

FOURTH QUARTER 2017

# ECON FOCUS

FEDERAL RESERVE BANK OF RICHMOND



## Medicine Markup

Americans pay a lot for prescription drugs.  
Does that mean we pay too much?



Apprentices Among  
the Robots

Following in the  
Family Footsteps

Interview with  
Jean Tirole

# ECON FOCUS

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*Econ Focus* is the economics magazine of the Federal Reserve Bank of Richmond. It covers economic issues affecting the Fifth Federal Reserve District and the nation and is published on a quarterly basis by the Bank's Research Department. The Fifth District consists of the District of Columbia, Maryland, North Carolina, South Carolina, Virginia, and most of West Virginia.

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# MESSAGE FROM THE INTERIM PRESIDENT

## The Richmond Fed and Urban Economics

As I've shared before in this space, the Richmond Fed has a deep and long-standing interest in understanding the constraints and opportunities in communities throughout our district. Recently, we have been investing additional resources in studying urban areas specifically.

Most economic activity takes place in cities. In the Fifth District, metro areas generated more than 90 percent of economic output in 2015 and were home to more than three-quarters of the population. Just three cities — Baltimore, Charlotte, and Richmond, where our three branches are located — account for 20 percent of our district's population and nearly one-quarter of its GDP.

Not all cities are the same, of course. Our region boasts some of the nation's most culturally and economically vibrant cities, but we also have cities suffering persistent decline. And even within relatively prosperous or fast-growing cities, there are pockets of entrenched poverty that policymakers have struggled to redress. These neighborhoods face challenges whose roots go back many decades and for which solutions do not seem to be near at hand.

OK, you might be thinking, but isn't urban economics outside the purview of the Federal Reserve? Isn't your job monetary policy? From the perspective of a regional Reserve Bank, however, studying our region is essential to conducting monetary policy. For example, what's happening in one area or one sector might be a harbinger of things to come for the economy as a whole. And national statistics such as the unemployment rate mask significant disparities between people in different areas of the country or different demographic groups. The fact that the economy added an average of 171,000 jobs per month during 2017 and the unemployment rate for the nation declined to 4.1 percent doesn't mean that people in rural West Virginia or inner-city Baltimore have an easy time finding jobs.

Moreover, monetary policy isn't the right tool to address these disparities. Effective monetary policy creates an environment conducive to economic growth and job creation, but it doesn't affect the many other real variables that influence when and where economic growth occurs — such as a region's initial endowments of land or natural resources, transportation patterns, changes in technology, or even changing tastes in where people want to live. Monetary policy is a blunt instrument — addressing the unique challenges facing any given city requires finesse.

In November, the Richmond Fed hosted a conference in Baltimore where some of the leading economists

in the field of urban economics shared their recent work. Developments in the field have enabled us to model cities mathematically in incredibly rich detail and make sure that any policy experiment is based on a city's current, specific reality. The work economists are doing today holds great promise for giving policymakers the tools to understand the consequences for a variety of stakeholders.

Of course, these are incredibly complex and difficult questions, and the solutions are likely to be years in the making. The Richmond Fed is proud to be playing some role in helping to advance the science of urban economics, and we are committed to that effort for as many years as it takes. But let me emphasize that we do not view our role as coming up with the "right" solutions or prescribing specific solutions to policymakers. Our role is as a convener and a disseminator; we want to bring together the best researchers (including our own economists, of course) and help get that research into the hands of policymakers so they can design the most effective solutions for their unique places and people.

This is my last column as interim president of the Richmond Fed. In June, I will be retiring after more than three decades with the Federal Reserve System. It has been my privilege to work with wonderful colleagues throughout the System and an honor to support the Fed's mission. In December, our Board of Directors announced that Thomas Barkin, a senior partner and chief risk officer at McKinsey and Company, had been selected as the Bank's new president and chief executive officer. Tom brings a wealth of management and financial experience to the Bank and has a strong legacy of promoting diversity and inclusion. He also has a keen understanding of the Federal Reserve from previously serving on the Atlanta Fed's Board of Directors. Everyone at the Richmond Fed looks forward to working with him to continue the Bank's service to the Fifth District and the country. EF



A handwritten signature in black ink that reads "Mark L. Mullinix".

MARK L. MULLINIX  
INTERIM PRESIDENT AND CHIEF EXECUTIVE OFFICER  
FEDERAL RESERVE BANK OF RICHMOND



**MARYLAND** — Medical supply manufacturer Medline announced in December 2017 that it will build a new 1.1 million-square-foot distribution center in Perryville. The Illinois-based firm's new facility will replace one in Havre de Grace. The center is expected to provide 200 new jobs over six years and, including the current workforce, will bring the total number of jobs to more than 300. Construction is expected to begin in 2018 with an opening in late 2018 or early 2019.



**NORTH CAROLINA** — In February, the newest session of the NC Farm School began giving guidance to farmers and aspiring farmers looking to start a new operation or diversify an existing farm. The four-month program consists of eight business planning seminars taught by experienced farmers and NC State University specialists who help students create viable business plans; it also offers tours of economically sustainable farms and introduces students to local agents who help them follow through with their plans and connect them to local resources. The program has been running since 2012 and is a partnership of NC State's Department of Agricultural and Resource Economics and NC State Extension.



**SOUTH CAROLINA** — In December 2017, Samsung announced a five-year partnership with the state, Clemson University, and the University of South Carolina to advance high-tech manufacturing research and development. The R&D program, named the Palmetto Consortium for Home Appliance Innovation, is designed to foster innovation and collaboration while developing a new generation of manufacturing professionals in South Carolina. Research is expected to occur in consumer electronics, energy efficient technology, sensor technology, and other areas.



**VIRGINIA** — The first U.S. manufacturing plant of American Merchant will be located in Bristol, the company announced in December 2017. American Merchant is a newly formed subsidiary of Hong Kong-based home textile manufacturer Merchant House International Ltd. Merchant House will invest \$19.9 million in the new textile plant, which will focus on home décor products. It is expected to bring more than 400 jobs to the region, with funding for employee training being provided by the Virginia Jobs Investment Program. American Merchant says it hopes to start production in early 2019.



**WASHINGTON, D.C.** — At the end of 2017, D.C.'s office leasing activity was 43 percent below its 10-year average, according to the Washington, D.C. Economic Partnership's 2017-2018 Development Report released in mid-December. The report found that the main reason for the slowdown was lower federal government leasing, likely due to a large reorganization occurring at the General Services Administration. A steep decline in new leases for co-working spaces was also a contributing factor. In 2017, there were 198,000 square feet leased to co-working spaces, as opposed to 380,000 square feet in 2016.



**WEST VIRGINIA** — An opioid crisis is engulfing the nation, and economists at West Virginia University say it is the biggest inhibitor to the state's economy. In November 2017, the university's Bureau of Business and Economic Research estimated that the opioid crisis is responsible for a \$1 billion void in the state's economy. That figure includes productivity loss from deaths and reduced productive hours and the cost of resources such as substance abuse treatment and law enforcement. West Virginia has been one of the hardest-hit states in the nation, having the most opioid overdose deaths per 100,000 people in 2016.

## Too Many Co-Authors?

BY RENEE HALTOM

No matter how you measure it, economists are collaborating more than they used to. Nearly all published economics research articles were solo authored in the 1940s. The share is now about a quarter, according to a recent analysis, while articles with three or more authors have reached about a third of the total. In the top journals, just one-fifth of papers are written alone. A recent byline in the *American Economic Review* featured no fewer than seven names.

The increasing ease of communication has played a central role. But that aside, what caused the burgeoning of co-authorships, and does it matter for the profession?

A likely factor is that papers have become multifaceted. Even macroeconomic papers feature “micro-foundations” in which people and firms are modeled to have complex, rational preferences that are then mapped to real-world data. The data have become exceptionally abundant and the analysis requires significant econometric and programming expertise. Often a subset of co-authors specialize in that part alone. Other co-authors may become involved in the project to acquire data or funding.

The profession’s growing competitiveness may also be a catalyst. Publications and citations are primary measures of influence and productivity, yet the acceptance rate of the top five economics journals has plummeted from 15 percent to 6 percent since 1980. So if a researcher can co-author three papers submitted to three journals, the chances of gaining stature may be improved over working on a single-authored paper submitted to just one journal.

In principle, the profession could adjust rewards accordingly — say, giving a duo-authored paper half as much credit as a solo-authored paper on an economist’s curriculum vitae. But in a recent survey of 47 economics department chairs, Stan Liebowitz at the University of Texas at Dallas found that a dual-authored paper got about 89 percent the value of a single-authored paper on average.

Is this a bad thing? Co-authoring should make a paper better, especially when one can choose co-authors based on gains from trade rather than proximity. Economist Daniel Hamermesh has documented that adding co-authors steadily increases citation counts for the top journals, though less than proportionally. In such conditions, Liebowitz argues, insufficient proration will lead to too many authors and less research produced. But co-authorship may also be an investment in future productivity if it transfers skills, nurtures a professional relationship, or confers stature to the less prominent members of the team.

One way co-authorship could be costly is if it hindered the ability of the market to infer the productivity of individual researchers. Unlike many hard sciences, the

standard in economics is to list authors alphabetically, making it potentially hard to discern individual contributions or lead roles.

But those in charge of hiring and promotions often have ways of ascertaining productivity. “The number of co-authors is still small enough that those in the know can quickly parse out who did what,” says Gilles Duranton, chair of the real estate department at the University of Pennsylvania’s Wharton School. “If a junior person previously solo authored two great papers that published nicely and captured the attention of a senior person they later co-author with, that suggests greater credit. But if they write with famous person X on the exact research agenda of famous person X, the credit may not be as high.”

Fuzzy market signals could be costlier in some cases than others. Research by Harvard University Ph.D. candidate Heather Sarsons found that male economists get more credit toward tenure for co-authored papers than female economists; women got equal credit only when they co-authored with other women. To the extent that women are systematically presumed to have contributed less than male counterparts, the co-authorship trend could prevent women from advancing. Sarsons’ finding has become part of an ongoing discussion about women in economics.

In the critical early years of one’s career, it may be worth authoring alone so there is no uncertainty about from whom the innovations stemmed. Solo authorship is most common in the years just following graduate school, when researchers most need to prove their academic credibility. At the same time, if one persistently writes alone despite the falling logistical costs to collaboration, it could signal an inability to work well with others.

In fact, the costs and benefits of co-authorship seem increasingly to depend on the stage of one’s career. Because of large fixed costs in accessing and preparing data, the professional path for economists may increasingly entail some years spent akin to a lab person in hard sciences, Duranton notes. Similarly, the demands on senior people are increasing. “There are some prominent people who publish a lot, but their main job is sensing the issues and basically organizing people to work together. This is obviously fundamental, but their contribution beyond the initial phase may be pretty limited.”

The economics profession is not alone: Co-authorship has increased across social sciences, especially in fields using experiments, large datasets, complex statistics, and division of labor among researchers. Some hard sciences have implemented standards for the minimum contribution that warrants a byline due to perceptions of co-authorship run amok. No sign yet that economics will follow suit. **EF**

# Speeding Up Payments

Can payments be made to work faster, safer, and more efficiently?

BY TIM SABLİK

Businesses and individuals in the United States make more than 100 billion payments each year. Cash, credit cards, and debit cards are ubiquitous in retail transactions, the automated clearinghouse (ACH) handles recurring transfers like bill payments and payroll deposits, and consumers and businesses wrote nearly 20 billion checks in 2015.

For the most part, participants don't think twice about how any of these payments work. But as commerce has accelerated, some observers have begun to ask whether payments are stuck in slow motion. Consumers are now accustomed to receiving goods ordered online the next day or even within hours, and businesses can send information across distributed supply chains instantaneously via email or messaging systems. Over the years, advances in technology have sped up some aspects of the payment process, but for most noncash payment methods, final transfer of funds and settlement between participating financial institutions can take a day or more. Even newer options like mobile payments still rely on legacy payment networks built in a pre-Internet era.

Several other countries — including recently Singapore, Switzerland, and Mexico — have developed faster payment options that promise real-time or near-real-time transfer of funds. In 2015, the Fed expressed a desire for a faster, safer, and ubiquitous payment solution for the United States. That same year, it gathered together members of the payment industry into a Faster Payments Task Force, which in July 2017 released its final recommendations and some solutions proposed by the private sector.

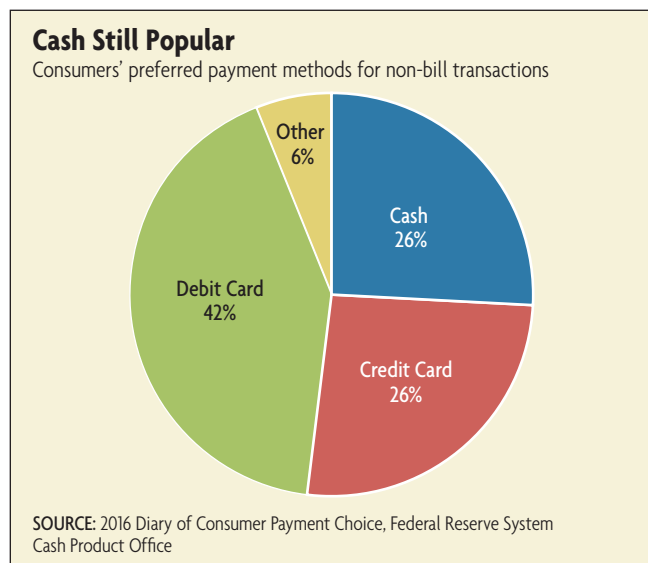
## What is “Fast”?

Just what is a fast payment? In many ways, physical cash is a perfect example. Every aspect of a cash transaction is settled immediately when the money physically changes hands between payer and recipient. The utility of this speed and finality may partly explain why rumors of cash's demise have been greatly exaggerated. According to preliminary findings from the Fed's Diary of Consumer Payment Choice, the number of U.S. notes in circulation has grown steadily since 1980. In 2016, there were \$1.43 trillion in notes in circulation. Large denomination bills are held both in the United States and abroad as a store of value, while smaller denomination notes continue to be used in over half of in-person payments under \$10. Cash was generally preferred by about a quarter of consumers for non-bill payments in 2016. (See chart.)

But in an increasingly digital economy, cash has some significant limitations. Paying for a purchase online with cash, while not impossible, requires additional steps. It is not surprising then that the number and value of noncash transactions has also continued to grow. Unlike cash, noncash payments go through two additional steps. The first step is broadly referred to as clearing. This is when the payment is authorized and the payer's and recipient's financial institutions exchange information. The clearing process confirms details about the transaction and verifies that the payer's account has sufficient funds to make the payment. Next, settlement occurs when funds are transferred from the payer's account to the recipient's and the transaction is complete.

To be sure, technology has sped up these steps over time. Originally, clearing for credit card payments required a phone call to the card-issuing bank that took several minutes to resolve, and the merchant had to manually imprint card information on a paper receipt. Now, those steps are handled in seconds using digital card readers.

Check payments, too, have gotten faster. Until the early 2000s, banks required receipt of the original check before settling check payments. The Fed had multiple check-processing sites in each of its districts handling thousands of checks shipped across the country. The Check Clearing for the 21st Century Act of 2004 (commonly known as the Check 21 Act) allowed banks to accept copies of checks in place of the originals, enabling faster processing and settlement. As a result of this greater efficiency, as well as declining check use generally, the Fed was able to consolidate its paper check-processing operations into a single location.



ACH, designed in the 1970s to also make check routing more efficient, has undergone a speed boost recently as well. NACHA, the organization that administers rules for the ACH network, is in the final phases of rolling out a same-day settlement option. For a fee, same-day ACH transactions submitted by certain times are settled later that day.

Despite advances like these, however, settlement for most noncash payments still typically takes at least a day and may take longer for some payment methods or transactions made outside normal business hours. (See table.) Further speeding up the process would bring significant gains, according to the final report of the Faster Payments Task Force.

### The Need for Speed

For individuals, faster settlement would provide a more accurate picture of the funds in their account. This could reduce the need for overdraft protection, as consumers could see fund availability in real time before making purchases. Faster payment settlement would also give individuals more flexibility with time-sensitive payments such as bills.

Faster settlement would allow funds from direct deposited paychecks to clear faster. (Some banks already credit recipients with funds from recurring payments before the transaction is fully settled, though this is not required.) This could benefit temporary workers in particular, allowing them to receive payment immediately upon completion of a job. Lastly, demand for a cash-like mobile payment method for person-to-person payments seems evident by the growth of third-party solutions such as Venmo and the recently launched Apple Pay Cash. Many of these solutions allow users to add funds to a digital wallet using a traditional payment method such as a payment card. They can then send those funds to other users' digital wallets instantly. But depositing funds into and withdrawing funds out of the digital wallet is still subject to the same settlement delays as traditional payment options.

A faster payment solution could hold a number of benefits for businesses as well. While check use has continued to decline since the mid-1990s, businesses still write an average of 24 checks a month, according to findings from the Fed's 2016 Payments Study. One driver of this is the need for recordkeeping. Current noncash payment options do not have robust messaging capabilities that allow businesses to send both payments and detailed invoice information together electronically. A new payments platform could offer better e-invoicing options. Additionally, adopting a messaging standard like ISO 20022, which is used in faster payment systems in other countries, could facilitate cheaper, more efficient global transactions.

With faster settlement, businesses would also face less risk that a transaction might be canceled or withdrawn after the business has already delivered goods or services

### Settlement Speed of Major U.S. Payment Systems

Payment Type	Settlement Speed
Wire	Immediate or at the end of the day
Automated Clearing House (ACH)	Next business day or same day
Debit/prepaid Cards	At the end of the day
Credit Cards	Within two days
Checks	Next business day

SOURCE: Faster Payments Task Force, "Final Report Part One," January 2017

to a customer. To be sure, to some parties and in some instances, the ability to reverse noncash transactions can be a feature rather than a bug. This raises an important question about faster payment design: How closely should noncash payments emulate the immediacy and irrevocability of cash?

### Settle Now or Later?

On a basic level, noncash payment settlement in the United States today functions similarly to how it did 200 years ago. In the 19th century, bank representatives would gather together at clearinghouses to settle accounts each day. This reduced the transaction costs of sending funds or representatives back and forth between numerous institutions and allowed banks to make one net deposit or withdrawal covering multiple transactions. Today, bankers may no longer have to physically gather in the same place to settle accounts, but payments are still collected and settled in batches at the end of the business day or some other predetermined period — a process referred to as deferred net settlement.

One way to speed up payments is to settle each transaction individually as it comes in, a method known as real-time gross settlement. The Fed actually pioneered the world's first real-time gross settlement payment platform in 1918: Fedwire. It is still used today to instantly transfer funds between financial institutions. But because access to Fedwire is limited and the fees associated with the service are high relative to other payment methods, it is generally used only for high-value bank-to-bank transactions.

There is nothing to say that real-time gross settlement couldn't be applied to retail payments, however. In fact, some countries, such as Switzerland and Turkey, have taken this approach with their faster payment systems. The benefit is that the entire transaction, from initiation to settlement, is completed all at once. This most closely resembles the speed and finality of physical cash. Indeed, of the final proposals presented by the Faster Payments Task Force, several of those featuring real-time gross settlement suggested using a digital currency such as a cryptocurrency.

Setting aside the practical and political questions about establishing a digital currency, there are other trade-offs to real-time gross settlement. In order to commit to settling each transaction as it occurs, payment service providers would need to keep more liquidity on hand to cover

all anticipated outgoing payments throughout the day. Under deferred settlement, liquidity needs are lower since institutions only need to send a payment if they have a net negative balance with another institution at the end of the settlement period. One way that countries with real-time gross settlement payment systems have attempted to mitigate this is by limiting the total value that users can send over the system in a given period.

In an effort to get the best of both worlds, several countries have taken a hybrid approach to faster payments by separating the transfer of funds from the settlement stage. For example, the United Kingdom's Faster Payments Service clears transactions in real time and the recipient's financial institution immediately credits the recipient's account with the funds from the payment. The actual settlement whereby the payer's institution pays the recipient's institution happens later during one of three settlement windows throughout the day.

This approach delivers faster payments from the perspective of users while maintaining more efficient net settlement between payment service providers. It does expose the recipient's financial institution to some degree of credit risk, however, since it must deliver funds to the recipient before actually receiving them from the payer's institution. To minimize this risk, transactions using this type of faster payment system are generally irrevocable once initiated.

### **One Solution or Many?**

In principle, countries are not limited to a single faster payment solution. In practice, however, economic forces may place limitations on the number of solutions that arise in the payments market.

Payment platforms are characterized by three features that may lead to market concentration: economies of scale, economies of scope, and network effects. Economies of scale exist when a producer's costs per unit fall as its production increases. Payment platforms have historically had high fixed costs but low or diminishing costs associated with each additional transaction.

Economies of scope exist when it is cheaper for one entity to produce several goods or services together. Payment platforms typically handle multiple stages of the payment process, from clearing to settlement, due to economies of scope. These forces tend to encourage market concentration, and historically this has been true of the payments market. For example, when the ACH network was first created, it had several operators; today, there are only two.

Network effects may also contribute to a concentrated payments market. Payment platforms are two-sided markets, meaning that a payment method needs to be both used and accepted by a large number of participants to be valuable as a means of exchange. For example, the more merchants who accept a particular payment card brand, the more valuable that card is to consumers because it can

be used in more places. Likewise, the more consumers who carry a particular kind of payment card, the more valuable it is for merchants to accept it, since doing so increases their opportunities to make a sale.

As researchers from the Federal Reserve Board of Governors, the Kansas City Fed, and the Boston Fed discussed in a 2017 paper, payment market concentration is not necessarily a bad thing. Having one or a small number of large payment operators can help ensure that payments are compatible and widely accepted across the country. Efficiency gains from economies of scale and scope can be passed on to users in the form of less costly payments. And it may be easier to enforce regulatory and security standards over a concentrated market.

On the other hand, the authors of the study also noted that user costs could be higher in a concentrated market due to a lack of competition, and some users might be underserved. Regarding innovation like faster payments, the authors found that the overall impact of market concentration is unclear. On the one hand, having market power gives a dominant payment operator incentive to innovate because it would reap all the rewards from a new offering. On the other hand, without competitive pressure, a payment operator may choose to maintain the status quo and continue profiting from existing technology.

The authors of the Fed study noted that technological advancements could reduce economies of scale and scope for payment processing, allowing a more decentralized market to emerge. This decentralization could result in more innovation driven by competition. On the other hand, it could lead to less efficient payments if the variety of systems are not compatible with one another, requiring consumers either to join multiple services or be left out — resulting in a lack of ubiquity in the new system.

Other countries have taken a centralized approach to driving faster payment innovation, with the government either building the new payment platform or mandating that the private sector develop one. The U.S. case is more complicated: There are multiple payment platforms in the country already and around 50 times more financial institutions than in some other developed countries. Additionally, the Fed is just one of several regulatory bodies with a stake in payments. So far, the Fed has tried to facilitate private action in the development of faster payments. Whether it will take a more active role would depend on the circumstances.

"We will be guided by current and potential market developments and challenges, as well as our long-established criteria for offering new products and services," then-Fed Gov., now Chairman, Jerome Powell said in an October 2017 speech. "These criteria include the need to fully recover costs over the long term; the expectation that the new service will yield clear public benefit; and the expectation that other providers alone cannot be

*continued on page 32*



# Student Debt vs. Homeownership

BY DAVID A. PRICE

**“Echoes of Rising Tuition in Students’ Borrowing, Educational Attainment, and Homeownership in Post-Recession America.” Zachary Bleemer, Meta Brown, Donghoon Lee, Katherine Strair, and Wilbert van der Klaauw, Federal Reserve Bank of New York Staff Report No. 820, July 2017.**

Student debt in the United States more than tripled between 2004 and 2016, increasing from \$360 billion to \$1.2 trillion. At the same time, homeownership rates of young Americans fell, with 31 percent of 30-year-olds owning a home in 2004 compared to 21 percent in 2016. In a recent paper, economists Donghoon Lee, Katherine Strair, and Wilbert van der Klaauw of the New York Fed, with collaborators at the University of California, Berkeley and Stony Brook University, studied whether there’s a connection between these two “unprecedented” developments.

The researchers analyzed individual-level data on borrowing and homeownership from the New York Fed Consumer Credit Panel, a large dataset based on credit report data from Equifax. They noted that over the period of their study, while the average total debt of young Americans declined slightly, the composition of that debt shifted dramatically: For the average American at age 30, home mortgage debt, auto debt, and credit card debt were all down (by 28 percent, 6 percent, and 36 percent, respectively), while student loan debt was up 174 percent. Their regression model indicated that rising student debt can account for between 11 percent and 35 percent of the decline in homeownership.

The authors observed that their results were consistent with a number of national surveys in which large shares of young adults reported that student debt was an obstacle to their buying a home.

**“Response of Consumer Debt to Income Shocks: The Case of Energy Booms and Busts.” Jason P. Brown, Federal Reserve Bank of Kansas City Research Working Paper No. 17-05, May 2017.**

Domestic production of oil and gas in the United States climbed around 40 percent from 2000 to 2015, and drilling of new wells almost tripled. With the surge in production came growth in employment and incomes in the affected regions. In addition, the changes in the market brought new or increased income streams from royalties on mineral rights. Unfortunately for the households involved, the boom was followed by a bust in prices and, in turn, by a drop-off in the drilling of new wells and by widespread layoffs in the industry. Jason Brown of the Kansas City Fed has

examined how consumers in oil- and gas-producing areas changed their borrowing during the boom years.

Using data from the New York Fed Consumer Credit Panel, Brown determined that increased drilling of wells in a county was associated with large increases in consumer debt such as credit cards and auto loans — presumably reflecting that consumers with rising incomes expected their higher income streams to continue. At the margin, each additional well drilled was associated with a \$6,750 increase in total consumer debt.

The effects varied depending on the extent of a county’s previous drilling development, however. In rural counties with little previous drilling, the increase in debt was much higher: \$23,000 per well in those counties versus \$5,900 in the rural counties with a more active history of well drilling. Brown suggested that this pattern could reflect “irrational exuberance that good times will continue indefinitely” in the areas with less previous exposure to the ups and downs of the industry.

**“Fintech Lending: Financial Inclusion, Risk Pricing, and Alternative Information.” Julapa Jagtiani and Catharine Lemieux, Federal Reserve Bank of Philadelphia Working Paper No. 17-17, July 6, 2017.**

So-called “fintech” lenders — online-only alternative lenders — often rely on mining nontraditional sources of credit information. Those sources may include social media accounts or sales information from companies such as Amazon or eBay. (See “Tomorrow’s Lenders?” *Econ Focus*, Second Quarter 2016.) Julapa Jagtiani of the Philadelphia Fed and Catharine Lemieux of the Chicago Fed have asked how lenders and consumers are faring under the new loan underwriting methods.

Jagtiani and Lemieux looked at individual-level data from the fintech lender Lending Club and the New York Fed Consumer Credit Panel. In addition, to assess how the effects of nontraditional lending varied with conditions in the local banking market, they looked at data on market concentration and brick-and-mortar bank branches from the Federal Deposit Insurance Corp.

The researchers found that the additional information sources used by Lending Club appeared to allow some consumers with low FICO scores to “be slotted into ‘better’ loan grades” and thereby receive lower interest rates. They further concluded that the nontraditional underwriting functioned well in identifying default risk and pricing credit accordingly. Finally, they found Lending Club was able to charge higher prices for loans in the most concentrated markets, where it had “more monopolistic power.” EF

# Price Gouging

BY HELEN FESSENDEN

As travelers and locals alike tried to get out of Hurricane Irma’s path over Florida last fall, social media buzzed with reports of “price gouging.” One of the best known was a call to boycott Delta Airlines by comedian Chelsea Handler, who told her nearly 8 million Twitter followers about a passenger who saw her quoted airfare suddenly jump from \$547 to over \$3,200 as she tried to lock it in. Although Delta and the passenger resolved the fare dispute amicably, the fact that this story lit up social media speaks to the broad public outrage over the practice of extreme price shocks during an emergency. To date, 34 states have laws that prohibit what they term “exorbitant” or “unfair” movements in price, and in Florida, more than 8,000 complaints were filed during and after Irma. To these consumers, the common thread was that these firms exploited dire circumstances to reap higher profits.

“Price gouging” is not, however, a technical term in economics. Even in those states where it’s illegal, the definition is often not quantified, and the penalties vary widely. Still, in popular parlance, cases of “price gouging” usually have several things in common. They typically occur during an unforeseen disaster or natural emergency that causes a supply shock, and they often involve essential goods such as food, water, or gas. Demand can spike as well, as people try to stock up on basics or find transportation out of the affected area. A well-known case with national scope was Hurricane Katrina in 2005, which crippled almost all of the Gulf’s refining and pipeline infrastructure, causing oil and gas disruptions thousands of miles away.

An opposing view from many economists is that such price hikes — while painful — actually make allocation more efficient during emergencies. They can compel consumers to conserve goods more carefully, and they allow firms to recoup any jump in transportation or production costs that might result from the disaster, encouraging them to maintain supply under difficult conditions. If the government were to cap prices, it might distort those incentives, exacerbate shortages, and encourage black-market activity. Furthermore, some examples suggest that it’s in fact quite difficult to distinguish excessive price markups from the standard market response to reduced supply and higher demand.

Hurricanes Katrina and Irma provide some insights into how complex this last question can be. In the case of Irma, the widespread outcry over airfare hikes prompted some airlines to set price caps, increase capacity, and

tap into additional help from extra workers sent by the Transportation Security Agency. There was a clear public stigma they wanted to address. Yet airfares, like most online prices, are set by algorithms rather than people, and one post-Irma study of airfare data suggested that the price movement of tickets showed a typical response to the shifts in supply and demand — similar to what would happen if you tried to book a flight on short notice before a major holiday. While the public viewed these fare hikes as “price gouging,” there may have been nothing unusual going on.

In the case of Hurricane Katrina, the supply effect on oil and gas was vast due to the Gulf’s position as a pipeline and refining hub. More than 90 percent of crude oil production was knocked out of operation, and gas prices at the pump jumped by an average of 40 percent, and more in some cases, especially in the Midwest and South. While one widely cited estimate concluded that a disproportionate retail markup of gas prices did occur (by around 40 percent), another analysis, issued by the Government Accountability Office, suggested that the rise in prices at the pump might have also reflected longer-term and external factors, such as foreign demand, in addition to the post-Katrina shortage. “The wide-ranging effects of Hurricane Katrina on gasoline prices nationwide are a stark illustration of the interconnectedness of our petroleum markets,” noted the report.

These examples point to the difficulties in determining the causes of extreme price movements. What’s clearer is that consumers still broadly support “anti-price gouging” laws, even if they know that price caps can lead to shortages. Some scholars have looked to behavioral economics to explain why these laws are popular. One explanation is that the perception of “fairness” has a market value of its own. For example, Harvard University’s Julio Rotemberg has suggested that whether consumers are directly affected by shortages or not, they derive satisfaction from knowing that firms can’t exploit affected customers by allowing prices to spike — even if price caps increase the risk of shortages. Looking at the seller’s side, Nobel laureate Richard Thaler of the University of Chicago argues that even in cases when a firm knows that capping prices isn’t optimal for its bottom line in the short term, it might balance those forgone profits against the risk of long-term costs of negative publicity that could result from becoming known as a “price gouger.” This calculation, in the firm’s view, might make self-restraint the better alternative. Or, as Thaler put it in a radio interview, “If you [tick] people off, you pay a price.” **EF**



ILLUSTRATION: TIMOTHY COOK

# RESEARCH SPOTLIGHT

## An Ounce of Prevention

BY HELEN FESSENDEN

Health care economists and policymakers have long focused on the role of prevention as a cost-saving investment. The 2010 Patient Protection and Affordable Care Act included, among other provisions, a requirement upon insurers that preventive care visits, such as checkups and basic screenings, have no co-payment. But what about low-income patients who don't have access to regular care or health insurance? One assumption that economists have long studied is that such individuals are more likely to use emergency department (ED) visits to treat preventable or chronic conditions. Such visits are not only far more costly, but less efficient in that they typically don't address long-term, follow-up care to handle conditions that can take months or years to treat. Whether the uninsured actually have more ED visits is another question; in a 2017 article in the journal *Health Affairs*, for example, researchers at the University of Chicago, Harvard University, and MIT found that the insured and uninsured tend to rely on emergency rooms with the same frequency and for similar kinds of care.

A broader question is whether improved access to primary care for at-risk groups is in fact one way to potentially reduce ED visits and ultimately drive down health care spending. In previous research, Cathy Bradley of the University of Colorado, Denver, David Neumark of the University of California, Irvine, and Lauryn Saxe Walker of Virginia Commonwealth University found that small incentive payments to low-income patients increased the chance that they would see a primary care provider (PCP). In a recent National Bureau of Economic Research paper, they have expanded on that study to look at whether such patients are also more likely to follow up after those first visits, whether ED visits fall, and whether overall health care spending is affected. To do this, they compared three groups — those receiving a free visit; a free visit plus a \$25 incentive payment; and a free visit plus \$50 — to a control group to assess health care use over 12 months and the resulting costs. They also divided the study into two six-month periods to analyze the results over time.

In terms of encouraging both PCP and follow-up outpatient or specialty care, the researchers found that the cash bonuses were tied to more visits across the two incentivized groups compared with the control group, especially in the

first six months. And the higher the incentive amount, the less time it took for the patient to schedule the first PCP appointment. But these increased visits didn't coincide with a drop in ED visits in those first six months. This finding seemingly runs against the assumption that increased access to primary care lowers overall ED use.

In the second six months of the study, the researchers noted several shifts. The number of PCP and follow-up outpatient or specialty visits fell among the cash-incentive groups, but it was still higher than visits among the control and \$0 groups. This time, ED visits slightly dropped in all the

three experimental groups compared with the first six months, regardless of the incentive sum — suggesting that participation in the experiment, not the dollar amount, might be a determining factor. Nonemergency ED visits also fell slightly.

As for the effect of all these extra primary care visits on health care costs, however, the results pointed to more spending,

not less. This jump was especially pronounced in the first six months, in which the control group's median per capita health care outlay was \$2,398, compared with \$3,394 for the three experimental groups. Spending fell across the board in the second half of the year, but it was still higher for the three treated groups (\$1,016) than the control group (\$582). In short, the jump in PCP visits and follow-up care didn't yield savings in that first year.

That said, the researchers cited several limitations to their study. One is that it was confined to 12 months, whereas many chronic health conditions can take longer to treat or manage. Another is that the jump in PCP and other visits in the first six months might simply reflect pent-up demand after years of irregular or inadequate care among the study's subjects. A related point, they noted, is that the increase in PCP visits was driven primarily by the less-healthy patients, who, in turn, would likely need more follow-up outpatient and specialty treatment — and therefore require more spending — in any event once they saw their PCP.

“In a low-income previously uninsured sample with poor baseline health, small cash incentives are effective at encouraging a PCP visit and perhaps effective at leading to a longer-term relationship with a PCP and fewer non-emergent ED visits,” the authors concluded. But this outcome, they cautioned, “may result in higher health care costs in the short-term.”

EF

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Cathy J. Bradley, David Neumark, and Lauryn Saxe Walker. National Bureau of Economic Research Working Paper No. 24100, December 2017.



# Medicine Markup

Americans pay a lot for prescription drugs. Does that mean we pay too much?

By Jessie Romero

**D**iabetics rationing their insulin because they can't afford the full dose. Senior citizens choosing between filling their prescriptions and buying groceries. Parents hoping an expired EpiPen will still work if their child has an allergic reaction.

Stories about Americans unable to pay the high cost of prescription drugs are not new. But in recent years, drug prices have drawn increased attention from policymakers on both sides of the aisle, prompted by the advent of expensive new treatments for Hepatitis C, cancer, and other illnesses, as well as steep price increases for existing treatments such as EpiPens and insulin. Prices look especially high when compared to those in many other developed countries, particularly in Europe.

In theory, the lack of drug price regulation in the United States stimulates innovation: The potential for high returns is why pharmaceutical manufacturers (and their investors) are willing to fund risky and expensive research. In practice, however, there are reasons to believe that the large revenues pharmaceutical companies earn from the U.S. market reflect not just the value of the innovations the companies have provided, but also the efforts those companies have expended to circumvent competition.

There are several reasons policymakers may want to ask to what extent drug pricing leads to an efficient distribution of resources. Prescription drug spending totaled nearly \$330 billion in 2016, 1.8 percent of GDP, and the government paid for more than 40 percent of it. More generally, drug spending and health expenditures overall affect both sides of the Fed mandate to support maximum employment and price stability. Health care spending totals 18 percent of GDP and health care is the third-largest employment sector. In addition, medical spending can alter the behavior and overall level of inflation. "The U.S. [pharmaceutical] system performs well when competitive forces are

strong,” wrote Fiona Scott Morton and Lysle Boller of Yale University in a 2017 paper. But when manufacturers can earn high profits by weakening or sidestepping competition, “the system no longer incentivizes the invention of valuable drugs. Rather, it incentivizes firms to locate regulatory niches where they are safe from competition on the merits with rivals.”

### Americans Pay More for Drugs

“Price” is not a straightforward concept in the pharmaceutical industry. Manufacturers sell drugs to wholesalers, who distribute them to pharmacies and mail order prescription services, who then distribute them to patients according to the reimbursement plans established by insurers and pharmacy benefit managers. At each step along the way, buyers and sellers negotiate substantial — and confidential — rebates and discounts. As a result, the published list price is generally much higher than what patients actually pay, although that is less true for patients with a high-deductible insurance plan or no health insurance at all.

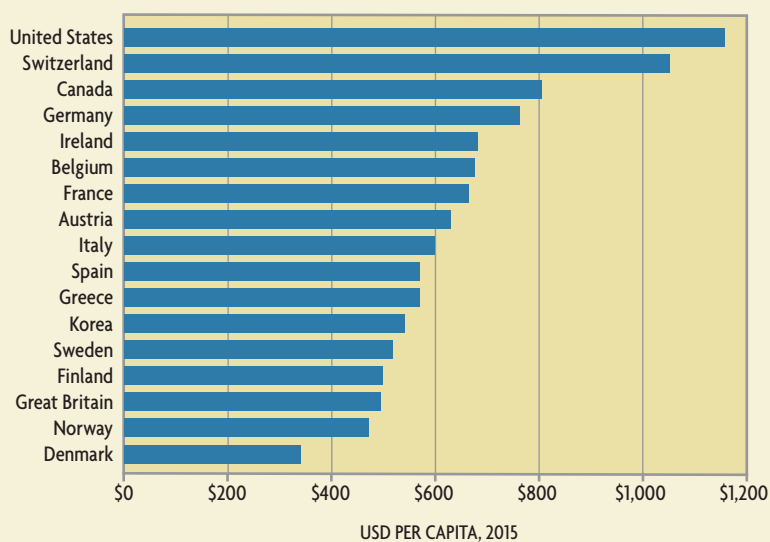
Even taking those discounts into account, which researchers can do by comparing sales data to list prices, Americans pay more for many prescription drugs. Net prices in the United States for the country’s 20 highest-selling drugs averaged more than twice the list prices in four other developed countries in 2015, according to research by Nancy Yu and Peter Bach of the Memorial Sloan Kettering Cancer Center and Zachary Helms, formerly a project coordinator at the center.

A Bloomberg analysis found similar results. In 2015, the cholesterol pill Crestor cost \$86 per month after discounts in the United States versus list prices of \$41 in Germany, \$32 in Canada, and \$20 in France. Humira, which treats rheumatoid arthritis, cost \$2,505 per month after discounts in the United States but listed for just \$1,749 in Germany, \$1,164 in Canada, and \$982 in France. Partly as a result, per capita drug spending in the United States far exceeds per capita spending in other developed countries. (See chart.)

Prices are higher in the United States for many medical goods and services, not just prescription drugs, and by some measures drug spending has remained on par with overall medical spending. According to data from the Centers for Medicare and Medicaid Services (CMS), for example, drug spending has fluctuated around 10 percent of total health care spending since the early 2000s. Other measures paint a different picture, however. According to the Bureau of Economic Analysis (BEA), drug prices increased nearly 70 percent between 2002 and the end of 2017, while prices for health care services increased 43 percent. In contrast to the CMS, the BEA data suggest that drug spending has increased from about 16 percent of health care services spending to 20 percent of spending over the past 15 years.

### Dollars for Drugs

Higher drug prices contribute to higher per capita drug spending in the United States



NOTE: Per capita spending refers in most countries to “net” spending, i.e., adjusted for possible rebates. Data include spending on over-the-counter drugs. Data exclude pharmaceuticals consumed in hospitals or other health care facilities.

SOURCE: Organisation for Economic Co-operation and Development

### Do High Costs Justify the High Prices?

Developing new drugs is risky. Researchers may test thousands of molecules before they identify a compound with the potential to be a new drug. Of the few compounds that do proceed to the first phase of human clinical testing, only about 10 percent go on to gain Food and Drug Administration (FDA) approval.

It’s also expensive. Pharmaceutical companies spend about \$1.4 billion on average to research and test an entirely novel drug, or “new molecular entity,” according to a 2014 estimate by researchers at Tufts University’s Center for the Study of Drug Development (CSDD). Including the cost of capital and the costs of failed drugs, the total price tag rises to \$2.6 billion. The last estimate the CSDD released, in 2003, put the cost of a new drug at \$800 million; the authors attribute the difference largely to the increased cost and complexity of clinical trials.

The CSDD study, which was based on survey data from 10 multinational firms, might overstate the cost of developing the typical drug, as new molecular entities are only a small share of the drugs that come to market. Most new drugs are variations on existing molecules and thus far less costly to develop. Also, the study includes only drugs that were first developed in-house — but increasingly, large multinationals license drugs from the smaller biotech firms that conduct the initial research. Other research suggests new drugs can be developed for less than \$1 billion.

Whatever the actual cost of each new drug, there’s no doubt pharmaceutical companies spend a great deal of money on research and development. In 2015, U.S.-based manufacturers spent \$75 billion on R&D, according to the Pharmaceutical Research and Manufacturers of America, a trade group, and they had higher R&D intensity (the ratio

of R&D to revenues) than other sectors. The National Science Foundation calculated that R&D intensity among pharma companies was 12.9 percent in 2015, compared to 9.8 percent in computer products, 8.5 percent in aerospace, and 6.7 percent in chemical manufacturing.

While high R&D spending is often used to explain high drug prices, there is a flaw in that reasoning, says Margaret Kyle, an economist at MINES ParisTech and a visiting professor at Northwestern University. “The causality is reversed. Pharmaceutical companies expect high prices, which allows them to justify making very large investments — rather than giving them greater incentive to look for ways to lower their costs by, say, running clinical trials more efficiently.”

In addition, the revenues pharmaceutical companies earn from high U.S. prices far exceed their R&D investments, according to Yu, Bach, and Helms’ research. They contend this pokes holes in the argument that high prices are necessary to cover high costs. For the 20 top-selling drugs in the United States, they compared revenue earned in the United States to the revenue earned in several European countries and Canada. The premium earned in the United States by U.S. net prices being higher than other countries’ list prices totaled \$116 billion. Only about two-thirds of that “excess” revenue was spent on global R&D.

But revenue earned today is the result of past investments, and there is no guarantee that today’s investments will yield the same returns. In fact, after increasing 290 percent between 2010 and mid-2015, the S&P pharmaceutical stock index fell nearly 30 percent over the subsequent two and a half years. (In comparison, the S&P 500 index increased 111 percent between 2010 and mid-2015 and has risen an additional 32 percent since then.)

Research suggests that the returns from pharmaceutical R&D are declining. In a 2015 article, Ernst Berndt of the Massachusetts Institute of Technology and several co-authors from the IMS Institute for Healthcare Informatics calculated net economic returns for drugs launched between 1991 and 2009. They found that the average present value for lifetime sales for drugs launched between 2005 and 2009, the most recent cohort studied, had declined to less than \$3 billion from more than \$5 billion for the 2000-2004 cohort. “If this level of diminished returns persists,” the authors concluded, “we believe that the rewards for innovation will not be sufficient for pharmaceutical manufacturers to maintain the historical rates of investments needed to sustain biomedical innovation.”

### The Government’s Role in Prices

France made headlines in 2014 when its government negotiated a price of about \$51,000 for a 12-week course of Sovaldi, a breakthrough drug that cures Hepatitis C, by threatening to tax drug makers if the health ministry’s costs exceeded a certain level. In the United States, the list price for the same treatment was \$84,000, a difference that many

attributed in part to the increased negotiating power that comes from having a single-payer health care system.

The U.S. government does pay a significant portion — roughly 42 percent — of the country’s prescription drug costs through Medicare, Medicaid, the Department of Veterans Affairs, and other insurance programs. But the market is still highly fragmented: In 2018, there will be nearly 800 stand-alone prescription drug plans available to seniors through Medicare Part D, for example. (In previous years, there have been more than 1,000 available plans.) The insurers who provide these plans can negotiate with drug manufacturers, but the 2003 law that created Part D also barred Medicare itself from doing the same.

In some circumstances the government does intervene in pricing. The federal 340B program requires drug manufacturers to give discounted prices to certain hospitals and other facilities with a high proportion of low-income patients. In addition, Medicaid, the Veterans Administration, and the Department of Defense receive mandatory discounts and rebates and are allowed to negotiate for further reductions. Because these organizations’ discounts are based on the prices charged elsewhere in the market, however, some research suggests these rules have actually led drug manufacturers to raise prices overall.

At a national level, the United States is the only developed country that does not regulate drug prices in some manner. The primary objection to enacting such regulations, or to allowing Medicare to negotiate lower prices, is that such policies would reduce pharmaceutical companies’ incentive to innovate. “Without doubt, government-imposed price controls in the largest market in the world would seriously harm investment in the next generation of medical breakthroughs,” according to the Biotechnology Innovation Organization, a Washington, D.C.-based trade group.

The group cites research by Joseph Golec of the University of Connecticut and the late John Vernon of the University of North Carolina at Chapel Hill. In a 2010 article, they concluded that if the United States had price controls similar to those in Europe, 117 fewer medicines would have been developed between 1986 and 2004. Other research has found a link between increases in market size and the number of new drugs targeted toward that market.

From that perspective, it’s possible U.S. consumers are funding innovation that benefits the rest of the world. “Particularly in smaller markets, it is tempting and individually rational for a government to free ride on high prices elsewhere,” says Kyle. “If you’re a small country, you know you’re too small to affect global innovation incentives, even if you double or triple your spending. Pharmaceutical companies are going to make the investment no matter what you do. So why incur the cost?”

It’s also possible, however, that Americans are paying for innovation that isn’t actually all that innovative. Many new drugs — as many as 70 percent, according to some estimates — are what detractors call “me-too” drugs.

These are treatments that have a different chemical mechanism but offer little or no clinical benefit over what's already on the market. If a decrease in expected revenue would mostly affect the development of me-too drugs, the effect on health outcomes might not be large.

### Profit Maximizing ...

A key assumption of microeconomics is that firms seek to maximize profit. But many people appear to find it distasteful for a company in the health sector to do so. For example, a Senate investigation after the introduction of the infamous \$84,000 Sovaldi criticized its maker, Gilead Sciences, for employing a pricing strategy

that "it believed would maximize revenue" rather than "fostering broad affordable access." (Despite the uproar, some health care economists believe Sovaldi represented a genuine breakthrough that could justify the high price.)

Pharmaceutical companies also have been criticized for what they do with their revenue. Much of it goes toward stock buybacks, according to research by William Lazonick of the University of Massachusetts Lowell and several co-authors. Between 2006 and 2015, the 18 pharma companies in the S&P 500 stock index spent \$261 billion to repurchase shares, more than half of what they spent on R&D. In Lazonick and his co-authors' view, these buybacks were a means to artificially boost the companies' earnings per share

## What About Generics?

Brand-name drugs typically get about 13 years of market exclusivity before they face competition from generic drugs. (Some of the initial 20-year patent term is taken up by clinical testing.) That competition has increased substantially in recent decades: Since 1994, the share of prescriptions filled with generic drugs has climbed from 36 percent to nearly 90 percent.

The generic industry got its first shot in the arm in 1984, when Congress passed the Drug Price Competition and Patent Term Restoration Act, commonly known as the Hatch-Waxman Act. Among other provisions, the law simplified the Food and Drug Administration (FDA) approval process for generic drugs. As generics became easier to manufacture and the quality improved, most states passed laws allowing pharmacists to automatically substitute generic for brand-name drugs unless the doctor specifies otherwise. Insurance companies promote generic drugs by charging lower co-pays for them or sometimes by not covering brand-name drugs if an equivalent is available.

Once multiple competitors have entered the market, the generic version of a drug sells for about 85 percent less than the brand-name version. Within a year of a generic entry, the branded drug's market share declines from 100 percent to 16 percent or less, according to research by Henry Grabowski, professor emeritus at Duke University, and Genia Long and Richard Mortimer of Analysis Group, an economic consulting firm. The IMS Health Institute estimates that generic drugs saved the U.S. health care system \$1.67 trillion between 2007 and 2016.

Brand-name manufacturers can employ a variety of strategies to try to retain their market share. For example, it's common for pharmaceutical companies to file additional patents for new versions of existing drugs by asserting the new version is clinically superior in some way, such as requiring fewer doses or having fewer side effects. Firms also can seek "orphan drug" status for an existing drug if it can be used to treat a rare disease,

which creates an additional period of market exclusivity. Critics view these follow-on drugs and orphan drug applications as attempts to curtail competition by gaming the system.

Sometimes, branded drug manufacturers just pay generic manufacturers to stay out of the market. These "pay-for-delay" agreements aren't necessarily illegal, although in 2013 the U.S. Supreme Court upheld the Federal Trade Commission's (FTC) ability to challenge them on antitrust terms. (In 2009, the FTC had filed a complaint against Solvay Pharmaceuticals for paying generic manufacturers as much as \$40 million per year to delay launching a testosterone treatment for nine years.) Pay-for-delay has become less common since the court decision, but it hasn't gone away. In 2015, the last year for which the FTC has released data, manufacturers struck 14 agreements affecting drugs worth about \$4.6 billion in sales.

The FDA allows citizens to file petitions when they have concerns about a product's safety. In recent years, more than 90 percent of the "citizen petitions" related to generic drugs actually have been filed by competitor companies. Even if the FDA ultimately denies the petition — which it usually does — the investigation can delay a generic drug's approval for several months. In the case of a blockbuster drug, those few months can be worth hundreds of millions of dollars to the brand-name manufacturer. Last year, the FDA implemented new rules designed to limit the potential abuse of the citizen petition system.

Generic drug manufacturers may have engaged in questionable business practices themselves. At the end of 2016, the attorneys general of 45 states and the District of Columbia filed a lawsuit against six generic drug manufacturers, alleging they had colluded to divide customers and fix prices. In October 2017, the AGs named 12 more companies and two individuals in the suit.

— JESSIE ROMERO

— and thus boost executive compensation that depended on share price. But firms repurchase shares for many reasons, and the practice is not unique to pharmaceutical companies; Lazonick and his co-authors also found that the vast majority of the companies in the S&P 500 spent a similar share of their net income on stock repurchases.

The fact that marketing expenses at the largest firms typically exceed R&D budgets by billions of dollars is often cited as proof that “Big Pharma” has its priorities misaligned. But “economic theory does not tell you that the amount spent on pharmaceutical R&D should exceed that spent on marketing,” says Joseph DiMasi, director of economic analysis at Tufts’ CSDD and one of the authors of the cost study. “Few if any other industries spend more on R&D than on marketing.” In addition, notes Kyle, “the value of an innovation is higher the more people are aware of and purchase the innovation. There’s no point spending money to develop a drug if no one knows about it and no one takes it.”

### ... or Profiteering?

Pharmaceutical prices in the United States might reflect the high costs of drug development and provide necessary incentives for innovation. But they might also reflect pharmaceutical companies’ attempts to avoid competition — for which the U.S. legal and regulatory framework provides multiple opportunities.

One such opportunity lies in the opacity of the distribution system. Pharmacy benefit managers typically negotiate large rebates for drugs and keep an undisclosed portion of those rebates for themselves. That might give manufacturers an incentive to raise their list prices in order to offer benefit managers more attractive rebates and earn a preferential space in their formularies. That’s what the three makers of insulin — Sanofi, Novo Nordisk, and Eli Lilly — are alleged to have done in a class action lawsuit filed at the beginning of 2017. Insulin prices increased nearly 300 percent between 2002 and 2013, despite the fact that the drug has been produced commercially since 1923.

Pharmaceutical companies also have been accused of exploiting the Orphan Drug Act, a 1983 law that encourages drug manufacturers to develop treatments for rare diseases by offering tax credits and extended market exclusivity. An investigation by Kaiser Health News published in January 2017 found that one-third of the 450 orphan drug approvals granted by the FDA since 1983

were for previously approved mass-market drugs that had been reclassified with a new use, or for drugs that had received multiple orphan designations — and thus multiple incentive packages. Drug makers may also use orphan drug status to delay the entry of generic competitors. (See sidebar.) Since Kaiser published its report, the Government Accountability Office has announced it will investigate the orphan drug system, and the FDA and Congress have begun closing some loopholes.

Taking advantage of existing laws or spending money on politics may not be inherently problematic. But economists tend to be especially wary of the latter when it takes the form of rent seeking, the economic term for attempting to acquire excess profits through political means. Not only is such behavior likely to result in inefficient policies, the money spent on lobbying or campaign donations to influence regulation is money that could have been spent on productive uses — such as developing new drugs.

Between 1990 and 2016, the pharmaceutical industry donated \$185 million to political candidates, political action committees, and other political groups, according to data compiled by the Center for Responsive Politics. Contributions increased from \$9.1 million in the 1998 cycle to \$19 million in 2000 and \$21.3 million in 2002. Many observers believe the pharmaceutical industry was instrumental in adding the ban on Medicare negotiations with drug companies in the 2003 law.

Campaign contributions are dwarfed by the amount spent on lobbying, on which there are no spending restrictions. Since 2007, the pharmaceutical industry has spent about \$240 million annually on lobbying; in 2009, a year of intense debate about changes to the health care system, lobbying totaled more than \$270 million.

At least when it comes to politicians’ rhetoric, political spending might not be having much of an effect recently; lawmakers across the political spectrum have declared their intention to lower drug prices. But while that might sound desirable from the consumer’s perspective, it’s far from clear that lower prices across the board would be an efficient outcome, either. “We pay too much attention to the average price level and not enough to variation across drugs,” says Kyle. “Big breakthrough drugs don’t get the prices that are justified, but then we pay too much for drugs with only marginal benefits. Aligning pricing with clinical benefits would create better incentives for innovation and make better use of our health care resources.” **EF**

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# Following in the Family Footsteps

When children enter a  
parent's profession,  
they probably aren't doing  
it blindly — they may have  
smart economic reasons

By David A. Price

Historically, the phenomenon of children entering their parents' careers — following in their parents' footsteps — was perceived as a social ill. It was a sign that the children were trapped by barriers keeping them out of other occupations and relegating them to reliving the work lives of their parents.

"It was interpreted as a negative in the sense that it represented children not being able to escape the occupation that their parents had," says David Laband, a retired Georgia Tech economist who has studied footstep-following extensively. "It reflected what we might call occupational immobility."

But as it turns out, many of the fields in which footstep-following is relatively common are ones with lines of people clamoring to get in, including law, politics, medicine, and sports and entertainment. That's hard to square with the historical view. Is a woman who follows her mother or father into medical school, say, really doing so because it's her only alternative?

One sport among many with a lot of footstep-following competitors is auto racing. Among race drivers who drove NASCAR cup series races in 2005, almost a third were the son, brother, or father of another driver or former driver. Were Dale Earnhardt Jr. and Kyle Petty trapped by society into entering their fathers' occupation, NASCAR auto racing?

To be sure, some footstep-following workers — whether sports stars or upper-middle-class professionals — begin their careers with a head start thanks to privileged circumstances. But money, legacy admissions at elite universities, and other boons of privilege don't just help a doctor's child become a doctor: They confer advantages that help that child get in the door of any number of elite occupations, most of which don't require suffering through organic chemistry and residencies. While economic privilege confers advantages, privilege alone, researchers agree, doesn't account for the footstep-following decision.

What economists have long known is that footstep-following occurs more often than simple chance would predict and, moreover, that children following in their parents' footsteps enjoy a wage premium, on average, over those who don't. So what's going on?

## Human Capital Begins at Home

Among male attorneys, more than 10 percent have a father who is or was also an attorney, according to survey data. (See table on next page.) Studies going back to the 1950s have found extensive footstep-following in law. Laband, with co-author Bernard Lentz, then of Ursinus College, sought to shed light on why. They had access to data from a research effort called Project Talent, which gathered detailed information

## Where Following is Heaviest

Selected occupations ranked by prevalence of sons' footstep-following

Occupation	Percent of sons in occupation with father in same occupation	Percent of fathers in each occupation	Footstep-following index
Federal public administration	7.29	1.74	4.20
Carpenter	14.39	2.72	5.29
Electrician	10.18	1.07	9.53
Dentist	2.56	0.19	13.31
Plumber	12.50	0.85	14.65
Lawyer	10.16	0.57	17.83
Doctor	13.91	0.59	23.73
Economist	1.54	0.04	37.26
Legislator	3.55	0.01	354.06

NOTE: The footstep-following index is the percentage of sons with father in the same occupation divided by the percentage of fathers in that occupation. Values shown in the index column may differ slightly from the quotients due to rounding of the data. Higher index values indicate a higher prevalence of footstep-following. Data are from 1972-2004.

SOURCE: Ernesto Dal Bó, Pedro Dal Bó, and Jason Snyder, "Political Dynasties," *Review of Economic Studies*, January 2009, vol. 76, pp. 115-142, table 9.

from around 400,000 high school students from 1960 to 1973, including the students' knowledge of the law (as measured by a nine-question quiz) and how much they talked with their parents about their career plans.

Laband and Lentz found in a 1992 article that although sons of lawyers in general didn't know any more about the law than sons of nonlawyers, those who talked about their career plans with their parents did know more about law, on average. In the researchers' view, the data on children of lawyers having conversations with their parents about career plans seemed to be a good proxy for having parent-child conversations about law in general. When they looked at more than a dozen factors that might influence a child's enrollment in law school, they found — unsurprisingly — that having a lawyer parent was statistically significant.

What was surprising was that when they introduced variables related to transfer of human capital from parent to child, such as the conversations about careers, the statistical effect of having a lawyer parent went away. Sons who didn't have such conversations with their parents were no more likely to enroll in law school than anyone else. (This research, like much long-term research in the area of footstep-following, focused on sons because women professionals were relatively few during the study period.) Moreover, the same pattern held years later, at the time of law school graduation: Sons who graduated from law school had higher earnings in their first years out of law school if they had had the career conversations with their lawyer parents in high school compared with other graduates — those with lawyer parents and those without.

Presumably, the children who had the conversations in high school kept having them after high school.

Laband and Lentz concluded that the career conversations marked a transfer of human capital that gave the children a leg up in law school admissions and later in the job market. It isn't a new idea, and the legal profession isn't alone: The Cambridge economist Alfred Marshall noted in his textbook *Principles of Economics* in 1890 that "as years pass on the child of the working man learns a great deal from what he sees and hears going on around him."

Research has also found that transfer of human capital helps to explain why children of entrepreneurs are much more likely to become entrepreneurs themselves. Thomas Dunn and Douglas Holtz-Eakin, then of Syracuse University, looked at this phenomenon and concluded in a 2000 article in the *Journal of Labor Economics* that it wasn't simply a matter of the parents' money: Holding access to capital constant, Dunn and Holtz-

Eakin found that the pattern still held. The evidence suggested, they wrote, that "parents impart to their offspring entrepreneurial skills, as opposed to a taste for self-employment or a general knowledge of the business world."

For economists, "human capital" refers to the job-relevant skills of a worker or of the labor force as a whole. Often, the term is used as if it were synonymous with knowledge gained in a college classroom or the task-specific skills of a trade. But human capital also extends to so-called soft skills such as sociability, judgment, persistence, and attitudes toward risk-taking. Over the course of a modern 18-year-long childhood, parents have many opportunities to pass along this human capital, whether wittingly or unwittingly. And it seems to make a difference. For instance, research by Japanese economists Tsunao Okumura of Yokohama National University and Emiko Usui of Hitotsubashi University found that in the United States, sociability has a positive effect on wages — and that after controlling for other factors, fathers with higher people skills tended, whether by nature or nurture, to have sons with higher people skills, and those sons tended to earn more than others.

### The Family Brand

In addition to human capital, researchers have found, the financial returns to footstep-following may be boosted by brand-name capital. One high-profile example is that children of celebrities in sports and entertainment may be drawn to their parents' fields in part by the doors opened by the family name. Economist Peter Grootuis

of Appalachian State University has tested this idea statistically with regard to NASCAR and Formula 1 race drivers and found support for it.

Groothuis determined that as of 2005, some 10.3 percent of active NASCAR drivers were sons of NASCAR drivers — a pattern that had been more or less consistent over the previous two decades. After analyzing sponsorship deals and determining each driver’s “value of time on camera,” or VTOC, during a race, he and co-authors Kurt Rotthoff of Seton Hall University and Craig Depken of the University of North Carolina at Charlotte found in a 2014 article in *Applied Economics* that sons of former drivers were more highly valued by sponsors than other drivers were. “Being the son of a former driver increases a driver’s season-long VTOC by \$30.9 million,” they wrote — corroboration that “name-brand capital seems to transfer within a family.”

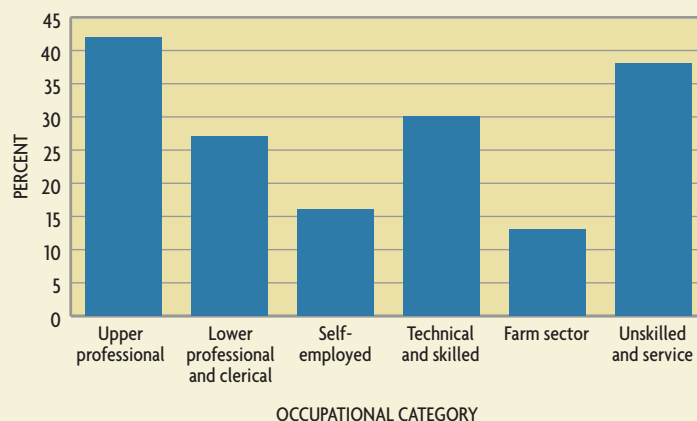
One way that the son of a famous driver may reap a return on his brand-name capital is that the early edge in name recognition could be critical to entering the sport in the first place. Entrance into a NASCAR event is determined in large part by whether a team owner will put the driver in a car — which, in turn, is determined in part by the sponsorship income the driver can bring the team. (Groothuis and his co-authors were not able to measure that effect separately, but he says it’s “consistent with our results.”)

In Groothuis’ view, the premium received by footstep-following race drivers comes from transfers of both brand-name capital and human capital. “We try to tease them out, but we believe they’re both taking place to some extent at the same time,” he says. “You grow up in the house, you know the racing, you know the community, you know the culture. It’s all there.”

Another area where the value of brand-name capital seems to contribute to footstep-following is politics. Over the period from 1789 to 1996, roughly 8.7 percent of members of Congress had a previous relative in Congress, according to a 2009 article in the *Review of Economic Studies* by Ernesto Dal Bó of the University of California, Berkeley, Pedro Dal Bó of Brown University, and Jason Snyder of the University of California, Los Angeles. They found that “dynastic” members of Congress, in their words — those from a family with a previous family member that was serving or had served in Congress — were less likely than others to have had any previous experience in public office and were more likely to represent the state they were born in. From this and other factors, the researchers inferred that these legislators benefited from name recognition and local political contacts. Brian Feinstein, now of the University of Chicago Law School, later analyzed U.S. House of Representatives races and found that such politicians enjoyed an electoral advantage between 0.72 and 7.90 percentage points in open-seat elections, holding other factors constant; he attributed this

### Following is Most Common at Top and Bottom

Percent of sons following fathers into same occupational category



NOTE: Includes men in General Social Surveys (1988-2004) born 1950-1979.

SOURCE: Emily Beller and Michael Hout, “Intergenerational Social Mobility: The United States in Comparative Perspective,” *The Future of Children*, 2006, vol. 16, no. 2, pp. 19-36, table 1.

pattern to transfer of human capital, access to donor networks, and brand-name advantages.

If the researchers are right about those advantages, it’s no surprise that many children growing up with politician parents find the family business attractive — in addition to values that the parents may have imparted as to what’s important in life.

### Where Daughters Follow

As career opportunities for women have opened, entry of daughters into their fathers’ occupations has increased, as well — from 6 percent for women born in 1909 to 20 percent for those born in 1977, according to a study by economists Judith Hellerstein of the University of Maryland, College Park and Melinda Sandler Morrill of North Carolina State University.

Although there is relatively little research on footstep-following by daughters, for the most part, as a result of low historical numbers of women in many professions, a new approach is yielding insight into how footstep-following may be different for women. Martha Stinson of the Census Bureau and Christopher Wignall of Amazon.com have used Census Bureau survey data in combination with Social Security records to build a picture of parent-child sharing of *employers*. The sharing of employers might or might not involve the sharing of an occupation, but it may be suggestive of similarities or dissimilarities in career paths.

Stinson and Wignall found that adult sons are more likely to share an employer with their father than adult daughters: By age 30, about 22 percent of sons shared their father’s employer (that is, worked for the same employer at the same time) compared with 13 percent of daughters. Their data also indicate how industry sectors vary along

*continued on page 33*



BMW's new body shop contains 2,000 robots.

# LEARNING IN THE FAST LANE

BMW's South Carolina plant is expanding its apprenticeship program in an attempt to grow a tech-savvy workforce

By Helen Fessenden

**D**ale Phillips, a night-shift maintenance supervisor at BMW's plant in Spartanburg, S.C., is busy balancing a full-time job with online coursework to complete a bachelor's degree in management. He oversees a team of equipment-services associates in the plant's paint shop, whose duties include preventing equipment breakdowns in the conveyors, lifts, pumps, and industrial robots. He says he never envisioned such a career until four years ago, when he started at the plant as an apprentice after spending most of his 20s and 30s as a grocery store manager.

"When I was 17 or 18, I was frustrated about what I was going to do after high school," explains Phillips. "I didn't have any guidance and didn't know how you prepare yourself for a good job. You just took whatever work you could find. But now I'm in a high-tech job, working as a supervisor. This is something I never even thought of."

Phillips is a graduate of the BMW Scholars program, an initiative that the company began in 2011 to secure a steady pipeline of high-skilled workers for its South Carolina operation. Modeled after European apprenticeships, it now trains about 35 workers a year in a partnership with local community colleges. Ninety-nine percent of them join the company full time upon completion, and that success rate is one reason why BMW is now planning to expand the program

to 200 a year. It's also part of a broader effort to ramp up hiring: By 2021, BMW is expected to add another 1,000 workers to its current workforce of 10,000, while it aims to add a fifth model to its production lineup, the new BMW X7.

BMW's use of apprentices — a practice common in many other countries but still unusual in the United States — is only one reason the plant stands out. It's also the largest auto plant in the firm's global operations and one of the longest standing foreign-owned automakers, operating in the South since 1994. (See "When South Carolina Met BMW," *Region Focus*, Second Quarter 2011.) About 70 percent of its vehicles are exported, with most going through the Port of Charleston, a logistical advantage that was key for BMW when it was scouting locations. But like many other carmakers, its operations are increasingly high tech, relying on robots for what was once manual labor and on humans for the more complex and digitized tasks. The goal of the Scholars program, says its manager Ryan Childers, is to train workers to learn the required mix of "soft" and "hard" skills.

"You need to function in a team environment with both robot and human co-workers," he says. "This requires electrical and mechanical training, often some algebra or statistics, and IT know-how. It's a new level of being multiskilled."

PHOTOGRAPHY: FRED ROLLISON

## Make Me a Match

Can the BMW Scholars experiment offer broader lessons for the United States? Spokesman Steve Wilson says the firm's overall worker retention rates are "very good," and he describes the Scholars program — which focuses on targeted and effective recruitment starting at the high school level — as one way to reduce the need to constantly replenish its skilled workforce. It's one approach that addresses a common and growing concern among firms in the region that a shortage of skilled workers is serving as an impediment to further hiring.

Both in academic research and at the policy level, apprenticeships are getting more attention as one possible solution to what is often termed a "skills mismatch" in the U.S. labor market, namely, a perception among employers that skilled labor is in short supply. The makeup of the U.S. job market has shifted in the last decade to reflect higher demand for workers with college education. According to the Bureau of Labor Statistics, over the last decade the share of employment in occupations requiring only a high school degree has fallen while the share of those requiring college has risen. One challenge, however, is that only around 70 percent of high school graduates go to college, and only around 57 percent of college freshmen complete their degree within six years; among students seeking certificates and associate degrees, completion rates are even lower. And more broadly, the rise in U.S. college attainment has been much more sluggish in recent years compared with the 2000s, especially among men.

Apprenticeships, as some economists see them, have several features that could help address skill mismatch. They can "fast track" workers (often from high school) to full-time employment in less time than a college education, as well as teach applied skills that are career-specific. And even though participating firms in "apprenticeship countries" often bear some upfront costs by paying for the apprentices' education, they can use the experience to better gauge potential over time before deciding to hire.

Harry Holzer, a senior fellow at the Brookings Institution and former chief economist at the U.S. Labor Department, points to another potential benefit of apprenticeships: They can train workers for what he terms jobs in "the new middle," ones that used to require only a high school degree but now demand more advanced technical and cognitive skills (such as health technicians and paralegals). In a 2015 paper, he concluded that the share of such positions among total jobs rose by 0.8 percentage point from 2000 to 2013, while the share of what he calls "old middle" jobs fell by 3.3 percentage points.

"If you look at sectors where employers have difficulty filling jobs, it's in health care, advanced manufacturing, IT, and transportation logistics," he says. "You don't need a college degree, but you do need something beyond high school. The 'old middle' jobs in fields like traditional manufacturing and clerical work do not. And that's where jobs are disappearing and wages are shrinking."

## Lessons From Abroad

Apprenticeships have long been established abroad, especially in Northern Europe. In those nations, upon high school completion, more young people — sometimes more than half of the total — choose apprenticeships over a university degree. While these programs vary from country to country, they typically require a young adult to apply to train with a firm upon graduation from high school. The apprentice then combines part-time work with part-time study at a local university and, over the course of three to four years, completes both the workplace training and the equivalent of an associate's degree; the combination of practical experience and coursework is known as the "dual system." The coursework relates directly to the job, and the trainee contributes to the firm's production and is paid, albeit at a low wage. The tuition is usually paid for by the state, the employer, or both.

When trainees in the dual system graduate, they become broadly employable because they secure a certification that is universally recognized in their field. These certifications encompass a wide range of middle-class jobs, often in technical or specialized professions. Many graduates are also offered a job at the firm, but the certification enables them to search beyond if they choose; in Germany, for example, about half take a job elsewhere.

Does this alternative to college make a difference in labor market outcomes? Economists who have studied the European job market note that youth employment rates are much higher in countries that have well-established apprenticeships — for example, Germany, Austria, and Switzerland — than in those that do not, mostly in the south. Those rates range between 40 percent and 60 percent of 15- to 24-year-olds in the former and between 15 percent and 30 percent in the latter, according to the Organisation for Economic Co-operation and Development (a gap that, to be sure, also reflects other differences among those economies). Young people in apprenticeship countries are also far less likely to be unattached under the OECD definition — that is, not working, studying, or training — than their counterparts elsewhere, often by a factor of two or more. In one recent study on the relationship between apprenticeships and youth employment in Germany, economists Regina Riphahn of the University of Erlangen-Nuremberg and Michael Zibrowius of the Cologne Institute for Economic Research found that apprentice graduates, by age 25, were more likely to be fully employed — by 30 percentage points — than those with neither training nor college with other factors held constant, including overall labor market conditions.

But the outlook appears much more mixed in the long run, according to economist Eric Hanushek of Stanford University. He warns that while apprenticeships can help boost youth employment by imparting specific vocational skills, they might not be useful in building general skills that involve cognitive reasoning, which can make workers more flexible when retraining is needed in the later years.



*Trainees in the BMW Scholars program at work in a robot training cell.*

In particular, he notes, this can be an issue when a worker has to adjust to new technologies. In terms of employment and earnings over a lifetime, he says, economists need to consider these factors rather than just look at the short run.

“It’s one thing to train young workers who can find initial jobs more easily, but my concern is with older people,” says Hanushek, whose research has found that labor market withdrawal among older men in Europe is more widespread among those who pursued apprenticeships or vocational tracks rather than the equivalent of American bachelor’s degrees. “We have yet to learn how we can provide incentives for workers to develop the general skills that make them resilient as the workplace changes.”

In a 2015 paper that Hanushek co-authored with economists Guido Schwerdt, Ludger Woessmann, and Lei Zhang, the authors noted that vocational- and apprentice-trained men had an employment and earnings advantage over those with university degrees until their mid-30s. But this declined and leveled off until about age 50 — at which point the college-educated group did better. In terms of the differences in lifetime earnings, however, the results varied across those countries, perhaps due to different long-run economic growth rates, the researchers wrote.

### **Moving On Up**

In the United States, large-scale apprenticeship programs are still rare enough that researchers don’t have much data to look at their long-run effects. According to a 2013 World Bank and International Labour Office study, only about 0.3 percent of the total U.S. workforce is in registered apprenticeships — about a 12th of the share in Germany. But some states, including South Carolina, have expanded “dual system” apprenticeships in recent years by building partnerships between colleges and firms and, in some cases, offering tax credits. Through the state’s “Apprenticeship Carolina” program, about 27,000 workers have been trained since 2007, including many at foreign-owned firms. Nationwide, there were about 505,000 registered apprentices in

2016, according to the U.S. Labor Department.

For its part, BMW has found ways to adapt the traditional model to the U.S. educational system. Although it’s had training programs in place since the plant opened, it formalized apprenticeships in 2011 with its BMW Scholars program, which it runs in coordination with four local community colleges. Students may apply as long as they have a high school diploma and have enrolled in one of those community colleges. They also need at least a 2.8 GPA and a major in particular applied fields, such as mechanical or electrical engineering, machine tool operations, or business. After they apply, they’re required to complete an interview and resume workshop to be formally considered. Many trainees are 25 or younger, but there’s no age limit, and older adults and veterans are also well-represented, according to BMW’s Childers. Overall, about 80 percent complete the program (those who drop out usually do so due to grades), and, as noted, virtually all find full-time work at BMW afterward, he says.

Since the Scholars program is relatively new, its long-run effect on earnings and employment among those who opted to participate won’t be seen for years. But as it stands now, it offers its trainees a financial head start compared to other young workers. During their training, trainees not only have their tuition covered, but are also paid between \$13 and \$15 an hour for part-time work; after they start full employment, their hourly wages can go up to \$30 an hour over five years. In contrast, the median hourly wage for South Carolina production occupations, including manufacturing, is about \$16. (BMW also provides tuition assistance to those who want to study further, as well as a benefits package that includes lease discounts on BMWs, including those made at the plant.) Childers notes that the firm has yet to apply for the state’s tax credit — \$1,000 per apprentice per year — but it might reconsider as the program expands.

### **A Risky Investment?**

The popularity of apprenticeships abroad poses a puzzle: Why do employers in apprenticeship-intensive countries offer and pay for training if these young workers might take what they learn and leave for another job? The late University of Chicago economist Gary Becker, among others, famously argued that firms have less incentive to invest in human capital if they know they risk losing that investment as a result of the employee departing. Yet in many countries with these programs, apprenticeships are as popular as ever, both among high school graduates and firms, even though many trainees ultimately take up full-time jobs with other firms.

This question often centers on the distinction between employer-specific skills — which the firm needs only for its production — and more portable general skills that a worker can leverage in other jobs. If an apprentice is gaining primarily employer-specific skills, there’s a greater chance that he or she will remain rather than taking those

skills elsewhere; that, in turn, increases the employer's incentive to invest in the apprenticeship. But studies suggest that most apprenticeships offer a mix of both, and in surveys, most apprenticeship graduates say that a fair amount of the learning can be transferred across jobs over their careers. This finding seemingly runs counter to the theory that firms have little reason to teach general skills if they know they might not recoup that investment.

Some economists contend that the typically low apprentice wages in these countries — which effectively price this risk of lost investment — might be one part of the answer to the apprenticeship puzzle. One 1998 study on German apprenticeships by MIT's Daron Acemoglu and Jörn-Steffen Pischke of the London School of Economics looked at what kind of information a firm gathers on a trainee and how it relates to pay. They noted that, at first, a new trainee is an unknown quantity to the firm, since he or she has no prior experience. But over time, that firm will gather specialized information about that worker that other firms don't have. That includes the firm's estimate of that trainee's marginal product of labor — the change in output that he or she provides — which in turn helps inform the firm what that trainee's wage should be. To test this proposition, the researchers compared the wages of trainees who stayed on with their firm with those of trainees who took a break (in this case, for military service) and reapplied to jobs upon their return. They found the latter group commanded higher wages, suggesting that they had more accurate information about the value of their skills once they were free to search for work; by contrast, firms discounted wages for trainees as long as they stayed on.

Other studies have looked at what separates firms that offer training from those that don't. Research on the Swiss experience suggests that features inherent to each firm can play a role in how that company decides whether training is worth it. A 2007 paper by Swiss economists noted that firms with a mix of tasks that apprentices can complete, as well as employees on hand who can train, were more likely to offer apprenticeships than firms that didn't fit that profile. Both features were more common in larger firms, and the study found that these firms in fact were more likely to choose to train. Because these factors are specific to each firm, public incentives such as subsidies might not have major effects on the decision to train, the study concluded.

### The American Exception

In the United States, the apprenticeship model is getting attention as one way to address problems such as the

skilled labor shortage and youth unemployment. But even its advocates agree that the U.S. labor market has features that make it relatively resistant to such an approach. One is higher labor mobility, which can make firms wary of making a long-term training investment; over the first 10 years in the labor force, an American will hold an average of six jobs, compared with two for a German (although, to be sure, Germany's dual system could explain part of this difference). Another difference is labor flexibility: In many countries, it's more expensive and difficult to fire workers than in the United States, so firms use apprenticeships as a relatively low-risk testing phase before deciding on a full-time hire. Finally, the overall cost of training is likely to be higher for U.S. firms, assuming they cover tuition, whereas higher education abroad tends to get a bigger public subsidy.

A bigger factor than finances, however, might be culture. In other countries, it's more likely that college is seen as one option among many, and apprenticeships are considered a worthwhile route to middle-class employment. In the United States, parents are more likely to see college as a vital investment without considering other alternatives, including vocational training or apprenticeships, to place their children on a viable career track — a view that's likely due in part to the persistent labor market advantages of a college degree. But for high school students who might not finish college for academic, financial, or other reasons — and who might drop out with debt but not the benefits of the degree — the apprentice route could be another alternative toward gainful employment. BMW's Childers agrees and says he sees this play out frequently when he meets with Scholar applicants and their families.

"To sell the Scholars program, you have to convince the parents," he says. "They come with the mindset that their kid has to go to college, and it's on us to show them that our program can also lead their kids into a lucrative and high-tech career — and can do so without debt."

Meanwhile, economic forces are at work that could push U.S. firms to be more creative in how they approach training, whether through apprenticeships or something else, says Hanushek of Stanford. As long as the labor market continues to tighten and baby boomers keep on retiring, he argues, firms will have to compete for a shrinking pool of skilled workers. In time, they might have to rethink their own role in growing human capital.

"American firms are having a hard time dealing with the need to compete more for labor," he says. "They're fighting for the same pool of workers, and they see this as zero sum. At some point, they might be forced to find solutions that are positive sum." **EF**

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## Jean Tirole

French economist Jean Tirole, recipient of the 2014 Nobel Memorial Prize in Economic Sciences, sees a close similarity between economics and the “caring profession” of medicine. “The economist,” he contended in his recent book *Economics for the Common Good*, “like the oncologist, makes a diagnosis on the basis of the best available (though necessarily imperfect) knowledge, and then either proposes the most suitable treatment on that basis or no treatment at all, if none seems necessary.”

The difference, for Tirole, is that in proposing policies, the economist must take into account the interests of people who aren’t in front of him or her and might not even be readily visible. “So the public sometimes accuses that economist of being indifferent to the sufferings of the visible victims.”

Tirole, who joined the Toulouse School of Economics in 1991 after a seven-year stint on the faculty of MIT, has made significant contributions to a wide array of areas within economics, including industrial organization, finance, banking regulation, and the economics of technology, to name a few. His 1988 textbook on industrial organization and his 2006 textbook on corporate finance are standards. With *Economics for the Common Good* — his first book meant for popular audiences, published initially in French — he seeks to bring the thinking and tools of academic economists to a general readership.

Ideologically, Tirole defies easy categorization. He favors what he calls a “strong state” and a generous social safety net, but also argues for humility on the part of regulators in light of the limited information available to them.

David A. Price interviewed Tirole in Washington, D.C., in November 2017.



**EF: How did you become interested in economics?**

**Tirole:** I was studying mathematics and physics in France. In high school, I liked mathematics and social sciences. But my first class in economics wasn’t until I was 21 or 22 at Ecole Polytechnique, which is an engineering school. It was a general introduction, actually quite a mathematical and theoretical one. Too much so indeed, because intuition and data are important in economics. Teaching economics is difficult — you want it to be rigorous but at the same time very intuitive, and there’s a certain trade-off.

**EF: And that one course was enough to move you in that direction?**

**Tirole:** Yes, because I was attracted to the mix of the human aspect of the social sciences and the rigor of quantitative analysis, a perfect combination for me. But I came late into the game, yes.

I then got an applied math degree also, and finally I moved to MIT for a Ph.D., where I really learned economics.

**EF: You said in your Nobel lecture that when you began studying industrial organization at MIT, you didn’t know what “industrial organization” meant.**

**Tirole:** Yes.



**EF: What started you down that road?**

**Tirole:** It was totally fortuitous. I was once in a corridor with my classmate Drew Fudenberg, who's now a professor at MIT. And one day he said, "Oh, there's this interesting field, industrial organization; you should attend some lectures." So I did. I took an industrial organization class given by Paul Joskow and Dick Schmalensee, but not for credit, and I thought the subject was very interesting indeed.

I had to do my Ph.D. quickly. I was a civil servant in France. I was given two years to do my Ph.D. (I was granted three at the end.) It was kind of crazy.

**EF: You've been credited along with others with creating the first unified, coherent theory of industrial organization. What are the main general policy prescriptions that follow from your work in this area?**

**Tirole:** Both antitrust and regulation are hindered by imperfect information. Regulators don't have the information that managers of firms have. And for that reason, policymakers have to be humble.

This is a much broader lesson, by the way. For example, in France, courts are involved in dismissal decisions, so they have some say on whether the firm needs a given job or not. And of course, the court doesn't have the information. You can make a similar observation with "command-and-control" environmental policies. Both in environmental and labor matters, governments sometimes suffer from hubris. They try to implement policies that they cannot implement efficiently because they don't have the information that's required.

I do believe in a strong state. But it requires regulation to be efficient; for that, governments must be humble and try to avoid intruding into an industry to do things that they simply cannot do.

**EF: One of the areas you address in *Economics for the Common Good* is the economics of online platforms such as Amazon or Uber that bring together buyers and sellers. Do you think these platforms create special issues for antitrust regulation?**

**Tirole:** I think the answer is yes — partly because the new platforms have natural monopoly features, in that they exhibit large network externalities. I am on Facebook because you are on Facebook. I use the Google search engine or Waze because there are many people using it, so the algorithms are built on more data and predict better. Network externalities tend to create monopolies or tight oligopolies.

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We need to invent rules that are not too information intensive. Regulators don't always have the required information, so they need to have rules that are robust, that are going to work regardless of the circumstances.

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So we have to take that into account. Maybe not by breaking them up, because it's hard to break up such firms: Unlike for AT&T or power companies in the past, the technology changes very fast; besides, many of the services are built on data that are common to all services. But to keep the market contestable,

we must prevent the tech giants from swallowing up their future competitors; easier said than done of course, as data are often missing to ascertain that the startup is indeed a competitor. And of course acquisitions are, along with IPOs, one of the standard routes for VCs and entrepreneurs to cash out.

Bundling practices by the tech giants are also of concern. A startup that may become an efficient competitor to such firms generally enters within a market niche; it's very hard to enter all segments at the same time. Therefore, bundling may prevent efficient entrants from entering market segments and collectively challenging the incumbent on the overall technology.

Another issue is that most platforms offer you a best price guarantee, also called a "most favored nation" clause or a price parity clause. You as a consumer are guaranteed to get the lowest price on the platform, as required from the merchants. Sounds good, except that if all or most merchants are listed on the platform and the platform is guaranteed the lowest price, there is no incentive for you to look anywhere else; you have become a "unique" customer, and so the platform can set large fees to the merchant to get access to you. Interestingly, due to price uniformity, these fees are paid by both platform and nonplatform users — so each platform succeeds in taxing its rivals! That can sometimes be quite problematic for competition.

Finally, there is the tricky issue of data ownership, which will be a barrier to entry in AI-driven innovation. There is a current debate between platform ownership (the current state) and the prospect of a user-centric approach. This is an underappreciated subject that economists should take up and try to make progress on.

**EF: You've mentioned bundling, you've mentioned most favored nation clauses — what should regulators do about those things to keep markets contestable?**

**Tirole:** It's always difficult, and we need to make more progress and do more research on simplifying the competition authorities' task. Take bundling, for example. The general lesson that you want to make the market contestable is fine, but sometimes bundling occurs for efficiency reasons. And you have to look into the detail of each case to see whether there's a real efficiency difference or whether the firm is just trying to keep its competitors out.

Another difficulty is that antitrust can be slow and

digital industries are moving very fast; if the authority decides too late, the entrant may already have folded. Another issue is territoriality and possible disagreements among authorities; a national competition authority may create a problem for the incumbent because its decision may force that firm to reconfigure its products worldwide.

We need to invent rules that are not too information intensive. Again, regulators don't always have the required information, so they need to have rules that are robust, that are going to work regardless of the circumstances. We, for example, designed information-light rules for patent pools; such rules enable antitrust authorities to say, "OK, we allow you to form a patent pool if you meet such, such, and such conditions." These rules — (a) patent owners should keep ownership of the patents and thus be able to grant individual, outside-the-pool licenses, and (b) the pool should make unbundled offers for the licenses — require no information from the antitrust authorities.

I think we need to do more rule design to facilitate the antitrust authorities' work, because, even leaving aside the financial cost of collecting, verifying, and analyzing data, authorities cannot afford to spend five or 10 years deciding, right? Besides, products that are complements today may become substitutes tomorrow, or the opposite. Because the usage changes, the competitive pattern changes. The job of antitrust authorities is extremely difficult in the end and we economists have to help them.

**EF: Your research with Jean-Charles Rochet started a whole new literature of two-sided markets. This has been influential on both industry participants and policymakers with regard to platform industries, especially those related to payments. What do you think is the main lesson for people to take away from that research?**

**Tirole:** Both authorities and private decisionmakers must analyze the two sides at the same time. For example, for competition policy in the payment card industry, authorities cannot just look at the merchant side or the cardholder side. They have to look at the interaction between both.

We get a fantastic deal from Google or credit card platforms. Their services are free to consumers. We get cashback bonuses, we get free email, Waze, YouTube,

## Jean Tirole

### ► Selected Present Positions

Chairman of the Board, Fondation Jean-Jacques Laffont/Toulouse Sciences Economiques; Chairman, Executive Committee, Institute for Advanced Study in Toulouse; Visiting Professor, Massachusetts Institute of Technology

### ► Education

Ph.D. (1981), Massachusetts Institute of Technology; Diplôme d'Etude Approfondie (1976), Docteur de 3ème Cycle (1978), Université Paris-Dauphine; Engineer (1978), Ecole Nationale des Ponts et Chaussées; Engineer (1976), Ecole Polytechnique

### ► Selected Publications

"Deadly Embrace: Sovereign and Financial Balance Sheets Doom Loops," *Review of Economic Studies*, forthcoming (with Emmanuel Farhi); *Economics for the Common Good* (Princeton University Press, 2017); "Efficient Patent Pools," *American Economic Review*, 2004 (with Josh Lerner); "Intrinsic and Extrinsic Motivation," *Review of Economic Studies*, 2003 (with Roland Bénabou); *The Theory of Industrial Organization* (MIT Press, 1988); and numerous other articles and books

efficient search services, and so on. Of course there is a catch on the other side: the huge markups levied on merchants or advertisers. But we cannot just conclude from this observation that Google or Visa are underserving monopolies on one side and are preying against their rivals on the other side. We need to consider the market as a whole.

We have learned also that platforms behave very differently from traditional firms. They tend to be much more protective of consumer interests, for example. Not by philanthropy, but simply because they have a relationship with the consumers and can charge more to them (or attract more of them and cash in on advertising) if they enjoy a higher consumer surplus. That's why they allow competition among applications on a platform, that's why they introduce rating systems, that's why they select out nuisance users (a merchant who wants to be on the platform usually has to satisfy various requirements that are protective of consumers). Those mechanisms — for example, asking collateral from participants to an exchange or putting

the money in an escrow until the consumer is satisfied — screen the merchants. The good merchants find the cost minimal, and the bad ones are screened out.

That's very different from what I call the "vertical model" in which, say, a patent owner just sells a license downstream to a firm and then lets the firm exercise its full monopoly power.

I'm not saying the platform model is always a better model, but it has been growing for good reason as it's more protective of consumer interest. Incidentally, today the seven largest market caps in the world are two-sided platforms.

But there is of course the other side, which is the merchant interest. So the right balance has to be found, and both platforms and antitrust authorities are trying to do so.

**EF: In that respect, it sounds like these platforms can be regulators themselves. Is that a concern?**

**Tirole:** I'm not too worried about that. I see antitrust issues with the platforms — they can do the wrong thing socially — but these regulatory activities don't look so bad because they try to avoid dissipation of total surplus. Without giving them a blank check, I think that this

particular activity of platforms is quite useful for society.

**EF: Predictions of massive unemployment or under-employment from automation have been common for a long time. As the tech industry is creating more dis-intermediation and bringing new kinds of automation to the workplace, are you bullish about the future of jobs that pay good wages?**

**Tirole:** History tells us that there is never a shortage of jobs. People have been predicting for two centuries that there will be, but in the end there are always new jobs to meet new needs for consumers and provide new services that can be supplied. So I'm not concerned, per se, about a shortage of jobs. I'm more concerned about a shortage of jobs that people will want to take. The danger right now is that the jobs that are likely to be created may be low-paying ones.

The losers, not only of globalization, but also of technological progress, either saw their wages stagnate over the last 30 years or ended up being unemployed (in southern Europe), or underemployed, or employed in gig jobs (in the U.S. and the U.K.). Some of my colleagues have documented a polarization between lower-paid people, who have low skills and haven't seen their salaries increase (or have in some cases seen their salaries decrease), and of course the high-skilled people who have benefited greatly from globalization and technological progress.

This may well keep happening. But not only to the low-skilled workers: AI also threatens the jobs of highly skilled people. For example, the role of doctors is going to be different. Here I'm not talking about the MIT biotechnologist or Harvard medical school professor, I'm talking about general practitioners and the like.

It's going to be hard for many. Take teachers. Or lawyers: Algorithms already do part of the lawyer job. Not all of it; writing a convincing legal argument, for example, is still very difficult, but the identification of all the relevant cases and the preparatory work can be done by an algorithm and it can be done very well. So it's not only the low-skill jobs I'm worried about.

Less-developed and emerging countries that are trying to develop markets for their cheap labor — which has done wonders in the past for China and India — will have to adapt their strategy as their flagship jobs, such as those in call centers, are going to become obsolete.

Jobs will be destroyed faster and faster, requiring more worker protection and less job protection. Of course, education and retraining will be key. We are not yet ready for providing it efficiently. I don't have any miracle cure, but it's going to be a big issue.

What are the alternatives? Some propose some form of protectionism against imports of goods and services. That would appear to be the current trend in the U.S.; we'll see. We should however not forget that protectionism can be self-defeating (retaliation by other countries hurts workers in exporting industries) and possibly morally

objectionable (is an American worker really more deserving than an Indian one?), and that it may hurt consumers both directly (reduced access to what the world has to offer) and indirectly (by creating domestic monopolies that will raise prices and slow down innovation).

In Europe, especially southern Europe, protecting jobs would seem the favorite option. But there's only so much you can do to protect jobs: First, you're only slowing down the adjustment, and second, it means that no stable job is created anymore, leaving the scene to gig jobs. If you protect the job too much through labor laws, as in France, what happens of course is that employers respond. So 90 percent of the jobs that are created today in France are temporary jobs. Tomorrow it will be 95 percent if no reform is made. It's inefficient. Temporary jobs are bad jobs. You're employed for a month, three months, and then you go through the unemployment spell, and then you are rehired. And employers don't invest in your human capital — you are perceived as the equivalent of a disposable tissue.

So we can slow down the adjustment, but in the end, we do have to protect workers in a different way. The Scandinavians protect workers through generous unemployment benefits; at the same time, the latter are required to work hard to find a new job. Workers are both well protected, as they should be — it's usually not their fault if they lose their job — and they are made accountable, in that they must search hard for a job and take an appropriate job if available. It's a quid pro quo. This Scandinavian contract is no panacea, but it is probably the best we have.

In the U.S., there has not been enough protection of the losers of globalization and technological change. That discontent was reflected in the last election. It's not the only explanation, of course, because we also see in Europe countries that are doing well despite votes for populist movements being high. Populism has broader causes, but discontent and anxiety about the future do not help.

The education system in many countries is not up to scratch. Just to take the example of France, the top 20 percent of students are very well educated, and those will again be the winners in the new world. But the 80 percent below actually don't get a good education. Later on, they will get poor vocational retraining, even though we spend 31 billion euros per year on this. You can understand people being very worried about their future. The growth in inequality is not likely to subside with such policies.

While I'm confident that we'll be overall much richer and healthier, I'm pessimistic about our social compact if we don't react to the challenge.

**EF: If we could shift gears again, you've made important contributions to banking theory. What do you think are the most important lessons of the financial crisis for the further development of banking theory?**

**Tirole:** Some of the lessons of the crisis we knew beforehand. We knew, for example, that large over-the-counter

positions or capital requirement evasion through off-balance-sheet special-purpose vehicles, like the conduits associated with securitization, can be factors of financial instability. But we had no clue about the actual magnitude of these arrangements — at least people in academia didn't. Maybe economists who were closer to banking supervisors and financial institutions may have known.

Better regulatory infrastructure is very important. And I think we have made progress. In the U.S., regulatory forum shopping, where banks could choose their regulator, has been made more difficult. Some regulators were very lenient. So having one player only — the Fed, which has some independence and credibility to do the supervision — was a good thing, in my view. Similarly, increasing the distance between banks and their supervisors through the single supervisory mechanism in Europe was at least in theory a good move.

Did we learn all these things with the crisis? No. But did we start putting more emphasis on them because of the crisis? Yes, I think that's correct. Partly because, as I say, it's not only the regulators who have imperfect information; the economists, at least those in academia, also are imperfectly informed. They can say that a practice is dangerous, but as long as they don't know whether it is widespread or limited, they won't spend that much time warning about it as they can't document a concern; neither will supervisors take the advice seriously.

Let me provide another illustration. Shadow banking is attracting substantial academic attention nowadays. Economists are trying to make progress in understanding the role of shadow banking and what kind of danger it presents. Again, what should we do, taking into account the fact that regulators have limited information? Even if regulators are independent of industry and political power, they still need the information to do a good job. We always come back to the same thing: We have to design rules that are not too intrusive and basically work with the actual information that regulators have.

**EF: One problem that was obviously important in the financial crisis is the so-called “too big to fail” problem. What do you think is the best solution to this problem, where regulators know that the possibility of a bailout will work against the firms’ self-discipline, but regulators may still feel they need to provide a bailout when a crisis occurs to avoid letting it become worse?**

**Tirole:** Well, that's correct. One issue is that “too big to fail” is always difficult to define. Was LTCM [Long-Term Capital Management] truly too big to fail? Was AIG? It's difficult because the potential for financial contagion depends on the troubled institution's balance sheet, on the correlation of exposures, on who is on the other side, and so on.

There are two possible strategies and a lively debate among economists about those two strategies. One is to

regulate anything you deem “too big to fail” or “too systemic to fail.” That's the systemically important financial institution, or SIFI, approach. It's fine, but the question is, as I said, how do you identify “too big to fail”? The size of the balance sheet and the leverage ratio are informative, but imagine that you face a large financial institution that invests only in safe assets. Is it “too big to fail”? No. So size per se is not very informative. One must dig deeper into the risk that it could create for financial stability, not an easy task for a regulated entity and even less so for a previously unregulated one. Conversely, you can have a smaller institution whose failure would create a lot of trouble.

As Emmanuel Farhi and I described in a recent NBER paper, a shadow bank may be bailed out for two reasons. One is the threat of financial contagion that its failure might engender, as we just discussed. The other is that it serves what I call “politically fragile” clients. On the liability side, it will be small depositors; on the asset side, it will be small and medium enterprises. And if those politically fragile clients migrate to the shadow banking sector, as happens in China, for example, and more and more in Europe and the U.S., the state might actually bail out the shadow banks because it wants to protect them.

**EF: When you say “politically fragile,” what do you mean?**

**Tirole:** If small depositors lose their savings, there's a strong temptation to intervene and make sure they don't, because that's all they have. The same goes for small and medium enterprises, which may not be as resilient as larger firms: The state might be concerned that if the SMEs lose their lender, which has specific information about them and engages in relationship banking with them, then economic activity may suffer. That's one reason why shadow banks may be rescued.

The other reason is more related to 2008, in that there might be problematic cross-exposures as I discussed previously. Regulators were worried that with AIG going under, regulated banks or insurance companies that would have lost money through their cross-exposures with AIG might themselves get into trouble.

So there are two ways of addressing the shadow banking problem. As I mentioned, one is to declare X as a systemically important institution and to supervise this financial institution and require capital adequacy from it. The alternative approach is some kind of ring fencing, which is meant to prevent regulated banks from being exposed to the possible failure of a shadow bank: One tries to keep the unregulated sphere away from the regulated one. I think the debate now is between those two competing philosophies, which both have their advocates.

**EF: Many of us in America think of Paris having a role in France similar to that of New York and Washington combined in the United States. Do you feel it's been**

**advantageous for you to be based away from Paris — more or less on the opposite side of the country?**

**Tirole:** That's right, Paris is both the political and economic capital. France is really centered around Paris. And traditionally many of the good schools and universities are in Paris, especially in the human and social sciences.

I had no personal reason to be in Toulouse except for my very charismatic friend, Jean-Jacques Laffont, who started a top economics department there. He was one of the top economists in the world, at the same time he spent much time developing something in what was at the time a rather unlikely place, and I admired that. That's why I went to Toulouse in 1991, and that's why I stayed in Toulouse.

But if you look at the U.S., the top universities may be in remote places. Or they may be in places like Boston or Chicago that are big cities but are not the economic or political capital. In my view, there's no reason to be in the capital unless you want to constantly advise the government.

And even then, I've been on the Council of Economic Advisers of France for almost 20 years. The Council of Economic Advisers is a nonpartisan body, so I've been serving a number of right-wing and left-wing governments. I've also belonged to many committees in Paris. From Toulouse, I can still perform public service at the national level.

But for research and teaching, there's absolutely no reason for why you have to be in the center of political decision-making. It's not the tradition in France, but the U.S. and other countries have shown that you can have really top universities away from the centers of decision.

**EF: Who would you say have been your main influences?**

**Tirole:** You are what your collaborators, and more generally, colleagues, make of you. They bring the best out of you, and they bring their own contribution; it's a collective endeavor. There are two people who have influenced me more directly. One is Jean-Jacques Laffont, both through our joint work and through his being a role model — someone actually working a lot for the common good. He never put his career first, which did not prevent him to have a very distinguished career until cancer took him away in 2004; he was obsessed with building a top institution in Toulouse, helping less-developed countries, and many other things. The other is Eric Maskin, 2007 Nobel Prize laureate, who is similar in many ways and was incidentally a close friend of Jean-Jacques. He was my adviser at MIT, and I owe him a lot.

MIT has been a special institution for me, including the "old guard": Bob Solow, Olivier Blanchard, Stan Fischer, Paul Joskow, Paul Samuelson, Peter Diamond — I'm not going to name all my mentors and friends, but MIT has been a very decisive influence in my career. Learning to work by this combination of both a rigorous approach and intuitive thinking has been important to me as an

economist. I was there as a student, I was there on the faculty, and I've stayed there as a visiting professor for 26 years now. Today there are many new faces, but the culture has been preserved.

I work hard, but everyone works hard. My one merit is to have been with the right people. You meet people who change your life, and they are your eye-openers.

**EF: Your book is written very clearly, very differently from academic economic research. What were you trying to achieve in writing the book?**

**Tirole:** In the past, I had been engaging with experts — in corporations, in government, in regulatory agencies, in central banks, and so on. But I never actually interacted with a wider audience. I defined my mission as research and teaching. But then with the Nobel Prize, people started asking me questions, mostly about the work of economists, what do they do, are they useful, what's their methodology, and so on. So I thought it would be useful to write a book to try to explain.

Now I go to high schools, which I didn't used to do. I talk to people, I give speeches for wider audiences, which again I didn't do before. The prize was the wakeup call. And in retrospect, the timing was right in light of the populist movements we have discussed earlier that are all over the world. At some point, if the population as a whole doesn't take economics, and science more generally, onboard — these thoughts would alternatively apply to medicine, evolution, biology, or climate science — if we don't manage to pass on basic knowledge, it's very hard for democracy to work. We get the policies that we deserve.

So we have to educate people in basic knowledge. Of course we cannot ask people to have a Ph.D. in economics or medicine or biotechnology, but we can provide them with the basic knowledge to think about what is a fact, an empirical test, the difference between a correlation and a causality, the nature of a theory, how to avoid pitfalls in reasoning.

All of those things could be taught in high school to some extent. We academics need to share better knowledge within the population, because in the end, politicians, and I'm not blaming them, tend to focus on reacting to what the electorate wants.

If you can advise governments, that's useful, but at some point, if you don't also have an adoption by the electorate as well, the policies that you'll get won't be the right ones necessarily. We have to rehabilitate, we have to create more trust and faith in experts. Sometimes those experts can be blamed, too. Our judgment may be impaired. But if the population has no respect for experts, anything goes, right? Anything goes, and then you may end up with bad outcomes.

On my small scale, I'm trying to do something. On my small scale. But if we all do that, we can improve things. EF

## The Rise and Decline of Petersburg, Va.

BY ANNE BURNETT, RAY OWENS, AND SANTIAGO PINTO

Early Virginians looked at Petersburg, with its location on the Appomattox River, as a town of economic vibrancy and promise. Incorporated in 1748 by the Virginia General Assembly, the town fulfilled that early promise and grew to become the commonwealth's third independent city in 1850. But turmoil as well as prosperity for Petersburg were ahead.

Throughout its 270 years, three factors have dominated Petersburg's economic history: tobacco, trade, and transportation. The city's early economic prominence was due to its tobacco plantations and warehouses as well as various mills powered by the river's falls. Later, the mills were replaced by other types of manufacturing. Petersburg remained a transportation hub throughout the evolution from canal boats to railroads to interstate highways. It also became a busy retail center, beginning as a fur trading post and later broadening its activities to more general retail and wholesale trade. And all along, Petersburg was near tobacco cultivation and involved in manufacturing of tobacco products.

The city's specialization in a small number of sectors has, however, made the city vulnerable to negative economic shocks, and these ultimately explain a large part of the city's fiscal struggles from the 1980s onward. When economic and social developments led the city's

businesses, and later its wealthier households, to move out, Petersburg was confronted with the loss of a sizeable amount of its tax base. This, combined with reported local mismanagement of the city's public finances, resulted in a slow but steady deterioration of the quality of life for those who remained in the area.

### Early Petersburg

When the English arrived in Virginia in 1607, the area south of the Appomattox River was occupied by the Appamatuck, a tribe of the Powhatan Confederacy. By 1638, Abraham Wood, proprietor of an early frontier outpost, had legally claimed the site. Nearly three decades later, Wood's son-in-law established a fur and Indian trading post called Peter's Point adjacent to the falls of the Appomattox River, and in 1733, William Byrd II laid the plans for the town named "Petersburgh" (as it was then spelled).

Tobacco plantations arose in the surrounding areas, and warehouses soon sprung up around Petersburg to facilitate tobacco transport to coastal ports and, from there, to England. Around that time, numerous water-powered mills arose in the area, manufacturing various products including cloth and cornmeal. In 1816, a series of canals and locks were constructed around the falls that allowed bateaux and canal boats to conduct trade between Petersburg and towns farther west along the river. By 1830, the Petersburg Railroad was incorporated and the town soon became a major transfer point for both the north-south and east-west railroad lines.

These developments laid the foundation for continued growth. The census of 1860 listed 9,342 whites and 8,924 blacks in Petersburg, making it the second-largest city in Virginia. With the outbreak of the Civil War in 1861, Petersburg's pre-eminence as a major railroad depot made the city important to Confederate supply lines and, consequently, a strategic objective of the Union Army. In June 1864, the Union Army outflanked the Confederate defenses, and the result was a siege of the city that would last until April 1865. During this time, Petersburg was subjected to almost daily shelling, directed not only toward military targets such as railroad depots and supply warehouse, but also toward public buildings and residential sections. The war devastated Petersburg, resulting in a slowdown of population growth for a prolonged period.

After a time, however, Petersburg's economy recovered during the postwar years. The early water-powered mills were replaced by other types of manufacturing during this period, and the role of trade was boosted by new merchants emigrating from Europe. Within a few decades,



*Tobacco warehousing and manufacturing have long been part of Petersburg's economic history. This image, from 1865, shows a tobacco warehouse on High Street that was used as a temporary prison.*

Petersburg and its surrounding communities again became a thriving manufacturing and raw materials processing center, generating numerous smaller businesses specialized in ironworks, sand and gravel production, and trade in cotton and peanuts.

### **A Second Tobacco Boom**

Moreover, tobacco warehousing and manufacturing again became the major local industry. By the late 19th century, farmers from the Carolinas began to cultivate bright leaf tobacco that was better suited to the production of increasingly popular cigarettes. Soon, cigarette manufacturing began to supplant the production of plug and twist tobacco (or “chewing tobacco”) in the city. With its well-developed transportation facilities, Petersburg became a dominant market for bright leaf auctions and had stemmery and leaf dryer facilities that added to its tobacco economy.

But by the turn of the 20th century, the tobacco industry was consolidating; most of the family-owned tobacco companies in Petersburg were acquired by the newly created American Tobacco Co. and became part of the “Tobacco Trust.” In 1902, the British-American Tobacco Co., or BAT, was established by an agreement between the Imperial Tobacco Co. of Great Britain and the American Tobacco Co. and its subsidiaries. In 1910, BAT moved its cigarette plant to Petersburg; the plant manufactured cigarettes for export primarily to China and Australia, and the plant quickly became the city’s largest employer and biggest taxpayer. By 1930, the changing economic and political conditions, primarily in China, caused this operation to be discontinued. Fortunately for Petersburg, Brown and Williamson Tobacco Co. (B&W) took over the shuttered BAT plant in 1932, replacing its predecessor as chief taxpayer and employer in the city.

As the automobile began to dominate transportation in the early 20th century, three main highways (U.S. Routes 1, 301, and 460) intersected at Petersburg’s center. These crossroads effectively made Petersburg the urban core of “Southside Virginia” and led its downtown area to become a thriving retail and professional center. By 1950, the population of Petersburg increased to 35,054, surpassing the previous peak reached in 1920. Another phase of highway development played out badly for the city, however: In the late 1950s, the newly constructed Interstates 95 and 85 converged at Petersburg but bypassed the city’s downtown area, eroding the city’s retail potential as well as that of its professional services. Middle and upper classes started to shift away from the city.

As Petersburg entered the second half of the century, significant social and economic changes were underway. The United States Supreme Court’s 1954 *Brown v. Board of Education* decision ruled that the “separate but equal” doctrine in public schools was unconstitutional. In a 1996 history of school desegregation, University of Richmond law professor Carl Tobias noted, “The Petersburg School

Board, like numerous others, developed and applied several stratagems for maintaining segregated public education.” But by 1970, considerable integration of Petersburg’s schools had occurred and “white flight” to nearby less racially diverse areas began in earnest. The composition of the city’s population shifted to primarily black.

In 1972, a crucial decision occurred that was to have long-lasting implications for the city’s finances. That year, the city annexed 14 square miles from neighboring Dinwiddie and Prince George counties, ostensibly to add large tracts of vacant land for industrial development and to expand its property tax base. This annexation almost tripled the geographic size of the city but added only 7,300 new citizens. But “white flight” and the shift of jobs away from the downtown area (often referred to as “job sprawl”) continued as manufacturing operations in Petersburg and the surrounding communities began to close or downsize.

### **The Economic Tide Goes Out**

In 1985, B&W consolidated its operations in Georgia and permanently closed its Petersburg plant. This was a major blow to the city — a decade before, B&W’s Petersburg facility employed as many as 4,000 workers. Adding to these woes, Petersburg’s proximity to Richmond — which had grown to dominate the region — hampered its ability to attract new firms and retain residents.

In the decades following Petersburg’s annexation and the closure of the B&W plant, the city began to experience a slow and prolonged period of job losses and urban decline. Substantial economic development in the annexed area never materialized and the costs to provide and maintain infrastructure in this new part of the city weighed on Petersburg’s fiscal budget. The city also had to address an abundance of deteriorating and abandoned properties, which contributed to lower property values and led to further downward pressures on tax revenues.

As job prospects in the city waned, residents left. After peaking at 46,267 in 1975, Petersburg’s population fell for the next 30 years, stabilizing at around 32,000 in 2005. Younger residents left to a greater extent than others, and the proportion of the population that was 65 or older reached 16 percent by 2016 — up from 10 percent in 1970. Educational attainment also slipped, with the proportion of residents graduating from college declining relative to statewide averages.

Inner-city blight, including increased unemployment, crime, and property abandonment, contributed to racial and social problems, and political turmoil emerged in Petersburg over time. According to the 2010 U.S. Census, the city had the highest concentration of poverty in the region at 21.5 percent, and it had an unemployment rate of 8.1 percent in mid-2016 — nearly double the statewide average.

High unemployment and a declining population negatively affected Petersburg’s housing sector. While the total



*The Peter Jones Trading Station is one of the many landmarks that reflect Petersburg's rich historical legacy.*

housing stock in Petersburg has edged up in recent years, the fundamentals driving prices — incomes and proximity to jobs — generally only limited appreciation in home values and, as a consequence, limited growth in tax revenues.

### **Effects on Local Public Finances**

The combination of these developments led to a slow, steady deterioration of the city's public finances. To be sure, it is common for cities to undergo cyclical periods of economic stress, which ultimately affect their finances; local revenues fluctuate as national and local economic conditions change, for example. But the underlying factors behind the deterioration of Petersburg's local fiscal health appear to be intrinsically structural. The exodus of high-income households and firms has weakened the city's tax base. In turn, the households that remain are disproportionately lower income and older, requiring more services from the local government. As a result, the decline of the city population has not been matched by reduced pressures on local government expenditures. In fact, all these factors have tended to increase the cost per resident of providing local services, imposing a significant financial stress on the city's budget.

The heightened financial pressures became evident by 2009 as tax revenue fell short of expenditures. The city responded by taking money from its general funds balance, issuing short-term debt, and deferring capital maintenance. The delayed maintenance of an aging infrastructure eventually strained the city's ability to deliver basic services. These developments underpinned several recent events that have garnered widespread public attention, such as a failing of the water system and substantial problems with the performance of the city's public schools.

As weakened local public finances translated into a lower quality of local public services, the city became

less attractive to its remaining residents, explaining part of the slow exodus of firms and households during the period. The local public finance channel, in this way, magnified and reinforced the initial negative effects. To address these recurring shortfalls, the city repeatedly drew down its cash reserves, leading rating agencies to downgrade Petersburg's debt.

Maintaining fiscal discipline in a city facing these structural economic problems has been challenging. The lack of comprehensive financial controls and the failure to adhere to sound budgetary rules worsened fiscal imbalances, transforming serious but potentially manageable economic problems into a crisis. In addition, conditions can worsen if local residents and officials do not promptly realize that these local economic challenges will likely be long lasting, resulting in a failure to

implement the appropriate adjustments.

To some extent, Petersburg responded to the fiscal challenges in a similar way to other cities in comparable situations. When faced with deteriorating local public finances, local officials, driven perhaps by political motivation, often try to develop short-term crisis solutions, which temporarily disguise the problems. This kind of behavior entails postponing the necessary decisions required to address the long-term imbalances, perhaps pushing them beyond the next election. But such a short-term approach can lead to the implementation of unsustainable policies that jeopardize the cities' longer-term economic prospects.

Looking ahead, Petersburg may well continue to face demographic and social headwinds. If current trends continue, the combination of an aging population and lower educational attainment will likely limit the attractiveness of the city to potential relocating businesses. If younger residents anticipate this, they will more likely locate away from the city. Additionally, continued delays of infrastructure maintenance and a lack of improvement in school performance could leave residents with compromised public services and somewhat limited skill sets. If this, in turn, is reflected in lower tax revenues in the future, the city's current set of problems could persist and be compounded.

### **Challenges of a Small, Specialized City**

In many ways, Petersburg's experience is typical of that of other cities during comparable economic downturns. Petersburg is an example of an older, smaller city whose economic growth historically depended on a narrow set of economic activities, specifically, trade, tobacco, and textiles. These cities are often described as "specialized" cities. (See "Diversification and Specialization Across Urban Areas," p. 36.)

Cities with a disproportionate presence of a small number of large firms concentrated in just one or two sectors



are more vulnerable to economic shocks. Clearly, in the last 50 years, technological changes and globalization have affected these cities to a greater degree than diversified cities. Another implication of this kind of local economic structure is that when those particular sectors go through good times, residents of those locations may not have strong incentives to acquire higher levels of education. To the extent that those industries offer relatively well-paying job opportunities to young residents with low-to-moderate skills, these residents might pursue those opportunities and perhaps acquire less additional education, anticipating little payoff from it. Such an approach could make residents more vulnerable to negative shocks and affect both their and the city's long-run economic prospects. To a certain degree, this also happens in cities with abundant natural resources such as coal or shale gas; in the short run, the temptation to limit education efforts is high at those locations given that job opportunities for those with low-to-moderate skills are readily available.

The empirical evidence suggests that small- and medium-sized cities such as Petersburg tend to be highly specialized, have a predominantly low- to moderate-skilled population, and concentrate their activities in specific sectors, such as steel, textile, auto, shipbuilding, aircraft, pulp and paper, petrochemical, and tobacco. In contrast, bigger metropolitan areas tend to be more diversified, host firms that produce high-tech manufacturing products, and provide a greater range of global financial and business services. While dominant local firms in smaller city settings benefit mostly from the size of their own industry, bigger cities attract activities that benefit from larger concentrations of people and industries. Additionally, the academic literature suggests that a city is more likely to become specialized if, in the past, transport costs were low.

Many small- to medium-sized cities in the United States have been hurt by one or more negative economic shocks, much like Petersburg. In the most extreme instances, those cities have lost much, if not most, of the industrial base that was once the pillar of their local economy. There are, however, other cases of cities, such as Bethlehem, Pa., and Concord, N.C., that were able to reinvent themselves and overcome decades of urban decline.

So why did Petersburg, founded at a location that was well adapted for long-term economic growth at the time, later follow a path of high levels of poverty, high unemployment, and dimming economic prospects? How did other cities, subject to similar economic challenges, turn things around and become attractive places? These questions have received a lot of attention in the economics literature, but the research has not yet been able to conclusively describe the mechanisms that determine the success or failure of certain cities. History has played an important role in explaining the initial development of some cities. However, not all of them have stayed on a prosperous path. One common element of the cities that have succeeded has been their ability to attract innovative industries and talented

individuals, which eventually made those locations even more successful. Despite recent advances, there is still a lot of work to be done to understand the connection between specialization, diversification, and city growth.

### **Prospects for Revival**

Petersburg grew and prospered for nearly 300 years through trade, textiles, and tobacco but now suffers from prolonged economic decline that has been amplified through reported fiscal mismanagement. Financially, the city has seen its tax coffers strained to cover the costs of providing services. Physically, this has resulted in delayed and, in some cases ignored, maintenance of infrastructure.

Despite the difficult path Petersburg has followed in recent decades and the current signs of decline that it faces, the area retains features that may yet define a positive direction for its future. Just as improving transportation technology effectively brought the city closer to Richmond over time and drew residents and income away from the city, so too might this force contribute to Petersburg's eventual rebound.

Petersburg's rich historical legacy is reflected in the wealth of architectural buildings in the Old Towne Historic District, adjacent to the Appomattox River. This infrastructure and location were the foundations that led to the emergence of trade and production then. In recent years, similar elements have resurrected a number of small towns in relatively close proximity to larger urban areas. Historical districts may function as the centerpiece of areas providing an array of amenities such as restaurants, entertainment, and shopping and can serve, at the same time, as the core of residential areas.

Adding to the potential for a residential-based development, the shorter commute times that hampered Petersburg's attractiveness on the jobs front could potentially support the city's viability. The proximity of the river is an added attraction.

Of course, the hurdles that must be cleared are formidable. A critical density of residential development must occur before the historical district amenities are viable. In turn, those amenities being in place would support residential development.

This chicken-and-egg situation can pose a substantial challenge and can lead to little or no development, leaving Petersburg's future uncertain. In a recent working paper, two Richmond Fed economists, Ray Owens and Pierre Sarte, with Esteban Rossi-Hansberg of Princeton University, ask whether Detroit has been in a somewhat similar position. The researchers suggest that residents of a city want to live in close proximity to one another and in sufficient numbers to generate stores and entertainment options. The paper evaluates how a specific policy instrument, a local government guarantee of residential investment, may foster the redevelopment of neighborhoods in cities like Detroit.

Under this type of policy, the city government contracts with local builders for the construction of an appropriate number of housing units in targeted neighborhoods. Such a policy, the paper shows, could generate sufficient housing and population density to make the amenities financially viable. In fact, private sales would likely end up absorbing all of the residential units, leaving none for the local government to buy — effectively making the guarantee costless to the local government. It may be that such a policy, or some other policy to jumpstart Petersburg’s residential development, could help

the city reverse its downward economic trend.

One thing that is clear is that regardless of the path Petersburg takes, it seems unlikely that the city will look like it did in the past. City leaders and residents should realize that any attempt to revitalize the area should be based on a realistic approach that exploits as much as possible the beauty of its historical downtown area and the river and its location near other prosperous locations. Betting the future of the city on the willingness of a couple of large firms to operate in the area may lead Petersburg to again face some of its old economic problems. **EF**

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### Speeding Up Payments *continued from page 6*

expected to provide the service with a reasonable effectiveness, scope, and equity.”

#### More Than Speed

In some ways, U.S. payments are already starting to speed up. The Clearing House, which is owned by the largest U.S. commercial banks, has begun rolling out a faster payments solution similar to the U.K. Faster Payments Service called Real-time Payments, or RTP. RTP makes funds available instantaneously while settling transactions on a deferred net basis multiple times per day. The payment platform had its first successful test in November 2017, and the Clearing House has said it hopes to make the service available to most of the country by 2020.

Speed isn’t the only benefit to rethinking payments. New platforms can take advantage of more advanced security features as well. Noncash payment systems have historically been limited largely to debit or “pull” transactions, where the payee’s institution requests funds from the payer, as opposed to credit “push” transactions, where the payer requests that funds be sent. This was due

to the fact that initiating a noncash payment requires a computer, and in the past recipients tended to be larger organizations that were more likely to have computers than individuals.

Today, anyone with a smartphone has a computer in his or her pocket. Credit push transactions may be less susceptible to fraud since the payer is the one who must initiate and authorize payment. The Clearing House’s RTP offers push transactions as do many other faster payment platforms in other countries. A separate Secure Payments Task Force helped the Faster Payments Task Force identify payment security goals and is working to develop proposals for achieving those goals.

The fundamental goal of any new payment system, however, is that it works — easily and reliably.

“While payments do provide economic value, they’re not what households and firms value the most,” says Scott Schuh, former director of the Boston Fed’s Consumer Payments Research Center. “What they value most are the goods and services that they’re buying. An ideal payment system provides the least costly way of making exchanges happen.” **EF**

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these lines. (See chart.) The comparison between father-son sharing and father-daughter sharing reveals that father-son pairings are most prevalent relative to father-daughter pairings in construction, while the opposite is true in accommodation and food, education, and health care. (These figures do not control for differences in educational or physical attributes that may be associated with entry into an occupation.)

Moreover, the researchers found that sharing by daughters, more than that of sons, was concentrated at the high end of the earning spectrum.

“The daughters really tend to share employers with their fathers mostly when the fathers are higher-earning,” Stinson says. “Our hypothesis is that that’s because those fathers are perhaps more likely to be working in an office as opposed to working a construction job. It does seem like daughters and sons access their fathers’ job networks differently.”

### Making Footsteps

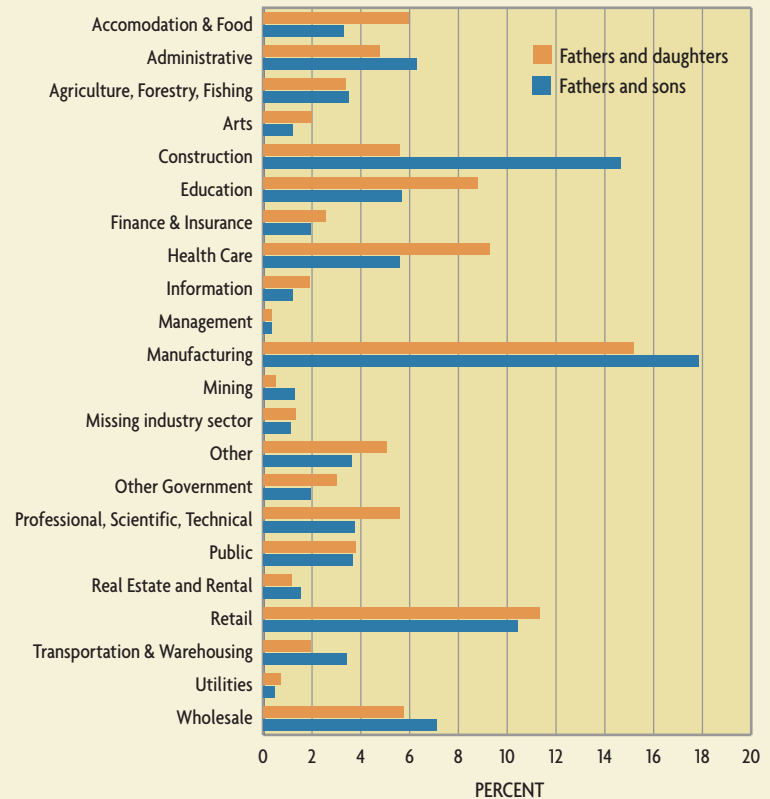
The evidence says that footstep-following often reflects, not feudal-like entrapment, but a desire to capitalize on opportunities. In that regard, some parents see occupation-specific human capital and reputational capital as gifts they can pass on to their children. But how far should those parents go in that direction?

Laband, who spent much of his career studying footstep-following, argues for openness. Conveying excitement about the world of work is a positive, he says, but “don’t just highlight the benefits of your occupation to your children; be candid with them about the pros and cons, so as they’re considering the range of opportunities they might pursue, they walk in with their eyes fully open.”

For the child who does learn the pros and cons and concludes that the work is attractive, Laband says, the upside

### Following Into a Parent’s Employer

Percentage of all shared-employer jobs, by sector



NOTE: Values represent the percentage of all shared-employer jobs (employer shared by parent and child) in each sector, as a share of all shared-employer jobs.

SOURCE: Martha Stinson and Christopher Wignall, “Fathers, Children, and the Intergenerational Transmission of Employers,” U.S. Census Bureau Center for Economic Studies Working Paper No. 18-12, March 2018, table 10.

may be a more satisfying career. “Any occupation has a downside — financial risks, loneliness, pick your hazard. Someone who goes into an occupation with the experience of watching his or her parents experience the full range of costs and benefits seems to me much more likely to be successful and to experience happiness.” **EF**

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### Economic Brief

March 2018, EB18-03

#### Preventing Bank Runs

By Renee Haltom and Bruno Sultanum

Banking can be defined as the business of maturity transformation, or “borrowing short to lend long.” Economists and policymakers have long viewed banking as inherently unstable, that is, prone to runs. This *Economic Brief* reviews the intuition and theory behind bank runs and the most popular proposed solutions. It also explores new research suggesting that runs might be prevented by creating a new, low-cost type of deposit contract that eliminates the incentive to run.

Banking can be defined as the business of maturity transformation, or “borrowing short to lend long.” For example, commercial banks take deposits from households and businesses — short-term liabilities that depositors can withdraw on demand — and use them to make longer-term loans to other households and businesses. Banking activity does not take place only within commercial banks; entities ranging from money market mutual funds to investment banks perform this bank-like function in what has become known as the “shadow-banking” sector.

Economists and policymakers have long grappled with the question of how to promote a stable banking sector. The core issue in this debate is that banking activity is viewed as inherently fragile — that is, prone to runs. A run is when many depositors withdraw their funds to avoid losing those funds if the bank becomes insolvent. Notably, a run can occur whether the bank is insolvent or not — that is, the fear of a run may be enough to produce one.

Runs can be very costly for economic activity; in fact, many economists view the 2007–08 financial

crisis as having resembled a traditional bank run across many markets.<sup>1</sup> Given the potential costs of runs, preventing them is of interest to policymakers and the general public.

This *Economic Brief* reviews the basic theory of runs and describes how the economics profession has explored potential solutions. It also presents a new solution proposed in a recent model by one author of this brief (Sultanum) along with David Andolfatto of the St. Louis Fed and Ed Nosal of the Atlanta Fed.

#### What Makes Banking Unstable?

To understand why banking may be inherently fragile, it is helpful to articulate its fundamental purpose. Banks solve an important problem for households and businesses by connecting savers (direct lenders) and borrowers. Direct lenders would like a safe place to put their money that offers a return, and borrowers would like to finance productive endeavors. Absent banks, the timing of a direct lender’s desired investment may not match up with the duration of the project that the borrower wants to fund. Also, direct lenders may struggle to monitor borrowers’

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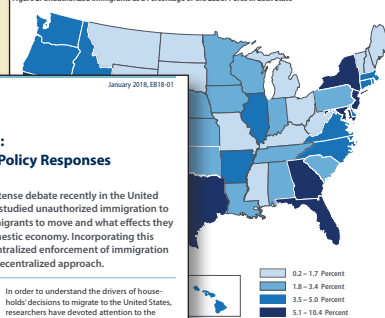
tighter border controls result in higher-skilled immigrants on average.

Unauthorized immigrant men and women also tend to work in different sectors. For example, men tend to work in formal jobs, while women are more likely to be employed by private households in service jobs. This may affect how households of unauthorized immigrants respond to policies intended to deter undocumented workers. Often underlying such policies is an assumption that undocumented workers have a harmful effect on domestic workers. So, over the years, economists have attempted to quantify these effects.

#### Unauthorized Immigrant Workers and the Domestic Economy

Just as gathering data on unauthorized immigrants is challenging, so too is measuring the impact those immigrants have on the domestic economy. Crucial to such analysis is an understanding of how unauthorized immigrant workers compare to domestic workers in terms of the degree of substitutability between the two groups. As long as employers can freely substitute foreign-born workers for domestic workers, an influx of immigrants represents an increase in the overall supply of labor, which would put downward pressure on wages. But if immigrant workers are imperfect substitutes for domestic work-

Figure 2: Unauthorized Immigrants as a Percentage of the Labor Force in Each State



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### Economic Brief

January 2018, EB18-01

#### Unauthorized Immigration: Evaluating the Effects and Policy Responses

By Santiago Pinto and Tim Sahlk

Immigration has been the subject of intense debate recently in the United States and in Europe. Economists have studied unauthorized immigration to better understand what motivates immigrants to move and what effects they have on domestic workers and the domestic economy. Incorporating this research into a model suggests that centralized enforcement of immigration policies may be more effective than a decentralized approach.

Immigration has recently been the subject of intense policy debate. Interest in immigration is not new, however. For many years, economists have devoted considerable attention to studying the factors that drive individuals to migrate from one country to another, the effects of immigration on the domestic economy, and how immigrants respond to various policies. Recently, economists have focused specifically on immigrants who enter the country unlawfully.

It is generally taken for granted that residents from other countries migrate to the United States because U.S. real wages exceed wages in their countries of origin. However, it is not always straightforward to empirically test this hypothesis using readily available information on documented immigration flows. Binding and slowly changing immigration quotas lead to queues to enter the United States. As a result, entering the country legally is often subject to extended delays. Therefore, legal immigrants do not respond to contemporaneous fluctuations in U.S. or foreign economies. It is partly for this reason that a large portion of the literature on immigration has focused more on the consequences of legal immigration rather than its causes.

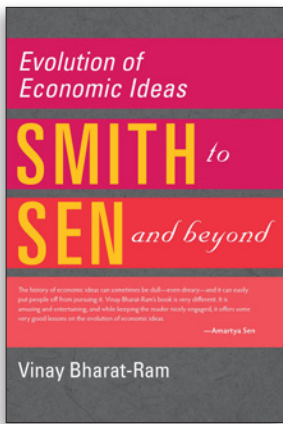
In order to understand the drivers of households’ decisions to migrate to the United States, researchers have devoted attention to the determinants of unauthorized immigration (UI) flows, which are more responsive to changes in business-cycle conditions. The main determinant of this responsiveness is, undoubtedly, the geographic proximity between the source and destination countries of unauthorized immigrants. Close proximity, as between the United States and Mexico, implies that shocks that affect the source country’s economy or the destination country’s economy will quickly result in changes in cross-border population flows. Moreover, as population flows persist over time, migration networks develop, facilitating movement across countries. These networks serve as channels through which U.S. employers communicate changes in local labor demand to prospective immigrants, and immigrants rely on these networks to find jobs and housing in the United States.

The ongoing research on UI is broad. Recent work has focused on the consequences of enforcing immigration policies at the state or local level. This line of research investigates the

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## Observing the Great Observers



**EVOLUTION OF ECONOMIC IDEAS:  
ADAM SMITH TO AMARTYA SEN AND  
BEYOND**

BY VINAY BHARAT-RAM, OXFORD:  
OXFORD UNIVERSITY PRESS, 2017,  
198 PAGES

REVIEWED BY AARON STEELMAN

One of the best-selling economics books of all time is Robert Heilbroner's *The Worldly Philosophers: The Lives, Times, and Ideas of the Great Economic Thinkers*. More than 4 million copies have been purchased since its original publication in 1953. While his interpretations of certain people's views and of particular events have been questioned by some who consider the book overly ideological, the reason for its appeal is widely shared: It features an unusual combination of ambition (he discussed most of the people you would expect to find, as well as many you wouldn't necessarily anticipate encountering) and readability (Heilbroner was a fine stylist, one of the better writers in the economics profession).

Many people have attempted to follow in Heilbroner's footsteps by writing accessible histories of economic thought. Among them is Vinay Bharat-Ram, chairman of DCM Limited, an Indian-based conglomerate with interests in engineering, information technology, real estate, and textiles. Bharat-Ram has also taught economics at the Indian Institute of Technology in Delhi, and his book *Evolution of Economic Ideas: Adam Smith to Amartya Sen and Beyond* is in large part a product of his classroom experience. "I tried to bring in a little human touch by relating abstract theories to my own business experience; it helped, but only up to a point," he writes. "It then struck me that exploring the lives, times, and social circumstances of the various philosophers who gave rise to the ideas that form the foundation of modern economics would be rewarding."

The book is organized around his interaction with students, in an almost Socratic style, with many chapters inspired by a wide range of questions they raised. As a result, it can at times seem a bit disjointed. But, he argues, there is a common thread running through its pages: Each person discussed "was a keen observer of the social conditions of his time and was deeply concerned about making a material difference to the economic well-being of the individual and the society as a whole."

Some histories of thought include fairly comprehensive

discussions of Scholastic thinkers, such as Thomas Aquinas (for instance, Joseph Schumpeter's monumental *History of Economic Analysis*), while others consider work done during the Renaissance. Bharat-Ram chooses the more conventional route of beginning with Adam Smith, whom he discusses with admiration and tries to rescue from the one-dimensional picture that some people have painted of him. "[M]any in Smith's own lifetime and many in the economics profession today believe that Smith's primary focus in the achievement of prosperity in society was on man's self-interest or selfishness," he writes. "The truth was — especially those who have read his *The Theory of Moral Sentiments* would appreciate this — that Smith's view of man was quite well-rounded. Smith believed that man was quite capable of empathizing with the suffering of others as well as taking upon himself the role of an impartial observer." He dubs Smith "The Great Optimist."

Following his discussion of Smith, he considers those he calls "The Pessimists," in particular, Thomas Malthus and David Ricardo, and then moves on to discuss "The Angry Genius," Karl Marx. His chapter on Marx is one of the better in the book and is followed by a brief but insightful discussion of Marx's critic, Eugen von Böhm-Bawerk, who argued that profit and interest do not simply amount to exploitation of labor, but rather are compensation for risk taken by capitalists.

Bharat-Ram's coverage of the important figures of the first few decades of the 20th century is satisfactory, but the book reaches a relative high point in his discussion of the debate between John Maynard Keynes and F.A. Hayek in the 1930s on business cycles. Bharat-Ram shows a strong interest in development economics and devotes a lengthy chapter to the Saint Lucian economist William Arthur Lewis. He also spends significant time on his countrymen Jagdish Bhagwati and Amartya Sen. Indeed, the book has somewhat of an overall Indian-centric focus, but this is unsurprising given its structure: Naturally, his students would be interested in how the ideas he considers apply to issues they routinely encounter. The book concludes with a short discussion of the 2008 financial crisis and the state of economic theory today.

Bharat-Ram disappoints in his over-reliance on secondary sources, such as Mark Skousen's *The Making of Modern Economics* and Sylvia Nasar's *Grand Pursuit: The Story of Economic Genius*. The book also has a surprising number of typographical errors. But, overall, it is a concise and useful introduction to the history of economic thought, although some readers might feel themselves better served by one of its competitors in that market, such as Todd Buchholz's *New Ideas from Dead Economists*. EF

### Diversification and Specialization Across Urban Areas

BY ANN MACHERAS AND MICHAEL STANLEY

Los Angeles is famous for the entertainment industry, San Jose for technology companies, and New York for the financial firms surrounding Wall Street. While each of these urban areas has a unique identity related to a particular sector of the economy, each is also, in fact, very diverse in its industrial composition. Urban areas differ in the extent to which they have a diverse set of industries or, conversely, the degree to which they are very specialized in a particular industry. Richmond Fed analysis supports previous research findings on the extent to which diversification or specialization varies with the employment size of urban areas. The concentration of firms in urban areas provides benefits that can derive from being close to other firms within the same industry and also from having access to a wider array of products and services from other industries. These benefits, or “economies,” help to explain why some urban areas grow more than others. This article examines some of these important concepts, provides relevant data for urban areas across the United States, and describes how diverse or specialized Fifth District urban areas are relative to other urban areas.

#### Diversification, Size, and Growth

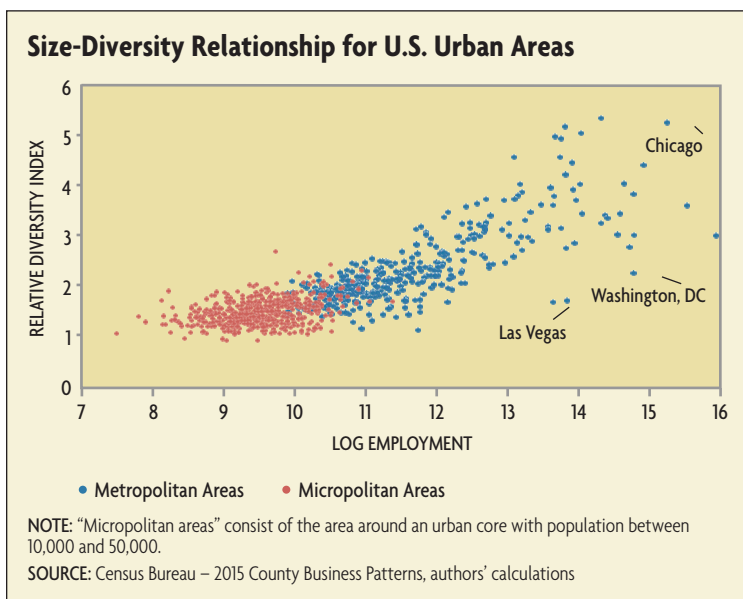
Researchers have explored why urban areas arise and what forces contribute to their growth. (Such research often considers not just urban areas, but metropolitan areas, which can include the urban core and surrounding counties.) In the Richmond Fed’s 2016 *Annual Report* essay, Santiago Pinto and Tim Sablik explained that cities arise because of the advantages of concentrating economic

activity in one place — a concept economists refer to as “agglomeration economies.” Firms within the same industry that cluster together can benefit from creating enough demand for their inputs that producers of these shared inputs decide they want to locate close by as well. The resulting improved access and lower cost of inputs is an example of “localization economies.”

Another type of agglomeration benefit can arise from firms in multiple industries locating in an area, providing a diverse industrial base. Such a variety of industries can give firms access to a broader array of business activities such as banking and legal services or better transportation networks, as well as a more abundant pool of educated workers. Benefits arising because of the diversity of industries are known as “urbanization economies.” An important source of agglomeration economies, both within industries and across industries, comes from the frequency of interactions between people within an urban area and the opportunities to learn from each other, which creates knowledge spillovers, or benefits that firms receive at no cost to them.

To study the industrial diversity of urban areas, economists need a measure of diversity that can be compared across different areas. One such measure is the relative diversity index (RDI), which compares the employment shares of industries in a given area to the industry shares of employment in the nation as a whole. The index increases as an area’s employment pattern moves closer to the nation’s pattern of industry employment, but it decreases toward zero as an area becomes more specialized in a few industries.

Gilles Duranton of the University of Pennsylvania and Diego Puga of the Centro de Estudios Monetarios y Financieros, or CEMFI, in a 2000 article in *Urban Studies*, calculated the RDI using 1992 data to compare diversity across U.S. metro areas. They found that larger urban areas, as measured by total employment, tend to be more diverse than smaller ones. We replicated this comparison using 2015 data from the U.S. Census Bureau and found that the relationship still holds: The diversity of urban areas generally increases with the employment size of the area. (See chart.) Our results show a strong relationship between size and diversity, with a correlation of 0.83 between the log of metro area employment and the RDI in 2015. Phoenix, Ariz., and Chicago, Ill., are the most diverse metro areas in the nation, while smaller urban areas are the least diverse. (For each metro area, we used employment at the three-digit NAICS level, a level of detail that provides enough variation



across industries but limits the problem of data suppression that occurs if an industry is too small for the data to be reported publicly.)

### Specialization, Size, and Growth

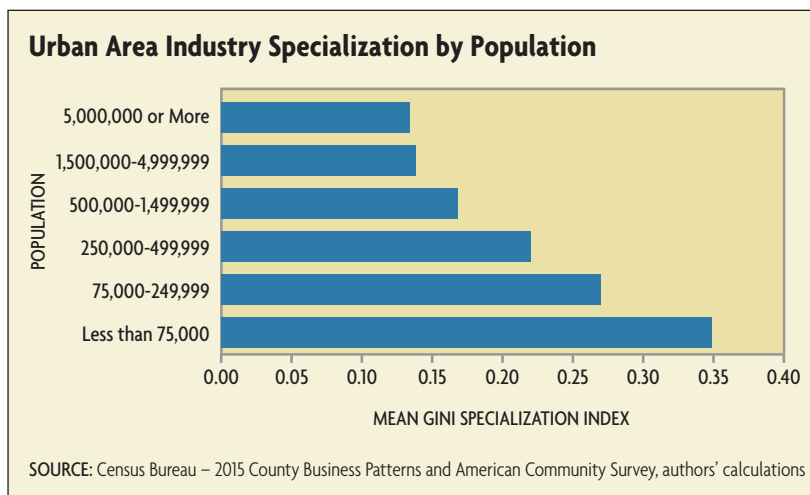
At the other end of the spectrum, some urban areas are characterized by a few large industries that tend to dominate local economic activity. For example, the Napa, Calif., metro area is specialized in wine production, and Gulfport, Miss., is concentrated in petroleum refining and related activities. As described in the previous section, these metropolitan areas may be characterized by strong localization economies that have provided advantages that lead firms within an industry to cluster together geographically. When viewed against national patterns of industry concentration, measured by shares of employment in a particular industry, urban areas can be described by the extent to which they are “specialized.” It turns out that large urban areas, based on total employment, are less specialized (more diverse) and smaller urban areas are more specialized (less diverse), but this does not tell the entire story.

One measure of urban area specialization involves a variation of the Gini index, which is most commonly used to measure income inequality. The Gini specialization index (GSI) is equal to zero if the employment shares for all industries in the area match those in the nation, but it approaches a value of 1.0 if the area is fully specialized in a single industry that is very small in the nation as whole. This index is directly related to the inverse of the RDI, so areas with high GSIs should have comparably low RDIs.

Using the GSI as a measure of specialization, Duranton and Puga, in a 2005 article in the *Journal of Urban Economics*, explored the change in industrial specialization over time and also across population size categories within a given year. They found that industrial specialization has declined over time, from 1977 to 1997, and that the degree of specialization at a given point in time was largest, on average, for smaller urban areas. We used 2015 data at the three-digit NAICS level to replicate their work and found that the relationship still holds — smaller urban areas are more specialized on average, as indicated by a larger GSI, than urban areas with greater population. (See chart.)

### Can Diverse Metros Have Specialized Industries?

Our analysis, and the work of Duranton and Puga, shows that an area can be diverse in its industrial composition and at the same time have one or more highly specialized industries. The previous measures we have described here, the RDI and GSI, are broad measures of relative diversity or specialization, respectively. They are calculated with data from all industries in order to provide



a single measurement for an urban area, comparing the pattern of employment across all industries to the national pattern. But it is also useful to understand the concentration of an individual industry within a single area relative to its concentration nationally. For this, we need a new measure: The location quotient (LQ) measures how concentrated a single industry is in an area by comparing shares of employment (or some other measure of economic activity) in that area with the same industry's share in the nation. Using shares of employment makes it easier to compare areas of different size, which would not be possible by comparing employment numbers directly. For example, an LQ of 2.0 means the industry is twice as concentrated in the urban area as in the nation, while an LQ of 0.5 means it is only half as concentrated. If the LQ equals 1.0, then the United States and the area of comparison must have the same relative industry concentration. These comparisons of LQs have the same interpretation no matter how large or small the urban areas and provide an easy way to compare industry concentration across urban areas, all relative to the nation.

Using the LQ measure to reveal specialized industries, it is possible for an area to be highly diverse, based on its RDI, even though some industries in that area are highly concentrated when compared to their employment shares in the nation as a whole. For example, the Chicago metro area is the second most diverse area in the United States as measured by the RDI, but employment in funds, trusts, and related financial activities is more than four times as concentrated in Chicago as in the United States. (See table on next page.) This is possible because the relative size of the industry matters for the RDI. The funds and trusts industry accounts for only two-hundredths of a percent of employment in the Chicago metro area, but this is still significantly larger than the share of U.S. employment in that industry. Because this industry is so small, it has little impact on the RDI, and total diversity in the region can be high even though that industry is highly concentrated in Chicago according to the LQ.

### Urban Areas with Highest Industry Diversity

RDI Rank	Urban Area	Most Concentrated Industry (Location Quotient)	RDI	GSI
1	Phoenix, AZ	Air Transportation (2.7)	5.9	0.085
2	Chicago, IL	Funds, Trusts, and Other Financial Vehicles (4.1)	5.8	0.087
3	Portland, OR	Computer and Electronic Product Manufacturing (2.7)	5.7	0.088
4	St. Louis, MO	Primary Metal Manufacturing (1.9)	5.5	0.091
5	Indianapolis, IN	Warehousing and Storage (2.8)	5.4	0.092
6	Kansas City, MO	Telecommunications (2.1)	5.4	0.093
7	Cincinnati, OH	Paper Manufacturing (2.0)	5.0	0.100
8	Buffalo, NY	Transit and Ground Passenger Transportation (2.0)	5.0	0.100
9	Tampa, FL	Leather and Allied Product Manufacturing (2.5)	4.9	0.103
10	Dallas, TX	Air Transportation (3.3)	4.8	0.104

SOURCE: Census Bureau – 2015 County Business Patterns, authors' calculations

The fact that metro areas can be simultaneously diverse and specialized (when narrowly defined) explains why even in large metropolitan areas, policymakers often define target industry clusters for the purpose of economic development marketing. The Boston area promotes the diversity of its economy (with an RDI of 2.97, ranked 81 out of 917 in our data) at the same time that it highlights its concentration of several industry segments such as financial services, information technology, health care, manufacturing, and tourism. Fittingly, our calculations show that the Boston metro area is relatively specialized in some of these fields. Two financial industries (funds, trusts, and other financial vehicles; securities, commodities, and other financial investments) are tied for the second-highest LQ in Boston at 2.6. Other specialized industries (as measured by LQ) that Boston boasts of include educational services, non-Internet publishing, data processing and hosting, computer and electronics manufacturing, and other information services, all of which are at least twice as concentrated in Boston as in the nation. In particular, Boston has been vying with San Francisco in claiming a position as the premier biotech hub. San Francisco, compared to Boston, measures as slightly more diverse overall, with an RDI of 3.25. But when comparing individual industries, San Francisco appears far more specialized than Boston, with an LQ of 3.3 in non-Internet publishing, 4.4 in data processing and hosting, and an impressive 8.2 for other information services. Both metro areas benefit from a density of colleges and universities and the ability to attract college graduates and scientific talent, which are important contributors to knowledge transfer spillovers.

#### Industry Diversity in the Fifth District

Urban areas in the Fifth District are distributed across the diversity spectrum. For example, Charlotte, N.C., is one

of the most diverse metro areas in the nation, ranked 11, while Bennettsville, S.C., is one of the least diverse, ranked 902 out of 917 urban areas. (See chart on next page.) When compared to urban areas across the nation, areas in the Fifth District are slightly more diverse than average, with a mean RDI of 2.0 in the Fifth District versus 1.9 for the United States, but this difference is likely not significant.

Among Fifth District urban areas, Charlotte has the greatest industry diversity, with an RDI of 4.6. Rounding out the top five diverse urban areas in the Fifth District, Charlotte is followed by Richmond, Va.; Raleigh, N.C.; Baltimore, Md.; and Columbia, S.C. The largest urban area in the Fifth District, Washington, D.C., ranks 19th within the district in diversity and 157th nationally. The Washington, D.C., metro area is not a typical large urban area, however, in view of the strong presence of the federal government and federal government contractors.

The Charlotte metro area serves as a good example of many of the complexities involved in discussing diversity and specialization. The most specialized industry in Charlotte, based on the LQ, is textile mills, which is more than seven times as concentrated in Charlotte as in the nation as a whole. Yet Charlotte is not particularly known for its textiles, which represent less than 1 percent of employment in the area. Bennettsville, the most specialized area in the Fifth District based on its low RDI value, also has its highest LQ in textile mills. But in Bennettsville, they account for approximately 15 percent of employment, with a concentration more than 177 times as strong as in the nation. This illustrates that areas differing widely in our broadest measure of industry diversity can be quite similar in terms of their most concentrated industries – in this case, textile mills. Yet the textile mill industry plays a much more significant role in Bennettsville than it does in Charlotte. Charlotte is better known for its financial sector, which is much larger than textiles despite appearing less concentrated by LQ. Credit intermediation services account for more than 50,000 jobs in the area and have the third-highest LQ in Charlotte at 2.4. Importantly, these financial jobs are supported by a wide array of other business services that provide agglomeration economies, while also making Charlotte one of the most diverse urban areas in the Fifth District and the nation.

As previously mentioned, it is notable that the Fifth District has a high concentration in the textile mills industry.



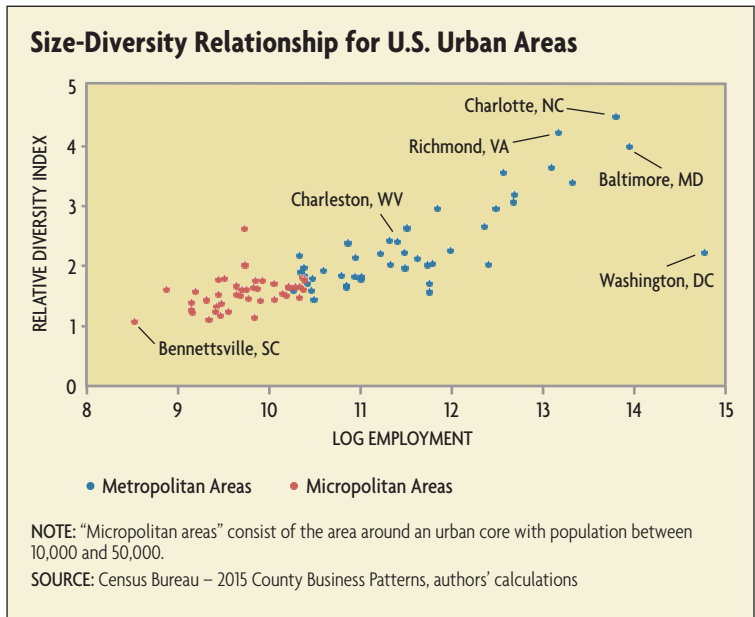
Of the 87 urban areas in the district, the textile mills industry has the highest LQ in 25 of them. The next most common industry is mining (excluding oil and gas), which has the highest LQ in seven urban areas. Despite this concentration, the Fifth District does not appear more specialized, overall, than the nation as a whole, likely because these industries are relatively small. In the 25 urban areas where textile mills are the most concentrated industry, the average employment share of that industry is only 2.5 percent, so this does not have a large impact on diversity measures across all industries.

### Conclusion

Urban areas vary in size and in industry composition across the nation, with some having a diverse mix of industries and others being relatively more specialized. Past economic research has found that measures of relative industry diversity increase with the population size of metropolitan areas. This makes sense because larger urban settings provide the backdrop for beneficial “urbanization economies” that occur when an industry experiences production or cost advantages from close proximity to a variety of other industries such as a range of business activities or improved transportation networks. In contrast, smaller urban areas tend to be more specialized. Our analysis confirms that this relationship between population size and industry diversity still holds true, both across the nation and within the Fifth District.

Interestingly, diversity and specialization are not

mutually exclusive, as large and diverse urban areas can be specialized in one or more particular industries. This is easily seen by examining LQs, or the concentration of a particular industry in an urban area relative to that same industry’s concentration in the nation. In general, the pattern of diversity and specialization in the Fifth District mimics the national pattern, with increasing measures of diversification as we move along the spectrum from Bennettsville, S.C., its smallest urban area, to Charlotte, N.C., one of its largest. **EF**



## TAKE A SNAPSHOT

This monthly update on the Fifth District economy includes timely analysis of labor market, household, business, and real estate conditions at both the state and metro level.

Visit: [www.richmondfed.org/research/regional\\_economy/reports/snapshot](http://www.richmondfed.org/research/regional_economy/reports/snapshot)



# STATE DATA, Q2:17

	DC	MD	NC	SC	VA	WV
<b>Nonfarm Employment (000s)</b>	<b>790.1</b>	<b>2,750.1</b>	<b>4,393.0</b>	<b>2,079.0</b>	<b>3,957.9</b>	<b>745.5</b>
Q/Q Percent Change	0.2	0.1	0.2	0.2	0.1	-0.2
Y/Y Percent Change	1.1	1.8	1.5	1.5	1.2	-0.4
<b>Manufacturing Employment (000s)</b>	<b>1.2</b>	<b>102.8</b>	<b>463.8</b>	<b>245.6</b>	<b>233.0</b>	<b>45.4</b>
Q/Q Percent Change	0.0	-0.5	0.4	1.0	0.2	-0.4
Y/Y Percent Change	0.0	-1.1	-0.1	3.3	0.4	-3.1
<b>Professional/Business Services Employment (000s)</b>	<b>168.1</b>	<b>458.1</b>	<b>630.7</b>	<b>272.3</b>	<b>735.2</b>	<b>65.5</b>
Q/Q Percent Change	-0.3	1.0	1.7	1.6	0.9	0.6
Y/Y Percent Change	1.9	4.1	4.3	1.2	2.9	-0.5
<b>Government Employment (000s)</b>	<b>238.8</b>	<b>514.0</b>	<b>731.8</b>	<b>365.8</b>	<b>714.8</b>	<b>154.2</b>
Q/Q Percent Change	-0.6	0.7	0.3	0.3	0.0	-0.7
Y/Y Percent Change	-0.4	2.0	0.9	0.8	0.1	-1.4
<b>Civilian Labor Force (000s)</b>	<b>401.5</b>	<b>3,229.3</b>	<b>4,927.2</b>	<b>2,328.3</b>	<b>4,307.3</b>	<b>779.8</b>
Q/Q Percent Change	1.2	0.7	-0.3	0.3	0.6	-0.2
Y/Y Percent Change	2.3	2.1	1.6	1.4	2.0	-0.3
<b>Unemployment Rate (%)</b>	<b>6.0</b>	<b>4.2</b>	<b>4.5</b>	<b>4.1</b>	<b>3.8</b>	<b>4.6</b>
Q1:17	5.7	4.2	5.1	4.4	3.9	5.2
Q2:16	6.1	4.3	5.0	5.1	4.0	6.0
<b>Real Personal Income (\$Bil)</b>	<b>47.2</b>	<b>319.6</b>	<b>395.3</b>	<b>180.2</b>	<b>406.7</b>	<b>60.6</b>
Q/Q Percent Change	0.0	0.6	0.7	0.3	0.3	-0.5
Y/Y Percent Change	0.7	1.4	2.2	1.9	1.2	-0.2
<b>New Housing Units</b>	<b>1,081</b>	<b>4,801</b>	<b>14,602</b>	<b>8,673</b>	<b>8,376</b>	<b>764</b>
Q/Q Percent Change	59.7	26.8	-7.8	4.6	15.6	13.2
Y/Y Percent Change	-17.8	-14.2	-3.4	-1.8	1.2	-1.9
<b>House Price Index (1980=100)</b>	<b>847.6</b>	<b>461.4</b>	<b>361.2</b>	<b>365.3</b>	<b>449.9</b>	<b>233.3</b>
Q/Q Percent Change	3.1	2.1	3.6	2.2	2.7	1.8
Y/Y Percent Change	6.8	3.9	7.2	6.2	4.0	2.0

**NOTES:**

- 1) FRB-Richmond survey indexes are diffusion indexes representing the percentage of responding firms reporting increase minus the percentage reporting decrease. The manufacturing composite index is a weighted average of the shipments, new orders, and employment indexes.
- 2) New housing units and house prices are not seasonally adjusted; all other series are seasonally adjusted.
- 3) Manufacturing employment for DC is not seasonally adjusted

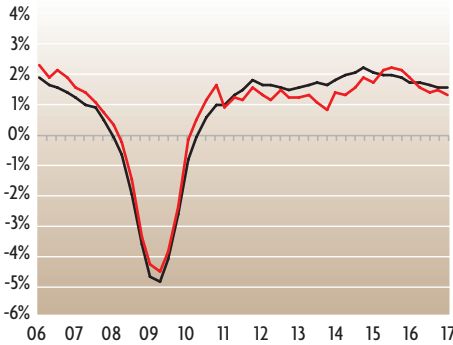
**SOURCES:**

Real Personal Income: Bureau of Economic Analysis/Haver Analytics.  
 Unemployment Rate: LAUS Program, Bureau of Labor Statistics, U.S. Department of Labor/Haver Analytics  
 Employment: CES Survey, Bureau of Labor Statistics, U.S. Department of Labor/Haver Analytics  
 New housing units: U.S. Census Bureau/Haver Analytics  
 House Prices: Federal Housing Finance Agency/Haver Analytics

For more information, contact Michael Stanley at (804) 697-8437 or e-mail michael.stanley@rich.frb.org

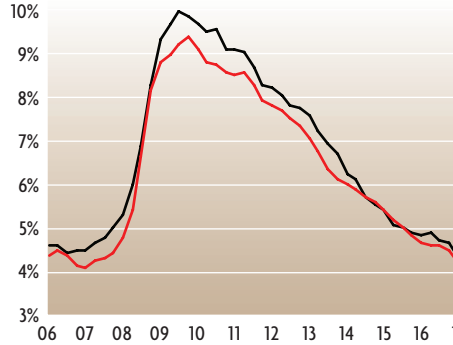
### Nonfarm Employment

Change From Prior Year  
Second Quarter 2006 - Second Quarter 2017



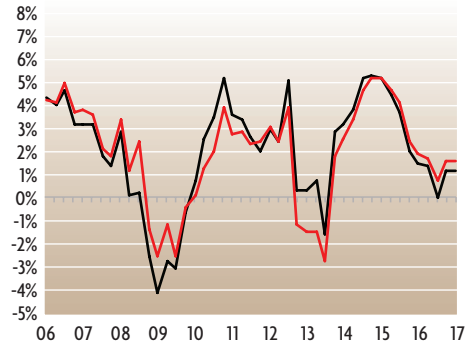
### Unemployment Rate

Second Quarter 2006 - Second Quarter 2017



### Real Personal Income

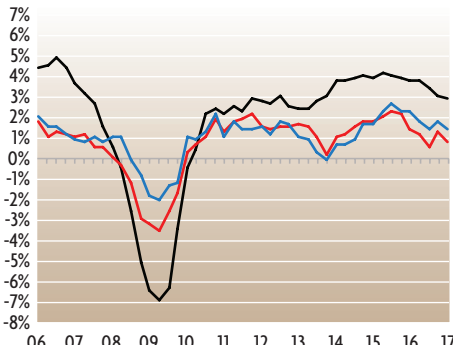
Change From Prior Year  
Second Quarter 2006 - Second Quarter 2017



— Fifth District — United States

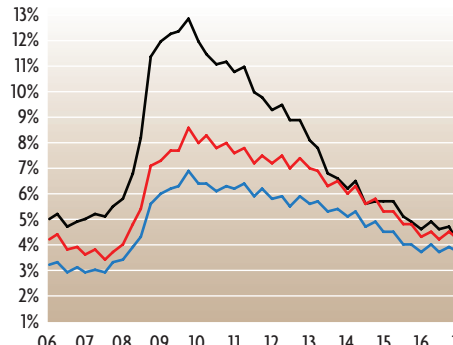
### Nonfarm Employment Major Metro Areas

Change From Prior Year  
Second Quarter 2006 - Second Quarter 2017



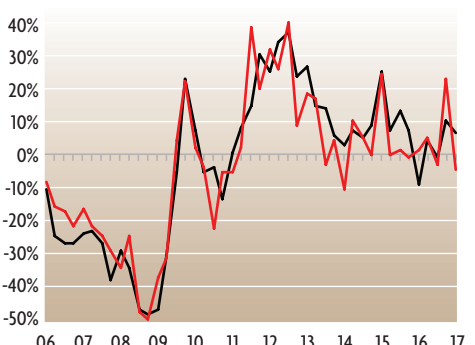
### Unemployment Rate Major Metro Areas

Second Quarter 2006 - Second Quarter 2017



### New Housing Units

Change From Prior Year  
Second Quarter 2006 - Second Quarter 2017



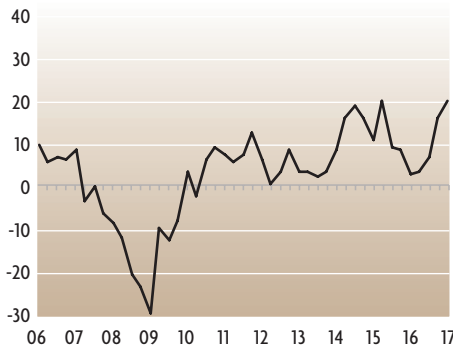
— Charlotte — Baltimore — Washington

— Charlotte — Baltimore — Washington

— Fifth District — United States

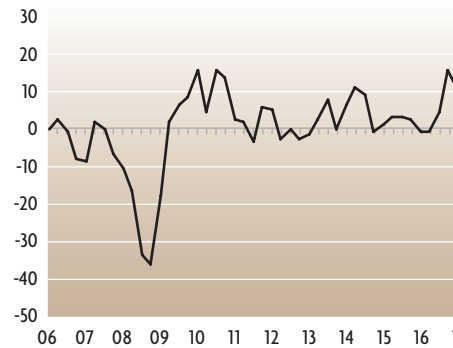
### FRB—Richmond Services Revenues Index

Second Quarter 2006 - Second Quarter 2017



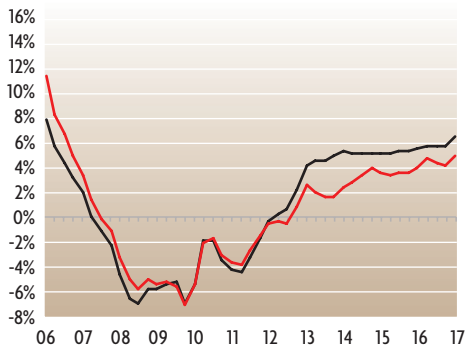
### FRB—Richmond Manufacturing Composite Index

Second Quarter 2006 - Second Quarter 2017



### House Prices

Change From Prior Year  
Second Quarter 2006 - Second Quarter 2017



— Fifth District — United States

# METROPOLITAN AREA DATA, Q2:17

	Washington, DC	Baltimore, MD	Hagerstown-Martinsburg, MD-WV
<b>Nonfarm Employment (000s)</b>	<b>2,681.0</b>	<b>1,412.1</b>	<b>107.7</b>
Q/Q Percent Change	1.6	1.7	1.6
Y/Y Percent Change	1.4	0.8	0.4
<b>Unemployment Rate (%)</b>	<b>3.7</b>	<b>4.2</b>	<b>3.8</b>
Q1:17	3.7	4.4	4.0
Q2:16	3.8	4.4	4.4
<b>New Housing Units</b>	<b>6,683</b>	<b>1,812</b>	<b>306</b>
Q/Q Percent Change	31.8	25.2	17.2
Y/Y Percent Change	-13.7	-13.2	20.9

	Asheville, NC	Charlotte, NC	Durham, NC
<b>Nonfarm Employment (000s)</b>	<b>191.6</b>	<b>1,181.1</b>	<b>309.8</b>
Q/Q Percent Change	2.0	1.7	1.1
Y/Y Percent Change	1.9	2.8	2.2
<b>Unemployment Rate (%)</b>	<b>3.5</b>	<b>4.2</b>	<b>4.0</b>
Q1:17	4.0	4.7	4.4
Q2:16	3.9	4.7	4.4
<b>New Housing Units</b>	<b>780</b>	<b>4,220</b>	<b>1,191</b>
Q/Q Percent Change	64.9	-15.2	8.4
Y/Y Percent Change	28.3	-5.3	14.0

	Greensboro-High Point, NC	Raleigh, NC	Wilmington, NC
<b>Nonfarm Employment (000s)</b>	<b>362.3</b>	<b>617.6</b>	<b>127.5</b>
Q/Q Percent Change	0.8	1.9	3.2
Y/Y Percent Change	1.2	2.8	2.3
<b>Unemployment Rate (%)</b>	<b>4.7</b>	<b>3.9</b>	<b>4.2</b>
Q1:17	5.1	4.3	4.6
Q2:16	5.1	4.2	4.7
<b>New Housing Units</b>	<b>812</b>	<b>3,668</b>	<b>512</b>
Q/Q Percent Change	-6.7	-5.2	18.5
Y/Y Percent Change	-20.2	-12.7	0.6

NOTE:  
Nonfarm employment and new housing units are not seasonally adjusted. Unemployment rates are seasonally adjusted.

	Winston-Salem, NC	Charleston, SC	Columbia, SC
<b>Nonfarm Employment (000s)</b>	<b>262.0</b>	<b>354.1</b>	<b>398.2</b>
Q/Q Percent Change	0.5	1.4	1.2
Y/Y Percent Change	0.0	2.0	1.2
<b>Unemployment Rate (%)</b>	<b>4.3</b>	<b>3.4</b>	<b>3.8</b>
Q1:17	4.7	3.8	4.2
Q2:16	4.7	4.3	4.6
<b>New Housing Units</b>	<b>611</b>	<b>1,658</b>	<b>1,496</b>
Q/Q Percent Change	34.0	-3.9	25.7
Y/Y Percent Change	-3.8	-17.6	21.4
	Greenville, SC	Richmond, VA	Roanoke, VA
<b>Nonfarm Employment (000s)</b>	<b>413.3</b>	<b>676.7</b>	<b>163.8</b>
Q/Q Percent Change	1.4	2.3	0.8
Y/Y Percent Change	0.8	1.7	0.6
<b>Unemployment Rate (%)</b>	<b>3.6</b>	<b>3.9</b>	<b>3.8</b>
Q1:17	4.0	3.9	3.7
Q2:16	4.5	4.1	3.8
<b>New Housing Units</b>	<b>1,321</b>	<b>1,546</b>	<b>N/A</b>
Q/Q Percent Change	11.0	-7.5	N/A
Y/Y Percent Change	-8.8	10.2	N/A
	Virginia Beach-Norfolk, VA	Charleston, WV	Huntington, WV
<b>Nonfarm Employment (000s)</b>	<b>774.5</b>	<b>119.2</b>	<b>138.6</b>
Q/Q Percent Change	1.6	1.5	1.2
Y/Y Percent Change	-0.2	-0.7	0.1
<b>Unemployment Rate (%)</b>	<b>4.3</b>	<b>4.7</b>	<b>5.5</b>
Q1:17	4.2	5.0	5.8
Q2:16	4.6	5.9	6.2
<b>New Housing Units</b>	<b>1,665</b>	<b>29</b>	<b>77</b>
Q/Q Percent Change	2.3	-43.1	120.0
Y/Y Percent Change	-12.7	-52.5	-601.8

For more information, contact Michael Stanley at (804) 697-8437 or e-mail [michael.stanley@rich.frb.org](mailto:michael.stanley@rich.frb.org)

## Is There a Wage Growth Puzzle?

BY JOHN A. WEINBERG

The Great Recession saw a weakening of labor markets that was, by some measures, the worst since the Great Depression. On an aggregate level, labor markets have since recovered substantially — the unemployment rate has fallen from a peak of 10 percent to just above 4 percent. At the same time, data on wages and hiring highlight something that has puzzled macroeconomists: As the labor market reaches levels consistent with full employment, wage growth seemingly remains slow.

As the economy recovers and employers start hiring again, the pool of individuals looking for a job should start to shrink relative to the openings created by employers. When that happens, wages should rise in a bid by employers to entice workers to enter the labor market or change jobs. But employers haven't reported the robust wage growth that we might expect. The January 2018 Beige Book, a Fed publication that assembles comments collected by Reserve Banks on local economic conditions from business contacts and other observers, reported "moderate" wage growth, although some employment sectors reported more increases than others.

What could explain the fact that labor markets seem to be tightening while wage growth appears subdued? There are a few possible ways to reconcile this seeming contradiction. The first is to remember to account for inflation when measuring wage growth. Because inflation has been lower recently compared to previous periods, nominal wage growth has also been lower. This contributes to the perception of a sluggish recovery. Researchers at the Brookings Institution's Hamilton Project argue that after adjusting for inflation, wages have actually grown faster in this recovery than during previous expansions going back to 1981.

A second explanation that has been proposed for depressed wage growth is declining productivity growth. The more productive workers are, the more valuable they are to employers, which should lead to higher wages. Historically, wages have grown in tandem with productivity over time. Moreover, economists have found that in recent decades, wage growth seems to be more closely tied to productivity than to measures of labor market slack or tightness like the unemployment rate. Like wages, productivity growth has also slowed since the 2000s. This may partially explain any slowdown in wage growth as well.

In fact, researchers at the Cleveland Fed have found that given low inflation and slow productivity growth, wage growth since late 2014 should have actually been weaker than what we have observed. Additionally, labor's share of income, which is the share of the economy's output that accrues to workers in the form of wages, had been

declining since the early 2000s but recently that decline has flattened and even reversed, another indication that wage growth may be strengthening further.

Of course, these measures tell us about the state of the aggregate labor market on a national level, which may mask differing labor conditions across industries, occupations, and geographic areas. Different parts of the economy can experience different labor supply and demand conditions, and the relative sizes of these parts of the economy may change over time. In this regard, looking at more granular data can be informative. On an aggregate level, strong wage growth in some areas may be offset by weak growth elsewhere.

Indeed, there has recently been some evidence suggesting that wages are growing faster in those metropolitan statistical areas with the lowest rates of unemployment. In the Fifth District, evidence on wage growth has been mixed. Like the other Reserve Banks, the Richmond Fed surveys employers in manufacturing and the service sector every month about business conditions in the Fifth District, including their sales, prices, and wages. Our wage indices for the manufacturing and services surveys, which measure the difference between the share of employers reporting that they increased in wages over the last month and those reporting a decrease, have risen only slightly since 2015.

At the same time, we've heard from some employers across our district that they are having difficulty finding qualified workers and have increased wages. The fact that many employers have expressed difficulty finding workers with the right skills may suggest that some labor market tightness is due to structural factors rather than broad-based recovery. To the extent this is true, workers without the right investments in human capital may not benefit from increasing wages.

From the perspective of monetary policy, the Fed's goal is to achieve maximum employment with stable prices. Both quantitative and qualitative measures suggest that labor markets are tightening. While nominal wage growth has been sluggish, real wage growth seems in line with, or even better than, what we've observed in some previous expansions. A substantial strengthening of wage growth without a corresponding growth in productivity could contribute to an acceleration of inflation. Accordingly, the Fed's monetary policymakers will continue to track both aggregate and regional measures of the labor market to inform their policy decisions. **EF**

**John A. Weinberg is a senior advisor in the Research Department at the Federal Reserve Bank of Richmond.**

# NEXT ISSUE

## Market Concentration

Many industries have become increasingly concentrated in the hands of fewer dominant firms. What's behind this trend? Are firms like Google, Apple, or Amazon simply more productive than their would-be rivals, earning them an outsized market share? Or is increased concentration a sign of monopoly power, which, some argue, has allowed dominant firms to earn higher profits at the expense of productivity and wage growth?

## Pay for Success

State and local governments in the Richmond Fed's district (and beyond) are increasingly experimenting with "pay for success," a funding method for social services that aims to shift risk from the public to the private sector. What are the promises and limits of this model?

## Do Entrepreneurs Pay to Be Entrepreneurs?

Being a self-made man or woman has long been part of the American dream. But could entrepreneurs reap greater financial rewards as employees? Some research suggests so, but other benefits continue to make self-employment attractive.

## Federal Reserve

The Federal Open Market Committee has often taken a cautious "wait and see" attitude on the impact of tax cuts — perhaps due to research on tax cuts of recent decades. For example, tax cuts slated to expire might have only a short-term effect on consumption and investment. And when cuts are anticipated, the economic boost might be less than it would be when they are a surprise. A look at tax overhauls since the 1980s, and how the Fed has factored them into its decisionmaking, reflects what economists have learned about the effects of tax policy.

## District Digest

Research suggests that land-use regulations, zoning laws, and restrictions on housing supply help to shape labor market outcomes across U.S. cities. How relevant are these factors in the Richmond Fed's district?

## Interview

Jesús Fernández-Villaverde of the University of Pennsylvania discusses the state of modern macroeconomics, the eurozone crisis, and the economics of the zero lower bound on interest rates.

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# THE REGIONAL VIEW

PODCAST

Hear what Richmond Fed regional economists have to say about the economy and the Federal Reserve System as they inform groups throughout the Fifth District.

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