their green credentials and to meet state zero-emissions quotas as they continue to derive the bulk of their revenues from gas-chugging pickup trucks and SUVs.

Electric-car advocates have been among the harshest critics. Tesla's Elon Musk, himself once a prime target of skeptics, likes to talk about "fool cells," while echoing Chu's pessimism about the cost of manufacturing fuel cells, not to mention producing, storing and distributing sufficient fuel at a low enough cost to make hydrogen cars commercially viable. But while there have been no true breakthroughs, there has been a steady incremental progress on all the important fronts.

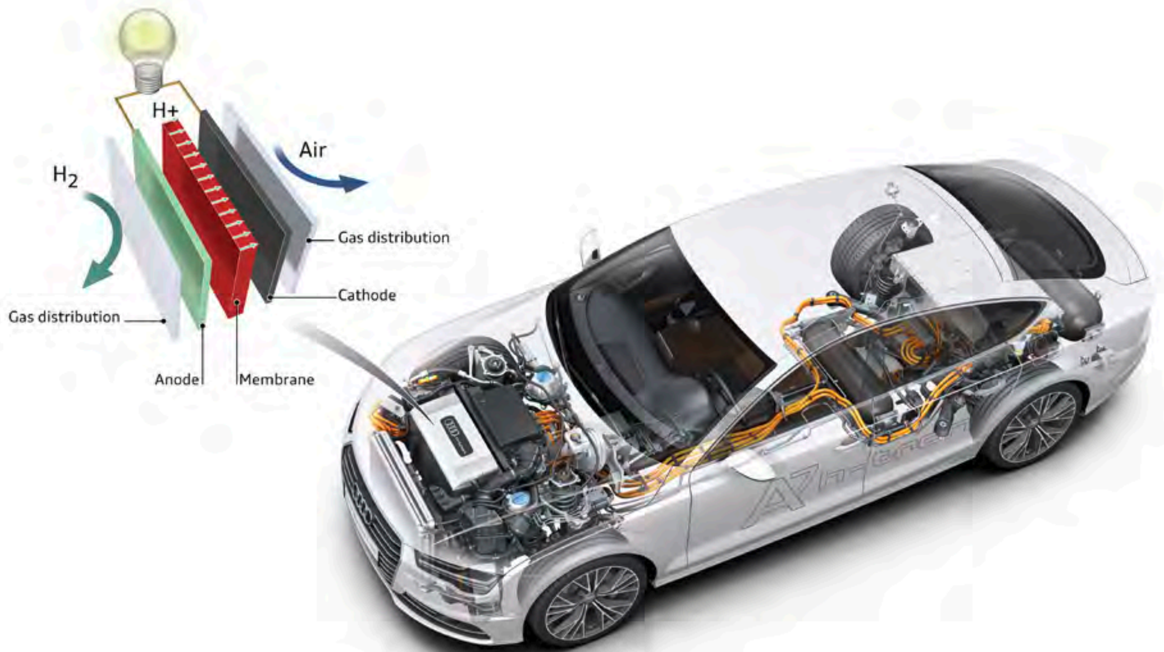
At the same time, the growing urgency of combating climate change and the corresponding changes in public policy, like the Zero Emission Vehicle requirement in California and seven other states, have created a less skeptical market climate. Moreover, the "better-than-expected" success of electric cars, like the Tesla Model S and Nissan Leaf, and the ever-greater market penetration of hybrids like the Toyota Prius, provide a model for public acceptance of alternative fuel vehicles. It's surely no coincidence that Toyota and Honda, which produced the first gasoline/electric hybrids, are among the first to market with hydrogen fuel-cell cars.

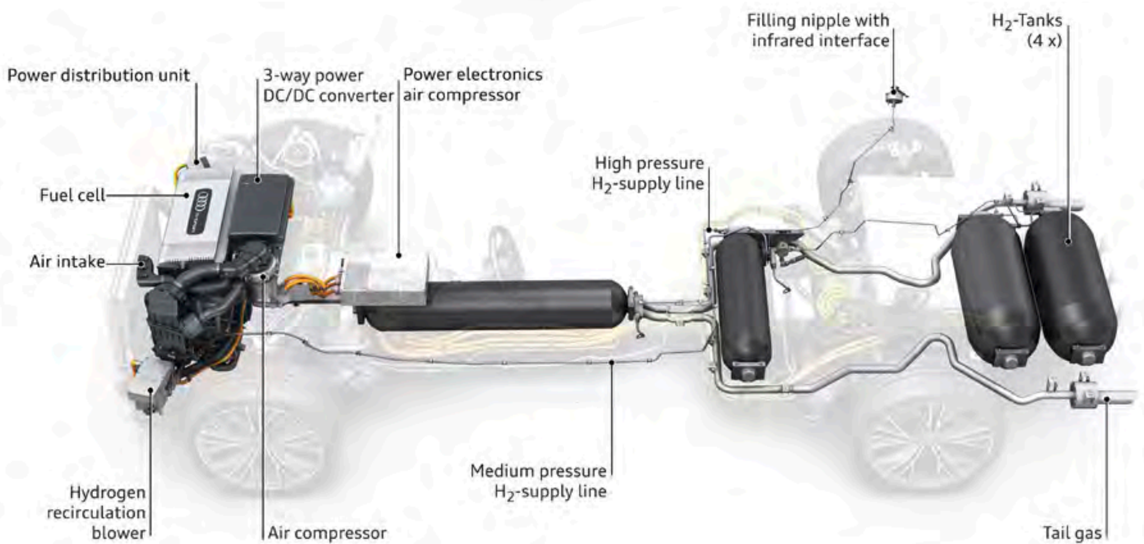
"I've been driving a fuel-cell vehicle for four years and it's great – a Honda Clarity," exclaims James J. Provenzano, president of Clean Air Now (an environmental nonprofit) and co-author, with Geoffrey B. Holland, of *The Hydrogen Age: Empowering a Clean-Energy Future.* "It's a beautiful car; it performs, and I'm coming from a Mercedes E-class. The biggest thing is the costs have come down … This technology is ready."

WAIT 'TIL NEXT YEAR

It is the perverse nature of new technologies that they rarely if ever develop as rapidly as politicians, technology writers or financial backers expect. The idea of fuel cells, which convert fuel into electricity without the muss and fuss of combustion, can be traced back as far as 1838. But the first quasi-commercial application did not come for more than a century, when NASA used them to generate power for probes, satellites and space capsules. The hydrogen-oxygen fuel cell was designed and first demonstrated publicly in 1959, and was used as a primary source of electricity in the Apollo spacecraft, which carried 24 astronauts to the moon from 1969 to 1972.

Not bad for a proof of concept. But for more down-to-earth applications, cost remained a huge barrier. Hydrogen-oxygen fuel cells generate electricity by capturing the en-





COURTESY OF AUDI

ergy released when hydrogen combines with oxygen to form water. That sounds simple enough. But for it to happen in the right place at the right time, the two gases first have to be processed through a membrane electrode assembly, which includes a catalyst to separate the hydrogen atoms into protons and electrons. That catalyst has typically been made of platinum or other scarce metals, and early fuel cells captured only a modest portion of the energy released by the electrochemical reaction, limiting their efficiency.

Much credit for bringing fuel-cell cost down and efficiency up is due to Ballard Power Systems, a British Columbia-based company that has been quietly plugging away at the technology since 1983. Although the automotive market remained a bridge too far,

Ballard did produce fuel cells for other purposes, including backup power for wireless telecom networks, onsite power generation for remote places, materials-handling systems like forklifts and even a fleet of city buses. The company also supplied fuel-cell know-how to Daimler-Benz and Ford, and more recently has entered a strategic alliance with Volkswagen. The shapely Audi A7 H-tron, the fuel-cell-powered version of Audi's sports sedan that was displayed at the Los Angeles show, employed Ballard's technology.

"Performance of the automotive fuel-cell system has improved significantly, to where it really is competitive with the internal-combustion engine, in terms of acceleration, smoothness, cold starts and efficiency," explains Guy McAree, Ballard's director of investor relations. "There's still some cost reduction that has to happen, though that's come a long way, too. We are still talking about limited deployments – hundreds of cars, not tens of thousands. But it's exciting because two or three years ago, you didn't see anything like this."

Honda, Toyota and Hyundai have also improved the efficiency and reduced the cost of their fuel cells. "We've been working on the technology for 15 years," says Derek Joyce, a Hyundai spokesman. "We did almost exclusively our own development. We want to be a leader in the technology."

Toyota has been working on fuel cells for 22 years; indeed, it leased 104 hydrogen Highlander SUVs to the public in the 2000s. "There were steady improvements along the way," notes Craig Scott, Toyota's national advanced technology vehicle manager. "The good news for fuel cells compared with batteries is we weren't looking for a fundamental breakthrough in physics."

Recently, fuel-cell technology has seen some developments that do verge on breakthroughs. A new class of catalysts developed by researchers at the Department of Energy's Lawrence Berkeley and Argonne National Labs could make fuel cells cost-competitive with other power generators. Employing nanotechnology, the researchers created a catalyst that uses roughly one-sixth as much platinum and offers more than 30 times the catalytic activity, making it both cheaper and more efficient than the conventional technology.

UBIQUITOUS BUT ELUSIVE

Hydrogen is the most abundant element in the universe, but there's a problem. It binds so promiscuously with other elements that it is virtually never found on its own. It is most often bound to carbon, as in fossil fuels, and, of course, with oxygen to form water. While hydrogen gas was first synthesized in the 16th century by mixing metals with acid, production of the gas remains costly today. Industrial production is mainly done by exposing the methane in natural gas to superheated steam, and less often, by the electrolysis of water. Most industrial hydrogen, which is highly flammable and expensive to compress for transport, is employed near its production site.

There have been no real breakthroughs in steam reformation, which accounts for about 95 percent of U.S. hydrogen production, but there have been serendipitous developments in the source of the raw material. Fracking, while nobody's idea of a green technology, has yielded an abundance of natural gas, driving down costs.

Producing hydrogen requires a lot of energy – the energy that heats the steam to at least seven times the boiling point of water – but so, for that matter, does generating electricity or refining gasoline with fossil fuels. In a study conducted by the Union of Concerned Scientists comparing well-to-pedal

emissions of the Hyundai Tucson hydrogen fuel-cell vehicle with a gasoline-powered Tucson showed a reduction of 34 to 60 percent in energy consumption, depending on the source of the hydrogen.

"At least in California, we have a renewable hydrogen standard – a minimum 33 percent must come from renewable sources, and we are estimating 46 percent by the end of the year," says David Reichmuth, a senior engineer in the UCS's Clean Vehicles Program. "That makes it a good bit cleaner. I think the promise of hydrogen – and this is similar to electric cars – is that there are a variety of ways to make it. There are cleaner ways, just like there are cleaner ways to make electricity."

Producing hydrogen requires a lot of energy – but so, for that matter, does generating electricity or refining gasoline with fossil fuels.

The cleanest way is through electrolysis, applying electricity to water to separate the H_2 from the O. And if that electricity comes from renewable sources like wind or solar, the cycle can be very clean, indeed. In most instances, electrolysis remains too expensive to be practical. But in areas with substantial wind and solar power that can only be produced episodically, it could be viable as a means of storing energy that would otherwise go to waste.

That largely explains why Chu, the critic who put the kibosh on federal R&D subsidies, is inching toward acceptance of hydrogen's role as an alternative fuel. Hydrogen, Chu explained to the *MIT Technology Review*, "could effectively be a battery of sorts. You take a certain form of energy and convert it to hydrogen, and then convert it back [into electricity]."

In 2013, the UK turned down a million megawatt-hours of renewable power because it was surplus to its needs at the time it was generated. ITM Power, a Sheffield, England-based company, proposes to turn that surplus electricity into hydrogen for use in fuel cells. It has a pilot electrolyzer project in Frankfurt, Germany, and will build three hydrogen refueling stations in London at a cost of £2.8 million ($4.2 million). It also has two refueling projects in the works in California and, overall, has some $15 million worth of projects "under contract or in the final stages of negotiation" around the world.

Hydrogen can also be produced from biomass, which a recent study by the University of California at Davis concluded could begin to make a significant contribution in about 2020. Provenzano of Clean Air Now says he often fuels his Honda Clarity from a hydrogen station attached to a sewage treatment plant in Orange County that produces enough hydrogen to fill 50 cars a day. Now there's a renewable resource.

BOUNCING BULLETS

Hydrogen has long suffered from bad word association because it brings to mind either a really big bomb or the *Hindenburg* disaster. Both are a bit unfair in the context of fuel cells.

The hydrogen weapon of the early 1950s was a uranium or plutonium fission bomb that heated a reservoir of hydrogen to temperatures found at the center of stars, fusing the atoms into helium and releasing humongous quantities of energy. And while the *Hindenburg* was filled with lighter-than-air hydrogen,

COURTESY OF TOYOTA

The Toyota Mirai.

the proximate cause of the deadly fire was probably a lightning strike or the flammable paint on the dirigible's fabric covering.

Nevertheless, safe storage of hydrogen has obviously been a concern for the automobile industry. In order to store enough hydrogen to provide a range comparable to internal-combustion-engine cars, it must be compressed, raising the question of what happens if a tank is punctured and the fuel rapidly escapes. Those who have seen the *Hindenburg* film clip (which is practically everybody) envision cars engulfed in flames when they are rear-ended.

Automakers are understandably at pains to allay such fears. The Toyota Mirai employs carbon-fiber-wrapped resin composite tanks, which were the first in Japan to meet the international standard for compressed hydrogen storage containers for vehicle fuel systems. In a dramatic video (since removed from the Internet), Toyota engineers fired bullets of increasing sizes at the pressurized tanks; they bounced off. Not until they fired a large-caliber explosive shell was a tank punctured – and then the hydrogen just hissed into the atmosphere without spectacle.

"Storage is always an issue when you're comparing it against a liquid fuel like gasoline" that does not require high pressure, acknowledges Toyota's Craig Scott. "We are still researching new technology, but this is sufficient to bring it to market today."

Remember the BMW Hydrogen 7, produced from 2005 to 2007? These were not fuel-cell vehicles, but conventional BMW 7-series sedans with internal-combustion engines that had been modified to run on either gasoline or liquid hydrogen. Liquid hydrogen, now the fuel of choice for NASA rockets, has high energy density and is relatively easy to transport.

But hydrogen must be cooled to within shouting distance of absolute zero in order to turn into a liquid. And liquefying one kilogram of hydrogen using electricity from the U.S. grid would by itself release some 18 to 21 pounds of CO_2 into the atmosphere, roughly equal to the CO_2 emitted by burning one gallon of gasoline. Moreover, the safety issues escalate with gas under these sorts of pressures. As Scott puts it, "Handling liquid hydrogen is not for the faint of heart."

CHICKEN AND EGG

There's still the nagging issue of hydrogen distribution infrastructure. While electric cars can be recharged at home – or anywhere else recharging equipment can be attached to the electricity grid – hydrogen fuel-cell vehicles need "gas" stations, just like their internal-combustion counterparts. This creates a commercial Catch 22: without the convenience of broadly deployed hydrogen fuel stations, consumers won't buy fuel-cell cars. But without a critical mass of hydrogen vehicles on the road, business won't have the financial incentive to build the fueling stations. The solution (if there is one) turns on the willingness of governments and hydrogen vehicle manufacturers to jumpstart the construction of the fueling network.

A year ago, the California Energy Commission announced that it would invest some $47 million to accelerate the development of public hydrogen refueling stations as part of its agenda to create a market for zero-emission fuel-cell vehicles. The Commission awarded funds for six fueling stations that will deliver only hydrogen derived from renewable sources. Still to come: another 13 stations in Northern California and 15 in Southern California, strategically placed to make it practical to use fuel-cell vehicles in regional centers

and along major transit corridors. California has earmarked an additional $150 million, with a goal of building yet another 100 new stations throughout the state.

Timed to the day of the Energy Commission's announcement, First Element Fuel, a California-based hydrogen fueling company, and Toyota announced an initial financial agreement that included a $7.2 million loan to assist First Element in the operation and maintenance of 19 new stations. Separately, Toyota said it will collaborate with Air Liquide, a big producer and supplier of industrial gases, to build and supply a network of 12 hydrogen stations in New York, New Jersey, Massachusetts, Connecticut and Rhode Island.

"We're trying to solve that last miracle by seeding infrastructure companies," said Toyota's Craig Scott. "We're building a hydrogen station right down the street from Tesla," he noted, in the expectation that Silicon Valley will be as receptive a market for the Mirai as it has been for electric vehicles.

A DIVERSIFIED PORTFOLIO

One surprising, and ironic, aspect of the hydrogen car rollout has been the amount of vitriol flung in its face by the electric car lobby. Ironic, because fuel-cell vehicles are electric cars, too, and the experience of driving one is very similar. Put it down to sibling rivalry, because these two technologies are competing for public funds and market acceptance the way brothers and sisters compete for parental affection. While California continues to commit cash for EVs, the Obama administration is phasing out support for hydrogen. Electric-car advocates would like that trend to continue.

"Apart from the environmental benefits, what advantages do FCVs have over conventional [electric] vehicles?" asks Tom Saxton, chief science officer of Plug In America, a coalition of electric-car advocates that formed after General Motors, Toyota and other manufacturers withdrew their not-ready-for-prime-time EVs from the market in 2005. "Is there a single automaker committed to offering a mass-market FCV in every state in the U.S., or are they just selling compliance cars that take advantage of CARB's higher ZEV credits for FCVs?" he asks, referring to the California Air Resources Board, and to the state's $5,000 rebate to fuel-cell car buyers, which is double the rebate offered for battery-powered EVs.

Then there's the unknown of what hydrogen will run at the pump. "What does it cost to fuel an FCV?" Saxton asks. "So far the automakers seem to be hiding the cost of fuel by bundling it with their compliance cars, but this isn't a strategy that scales up."

Head-to-head, though, hydrogen may prove a match for battery-powered cars. Fuel-cell vehicles deliver the same instant torque, seamless power delivery and near silence that delight drivers of Teslas and Nissan Leafs alike, with the added advantage of 300 mile range and fueling that takes 5 minutes. Other than Tesla's $70,000 (and way up) Model S, most EVs can go only about 80 miles on a charge, and Tesla's refueling, even at on-the-road supercharger stations, takes about half an hour for an 80 percent charge.

Hyundai's spokesman said the company will sell its FCV in every state as fueling stations are built, though it is not offering to fund them. Toyota, too, plans nationwide distribution; the company is financing stations in multiple states as well as in Denmark, Germany and the UK. Honda and Volkswagen have not announced their distribution plans, but will likely respond to market signals.

Hydrogen fuel costs remain a question mark because there are so many variables, and the technology is still evolving. What is known is that the cost has already dropped

Hydrogen-powered bus for California's Alameda-Contra-Costa Transit District.

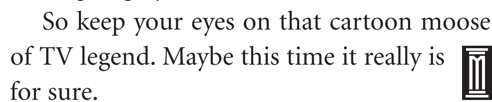
COURTESY OF AC TRANSIT

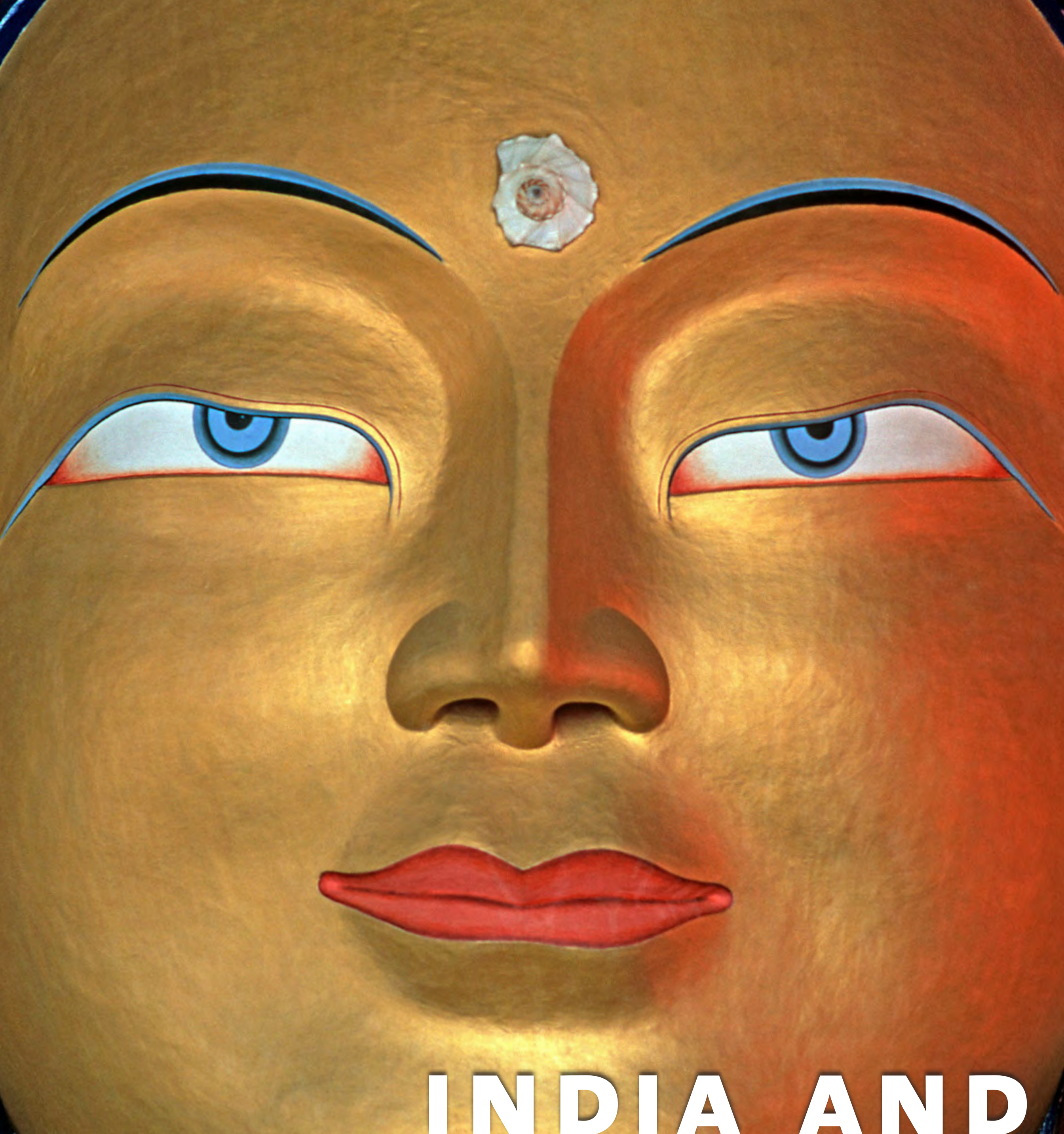
significantly and should continue to fall as the production technology evolves. Direct solar electrolysis, currently under development at the California Institute of Technology, would make low-cost renewable hydrogen abundant. "In quantity, the cost should be no more than natural gas," says Provenzano of Clean Air Now.

Lost in the hue and cry is the fact that none of the big automakers behind the FCV are putting all their eggs in the hydrogen basket the way Tesla has with electricity. Honda and Toyota have made a limited number of battery electric vehicles along with scads of gasoline hybrids and plug-in hybrids, while Volkswagen currently offers battery EVs, plug-in hybrids, gasoline hybrids and diesel hybrids. One area where the fuel cell is likely to dominate other fuel systems is in larger vehicles, like trucks and buses, where electric power simply requires more weight in batteries than is practical.

"I think the [Chu] miracle quote was headline catching, but a little off," says Reichmuth of the Union of Concerned Scientists. "Real drivers are going to be behind the wheel soon, and there are already some on the road in California. From our office, we see fuel-cell buses going by all the time."

So keep your eyes on that cartoon moose of TV legend. Maybe this time it really is for sure.





INDIA AND
TWINS UNDER

BY PALLAVI AIYAR

The discourse on Asia's so-called rise is dominated by comparisons of China and India, countries whose vast populations and buoyant economies have captured the imagination of international investors, journalists and policy analysts. Indeed, the India-China comparison is a virtual industry, born aloft on a river of books and reports that rely on florid bestial analogies featuring casts of tigers, elephants, dragons and tortoises.

© J MARSHALL, TRIBALEYE IMAGES/ALAMY

INDONESIA
THE SKIN?

AND CHIN HWEE TAN

© STEPHEN COYNE/ALAMY

"Chindia"-scented rhetoric abounds with catchphrases that state the obvious, but whose import is less so. China has the hardware, India the software; India needs China's roads, China could do with India's political inclusiveness. Given how fundamentally different India and China are, though, these kinds of "lessons learned" (complete with PowerPoint presentations) are of limited value. An apple cannot become an orange

simply because a McKinsey or Deloitte report asserts it would be beneficial for it to do so.

TWO'S COMPANY

The more relevant comparison in Asia – and one with enormous implications for the global economy – is between India and its civilizational sibling, Indonesia. These two eclectic democracies have more in common than India and China, yet they are rarely hyphenated.

While China's per capita GDP in 2013, adjusted for purchasing-power parity, was $9,600, the equivalent for India was a mere $4,000, putting it much closer to Indonesia's $5,200. China's investment in fixed capital in 2013 accounted for 46 percent of its GDP, compared to only 30 percent in India, a figure that is again more comparable to Indonesia's 33 percent. China is the global leader of merchandise trade, boasting well over a 10 percent share of the world total, while India's share is only 1.6 percent and Indonesia's is 1.0 percent.

On parameters of human development ranging from sanitation to malnutrition, India and Indonesia are once again closer to each other than they are to China. For example, around 37 percent of children under the age of 5 in Indonesia and 39 percent in India are stunted (that is, shorter than the World Health Organization's reference population) from malnutrition and related factors, compared to less than 10 percent in China.

A list of the fundamental challenges confronting India today could just as well be Indonesia's. On the economic front, both nations need to boost manufacturing competitiveness to create the millions of jobs required to ensure their young and growing populations become a demographic dividend, rather than a Malthusian disaster. Both have governments that must attract foreign investment and fix creaky infrastructure, even as they assuage protectionist lobbies and battle entrenched corruption. Weak governance plagues both nations, as both Delhi and Jakarta continue to struggle to balance power between the center and provinces.

"Bhinekka Tinggal Ika" (multiple but one), the Indonesian national motto, is in essence identical to the Indian catchphrase of "unity in diversity," and they underscore the nations' comparable accomplishments in having managed to sustain national identities in societies fractured along ethnic and religious lines. Nonetheless, ensuring the rights of minorities remains a fraught undertaking for both countries.

China's problems are, for the main part, of a different nature. The country already boasts world-class infrastructure. It is an established manufacturing powerhouse and became the world's largest recipient of foreign direct investment in 2012. China's demographic problems look more like those of highly industrialized countries with their aging populations, low fertility rates and contracting labor forces.

With a single official language (India has 23), standardized written script, one major ethnic group, and political tendency (both past and present) toward imposing uniformity, China is also a more homogeneous nation in ethnic and religious terms than India or Indonesia. While China does not have a national motto, *tianxia* ("all under heaven") is a dictum long associated with the Middle Kingdom that stresses the complete political sovereignty of the Chinese emperor over all the land "divinely" ordained for him. It illuminates the strong centripetal tendency that has been, and still is, fundamental to the Chinese polity.

PALLAVI AIYAR is an author and journalist based in Jakarta. Her latest book is *Punjabi Parmesan: Dispatches from a Europe in Crisis*. CHIN HWEE TAN is a founding partner in Asia of Apollo Global Management.

Even relatively hard-line Islamic political parties have been known to hold *wayang* performances to boost their electoral fortunes.

ASSOCIATED PRESS/SUROTO

Unlike India or Indonesia, contemporary China is preoccupied with foreign policy issues and the pressing of territorial and maritime claims. Economically, it needs to move up the value chain from a manufacturing hub to a services leader and an innovation center. Politically, China's leaders are focused on "stability" – a euphemism for ensuring the Communist Party's monopoly on power.

CONNECTIONS

An Indian's first reaction to China is often bewilderment. The language is wholly alien in sight and sound. The scale of the architecture seems outlandish. The highways are impossibly smooth, and the winter cold frighteningly desolate. Despite the fact that the days of everyone dressing in identical Mao suits are long over, there is an underlying uniformity to the physical and intellectual lives of the Chinese that is unfamiliar to Indians. Every big Chinese city has identical glittering glass-and-chrome malls. Smaller towns use bathroom tiles as their construction material of choice. The heated political debates that are par for the course aboard Indian trains are absent; the pageantry of street demonstrations and strikes is missing. Calls to prayer and the ringing of temple bells are rarely part of the aural backdrop.

Indonesia, on the other hand, is immediately familiar to an Indian. Regular demonstrations, featuring protestors who range from workers clamoring for a higher minimum wage to religious hardliners demanding the cancellation of beauty pageants, cause massive gridlock on the roads. Little retail shops selling everything from candy to talcum powder shelter in the shade of the extravagant malls. The call of muezzins punctuates the day, while the smell of moist earth emanate from gardens.

Everywhere – embedded in the language, on street signs, in political commentary and on bus advertisements – are references to the Hindu epics of the Ramayana and Mahabharata. An enormous statue of Krishna leading Arjuna into battle dominates the roundabout in front of Monas, Jakarta's main nationalist monument. Even Indonesian Muslims are commonly named after Hindu gods and goddesses. Among the country's favorite forms of mass entertainment, particularly on the populous island of Java, is *wayang kulit*, shadow-puppet theater that features tales from the Indian epics.

Consequently, it remains common in both countries to express values like courage, strength and honesty with allusions to characters from Hindu stories. Even relatively

hard-line Islamic political parties like the Partai Keadilan Sejahtera (PKS) have been known to hold *wayang* performances to boost their electoral fortunes. At a party convention held in Jogjakarta in 2011, for example, the PKS staged scenes from the life of Bima (a Mahabharata hero) to claim the need for a Bima-like entity (the PKS itself) to fight corruption.

The explanation for this affinity (it was not wholesale but tempered and modified by indigenous culture) is that for centuries, Hindu-Buddhist kingdoms ruled over large parts of the Indonesian archipelago. And Hindu cultural norms continued to infuse indigenous mores, even after large-scale conversion to Islam in the 16th century.

Colonial rule – British in India's case and Dutch in Indonesia's – disrupted many of the direct links between Indian and Indonesian kingdoms. Long established trade routes along which textiles, spices and ideas had travelled for centuries were gradually taken over by European powers from the 17th century on.

India and Indonesia both gained their independence in the late 1940s, but the turn toward economic isolationism that characterized decolonization in both only cemented the colonial disconnect. As a result, Indians and Indonesians today are generally unaware of their strong cultural ties. Yet, the India-Indonesia hyphenation is a reality that finds present-day resonance not only in value systems, but in language. A large percentage of the vocabulary of Bahasa Indonesia, a standardized form of Malay, derives from Indian languages, including Sanskrit, Tamil and Urdu.

SIMILARITY IN DIVERSITY

China has long been a more territorially coherent entity than India or Indonesia. The geographical boundaries of China over the centuries have been mutable, but what we call "India" and "Indonesia" arguably did not even exist as political entities until the colonial period. Well into the second half of the 20th century, many Western commentators believed that post-colonial balkanization was inevitable for both, given their eclectic mixes of languages, ethnicities and religions. India, the world's largest democracy, is a Hindu-majority country – but is home to almost as many Muslims as Pakistan, in addition to substantial numbers of Christians, Sikhs, Buddhists and Zoroastrians. Contemporary currency notes have the denomination written in 15 languages.

REUTERS/ARKO DATTA

Indonesia's remarkable diversity is less widely understood. With 250 million citizens, it is the world's fourth-most-populous nation and third-largest democracy. Superimposed on the map of Europe, the Indonesian archipelago would span the distance from Ireland to the Caspian Sea. It is home to 719 languages, spoken by people from over 360 ethnic groups (although, unlike India, it does have a national language: Bahasa Indonesia).

Seven out of eight Indonesians self-identify as Muslims, implying that more Muslims live

ASSOCIATED PRESS/ZIA MAZHAR

Both countries face major challenges in ensuring that democracy does not turn into the tyranny of the majority.

in Indonesia than in any other country. The state, however, also recognizes five other religions: Hinduism, Buddhism, Protestantism, Catholicism and Confucianism.

India and Indonesia have grappled with secessionism on their peripheries for decades, but have nonetheless survived decolonization almost intact. They have consequently defied the European concept of the ideal nation, in which a single religion, language and ethnicity is assumed to be the "natural" basis for a sustainable political state.

That India and Indonesia have not only endured but are among the fastest growing economies in the world today is a testament to the fact that it is possible to create a strong, common identity out of seemingly irreconcilable multiplicity. That they are able to calibrate such diversity within a democratic political system (Indonesia has been a democracy since the downfall of military dictator Suharto in 1998) is an achievement that sets them apart from China.

However, both countries face major challenges in ensuring that democracy does not turn into the tyranny of the majority. Narendra Modi (India's current prime minister), who is widely hailed as an economic reformer, also stands accused of doing little to stop the 2002 religious riots that took place under his watch as chief minister in the State of Gujarat. More than 1,000 people, mostly Muslims, were killed.

Modi denies that he was complicit and has been cleared by the courts; nonetheless, many civil-society groups continue to hold him culpable. Modi's political party is also closely affiliated with the right-wing Hindu organization, the Rashtriya Swayamsevak Sangh, whose objective is to establish India as a Hindu nation. Thus India's pluralism cannot be taken for granted.

Indonesia's new leader, Joko Widodo (popularly known as Jokowi), has stronger credentials among his country's minority communities. When he ran for governor of Jakarta in 2012, for example, he chose Basuki Tjahaja Purnama, a Christian of Chinese descent, as his running mate. Yet, minority Muslim groups, including Shia and Ahmadiyah, continue to protest discrimination at the hands of the majority Sunni Muslims. Christian groups have also complained about difficulties in acquiring permits to build churches.

India and Indonesia eschewed theocracy as the basis for nation-building. Nonetheless, unlike in secular Europe, religion has an active place in the public life of both. As a result, they constitute important experiments in developing a third way for countries in which religion remains a central part of the identity of most citizens, but where the more intolerant aspects of religion are held in check.

The preamble to India's constitution asserts that it is a secular state. However, neither the constitution nor its laws define the relationship between religion and state. Instead, secularism is understood as respect for all religions.

Indonesia's constitution leaves out the word secular altogether. The founding doctrine of Pancasila, which forms the basis for the constitution, professes a "belief in the divinity of the one God." But by leaving out any reference to a specific God (in the face of opposition from Islamists who had wanted a concrete mention of Allah), the Indonesian constitution also protects freedom of religious belief and practice.

As India and Indonesia feel their way forward into the new millennium, there is inevitably confusion about their founding ideas. Conceptually, both nations are works in progress, rather than polished accomplishments. But this only underscores how germane their experiences are for each other.

Religion remains a political force in each, even as development and fighting corruption have emerged as vote-winners. If the economic growth promised by the new governments in Delhi and Jakarta fails to materialize, it is possible that leaders, especially Modi, will fall back on stoking religious rivalries as a strategy aimed at the next elections. It is unclear, though, how voters would respond to such tactics.

UNLEASHING GROWTH

Although India initiated economic reforms in the early 1990s, more than 20 years after Indonesia's liberalization under the military dictator Suharto, the countries share a variety of similarities on the economic front.

Over the past decade, both have managed sustained growth in spite of slowdowns in the wake of the 2008 global financial crisis. The average real growth for India was 7.7 percent, while Indonesia grew at 5.5 percent. Both have made considerable strides in opening their economies to global forces, with exports now amounting to one-quarter of GDP. The median age in India is 27, close to the 29 in Indonesia and considerably more youthful than the corresponding 37 in China.

In 2013, the two countries were part of the so-called Fragile Five, a term coined by Morgan Stanley to identify emerging economies with large trade deficits. But since the elections of Modi and Jokowi in mid-2014, investor sentiment has improved. And many analysts argue that both nations now have a window of opportunity in which tough reforms taken by their popular leaders could translate into long-delayed structural changes that open the door to more-rapid growth.

Ben Bland, then the Indonesia correspondent for *The Financial Times,* listed "endemic corruption, woefully inadequate physical in-

frastructure, uneven law enforcement and underinvestment in health and education" as the main factors holding Indonesia back. The lack of ease in doing business in Indonesia and the need for smoother coordination among government ministries and between the central and local governments are the other challenges cited.

It is possible to substitute India for Indonesia and end up with a similar inventory. The World Bank's Ease of Doing Business Index ranks Indonesia 114th out of 189 countries, while India is 142nd. Health care expenditures as a percentage of GDP are a low 4 percent in India and an even lower 3 percent in Indonesia. According to Transparency International's 2014 corruption rankings, India placed 85th out of 175 countries, while Indonesia comes in 107th – major drags on productivity, innovation and capital formation.

Both countries, moreover, urgently need a boost in manufacturing to absorb the underemployed labor flooding into cities in search of jobs. Getting from here to there won't be easy for either, however. The success of Modi and Jokowi in achieving this goal will depend in large part on their skill in balancing protectionist lobbies and subsidy-habituated state-owned enterprises with reforms aimed at opening up to foreign investment, cutting red tape and taking on entrenched elites.

The tumble in global crude oil prices has helped ease the fallout of Indonesia's decision last November to cut fuel subsidies, raising the prices of petrol and diesel by more than 30 percent. The move could save Indonesia $8 billion to $10 billion this year. India, too, stopped subsidizing diesel prices (last October) and raised fuel taxes.

But the way the savings are redirected will be crucial in determining whether there is a positive impact on economic growth. Given the high incidence of poverty in both countries – particularly in India, where more than half the population lives on purchasing power equal to less than $2 a day – using the extra funds to benefit the poor would serve the cause of growth and political stability. Part of the money might go to health, education and transportation. But some ought to be allocated as direct cash payments to poor households, thereby reducing opportunities for corruption by middlemen.

Conceptually, both nations are works in progress, rather than polished accomplishments. But this only underscores how germane their experiences are for each other.

It will not be easy for either country, however, to confront the endemic problem of corruption. Jokowi has already run into trouble over his nomination of Budi Gunawan, a powerful general, as police chief. Gunawan is a former security aide to Megawati Sukarnoputri, who heads Jokowi's political party, and he is known to be close to her. Three days after his nomination, the KPK, Indonesia's anticorruption agency, named Gunawan as a suspect in a corruption probe. The police then arrested one of the KPK's five commissioners on perjury allegations relating to a five-year-old case.

In the process, Jokowi's reputation took a battering. The president suspended Gunawan's nomination, but did not drop it until more than a month later. Consequently, he alienated both popular opinion, which saw

him as buckling to the old guard, and many of the political elite who viewed Gunawan as an ally.

How this will all play out for Jokowi's reform ambitions is unclear. But it underscores how tough it is to curb the influence of the corrupt elite in Indonesia.

LEFT: ASSOCIATED PRESS/TATAN SYUFLANA. RIGHT: RAVEENDRAN/AFP/GETTY IMAGES

The Indonesian president's troubles are deepened by the reality that his party, the PDI-P, is a minority in Parliament. Worse, he cannot even rely on the support of his own party, which is controlled by Sukarnoputri. In contrast, Modi enjoys a strong majority in the Indian Parliament. Nonetheless, his party, the BJP, was trounced in state assembly elections in Delhi earlier this year, winning only 3 of 70 seats.

Moreover, the big winner was the newbie Aam Aadmi Party (AAP), which is led by a former anticorruption activist who ran on a platform of increasing market-distorting subsidies for electricity and water. It is not easy for any government, even one with a strong mandate at the center, to enact structural change in a country like India, where voters tend to respond to short-term sops.

CONTRAST IN LEADERSHIP

Compared to India, Indonesia is a new democracy. General Suharto's three-decades-long dictatorship was dismantled in 1998. However, the two countries are already political doppelgangers. A multiplicity of parties, noisy rallies, demanding trade unionists, and a free and assertive press are part of the public landscape in both nations – a far cry from the annual meetings of China's National People's Congress that are usually orchestrated into rigor mortis.

Last year's elections saw the elevation of a new breed of popular leader in both countries. Voters were clearly disenchanted with traditional elites. Modi, whose family ran a tea stall, has risen from near the bottom of India's caste and class hierarchies. Jokowi is from a similarly underprivileged background. The son of a carpenter, he was a furniture seller before becoming the mayor of Solo, a midsized city in central Java.

These similarities should not obscure trenchant differences in temperament and policy inclinations that divide them. But it is these divergences that are what will make the India-Indonesia comparison so interesting to observe in the coming years.

As a leader, Modi is dominant and combative, while Jokowi is consensual and conciliatory. In his long reign (2001-14) as chief minister of Gujarat State, Modi acquired a reputation for governing with a firm hand as he pursued an aggressive, pro-business agenda. And since taking charge of the country, he has concentrated power in the prime minister's

office. Ministers are left with little elbow room.

In contrast, Jokowi is unassuming in manner. As governor of Jakarta (a post to which he was elected in 2012) he avoided the tangible trappings of power like fancy cars and security details. He often walked around public markets listening to people's concerns firsthand, and was known for attending popular city events like rock concerts and marathons.

While Modi's reputation in Gujarat was built on the back of large infrastructure projects, Jokowi's derives from his stint as mayor of Solo, during which he transformed a formerly crime-ridden city into a center for regional arts and culture. It was there that he demonstrated his mediation skills in relocating street vendors from a park in the city center.

Modi is an economic reformer with capitalist instincts. His achievements in Gujarat included attracting substantial investments into manufacturing and power projects. He introduced business-friendly policies aimed at cutting red tape and making land acquisition easier than in other parts of the country.

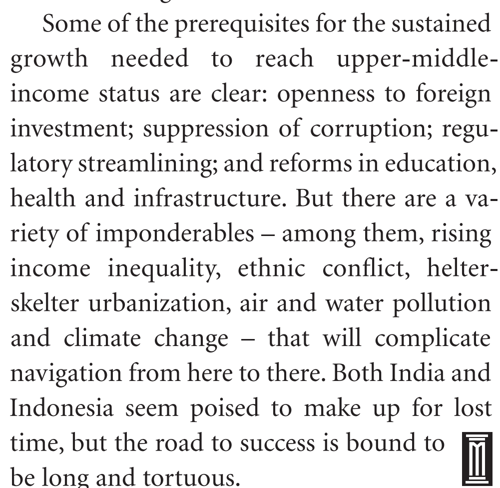
As prime minister, he has yet to make any dramatic announcements on the reform front, but he has made a raft of more modest proposals, including relaxing foreign investment rules for insurers, military contractors and real estate companies. A broad tax overhaul is also underway. And in recent months, India's growth has matched China's for the first time.

Jokowi, on the other hand, is a communitarian. In Jakarta, as in Solo, he made societal welfare a consistent priority. His sympathies lie with small-business owners, like the street vendors of Solo. As governor of Jakarta, his flagship projects included free health care and education funds for the poor, the shifting of thousands of squatters out of flood catchments into low-cost apartments, and the restarting of a much-delayed public transport overhaul. As president he has widened the policy of smart cards for accessing free health care and education for the poor.

The difference in temperament and policy inclinations of the two leaders is what will make the India-Indonesia comparison so interesting to observe in the coming years.

THROUGH A GLASS DARKLY

Analysts have forecasted six-plus percent growth for India and five-plus percent growth for Indonesia this year. Although faster than the recent norm, growth at this level is not enough to be truly transformative for either nation over the medium-term – China's growth at this stage of development was in the range of 10 percent. New Delhi and Jakarta must lift millions out of poverty, a task that will require them to innovate and invest on a much larger scale.



Some of the prerequisites for the sustained growth needed to reach upper-middle-income status are clear: openness to foreign investment; suppression of corruption; regulatory streamlining; and reforms in education, health and infrastructure. But there are a variety of imponderables – among them, rising income inequality, ethnic conflict, helter-skelter urbanization, air and water pollution and climate change – that will complicate navigation from here to there. Both India and Indonesia seem poised to make up for lost time, but the road to success is bound to be long and tortuous.

It's no secret that, on average, women – even those with equivalent education and experience – typically earn less than men. The ratio of the average (mean) earnings of female workers (full-time, full-year, 25 to 69 years old) to that of their male counterparts was 0.72 in 2010. The pay ratio of median earners (those at the 50th percentile) for the same groups was 0.78. But that is not the whole story.

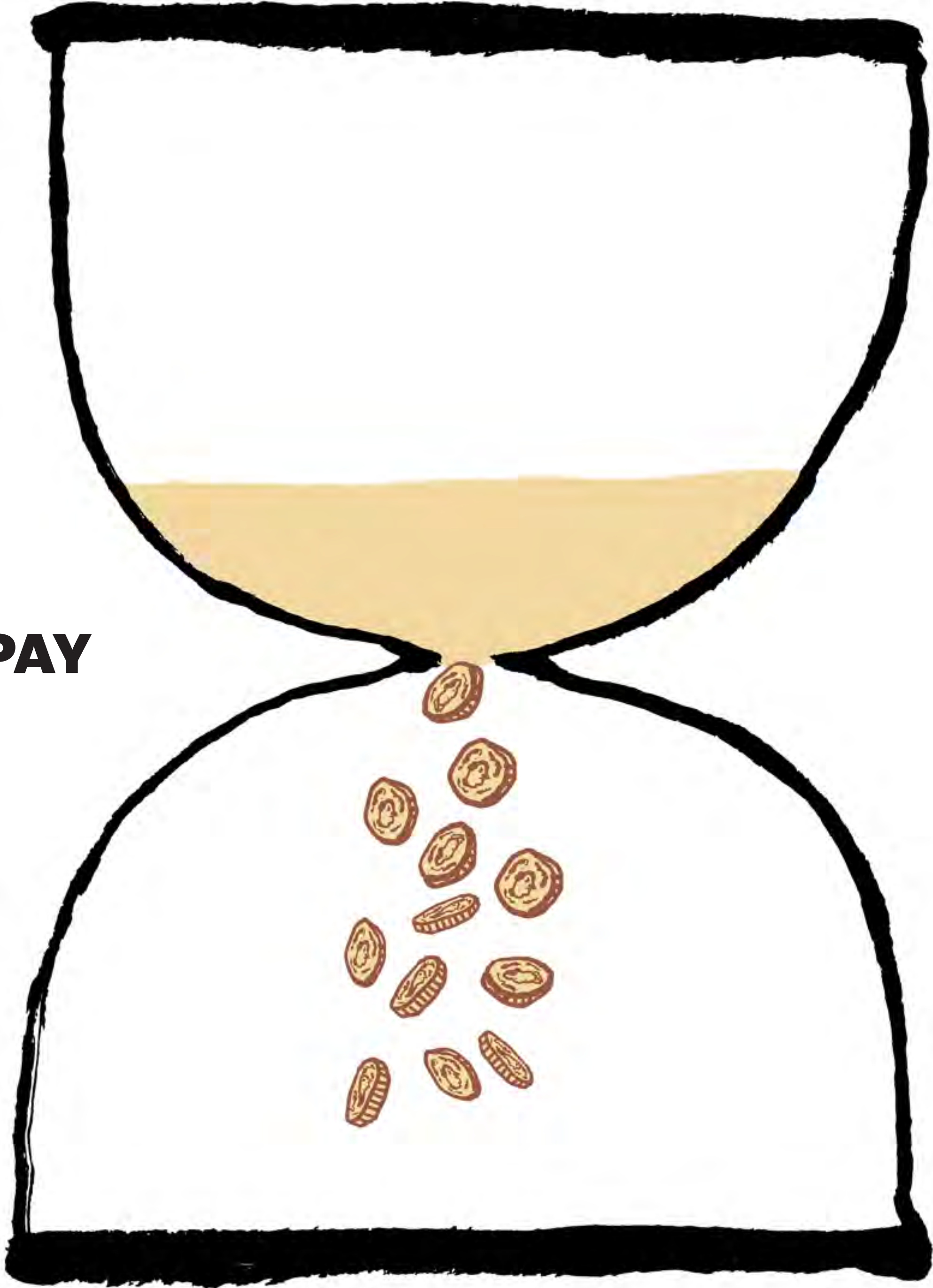
HOW TO ACHIEVE GENDER EQUALITY

First the good news: the gender gap has narrowed. The ratio of median earnings increased from 0.56 to 0.78 in the three decades prior to 2010. This narrowing of the gap in pay reflects the converging economic roles of men and women, a reality that is among the grandest social and economic advances in the last century. There are many aspects to the convergence, and each can be thought of as a chapter in a figurative book. The big question is whether the last chapter, in which the economy achieves full equality, can be written. And if so, how?

JEAN JULLIEN

BY CLAUDIA GOLDIN

IN PAY



Like many others, I think convergence is possible. However, I depart from the conventional view of what it would take to write this final chapter. The solution does not have to involve government intervention and it does not depend on the improvement of women's bargaining skills or heightened will to compete. Nor must men become more responsible in the home (although that would greatly help).

What is needed are changes in how jobs are structured and remunerated, enhancing the flexibility of work schedules. To succeed, the changes must decrease employers' costs in substituting the hours of one worker for another. Firms that have family-friendly policies – and there are many of them – are moving in the right direction. But if those policies are accompanied by decreases in women's average hourly pay and dimmer prospects for promotion because the cost of accommodating flexible hours remains high, they will only reinforce gender differences in the workplace.

The gender gap in hourly compensation would vanish if long, inflexible work days and weeks weren't profitable to employers – that is, if firms did not have a financial incentive to pay employees working 80 hours a week more than twice what they would receive for 40-hour weeks. A similar statement can be made with regard to working specific schedules tailored to episodic increases in demand or putting in enormous amounts of time at the start of one's career to demonstrate allegiance and commitment.

The costs of temporal flexibility have in fact begun to fall in some sectors – notably, technology, science and health. And the change is reflected in the increased use of teams of substitute employees, as well as in the more routine handing-off of clients, patients and customers from one employee to another. It should be noted, however, that adaptation has been slower in other sectors, among them financial and legal services.

CLAUDIA GOLDIN is the Henry Lee Professor of Economics at Harvard and director of the National Bureau of Economic Research's Development of the American Economy program. Her most recent book, written with Larry Katz, is *The Race between Education and Technology*.

CONVERGING ECONOMIC ROLES

The primary convergences of the past decades have concerned the "human capital" attributes – education, experience – of men and women. By the same token, differences in labor force participation rates between men and women have narrowed. In recent years the participation rate for 25-to-54-year-old females has risen to close to 75 percent, 14 percentage points below the rate for males. Contrast that with the 46 percentage point difference in 1970 and the 29 percentage point difference in 1980. Meanwhile, as participation rates of women have climbed, their time out of the labor force has decreased and their job continuity has increased.

Years of education of women have surpassed that of men among Americans born since the early 1950s. The distribution of college majors has become more equal between men and women, and women now represent the majority, or nearly the majority, of students in professional training in medicine, law, dentistry, veterinary medicine, pharmacy and optometry.

But there the progress ends. Gender differences in earnings are not much further reduced if one corrects for factors such as educational quantity and quality because there are now few such differences that disadvantage women. But gender earnings gaps remain. Why the persistent difference?

The answer turns on an understanding of where earnings differences between men and

women are found. In what occupations, at what ages, and for what birth cohorts are the differences large or small? These provide clues that allow the formulation of a framework for explaining the basis of pay gaps by gender.

But while this analysis tells us what might level the playing field in the labor market, it doesn't follow that the solution can be achieved through regulation. Actually, it suggests the opposite.

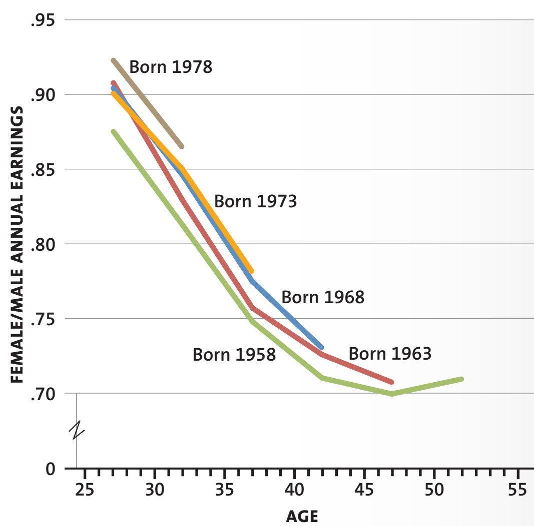
EARNINGS GAPS BY AGE, COHORT AND OCCUPATION

The first evidence concerns gender earnings gaps by age for a range of birth cohorts. The calculation should hold hours per week and weeks per year constant, so the gap does not simply reflect the fact that working more hours and weeks yields greater income. The real issue here is what working more time or less flexible schedules means for hourly pay. Therefore, I only examine the experience of full-time, full-year workers, and I account for hours and weeks above the "full" amount in the statistical analysis. Consider earnings gaps among college graduates now aged 35 to 55, tracked from the time they were in their late 20s.

Two findings stand out. First, there is a decreasing pay gap across cohorts. The youngest (born around 1978) has the smallest gender gap and the oldest (born around 1958) has the largest gender gap at each age. More important to the story, the gaps within cohorts greatly increase over time. Whereas women in their late 20s are earning around 92 percent what comparable men receive, those in their early 50s receive just 71 cents on the average male's dollar.

A second group of clues comes from analyzing gender earnings gaps by occupation. By occupation I mean occupations defined by the U.S. Census at the "three-digit" level of specificity, which total 469. It is worth noting that, while most are fairly narrowly defined (e.g., "actuary," "chemical engineer"), some are overly broad (e.g., "physicians and surgeons").

RELATIVE ANNUAL EARNINGS (FULL-TIME, FULL-YEAR) OF COLLEGE GRADUATES BY BIRTH COHORT 1958–1978



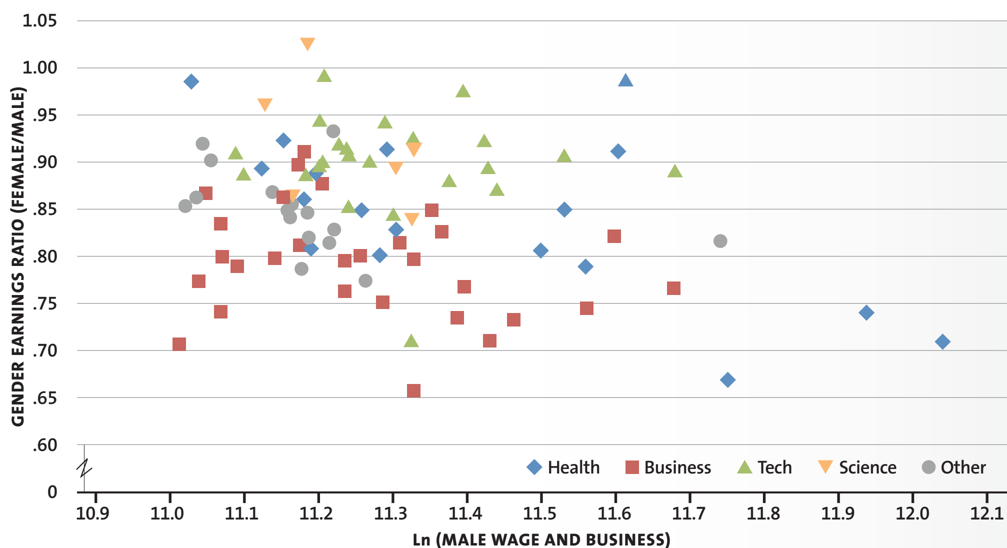
NOTE: Sample consists of full-time (35+ hours), full-year (40+ weeks) college-graduate (16+ years of schooling) men and women (white, native-born, non-military, 25 to 69 years old).
SOURCE: U.S. Census Micro-data 1980, 1990, 2000, and American Community Survey 2004 to 2006 (for 2005), 2009 to 2011 (for 2010).

Here, it's worth emphasizing that the relationship between the gender earnings gap and occupations for all men and women is accounted for mainly (85 percent) by the gaps within occupations, not across occupations (the remaining 15 percent). Looking only at college graduates, 65 percent of the gender pay gap is due to that within occupations and 35 percent is due to the distribution of occupations by sex.

Putting this another way, the gender earnings gap would not be reduced much if women were distributed among occupations in exactly the same proportions as men. In fact, for the labor force as a whole, just 15 percent of the gap would be eliminated if women were

GENDER EARNINGS GAPS BY OCCUPATION 2009–2011

FULL-TIME, FULL-YEAR WORKERS IN OCCUPATIONS WITH MALE EARNINGS >$60,000 A YEAR



NOTE: Sample consists of individuals 25 to 64 years old, excluding those in the military
SOURCE: American Community Survey 2009 to 2011.

distributed exactly as were men by occupation, but the earnings gaps within occupations remained constant. For college graduates, just 35 percent of the total gap would be eliminated. Now that we know the importance of the within-occupation gender pay gap we can focus on it.

Although I construct the gender pay gaps for all 469 three-digit occupations, I will focus on individuals in occupations with average compensation exceeding about $60,000 per year, often termed "professional service workers." This group includes around 60 percent of all male college graduates and about 45 percent of all female college graduates. I classify the occupations in several categories: Business and Finance, Health, Science, Technology and a small "Other" category. This categorization can be done for the higher-income groups, but not for those with lower incomes.

As in the first figure, the gender gap is measured by the ratio of female to male earnings and is almost always less than one. The lower the marker, the larger the gender gap. The means of male annual earnings by occupation range from $60,000 to $170,000.

The Business and Finance occupations have relatively large gender earnings gaps, while Technology and Science have relatively small ones. Within the combined Tech-Science groups there is one big outlier – airline pilots – where women earn only about 70 percent as much as men. This is a somewhat anomalous occupation within the grouping because military experience has been an important entryway and seniority matters considerably. Gaps in Health occupations are scattered throughout the graph. The Health occupations with a high rate of self-ownership (e.g., dentist, podiatrist) generally have larger gender earnings gaps than those with low rates of self-ownership (e.g., pharmacist, various types of therapists).

The gender gap in hourly compensation would vanish if firms did not have a financial incentive to pay employees working 80 hours a week more than twice what they would receive for 40-hour weeks.

Across the entire sample of full-time, full-year workers, the residual earnings ratio (female/male) for the Business and Finance occupations is 0.787 and the residual earnings ratio for the Technology and Science occupations combined is 0.892. For a sample limited to college graduates, the residual earnings ratios are 0.797 for individuals in Business and Finance and 0.903 for those in Science and Technology.

These very large differences between Business and Finance on the one hand and Technology and Science on the other demand explanation.

A really interesting hint concerns the role of average hours by occupation. In the analysis just discussed, the sample was limited to full-time workers (35 hours plus) and mean hours for each occupation was added as a control. When instead I allow hours to affect earnings differentially for each occupation, average time worked per week in the Business and Finance occupations (plus lawyers in the "Other" category) has a very large impact on hourly pay. But weekly time worked in the Technology and Science occupations has only a small impact.

That is, those in a Business or Finance occupation who work, say, 50 hours per week are, on average, paid disproportionately more than those who work 40 hours per week. But their counterparts in Technology or Science occupations who work 50 hours per week only increase their weekly or annual earnings proportionately more than those laboring 40 hours.

JEAN JULLIEN

UNDERSTANDING GENDER DIFFERENCES IN PAY

Here, I explore what happens when employees cannot "hand off" clients, patients and customers in a costless fashion. The framework fits into a model of compensating differentials and provides the foundations for the costs of providing a worker amenity such as flexible work hours.

Consider an employee (say someone with a law degree) in a position (say a lawyer in a relatively large law firm) whose work yields

$X per hour during a normal Y-hour work week. But if the lawyer is on the job fewer than Y hours (or is not around during particularly vital business hours), his/her value is less than $X per hour. Another lawyer's position (say, in-house counsel for a business) generates less value per hour than at a large firm. But it also comes with a lower penalty per hour for not being around for more than

some minimum number of hours per week. Now add a third lawyer to the mix – say, one working for a government agency. This lawyer generates the lowest value per hour, but his/her output is linear – that is, the value per hour remains the same, regardless of how many hours are worked per week.

Under these conditions, the value of a lawyer in the labor market depends on the costs to the firm of providing temporal flexibility. The big law firm won't be willing to pay as much to lawyers unwilling to put in Y hours a week than it is to lawyers who are willing. The reason is that their clients do not view two lawyers working 0.5Y hours each as good substitutes in the most productive positions for one lawyer working Y hours. The lawyers are better substitutes for each other as corporate counsels and perfect substitutes in government positions.

The framework suggests that "non-linearity" in labor value arises when it is costly to employers to allow workers to be off the job temporarily, when it is difficult to hand off clients to colleagues, and when interdependent teams must coordinate schedules – as in many finance and legal occupations. Note that non-linearity here means that a lawyer working 30 hours a week is worth less than half what a lawyer working 60 hours is worth.

Linearity, on the other hand, arises when employees can substitute for each other in a relatively costless fashion, when there are many independent team members, when information systems lower the cost of handing off clients and patients (as in health, pharmacy). Here, a lawyer who works 30 hours a week is worth precisely half that of a 60-hour-a-week lawyer.

Given the framework, what occupational characteristics should be related to residual gender gaps? I approach this question in two ways.

LESSONS FROM O*NET

The first involves identifying relevant characteristics for all three-digit occupations to see if the gender gap in earnings is related to whether the job is compatible with temporal flexibility without a significant loss in productivity. The source for the data is O*NET, a database underwritten by the U.S. Department of Labor. O*NET provides hundreds of characteristics for each occupation. Many of

JEAN JULLIEN

them concern physical strength and cognitive abilities, which are not relevant to the issues here. But there are a variety of characteristics that are directly related to the job features highlighted by the framework. I selected characteristics indicating the degree to which employees:

- are subject to strict deadlines and time pressure;
- need direct contact with others;
- must develop cooperative working relationships with others;
- are tied to highly specific projects;
- cannot, as a practical matter, determine their pace, tasks, priorities and goals.

For the purposes of computation, I normalize each characteristic to have a mean of zero and a standard deviation of one. A negative score implies there is less-than-average need to be around, less time pressure, more work on specific projects, and more ability to regulate one's own pace and goals. A positive score has the opposite implication.

Technology and Science occupations score far lower – that is, are far more flexible in terms of time – by these criteria than do Business, Finance and Law occupations. In fact, they score about one standard deviation below on most of the characteristics.

Not surprisingly, there is a strong negative association between the average of the O*NET scores for the five job categories and the (corrected) ratio of female to male earnings. The lower the average of the O*NET scores the higher is the (corrected) ratio of female to male earnings in that occupation.

LESSONS FROM THE LARGE GENDER EARNINGS GAPS IN MBAs AND JDs

Another way to gain insight into differences in the gender earnings gap is to explore individual occupations that have substantial pay gaps. The data I use are longitudinal or retrospective, and contain enormously rich information on characteristics that are related to individual productivity.

The data for Business and Finance come from administrative records of University of Chicago Booth School MBAs (1990 to 2006)

and a survey, used in my research with Marianne Bertrand of the University of Chicago and Larry Katz of Harvard. We found that the gender earnings gap greatly increases with time since attainment of an MBA, so that 12 to 15 years after earning an MBA women earn just 57 percent as much as men. Even after correcting for MBA courses taken (some specialties pay more) and grades, the figure is still 64 percent, although it is about 95 percent at the start of their careers. But the largest factors explaining the gender earnings gap are weekly hours and time spent out of the

labor force, even though differences in hours by gender are not large and time out for women is not extensive.

We found that, when they have children, MBA women shift into lower paying positions (or out of the labor force) to gain temporal flexibility. The finance and corporate sectors heavily penalize lower hours for both men and women, and flexible or low-hour positions are rare. Half of all MBA women who work part-time are self-employed.

For the data on law degrees (JDs) I used the University of Michigan Law School Alumni research data set, which contains rich information on hours and earnings. The relationship between the gender earnings gap and time since earning the JD degree is similar to that for the MBAs. Because the information on hours in the law school alumni data set is much better than that for the MBAs, I can better assess whether hourly earnings are non-linear with respect to hours worked.

I examined annual earnings (in constant dollars) by hours worked 15 years after the JD degree was earned for men and women who graduated from law school between 1982 and 1991. Earnings are clearly non-linear, with those working more hours per week earning more per hour. These findings stand up to controls for years off the job and years working part-time. In addition, the fraction of women in the lower-hour group is much higher, and the fraction of the women who have children is also much higher in the lower-hour group.

LESSONS FROM THE SMALL GENDER EARNINGS GAP IN PHARMACY

Pharmacy is a very high-income occupation. Among (full-time, year-round) male workers, it was the eighth highest on an annual basis in 2010 and among women it was the third highest. But unlike occupations in business, finance and law, it has a small gender pay gap and almost no penalty for low hours.

Pharmacy underwent major changes in the last several decades. Self-ownership and the fraction working in independent practice plummeted from 1970 to the present. Whereas almost 70 percent of all pharmacists in the United States worked in an independently owned pharmacy in 1970, just 14 percent do today. Meanwhile, the fraction of pharmacists who are female rose from around 10 percent in 1970 to almost 60 percent today, and the ratio of female to male annual earnings increased from 0.65 in 1970 to 0.92 today.

Most pharmacists are now employees of large firms or hospitals. The spread of vast information systems and the standardization of drugs have enhanced their ability to seamlessly hand off clients and be good substitutes for one another. The result is that short and irregular hours are not penalized. Pay is almost perfectly linear in hours. Those who work fewer hours – say, because of family responsibilities – are paid proportionately less. Part-time work is common, especially for women. But there is almost no part-time wage penalty.

WHERE WE STAND

We now know what must be in the last metaphoric chapter for it to be truly the last. It must involve considerable economic change, not a Band-Aid with firms offering flexible hours and schedules to workers in return for lower compensation. And to get from here to there, temporal flexibility must become less expensive for firms, pushing competitive labor markets to generate more linearity of earnings with respect to the number of hours and the particular hours worked.

A restructuring of jobs has happened organically in many health care occupations, in-

For pharmacists today, short and irregular hours are not penalized. Pay is almost perfectly linear in hours.

cluding pharmacists, physicians, optometrists and veterinarians. Some physician specialties have low hours, few on-call hours, and primarily planned procedures. Many of the Technology and Science occupations have built-in flexibility because work projects are often done independently and are highly specific requiring less oversight. And the spread of information systems has led to change in other sectors, enhancing substitutability across workers.

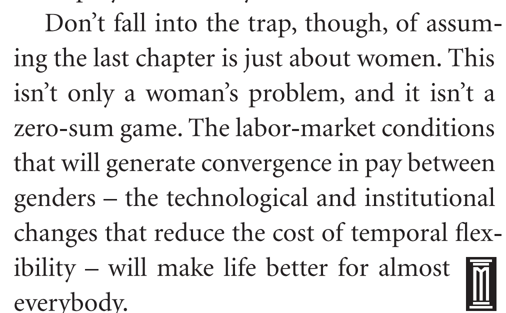
Am I advocating that workers become clones of one another? Wouldn't that degrade the work of professionals?

Many of the highest earning and most prestigious professionals have almost perfect substitutes, a reality acknowledged by the way their professions are organized. Obstetricians cannot deliver two babies at the same time – or deliver them when they are on vacation in Cambodia – and thus work in group practices. Likewise, anesthesiologists generally work in groups and surgeons will generally pick a group of anesthesiologists to work with, not individual anesthesiologists. Personal bankers are organized as teams so that clients can obtain help 24/7.

Am I suggesting that all jobs could be structured so that clients could be handed off seamlessly, driving labor markets toward linear pay? There will always be some jobs that require one person to be on call. We don't expect the occupant of the White House to have a perfect substitute. But we have long lives, and as the need to care for children declines so does the need for flexible- and/or part-time hours (although these needs may return with elderly parents or ill spouses).

The earlier chapters in the grand gender

JEAN JULLIEN



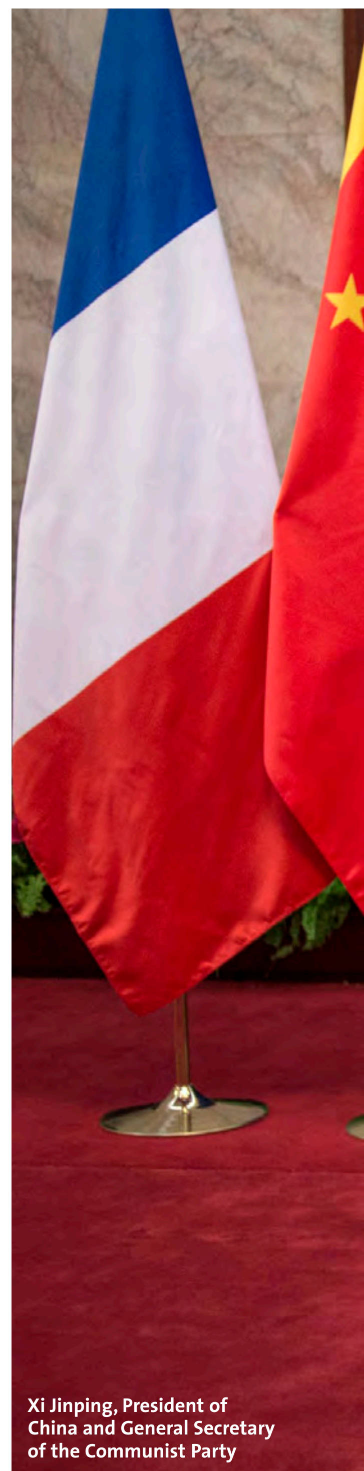
convergence chronicled women's relative gains in education and work experience. But the last chapter concerns the utilization and remuneration of these productive attributes. It will be about how firms respond to changes in technology and to the evolving preferences of employees as family/work issues arise.

Don't fall into the trap, though, of assuming the last chapter is just about women. This isn't only a woman's problem, and it isn't a zero-sum game. The labor-market conditions that will generate convergence in pay between genders – the technological and institutional changes that reduce the cost of temporal flexibility – will make life better for almost everybody.

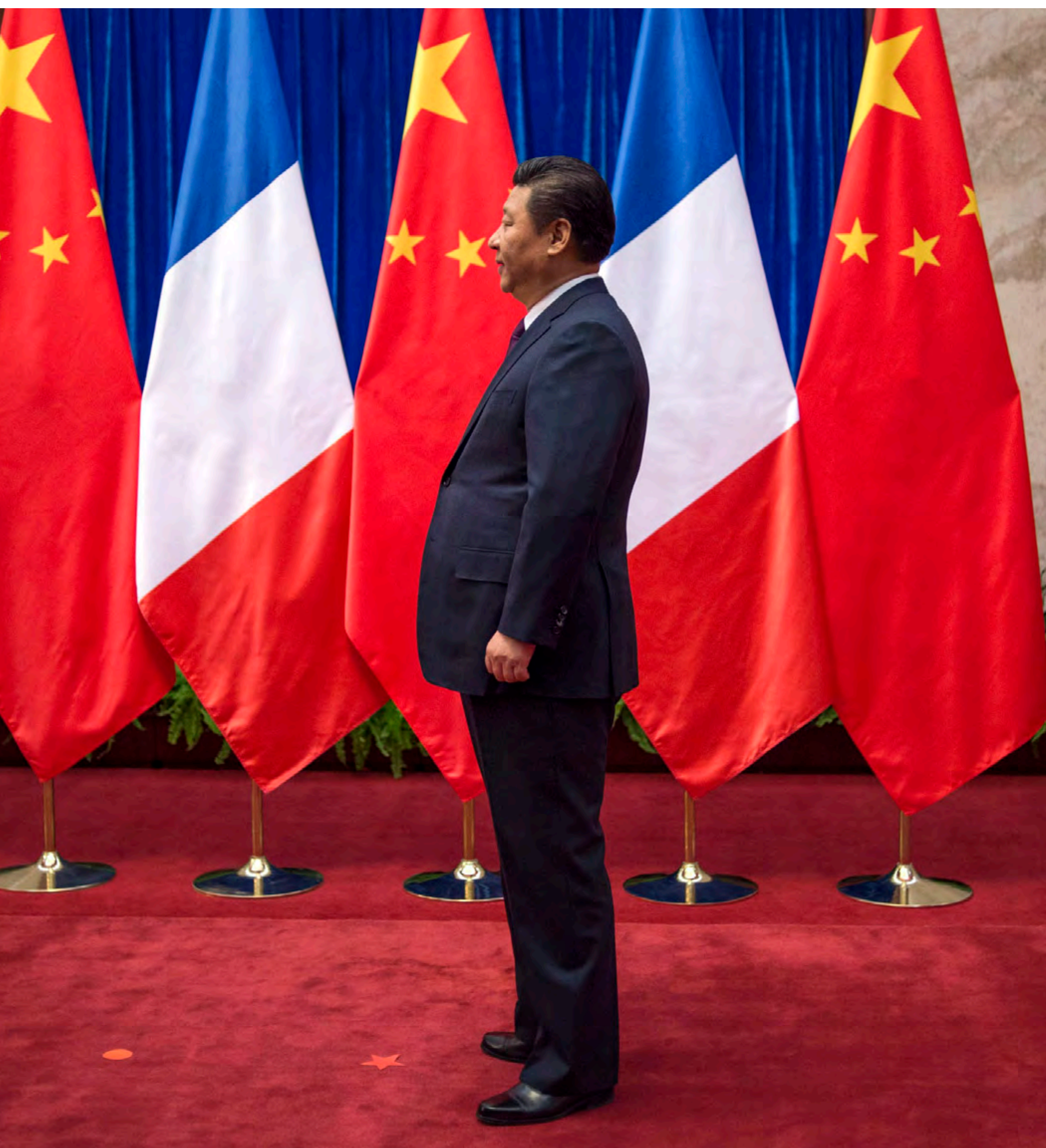
China AT THE Crossroads

BY MARSHA VANDE BERG

China's economic slowdown – three consecutive quarters of slowing expansion, with more forecast through the end of 2015 – has caught Beijing in a dilemma. Indeed, the below-target GDP growth is forcing the leadership to weigh the compatibility of policies for rekindling fast-paced expansion and the long list of institutional reforms that, just a few months ago, were widely seen as vital to keeping the maturing economy on track toward high-income status. At least on the surface, economic policymakers are opting for the former, declaring that growth and government-led development are now the priorities, even at the expense of delaying the structural reforms needed to support a huge and increasingly complex economy.



Xi Jinping, President of China and General Secretary of the Communist Party



That choice is understandable. Without rapid growth, the tens of millions of unemployed and underemployed Chinese streaming into the country's megacities won't be able to find jobs, while the burgeoning middle class may fall victim to what development economists term the "middle-income trap." The catch – well, one catch, anyway – is that expansion may prove self-limiting if China remains dependent on export-led growth in an ever-more-competitive global manufacturing sector.

Some way, some day (preferably soon) China's economy must be rebalanced in ways that diversify output and put services in place as the lead driver. And that will require (among other things) more sophisticated regulation of an economy that now awkwardly mixes ebullient private markets with what might be called crony socialism.

In the meantime, a variety of developments suggest that despite the emerging preference for fast growth, China's leaders are trying to have it both ways. And this is giving legitimate hope to China's free-market champions, who want to believe that reforms will continue to be rolled out in parallel with efforts to juice up sagging demand.

JUGGLING AT THE APEX

Recent pronouncements from the top underscore Beijing's focus on measures that arrest the growth slowdown. But reforms are clearly still on the table. Some are designed to rationalize fiscal management. Among them are a revised national budget law that makes budgeting more transparent; a broad-based value-added tax that replaces a hodgepodge of business taxes; and the refinancing of the massive debts of local governments that accumulated during the global financial crisis, when localities were ordered to pay for China's stimulus program. In the same vein, Beijing changed procedures to bring greater clarity to the relationship between central and local governments.

Moreover, the transition plan aimed at raising the growth rate is built for double duty. It anticipates the imperative for enhanced social-welfare programs in a better-balanced economy as well as the need for greater environmental protection and promotion of R&D to support China's move up the global pecking order of technology.

Commentary from the meetings of the National People's Congress on March 5, along with subsequent statements by the party leadership at the March 21-23 Economic Summit and annual China Development Forum in Beijing, supports the view that the government is hedging its bets. In his formal address to the nearly 3,000 delegates participating in the National People's Congress, Premier Li Keqiang affirmed that "reforms will be built around development and support of development rather than capital and financial market reform."

By the same token, Zhou Xiaochuan, head of the central bank, has not hidden his fear that domestic inflation was falling too fast. What's needed is to remain alert in the face of deflationary risks, he cautioned. And he acted on his view that the monetary authorities have considerable wiggle room to cut the banks' minimum reserve requirements in order to encourage lending.

Meanwhile, the deputy prime minister, Wang Yang, turned his sights on China's slowing trade growth, a crucial economic indicator for an export-led economy, calling on the government to act immediately to curb the

MARSHA VANDE BERG is a senior fellow in the Harvard Law School program on international financial systems and a member of the advisory board of the RAND Center for Asia Pacific Policy.

PREVIOUS PAGE: REUTERS/FRED DUFOUR/POOL

ASSOCIATED PRESS/HAO QUNYING

Premier Li Keqiang affirmed that "reforms will be built around development and support of development rather than capital and financial market reform."

downturn and prevent it from deteriorating into one continuous "speed loss." (Something was lost in translation, but you get the point.)

The proceedings of the Economic Summit and subsequent China Development Forum, China's highest-level meeting between foreigners (among them, me) and senior economic policymakers, provided a somewhat wider perspective on the leadership's thinking. And while China's policymakers' public statements are always cautious, that doesn't stop anybody from reading between the lines. Participants described China's growing pains as the "new normal," a time when China's increasing integration with the global economy makes it difficult to expand rapidly simply by increasing exports. "The government needs to change from being a strong government to being a smart government," said Liu Shijin, vice president of the Development Research Council, the State Council's research arm.

It's all right if growth drops down to medium speed, explained Wu Jinglian, a widely respected China economist and DRC research fellow. The quality of growth, he suggested, was more important than the pace.

IMAGINECHINA

TRANSLATIONS FROM THE CHINESE

If all this still leaves you puzzled about what the leadership wants and expects to happen, that probably wouldn't bother them. This, after all, is a delicate moment in contemporary Chinese history, as the economy teeters on the edge of development and political power is being consolidated under Xi Jinping, the president and the Communist Party's general secretary. One must assume that it is an especially inauspicious time for officials to stick their heads out.

Also notable is what actually happened between November 2013 and now in the way of getting reforms into place – and what those reforms mean for the larger picture of China's economic success. Less than two years ago, China announced a bold commitment to letting Adam Smith's invisible hand replace the government's in guiding its economy. Many saw this as a commitment to liberalizing the financial sector and a step toward currency convertibility, market-determined interest rates and more-liquid bond markets. Although there was no blueprint, the announced deadline was the end of this decade.

There are some who argue that this commitment remains intact, and they are supported by evidence that important reforms have been put into place, albeit at a deliberate pace. What appears different between then and now, however, is what lies at the heart of the current agenda to speed up growth, create enough jobs, meet demands for more equitable wealth distribution and keep public order.

One of the clearest explanations of both the quality and instance of the post-2013 reforms comes from outside the country. Barry Naughton, an economist who teaches in the Chinese Studies Program at the University of California, San Diego, divides reforms into three buckets: fiscal policy, property rights and foreign economic policy.

Fiscal policy reform spotlights the role of Lou Jiwei, the former head of the China Investment Corporation (China's sovereign wealth

The Asia Infrastructure Investment Bank, opposed in part by the Obama administration because it could undermine efforts to set high standards for environmental impact on infrastructure loans, was applauded by potential recipients for the same reasons.

fund), who is now Xi's minister of finance. At the top of his agenda is a clever debt swap intended to help local governments ease the crushing debt they amassed as a result of the four trillion renminbi (about $650 billion) stimulus in 2008-09 and a hyper-active housing market. The debt-swap plan provides local governments with a vehicle for issuing municipal bonds in the interbank market and then applying the proceeds to repay maturing debt over the course of this year.

The plan is labeled an interim liquidity measure and carries an implicit 1 trillion renminbi (about $160 billion) subsidy. It will be helpful – but probably only modestly helpful, given the outsized debts that local governments now carry and the dearth of revenue generated by the infrastructure built with the borrowed funds.

Still, the swap plan is an important step toward putting local governments on a sounder fiscal footing and ultimately to positioning them as engines of growth and job creation. Moreover, the regulations governing the swap are expected to lend greater clarity to the divisions of responsibility between the two levels of government, and, with that, more effective central government oversight.

The second bucket of reforms is designed to clarify and defend farmers' property rights, which could become the prototype for a country-wide restructuring of the agricultural sector that increases productivity and growth. The reforms protect farmers against the uncompensated loss of property to developers who, often in collusion with local governments, amass land for future construction projects. There will now be clear laws governing the rental of land and its use as loan collateral.

And none too soon, writes Naughton. He argues that "institutions must catch up with the changed rural reality, notably mass migration from China's rural to urban areas, and this new policy creates space for compromise and facilitates a consensus in support of the measure among urban elites."

The third bucket includes a series of initiatives designed to lengthen China's economic reach abroad (notably in Asia), to increase access to foreign capital and to employ global markets to help rebalance the domestic economy. Xi has been signaling his intentions on this front for some time. Last November's meeting of the Asia Pacific Economic Summit in Beijing featured his unveiling of China's plan to organize a multilateral credit facility, the Asia Infrastructure Investment Bank, and to invite some 30 countries to join as founding members. The initiative, opposed in part by the Obama administration because it could undermine efforts to set high standards for environmental impact on infrastructure loans, was applauded by potential recipients for the same reasons.

The announcement received scant international attention at the time, but ultimately contributed to catapulting Xi and China's economic diplomacy onto a wider international stage. Xi, by the way, has certainly won the first round in this contest with the United

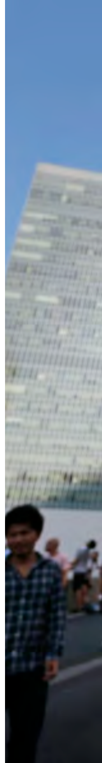
States: Australia, as well as South Korea and most EU countries, has signed on. (So far, Japan has not made a decision.)

But the infrastructure bank is only a part of the story. China has negotiated a new trade agreement with Australia that includes most-favored-nation status for Australia, and a similar agreement is in the offing with South Korea. An even-more-groundbreaking initiative involves the loosening of currency restrictions. That initiative, the Shanghai Free Trade Zone, which has long been in the planning stages, represents a major experiment in allowing the use of China's currency in international transactions without direct regulation.

During the early stages of the Shanghai Free Trade Zone's development, the port city of Tianjin was awarded the right to establish a similar zone focused on expanding trade and commercial relations with South Korea, which is just a few hundred miles away across the East China Sea. Other free-trade zones receiving approvals include a site in Guangdong province, the industrial heartland of southern China, which is intended to expand the region's already booming commerce with Hong Kong, and yet another in Fujian province, to build on its proximity to Taiwan.

Complementing the free-trade zones, China is dipping another toe in the waters of global securities trading. The Shanghai-Hong Kong Connect (soon to be joined by the Shenzhen-Hong Kong Connect) is a platform that allows investors on both sides of the China/Hong Kong border to trade stocks via registries in each of the respective markets. Buyers and sellers on the China side pay in renminbi, while their counterparts in Hong Kong settle transactions in Hong Kong dollars. The Connect platform also gives foreigners, including big institutional funds, access to so-called A-Market securities – shares in Chinese companies (many of them state-owned-enterprises in transition) that before November 2014 were only available to Chinese nationals and pre-approved foreign investors.

These experiments, it should be noted, may presage the breakthrough reform of allowing China's currency to be freely exchanged for others, and potentially giving the renminbi global reserve-currency status alongside the dollar and the euro. This shift, urged for years by China's big trade partners and foreign investors, would open the spigot for the foreign cash needed to modernize the nation's sluggish state-owned enterprises. A market-determined exchange rate would likely also signal the end of near-total dependence on manufacturing-export fueled growth – one crucial step in avoiding the much-feared middle-income trap.



Notable, too, is China's more recent announcement that it was about to implement an FDIC-like deposit insurance plan. But if the announcement's real significance turns out to represent a resolution of the long-standing debate about the effects and therefore the pace of capital-market reform, it also raises the more immediate question about the government's role in an economy that is increasingly driven by market forces.

The official response to China's dilemma – government-directed growth, reforms based on markets as drivers, or something in between – depends on Xi, who has amassed more power than any Chinese leader since Mao Zedong. Xi's authority, grounded on his hard-hitting drive against corruption in high places, has made him extremely popular. (He is affectionately referred to as Papa Xi.) But it is also raising questions about Xi's views on economic reform.

Early on, it was widely believed that the anticorruption drive's popularity would add to the president's political capital, allowing him

LEFT: ASSOCIATED PRESS/WONG MAYE-E. RIGHT: ASSOCIATED PRESS/KIN CHEUNG

Xi's core long-term goal, it is widely believed, is to sustain market-driven economic growth without opening the door to challenges to the Communist Party's monopoly on political power.

to override the objections of special interests who were unhappy about reforms, especially those involving state-owned conglomerates. But some observers are now asking whether the investigations are being used to rationalize a slowdown in reform efforts, thereby giving Xi more flexibility in agenda-setting.

Either way, remarks attributed to Wang Qishan, a Politburo member and secretary of the nightmarishly named Central Commission for Discipline Inspection of the Communist Party, are apt: the anticorruption struggle is a "battle that cannot afford to be lost."

Xi's core long-term goal, it is widely believed, is to sustain market-driven economic growth without opening the door to challenges to the Communist Party's monopoly on political power. Anticorruption efforts help to achieve this goal by allowing markets to work more efficiently, even as they increase the political legitimacy of the party as the defender of the general welfare. But these efforts also have the potential to disrupt the symbiotic relationship between China's capitalists and their regulators. Indeed, it once again raises the question of whether authoritarian rule is fundamentally incompatible with the workings of a diversified, highly productive market economy.

We may soon know a lot more about Xi's reform inclinations. This year marks the conclusion of the 12th Five-Year Plan, which means Xi will need to come forward with the first Five-Year Plan of his own devising. It is this document that typically showcases the leadership's thinking about the economy. Thus, for Xi – and for China – this moment may be critical.

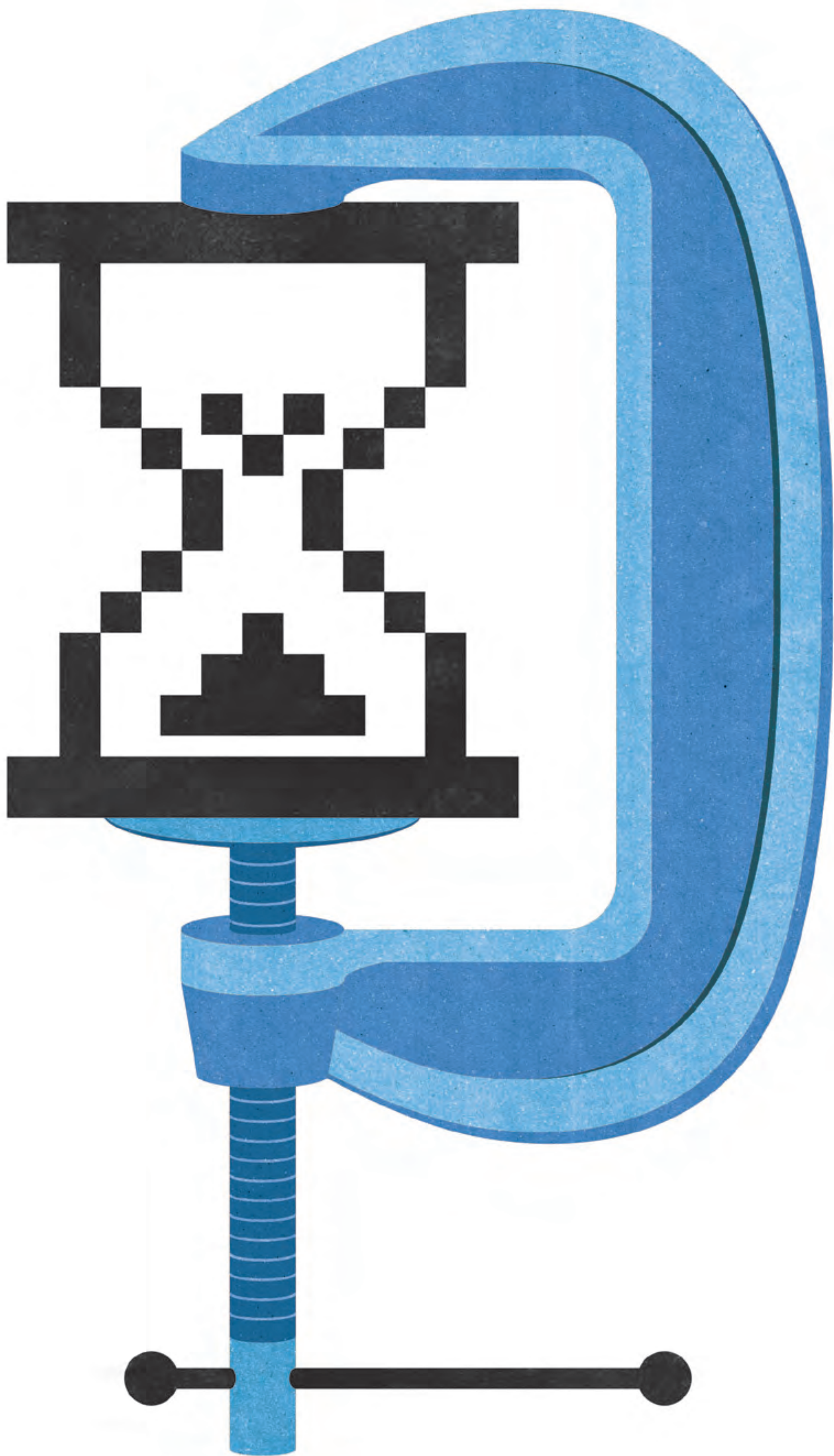
3.0 THE ATTENTION ECONOMY

BY FRANK ROSE

Nearly a half-century ago, in a lecture sponsored by Johns Hopkins University and the Brookings Institution, the economist and future Nobel laureate Herbert A. Simon told a story about bunny rabbits. It seems his neighbors had purchased a pair of bunnies for their daughter as an Easter present, and since the rabbits were of different genders the neighbors soon found themselves living in, as Simon put it, "a rabbit-rich world." This would have consequences not just for the neighbors but for the local food supply. "A rabbit-rich world is a lettuce-poor world," Simon pointed out, "and vice versa."

Alas for leporidologists, Simon was not giving a disquisition on rabbits. His actual topic was information, which even then appeared to be exploding, and he went on to make an observation that has been cited many times since:

> In an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients. Hence, a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.



KOTRYNA ZUKAUSKAITE

And so, at the dawn of the information age, was born the notion that we live in an "attention economy" in which a glut of information leaves us with a deficit of attention. It was a radical idea, since for most of human history it has been information that's in short supply and attention that's abundant. But Simon was prescient. In a few quick sentences, he predicted a reversal of the economic relationship between media producers and media consumers. In the future, the value of information (the stuff being produced) would trend toward zero, while the value of attention, which is owned by consumers but can be leveraged by companies that help them allocate it, would only rise. Google, its founders as yet unborn, would triumph; newspapers would collapse.

Of course, it wasn't quite that simple. There were other issues to be decided, chief among them the question of how to measure this newly identified resource called attention. Simon thought the answer was fairly obvious: attention should be measured by the amount of time an average business executive, a person he identified as having a bachelor's degree and an IQ of 120, spends focused on something. Such "attention units" would capture the cost, in addition to any monetary outlay, of receiving information.

But Simon was a good 30 years ahead of his time. By the time the rest of the world caught up with his ideas, other, cruder, metrics had come into use – metrics that have so distorted the economics of the Internet that we find ourselves awash in information that's useless, even predatory, while information that actually deserves our attention often goes begging. Fixing this won't be easy, but it's going to be critical to a functioning media industry – as a growing number of people are starting to point out.

MAU-MAUING THE FLAK CATCHERS

Last January, Evan Williams became the latest to speak up. Williams is a co-founder of Twitter, the microblogging service that went public in 2013, and more recently of *Medium*, an online publication that doubles as a blogging platform and has serious journalistic ambitions. In December, Facebook announced that Instagram – the popular photo-sharing app that it bought for $1 billion in 2012 – had 300 million "monthly active users" (MAUs, in the lingo of the trade). This was remarkable for a service that nine months earlier had only 200 million.

But commentators on Wall Street and in the media immediately ginned up a comparison with Twitter, whose user base, after an initial growth spurt, stood a little below 300 million – much to the Street's distress. From CNBC to *Mashable* to *Adweek*, one outlet after another proclaimed Instagram to be "bigger than Twitter." A Citibank analyst announced that Facebook's not-yet-profitable photo app might be worth $35 billion, far more than Twitter's market cap of $24 billion. A columnist for CNNMoney opined that Twitter should sell itself to the highest bidder.

Williams's response, delivered to a *Fortune* reporter: "I don't give a s***." And for good reason. Aside from the fact that they're interactive services that live on Internet-connected electronic devices, Twitter and Instagram have little in common. Twitter, as Williams pointed out, is a "realtime information network" where big news breaks first and world leaders and celebrities speak to global audiences. But while Twitter can be highly addictive to initiates, it has not made itself friendly to newbies – a failing that contributed to in-

FRANK ROSE is a senior fellow at the Columbia University School of the Arts and the author of *The Art of Immersion: How the Digital Generation Is Remaking Hollywood, Madison Avenue and the Way We Tell Stories.*

vestors' feelings of relief when its CEO resigned in June. Instagram, on the other hand, is a fun and extremely well-executed app that encourages people to connect over photos.

Monthly active users can be a helpful yardstick for such online services, but as *Slate*'s Will Oremus pointed out in one of the few informed appraisals of the Twitter/Instagram contretemps, "they aren't the only one. Others might include the amount of time users spend on the network, the amount of content they post, and the number of people who see that content." By those measures, Twitter far outstrips its so-called rival: 500 million tweets per day compared to 70 million photos posted to Instagram; 500 million people per month who visit the site but don't log in (and therefore aren't counted as "active users"); 185 billion impressions per quarter.

In Twitter's case, a shortage of MAUs turned off advertisers, weighed on the stock price, and helped precipitate a change in leadership. But as misleading as the MAU metric can be for social sites, the monthly tally of "unique visitors" – typically used to gauge the importance of media sites – is worse, for the stock price and for ad rates alike. It assumes that if someone lands on a Web page, that person is going to stay there long enough to read or watch whatever is onscreen. The reality is quite different. According to the Web analytics firm Chartbeat, 55 percent of the people who visit a Web page stay there for less than 15 seconds. Yet the site with the most traffic wins, regardless of how fleeting that traffic might be.

We've been here before, of course. "Uniques" are the online equivalent of ratings on television. The fixation on ratings fed the lowest-common-denominator effect that held the industry in its grip from the late 1950s until just a few years ago, when the rise of pay-TV channels and the growing sophistication of audiences pushed television into a new "golden age" typified by serials like *Mad Men* and *Girls*. But the situation is even worse online because only a third of Web advertising is bought on the same cost-per-thousand basis that prevails on TV. The rest is "performance based," meaning that advertisers pay a fraction of a penny each time someone clicks on their ads. So it's not enough for advertisers to reach as many eyeballs as possible; in order for those eyeballs to count, they have to generate some sort of response.

55 percent of the people who visit a Web page stay for less than 15 seconds. Yet the site with the most traffic wins, regardless of how fleeting that traffic might be.

That makes sense for Google, which generates the great bulk of its outsized profits ($14.4 billion on revenues last year of $66 billion) by serving up precisely targeted ads next to search results. But it has fed the perception in the ad business that online display advertising – banner ads that run across the top of a Web page, for instance – is ineffective because it doesn't generate as many clicks as search advertising. So rather than being treated as a brand-building medium like television, the Internet has devolved into a direct-response medium – a bargain-basement ad emporium

that's only as good as the next click. Which will be a problem since the Internet is where television is headed.

It doesn't help that the Internet is essentially unaffected by physical constraints. Television, especially analog television, has discernible limits: there are only so many viewing hours in the day, only so many megahertz of bandwidth that can be devoted to broadcasting channels simultaneously, only so many minutes that can be devoted to ads without audiences tuning out completely. (The current rule of thumb in the United States is 8 minutes out of every 30.) Not so online, where the potential number of ad-carrying Web pages is effectively infinite.

At the same time, online distribution is largely controlled by users rather than publishers, either through search engine queries or by spreading information virally on sites like Facebook and Twitter. Marc Andresson, a leading Silicon Valley venture capitalist, has been talking about "a golden age of journalism" that could follow a transition to a new-generation audience that's mobile and always connected. But with users driving distribution and with infinite inventory pushing ad rates relentlessly downward, the focus on unique visitors and click-through rates has inspired a lot of Web publishers to try to game the system – to go big by providing junk content to go with the junk ad medium that serves it up.

WHAT THE ALGORITHM SAID TO THE CONTENT FARM

The first target for abuse was search. Through the miracle of search engine optimization, Web publishers can design their sites to attract notice from the bots that crawl the Net on behalf of Google and other search engines. Figure out how to take maximum advantage of this while delivering minimal value and you get something like Demand Media, the "content farm" that five years ago looked like the future of journalism.

And a dismal future it would have been: the idea was to pay writers and videographers a pittance – $15 or so – to churn out near-useless material on topics a computer algorithm said people wanted to know about, then lard it up with ads and rely on search engines to drive traffic. Most visitors would go straight back to Google, but who cared? A unique was a unique, no matter how fleeting the visit, and Demand Media was soon getting more than 100 million uniques a month, making it one of the top 20 Web properties in the United States.

Demand Media's business model was stunningly cynical, though the company did try to dress it up with self-serving rhetoric about "publishing what the world wants to know and share." More surprising was the number of tech-savvy individuals who bought in. "They really understand consumer behavior on the Web and how to build businesses on it," Facebook COO Sheryl Sandberg said to *Bloomberg Businessweek*. *Wired* magazine concluded at the end of a lengthy profile that "the Demand way may be inescapable."

Investors certainly seemed to think so. In January 2011, when Demand went public in an IPO led by Goldman Sachs, the market valued it at $1.9 billion on opening day. Never mind that it had lost money in each of its four years of existence; it was the first IPO to top $1 billion since Google itself went public in 2004. The New York Times Company, meanwhile, was valued at $1.55 billion.

That was then. By November 2013, not quite three years later, Demand Media's traffic had fallen by half, its CEO had resigned, and its stock price had dropped from a peak of $52.50 shortly after the IPO to somewhere around $5. What happened? Google.

Days before Demand's initial public offering, Google's engineer in charge of fighting

KOTRYNA ZUKAUSKAITE

Web spam noted in a company blog post that users wanted it to take action against content farms and the like. His advisory was largely ignored in the froth of the IPO. But a few weeks later, Google made good on the threat by introducing a significant change in the way it tallied search results. Its new search algorithm, called Panda, specifically penalized low-quality sites – those with thin content and too many ads.

Demand Media's traffic plummeted. By April 2011, outside analytic services were reporting that visits to its sites were down as much as 40 percent. The stock price started falling accordingly. Copycat sites, of which there was no shortage, suffered a similar fate. Google "wouldn't give us any relief," one competitor told an interviewer from Harvard's Nieman Journalism Lab, "so I realized this was not a sustainable business."

With search out, would-be media innovators turned to social. You would think that sharing through social media would be relatively immune to the gamesmanship that corrupted search, since for something to go viral it presumably has to deliver on some level. (There's a reason that homemade cat videos tend to be insanely popular.) But that turned out not to be the case. No sooner did content farms implode than "clickbait" and "linkbait" took their place.

We've all seen them – headlines that stop at nothing to get us to drop everything so we can click on the story and then link to it:

- *32 Freaky Times the World Was Creepy in the Worst Ways Imaginable*
- *The Things You Can Find on These 25 Bizarre Islands Seem Too Freaky to Be Real*
- *She Was Hit by a Car, Struck With a Hammer, Buried...and She STILL Wags Her Tail*

And my personal favorite for at least the past five minutes:

- *He Thought He Could Be a Human Anteater, But What Happened Was...OMG*

These are all recent examples from ViralNova, a site most readers of this journal have probably never heard of. Nonetheless, in April 2014 *Bloomberg Businessweek* declared the year-old business "one of the defining media companies of this convulsive era." What made it defining was the same thing that once made Demand Media defining, but with a twist. ViralNova lures millions of people to junk content, not through search but because it can induce people to link to it – mainly on Facebook, which accounted for 90 percent of the site's 6.6 million monthly unique visitors.

ViralNova is headed by Scott DeLong, a 31-year-old entrepreneur who lives next to a cornfield in North Canton, Ohio (pop. 17,500). DeLong doesn't have a huge news operation or a vast network of contributors; he doesn't need them. All he requires is an eye for arresting video, the nerve to poach it from other online sources (many of which have themselves poached it from someone else), a savvy way with Facebook, and enough servers to keep the whole thing from crashing. This last appears to be his biggest problem.

DeLong is not alone. Upworthy, founded by the former MoveOn organizer Eli Pariser and the former *Onion* editor Peter Koechley, pioneered the genre in 2012. After six months online, it could (and did) boast of 8.7 million uniques, with every post being shared an average of 25,000 times. Ashton Kutcher's new site, A+, has 27.5 million monthly uniques in the United States alone and was recently hailed on the news site Business Insider as "one of the most important media companies in America" – even though, as the writer admitted later in the same sentence, "almost no one knows it exists."

And then there's Emerson Spartz, a 27-year-old Chicagoan who created a hugely pop-

ular Harry Potter fan site at 12 and now runs a potpourri of ad-laden websites that repurpose and repackage content for maximum virality. In a recent *New Yorker* profile, Spartz made it clear he thinks originality is for chumps: it takes too much time, and people are no more likely to click on the result. So he and his peers feed off each other while frequently harvesting the value of information other people have painstakingly gathered.

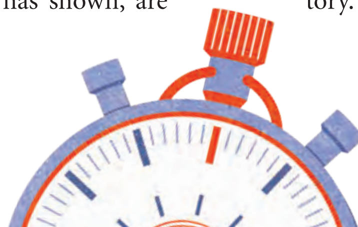
All this is possible because we no longer have to wonder why one story or video goes viral and another does not. What used to be viewed as a crapshoot is now almost a science. Jonah Berger of the Wharton School wrote a best seller called *Contagious* after he and a colleague, Katherine Milkman, analyzed 7,000 *New York Times* articles that ran in the fall of 2008. The study showed that a key factor in getting people to email stories to friends and colleagues was emotional arousal.

In general, people were more likely to email positive stories than those that generated negative emotions like anger or anxiety. But intensity mattered, too. Stories that sent readers into a rage were more likely to go viral than those that evoked emotions that were only mildly positive, or that were negative in a deactivating way, like sadness. In the book, Berger cites a handful of other factors as well, among them social currency, practical usefulness and good storytelling. Much less important, as Duncan Watts, a Microsoft researcher and former Columbia professor, has shown, are "influentials," the highly connected individuals singled out in Malcolm Gladwell's best seller *The Tipping Point*. Opinion leaders, contrary to popular opinion, aren't nearly as critical to spreading information as ordinary people who are easily persuadable.

ViralNova lures millions of people to junk content, not through search but because it can induce people to link to it – mainly on Facebook, which accounted for 90 percent of the site's 6.6 million monthly unique visitors.

Unruly, a London-based company that specializes in delivering highly shareable ad videos, offers a far more granular approach to virality. Its proprietary ShareRank algorithm, developed from more than 100,000 viewer reactions, gauges the likelihood that a given ad video will be shared, depending on (among other things) the psychological response it generates and the social motivation it appeals to. Celebrities don't have much impact, but friends do; according to co-founder Sarah Wood, an ad that's recommended by a friend is up to 50 percent more likely to trigger a purchase that an ordinary recommendation. But while the rate of online video sharing kept doubling for years, it has recently started dropping off. The problem, Wood says, is sheer volume: "We can't take any more and pay attention to it."

Which gets to the heart of the issue. There's nothing wrong with virality – it's how news and ideas spread in the Internet age. The problem is with how we measure success and what kind of behavior those metrics encourage. The focus on uniques and click-throughs assumes that value online is where it has always been in the media business, in ad inventory. But Web pages can multiply like



bunny rabbits – and the more they do, the less valuable each ad opportunity becomes. What's needed is an injection of scarcity – and "the only unit of scarcity on the Web," as Chartbeat's CEO, Tony Haile, recently told *Advertising Age*, is time. Herb Simon would approve.

IN SEARCH OF LOST TIME

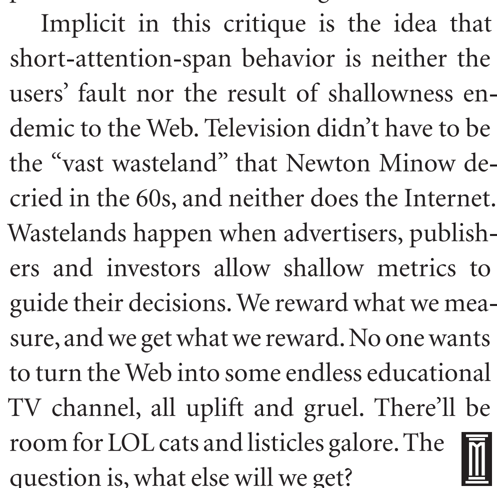
It follows that, as with any scarce resource, those who capture users' time should be able to charge a premium. The question is, how do you capture it? Time online is owned by users, not publishers, so it's theirs to spend. But if they spend it on your content, then it should be yours to monetize – or so argues Haile, whose company measures traffic for clients ranging from the *Financial Times* to Gawker Media. Haile evangelizes for what he calls the Attention Web, a Web that looks beyond clicks, links, uniques, and monthly active users to actual engagement – something that no longer has to be guessed at, now that companies like his can capture it on a user-by-user, second-by-second basis.

Last September, Chartbeat became one of several ad tech companies whose metrics for time spent and other not-yet-common factors are accredited by the Media Rating Council, the industry body in charge of such things. Meanwhile, research by Chartbeat and other companies – among them Google, Microsoft and Yahoo – has demonstrated that the longer an online display ad is in view, the higher the brand recall. This challenges the myth that banner ads don't work. True, they don't get a lot of click-throughs – but neither do highway billboards or 30-second TV spots or double-truck magazine spreads. Just because a banner ad can be clicked on doesn't mean it needs to be. Done well, display ads online should be as effective at brand-building as television spots have been. The difference is that, unlike television, the Internet can actually tell advertisers if anybody is looking.

The brand issue is critical, and not just for advertisers. When a publisher relies on transient traffic from Google or Facebook and tries to maximize uniques at the expense of delivering a satisfying experience, it's never going to develop brand loyalty. So publishers have to make a choice: what kind of site do they want to run?

Upworthy's founders say they've decided to mend their ways, focusing on engagement factors like comments and time spent reading. Instead of optimizing for Facebook shares and page views, they plan to return to their original mission, helping people "find important content that is as fun to share as a FAIL video of some idiot surfing off his roof."

For people like Upworthy's Peter Koechley, Chartbeat's Tony Haile and Twitter's/Medium's Evan Williams, attention metrics are a make-or-break proposition. "We are in an all-out war for attention between the forces of inanity and the forces of things that actually matter to society," Koechley told *The Guardian* before speaking at its annual Changing Media Summit last spring. "We feel like people paying attention and being aware of important issues is one of the big roles of media."



Implicit in this critique is the idea that short-attention-span behavior is neither the users' fault nor the result of shallowness endemic to the Web. Television didn't have to be the "vast wasteland" that Newton Minow decried in the 60s, and neither does the Internet. Wastelands happen when advertisers, publishers and investors allow shallow metrics to guide their decisions. We reward what we measure, and we get what we reward. No one wants to turn the Web into some endless educational TV channel, all uplift and gruel. There'll be room for LOL cats and listicles galore. The question is, what else will we get?

KOTRYNA ZUKAUSKAITE

RETIREES

THE NEW GLOBAL SECURITY THREAT

BY THOMAS J. HEALEY
AND CATHERINE M. REILLY

One great threat to social, economic and political stability around the world has nothing to do with extremism or authoritarian rule. It is that most governments currently lack the means to ensure comfortable lives for ballooning growing numbers of retirees without shortchanging the young or bankrupting public coffers.

There are troubling signs everywhere you look. Public pension systems that were never designed to cope with rapidly aging populations are struggling to meet their obligations – and some are already cracking under the strain. Meanwhile, the rise in government debt-to-GDP ratios that followed the global financial crisis, along with paltry interest returns on the fixed-income portfolios of retirement systems, has exacerbated the problem.

To be sure, the pension imbroglio manifests itself differently from country to country. Brazil has an extraordinarily generous system that, for example, allows daughters of military personnel to keep their fathers' pensions after the fathers die. This kind of largesse has served to ramp up inflation, fray public finances and suck resources from productivity-enhancing investment.

By contrast, in South Korea, a mere third of retirement-age citizens have pensions. Couple that with the fact that Koreans are backing away from the tradition of providing for elderly parents, and you have a recipe for political and cultural conflict. One grim consequence is already in evidence: faced with the prospect of living out their final years in poverty, Koreans who are too old to work are committing suicide at a rate that's tripled over the past 15 years. Indeed, for this and other reasons, South Korea now has the highest suicide rate of any high-income country.

Brazil and South Korea may be polar opposites in their shortcomings in retirement planning, but they share a formidable challenge. In both countries,

J.D. KING

the number of people over 65 is expected to grow threefold by 2050, leaving their current pension systems increasingly inadequate or unviable, or both. To identify the sorts of pressures and problems governments face – as well as to pinpoint remedies based on best practices employed by the most-foresighted nations – we studied pension systems in 33 countries across five continents.

We uncovered a host of practical ways in which countries could provide for retirees without pushing already-stressed government budgets to the brink. Doing that, however, calls for a difficult balancing act in which nations improve both the *sustainability* and the *adequacy* of their pension systems.

Countries are often good at one task, but seldom both. For example, South Korea, China and India rank among the top-five most-sustainable – that is, their programs place the least burden on public finances to provide the benefits promised. By no coincidence, though, they also rank among the lowest five in terms of adequacy, as measured by their capacity to ensure sufficient income to retirees, which we defined as providing at least 60 percent of the average wage to those who retire at 65. (Since pensions can originate from either the public or private sectors, we included both sources of funding in our study.)

Moreover, a pension system that is apparently fiscally viable but inadequate to the task still poses a risk to public finances in the long run. Even if the fiscal burden is not currently great in countries like South Korea, China and India, they could eventually pay a steep price when their governments are forced to provide public assistance to increasing numbers of the elderly without the means to make ends meet. In other words, low levels of pension-system adequacy may eventually translate into equally low levels of sustainability.

On the other side of the coin, the pension systems of countries including Austria and Hungary are among the most adequate – but also among the shakiest in terms of sustainability. While they've promised ample income for retirees, that generosity will come at a price. The projected burden on public finances is so heavy that unless these countries seriously address sustainability, they will almost certainly be unable to keep their promises.

By our reckoning, the U.S. system falls within the inadequate group of pension programs. This may come as something of a surprise because this country relies so heavily on private pension assets, which masks inadequacies in the public retirement realm. In truth, though, the U.S. system is highly fragmented, combining government-provided Social Security, corporate- or state-sponsored defined-benefit (annuity-like) pension plans and tax-sheltered direct-contribution plans like IRAs and 401(k)s, as well as personal savings. Thus, while aggregate private pension

THOMAS HEALEY, a former assistant secretary of the Treasury and former partner at Goldman Sachs, is a senior fellow at Harvard's Kennedy School of Government. CATHERINE REILLY, formerly chief economist of Pohjola Asset Management in Finland, is a student in the Master of Public Administration program at the Kennedy School. A more technical version of this article, "M-RCBG Associate Working Paper No. 39," can be downloaded free on the Kennedy School website.

J.D. KING

savings is impressively high, roughly half of the working population has no access to employer-sponsored plans and little in the way of private savings. Large numbers will thus be dependent on woefully inadequate Social Security checks.

Other countries whose benefits appear inadequate to meet the needs of retirees include Mexico, Indonesia and Australia (in addition to the previously mentioned China, South Korea and India). Australia, incidentally, registered the lowest spending on public pensions as a share of GDP of all the developed countries we studied.

European nations, on the other hand, can boast of high levels of pension adequacy. However, with a few notable exceptions, including Switzerland and the Netherlands, they have done little to ensure sustainability through advance funding. At the other end of the adequacy spectrum are developing countries with typically meager public benefits and few private pension resources.

Which countries, then, can be considered the world's top pension stewards, balancing sustainability and adequacy to land in the efficient space mapped out in our study?

The Netherlands is clearly a leading innovator in pension-plan design. Its pension system is built on a combination of a universal flat-rate pension and quasi-mandatory occupational pensions covering 95 percent of the working population. Employers and employees alike contribute to the occupational pension fund. Employers must fund their actuarial obligations each year, but after that bear no further risk. Pensions are paid as a career-average-income-based annuity, but employees share the risk, as payments can be lowered if the plan fails to meet its solvency requirements.

Other high achievers include Switzerland, Denmark, Sweden and Britain. A number of former Eastern Bloc countries – Poland, Estonia and both the Czech and Slovak Republics – also reside within the efficient category. That's a two-sided coin, though, since their efficiency follows from the fact that, on average, retirees collect pensions for a shorter period (generally 15 to 20 years) because life expectancy is lower than in high-income countries.

TOP AND BOTTOM COUNTRIES ON SUSTAINABILITY AND ADEQUACY

	SUSTAINABILITY INDEX		ADEQUACY INDEX	
	COUNTRY	SCORE	COUNTRY	SCORE
TOP FIVE	S. Korea	82	Luxembourg	97
	Australia	75	Russia	83
	India	74	Hungary	74
	Indonesia	72	Netherlands	74
	China	70	Austria	67
BOTTOM FIVE	Italy	12	Germany	30
	Austria	11	China	22
	Greece	10	Mexico	20
	Hungary	9	S. Korea	4
	Belgium	9	India	2

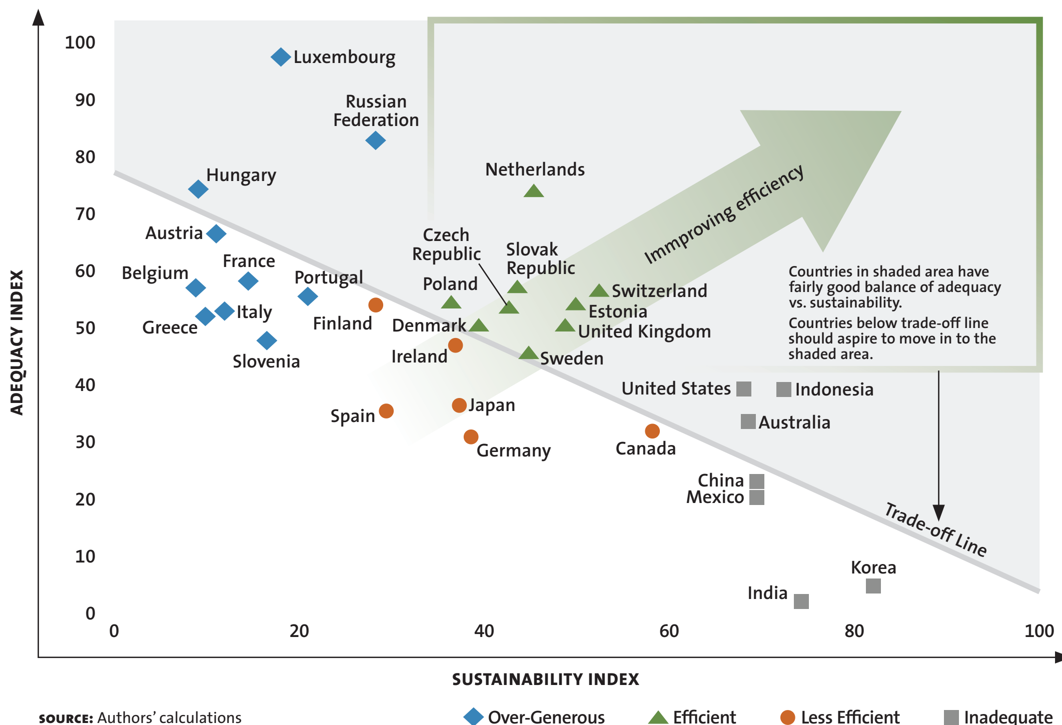
SOURCE: World Bank

WHAT CAN BE DONE?

As policymakers in the United States have learned over the past half century, there is no set-it-and-forget-it formula for calibrating the sustainability and adequacy of pension systems. The recipe will differ by country based on differences in demographics and plan dynamics, and may require politically difficult midcourse corrections. Before weighing what reforms might work, however, it's helpful to look more closely at the nature of the problems they're intended to address.

One core reason that government pension systems are under so much stress, particularly in Western countries, is that they were designed predominantly on a pay-as-you-go basis. In a pure pay-as-you-go plan, current revenues cover current pension benefits. If

ADEQUACY VS. SUSTAINABILITY: THE TRICKY TRADE-OFF



SOURCE: Authors' calculations

the share of the population receiving benefits remains stable, that is a perfectly reasonable way to fund a pension program. The logic behind such plans suffers, however, when the demographic profile changes. Case-in-point: the Baby Boomers.

Because this post-World War II generation is far larger in numbers than its predecessors, the share of population in retirement is increasing rapidly in many parts of the world. Combine this with another shifting dynamic, the increase in life expectancy, and you're left with a precipitous decline in what's known as the old-age support ratio – that is, the ratio of working-age people to the population over 65.

In plain English, there are fewer people available to pay for pensions and more people receiving them than there were in the past.

Gilding this poisonous lily is the fact that, even as life expectancy is rising, the retirement age is falling in many countries, increasing the expected time spent as pensioners for countless millions around the globe. As if this weren't enough, the problem is further compounded by the fact that so many public pension plans offer fixed monthly (and in some cases, inflation-indexed) payments, with little if any automatic adjustment to the plans' capacities to actually sustain those payouts.

The math is simple and the conclusions troubling: the population still working will have to shell out ever-larger sums to cover the cost of pensions. Indeed, barring unanticipated gains in productivity, the burden on the working population will surely become intolerable. In most of the countries we studied, that breaking point is forecast to occur between 2030 and 2040.

Early retirement is a particularly big problem in Europe. France, for example, has one of the lowest retirement ages and one of the highest life expectancies, leading to an expected retirement duration of 25 years. By comparison, in countries that fit our efficient parameters, the maximum expected duration is 20 years. The inescapable conclusion for countries like France? They need to raise their retirement age.

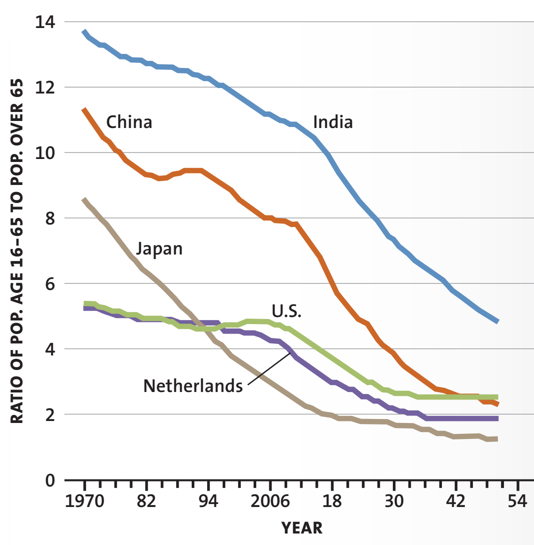
Hiking the age of retirement to track increases in life expectancy (and thus stabilize average years in retirement) is, indeed, an extremely powerful tool for improving the sustainability of pension systems. Even relatively small increases could have a large fiscal impact.

The catch, of course, is that raising the retirement age is hugely unpopular. In fact, some countries (including France and Germany) have actually moved in the opposite direction, reversing previous increases in the minimum age of pension eligibility. However, there does appear to be a growing awareness in the countries we studied that something must give. A crucial step, we believe, to getting from here to there without a serious backlash is to raise the retirement age in gradual increments.

There are other sound approaches policymakers could deploy to ensure that pension costs are in sync with increases in life expectancy. One is to introduce a longevity coefficient into the pension-benefit calculus. The concept is rather simple: as life expectancy rises, the expected monthly payment for new retirees automatically falls sufficiently to offset the expected rise in cost. Finland and Italy currently use longevity coefficients, and other governments are exploring their potential.

Adding longevity coefficients alone, however, would not put pension plans on a sustainable footing if the underlying entitlements are excessive. Traditionally, benefits have been

OLD-AGE SUPPORT RATIOS ARE DECLINING GLOBALLY



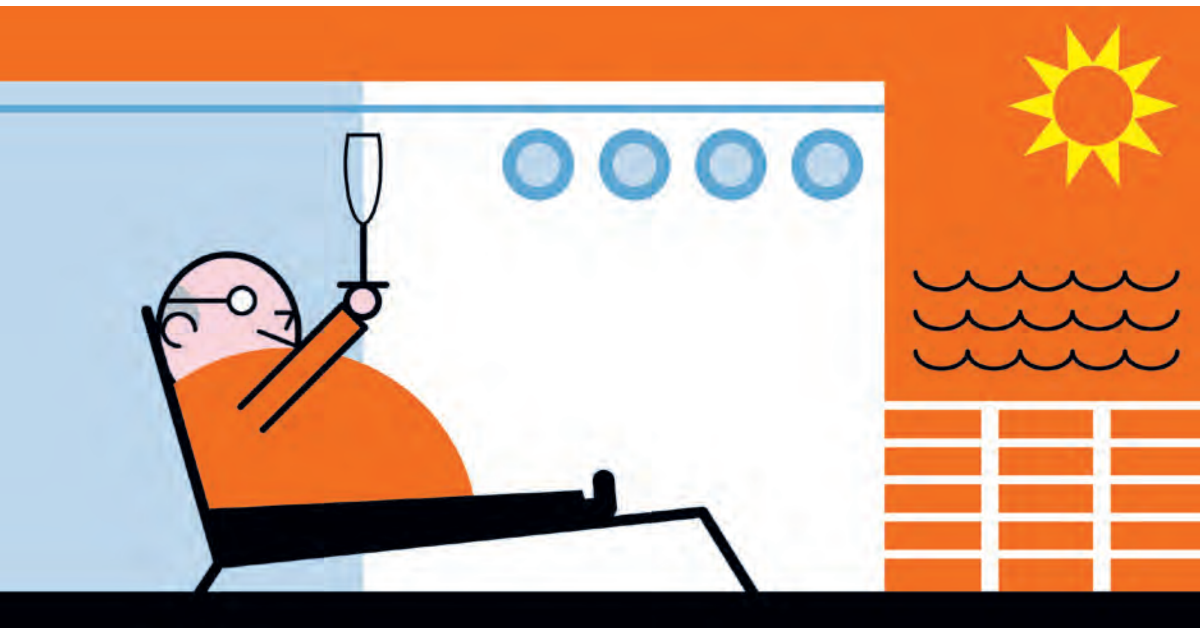
SOURCE: Authors

linked to final-year earnings – a practice that opens the systems to gaming at the expense of the funders. Happily, a growing number of countries are shifting to benefit formulas based on lifetime earnings. This fundamental change is not just aligning payouts with actual employee contributions, but significantly reducing expenditures across entire pension systems.

Another route to improved sustainability, of course, is to increase workers' incentives to stay on the job longer. To that end, Finland and Britain have experimented with offering higher pension-accrual rates to those who prolong their careers. Sweden allows employees to choose their own retirement ages with no upper limit, adjusting monthly pension entitlements accordingly.

TOWARD BROADER PENSION COVERAGE

Countries have inadequate pension programs either because the share of the population that is covered is low or the promised payout



is insufficient to meet retirees' needs. In the United States, for example, just half of employees are covered by occupational pension plans. And the proportion is even lower in Canada and South Korea, with 40 percent and 30 percent coverage, respectively.

Clearly, one key to protecting more people is to take the decision out of their hands – saving for retirement is an area in which households make notoriously myopic choices – by introducing compulsory or, at a minimum, opt-out enrollment as part of well-designed pension programs with adequate contribution rates.

Governments also need to ensure that employees have easy access to pension systems they can take with them as they change employers. Under U.S. regulations, 401(k) plans effectively become portable after five years on the job. Meanwhile, Britain has introduced the National Employee Savings Trust, which gives workers who lack access to an employer-sponsored plan a low-cost, portable retirement savings account with automatic enrollment. Meanwhile, Australia is considering a plan to introduce compulsory annuitization of retirement savings, preventing retirees from imprudently putting their core savings at risk and eliminating the chance they will outlive their nest eggs.

President Obama's proposal for myRA accounts, while modest, is also a step in the right direction. These accounts would give people without employer-sponsored plans such as 401(k)s access to affordable retirement savings accounts with automatic deposits from their paychecks.

BUILDING TO LAST

The ultimate reward for countries optimizing both sustainability and adequacy is improved pension efficiency. Improving efficiency is of particular interest for countries in our less-efficient bracket – among them Ireland, Japan, Germany, Spain, Canada and Finland. First, they must build strong and durable links between payments and long-term sustainability into their pension systems. This means both sponsors and beneficiaries must share the risks, a characteristic clearly at odds with traditional

J.D. KING

defined-benefit plans in which plan sponsors (and sometimes government pension insurers) bear the lion's share of the risk.

Two intriguing new approaches in this vein are "notional defined contribution plans" and "collective defined contribution plans." With an NDC, contributions are recorded as notional accounts, to which a rate of return (typically the rate of GDP growth) is applied. The balance in the account is then converted to an income stream upon retirement. By linking contributions to GDP growth, notional accounts prevent the pension burden from outstripping the economy's ability to fund them. They are typically used for reforming pay-as-you-go systems.

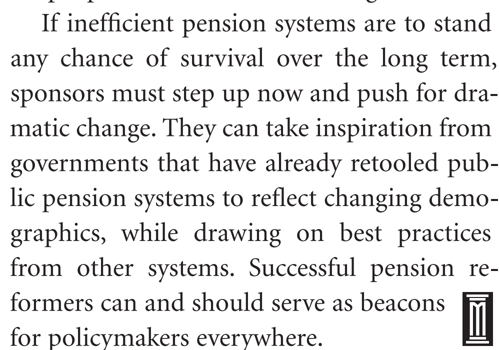
Under collective defined contribution plans, which are used in conjunction with advance or prefunded plans, proceeds are pooled in centrally administered investment funds rather than put in individual accounts. Beneficiaries thus bear both market and longevity risks collectively rather than individually, giving the plans some of the risk-sharing characteristics of traditional defined-benefit systems. Since the pool contains members in different phases of their lives, the fund is able to maintain higher investment rates and thus deliver better returns over the long run than individual plans. Benefit payments are calculated on the basis of lifetime contributions and annuitized upon retirement.

It makes eminent sense for plan sponsors to seek to maximize returns on advance-funded assets within acceptable risk parameters. But some collectively managed pension funds – including some of those in the United States, China and Japan – are constrained by requirements that they invest their funds in domestic government bonds. This means they are not reaping the full potential rewards of advance funding their pension assets. For collectively managed pension programs to achieve the best results, the assets should be invested in diversified portfolios that include risky assets. For plans in which beneficiaries have discretion in investment choices, it is important to provide savers with appropriate, low-cost default portfolios, as many savers lack the financial literacy to make optimal investment decisions for themselves.

BEACONS OF ENCOURAGEMENT

Despite the political and economic complications of changing entrenched public pension systems, extensive reforms have in fact been achieved by a handful of progressive nations. The Netherlands and Denmark, for example, have introduced collective defined contribution plans in which payouts are adjusted if solvency limits are breached. Sweden now has a notional defined contribution plan in which benefits depend on GDP growth, while Britain and Poland have expanded their direct contribution systems.

For most countries, though, the shift from inadequacy and/or unsustainability to high efficiency will be considerably more difficult. In Europe, for example, many countries with steep pension liabilities are also saddled with high government debt. While raising the retirement age in line with life expectancy would clearly help put these systems on a more sustainable course, it would first require major labor market reforms to make it easier for people to extend their working lives.



If inefficient pension systems are to stand any chance of survival over the long term, sponsors must step up now and push for dramatic change. They can take inspiration from governments that have already retooled public pension systems to reflect changing demographics, while drawing on best practices from other systems. Successful pension reformers can and should serve as beacons for policymakers everywhere.

MANAGING RISK IN DRUG DEVELOPMENT

The Case for FDA Swaps and Annuities

BY TOMAS J. PHILIPSON

Profit in the global health care industry is highly concentrated in the United States, the largest market for pharmaceuticals and medical devices in the world. As a result, most health care innovators around the globe seek approval from the U.S. Food and Drug Administration. However, as is well known, the costs of gaining this approval are formidable. The average development cost for each drug and biologic (medicine derived from living organisms) is $1.2 billion, typically spread over about a decade of R&D, testing and review. Even more dispiriting, roughly seven out of eight candidates for approval never reach market.

FDA SWAPS AND ANNUITIES

It's widely agreed that rigorous testing is essential to ensure public safety. Plainly, though, the process creates substantial uncertainty for investors. I believe that hedging tools similar to those routinely used in financial markets could improve the risk-return trade-off, attracting investors to a field that would benefit from access to more private capital.

RUNNING THE FDA GAUNTLET

In seeking FDA approval, innovators face two risks. First, they may never earn a penny if the FDA concludes that the innovation in question isn't up to U.S. standards of safety and efficacy. Second, the time-consuming process of regulatory review reduces investors' return because approval may be unexpectedly delayed by months or years, commensurately shortening the period in which the owner of the patent has market exclusivity. I propose creating financial instruments that would help to manage these risks by encouraging outside investors to share them with the innovators.

The FDA's approval process can be charted by several milestones:

- Filing an initial drug application.
- Safety testing in Phase I.
- Further safety and dosage tests in Phase II.
- Larger-scale efficacy testing in Phase III.
- Final approval of the new drug application, which is filed after all the evidence has been generated and assessed.

Drugs can be rejected at any stage – even after successful completion of Phase III testing. (A similar process governs approvals of biologics and medical devices.)

I consider two sorts of financial derivatives that could be used to hedge the risk of non-approval or unanticipated delays in approval. The first I call an FDA swap, which in many ways imitates the form and function of the credit default swaps already widely used to hedge credit risk in bond markets. The second I call an FDA annuity, which hedges against approval delays by paying the investors an agreed-upon sum during the life of the testing process.

FDA SWAPS

The swaps would work as insurance against non-approval. The basic idea is straightforward. The buyer of the swap contract pays a monthly premium to the seller. If the drug is not approved (or if the product isn't resubmitted for consideration to the next stage in the approval process) by the maturity date of the contract, the buyer is paid an amount specified in the contract.

The devil is, as usual, in the details. The swap contract would also need to specify what would happen if there were a change in ownership of the product and whether the seller of the swap would gain possession of the buyer's intellectual property in the event of non-approval. Contracts, moreover, would need to precisely specify what constitutes non-approval. They would also need to specify how much would be paid, and when, if testing were prolonged. But these issues are hardly unique to FDA swaps. They are faced (and surmounted) every day in the creation of derivative contracts that are used to manage risks ranging from interest-rate variation to extreme weather.

FDA ANNUITIES

FDA swaps would insure innovators against the risk of non-approval. By contrast, FDA annuities would serve as insurance against the risk that success in the approval process

TOMAS J. PHILIPSON is a senior fellow at the Milken Institute, the Daniel Levin professor of public policy at the University of Chicago, director of the health care program at the university's Becker Friedman Institute and a founder of Precision Health Economics LLC.

PREVIOUS PAGE: JOHN UELAND

would take longer than expected. For small-molecule drugs (most often, drugs taken orally), the first three FDA phases of clinical development are estimated to take an average of about 24 months, 30 months and 42 months, respectively, with the final approval averaging an additional year.

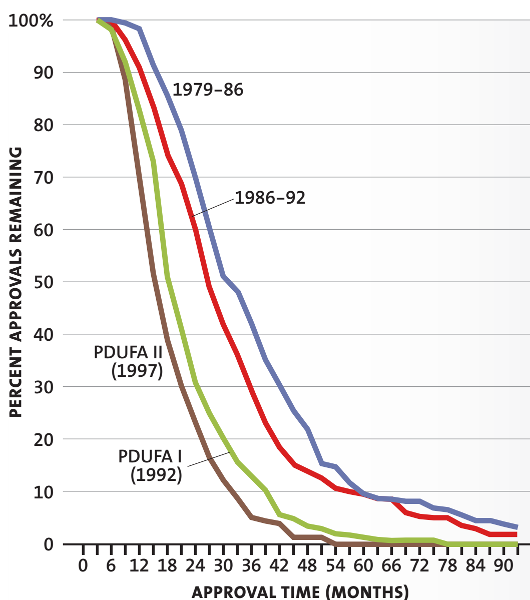
However, as the figure to the right suggests, there is large variance, and thus developer risk, in approval times. The graph shows the share of products that have not yet been decided upon by the FDA, before and after passage of the Prescription Drug User Fee Act of 1992 (PDUFA I) and the amended Act of 1997 (PDFUA II), which permitted the FDA to charge fees that cover the cost of speeding the review process.

The risks inherent in these regulatory "survival curves" could be insured by annuity-like instruments, just as human survival times are insured by lifetime income annuities. For even if a product ultimately gains FDA approval, the statistical tails on approval times can create enormous variability in the rate of return on the developer's investment.

Consider the consequences of a delay of, say, six months for a blockbuster drug with likely monthly earnings of $100 million. The $600 million in lost earnings can never be recovered, because the patent expiration date remains unchanged. Note, moreover, that the losses are in near-term revenue, which is more heavily weighted in rate-of-return calculations because future income flows must be discounted to adjust for the opportunity cost of the investors' capital.

FDA annuities would insure investors against delays in the process, assuming the product ultimately received approval. The buyer of the annuity would make monthly payments to the seller for an agreed-upon period (or, alternatively, buy the annuity up-front with a single payment). After this accu-

SURVIVAL CURVES FOR FINAL APPROVALS



SOURCE: Author

mulation period ended, the annuity would click on, just like a standard lifetime income annuity.

ONE SIZE NEEDN'T FIT ALL

Given the many milestones along the way to a regulatory decision at which non-approval or delays can take place, one would expect that swaps and annuities would be tailored to specific testing and evaluation stages. For example, swaps might be written only for the phase a product is entering, or for non-approval in any of the remaining phases until approval.

Swaps might also be created for whole baskets of compounds being reviewed by the FDA. One could imagine, for example, that the entire pipeline of a given manufacturer might be hedged, not unlike the way credit default swaps are sometimes written on indexes or specific baskets of bonds. Consider, too, that securitized default obligations, similar to

credit default obligations, could be created for these baskets of products.

IF WE BUILT IT...

These instruments mimic many instruments used successfully outside of health care. Credit default swaps are like the proposed FDA swaps because lenders' defaults are similar to FDA non-approval. They were introduced in the early 1990s, and their use has blossomed in the decades since because they are so attractive for both hedging and speculating. In 2012, their reported aggregate notional value exceeded $25 trillion (yes, trillion) worldwide.

Credit default swaps are non-standardized contracts and are thus not traded on exchanges. However, markets for non-standardized FDA swaps and annuities could still prove to be quite liquid, just as markets for non-medical swaps are today. Indeed, one would presume that the stakeholders willing to participate in such markets for corporations engaged in medical R&D – especially portfolio managers, hedge funds and pension funds, as well as pharma companies with competing or complementary drugs whose value could be affected by approval or non-approval – would also have an appetite for FDA risk instruments.

The corporate acquisitions of biotech innovators completed in recent years offer indirect evidence of the potential value of hedging contracts for medical innovations. In deal structures involving so-called contingent value rights, acquirers agree to make additional payments once the acquired companies hit specified regulatory benchmarks. For example, Celgene's $3 billion deal for Abraxis BioScience in 2010 included a contingent-value-rights provision conditioned upon regulatory approval of the cancer drug Abraxane. The terms of the $20 billion sale of Genzyme Corp. to Sanofi-Aventis in 2011 was tied to the performance of Campath, another cancer medication. An interesting aspect of the aforementioned rights is that they were listed separately on exchanges and proved quite liquid in trading.

The corporate acquisitions of biotech innovators completed in recent years offer indirect evidence of the potential value of hedging contracts for medical innovations.

Regulations to ensure transparency would be needed for both over-the-counter and exchange-traded hedging instruments. But much of the heavy lifting in this regard would likely be done by private enterprise with little official prompting. There are already firms (such as Claravant) emerging in the marketplace that rate the risks associated with pipeline medical products in much the way Moody's rates the bonds underlying credit default swap contracts. In addition, many financial institutions conduct their own surveys of independent experts to better assess development-related FDA risk.

Despite transparency issues, it is important to keep in mind that many markets exhibit substantial liquidity despite asymmetries in information, in which one party to a transaction knows a great deal more than the other. Indeed, issuers of stocks and bonds often know much more about the value of these securities than buyers, yet substantial liquidity exists in most initial public offerings.

JOHN UELAND

FDA swaps and annuities may be particularly valuable for products in late-phase development because the acquisition of companies with early-stage pipeline products by large pharmas essentially serves as non-approval insurance for smaller biotech companies. On the sell side, the small biotech gets a fixed payment even if it fails to deliver valuable products later. In effect, the small biotech purchases insurance by giving up part of its potential profit to the big pharma buyer in exchange for a limited downside in case of non-approval. On the buy side, the big pharma company may acquire portfolios of potential drugs of which, perhaps, one in ten or so compounds succeeds. It thus acts like an insurance company, reducing risk through diversification.

Note, too, that market-making in medical R&D derivatives might assist broader functions. In a liquid market, trading prices serve an important informative role. Speculation may arise because of differences in opinion about risks affecting the value of a financial instrument. In addition, if public pricing of the instruments discussed becomes available, it will be useful for understanding how the market assesses regulatory risks, in much the same way that corporate debt yields compared to Treasury yields offer information about the markets' views on corporate defaults. FDA swap prices would be valuable in predicting future FDA rejection rates for the same reason corporate yields predict defaults. For single-product biotechs, there will be arbitrage opportunities for exploiting any mispricing of regular debt or FDA swaps.

ENTER THE NONPROFITS

The liquidity of these instruments might be enhanced by the infusion of capital from third parties, notably from nonprofit patient groups and foundations that are increasingly taking on the role of equity investors rather than mere donors in the development of new drugs and devices. Such organizations are legally permitted to profit from investments. They differ from for-profit firms, however, in that they must reinvest the gains in ways that further their philanthropic missions. So-called venture philanthropy (in which nonprofits finance for-profits) may be particularly useful in boosting incentives for small firms.

For example, the Cystic Fibrosis Foundation sold the rights to its patented drugs, including Kalydeco, for $3.3 billion. This left the foundation in the enviable position of needing to find other productive ways to fight the disease. One potential approach would be to make an otherwise-illiquid market for medical R&D derivatives liquid by providing funding and eliminating any negative bid-ask spreads between for-profit parties. In other words, third-party nonprofits might choose to subsidize part of a swap or annuity purchase with the goal of creating a viable market.

Such third-party subsidies might even come from less-obvious sources within the biopharmaceutical industry. For example, new regulations might be written to allow pharmas to repatriate foreign earnings without incurring tax liability if the funds were used to eliminate negative bid-ask spreads on FDA swaps.

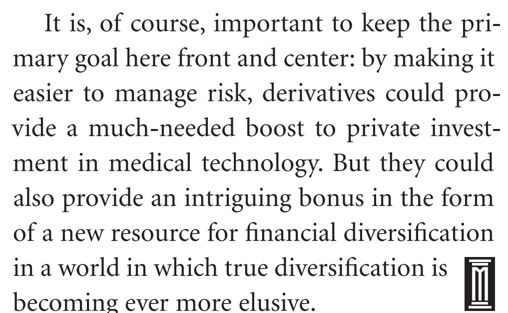
THE OTHER SIDE OF THE TRADE

The less variation there is over time in *aggregate* FDA approval behavior, the more attractive these instruments may be to counterparties. Life insurance offers a useful analogy. A policy has value for individual customers because it removes the financial uncertainty associated with mortality. This is true even though aggregate mortality rates may be certain, making them easy to absorb by counterparties offering the insurance.

Another characteristic of the market for FDA derivatives that increases the potential value to counterparties is how the risk relates to their other holdings. The holy grail of financial-portfolio investment is diversification that allows investors to maximize expected returns for the level of risk they deem acceptable. But true diversification is not easy to manage in an era in which the returns from the big, liquid securities markets are positively correlated. And it is likely to become even harder as the global economy becomes increasingly integrated.

By contrast, it is unlikely that approval behavior on the part of the FDA, driven largely by the biological reaction of new molecules in humans, varies with aggregate economic behavior, such as the business cycle. This lack of correlation with other asset classes implies that FDA derivatives ought to be especially attractive to investors seeking diversification in their financial portfolios. So in the process of reducing the real cost of medical innovation by making it cheaper to manage risk, medical R&D derivatives would offer an attractive way to tame financial portfolio risk to the parties on the other side of the transaction.

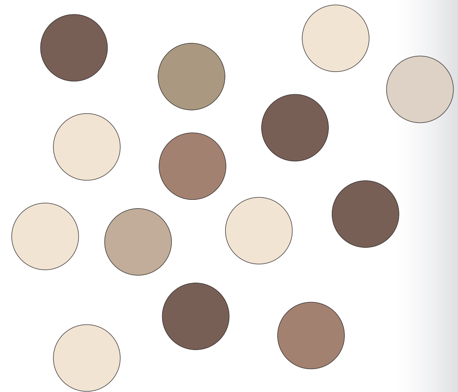
It is, of course, important to keep the primary goal here front and center: by making it easier to manage risk, derivatives could provide a much-needed boost to private investment in medical technology. But they could also provide an intriguing bonus in the form of a new resource for financial diversification in a world in which true diversification is becoming ever more elusive.



Diversity Explosion

BY WILLIAM H. FREY

Regular readers of the *Milken Institute Review* are familiar with the byline of the eminent demographer Bill Frey. He's a frequent contributor to the *Review* as well as a senior fellow at the Institute, offering the latest on who lives in America (and where and why) in the form of bite-size "charticles." Bill, by the way, apparently never sleeps. He's also a senior fellow in the Metropolitan Policy Program at the Brookings Institution and a research professor at the University of Michigan's Population Studies Center. ¶ If you've found Bill's charticles as interesting as I have, you're going to devour his latest book, *Diversity Explosion: How New Racial Demographics Are Remaking America*. He's sifted through Himalayas of data to explain in nontechnical terms how the country is being radically transformed by population dynamics. Here, we excerpt the chapter on neighborhoods. It's an upbeat story – one that suggests that the conditions creating racial conflict from Ferguson to Baltimore may be on the wane.



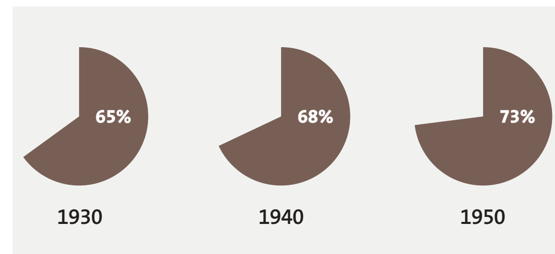
—*Peter Passell*

One of the most intimate settings of American life — one that has an especially important role in shaping community race relations — is the neighborhood.

Neighborhoods are where Americans socialize, shop and attend school and where civic matters have the most impact. Most directly related to the subject of this book is the fact that the racial makeup of a neighborhood can either foster or prevent interactions with other groups. And for many Americans, the term that comes to mind when thinking about race and neighborhoods is segregation. This term conjures up the image of the stark separation between blacks and whites across broad swaths of American neighborhoods that prevailed for much of the 20th century, when segregation was hardly voluntary on the part of blacks. It was deeply rooted in the discriminatory forces that denied blacks anything resembling equal access to jobs, adequate schooling and public services – both before and after the civil rights movement of the 1960s.

A less stark type of segregation, most pronounced in the earlier part of the 20th century, was seen in the separate neighborhoods composed of white ethnic immigrant groups in major cities as they assimilated into American life. The immigrant enclaves of Irish, Poles, Italians, Jews and others created economic and cultural comfort zones for them and their co-ethnics. But compared with black ghettos, these enclaves were relatively transitory, usually lasting no longer than a generation. As emigration from Europe waned in the middle of the 20th century, these areas became less prominent as later generations voluntarily moved to the suburbs or other parts of the country.

AVERAGE BLACK-WHITE SEGREGATION LEVEL



NOTE: Segregation levels represent percent of blacks who would have to move to other neighborhoods to be distributed similarly to whites. Values range from 0 (complete integration) to 100 (complete segregation).
SOURCE: Cutler, Glaeser and Vigdor, *Journal of Political Economy* (1999); U.S. Census, 1990-2010

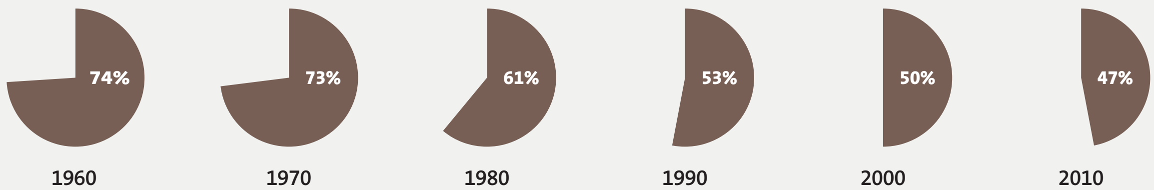
The 21st century began with some vestiges of past segregation – but also in the midst of the new diversity explosion, which holds the potential to reshape the concept of neighborhood segregation and integration as the country moves forward. In the case of blacks, the emergence of a middle class, their continuing flow to prosperous metropolitan regions in the South and their more widespread movement to the suburbs are driving a shift toward less segregated neighborhood settings than was the norm for much of the 20th century.

The 21st-century counterpart to early 20th-century immigrant enclaves is the neighborhood composed of new minorities – Hispanics and Asians. Yet their recent, widespread dispersion beyond the traditional melting pots also provides opportunities

for greater integration at the local level, although perhaps after an initial period of self-segregation.

FROM GHETTOS TO THE DECLINE IN BLACK SEGREGATION

The recent decline in black segregation is especially remarkable when viewed in the context of what might be termed the "ghetto-



ization" of America's black population for much of the 20th century. The rise of black neighborhood segregation in large urban ghettos is one of the most defining and regrettable episodes in America's social and demographic history.

Beginning more than a half-century after the Emancipation Proclamation, black ghettoization was bound up in the separation of most of the nation's black population from mainstream society, which limited blacks' access to schools, public services, private-sector amenities and, ultimately, opportunities for upward mobility. Black neighborhood segregation continued unabated until 1970, after which it began to loosen over the next two decades, with declines becoming more pervasive as the country approached the 21st century.

This pattern is depicted in the figure above, which shows average black-white segregation levels for U.S. metropolitan areas between 1930 and 2010. Segregation levels are measured by the "dissimilarity index," which, as used here, compares black and white population distributions across metropolitan neighborhoods. It ranges from a value of 0 (complete integration), where blacks and whites are distributed similarly across neighborhoods, to 100 (complete segregation), where blacks and whites live in completely different neighborhoods. Values can be interpreted as the percentage of blacks who would have to change neighborhoods to become completely integrated with whites. Values of 60 and above are considered high; values of 30 and below are considered low.

THE GREAT MIGRATION AND THE RISE OF BLACK SEGREGATION

The Great Migration of blacks from the South to Northern cities was a major factor in the rise of black ghettos, which were later perpetuated by a host of private- and public-sector forces. The first wave of the Great Migration, between 1910 and 1930, drew large numbers of blacks to Northern cities including Chicago, Detroit, Cleveland, New York and Philadelphia. However, after arrival they found that they were allowed to live only in certain neighborhoods because of the white backlash against integration.

That backlash first erupted as open violence in the form of riots, bombings and other forms of intimidation to keep blacks from entering all-white neighborhoods. In addition, homeowner associations were formed to work with real estate agents and city planning offices to find ways to restrict black movement.

One common device was to attach a restrictive covenant to a deed, specifying that a property could not be occupied by blacks or other groups deemed undesirable for a long period, such as 99 years. These covenants were deemed legal by the Supreme Court in 1926, a decision that was only overturned in 1948 at the behest of the NAACP.

Even when population pressure made black expansion into white neighborhoods inevitable, coalitions of real estate agents employed a strategy called blockbusting – inducing a black family to become the first black occupants in a neighborhood in order to scare resident whites into moving. Blockbusting ensured that black expansion could be restricted to selected neighborhoods as they turned over from white to black, and it enabled agents to reap above-market profits from black buyers. In 1940, black segregation already was high and most urban blacks lived in almost exclusively black ghettos. A national survey in 1942 showed that 84 percent of whites agreed that "there should be separate sections in towns and cities for Negroes to live in."

The second wave of the Great Migration took place during the post-World War II period, but for the most part, blacks were excluded from the postwar suburbanization movement. Again, strong resistance among whites to accepting blacks as neighbors led real estate agents to employ discriminatory practices in selling and renting homes, including the steering of blacks away from available white neighborhoods or the outright refusal to sell or rent homes to blacks in those locations. Local suburban governments also practiced exclusionary zoning to limit areas where blacks could obtain residences.

Lending practices such as "redlining" also were designed to restrict blacks, continuing a process that began in the 1930s. Their impact was magnified in the postwar period due to the expansion of mostly suburban housing and the availability of federally insured loans that, in practice, were given largely to whites.

A national survey in 1942 showed that 84 percent of whites agreed that "there should be separate sections in towns and cities for Negroes to live in."

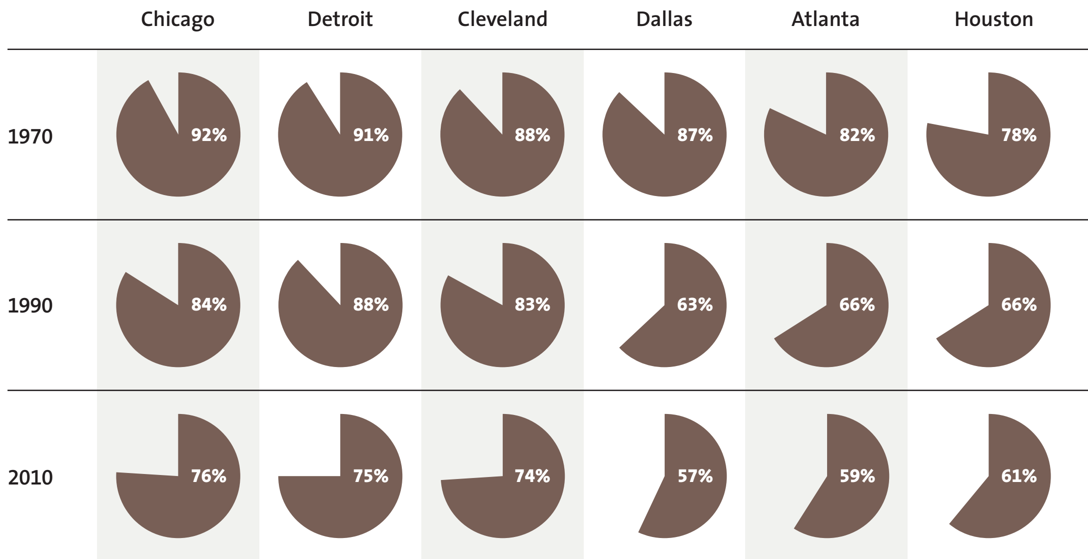
At the same time, the concentration of poor urban blacks in city neighborhoods was exacerbated by 1960s-era public housing programs that, while eliminating blighted ghetto neighborhoods, re-segregated black residents into large housing complexes.

Although heavily focused on cities in the Northeast and Midwest, these practices occurred in all regions of the country. In 1970, the average black-white segregation level among all metropolitan areas was well above 70. But in the large metropolitan areas where most blacks lived, segregation levels were much higher, with levels of 90 or more in Chicago, Detroit and Los Angeles. Segregation levels greater than 80 were found in the Southern metropolitan areas of Atlanta, Dallas, Miami and Washington, D.C.

SEGREGATION IN DECLINE

On the heels of large urban riots in the 1960s and the Kerner Commission's warning that America was evolving into two racially and spatially separated societies, Congress passed the 1968 Fair Housing Act – key civil rights

BLACK-WHITE SEGREGATION LEVELS IN SELECTED METROPOLITAN AREAS



NOTE: 1970 pertains to all blacks, while 1990 and 2010 pertain to non-Hispanic blacks.
SOURCE: Douglas S. Massey and Nancy Denton, *American Apartheid: Segregation and the Making of the Underclass* for 1970; 1990 and 2010 U.S. censuses.

legislation that prohibited racial bias in the sale and rental of housing and, by extension, discouraged racial segregation.

These events raised awareness of the hardship that extreme racial segregation was imposing on blacks, cities and the society at large. Soon thereafter, as part of the "open housing" movement, additional legislation and court decisions as well as government and citizen-initiated efforts were put in action to discourage discriminatory lending and real estate practices. For example, the Home Mortgage Disclosure Act required financial institutions to report information on the race and income of those who obtained or were denied mortgages.

Segregation began to decline between 1970 and 1980, although the greatest declines occurred in modest-size metropolitan areas in the South and West that housed relatively small numbers of blacks. Unlike with other groups, an increase in income or educational attainment for black households did not translate into access to appreciably more integrated or higher status neighborhoods. Areas with the largest, most concentrated black populations, including Chicago, Detroit and Cleveland, remained highly segregated, with minimal black suburbanization. On average, large non-Southern metropolitan areas showed declines of fewer than 5 points in segregation between 1970 and 1980.

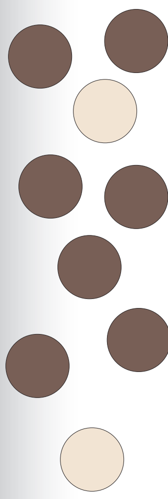
In *American Apartheid*, published in 1998, Douglas Massey and Nancy Denton argued that the open housing efforts in the immediate post-civil rights years had little impact on the strong institutional forces that maintained segregation.

In spite of legislation, an array of informal and quasi-legal discriminatory practices on the part of the real estate industry and financial institutions continued, some of which were documented in housing market "auditing"

Although all minority groups still show a preference for members of their own group as neighbors, there is also tolerance for other groups – particularly in multiracial settings.

investigations by the Department of Housing and Urban Development. Yet declines in black-white segregation continued between 1980 and 1990, again with the greatest reductions occurring in Southern and Western cities – including those with considerable black populations. Between 1970 and 1990, segregation levels declined from 87 to 63 in Dallas, from 82 to 66 in Atlanta, and from 78 to 66 in Houston.

Many of these areas were beginning to attract black migrants, part of the emerging reverse black movement to the South. The overall population gains in these areas, part of a general migration to the Sun Belt, helped to trigger increased suburban development and growth. Because substantial suburban growth in these areas took place after the passage of the Fair Housing Act, the impact of that law in reducing segregation was greater there than in more stagnant areas of the country.



The large Northern areas with the highest segregation levels were still most resistant to integration. As of 1990, Chicago, Cleveland and Detroit continued to show segregation levels above 80, and the majority of their Northern counterparts registered levels in the high 70s or above. Most of these areas had relatively modest growth and therefore little new housing compared with their Southern and Western counterparts. Within them, old stereotypes persisted about which communities were appropriate for whites and blacks, with whites expressing a strong distaste for integrated neighborhoods.

THE BEGINNINGS OF BLACK-WHITE INTEGRATION

The 2010 census shows that black-white segregation is still quite evident in the United States. But it also reveals forces that will lead to an easing of segregation to well below the ghettoized patterns of the mid-20th century. Among all metropolitan areas, the average segregation level is 47. Among the 100 largest metropolitan areas, including those with the largest black populations, segregation stands at 55 – well below the levels of 70 or more in the immediate postwar decades. A total of 93 of these areas showed declines in segregation between 1990 and 2010, making neighborhoods without any black residents extremely rare.

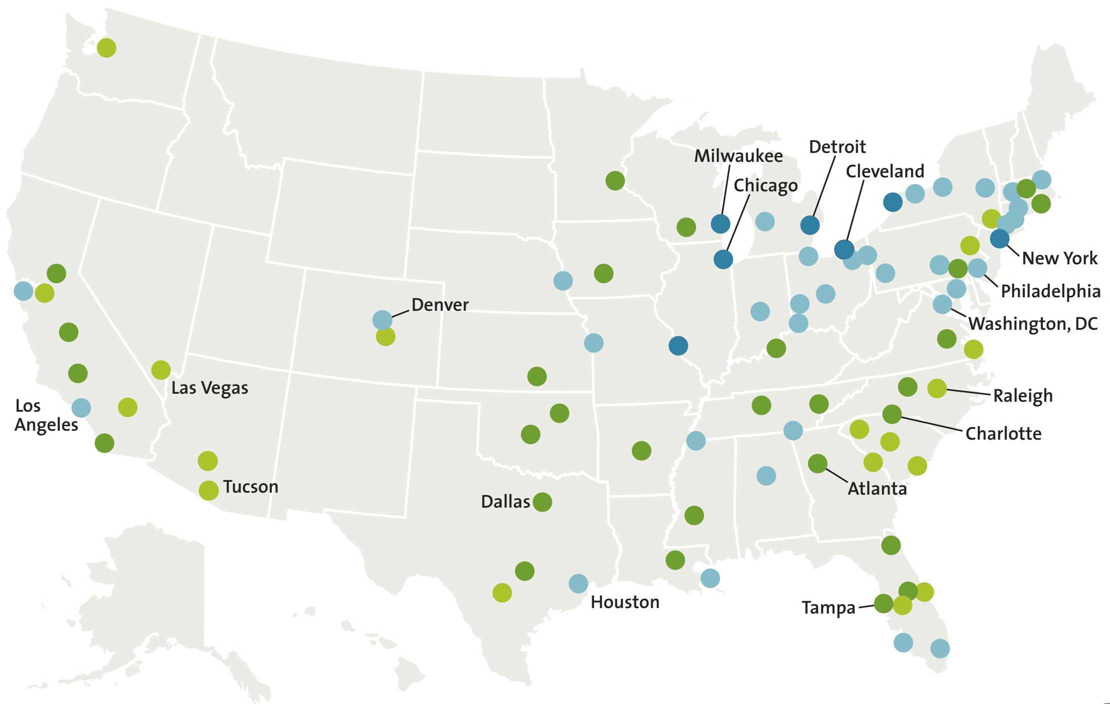
Some of the trends spurring these shifts were suggested in the 1990s. One is the continued decline in segregation in Southern areas that are magnets for both blacks and whites, as well as in areas in the West where new suburban housing continues to be constructed. As more of the black population moves to these areas, fewer of the nation's blacks will live in highly segregated neighborhoods.

The pattern of declining segregation is beginning to spread outward from Atlanta, Dallas and other larger Southern metropolitan areas. For example, Tampa, Bradenton and Lakeland (all in Florida) are among the cities where segregation has declined markedly since 1990.

In the North, black population losses in cities, the demolition of large public housing projects and increased suburbanization of blacks are contributing to declines in segrega-

BLACK–WHITE SEGREGATION, 2010

FOR THE 87 OF THE LARGEST 100 METROPOLITAN AREAS WHERE BLACKS REPRESENT AT LEAST 3 PERCENT OF THE TOTAL POPULATION.



SEGREGATION LEVEL

0 indicates complete integration, 100 indicates complete segregation

Below 50 | 50 to 60 | 60 to 70 | 70 and over

SOURCE: 2010 U.S. Census

tion. In Detroit, segregation levels declined from 88 in 1990 to 75 in 2010. Chicago and Cleveland, among others, also experienced marked declines during this period.

Another impetus toward less segregation is the growth of the Hispanic and Asian populations. Although all minority groups still show a preference for members of their own group as neighbors, there is also tolerance for other groups – particularly in multiracial settings. That leaves open the possibility that in metropolitan areas where blacks are one of two or more major minority groups, other minorities can serve to buffer these divisions.

In the 1980s and 1990s, there already was a marked tendency for black-white segregation to decline in multiracial metropolitan areas, especially those in Melting Pot regions such as Houston, Dallas, Los Angeles and Riverside (Calif.). The 2010 census shows that some of the lowest black-white segregation scores are in areas with large or growing new minority populations, including Phoenix, Las Vegas, Riverside, Tucson, Stockton and San Antonio. Several Southeastern areas that have had notable recent declines in black-white segregation, such as the cities in Florida cited above, also are home to

BLACK-WHITE SEGREGATION RANKS, 2010

MOST SEGREGATED RANK/AREA	SEGREGATION LEVEL	LEAST SEGREGATED RANK/AREA	SEGREGATION LEVEL
1 Milwaukee	82	1 Tucson	37
2 New York	78	2 Las Vegas	38
3 Chicago	76	3 Colorado Springs	39
4 Detroit	75	4 Charleston	42
5 Cleveland	74	5 Raleigh	42
6 Buffalo	73	6 Phoenix	44
7 St. Louis	72	7 Greenville	44
8 Cincinnati	69	8 Lakeland	44
9 Philadelphia	68	9 Augusta	45
10 Los Angeles	68	10 Riverside	46

SOURCE: 2010 U.S. Census

substantial Hispanic populations. The increased multiracial character of New Sun Belt metropolitan areas, both inside and outside the South, should pave the way for even further attenuation of segregation in metropolitan areas.

Another reason to expect further meaningful declines in black-white segregation is the emergence of the black middle class, along with the increased ability of blacks to translate economic advancement into housing in less segregated and higher quality neighborhoods. Because of the refusal of whites to accept any blacks in their neighborhoods, there was scant evidence as recently as 1980 of any translation of improvement in blacks' personal economic circumstances into better neighborhood quality.

White attitudes began to change in the 1990s. Although still more limited by persistent discriminatory attitudes and social inertia than Hispanics and Asians, upper-income and more educated blacks are now more able to live in integrated, affluent neighborhoods than blacks who are less well off. Segregation is also less prevalent in metropolitan areas where there is greater convergence of black and white incomes. The upward mobility of a segment of the black population now brings the promise of greater declines in segregation.

The current geography of black-white segregation shows a noticeable regional difference, but segregation scores are generally lower than in 1990. Among 87 large areas with at least minimal black populations, 47 areas, located primarily in the South and West, show scores below a "high" value of 60. In contrast, in 1990 only 29 areas registered such scores. Among the new areas with segregation levels below 60 are Atlanta, Louisville, Dallas, Nashville and Tampa. Three Northern metros, Minneapolis-St. Paul, Des Moines and Providence, also fell below 60. About one-fifth of these metros have segregation scores below 50, including Western metros such as Phoenix and Las Vegas and Southeastern metros such as Charleston and Raleigh.

Even more revealing is the reduction of segregation in areas with traditionally higher levels of separation.

Each of the areas with segregation levels of 60 or more showed declines – by more than 5 points for most – since 1990. In 1990, 27 areas had segregation scores exceeding 70, with five areas (Detroit, Chicago, Cleveland, Milwaukee and Buffalo) exceeding 80. By 2010, only seven areas were above that level, and only one (Milwaukee) stayed above 80. A number of forces – increased black suburbanization, demolition of urban public housing, losses of black residents and some reduction in the discriminatory practices of financial institutions and real estate agents – are contributing to new reductions in segregation in places where, until recently, segregation would not budge.

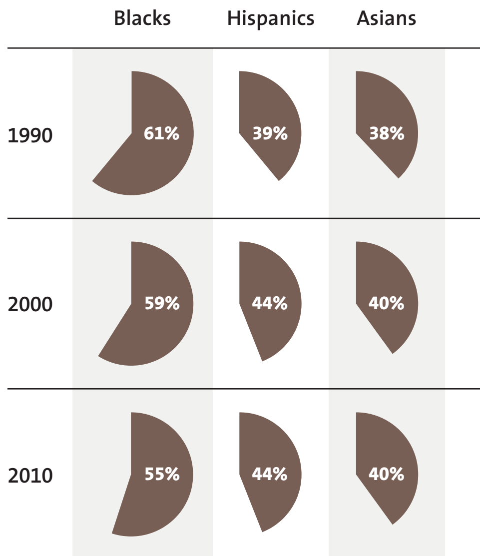
The recent widespread reduction in black-white segregation should not be confused with its elimination. Segregation levels in the 50 to 60 range, found in many large metropol-

itan areas, are still substantial by any reasonable standard. Social and demographic inertia, particularly in older, slower-growing metropolitan areas, still isolates many black children in high-poverty areas in ways that perpetuate disadvantages across generations and deprive a substantial segment of the black population of the wherewithal to relocate to higher quality communities.

Yet new forces affecting black-white segregation are ushering in an era that will be quite different from the era of wholesale ghettoization of the black population 50 years ago. The shift of the black population to more prosperous areas in the South, the movement of younger generations of blacks to the suburbs, the general change in racial relations among blacks and whites, and the substantial period that fair housing laws and practices have had to take root have dramatically expanded the opportunities to increase integration.

Moreover, the growth and dispersion of new minority groups to all parts of the country, especially to the New Sun Belt where all groups are moving, have the potential to ease the animosities associated with the long-standing black-white divide. Asian, Hispanic and soon multiracial groups will serve to buffer those animosities at the neighborhood and community levels.

BLACK, HISPANIC AND ASIAN AVERAGE SEGREGATION LEVELS FOR 100 LARGEST METROPOLITAN AREAS



NOTE: Segregation levels represent the percent of blacks, Hispanics or Asians who would have to move across neighborhoods to be distributed similarly to whites. Values range from 0 (complete integration) to 100 (complete segregation).
SOURCE: 1990-2010 censuses

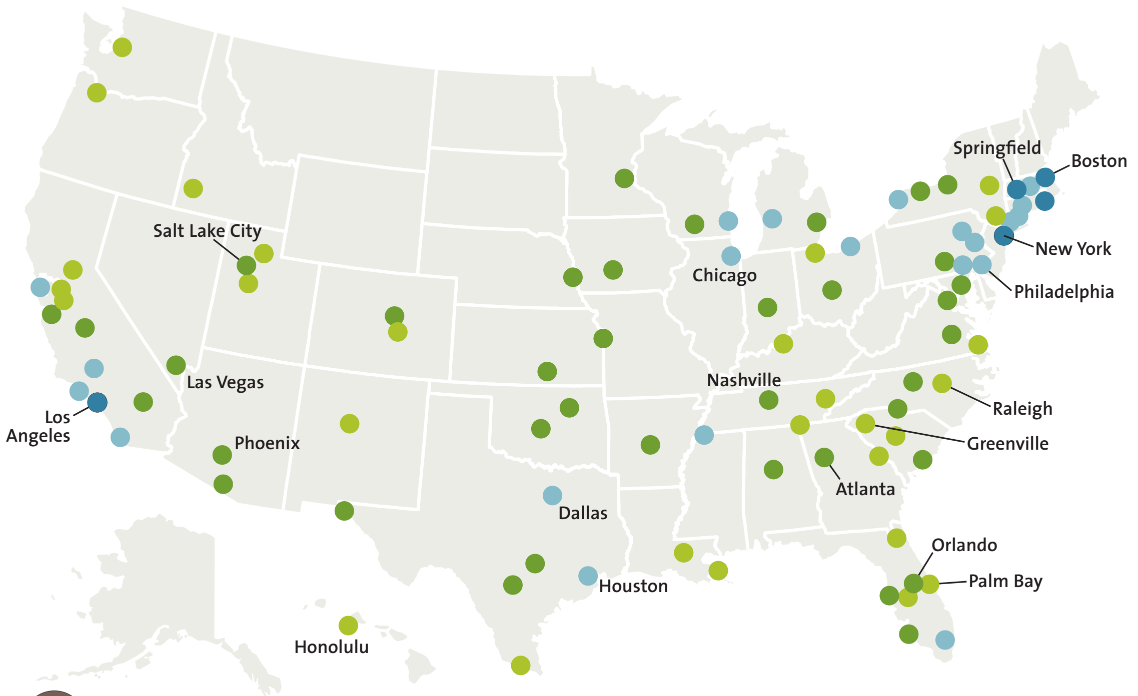
HISPANIC AND ASIAN SEGREGATION IN FLUX

The severity and persistence of black segregation in the 20th century stand in contrast to the lower, more transitory segregation trends of earlier white immigrant groups as well as to the current segregation patterns of Hispanics and Asians. Both Hispanics and Asians owe their growth in numbers to the more open immigration laws since 1965, and like earlier groups, they have continued to disperse across the country. Hispanic and Asian segregation levels are, on average, markedly lower than those for blacks. Yet as black segregation levels continue to decrease for the majority of metropolitan areas, no similar trend exists for the newer minorities. In fact, among the 100 largest metropolitan areas, average Hispanic and Asian segregation appears flat between 2000 and 2010 after increasing somewhat in the 1990s.

Although this may not appear to follow the transitory paths of ethnic immigrants a century ago, there is an important caveat. Both Hispanic and Asian communities continue to be replenished with new immigrants, whose segregation levels are higher than those of their native-born counterparts. So the average "static" segregation picture for Hispanics

HISPANIC-WHITE SEGREGATION, 2010

SEGREGATION FOR THE 93 OF THE LARGEST 100 METROPOLITAN AREAS WITH HISPANIC POPULATIONS OF AT LEAST 3 PERCENT OF THE TOTAL POPULATION.



SEGREGATION LEVEL

0 indicates complete integration, 100 indicates complete segregation

Below 40 | 40 to 50 | 50 to 60 | 60 and over

SOURCE: 2010 U.S. Census

and Asians conflates both a turn toward integration among long-term residents and higher segregation levels among new immigrants.

In *Where We Live Now*, the sociologist John Iceland of Penn State provides evidence that "spatial assimilation" into more integrated neighborhoods is occurring among Hispanics and Asians who have lived in the United States the longest and among those who were born in the United States. It is also the case that Hispanic and Asian residents with higher incomes and education are able to translate their status into residence in more integrated neighborhoods. These trends play out across individual metropolitan areas that vary in size, growth and makeup with regard to their Hispanic and Asian groups. Because there is no typical segregation pattern for metropolitan areas, it is useful to see how they differ.

Hispanic Segregation Across Metropolitan Areas

Hispanic segregation patterns vary across regions of the country, reflecting Hispanic settlement histories and the locations of primary Hispanic groups. The map above displays Hispanic-white segregation levels in 2010 for

93 large metropolitan areas with a significant Hispanic population. Segregation levels range from a low value of 25 to a high value of 63. Two kinds of metropolitan areas are positioned at the upper end of the Hispanic segregation spectrum. First are the areas that are home to the largest Hispanic populations and have served as major gateways for Hispanic immigration. Both Los Angeles and New York have segregation levels of 62. Miami, Chicago, San Francisco, San Diego, Dallas and Houston register scores of 50 or higher. Segregation in most of these areas did not change dramatically in the past two decades because these areas continue to attract new immigrants who begin to establish themselves in clustered racial enclaves.

A second set of areas with Hispanic-white segregation levels above 50 are in the Northeast and Midwest, particularly those areas with large Puerto Rican enclaves. This includes a swath of areas of all sizes in New England and Pennsylvania, including Boston, Providence, Philadelphia and Allentown. Also included in this group are industrial areas such as Milwaukee, Cleveland and Buffalo.

Metropolitan areas with lower Hispanic-white segregation levels – in the 40s and below – are spread over the country, especially in the South and interior West. These tend to be areas in which Mexicans are the primary Hispanic group and areas with small or quickly growing Hispanic populations. Among the larger areas in this category are Atlanta, Charlotte and Nashville in the South, and Phoenix, Las Vegas and Salt Lake City in the West. The smaller areas are located in swaths of New Sun Belt states in the Southeast, Mountain West and interior California.

One of the reasons that Hispanic segregation, on average, has not declined is that segregation is increasing in many of the new destination metropolitan areas that have attracted Hispanics as part of the larger dispersion phenomenon.

GREATEST INCREASES IN HISPANIC-WHITE SEGREGATION, 1990-2010

	Segregation Level	
Rank/Area	2010 Level	1990-2010 Increase
1 Miami	57	+25
2 Nashville	48	+24
3 Scranton	53	+23
4 Indianapolis	47	+21
5 Tulsa	45	+20
6 Memphis	51	+18
7 Raleigh	37	+17
8 Greensboro	41	+17
9 Little Rock	40	+16
10 Birmingham	45	+16
11 Charlotte	48	+15
12 Richmond	45	+15
13 Atlanta	49	+14

SOURCE: 1990 and 2010 U.S. censuses

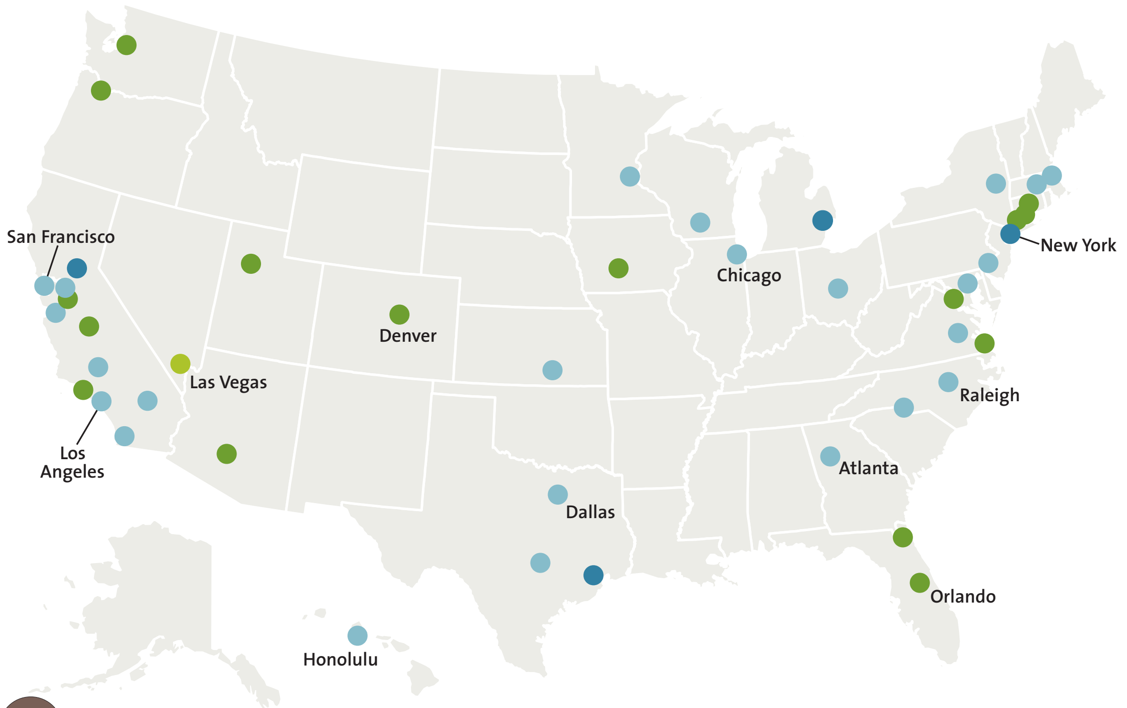
These areas have lured Hispanics who are more likely to be foreign-born, to be less fluent in English and to have lower levels of education attainment than Hispanics residing in other kinds of areas. As a consequence, these Hispanics are less likely to assimilate quickly, especially in places where the Hispanic population is new and subject to indifferent or discriminatory behavior on the part of established whites and blacks.

The table above lists large areas with the greatest increase in Hispanic segregation between 1990 and 2010. For the most part, these are new Hispanic destinations, located primarily in the South, including Nashville, Memphis, Raleigh, Charlotte, Greensboro and Atlanta. New destinations outside the South, Scranton and Indianapolis, also showed noticeable gains in segregation.

Overall, 27 of the 93 metropolitan areas showed meaningful (at least 10-point) gains in segregation during the two-decade period.

ASIAN-WHITE SEGREGATION, 2010

SEGREGATION FOR 45 OF THE 100 LARGEST METROPOLITAN AREAS WITH ASIAN POPULATIONS AT LEAST 3 PERCENT OF THE TOTAL POPULATION



SEGREGATION LEVEL

0 indicates complete integration, 100 indicates complete segregation

Below 30 | 30 to 40 | 40 to 50 | 50 and over

SOURCE: 2010 U.S. Census

In most of these areas, the Hispanic population is small, new and rapidly growing. And in all but three (Miami, Scranton and Memphis), the 2010 segregation levels were relatively low – below 50, and in several cases in the 30s. In Raleigh, for example, the Hispanic population grew more than 150 percent as its segregation level rose from 20 in 1990 to 37 in 2010.

So, at present, the Hispanic population is dispersing away from highly segregated areas to new areas that provide greater opportunities than earlier gateway regions. Even though new Hispanic enclaves are making these new destinations more segregated than before, they are still less segregated than the former gateway areas. In addition, if these new residents are able to translate their opportunities into economic mobility for themselves and their children, they will be following the trajectories of earlier immigrant and racial groups toward even greater integration.

Asian Segregation Across Metropolitan Areas

The Asian population is growing even more rapidly than the Hispanic population. Well over half of Asians in the United States are

Asians residing in many new destinations have high education attainment, so segregation in these areas does not conform to the low-skilled profile associated with some Hispanic and immigrant groups.

foreign-born and they are far more concentrated in established gateway areas than Hispanics are. But there is still variation across metropolitan areas in Asian-white segregation levels. Among the 45 largest metropolitan areas with significant Asian populations, segregation levels range from 29 (for Las Vegas) to 52 (for New York).

Metropolitan areas that have served as traditional Asian immigrant gateways tend to have higher levels of Asian-white segregation. New York, Los Angeles and San Francisco register segregation levels in the 47 to 52 range, though those levels are markedly lower than for Hispanics. Other areas with segregation levels exceeding the mid-40s tend to be those with large established Asian populations (Sacramento, San Jose, San Diego, Boston and Chicago), those with quickly growing Asian populations (Houston, Dallas, Atlanta and Raleigh), and a few older Northeast and Midwest areas (Philadelphia, Detroit and Wichita). Areas with the lowest levels of Asian segregation tend to be in the Mountain West (Las Vegas, Salt Lake City and Denver), Florida (Orlando and Jacksonville), interior California (Modesto and Fresno) and "suburban-like" areas (Oxnard and Bridgeport) that are near major metros.

Changes in Asian segregation for individual areas are not as pronounced as changes in Hispanic segregation, although areas experiencing large Asian population increases, including new Asian destinations, experienced higher segregation in 2010 than in 1990. Among areas showing a 20-year increase in segregation of at least 5 points are Richmond, Atlanta, Las Vegas, Dallas, Orlando and Phoenix. Most of these areas have modest or low levels of segregation. Other areas with established Asian populations, such as Los Angeles and San Jose, showed only small increases in segregation.

Asians residing in many new destinations have high educational attainment, so segregation in these areas does not conform to the low-skilled profile associated with some Hispanic and immigrant groups. Yet if the past experiences of other Asians and other immigrant groups are an indicator, their segregation levels should decline with increased length of residence in their new locations.

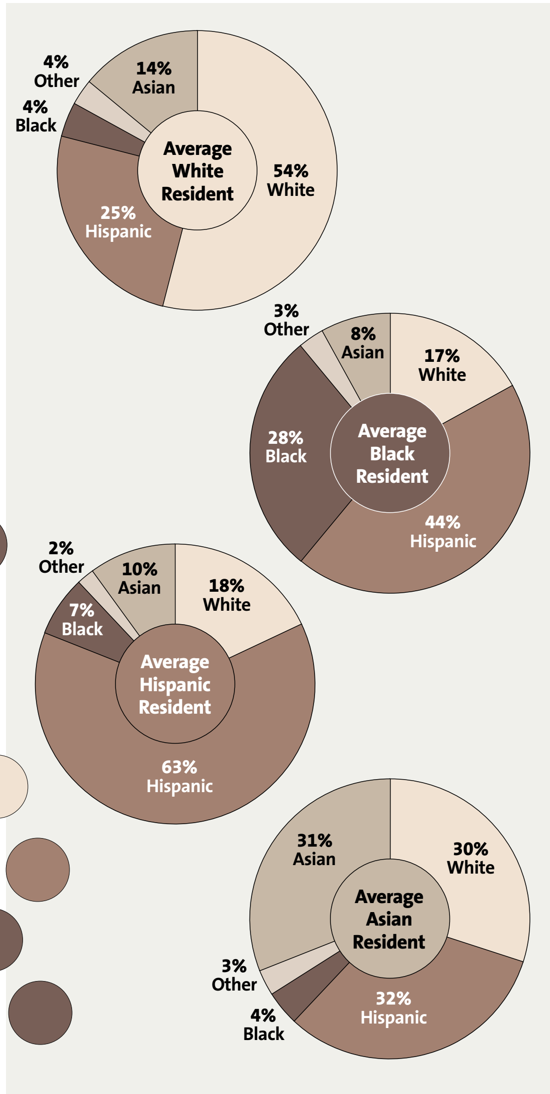
TOWARD NEW MULTIRACIAL NEIGHBORHOODS

I've focused thus far on segregation levels as measured by the dissimilarity index. Although it serves its purpose, in a sense the measure is detached from reality because it does not give an on-the-ground picture of the kinds of neighborhoods in which a typical white, black, Hispanic or Asian resides. That is because real-world neighborhoods are composed of multiple racial groups, not just pairings of one group with whites. Furthermore, the size of each racial group in a given neighborhood is affected by the overall racial makeup of the metropolitan area.

For example, an average neighborhood in a multiracial metropolitan area like Los Angeles will look very different from an average

RACIAL MAKEUP OF THE NEIGHBORHOOD SURROUNDING THE AVERAGE RESIDENT

LOS ANGELES METRO AREA, 2010



SOURCE: 2010 U.S. Census

neighborhood in a much whiter metro like Minneapolis-St. Paul. Both areas show some segregation between whites and blacks, Hispanics and Asians. But there are many more minorities in Los Angeles than in Minneapolis-St. Paul, meaning that an average neighborhood where whites live in Los Angeles will be more diverse than an average neighborhood where whites live in Minneapolis-St. Paul.

The figure to the left shows the neighborhood racial composition for the average resident of each racial group in Los Angeles. The average white Los Angeles resident does, indeed, live in a neighborhood that has a healthy smattering of Hispanics and some black and Asian residents. But there are also far more white residents – 54 percent – in this average neighborhood than in neighborhoods that are home to the average black, Hispanic or Asian. So segregation still matters in the way that it affects on-the-ground neighborhoods, even in Los Angeles.

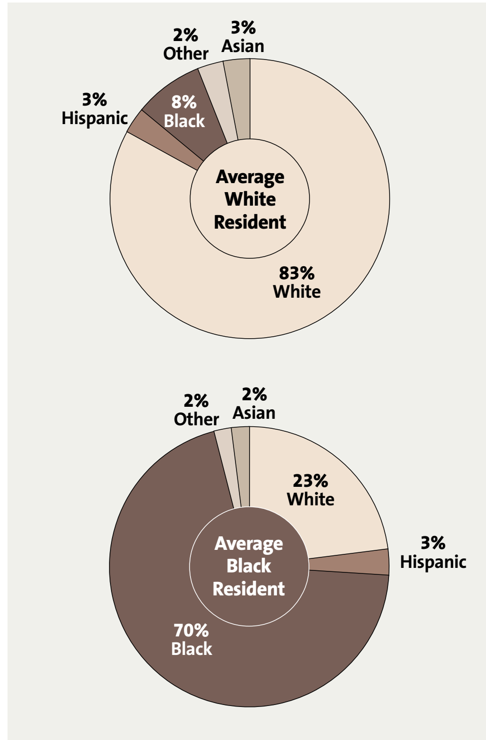
That is not to say there are no neighborhoods that are completely white or completely Hispanic in Los Angeles. But, on average, residents of each race (especially Hispanics) are somewhat exposed to members of all races. The multiracial character of the Los Angeles region does spill over across the area's neighborhoods. Such spillover is also seen in many of the other places in the Melting Pot regions of the country.

Of course, the situation is different in regions that have quite different racial makeups. Both Detroit and Atlanta are metros in which blacks are the predominant minority. Yet they also differ in important respects. Detroit is a stagnating metropolitan area, located in the nation's Heartland region. It has lost black migrants for decades while registering only modest population gains from other minorities. In contrast, Atlanta has been the primary magnet for black migrants and has also experienced rapid growth in its Hispanic and Asian populations.

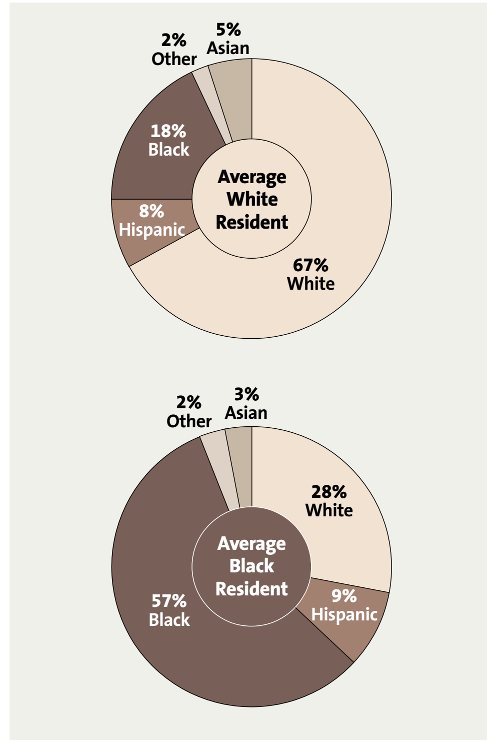
Moreover, in recent decades, black migration waves included many middle-class blacks and occurred in a post-civil rights environment in which new residential development

RACIAL MAKEUP OF THE NEIGHBORHOOD SURROUNDING THE AVERAGE RESIDENT

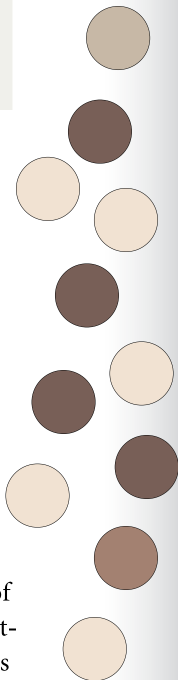
DETROIT METRO AREA, 2010



ATLANTA METRO AREA, 2010



SOURCE: 2010 U.S. Census



Detroit is a stagnating metropolitan area. Atlanta has been the primary magnet for black migrants and has also experienced rapid growth in its Hispanic and Asian populations.

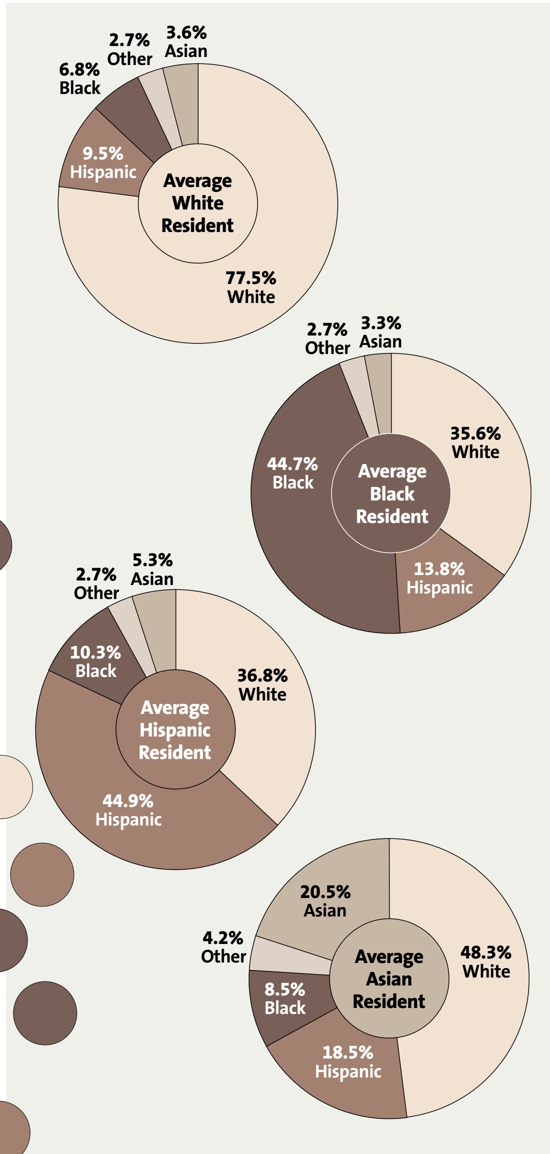
was subject to stricter antidiscrimination regulations. For these reasons (among others), Atlanta witnessed a greater decline in black-white segregation than Detroit did.

A comparison of typical white and black neighborhoods in each metropolitan area shows noticeable differences. In both, the average white person lives in a neighborhood that is mostly white. But in Detroit, whites constitute 83 percent of white resident neighborhoods while in Atlanta whites make up just 67 percent of white resident neighborhoods. Blacks in Atlanta also live in neighborhoods that are somewhat more integrated, with greater percentages of whites and Hispanics and smaller percentages of same-race neighbors than one finds in Detroit.

Of course, even in Atlanta, there is a high rate of segregation. Blacks, on average, live in

RACIAL MAKEUP OF THE NEIGHBORHOOD SURROUNDING THE AVERAGE RESIDENT

UNITED STATES, 2010



SOURCE: 2010 U.S. Census

neighborhoods that are more than one-half black while whites live in neighborhoods that are two-thirds white. But the segregation in Atlanta is becoming less extreme.

A NATIONAL NEIGHBORHOOD SNAPSHOT

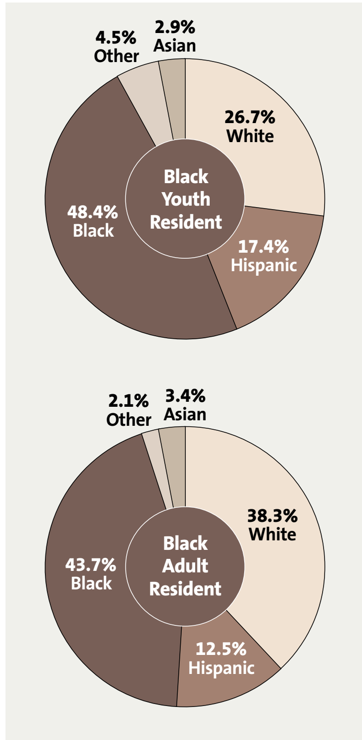
America's racial mosaic is changing in cities, suburbs, states and regions. Although the broad Melting Pot, New Sun Belt and Heartland regions are still somewhat distinct, the dispersion of new minorities virtually everywhere and the continuing southward movement of blacks are leading to shifts that will, for the most part, blur long-maintained spatial divisions, even at the neighborhood level. Therefore, it is useful to observe the kind of neighborhood in which the "average" white, black, Hispanic and Asian resident lives to provide a benchmark of where things stood at the time of the 2010 census. This picture is given in the figure to the left, which is drawn from all of the neighborhoods in the United States – including those in metropolitan and non-metropolitan areas of all sizes and in every part of the country – for the average resident of each racial group.

The average white resident, for example, lives in a far less diverse neighborhood – one that is more than three-quarters white – than residents of any other group. Nonetheless, the average white person today lives in a neighborhood that includes more minorities than was the case in 1980, when such neighborhoods were nearly 90 percent white. Moreover, the average member of each of the nation's major minority groups lives in a neighborhood that is at least one-third white, and in the case of Asians, nearly one-half white. Hence, there is a tendency toward more integrated living among these groups as more minorities relocate to white-dominated or multiracial neighborhoods.

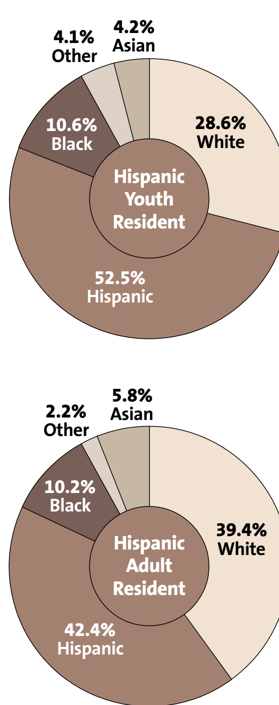
One issue that is especially important is the segregation of minority children into neighborhoods and school districts that often have fewer resources and show poorer overall performance. National statistics comparing

NEIGHBORHOOD MAKEUP OF AVERAGE YOUTH AND ADULT RESIDENT, 2010

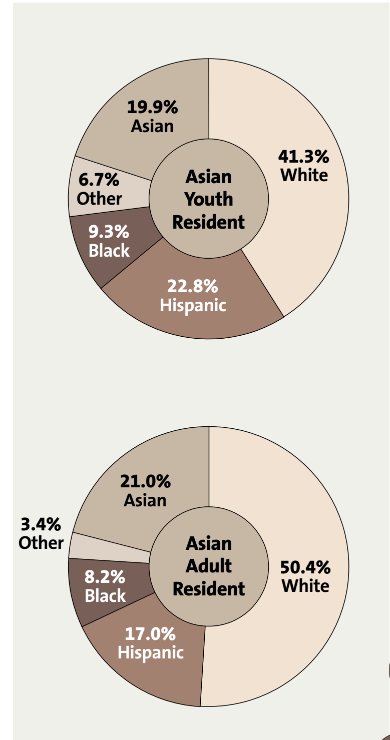
BLACKS



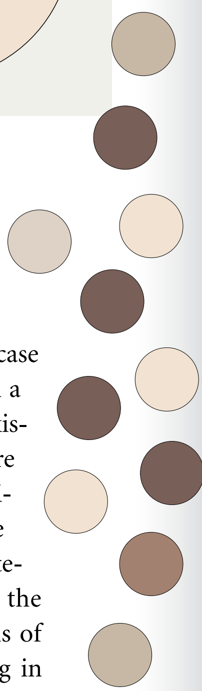
HISPANICS



ASIANS



SOURCE: 2010 U.S. Census



neighborhood profiles for average black, Hispanic and Asian children show them to be decidedly more exposed to members of their own racial group – or having less contact with whites – than is the case for their adult population.

In part, that reflects a continuing tendency for white families to choose local areas with better resources and schools and fewer minorities than the local areas that are available to minorities. Given today's more diverse youth and their important role in the future workforce, the inequality of opportunities associated with their segregation across neighborhoods needs to be addressed.

Still, overall, population shifts that are bringing Hispanics and Asians to previously whiter New Sun Belt and Heartland regions will almost certainly continue to alter the neighborhood experiences of these groups by bringing them into more contact with whites than was the case in the past. The nation's blacks have seen a marked shift from a mostly ghettoized existence five decades ago to one that more closely follows the path of other racial minorities and immigrant groups as more blacks move to more suburban and integrated communities, particularly in the South. So the broader migration patterns of blacks, Hispanics and Asians are moving in the direction of greater neighborhood racial integration, even if segregation is far from eliminated.

BY ALLEN R. SANDERSON AND JOHN J. SIEGFRIED

As America goes through the annual rituals of college football bowl games and the national basketball tournaments (aka March Madness), one seemingly straightforward question hardly ever gets asked: why is the nation's higher-education system home to a vast organization of big-money sports? After all, not a single one of the institutions that spend tens of millions supporting intercollegiate athletics mentions the goal of providing commercial entertainment in its charter.

But that question is now being asked, albeit indirectly, by a variety of courts trying to reconcile the commercial aspects of intercollegiate sports with the conventional views of the job of the nation's colleges and universities. How this will play out is anyone's guess.

HOW WE GOT HERE

While only 15 years old, this century has already seen both the best and worst of times for the National Collegiate Athletic Association and its member universities. On the one hand, massive revenues and robust television ratings from football and men's basketball – not to mention the celebrity status and seven-figure compensation packages going to the most successful college coaches – attest to the popularity and vitality of the college game. On the other, the NCAA has never been so regularly on the defensive regarding the image of its players and coaches.

ALLEN SANDERSON and JOHN SIEGFRIED are economists at the University of Chicago and Vanderbilt University, respectively. This essay is based on the authors' article in the Winter 2015 issue of *Journal of Economic Perspectives*.

The disjuncture between the NCAA-peddled myth of college athletes as "amateurs" who are first and foremost "student-athletes" and the reality that they are poorly paid professionals who all too often are not up to the academic demands of higher education has led to scandals with monotonous regularity. In many cases, underpaid star players are caught with their hands in the cookie jar. For example, the 2005 Heisman Trophy award to USC running back Reggie Bush was vacated after discovery that he and his family received massive concealed payments.

In many other cases, athletics programs are caught greasing the academic wheels for athletes who could not otherwise have (literally) made the grade. National Basketball Association star Derrick Rose submitted fraudulent SAT scores to the University of Memphis, whose coach at the time was John Calipari. Memphis was slapped on the wrist for the transgression, but the coach moved on to even greener pastures at Kentucky. Meanwhile, the University of North Carolina (Chapel Hill) was caught enrolling players in ghost courses to keep non-student-athletes on the roster –

KENT GIDLEY, UNIVERSITY OF ALABAMA ATHLETICS

The Power of People
WHITNEY BAN
SEC
84
74
NIKE

a practice that had apparently been going on for decades. Not to be outdone, University of Georgia coach Jim Harrick was fired over academic fraud involving bogus courses and grading.

These various forms of cheating shock – just shock! – the talking heads of sports and provide plenty of fodder for righteous newspaper editorials. But once the ripples die down, one can be almost certain that nothing much will change. The same cannot be said, though, for the current round of legal challenges to the organization of big-time college sports.

• In a petition to the National Labor Relations Board, several Northwestern University football players argued that they were employees rather than students and thus should be entitled to employee medical benefits and be allowed to bargain collectively over compensation and work conditions. And in March 2014, a regional NLRB regulator agreed, raising the prospect that college sports programs will be treated like the businesses they sometimes are.

• In the same vein, a collection of cases challenge the legal authority of the NCAA and the big sports conferences to cap grants-in-aid (read: salaries) for "student-athletes." These cases, incidentally, may be turbo-charged by a class-action lawsuit in federal court against the NCAA and the conferences by sports attorney Jeffrey Kessler, claiming injury to all college athletes harmed by limitations on compensation.

• A lawsuit brought by former UCLA player Ed O'Bannon argues that, after players leave college, they are entitled to a share of revenues generated by the commercial use of their images. And in July 2014, Federal District Court Judge Claudia Wilken ruled in favor of O'Bannon. Indeed, she went further, suggesting that any collective agreement to cap player compensation constituted restraint of trade under the Sherman Antitrust Act, leaving the next shoe to drop to a federal appeals court.

But we get ahead of ourselves. The validity of these challenges can be evaluated only in the context of the remarkable state of NCAA sports.

THE COLLEGE ATHLETICS LANDSCAPE

Most colleges and universities in America field a variety of men's and women's intercollegiate sports teams. Given that all but a score of these programs lose money in a strict bottom-line accounting sense, one must ask why financially pressed institutions continue to subsidize them with a combination of mandatory student fees, general institutional funds, cash pried from state legislatures, and contributions solicited from alumni and well-heeled donors. All this money, one should note, might have been directed toward reducing tuition or improving academic programs.

In the private sector, recurring losses serve as a signal to redeploy assets elsewhere. But in intercollegiate athletics, losses seem more likely to induce university administrators to double-down, attracting winning coaches with salaries worthy of Fortune 500 CEOs and spending lavishly on recruiting and physical facilities.

USA Today annually compiles stats on these direct and indirect subsidies for individual universities. We used these data to get some perspective on the magnitude of the support at a sampling of public universities with Division I teams.

Not all state-supported universities with Division I teams need outside help. In 2013, Texas, Ohio State, Oklahoma, Louisiana State, Penn State, Nebraska and Purdue covered all of their intercollegiate athletic expenses with sports-generated revenues. And some universities that did subsidize athletics – for exam-

MEDIAN FINANCIAL STATS FOR 126 DIVISION I UNIVERSITIES WITH BOWL-ELIGIBLE FOOTBALL TEAMS ($ MILLIONS, EXCEPT AS NOTED)

TOTAL YEAR	GENERATED REVENUE	ALLOCATED REVENUE	SUBSIDY REVENUE	AVERAGE PERCENTAGE	# OF ATHLETES REVENUE	ON SCHOLARSHIP
2004	$28.3	$22.8	$5.4	19.1%	$28.3	577
2005	32.8	24.3	8.5	25.9	31.6	589
2006	35.4	26.4	9.0	25.4	32.4	588
2007	37.6	26.1	11.5	30.6	33.5	598
2008	41.1	30.5	10.6	25.8	34.8	602
2009	45.7	32.3	13.4	29.3	37.9	603
2010	48.3	35.3	13.0	26.9	39.7	611
2011	52.7	38.8	13.9	26.4	42.3	616
2012	56.0	40.6	15.4	27.5	44.2	615
2013	61.9	41.9	20.0	32.3	48.2	611

ple, by paying the tuition component of grants-in-aid out of general university funds – earned sufficient revenues so that they did not need those subsidies to break even. This group includes Alabama, Michigan, Florida, Oregon, Michigan State, Kentucky, Kansas, Washington, Indiana, Missouri, Texas Tech, Kansas State and Mississippi State.

But these exceptions are the few and far between. More than 90 percent of Division I public universities do subsidize their intercollegiate athletics programs. In 2013, the highest subsidy was at Rutgers, which was in the red by almost $50 million. That, however, amounted to less than $1,500 per undergraduate student because of Rutgers's large enrollment. Many of the highest sports subsidies per student, frequently exceeding $2,000, are at the half-dozen or so academically selective private universities with more-modest enrollments that field teams in the five major conferences (Atlantic Coast, Big 12, Big Ten, Pac-12 and Southeastern). Alabama-Birmingham is included in our sampling because it announced last year that it would discontinue Division I football due to escalating costs. The subsidy data explain that decision.

The last column in the table above reports the percentage by which 2014 in-state tuition could have been reduced if all of the intercollegiate athletics subsidies had been diverted to that end. It ranges as high as 14 percent, even if Alabama-Birmingham and Georgia State are excluded. (The latter is just entering Division I, so the high outlays may reflect only startup costs.) It is thus clear that intercollegiate athletics constitutes a non-trivial part of tuition paid by many students and their families to public universities.

UNIVERSITY	SUBSIDY ($ MILLIONS, 2013)	2013 SUBSIDY/ UNDERGRADUATE STUDENT	SUBSIDY AS % IN-STATE 2014 TUITION
Alabama-Birmingham	$18.1	$1,601	22.2
Arizona	7.3	232	2.5
Connecticut	18.9	1,076	11.6
Delaware	26.1	1,435	13.5
Georgia State	22.6	917	14.7
Minnesota	8.1	235	1.9
North Carolina-Chapel Hill	9.2	495	7.7
Rutgers	47.0	1,487	13.9
Tennessee	2.4	594	6.9
UCLA	2.6	94	0.8

AND FOR WHAT?

This substantial addition to the cost of a university degree (so the argument goes) is worthwhile to the students, families or taxpayers

JON GARDINER, DUKE PHOTOGRAPHY

who foot the bill. Specifically, supporters of the status quo say that success in intercollegiate athletics convinces state legislatures to increase appropriations for other university programs, as well as attracting private donations from alumni and local boosters who call the teams their own. A modest accumulation of research supports this argument. But even the most successful sports programs have a way of expanding their budgets to absorb the surplus. As a result, the amounts that are actually available for use beyond the athletic departments are never very large.

Does the presence of high-profile intercollegiate athletic programs attract better qualified applicants or students paying full tuition?

Again, the evidence suggests some favorable effects for successful teams. But the advantages are fleeting, and, in any case, success serves no greater societal purpose since it serves only to shuffle enrollments by applicants who were planning to go to college in the first place. Moreover, it is likely that the government funds used to subsidize intercollegiate athletics could have had a greater positive impact on the relevant institutions if they were instead allocated directly to university fund-raising efforts or marketing to prospective applicants – or even, heaven forbid, to moderating the seemingly relentless rate of increase in college tuition.

SEVENTY YEARS AND COUNTING

In the early 1950s, to hold down its costs, the NCAA established a binding ceiling on the remuneration that could be given to an intercollegiate athlete – a grant-in-aid restricted to room, board, tuition, fees and books. A collective practice like this would be illegal in almost any other enterprise. But it flourishes in colleges, especially in cooperation with the professional sports leagues. Minimum age requirements established by the National Football League and the National Basketball Association restrict alternatives available to prospective college athletes, giving the NCAA virtually total control over the labor market for young athletes who hope to become professionals. In return, the professional leagues can foist the costs of training their future recruits on universities.

The NCAA's market power is not only reflected in substantially below-market compensation for the best players, but also leads to overuse of this chief "input" in sports entertainment through a steady expansion of regular-season football and bowl games (which now number 39, with some teams without winning records participating), moneymaking post-season conference basketball tournaments and steady expansion of the March Madness field (now up to 68 for the men's tournament). The long, long seasons reduce the time available for the athletes to even pretend to be students, and increase the risk of injuries that will prevent the very best players from ever cashing in with the pros.

MATTHEW MITCHELL/MSU ATHLETIC COMMUNICATIONS

College players, it goes without saying, have no voice in decisions to expand schedules, and no claim on the incremental revenues that are generated by additional games, expanded playoff schedules and post-season tournaments.

The core issue is not, as often claimed by advocates for intercollegiate sports, whether college athletes should be paid. Apart from a few "walk-ons," most of the players are, in fact, already being paid via grants-in-aid that cover most of their expenses. In our view, amateur status should not be defined by whether student-athletes are paid directly or have their bills paid for them, but rather by the nature of the relationship between the player and the institution. The real issue is restraint of trade – that, through the NCAA, universities collectively agree to cap their players' compensation, which in other businesses would violate Section 1 of the Sherman Antitrust Act.

This is not to say that the average college

athlete is "underpaid." We know this is not the case because virtually all university sports programs require subsidies to stay afloat. But it changes the distribution of compensation dramatically. The artificial ceiling holds down benefits that otherwise would accrue to the most talented collegiate football and men's basketball players, many of whom are African-Americans from low-income households. In contrast, athletes in non-revenue sports, most of whom are white and middle-class, are winners. Consider, too, that the restraint of trade facilitates the diversion of surpluses to coaches' salaries, which in many cases exceed the compensation of university presidents.

Coaches were not always paid employees. Prior to 1892, college football coaches were all volunteers. That ended when the University of Chicago offered legendary coach Amos Alonzo Stagg a salary to leave Springfield College and take over the helm of the Chicago team – which he managed so successfully that the Cook County stadium (where the atomic bomb was developed during World War II) was later renamed for him.

The question that naturally follows is why players should be unpaid volunteers. Why shouldn't teams be forced to compete for student-athletes' services the way other employers compete for CEOs or security guards (and the way intercollegiate teams compete for coaches)? After all, the American Library Association does not coordinate a maximum wage for student library employees at colleges across the country.

The explosion of revenues flowing to NCAA members from television revenues, stadium seat sales and brand licensing has created growing unease in the media and the court of public opinion over the distribution of the largesse. The amounts are truly staggering. The NCAA organization itself enjoyed total revenue of almost $1 billion in the 2013-14 fiscal year, in addition to fees collected directly by its member colleges and universities. Its surplus reached $80 million, a 30 percent increase over the prior year. The NCAA's accumulated surpluses now amount to $700 million – quite a sum for a not-for-profit organization, and apparently sufficient to justify paying its chief executive officer $1.7 million and his second-in-command about $1 million during calendar year 2012 (the latest year that figures are available).

HALF MEASURES

In an effort to head off serious challenges to its business model, the NCAA recently made modest upgrades to rules governing maximum player compensation in the five "power conferences," adding unrestricted meal plans and multiyear scholarships and meeting other incidental out-of-pocket costs for players. But these changes fall well short of competitive labor-market compensation for star players and are mainly an attempt by the NCAA to stay one town ahead of the sheriff. The incentives to overuse players and the glaring disparity in pay between coaches and athletic department administrators, and the players doing the heavy lifting on the field, have hardly changed.

As several pending lawsuits (noted above) involving various aspects of NCAA collective action play out, commercialized intercollegiate athletics a decade from now could become very different. If labor and antitrust laws are applied to college sports, universities will no longer be able to exercise market power that transfers income from young minority players (and, arguably, from the pockets of degree-seeking students hard-pressed to cover tuition) to the paychecks of coaches and athletic directors. Indeed, in 40 of the 50 states, the most highly paid public employee is a university football or basketball coach,

with most of them earning that distinction in competition with medical-school deans and university presidents.

MOVING FORWARD

The current arrangements in the labor market for big-time college athletes are inefficient, inequitable – and probably unsustainable under current law. Some 40 years ago, professional sports leagues were forced to ease restrictions on their player labor markets, moving from total league control of salaries to a hybrid model mixing broad constraints on compensation with more balanced individual and collective bargaining. It's now time to end the price-fixing that restrains compensation received by college players and let them share in the windfalls generated by Americans' enthusiasm for college spectator sports.

When asked about one of the pending lawsuits that seeks an injunction against the NCAA's practice of restricting player compensation to expenses, NCAA president Mark Emmert said it would "blow up college sports."

Moving to a free market for intercollegiate athletes would, indeed, be disruptive. But we believe that big-time college athletics would not be demolished because the market value of the entertainment is so high. For one thing, paying star players what they're worth in a competitive market would require a major adjustment in outlook from both the players who would be left behind and from university communities as a whole that have swallowed the notion that student-athletes are truly a part of higher education.

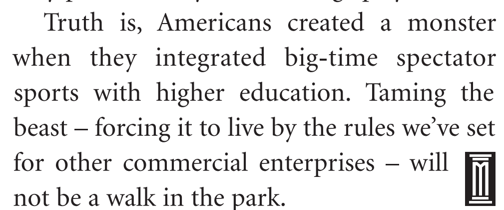
More tangibly, it is likely to increase the investment required of universities that want to compete at the highest levels in men's football and basketball. While one would expect that some of the cash needed to pay more to star players would come out of the surpluses now used to bid up the salaries of coaches and administrators, it could take a long time to reach that equilibrium. As a result, many more university trustees and state legislators will be forced to ask whether it is ethical or politic to pass on the costs to tuition-paying students.

* * *

Intercollegiate athletics seems poised to move in the direction we describe, fostering net gains in productivity. But, as with most changes in market institutions that increase efficiency – think freer international trade, anti-discrimination laws, tax reform, regulation that internalizes the costs of pollution – there will be losers as well as winners. While some athletes will be paid more, some will see their grants-in-aid trimmed. Meanwhile, some Division 1 sports programs are likely to fold, or at least downsize, implying fewer chances for less accomplished athletes to participate in intercollegiate athletics.

The key to successful change is to prevent the potential losers from vetoing adaptation. In this case, that might not seem an especially daunting hurdle since the courts that are forcing change are partly insulated from interest-group pressure. But the NCAA and the high-profile coaches whose seven-figure salaries would ultimately be at risk would almost certainly press for legislation to exempt college sports from the antitrust and labor laws. And resistance to such rollbacks might not hold. Who, after all, could be counted on to defend the rights of a few thousand mostly poor, mostly minority student-athletes, some of whom are likely to get rich anyway once they put in their years as college players?

Truth is, Americans created a monster when they integrated big-time spectator sports with higher education. Taming the beast – forcing it to live by the rules we've set for other commercial enterprises – will not be a walk in the park.



I know, I know … the blogosphere is so big that it's next to impossible to separate the nutritious stuff from the empty calories. But you owe yourself a look at the Milken Institute's Currency of Ideas for a sense of what's happening at the Institute. Here's an hors d'oeuvre *of posts from staff and fellows that might just tempt you to become a regular diner.*

Let My People Grow

While Israel has grown more rapidly than other advanced economies, with 10 percent of the workforce in the high tech sector generating over 50 percent of industrial exports, the disturbing transformation of its income distribution and society has made Israel one of the most unequal societies in the world. … The share of Israel's population living on less than half the country's median income has more than doubled since 1992, from 10.2 percent to 20.5 percent. Even more disturbingly, the share of children living in poverty quadrupled over the same period, from 7.8 percent to 27 percent. … The need for a bridge to the middle class for young people has become glaringly obvious, with housing prices having increased more than 68 percent over the past nine years, and an astounding 70 percent of workers earning below the average wage rate.

—*Glenn Yago*

REUTERS/RONEN ZVULUN

Apple Pay and Pay and Pay

A *Washington Post* story describes an observed elevated rate of fraud on Apple Pay, with one analyst, Cherian Abraham, placing the rate at about 6 percent – which, as the *Post* points out, is about 60 times the rate of swipe transactions. … Have hackers infiltrated Cupertino? Are people stealing iPhones and defeating the fingerprint check (or worse, cutting off fingers)? No, it is much simpler than that. Criminals are buying payment credentials online, loading them onto iPhones, and then using Apple Pay to buy things with the stolen card. There is a fiendish brilliance to it: the thief doesn't need to have the card, which means the card isn't missing, which means the card's actual owner may not know the card was compromised until the statement arrives (if they even read the statement).

—*Brian Knight*

Generation Deferred

Despite being saddled with criticism ranging from narcissism to laziness, many millennials have stuck with the plan. You know the plan: work hard in school, go to college and maybe grad school, and you will end up with a well-paying job and a home of your own. Somewhere along the line this plan became more of a fantasy, especially in California.… Compared to other states, California home prices appear untethered to the incomes actually earned by residents. The lack of affordable housing has caused California to lose some of its best young talent.… In the past 20 years, California has seen an exodus of almost 4 million people to other U.S. states. Most of those leaving were young families, the group most likely to become first-time homebuyers.

—*Matt Horton and Kristen Keough*

Delphi on the Potomac

As is often the case when central bankers speak, those on the receiving end parse every word, and interpretations vary. The Federal Reserve chair, Janet Yellen, gave analysts and market participants much to ponder in her recent testimony before committees of Congress. Although her remarks offered insight on the FOMC's view of economic conditions, she did not provide a clear timeline for the course of monetary policy. Or did she?

The Fed chief stated, "The FOMC's assessment that it can be patient in beginning to normalize policy means that the Committee considers it unlikely that economic conditions will warrant an increase in the target range for the federal funds rate for at least the next couple of FOMC meetings."

In my view, this implies that the Federal Open Market Committee, or FOMC, will raise the federal funds rate as early as mid-June.

—*Keith Savard*

Think Global, Act San Joaquin Valley

When it comes to bridging the skills gap, collaboration is the new competition. … In the past, companies harvesting fruit or drilling for oil may not have needed to invest heavily in human capital. Many jobs in natural resource-rich economies typically required low-skill, low-wage labor. Yet innovations in plant science and the mechanization of labor-intensive processes have led to increased productivity, and with it, an increasing need for more skilled workers, especially in the STEM fields (science, technology, engineering and mathematics). Agricultural companies in Kern County and the greater San Joaquin Valley are collaborating with each other and with local educational institutions to leverage public, private and philanthropic funds. … Not only are the programs focused on high-skill agriculture occupations with jobs connected to them, they also provide students with a head-start on getting an advanced degree.

—*Priscilla Hamilton and Minoli Ratnatunga*

Sunshine for the Golden State

California is known for technological innovation. Netflix, Google and Apple (among hundreds of other pioneering companies) were founded here, and the state consistently ranks among the top-five in the Milken Institute's State Technology and Science Index. So why, then, does it find itself looking up at many other states when it comes to creating a cohesive open-data policy?… At present, each individual state agency follows its own standards for publishing data, and the lack of a streamlined policy threatens to create confusion and mixed signals. To maximize ease of use for both users and agencies, the state must develop a uniform strategy that dictates how and when machine-readable data are published by its agencies.

—*Jason Barrett*

WHERE THE ACTION IS

It's no secret: small and mid-size businesses are the source of much dynamism in the American economy, and capital is the fuel that keeps the wheels churning. To find out more about how owners and managers in the vital SMB sector gain access to capital, the Institute partnered with the National Center for the Middle Market on a unique survey. Sampling more than 600 firms, the survey confirmed that businesses far and away preferred to self-finance where possible, even in the current low-interest-rate environment. Debt remains the second choice – and everything else is a distant third. Encouragingly, the majority of these firms said they plan to expand in the near future and don't view the cost of capital as a deterrent.

To read the entire report, "Access to Capital: How Small and Mid-Size Businesses Are Funding Their Futures," check the Institute website.

PART OF THE SOLUTION?

For more than a decade, the Institute's FasterCures group has worked to advance biomedical innovation and to ensure that better treatment is not only developed, but available in timely fashion to those who need it. In June, FasterCures convened 100 representatives from leading sources of R&D finance and patient foundations, along with industry executives and health care researchers, to work on solutions to the problems of bringing patient perspectives into coverage and reimbursement decision-making. Part of a growing effort to expand opportunities for hands-on connection to discovery, development and delivery of new therapies, the event was highlighted by a webinar hosted by FasterCures and the Patient Centered Outcomes Research Institute. The goal: education on building and leveraging effective patient registries, and the release of a video history on patients' engagement in medical research.

WE DID IT AGAIN!

With some 700 speakers, 170 events and 3,500 attendees, this year's Milken Institute Global Conference was bigger and better than ever, celebrating the power of ideas to drive change. In addition to exploring solutions to pressing challenges in everything from financial regulation to health care R&D to education reform, the 2015 conference focused on how to bring women into the global mainstream. Most of the panels are available for streaming on the Milken Institute website.

COURTESY OF THE MILKEN INSTITUTE

When One Is Not Enough

Man (and woman) does not live by bread alone. (I gotta remember to write that one down…) And, these days, the media, as well as the academic and think-tank worlds, brims with talking heads describing the limitations of GDP as a measure of societal welfare. Truth is, no single number or index of weighted numbers can capture everything we'd want to know about absolute or relative welfare for a whole country. But one of the most venerable attempts is the UN's Human Development Index, which factors in life expectancy and education along with income. More recently, the UN has added an HDI adjusted for income inequality, as well as a Gender Inequality Index. The latter index factors in maternal mortality rates, adolescent birth rates, education and labor force participation.

Among high-income industrialized countries, all three indices are strongly correlated. But there are some interesting outliers – including the United States. Here's a sampling, selected for general interest and, in a few cases (in bold), unusual results.

	GDP PER CAPITA $, PPP, 2014	HUMAN DEVELOPMENT INDEX RANK 2013	INEQUALITY-ADJUSTED HDI RANK 2013	GENDER INEQUALITY RANK 2013
Norway	$55,400	1	1	9
Australia	43,000	2	2	19
Switzerland	54,800	3	4	2
Netherlands	43,300	4	3	7
United States	**52,800**	**5**	**28**	**47**
Germany	39,500	6	5	3
Canada	43,100	8	10	23
South Korea	33,200	15	35	17
Japan	37,100	17	23	25
Slovenia	**27,400**	**25**	**16**	**1**
Saudi Arabia	31,300	34	??	56
Russia	18,100	57	54	52
Iran	12,800	75	109	109
China	**9,800**	**91**	**??**	**37**
India	4,000	135	135	127
Niger	800	187	184	151

© RICHARD LEVINE/ALAMY

MILKEN INSTITUTE

Changing the World in Innovative Ways

VIDEOS

http://www.milkeninstitute.org/videos/

Milken Institute Events

From our flagship event, the Global Conference, to summits in Asia and London, to briefings in Washington, we bring together leaders with diverse expertise from across sectors and industries.

Videos from hundreds of panels featuring leaders from some of the world's top firms, organizations, universities and governments are available to view online.

www.milkeninstitute.org/events

Asia Summit
Lunch Program: China Today and Tomorrow

London Summit
Global Overview: Geoeconomics vs. Geopolitics

Partnering for Cures
The Future of Medical Innovation

California Summit
Training the 21st Century Workforce

Global Conference
Women: Key Players in High-Growth Investment Strategies

CLAUDIA GOLDIN
On closing the gender pay gap.
The key is flexible work schedules.

LARRY FISHER
On hydrogen-powered cars.
Miracles sometimes happen.

FRANK ROSE
On the Internet battle for eyeballs.
Time is the scarce resource.

PALLAVI AIYAR AND CHIN HWEE TAN
On comparing the Indian and Indonesian economies.
More alike than you think.

THOMAS HEALEY AND CATHERINE REILLY
On the coming global pension disaster.
Pay now or pay later.

TOMAS PHILIPSON
On financial engineering for pharmaceutical R&D.
Managing risk with derivatives.

MARSHA VANDE BERG
On China's high-wire act.
Reform or growth – must they choose?

ALLEN SANDERSON AND JOHN SIEGFRIED
On the NCAA monopoly.
Pay players what they're worth.

BILL FREY
On neighborhood desegregation.
The bonus from diversity.