

# ECON FOCUS

FEDERAL RESERVE BANK OF RICHMOND

REINSURANCE counterparty deductible  
 risk SERVICES TRANSACTIONS FINANCE  
 SECURITY CAPTIVE PRODUCTS INVESTORS  
 COVERAGE CAPTIVE VALUE LOSSES  
 PROPERTY casualty PREMIUM POLICY PROTECTION  
 FLOAT underwriting LOSSES  
 CATASTROPHE EXCLUSION LIQUIDITY COMMERCIAL LINES  
 PREMIUM asset DERIVATIVES ANNUITIES SECURITY  
 EXCHANGE EFFICIENCY REINSURANCE FUNDING

## INSURANCE IS BORING

OR AT LEAST IT'S SUPPOSED TO BE

claims FUNDING ANNUITIES  
 life CATASTROPHE capital REGULATION REINSURANCE  
 LIQUIDITY  
 COMMERCIAL LINES PARTNERSHIP  
 LENDING VALUE FINANCE  
 EFFICIENCY CASUALTY SECURITIES  
 peril SOLVENCY SHADOW INSURANCE  
 counterparty security CLAIMS deductible policy  
 LOSSES

Why Didn't Canada  
Have a Financial Crisis?

Riding  
the Rails

Interview with  
Mark Gertler

# ECON FOCUS

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## Rethinking the 'Lender of Last Resort'

Many people have come to think of central banks as a necessary, almost inherent, part of a healthy financial system. But for some functions the Fed has adopted since it was created in 1913, there is no reason, in principle, that they must be performed by a central bank. An example is the function of “lender of last resort,” a phrase often used to describe how central banks have tended to respond to financial crises. When many market participants withdraw funding at once, it can mean financial distress for fundamentally solvent borrowers, a situation often called a “run.” Temporary central bank lending to sound institutions can, therefore, prevent unnecessary failures.

Two articles in this issue of *Econ Focus* explore alternatives to a central bank as lender of last resort. One discusses the little-known Panic of 1914, which occurred before the Fed had officially opened its doors. To end the crisis, the Treasury issued fully collateralized emergency currency, and private clearinghouses extended loan certificates to their members. Both helped banks meet depositors' demands. While the Treasury played a strong role in this response, the episode demonstrated that fast access to an asset-backed currency — which need not come from the central government — could stem a run.

Another article in this issue explores why Canada has been able to fend off financial crises almost entirely, while the United States has been especially prone to them. Part of the answer is that, from Canada's inception, its banking system was structured to be less vulnerable to shocks. Banks could establish wide networks of branches to diversify their portfolios. They were also allowed to issue new currency backed by their own general assets to meet the demands of depositors. Both features enabled banks to lend reserves to one another in emergencies and expand the supply of currency elastically.

These responses were effectively ruled out by laws in the United States, as the articles discuss. The lack of diversification and reliable access to reserves made banks rather vulnerable to local economic shocks and seasonal shifts in currency demand — which often led to the very bank runs that our currency and branching restrictions left the banking system ill-equipped to handle.

The Fed was given lender of last resort powers in order to provide a more elastic currency to stave off panics in a way that existing laws prevented the banking system from doing on its own. Thus, the Fed was founded to ameliorate the destabilizing effects of other policies.

There is a parallel to today. The Fed's functions have evolved, now with a much larger role in setting monetary policy, the core mission of the Fed and other central banks. But its lender of last resort powers remain. Many people

have argued that the Fed's “emergency” lending powers under section 13(3) of the Federal Reserve Act — which enables the Fed to extend broad-based loans to troubled markets — must be preserved to enable a response to all manner of “runs” in the financial system.

But one important source of excessive risk, in my view, is the government safety net itself, which includes the lender of last resort. A government backstop reduces the borrowers' incentives to design contracts and credit market instruments that are less vulnerable to runs. It also diminishes the incentives of lenders to monitor borrowers. That makes crises more likely and the government's liquidity support more likely to be called upon. As a result, the government's financial “safety net” only grows over time. Estimates by Richmond Fed researchers show that 57 percent of the entire financial sector is either explicitly guaranteed by the government or market participants can reasonably expect guarantees based on past statements and actions. To the extent that the safety net results in excessive risk-taking, the Fed's present-day lender of last resort powers exist to counteract instabilities created by flawed policies, just as they did when the Fed was founded.

A better way to deal with financial instability would be to scale back the incentives for excessive risk-taking. A smaller government safety net would give markets greater incentive to adopt their own protections against runs. This may not rule out runs entirely. But history has convinced me that the self-fulfilling nature of government backstops cannot reliably prevent runs either and can in fact cause instability. The experiences of 1914 and Canada force one to consider that there could be alternatives to a centralized role of lender of last resort, some which could conceivably be devised by markets themselves under the right set of incentives.

In American history, we have often treated financial system instabilities with reforms that don't address the fundamental problem. My hope is that the Fed's second century will prove that policymakers are willing to take a harder look at the true sources of instability in our financial system. **EF**



JEFFREY M. LACKER  
PRESIDENT  
FEDERAL RESERVE BANK OF RICHMOND

## Bringing Home the Bacon China's WH Group Buys Virginia's Smithfield Foods

Last September, shareholders of Virginia-based Smithfield Foods, the United States' largest pork producer, approved the company's purchase by the Chinese company WH Group for \$4.7 billion.

The deal valued Smithfield at \$7.1 billion taking into account assumed debt. Shareholders received \$34 per share, a 31 percent premium over the closing price the day before the purchase was announced in May. The acquisition was the biggest purchase ever of an American company by a Chinese company.

WH Group, a holding company that also owns China's largest meat processor, purchased Smithfield primarily to gain access to a reliable source of imports. Pork accounts for more than three-quarters of China's meat consumption, and demand has multiplied as more people move into the middle class. But the country's farm system is fragmented and inefficient, and processors have struggled to keep pace. At the same time, Chinese consumers are increasingly wary of Chinese brands after a history of food safety scandals, including the discovery of the illegal additive clenbuterol in the pork of a WH Group subsidiary.

The purchase is also part of WH Group's efforts to appeal to global investors, as was a name change in January from Shuanghui International. WH Group is currently owned by an assortment of private equity

firms, including the private equity arm of Goldman Sachs, but the company started taking orders for a \$5.3 billion initial public offering in mid-April. The IPO will be the largest in Asia since Japan Airlines raised \$8.5 billion in September 2012.

For Smithfield, the deal is an opportunity to keep growing despite a stagnant domestic market. Total U.S. pork consumption has been flat for the past three decades as per capita consumption has steadily declined. "China is the fastest-growing and largest overseas market," Smithfield CEO Larry Pope said in a statement. "Increasing our sales to China is central to our growth strategy."

American pig farmers also stand to benefit from increased exports; the North Carolina Pork Council endorsed the deal for leading to "expanded overseas sales and more opportunities for the thousands of North Carolinians who work in the pork production chain." North Carolina is the United States' second-largest pig farming state, with \$2.56 billion in sales in 2012.

But some politicians and farmers' unions are worried about the effects on U.S. food safety, national security, and intellectual property. The Senate Agriculture Committee held a hearing about the merger in July at which senators expressed concern that the purchase could harm the United States' food supply, or that it was a ploy by WH Group to appropriate Smithfield's expertise and technology in order to encroach on U.S. producers' share of other export markets.

The acquisition required federal clearance. The Committee on Foreign Investment in the United States (CFIUS), a multi-agency body, reviews proposed foreign takeovers of U.S. companies for their potential national security implications. Both Smithfield and WH Group executives have stated that WH Group will not seek to export Chinese pork to the United States. In addition, WH Group has pledged that it will retain Smithfield's entire management team, continue to operate all of Smithfield's facilities, and honor the company's existing union contracts. CFIUS approved the merger without conditions in early September.

PHOTOGRAPHY: COURTESY OF THE BOSTON PUBLIC LIBRARY/TECHNOR BROS. COLLECTION



*Smithfield Foods got its start in 1936 as a small meat-packing company in Smithfield, Va., the home of "genuine Smithfield hams."*

Matthew Slaughter, associate dean of Dartmouth's Tuck School of Business, says that the deal is likely to be good for both Smithfield and the economy as a whole. "What often happens is that when a U.S. company is acquired by a foreign company, the foreign company's connections and expertise in other parts of the world will help pull exports from America," he explains.

And more generally, Slaughter says, foreign direct investment can lead to higher productivity and wages in the receiving country. "The preponderance of evidence for the United States and many other countries

shows that on net, cross-border foreign investment generates large benefits for the countries that are involved, and for a lot of the workers that are involved too."

Some Smithfield workers are nervous about the change, but so far it appears to be business as usual. WH Group's chairman and CEO visited Smithfield's headquarters on their first official day as owners, which happened to be employee appreciation day. While the executives toured the facility, their new employees ate burgers and barbecue (pork, of course) on the lawn outside.

—JESSIE ROMERO

## Rising Tide

### Reforming Flood Insurance Causes Hardship for Homeowners

When Hurricane Betsy hit Louisiana in 1965, it flooded thousands of homes and caused \$1.5 billion in damage (\$11.1 billion in today's dollars). In the aftermath, Congress created the National Flood Insurance Program (NFIP). Today the NFIP covers about 5.6 million participants and insures \$1.29 trillion in assets. Almost exactly 40 years after Betsy, when Hurricane Katrina slammed the Gulf Coast, the NFIP was available to insure homeowners — but claims from Katrina and subsequent storms like Hurricane Sandy left the fund more than \$20 billion underwater. To make up the deficit, Congress passed the Biggert-Waters Flood Insurance Reform Act of 2012, which began phasing out subsidized flood insurance rates in 2013.

Subsidies were seen as necessary to encourage participation early in the NFIP's history. They applied largely to properties constructed before the creation of a national flood insurance rate map in 1974. Properties that were later remapped into higher-risk flood zones could also be "grandfathered" into lower rates if they had been built using the best practices at the time. As a result, about 20 percent of NFIP policyholders receive some form of subsidy. By raising these rates to reflect current flood risks, Congress hoped to put the program back on solid financial footing. But affected homeowners balked at the costs.

"It has had a tremendous impact," says Tomp Litchfield, president of the North Carolina Association of Realtors. "I have seen rates in our area go up by anywhere from 50 percent to well over 100 percent, or in some cases 200 percent."

Some homeowners reported rate increases of more than \$20,000 a year. These sudden increases trapped residents, making their longtime homes both unaffordable and unsellable. Litchfield says he has seen several home sales fall through because of the uncertainty surrounding flood insurance rates. In response to public outcry, the Senate and House passed legislation to limit yearly increases. President Obama signed the bill in March.

The fiscal challenges currently facing the NFIP have been anticipated since its inception, according to Erwann Michel-Kerjan, executive director of the Risk Management and Decision Processes Center at the University of Pennsylvania's Wharton School of Business. In a 2010 *Journal of Economic Perspectives* article, Michel-Kerjan wrote that the NFIP was "designed to be financially self-supporting, or close to it, most of the time, but cannot handle extreme financial catastrophes by itself."

A key problem in providing flood insurance is that the risks are highly correlated. In other insurance markets, such as health or auto, the burden of risk can be spread across a wide geographic area and



*Members of the FEMA Urban Search and Rescue task force survey New Orleans following Hurricane Katrina in 2005. Flood damage claims from the devastating storm left the National Flood Insurance Program about \$17 billion in debt.*

varying risk profiles, making it unlikely that all policyholders will face catastrophic risks at the same time. (See “Risky Business?,” p. 14.) But only homeowners in flood zones are likely to purchase flood insurance, and catastrophic events, if they occur, are likely to affect a large portion of policyholders at the same time, placing a significant financial burden on the insurer.

Raising rates to reflect true flood risks can mitigate the financial risk to the insurer, as well as address another problem: moral hazard. Insuring against consequences can encourage greater risk-taking, and subsidies increase this danger by further isolating policyholders from the costs of risky behavior. In the case of flood insurance, subsidies may encourage overbuilding in flood-prone areas. Indeed, only about 1 percent of insured properties are classified as “repetitive-loss properties” by FEMA, but nearly all of them pay subsidized flood insurance rates, and they have accounted for roughly a quarter of all claim payments between 1978 and 2008. About 10 percent of these repetitive-loss properties have cumulative flood insurance claims that exceed the value of the property itself.

In a 2013 report, the Government Accountability Office (GAO) noted that even if the NFIP’s debt were forgiven, rates would need to increase “significantly” to build up a reserve fund for future catastrophes.

“The financial reforms included in the [Biggert-Waters Act] could go a long way toward reducing the financial exposure created by the program,” the GAO concluded.

—TIM SABLİK

## Making Amends NC Offers Payments to Victims of Its Eugenics Program

North Carolina is now collecting claims from victims of its 48-year forced sterilization program. The gathering of claims is part of a \$10 million compensation plan signed into law by Gov. Pat McCrory last July. North Carolina is the first state to offer compensation to victims of such programs.

About 7,600 men and women were sterilized under North Carolina’s program, which ran from 1929 to 1977, with the last victims sterilized in 1974. The state authorized the practice for “any mentally diseased, feebleminded or epileptic inmate or patient” in a public institution; in addition, social workers could petition for the sterilization of members of the public. Sterilization could be done in the best interest of the patient — or “for the public good.” This phrase, combined with vague designations such as “feebleminded,” led to sweeping implementation. Victims included children as young

as 10, illiterate teenagers, rape victims, and the poor.

North Carolina was not alone in its implementation of “eugenics” — a widespread movement that believed certain conditions should be eliminated from the population by sterilizing anyone who might pass them on. More than 60,000 people suffered under such programs in 32 states.

Why is North Carolina the only state, thus far, offering compensation? The reason may be very simple — its victims are likely to still be alive. Most states abolished their eugenics practices after World War II, while North Carolina sterilized 70 percent of its victims after 1945. This was partly because in the late 1940s, North Carolina began using sterilization as a way to combat poverty, which led to an increase in victims who did not reside in state institutions.

In 2002, North Carolina became one of the first states to formally apologize for its eugenics program,

PHOTOGRAPHY: JOCELYN AUGUSTINO, FEMA

and in 2011, a gubernatorial task force on eugenics was created. In 2012, the task force submitted recommendations that became the basis for the final compensation program.

The \$10 million will be distributed evenly among all claimants. In order to be eligible, claimants must have been alive on June 30, 2013, and must prove they were involuntarily sterilized by the state (including minors and incompetent adults who were sterilized with parental/guardian consent). The N.C. Office of Justice for Sterilization Victims was created to assist

with this process. All claims must be received by June 30, 2014, with payments expected to be made on June 30, 2015.

Information packets were mailed to 800 potential claimants in November, though public information officer Chris Mears says it is still too early to estimate how many will file claims. According to a *Washington Post* article in December, unnamed state officials estimated around 200 claimants, which would mean a one-time, tax-free payment of \$50,000 per person.

—LISA KENNEY

## Lowering the Bar for Beauticians SC Weighs Proposal to Reduce Cosmetology Training

**I**n South Carolina, it takes 1,500 hours of training in a state-approved beauty school to become a licensed cosmetologist. It takes only 200 hours of training to become an emergency medical technician.

The state's Department of Labor, Licensing and Regulation (DLLR) compared those requirements in late 2013 after Gov. Nikki Haley asked state agencies to evaluate the effects of their rules and regulations on economic growth. Among many recommendations that emerged from that review, the DLLR stated that South Carolina should reduce the hours of training required to become a licensed cosmetologist. The DLLR supported its recommendation by making a classic barriers-to-entry argument: Reducing the required training would improve economic development by making it easier and cheaper for people to obtain jobs as cosmetologists. According to testimony by industry representatives before a state legislative subcommittee, students must spend \$16,000 to \$20,000 to obtain the necessary training.

Economists have long hypothesized that trade and professional associations lobby for licensing regulations to erect occupational barriers to entry. These barriers raise wages for licensed providers, primarily by limiting competition and improving quality.

In a 2009 study, economists Morris Kleiner of the University of Minnesota and Alan Krueger of Princeton University attempted to measure the influence of occupational licensing on the labor market. They agreed that occupational licensing "serves as a means to enforce entry barriers." They further found that licensing in the United States is associated with

wages that are about 14 percent higher for workers who are licensed.

Kleiner and Krueger also noted that licensing laws have proliferated significantly since 1950. According to the Council of State Governments, state licensing laws covered less than 5 percent of U.S. workers in the early 1950s. That share increased to at least 20 percent by 2000, according to data from the Census Bureau and the Department of Labor. In a combined measure of all government licensing, a Westat survey found that approximately 29 percent of U.S. workers needed licenses to hold their jobs in 2008.

"The occupational association has a significant ability to influence legislation and its administration, especially when opposition to regulatory legislation is absent or minimal," they wrote. Today, most states' licensing requirements for cosmetologists are similar to those in South Carolina. Cosmetologists and owners of beauty schools have convinced state governments that these requirements are necessary to protect the public, but the DLLR disagrees.

"Most people style their own hair every day and commercial hair dyes are sold to the public for home use," the DLLR noted in its report to Haley's Regulatory Review Task Force. "Nail technicians essentially paint fingernails and toenails and apply artificial nails. Estheticians practice skin care. These are functions that many people perform at home without any training."

*The South Carolina Association of Cosmetology Schools did not accept invitations to comment for this article.*

—KARL RHODES

# FEDERAL RESERVE

## The Last Crisis Before the Fed

BY TIM SABLİK

On the eve of World War I, the United States averted a financial crisis

**Y**ou gentlemen are to form the bulwark against financial disaster in this nation," Treasury Secretary William Gibbs McAdoo told the members of the first Federal Reserve Board as they took their oath of office on Aug. 10, 1914. The seven men — including McAdoo, who served as the first chairman of the board — would not have to wait long for their first test. Less than two months earlier, Austria's Archduke Franz Ferdinand and his wife were assassinated by a Bosnian-Serb nationalist, plunging Europe into war.

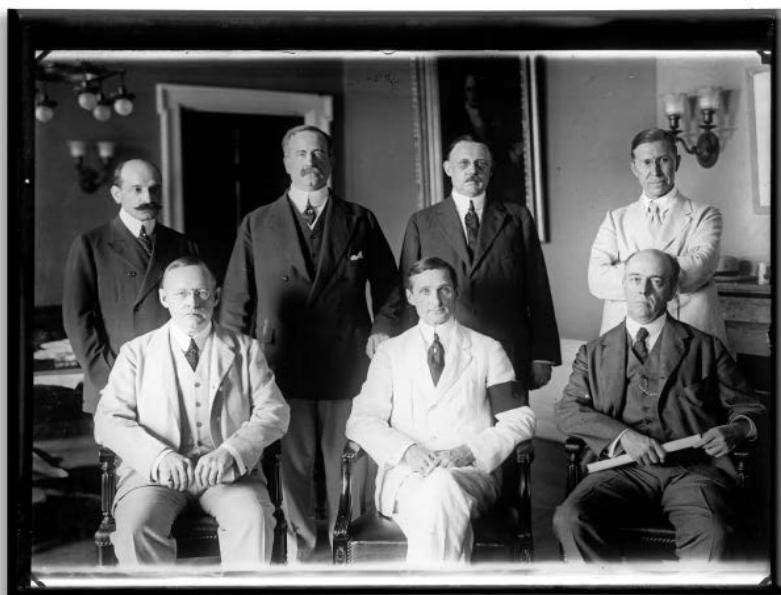
The United States would also be swept up in the conflict, but its first battles were waged in financial markets. European powers needed money to finance fighting, and that meant gold. At the time, the United States was a debtor nation and a minor financial power, but the warring European nations could no longer trade with each other. They quickly began selling their holdings on the New York Stock Exchange, converting dollars to gold. In June and July, the United States had

nearly \$70 million in net gold exports. The effect of several European nations calling in their debts simultaneously created a significant external drain on U.S. gold reserves, threatening to place constraints on banks' ability to lend domestically.

It would have been a golden opportunity for the nascent Federal Reserve to save the day. According to 19th century British economic writers Henry Thornton and Walter Bagehot, a lender of last resort could counter such a threat by raising interest rates to stem the outflow of gold to foreign nations while lending freely to sound financial institutions to satisfy domestic demand for money. The Federal Reserve System had the capacity to do just that, but there was one problem: It wasn't actually up and running yet.

### Panics and Reform

The tool that would rescue America in 1914 would come from the previous banking crisis, the Panic of 1907. In October of that year, a loss of confidence in certain New York trusts prompted runs on those institutions. Trusts held assets for clients, like banks, but they were subject to fewer regulations and so were able to offer higher returns and engage in more speculative investments. The run on trusts quickly spread to banks and became a full-fledged panic. While a crisis sparked by trusts was new, banking panics in the United States were not: Between 1863 (when the National Banking Act was passed) and 1913 (when the Federal Reserve Act was passed), there were six major banking panics. The National Banking Act had replaced competing currencies issued by state-chartered banks with a national currency backed by government bonds. Prior to the Act, there were thousands of state bank notes in circulation, creating a nightmare for consumers to verify the value and authenticity of any currency used



*The members of the first Federal Reserve Board are sworn in on Aug. 10, 1914. Treasury Secretary William G. McAdoo is seated in the center of the front row.*



for trade. (See “The Counterfeiting Weapon,” *Region Focus*, First Quarter 2012.)

National bank notes helped standardize money in the United States, but they possessed their own shortcomings. The new notes were highly inelastic, meaning the banking system could not easily expand its supply of notes in response to increased demand. Since the notes were backed by government bonds only, banks needed to raise additional capital in order to increase their stock of currency. Even assuming they could do so, the process of getting new notes was slow. According to a May 2013 paper by Jon Moen, a professor of economics at the University of Mississippi, and Ellis Tallman, a professor of economics at Oberlin College and senior economic advisor at the Cleveland Fed, “National bank note issues took nearly three weeks from request to delivery.”

Banks attempted to accommodate sudden demand for currency through clearinghouses. These acted as something like a central bank for members: The clearinghouses could issue loan certificates to them based on the value of various types of assets that a bank held, not just government bonds. These certificates could be used to pay obligations to other member banks, which freed up currency to pay depositors. But this solution was imperfect because the clearinghouse certificates were not currency and therefore could not be issued to the general public. Clearinghouses also required the cooperation of their members, making them unreliable lenders of last resort.

Describing each national bank as an “isolated island of money,” McAdoo recounted the problems of that era in his autobiography: “There was no certainty that any bank could depend on its neighbors for aid; consequently, at the first sign of panic every one of them made a frantic effort to call in loans and get together as much cash as possible — a procedure which invariably made matters worse instead of better.”

Additionally, some financial institutions lacked access to clearinghouse funds, as was the case with New York trusts in 1907. In response to these shortcomings, there was a strong push for financial reform after 1907. Some legislators wanted to create an asset-backed currency, which would have allowed banks to issue currency backed by assets other than government bonds, making the money supply more elastic. Others wanted a central bank to oversee an elastic currency for the entire financial system. Unable to reach agreement, Congress passed a temporary measure: the Aldrich-Vreeland Act of 1908. It allowed the Treasury to act as a lender of last resort during a crisis via a reserve of \$500 million in emergency currency. National banks could obtain this currency by pledging various types of bonds or commercial paper as collateral.

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There was no certainty that any bank could depend on its neighbors for aid; consequently, at the first sign of panic every one of them made a frantic effort to call in loans and get together as much cash as possible — a procedure which invariably made matters worse instead of better.

— William G. McAdoo

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Although the Act addressed some of the shortcomings of clearinghouses, it was a temporary fix. It would expire on June 30, 1914. Many contemporary observers doubted that it would succeed at preventing panics should the need arise during its short lifespan. Some were even more critical. Writing in the *Journal of Political Economy* after the bill’s passage, University of

Chicago economist J. Laurence Laughlin called it “a Pandora’s box of unknown possibilities for evil.”

The legislation established a committee to develop a more permanent solution, ultimately the Federal Reserve Act, which was signed into law on Dec. 23, 1913. To provide time for setting up the new central bank, Congress extended the Aldrich-Vreeland Act by a year to June 30, 1915. It would prove to be a prescient decision.

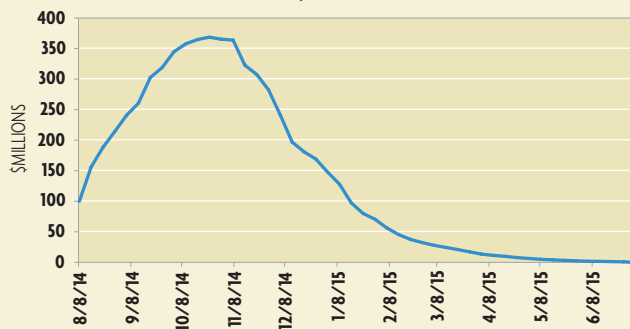
### McAdoo’s War

The crisis building in the summer of 1914 had the potential to be far worse than the Panic of 1907. That panic had ended in part because gold inflows from European investors looking to capitalize on low U.S. stock prices eased liquidity constraints. But in the summer of 1914, war-torn Europe wasn’t sending gold, it was demanding it. The major European stock markets shut down at the outset of hostilities. Once Great Britain entered the war, London, the financial center of the world, closed its doors, throwing the foreign exchange market into chaos. European investors scrambled to draw funds from the one major market still open: America. There was no guarantee the United States would be up to the task, however.

“The United States was definitely not a financial power,” says William Silber, a professor of economics at New York University’s Stern School of Business and author of a book about the 1914 crisis. “The instability of the American banking system factored into the minds of European investors, and given that there were these huge gold drains in 1914, that led to speculation that the Treasury might be forced to suspend convertibility.”

The New York Stock Exchange fell 6 percent on July 30, the biggest one-day drop since March 14, 1907, as European nations rushed to withdraw funds before such a suspension occurred. This posed a double problem. If such sales had occurred domestically, then the money would have remained in the American banking system to be loaned out to investors interested in buying, helping to arrest the decline. But in this case, all of the money was flowing out of the United States, draining the funds that banks could lend. Writing in 1915, Harvard economist O.M.W. Sprague, a leading scholar of financial panics, described the situation: “No banking system in a debtor country could be devised which would be able to endure the double strain which was

### Aldrich-Vreeland Currency in Circulation



SOURCE: Comptroller of the Currency, *Annual Report*, Dec. 6, 1915

imposed upon the banks of the United States by the wholesale dumping of securities by foreign investors on the New York market. To supply gold to the full amount of the purchase price and at the same time to grant loans to enable purchasers to carry the securities was soon seen to be a manifest impossibility.”

McAdoo was not content to sit idly as a financial crisis loomed. He had always been drawn to the big stage of public action. As a young Tennessee lawyer, he embarked on a quest to electrify the streetcar system in Knoxville. Although the venture proved unprofitable and ultimately bankrupted him, he was undeterred. Moving to New York, he oversaw the successful construction of a railroad tunnel beneath the Hudson River between New York and New Jersey. The urge to leave a lasting public legacy was an integral part of his character.

“I had a burning desire to acquit myself with distinction and to do something that would prove of genuine benefit to humanity while I lived,” he wrote. As he watched the U.S. financial system slip toward panic in the summer of 1914, that same instinct compelled him to take the stage once more.

“He wanted to make the United States a financial superpower,” says Silber. In his book, he argues that McAdoo saw the crisis as an opportunity to usurp London’s place as the financial capital of the world.

Doing so would require improvisation, however. In early August, the nominees to the Fed’s Board of Governors were still locked in congressional hearings, and the 12 district banks had yet to be chartered. Although McAdoo’s preference was to accelerate the process for opening the banks, Benjamin Strong, a prominent banker who would become the first president of the New York Fed and an early system leader, argued in favor of delay. Strong worried the district banks would not have enough gold reserves to meet demands, and failing to pay out gold would do irreparable harm to the reputation of the new central bank. McAdoo would have to find another way.

He spoke with the governing board of the New York Stock Exchange on the morning of July 31 and persuaded them to suspend trading. The exchange would remain closed until Dec. 12, 1914, an unprecedented length of time. While the action halted the foreign gold drain, it also created a domestic problem. The assets of many banks were held in the stock exchange. Banks were cut off from a major source

of their liquidity, impairing their ability to conduct ordinary operations. McAdoo’s answer to the foreign threat had sown the seeds for a domestic banking crisis.

### The Home Front

Without the Fed to provide liquidity to sound institutions, McAdoo had to turn to the Aldrich-Vreeland Act. Loans under the Act would not be bailouts, as any bank seeking emergency currency would have to put up full collateral and pay increasing interest to ensure the funds would be retired quickly after the crisis passed.

McAdoo had actually invoked the Act to offer emergency loans the previous summer, when legislation to reduce tariffs prompted a decline in stock prices as businesses worried about greater foreign competition. Although no banks applied for the emergency currency, the stock market reacted favorably to the announcement. Almost exactly one year later, McAdoo made a similar announcement: “There is in the Treasury, printed and ready for issue, \$500,000,000 of currency, which the banks can get upon application under that law.”

This time, banks were keenly interested in obtaining the currency, but there were some problems. The Act allowed national banks to apply for the emergency loans only if they had already issued national bank notes equal to at least 40 percent of their capital. The restriction was intended to prevent overuse of the currency, but it meant that many major banks could not participate at all. For example, National City Bank in New York had \$4 million bank notes in circulation in 1913 — only 16 percent of its capital. Additionally, state-chartered banks and trusts could not borrow under Aldrich-Vreeland, mirroring the lack of access that had escalated the Panic of 1907.

Recognizing the potential problem, McAdoo visited Congress the same day he invoked the Act, asking legislators to remove the restrictions.

“If depositors thought that certain institutions didn’t have the currency, there might have been a run on those institutions. So the fact that the major New York banks could not have qualified for Aldrich-Vreeland money could have been an impediment,” says Silber.

Once Congress amended the Act, the emergency notes flowed to banks quickly (see chart). Just one week after McAdoo’s announcement, banks had requested \$100 million in Aldrich-Vreeland currency, and large trucks delivered bags full of the preprinted notes to Treasury offices around the country. But while the amendment opened access to non-national banks, it did so with a caveat: Carter Glass, chairman of the House Committee on Banking and Currency and co-author of the Federal Reserve Act, added a requirement that state banks and trusts become members of the Federal Reserve System to obtain Aldrich-Vreeland currency. The change would ultimately dissuade those institutions from signing up for the emergency currency, as they were not interested in the regulations and costs associated with being Fed system members.

Fortunately, they still had access to clearinghouse loans. After the experience of 1907, the clearinghouses had expanded to include trusts as members. In a March 2013 paper with Margaret Jacobson, a research analyst at the Cleveland Fed, Tallman found that financial institutions borrowed nearly as much from the clearinghouses as they did through Aldrich-Vreeland. In 1914, approximately \$385.6 million Aldrich-Vreeland notes and \$211.8 million clearinghouse loan certificates were issued.

“The combination of clearinghouse loan certificates and emergency currency formed a composite good that was a more complete substitute for legal money which was thus able to generate a temporary increase in the monetary base,” Jacobson and Tallman wrote.

In the three months after the start of the crisis, the money supply increased at an annual rate of 9.8 percent; in contrast, the first three months of the Panic of 1907 saw the money supply contract at a rate of nearly 11.6 percent. Since they couldn’t be used as cash, clearinghouse loan certificates alone did not effectively increase the money supply in previous crises.

“In 1914, Aldrich-Vreeland served that purpose,” says Tallman. “Banks used it to give cash to their depositors.”

Thanks to the Aldrich-Vreeland notes, banks were able to continue operations and honor all requests for withdrawals. The emergency notes peaked at the end of October and quickly declined as the threat of crisis subsided.

### Lessons of 1914

With the help of the Aldrich-Vreeland Act, McAdoo was able to avert a costly panic and improve America’s standing as a world financial power. By 1915, New York was receiving

international loan requests, while London was embroiled in war. Many had thought that a central bank would be necessary for such a feat. Upon voting to amend the Aldrich-Vreeland Act in August 1914, Carter Glass had remarked, “If the Federal Reserve System were fully organized there would be no earthly necessity for the action proposed here today.” But when tested during the Great Depression, the Fed did not perform as well as Glass had envisioned. While there were many elements that played into the severity of the Depression, many economists point to the Fed’s failure to provide adequate liquidity to the system as a contributing factor because it allowed the money supply to contract.

Ultimately, it is difficult to say how much of Aldrich-Vreeland’s success was due to its design versus McAdoo’s resourcefulness. Had McAdoo not pushed to amend the Act at the outset of the crisis or had he not been as quick to take action, things might have turned out much differently. But the overall success in 1914 still points to other roads the United States could have taken to solve the problem of banking panics. Writing about the founding of the Fed, Elmus Wicker, an emeritus professor of economics at Indiana University, observed that “had the experience of the 1914 banking crisis been available earlier, the question of panic prevention would have been resolved without the necessity for a central bank.”

Other countries mitigated panics with systems very different from the one the United States ultimately adopted (see “Why Was Canada Exempt from the Financial Crisis,” p. 23). A central bank fulfills many other functions in addition to panic prevention, but if panics were the only problem, the success of Aldrich-Vreeland suggests that there may have been alternatives to the Fed. **EF**

### READINGS

Bordo, Michael D., and David C. Wheelock. “The Promise and Performance of the Federal Reserve as Lender of Last Resort 1914-1933.” National Bureau of Economic Research Working Paper No. 16763, February 2011.

Jacobson, Margaret M., and Ellis W. Tallman. “Liquidity Provision during the Crisis of 1914: Private and Public Sources.” Federal Reserve Bank of Cleveland Working Paper No. 13-04, March 2013.

Moen, Jon, and Ellis W. Tallman. “Close but not a Central Bank: The New York Clearing House and Issues of Clearing House Loan Certificates.” Federal Reserve Bank of Cleveland Working Paper No. 13-08, May 2013.

Silber, William L. *When Washington Shut Down Wall Street: The Great Financial Crisis of 1914 and the Origins of America’s Monetary Supremacy*. Princeton, N.J.: Princeton University Press, 2007.

Sprague, O.M.W. “The Crisis of 1914 in the United States.” *American Economic Review*, Sept. 1915, vol. 5, no. 3, pp. 499-533.

Wicker, Elmus. *The Great Debate on Banking Reform: Nelson Aldrich and the Origins of the Fed*. Columbus, Ohio: The Ohio State University Press, 2005.



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# JARGON ALERT

## Public Goods

BY TIM SABLİK

In the centuries before radar and GPS, lighthouses guided ships safely through dangerous waters. Today, they exist mostly as relics of the past, providing scenic backdrops for postcards and photos. But lighthouses have also fulfilled an important role in economics textbooks: illuminating the concept of public goods.

There are two qualities that set public goods apart from other goods. They are “nonrival,” meaning their use or consumption by one party does not inhibit their use or consumption by another, and they are “nonexcludable,” meaning that it is impossible (or too costly) to prevent any consumers from using them. In the case of lighthouses, one ship captain can make use of the light to avoid danger without inhibiting other captains from doing the same. Additionally, once a lighthouse is constructed, it is impossible to block any ship on the water from using its light. Other textbook examples of public goods include fireworks displays, national defense, and environmental quality.

Nonexcludability can create a “free rider” problem. Imagine there is an entrepreneur who wants to build a new lighthouse.

He knows the lighthouse provides a valuable service to ship captains, and he asks each captain to contribute to its construction. The captains want to see the lighthouse built, but they also know they can enjoy the benefits of the completed lighthouse whether or not they paid for it. This means they can choose to contribute nothing and hope to “free ride” on the generosity of others. But if enough of the captains think this way, then the entrepreneur will not raise sufficient funds, and the lighthouse won’t be built. This has led many economists to conclude that public goods represent a form of market failure that the government can correct by providing them through tax revenue.

Paul Samuelson, who provided the modern economics definition of public goods in a 1954 article, wrote in his seminal textbook: “A businessman could not build [a lighthouse] for a profit, since he cannot claim a price from each user. This certainly is the kind of activity that governments would naturally undertake.”

But in the decades that followed, economists began to challenge the assumption that public goods could only be provided by the public sector. In a 1974 paper, Ronald Coase investigated the history of lighthouses in England. He discovered that, contrary to common assumption, many of the lighthouses had been built and maintained by private

individuals. These individuals raised money for the lighthouses by collecting a fee from ship captains at ports. This is an example of what economists would later call “tying”; that is, lighthouse owners were able to tie the use of the public good (the lighthouse) with the use of another good for which private property rights are assigned (the port). Any captain who refused to pay for the lighthouses could easily be excluded from the port. Lighthouses in England continue to be funded the same way today.

Changes in technology can also make it viable to privately provide goods that once seemed nonexcludable. When TV debuted, it was seen as a public good. Anyone with a receiver in range of the signal could enjoy the broadcast, making it impossible to charge for TV and exclude those who refused to pay. But as technology improved, private cable companies were able to exclude nonpayers by requiring proprietary cable boxes to descramble their signal.

Not all economists agree that public goods should be provided privately even if it is feasible to do so, however. Because such goods are also

nonrival, it is in theory costless to provide them to any number of consumers. In the case of TV broadcasts, Samuelson argued that it was not in the best interest of society to exclude any individuals from watching programs, since doing so would only diminish society’s overall happiness.

But other economists countered that providing public goods always entails costs. Economist Jora Minasian argued in a 1964 article that TV broadcasters must determine which programs to provide with finite resources. Making that choice efficiently requires some sort of market pricing system to determine the programs that will generate the most utility for viewers. Minasian concluded that “the theory of public goods is of little help in distinguishing those goods that are best provided via community action from those that should be left to individual decisions and preferences.”

Research conducted by Coase, Minasian, and many others during the 1960s and 1970s revealed that there were in fact fewer examples of truly public goods than economists initially thought. Rather, the public or private provision of any good involves costs and benefits, and it may not always be immediately clear which solution results in the best outcome. Additionally, those tradeoffs can change over time as technology improves.

EF



ILLUSTRATION: TIMOTHY COOK

# The Case of the Missing Deflation

BY TIM SABLİK

In the late 1950s and early 1960s, economists observed that inflation and unemployment tended to move in opposite directions, a relationship known as the Phillips curve. Today, economists use a revised version of the Phillips curve, called the New Keynesian Phillips curve, to forecast inflation. Although there are different versions of the New Keynesian Phillips curve, a common one relies on recent inflation and the gap between current unemployment and the natural rate of unemployment (or NAIRU) to predict the likely path of future inflation. Simply put, low recent inflation plus high unemployment equals low inflation or even deflation in the near future.

Deflation is a particularly troubling prospect for central bankers, since expectations of future deflation can cause consumers to delay spending, compounding the problem and creating a deflationary spiral. In early 2009, the threat of such deflation looked very real to many, but it never materialized. Where did the deflation go?

In a recent working paper, Robert Gordon of Northwestern University argues that “the puzzle of missing deflation is in fact no puzzle.” Gordon presents a modified Phillips curve to show that the deflationary pressures of the

2007-2009 recession were not as great as the standard model predicted. This “triangle” model relies on three main variables to forecast inflation: inertia, demand, and supply. Inertia refers to expectations of future inflation; people generally expect tomorrow’s inflation to be similar to today’s. Demand refers to the gap between current employment and the NAIRU, similar to the standard Phillips curve.

Supply shocks, the final component, include sudden changes in energy prices or in productivity growth. The New Keynesian Phillips curve does not explicitly include such shocks. Gordon argues that this limits the ability of the model to explain the movements of inflation and unemployment. Depending on the combination of supply and demand shocks, the relationship between unemployment and inflation can be either negative (as it was in the 1960s, when unemployment was falling and inflation was rising) or positive (as it was in the 1970s, when they rose together).

Gordon compares the forecasting performance of the New Keynesian Phillips Curve and his triangle model in two simulations. In the first test, he uses data from 1962 through 1996 to simulate forecasts for the first quarter of 1997 through the first quarter of 2013. The standard model predicts much higher inflation than actually occurred, while the triangle model predicts an inflation pattern very close to

reality. Gordon then repeats the simulation using data from 1962 through 2006, forecasting inflation for 2007 through 2013. This time, the standard model predicts ever-increasing deflation after 2007, while the triangle model again forecasts inflation very close to actual observed values.

What explains the different predictions of the two models? Gordon points to the role of supply shocks and the longer lags in the triangle model. “While the high unemployment rate pushed the inflation rate down in 2009-2013, the inflation rate was pushed up by higher energy prices and declining productivity growth,” he writes. Because the New Keynesian Phillips Curve did not include such explicit supply shocks, it incorrectly predicted deflation.

Still, Gordon’s initial model is not a perfect match: It forecasts inflation that is too low for 2012-2013. He hypothesizes that this may be due to the different inflationary pressures exerted by short-term versus long-term unemployment. Some research has suggested that workers who have been unemployed for six months or more may put less downward pressure on prices and wages because they have less impact on the labor market.

Employers may view them as “unemployable,” either because their long absence from the workforce signifies some hidden negative quality or because their marketable skills have eroded during that period. The 2007-2009 recession was notable for the dramatic increase in long-term unemployment, which could have influenced the lack of deflation. Gordon tests this hypothesis by rerunning his simulations with the triangle model using only short-term unemployment in his employment gap measure. He finds that this specification more closely predicts actual inflation through 2013. It supports the view that deflation was less severe because a significant portion of the unemployment during the recession was long-term.

In Gordon’s model, the elevated long-term unemployment also has implications for NAIRU. He finds that NAIRU may have shifted from 4.8 percent in 2006 to 6.5 percent in 2013. “There may be less slack in the U.S. labor market than is generally assumed, and it may be unrealistic to maintain the widespread assumption that the unemployment rate can be pushed down to 5.0 percent without igniting an acceleration of inflation,” he writes. Gordon concludes that Phillips curve models should include both demand and supply shocks in order to appropriately forecast and explain inflation behavior. **EF**

“The Phillips Curve is Alive and Well: Inflation and the NAIRU during the Slow Recovery.”  
Robert J. Gordon. National Bureau of Economic Research  
Working Paper No. 19390, August 2013.

# Allocating Airwaves

BY TIM SABLİK

The 21st century has witnessed the decline of broadcast media and the rise of wireless communication. In the 1960s, nearly all TV-owning households in the United States relied solely on over-the-air broadcast transmissions; today, only about 7 percent do. In contrast, data traffic in the United States from smartphones and other wireless devices ballooned from 388 billion megabytes per year in 2010 to nearly 1.5 trillion megabytes in 2012, nearly a fourfold increase. The spectrum currently allocated to broadcast TV is highly desired by mobile providers because of its ability to carry signals over long distances and penetrate obstructions like buildings. In its 2010 National Broadband Plan, the Federal Communications Commission (FCC) set a goal of making slightly over 40 percent of that spectrum available for new uses through a new “incentive auction” process.

That auction was scheduled to take place this year but was delayed until mid-2015 due to its complexity. While the FCC has conducted nearly 100 spectrum auctions since 1994, they were mostly conventional “one-sided” auctions — participants bid on a predetermined supply of spectrum. The incentive auctions will be “two-sided” — one auction to determine supply and one to determine demand. In the supply auctions, better known as “reverse” auctions, TV licensees will place bids signaling the amount of money they would accept either to cease broadcasting or to share spectrum with another station. TV stations also have the option to continue broadcasting. The FCC will then move the spectrum allocations of the remaining TV stations to create a continuous band of free spectrum to offer in the demand (or “forward”) auctions.

The primary challenge with this new approach is coordinating both auctions. In order to pay for the spectrum offered by stations in the reverse auction, the FCC must raise enough money in the forward auction. At the same time, the FCC does not know how much supply it has to offer in the forward auction until it conducts the reverse auction.

Although the FCC will not announce the official rules for its auction until later this year, economists have suggested a few solutions to the coordination challenge. One approach would be to conduct both auctions simultaneously using a descending clock auction format. The FCC would set an initial price and check which participants are willing to sell (in the case of the reverse auction) or buy (in the case of the forward auction) at that price. The price would then move down or up in regular intervals until there are no participants left in the auction. The FCC could use this data to construct supply and demand curves and calculate the optimal reallocation of spectrum.

The advantage of the more complex two-sided auction is that it allows for the new spectrum band plan to be market-determined. In previous auctions, like the 2008 auction for spectrum freed up by the nationwide switch from analog to digital TV, the FCC split available spectrum into blocks of varying size and geographic coverage.

In a 2013 paper, University of Maryland economics professor Peter Cramton found that prices in the 2008 auction were significantly higher for blocks with larger geographic coverage. Wireless companies were mostly interested in assembling continuous coverage, he argued, and while bidders could assemble such coverage from small licenses, that carried greater risk. The bidder might fail to acquire all the necessary pieces for the desired package or be forced to pay higher prices to holdouts on key licenses. The incentive auctions could mitigate these problems by offering generic licenses in the initial forward auction, allowing bidders simply to signal the quantity and distribution of spectrum they desire, leaving the assignment of specific frequencies for later.

The FCC has said that its role as an auction facilitator will help bidders overcome the costs of negotiating with hundreds of license holders, but not everyone agrees it is the best solution.

“The system is extremely rigid because of the nature of the rights that have been assigned,” says Thomas Hazlett, a professor of law and economics at George Mason University who contributed to the National Broadband Band Plan. “Those rights are not spectrum ownership rights, but rather very truncated rights to do particular things.”

Hazlett argues that even if TV licensees were willing to sell their holdings to wireless companies in the market, those companies could only use the new spectrum for TV broadcasting because of the way the licenses were originally structured. Hazlett applauds the FCC’s decision to offer flexible-use licenses in the incentive auctions, giving buyers more control over how the spectrum is used in the future, but he would take it one step further. The FCC has the authority to issue overlay licenses to the TV band, which would allow TV broadcasters to continue broadcasting if they want, but would also grant rights for other uses, allowing them to sell their licenses freely to non-broadcasters outside of an FCC auction process.

The FCC considered using overlays in its National Broadband Plan but dismissed them as too costly for bidders to negotiate with licensees. But Hazlett argues that the incentive auctions also entail costs that the FCC did not consider, such as administrative and legislative delays.

“It’s an economic problem we face,” he says, “not an engineering one.”

EF

# THE PROFESSION

## The Future of History

BY JESSIE ROMERO

In the mid-2000s, when economic stability seemed like it was here to stay, a well-regarded economist applied for a National Science Foundation grant to study economic crises. The application was rejected because, in the words of one referee, “We know those things don’t happen anymore.”

That referee was soon proven wrong, of course, and his comment illustrates what some see as a serious problem: the waning influence of economic history as a discipline, which seems to have left the economics profession without the historical context it needs to interpret current events. Many economic historians feel, as Robert Whaples of Wake Forest University wrote in a 2010 article, that it is “a neglected field, a field on the margins.”

But the perception of neglect is nothing new — and might not be accurate, according to Price Fishback, an economic historian at the University of Arizona and executive director of the Economic History Association (EHA). “We’ve been saying that economic history is on the decline ever since I’ve been in the field.” (Fishback completed his Ph.D. in 1983.) “But the field looks pretty stable to me.”

Certainly, there are worrying signs. In the 1960s and 1970s, it was common for university faculties to have at least one economic historian, and few economics students could escape graduate school without studying economic history. Today, economic history has all but vanished from graduate school curricula. And job opportunities for economic historians are slim. Out of 256 recent job postings on the American Economic Association’s website, only nine listed economic history as a preferred specialty. “It is a small market for economic historians,” admits Fishback. “Everybody who goes out on the job market as an economic historian typically goes out as something else as well.”

Economic historians are disappearing from history departments as well. Between 1975 and 2005, the number of history departments in the United States with an economic historian fell from 55 percent to 32 percent, despite the fact that the number of history professors overall more than doubled.

In part, the shift reflects the increasing importance of mathematics in economics, Fishback says. “When I started grad school back in the 1970s, there were people who were taking calculus courses at the last minute. These days you pretty much have to be a math minor to enter an economics Ph.D. program.”

The specialty also was changed by the “cliometrics revolution” that began around 1960. Cliometrics is the application of rigorous quantitative techniques and economic theory to historical analysis. (“Clio” was the Greek muse of history.) Exemplified by the research of future Nobel

laureates Robert Fogel and Douglass North into topics such as railroads, slavery, and the importance of institutions, cliometrics quickly became dominant.

But there were unintended consequences: Because economic history was now using the same tools as other specialties, separate courses were deemed unnecessary and economic historians were no longer considered a distinct group. Cliometrics also made economic history less accessible to historians who lacked formal economics training. At the same time, the use of quantitative approaches has spurred new interest in economic history, says Philip Hoffman, an economic historian at the California Institute of Technology and the current president of the EHA. “Economic theory has helped revive economic history. There is fascinating research being done by people outside of economic history but who use historical data.” And Fishback notes that work that might be categorized as economic history is increasingly published in top-tier mainstream journals.

Lately, interest in economic history has been especially high as policymakers and economists have tried to understand the financial crisis and recession. And economists with historical expertise have been prominent in policymaking. Christina Romer of the University of California, Berkeley, who chaired the Council of Economic Advisers in 2009-2010, has written extensively about the Great Depression, as has former Fed Chairman Ben Bernanke.

Many people also believe that reinstating economic history courses in graduate programs could help economists recognize the next crisis sooner. As Kevin O’Rourke of Oxford University wrote on the economics website *VoxEU*, “Historical training would immunise students from the complacency that characterised the ‘Great Moderation.’ Zoom out, and that swan may not seem so black after all.”

Of course, not everyone agrees that more training in history is the cure for what (if anything) ails economics. As Harvard University economist Edward Glaeser wrote in a chapter for the 2012 book *What’s the Use of Economics*, knowledge of history is important for economic policymaking, but graduate school isn’t necessarily the place to impart it. “We should trust Ph.D. programs to deliver competent researchers and hope that later experience provides the judgment that the wider world demands.” Others believe that the more important curriculum change is greater study of credit markets and financial frictions.

Either way, the financial crisis and recession are starting to recede into history themselves. But even if the current vogue for economic history proves to be a blip, the economy will continue to present questions that cannot be answered fully without turning to the past. **EF**

# RISKY BUSINESS?

## Insurance is boring ... or at least it's supposed to be

BY JESSIE ROMERO

In ancient Babylon, around 1800 B.C., merchants transporting their goods to markets in the Mediterranean and Persian Gulf had to worry about thieves, pirates, and sinking ships. So they developed a system to share the risk of transport with their investors: Merchants paid a premium above the going interest rate in exchange for a promise that the lender would cancel the loan in the event of a mishap.

By collecting premiums from many merchants, an investor could afford to cover the losses of a few.

Nearly 4,000 years later, the basic model of insurance hasn't changed much, although its size and scope have increased dramatically. Today, there are more than 3,700 insurance companies in the United States alone, selling insurance on everything from crops to vacations to fantasy football teams. Insurance premiums (excluding health insurance) totaled \$1.1 trillion in 2012, about 7 percent of GDP.

It's also possible to buy insurance on insurance itself. This practice, known as reinsurance, helps insurance companies limit their exposure to risk and free up capital for other uses. But it also increases the interconnectedness of the insurance industry, which, in the wake of the financial crisis, has some regulators concerned

about the potential for systemic risk. Those concerns are exacerbated by the recent trend of insurance companies purchasing reinsurance from companies they own — creating a so-called “shadow insurance” industry. Are tools intended to help insurance companies manage their risks actually making the industry as a whole more risky?

### Insurance and the Economy

In general, there are two types of insurance companies apart from health insurers: property/casualty companies and life insurance companies. Property/casualty companies sell products designed to protect consumers and businesses from financial loss due to damage or liability. Life insurance companies sell life, disability, and long-term care insurance, as well as annuities and other financial products that



provide individuals with an income stream during retirement.

Although property/casualty companies far outnumber life insurance companies — there are more than 2,700 of the former in the United States, compared with about 1,000 of the latter — by most measures the life insurance sector is much larger. Life insurance accounts for 58 percent of written premiums, and life insurance companies hold \$5.6 trillion in assets, compared with the \$1.6 trillion held by property/casualty companies. Many insurance liabilities are long term in nature, but companies must also be able to pay out claims quickly and sometimes unexpectedly; they thus tend to invest in stable, liquid assets. About 70 percent of property/casualty insurers' assets and 54 percent of life insurers' assets are invested in bonds. (See chart.) That makes them a major source of funding for corporations, state and local governments, housing, and the federal government. For example, life insurance companies own 18 percent of all outstanding foreign and corporate bonds.

Insurance companies have a lot to invest because of “float,” which is money that has been collected in premiums but not yet paid out in claims — or “free money,” in the words of Warren Buffett, whose company Berkshire Hathaway owns GEICO as well as several other smaller insurance companies. Particularly in the property/casualty sector, float is the primary source of profit; many companies show a loss on underwriting, meaning that they collect less in premiums than the total of their current expenses and expected future payouts. State Farm, the largest insurer in the United States, incurred an underwriting loss in nine of the past 12 years, while still earning billions in net profit.

### Insuring the Insurers

State Farm and other property/casualty companies will insure your home against the risk of damage from hail, lightning, wind, or fire, but they won't insure against flood damage. That's because insurers depend on the “law of large numbers” to limit their exposure to risk. The law of large numbers is a statistical rule stating that the larger the number of individual risks, the more likely it is that the average outcome will equal the predicted value. For example, flipping a coin 20 times is more likely to yield 50-50 results than flipping it twice. So even if it's impossible to predict when lightning will strike a single home, it is possible to determine the average likelihood of a lightning strike across many homes. By selling a large number of policies, insurers are able to calculate with some confidence how much they are likely to pay out to the entire pool, and set their premium levels accordingly. That's not the case with a flood or other catastrophic event, which could cause an unpredictable amount of damage to many homes within the same geographic area at the same time.

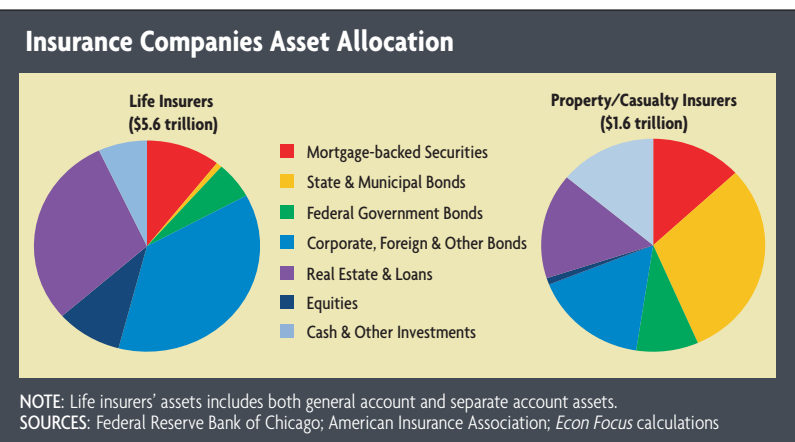
More than  
3,700 insurance  
companies in the  
United States  
sell insurance  
on everything from  
crops to vacations  
to fantasy  
football teams.

Sometimes the law of large numbers isn't enough protection, as proved to be the case in 2005 when hurricanes Katrina, Rita, and Wilma — three of the top 10 most expensive hurricanes in U.S. history — all struck the southeast United States within a few months of each other, causing \$80 billion in insured losses. (The National Flood Insurance Program, which is run by the federal government, paid out an additional \$18 billion.) To help hedge the risks of such large claims, property/casualty insurers buy insurance for themselves — a practice known as reinsurance. (Life insurance companies also

purchase reinsurance, but property/casualty companies make up the majority of the market.) Reinsurers covered about 45 percent of the losses resulting from the 2005 hurricane season, and 60 percent of the losses related to the Sept. 11, 2001, terrorist attacks. “Reinsurance quite literally makes the property/casualty market possible,” says Tom Baker of the University of Pennsylvania Law School.

In a reinsurance contract, the company that wishes to purchase reinsurance is called the cedent. The cedent pays a premium to cede certain risks to the reinsurer. In exchange, the reinsurer promises to pay some portion of the cedent's losses, or to pay for losses once a certain threshold is reached. The cedent is then allowed to claim a credit on its financial statements for the ceded risks, either as an asset or a reduction in liabilities. This enables primary insurers to write more policies and to take on risks that they might not otherwise insure. That trickles down to consumers and businesses in the form of cheaper policies and more insurance for new or untested ventures.

Reinsurers manage their risks by writing policies for companies all over the world, since the risk of an earthquake in New Zealand is uncorrelated with the risk of a hurricane in the United States. Reinsurers also are located all over the world: In 2011, U.S. insurance companies purchased reinsurance from nearly 3,000 reinsurers domiciled in more than 100 foreign jurisdictions. Still, the market is dominated by a small number of large companies; the 10 largest nonlife



reinsurers account for about half of global premiums. And the majority of reinsurers tend to be located in just a few countries: Germany, Switzerland, the United States, and especially Bermuda, home to 16 of the world's 40 largest reinsurers, where less stringent regulatory and capital requirements make it relatively easy to set up a reinsurance company.

### **Is Reinsurance Risky?**

Since the 2008 financial crisis, the insurance industry has come under new scrutiny from both U.S. and international regulators. That's largely because American International Group, the second-largest insurance company in the United States, received a government bailout in 2008. AIG didn't get into trouble through its traditional insurance business — the problems stemmed from its derivatives and securities lending operations — but the company's near-collapse underscored the role that large nonbank institutions play in the financial sector. Since the crisis, both AIG and Prudential have been designated "systemically important financial institutions" by the Financial Stability Oversight Council, making them subject to additional supervision. Prudential is the third-largest U.S. insurance company, and is closely connected to capital markets through its derivatives and securities lending portfolios, among other activities. (See "First Designations of 'Systemically Important' Firms," *Econ Focus*, Third Quarter 2013.)

Regulators also are looking specifically at reinsurance. For example, the Federal Insurance Office, a new division of the Treasury Department that was created by the Dodd-Frank Act, has been charged with preparing a report for Congress on the "breadth and scope" of the reinsurance industry. (The report was due in September 2012 but has not yet been completed.) The International Association of Insurance Supervisors (IAIS), which has developed a framework for identifying "global systemically important insurers," is considering developing a separate methodology for reinsurers.

The potential for systemic risk stems from the degree of interconnectedness created by reinsurance. If an insurance company writes a policy and purchases reinsurance for that policy, it still carries the risk of whether the reinsurance counterparty will pay when it is supposed to. And the reinsurer might purchase reinsurance itself, which creates additional counterparty risk, explains Anna Paulson, the director of financial research at the Chicago Fed. "Part of the issue has to do with opacity and being able to see who ultimately bears the risk," she says.

Still, research suggests that while the failure or insolvency of a major reinsurer could lead to a crash within the insurance industry, the damage would be unlikely to spill over to the rest of the economy, as J. David Cummins and Mary Weiss of Temple University concluded in a 2010 working paper. (Cummins and Weiss do note that the risk increases if reinsurers are heavily involved in noninsurance activities, such as derivatives trading or asset lending.) The

IAIS reached the same conclusion in a 2012 report, noting that in reinsurance the payments are strictly tied to the occurrence of an insured event. Unlike in banking, there is no overnight lending, and there are no payments or cash calls on demand, either of which might spark a run on reinsurance. (Financial institutions that rely on short-term loans, such as overnight loans, to fund longer-term assets face significant liquidity risks if their counterparties become unwilling to provide or roll over the loans.) Between 1980 and 2011, 29 reinsurance companies failed with minimal impact on the broader insurance industry.

"Imagine these institutions are running a marathon," says Etti Baranoff, a professor of insurance and finance at Virginia Commonwealth University. "The banks are holding hands, so if one falls down, it pulls the others down with it. But the reinsurers are just running beside the insurance companies. If one of them falls down, the insurer might run a little slower, but he could still make it to the finish line."

### **A New Shadow Industry?**

While traditional reinsurance might not be of great concern to regulators, the same is not true of "captive" reinsurance, a vehicle used primarily by life insurance companies that has become popular over the past decade. A captive reinsurance company is a wholly owned subsidiary of a primary insurance company, usually domiciled in a different state or offshore. The primary insurer cedes a block of policies to the captive, which often has lower capital and collateral requirements than its parent company. As with third-party reinsurance, this reduces the liabilities on the books of the parent company and allows it to make other use of the capital it had set aside for those liabilities, such as paying dividends to shareholders or issuing securities. The difference is that the amount of risk hasn't been reduced. "Normally, with reinsurance, you're actually transferring risk off of your balance sheet and out of the consolidated organization. But captive insurance often doesn't provide the benefit of a risk transfer. The risk stays within the consolidated organization," says Paulson.

Captives have been used by noninsurance companies since the 1960s as a way to self-insure against risks that might be very expensive to insure through a third party; oil companies, for example, have used captives to insure themselves against environmental claims. Because the parent company is the only one at risk, capital requirements are relatively low, which makes them cheap to set up. And the parent company can claim significant tax deductions for the premiums it pays to its new subsidiary.

Life insurers got into the game in the early 2000s, after the National Association of Insurance Commissioners issued new guidelines for state regulators that required life insurers to hold much higher reserves on certain term and universal life policies. But if an insurance company could cede some of those policies to captives, it could take credit for reinsurance and reduce its required reserves. Around the

same time, states began changing their rules to allow life insurers to establish captives, led by South Carolina in 2002.

The practice grew quickly. In 2002, companies with captives ceded them 2 cents of every dollar insured. By 2012, they ceded 25 cents of every dollar insured. Over the same period, the total amount of “shadow insurance” grew from \$11 billion to \$364 billion, according to research by Ralph Kojien of the London Business School and Motohiro Yogo of the Minneapolis Fed.

States such as South Carolina, Utah, Hawaii, and especially Vermont, which is the largest captive domicile in the United States, began courting captive insurers in an effort to compete with Bermuda for the business travel, white-collar jobs, and tax revenue they create. Since 2005, the captive industry has contributed more than \$100 million to South Carolina’s economy, according to the South Carolina Department of Insurance. “South Carolina has a strong interest in economic development and job growth and the captive sector does just that,” the department said via email.

More than 30 states and Washington, D.C., currently advertise themselves as captive domiciles, although they differ in the types of risks they allow companies to reinsure. In June 2013 North Carolina became the most recent state to allow captives.

Critics of captive insurance in the life insurance industry are concerned that this competition will lead to a regulatory “race to the bottom.” State insurance regulations generally treat captives much more leniently, since regulators aren’t concerned about the effects of the captive’s solvency on the state’s consumers. And one way for a state to lure more captives is to have lower capital formation and reserve requirements than its neighbor. But those concerns aren’t well founded, according to the South Carolina Department of Insurance, since states can also compete on factors such as the cost of doing business, the prevalence of professional service firms in the state, or the experience of the state insurance department’s staff.

The bigger concern of critics, however, is that the use of captive insurance makes life insurers appear healthier than they are, by allowing them to increase their capital buffers without actually transferring risk or raising new capital. According to Kojien and Yogo’s research, accounting for captive reinsurance reduces the median company’s risk-based capital by 53 percentage points, or three ratings notches. (The credit rating agency A.M. Best assigns insurance companies one of 16 ratings, from A++ to S.) Expected losses for the industry increase by between \$19 billion and

\$61 billion; because states operate guaranty funds in the event of an insurance company insolvency, those losses could potentially be borne by taxpayers and other insurance companies. And because the new state laws allow captives to keep their financial statements confidential, it is difficult for consumers, shareholders, and regulators to find out how much an insurer relies on captive reinsurance.

Benjamin Lawsky, New York’s superintendent of financial services, recently called for a moratorium on the formation of new captive reinsurance companies. Dave Jones, California’s insurance commissioner, told the *New York Times* that California would not allow captives to form in the state because it was “concerned about systems that usher in less robust financial security and oversight. ... We need to ensure that innovative transactions are not a strategy to drain value away from policyholders only to provide short-term enrichment to shareholders and investment bankers.” The University of Pennsylvania’s Tom Baker is more blunt: “Anytime a company is setting up its own captive, hold on to your wallet.”

But captives also provide real benefits to their parent companies and, by extension, to consumers, and there could be costs to eliminating them. “Through captives, insurers are able to ... avoid credit downgrades and reductions in the availability and affordability of some life insurance products,” the South Carolina Department of Insurance said via email.

Kojien and Yogo also note that captive reinsurance reduces financial frictions for the companies that use it, which may lower their marginal cost and thus increase the supply of insurance to consumers. They estimate that eliminating captives could raise marginal cost by 17.7 percent for the average company and reduce the amount of insurance underwritten annually by \$21.4 billion, from its current level of \$91.5 billion. “There are pluses and minuses of captives, and they need to be analyzed together,” says Paulson. “Ultimately the debate is, have we found an appropriate balance? Do we collectively have enough insight into what’s going on?”

From ancient Babylon to modern Bermuda, insurance has evolved to meet the needs of consumers and corporations — and of the insurers themselves. Captive insurance and reinsurance might be innovations that increase the efficiency and profitability of the industry, or they might cause significant harm to the financial sector, or both. Either way, they will not be the last innovations debated by regulators, economists, and policymakers. **EF**


## READINGS

Cummins, J. David, and Mary A. Weiss. “Systemic Risk and the U.S. Insurance Sector.” Temple University Working Paper, Sept. 14, 2010.

Kojien, Ralph S.J., and Motohiro Yogo. “Shadow Insurance.” National Bureau of Economic Research Working Paper No. 19568, October 2013.

International Association of Insurance Supervisors. “Reinsurance and Financial Stability.” IAIS Policy Paper, July 19, 2012.

McMenamin, Robert, Anna Paulson, Thanases Plestis, and Richard Rosen. “What Do U.S. Life Insurers Invest In?” Federal Reserve Bank of Chicago *Chicago Fed Letter* No. 309, April 2013.



*New development hugs the tracks along the LYNX light rail line in Charlotte, N.C.*

# DIRECTING == TRAFFIC ==

Development patterns and other factors have shaped transportation options in the Fifth District.  
Where does rail transit fit in?

BY CHARLES GERENA

It's the middle of the morning rush in Charlotte, N.C. Within earshot of the roar of traffic from Interstate 485, an electric train quietly pulls into the last stop on the LYNX, the Queen City's light rail line.

The silver and blue train fills up quickly. Some passengers are dressed in business attire, making their way to jobs less than half an hour away in Uptown Charlotte. Others are heading to the courthouse or one of the other government offices near the central business district.

People have their reasons for riding the LYNX — or any other train — instead of joining the masses on the interstate. For policymakers who envision the economic and environmental benefits of rail transit, the challenge is in expanding ridership beyond this customer base. They believe it is worth the investment of taxpayer money to expand transit service over the long term and attract more of the so-called “choice riders” who can be enticed into leaving their cars at home.

In recent decades, that has usually meant building light rail systems with streetcars or two-car trains. These systems typically carry fewer passengers than a subway and travel at grade level over a semi-exclusive right of way. They usually run on electricity, so trains whir by like a spaceship.

Baltimore built a 30-mile light rail line in the 1990s to connect the city's downtown to the surrounding suburbs. It took more than a decade for the Fifth District to develop additional light rail options: the LYNX in 2007 and the Tide in Norfolk, Va., in 2011. While it's too early to judge the success of either effort — especially since each is much smaller and younger than Baltimore's system — both have managed to attract a growing number of passengers.

Thus far, however, the LYNX's ridership growth has been outpaced by the growth in population in the surrounding city and metropolitan area (see adjacent chart). This record highlights the challenges of introducing a rail system into a metro area with a widely dispersed population that

PHOTOGRAPHY: JAMES P. KARNER

has been traditionally served by automobiles and buses.

“The one thing about the South that is especially challenging is that we don’t have dense development,” says Stephen Billings, assistant professor of economics at the University of North Carolina at Charlotte. Billings has studied the impact of the LYNX on surrounding property values. “Density is a huge component of the success of transit. If you look at the transit investments throughout the South, they have more limited impacts because they just can’t serve as many people for a given route.”

Critics of mass transit believe federal funding encourages policymakers to improve a regional transportation system using the most expensive rail options, even when they aren’t the most appropriate given the region’s development patterns. Instead, more time and money should be spent on improving bus service and modernizing roads.

### Many Modes, Many Reasons

The choice of transportation mode partly depends on how one values time. For example, rather than drive 10 minutes to a downtown campus, a college student may take 30 minutes to walk to a bus stop, wait for a bus, and travel to school to avoid paying hefty parking fees. A banking executive may not mind being stuck in traffic for 45 minutes because the evening commute provides an opportunity to unwind.

Unforeseen circumstances can also dictate one’s choice of transportation. David Hartgen, a transportation consultant and senior fellow at the libertarian Reason Foundation, believes that mass transit primarily offers mobility to those who find themselves with no other means of getting around. This captive market changes over time.

“Most transit systems have 30 to 40 percent turnover in ridership every year,” says Hartgen. “Fixed systems don’t work nearly as well in that kind of churning market environment. Bus systems are much more flexible.”

Finally, and most important, transportation preferences depend on how real estate development has occurred in a metropolitan area. Generally, the more people who choose to live and work along corridors, the better high-capacity transit options like trains perform and the worse automobiles and interstates perform. If residential and commercial development is spread out and not in clusters that can be linked together, then rail transit has a harder time getting people out of their BMWs and Darts.

Development patterns have shaped the transportation options available in the Fifth District, says Adie Tomer, a senior research associate and associate fellow at the Brookings Institution. Tomer studies transportation infrastructure in metropolitan areas. “For centuries, the Southeast had a more rurally driven economy and more land-intensive industry than its northern neighbors,” he says. The region became more industrialized at the same time that the automobile started influencing the development of its metro areas. Also, land was plentiful, making it “very easy to institute sprawling development” that favors automobile travel.

As a result, buses blanket the sprawling metro areas south of the Mason-Dixon Line. Bus routes are not fixed, which enables transit operators to respond to shifting population patterns. In contrast, higher capacity, fixed-route subways like the Metro in Washington, D.C., and commuter rail systems like the MARC in Baltimore link together the more densely populated metros north of the Mason-Dixon.

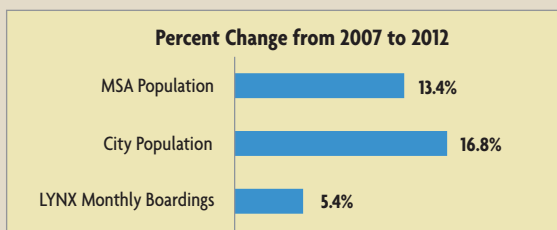
At one time, it wasn’t government transit agencies that responded to changes in transportation needs. Most urban transit systems were privately owned and operated, from the days of horse-drawn railcars in the mid-1800s to the advent of electric streetcars in places like Richmond in the late 1880s to the bus systems that replaced streetcars after World War II. Government involvement primarily came in the form of awarding exclusive franchises to private operators in exchange for some oversight.

Over the years, private operators went bankrupt or sold out to state and local governments as the interstate highway system and the population flight to the outer suburbs eroded ridership on buses and trains in inner cities. When Congress passed the Urban Mass Transportation Act of 1964 and a similar funding bill in 1970, billions of dollars became available to help cover the cost of mass transit systems, primarily capital expenses. This supported state and local governments as they took over private operators.

The influx of federal money had another unintended consequence: It encouraged governments to favor transit projects with higher capital costs, namely rail lines. In contrast, bus lines have lower capital costs.

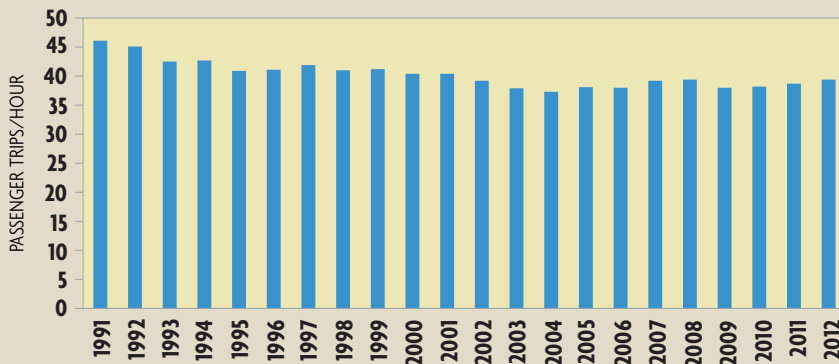
Light rail has been favored over buses for another reason, according to Randall O’Toole, who has studied transportation issues at the free-market-oriented Cato Institute. O’Toole says policymakers have expanded transit services beyond urban neighborhoods where people have traditionally used them in order to justify taxing suburbanites for transit. But ridership has not increased as quickly as service has expanded, pushing down the number of passengers transported per vehicle hour (see chart on next page). Rail advocates have argued that in order to attract choice riders who don’t ride the bus, governments need to build fixed route systems like bus rapid transit and light rail that are grade-separated from traffic, have covered stations, and are

### Growth in Population vs. Light Rail Ridership in Charlotte, N.C.



NOTE: Monthly boardings are number of unlinked passenger trips for the month of December.  
SOURCES: National Transit Database, Charlotte Chamber of Commerce, BEARFACTS-Bureau of Economic Analysis

## U.S. Mass Transit Usage



NOTE: Passenger trips/hour refers to unlinked passenger trips per vehicle revenue hour, a count of the number of people who boarded a mass transit system for every hour that the system was in service.  
SOURCE: National Transit Database

served by shiny new vehicles.

UNC Charlotte's Stephen Billings agrees that while buses are more flexible and cost-effective, there is a cultural bias against them. "Buses are considered an inferior type of transportation. They have a perception of being dirty or dangerous," he notes.

Also, bus service isn't as efficient in metropolitan areas that are less dense, since longer and more frequent trips through neighborhoods are required to provide adequate service. "If it's more than a 15-minute wait between buses or stops are more than half a mile away," says Billings, "that is a big deterrent to taking a bus."

The flexibility of a bus system also means that stops — and paying customers — can be moved out of a neighborhood. As a result, businesses may be less willing to invest in new development along a bus route. In contrast, "if you have a light rail line, they know it's not going to change," says Billings.

### Transit as Economic Driver

The promise of rail transit as an economic driver is one of the reasons Charlotte and Norfolk developed their light rail systems, even though both cities are significantly less dense than Baltimore or Washington, D.C. (see adjacent chart). Policymakers hoped that trains would spur new residential and commercial development.

Recent research has indicated a positive relationship between a stop on a transit line and surrounding land values in some cases. Billings points to the potential of agglomeration economies, whereby a certain level of density results in real increases in economic activity. For example, a young couple may view the combination of restaurants, apartments, and a light rail stop within walking distance as an attractive option. "The question is does [rail transit] investment spur enough concentrated development that leads to substantially more?"

Indeed, the effects of mass transit on development have been found to be relatively modest and limited by distance. Furthermore, land-use regulation usually has to be changed

first to support transit-oriented development.

Norfolk was in a unique position to encourage economic development along the 7.4 miles of its Tide light rail line. Urban renewal efforts of the 1950s and 1960s left a blank slate from which to redevelop most of its downtown, including empty lots around the Tide's stations. Officials have rezoned that land to support denser, pedestrian-friendly development.

In Charlotte, city planners worked with officials in Mecklenburg County and six town councils to create special zoning districts around the stations on the first leg of the LYNX light rail system, the Blue Line. Each new development in a district must meet a minimum level of density and be walkable and attractive. At the same time, the city upgraded sidewalks, installed new light fixtures, and improved

roadways in the districts.

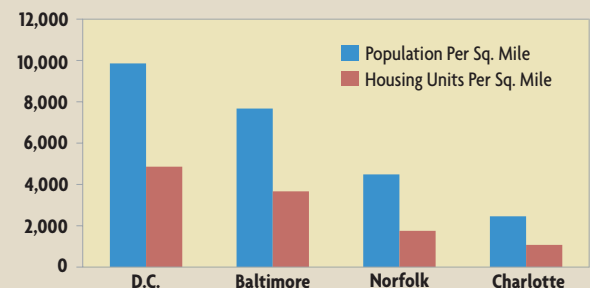
So far, investors have ponied up \$288 million to build residential, retail, and office space around the Blue Line's stations from 2005 to 2013, while another \$522 million of development is under construction. Just a quick glance out the window of the LYNX confirms this rush of activity.

The view changes quite a bit as you travel the 9.6-mile length of the Blue Line, however. Most of the development has occurred around the seven northernmost stations in Charlotte's central business district and South End, a revitalized industrial section of the city flanked by stately 19th and 20th century homes. Modern condos and upscale restaurants hug the train tracks, separated only by a black fence and a paved walking path. In contrast, not much new development has occurred on the south end of the Blue Line. The LYNX shares the tracks with freight trains and is surrounded primarily by residential neighborhoods and clusters of industrial and low-density commercial development.

Billings published a paper in November 2011 that compared residential and commercial development along the Blue Line with development activity along alternative alignments that weren't selected. He found that while the presence of the light rail line had a small impact, "it's definitely not as big an impact as it first looks."

The LYNX may look good when you compare property

### Densities of 5E Cities with Rail Transit



SOURCE: U.S. Census Bureau

values and the amount of new development along the Blue Line with the rest of the city. But its route “was picked for a reason — it was an area that had potential,” says Billings. “Maybe all we’re seeing is people investing in a place that was doing well anyway, and if you hadn’t invested in light rail, it would have been the same story.”

The Institute for Transportation and Development Policy, a nonprofit that works with cities to develop transit systems, recently released a report that examined the development potential of streetcar, light rail, and bus rapid transit systems in 13 cities, including Charlotte. The report found that the marketability of the land along transit corridors and government support were the most important determinants of development.

“Some transit corridors were able to stimulate really high levels of development and other corridors stimulated almost none,” says Annie Weinstock, a co-author of the report. “It’s not like you build mass transit and then you have development. There are a lot of things that have to come into play.”

Directing growth along corridors and clustered around stops on a light rail line requires a lot of work, especially in the short term. And not every lever that steers economic development is under the control of government planners. For example, banks have to be willing to fund transit-oriented development projects. So, expectations should be set accordingly.

“Too often people expect a mass transit investment to do a lot more than it is designed to do,” explains Weinstock. “It can have other benefits in terms of linking communities, changing the character of a street, and helping to stimulate transit-oriented development. But the main thing that mass transit does is provide a better and shorter trip for the most people possible.”

If rail transit provides a viable alternative for the millions of people who can’t drive to work, it could be an economic driver in another way. It can help reduce labor market frictions by connecting workers in or near a metro area’s urban core with the employers in the suburbs who need their skills.

A 2012 study by Adie Tomer at Brookings found that 72 of the nation’s 100 largest metropolitan areas have more jobs in the suburbs than in their central cities. Yet only 64 percent of suburban jobs — and only 52 percent of jobs in southern suburbs — are accessible to mass transit.

### Transit as Traffic Decongestant

Finally, by offering alternatives to driving, rail transit promises to help relieve traffic congestion in a metropolitan area. In turn, this can have environmental benefits and reduce parking and travel delays.

The key is to draw a sufficient number of drivers off of roads. Buses and trains consume their share of fossil fuels — even electric ones do so indirectly — so they have to carry enough people to generate a lower amount of pollution per commuter than individuals traveling by themselves on interstates.

Some transportation researchers aren’t convinced that transit projects can reduce congestion. Erick Guerra, an assistant professor of city and regional planning at the University of Pennsylvania, points to the same problem that arises when roads are expanded to serve densely populated areas. As you improve travel conditions, the freed up capacity fills up quickly. “Someone leaves for their commute at 7 a.m. instead of 6:30 a.m. because the road is less congested,” says Guerra. “It winds up getting as congested as it was before.”

Congestion on the interstates that parallel Charlotte’s and Norfolk’s light rail lines continues to be a problem. Upon first glance at traffic counts at various points, one wouldn’t see much change. Of course, there is no telling whether those counts would have gone much higher in the absence of light rail.

Guerra believes a better alternative to mass transit is better management of traffic via congestion pricing of roads. “Even though drivers are spending a lot on their cars, they are not spending anywhere near the cost of the land that they are traveling on,” he notes. Current user fees barely cover road maintenance, so a lot of the money comes from general taxes that everyone pays. The problem with that approach is “if you drive on local roads 100 miles a day, you’re paying the same amount for those roads as someone who doesn’t drive at all.”

It may sound like Guerra and other researchers are against rail transit in general. In fact, recent research has indicated that transit is neither the cure-all nor the debacle it is often portrayed to be. Rather, transit is an option that can make a difference, if it is developed in the right place and part of a comprehensive effort to improve the accessibility and efficiency of a region’s transportation infrastructure. **EF**

### READINGS

Billings, Stephen. “Estimating the Value of a New Transit Option.” *Regional Science and Urban Economics*, November 2011, vol. 41, no. 6, pp. 525-536.

Cervero, Robert, and Erick Guerra. “Urban Densities and Transit: A Multi-dimensional Perspective.” University of California Institute of Transportation Studies Working Paper No. 2011-06, September 2011.

Hook, Walter, Stephanie Lotshaw, and Annie Weinstock. “More Development for Your Transit Dollar: An Analysis of 21 North American Transit Corridors.” Institute for Transportation and Development Policy, September 2013.

Tomer, Adie. “Where the Jobs Are: Employer Access to Labor by Transit.” Brookings Metropolitan Opportunity Series, July 2012.



# Why Was **Canada** Exempt from the Financial Crisis?

Canada has avoided crises for 180 years, while we have been prone to them. Can we recreate its stability here?

BY RENEE HALTOM

**A**s the worst financial crisis in generations hit the United States in 2007 and 2008, Canada was a pillar of resilience.

No Canadian financial institutions failed. There were no government bailouts of insolvent firms (just a couple of lending programs to address market volatility relating to problems in the United States). Canada was the only G-7 country to avoid a financial crisis, and its recession was milder than those it experienced in the 1980s and early 1990s. For the last six years, the World Economic Forum has ranked Canada first among more than 140 countries in banking stability.

It's not just one-time luck. If you define "financial crisis" as a systemic banking panic — featuring widespread suspensions of deposit withdrawals, bank failures, or government bailouts — the United States has experienced 12 since 1840, according to a recent study by Charles Calomiris, professor of finance and international affairs at Columbia University, and Stephen Haber, professor of history and political science at Stanford. That's an average of one every 14 and a half years. Canada has had zero in that period. Its largely export-driven economy has seen more than its share of recessions, and even some notable bank failures, but it has almost completely avoided systemic problems. Even during the Great Depression, when more than 9,000 of our banks failed, Canada lost a grand total of one — to fraud.

One might suspect that it's because Canadian financial institutions tend to be more tightly regulated; they have higher capital requirements, greater leverage restrictions, and fewer off-balance sheet activities. But Canada's financial system was largely unsupervised until the late 1980s. In a period in which both Canada and the United States had virtually no official supervision or regulation of bank risk-taking — from the 1830s to the advent of the Fed in 1913 — America experienced no fewer than eight systemic banking crises, while Canada had only two short-lived episodes in the 1830s relating to problems here. That suggests regulation alone can't explain Canada's stability.

All the while, Canadian banks provide ample credit to the economy. According to the World Bank, Canada ranks in the middle among high-income countries in the provision of

credit, with bank lending as a percent of GDP averaging 95 percent over time, compared with 52 percent here.

Canada has seemingly found a way to balance the provision of credit with the containment of risk. The question is, would adopting some of its characteristics produce the same success here?

## What's Different in Canada?

The financial systems of Canada and the United States provide the same basic services. The striking difference is in how they are provided.

America has one of the world's more fragmented financial systems, with almost 7,000 chartered banks and a legion of regulators. Depending on its charter, an American bank can be regulated by the Fed, the Federal Deposit Insurance Corporation, the Office of the Comptroller of the Currency, or state regulators — and that's just the list for banks. By contrast, Canada has just 80 banks, six of which hold 93 percent of the market share, according to the International Monetary Fund. It has one overarching financial regulator, the Office of the Superintendent of Financial Institutions (OSFI), which oversees all manners of financial firms: banks, mortgage lenders, insurance companies, pension funds, and more. (Securities markets are regulated by Canada's 13 provincial and territorial governments, but their regulations are largely harmonized.)

What explains these differences? The answer requires a bit of onion peeling. A financial system's structure is, in part, a response to regulation. But regulation is an evolutionary process; policymakers tend to tweak regulatory rules and procedures in response to financial crises or major bank failures. So to truly understand a country's financial landscape, you have to go back — all the way back — to its beginning. Financial regulation in a new world typically starts with one question: Who has the authority to charter banks?

This seemingly small choice sets off a chain reaction, according to Michael Bordo and Angela Redish, Canadian economists at Rutgers University and the University of British Columbia, respectively, and Hugh Rockoff, a monetary expert also at Rutgers. They've studied the differences between Canada and the United



States in several papers dating back to the 1990s.

They argue that the states here prohibited banks from branching, while Canada did not. These differences don't exist today; American and Canadian banks alike are free to establish branches virtually anywhere they are economically viable. But for most of U.S. history, up to 1994, most states had some form of restrictions that prohibited branching across state lines, and within states in some cases. The result: a lot of U.S. banks. At the peak almost 100 years ago, there were 31,000 individual institutions, virtually one distinct bank for every city and town, and almost no branches.

Many economists have argued that this “unit banking” in the United States made banks more fragile. For one thing, banks were rather undiversified. “Their assets would be mostly local loans, mortgages on farms or farm machinery, depending on whatever crop was grown in the area. If the price of wheat fell, loans depending on those local crops could be in trouble,” says Rockoff. A single bad harvest was liable to set off a wave of local failures, tightening credit to the entire region.

Unit banking aggravated other unstable features of U.S. banking. Regional shocks often produced bank runs, and the rush of deposit withdrawals would drain banks of cash. It was difficult to issue more currency because all notes had to be backed by government bonds, which were costly and slow to obtain. Addressing this problem is one reason the Fed was created in 1913, to expand the currency supply quickly in times of need.

Canadian banks solved the bank run problem with no central bank. Scholars have chalked this up to a few things. First, its banks were inherently less risky because diversification helped them absorb shocks. Second, its banks could respond to depositors' demand for cash by printing their own currency backed by general assets. Third, the system's high concentration facilitated coordination in emergencies. The Canadian Bankers Association, a private consortium of banks, established a fund to honor notes issued by failed banks and arranged takeovers of failing banks when our country was enduring the panics of 1893 and 1907. As a result, note holders and depositors rarely experienced losses. Competing banks had an incentive to prevent such losses because, in a highly concentrated banking system, a single failure would be bad for everybody. In exchange for support, they policed each other to prevent excessive risk-taking.

“People were fairly confident that something would be worked out, so Canada didn't get the panicky bank runs that we did in the United States,” Rockoff says. American banks tried the same with private clearinghouses and coinsurance schemes, but these efforts often failed; the banks' interests sometimes proved too diffuse to provide confidence that panics would be averted. (The Canadian government did backstop the banking system on some occasions, mostly through regulatory forbearance, Redish says. At the request of farmers, it loosened collateralization requirements on note issuance in 1907 and itself issued additional notes in 1914. Some scholars have also argued that banks were

## Financial regulation in a new world typically starts with one question: Who has the authority to charter banks?

insolvent during the Depression but avoided runs because of an expected backstop by the government.)

From its beginning, Canada's banking system was structured to be less vulnerable to shocks and thus did not give rise to the need for a central bank to achieve stability. By contrast, the Fed was created to offset vulnerabilities in the American banking system.

### Political Roots of Instability

The Fed's founders didn't address branching restrictions, however, even with full understanding that small, vulnerable banks were part of the core problem. In 1910, the financial scholar O.M.W. Sprague of Harvard University, studying on behalf of the congressionally established National Monetary Commission, concluded that unit banking was “a deep-seated cause of weakness in the financial system” and the single most important difference between banking in the United States and other countries, almost all of which allowed branching. But if unit banking was known to be such a problem, why was it allowed to persist?

According to the recent study by Calomiris and Haber, set out in their 2014 book *Fragile By Design*, united factions with an interest in keeping banks small succeeded in shooting down attempts at branching liberalization until the 1980s. They argued that the unique structure of the U.S. political system allows popular interests to sway policy more than in other countries. The U.S. Constitution gave all functions not explicitly handed to the federal government, such as regulatory policy, to the states. Interests needed only to win legislative fights at the local level, which was a far easier task than in today's relatively more federalized system, Calomiris and Haber contended. Thus, they argued that the origins of a country's financial stability — or lack thereof — are mainly political.

Small farmers opposed branching because it would allow banks to take credit elsewhere after a bad harvest. Small banks wanted protection from competition. And many others opposed any signs of growing power concentrated in any one institution — or bank. “Even in recent years, there was a feeling that local community banks were doing something really good and should be protected or encouraged in some way,” Rockoff says.

As the financial system evolved, branching was defeated at every turn. The first attempts at creating a central bank — in 1791 and 1816 — temporarily established a dual system of both state- and nationally chartered banks. But fears about the concentration of power, including opposition to branching, led to the charters of both central banks not being renewed. After 1830, several states experimented with “free

banking,” which allowed individuals to establish banks anywhere, but free banks were still prohibited from branching. National banks were created to fund the Civil War by issuing notes backed by government bonds but were forced to honor state branching limitations. The political infeasibility of branching meant the Fed’s founders, despite Sprague’s conclusions, barely even discussed it as a realistic option.

North of the border, the balance of power was different. “In Canada those same groups existed, and they tried the exact same things as in the U.S., but they didn’t succeed,” Calomiris says.

The architects of Canada’s Constitution had precisely the opposite objective from those of the U.S. Constitution: After the French population in Quebec staged a revolution in 1837-1838, “the British realized they had to build a set of institutions to make it hard for the people who hated their guts to create disruptions,” Calomiris says. Canadians weren’t as fearful of the concentration of power; their independence came in 1867 through legislation, not revolution. The first Canadian banks were established by Scots, who mimicked Scotland’s branched system. In addition, Canada’s export-based economy was better served by a national system that could help products move not from city to city, but from country to country.

The Canadian constitution gave the regions equal weight in the upper house of the legislature, much like the U.S. Senate, to dilute the French influence in Quebec. Population determines representation in the lower house, much like the U.S. House of Representatives, creating incentives for centrist parties that cater to the median voter. Laws passed by the lower house can be overruled by the Senate, whose seats are filled by appointment of a governor general of Her Majesty the Queen and held until age 75.

Many times, the Canadian government defeated populist measures that would have changed the banking system. One law passed in 1850 tried to replicate U.S. free banking, including the requirement that notes be backed by government bonds to encourage government bond purchases. But the legislature refused to end branching, and the free banks simply weren’t viable in comparison. Few free bank charters were ever issued. In response to the episode, provisions were included in the 1867 constitution to ensure that banking policy was made at the national level.

### **Domino Effects**

Not only did branching restrictions persist in this country, but new laws served to protect small banks. Many such laws were enacted after the Depression, when a third of the nation’s banks, most of them small, failed. Federal deposit insurance, created in 1933, originally applied only to small banks. It was added to the Glass-Steagall Act of 1933 at the last minute to gain support from Henry Steagall, the powerful representative from agrarian Alabama. The Act was the culmination of no fewer than 150 attempts over the previous 50 years at passing a federal deposit insurance system for small banks, Calomiris and Haber argue. Other bank restric-

tions in Glass-Steagall — like Regulation Q’s ceilings on the interest rates that banks could pay depositors, and rules prohibiting banks from securities dealing — were intended to prevent excess speculation but also served to keep banks small.

That had a side effect: The shadow banking system took off. “Regulations limited the amount of credit that the commercial banking system could extend to industry, so instead it was provided through other financial markets — the stock and bond markets, investment banks, and others,” Rockoff says. With shadow banking came a disparate set of nonbank regulators, such as the Securities and Exchange Commission and others, helping to explain the relatively fragmented regulatory system we have today.

Canada also suffered during the Great Depression when its money supply plummeted. “The political situation was as dire in Canada as it was in the United States; the government has to do something in the depths of a depression,” Redish says. The prime minister launched the Royal Commission on Banking and Currency to consider a central bank. Some scholars, including Redish and Bordo, have argued that there was no economic necessity for a central bank. Instead, it was seen as something that could be done in the national interest — meeting the political demand for reform — that wouldn’t do much harm. The Bank of Canada opened its doors in 1935.

Though deposit insurance finally stemmed bank runs in the United States, it wasn’t instated in Canada until 1967. But overall, says Redish, “there was very little regulation of the Canadian banking system until 1987. There were two bank failures in the early 1980s that kind of woke everybody up; they were the first bank failures in 60 years.” By comparison, the United States had 79 bank failures in the 1970s alone. The precursor to OSFI, Canada’s current regulator, had just seven bank examiners in 1980, compared with thousands of examiners here. When OSFI was established in 1987, it encompassed most financial activity, including off balance sheet activities.

When the economy changed in the decades preceding the 2007-2008 financial crisis, the financial systems of Canada and the United States were structured to respond differently. This was especially true during the inflationary 1970s. With interest rates on deposits capped here, investors sought protection from inflation elsewhere, such as money market mutual funds that allowed check writing and other deposit-like features. Deregulation moved additional funds out of the banking system.

In Canada, the reverse happened; after walls between securities brokerage and banking were removed in 1987, banks absorbed securities brokerages, mortgage lending, and other activities that occur outside of the banking sector in America. According to a June 2013 study by Bank of Canada economists Toni Gravelle, Timothy Grieder, and Stéphane Lavoie, shadow banking activities are about 40 percent the size of Canada’s economy, compared with 95 percent in the United States. Not only is a significant

portion of that activity in Canada undertaken by banks, 60 percent is regulated and explicitly guaranteed by the government, for example, through insurance or access to a lender of last resort. Canada's bank regulations and charters — all of them — are revised every five years, an attempt to help regulation adapt to innovation and emerging risks.

Nowhere did Canada's structural and regulatory differences manifest themselves more clearly than in mortgage finance. Canadian banks tend to hold on to mortgages rather than selling them to investors. Fewer than a third of Canadian mortgages were securitized before the financial crisis, compared to almost two-thirds of mortgages in the United States. Some have argued that this, combined with tight regulatory standards, gives Canadian banks stronger incentive to make those mortgages safe. Fewer than 3 percent of Canadian mortgages were classified as subprime before the crisis, compared with 15 percent here. In Canada, banks can't offer loans with less than 5 percent down, and the mortgage must be insured if the borrower puts less than 20 percent down. Mortgage insurance is available, moreover, only if the household's total debt service is less than 40 percent of gross household income. Not only did Canada have a much smaller housing boom than us, but its mortgage delinquencies barely rose above the historical average of less than 1 percent. At the peak, 11 percent of American mortgages were more than 30 days overdue.

The lesson is not that shadow banking is bad, Rockoff says, nor that regulations and a lender of last resort are a panacea. It's that if you have two parallel banking systems within a country, and one is regulated but the other has only vague constraints, it's clear where the risks will gravitate. At the same time, it's hard to use regulation to bring risk into the fold. "I think next time around we'd just find problems somewhere else," Rockoff says. The better solution, he says, is to align private incentives against excessive risk-taking. For much of Canada's history, that has occurred naturally because banks monitored each other in exchange for the implied promise of mutual support in crises. Overall, monitoring has been made more feasible by the fact that its system includes only a small number of players.

Branching was finally made inevitable after the 1980s by globalization and technological innovation, which made the geographic boundaries of banks less relevant. The final U.S. restrictions were repealed by the Riegle-Neal Interstate Banking and Branching Efficiency Act in 1994. But by then, our fragmented system was already in place.

## Working With the System We Have

It can be tempting to look at the outward characteristics of another country's stable financial system and conclude that its regulations or structure will produce the same stability here. But doing so may not address the fundamental sources of instability and could create new problems. "It's very hard to imitate success once you realize that success is based on political institutions with deep historical roots," Calomiris says.

Moreover, there may be ways in which our financial system outperforms Canada's. Critics claim that Canada's tightly regulated system is slower to innovate and fund entrepreneurs. And because there are only a few large banks, the failure of one could be difficult for the financial system to weather.

As for the way policy is made here, there are important cultural reasons for it. "If you went to Americans right now and said, 'We can fix our problem; let's just change the 17th Amendment so we no longer have a popularly elected government,' I don't think you'd find many takers," Calomiris says. He is quick to point out that a less representative government does not produce greater stability; he and Haber overwhelmingly found that democracies outperform autocracies in financial stability. Instead, they emphasize that stability tends to prevail in democracies in which policy is made with an eye toward overall stability rather than popular interests.

Democracies do tend to take constructive steps when financial problems affect the median voter. That happened when President Carter nominated Paul Volcker to the Fed chairmanship in 1979 to end rampant inflation. But households could understand inflation and felt directly that it harmed them. The challenge today is that banking is nuanced; on that topic, it is harder to create an informed electorate.

There have been many proposed explanations for why our financial system proved much less resilient than Canada's in 2007 and 2008, from insufficient regulation, to lax mortgage lending, to our history of government rescues. The longer lens of history shows, however, that any one explanation for financial instability — and therefore any one regulatory attempt to fix it — may be too simple.

Even if unit banking is a relic of the past, it is still with us through its effects on the evolution of the U.S. financial system — just as reforms today will determine the shape and stability of the financial system of the future. **EF**

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## READINGS

Bordo, Michael D., Angela Redish, and Hugh Rockoff. "Why Didn't Canada Have a Banking Crisis in 2008 (Or In 1930, Or 1907, Or...?)" National Bureau of Economic Research Working Paper No. 17312, August 2011.

Bordo, Michael D., and Angela Redish. "Why Did the Bank of Canada Emerge in 1935?" *Journal of Economic History*, June 1987, vol. 47, no. 2, pp. 405-417.

Calomiris, Charles W., and Stephen H. Haber. *Fragile By Design: The Political Origins of Banking Crises and Scarce Credit*. Princeton, N.J.: Princeton University Press, 2014.

Gravelle, Toni, Timothy Grieder, and Stéphane Lavoie. "Monitoring and Assessing Risks in Canada's Shadow Banking Sector." Bank of Canada *Financial System Review*, June 2013, pp. 55-63.

# CREDIT SCORING — AND THE — Revolution in Debt

## How a number changed lending (and got some Americans in over their heads)

BY DAVID A. PRICE

Whether you're applying for a mortgage, signing up for a credit card, or thinking about how to finance a small business, you'll quickly come face to face with one of the transformative developments of the digital age: the credit score. It doesn't enjoy the glamorous image of the social network or the smartphone — but much as those tools have spread access to information, the credit score has been a powerful catalyst in broadening access to credit.

Credit scoring is a process for analyzing a borrower's credit risk — the likelihood of repaying the loan — using a computer model and expressing that risk as a number. Creators of scoring models statistically analyze the records of a large number of consumers, perhaps more than a million, and determine the extent to which different factors in those records were associated with loan repayment or default. Those factors then become the basis for calculating scores of future borrowers or prospective borrowers. Lenders use the scores to solicit customers (for example, to select individuals to target with credit card offers), to decide whether to grant credit, and to determine the interest rate that a borrower will be offered. Studies have found that credit-scoring systems outperform the judgment of human underwriters, on average; moreover, they do so at a fraction of the cost.

Perhaps because credit scoring is a process innovation, rather than a product that is highly visible to consumers in its own right, its role in the growth of credit has been little heralded. Without it, however, today's financial system in many ways would be unrecognizable.

### Emergence of Credit Scoring

Credit scoring has its roots in local credit bureaus that started in the 1830s to help firms decide whether to extend trade credit — that is, credit to a business customer, such as a retailer buying on credit from a manufacturer or wholesaler. Until then, the nature and scale of trade in the United States had made it reasonable for suppliers to rely on letters of recommendation in determining a customer's creditworthiness. When credit bureaus came into the picture, they offered hard data on the customer's payment record shared by other businesses in the community. Companies manually

evaluated the information from credit-bureau files together with the contents of the customer's credit application.

Consumer credit bureaus followed later in the century, many of them established by groups of merchants or an area's chamber of commerce. A handful of them banded together in 1906 to share information, forming an organization known as Associated Credit Bureaus. To meet increasing demand for credit information on out-of-town and out-of-state consumers, bureaus joined the association at a rapid pace; according to a 2005 history by Robert Hunt of the Philadelphia Fed, its membership grew from fewer than 100 in 1916 to around 800 in 1927 and 1,600 in 1955.

The ensuing decades saw consolidation among the credit bureaus. Additionally, in the 1950s, a new tool with possibilities for the credit information industry arrived: the computer. All the ingredients for automated credit scoring were now in place.

"What made credit scoring possible was three things," says Fed economist Glenn Canner. "One, you needed data. The data became widely available in the 1950s through the emergence of larger credit bureaus. Two, you needed computing power. And three, you needed someone with bright ideas."

The bright ideas came from William Fair and Earl Isaac, an engineer and a mathematician who had worked together at Stanford Research International (SRI), a think tank, where they created mathematical models on computers for the military. They came to believe that the combination of the new digital machines and their own mathematical talents could be the basis for a profitable consulting firm serving the private sector. In 1956, investing \$400 apiece, they left SRI to start Fair Isaac Corporation.

As they explored various directions for the business, inspiration struck, and they began trying to interest consumer credit companies in the concept of credit scoring. They sent letters in 1958 to the 50 largest consumer lenders in the country and received only one reply. But a single client was all they needed to show the value of their idea; that year, a finance company, American Investments, had them create the first credit-scoring system.

For the next decade, use of credit extended by retailers continued to dominate over use of general-purpose charge cards and credit cards. Accordingly, national department store chains, rather than banks, led in the adoption of the new technology. "Unsecured consumer credit from financial institutions did not appear in any significant amount in the United States until the late 1960s," says Richmond Fed economist Kartik Athreya.

By 1978, however, banks and retailers held around the same amounts of revolving credit, according to the Philadelphia Fed study — and by 1993, revolving credit balances at banks totaled more than three times the balances at retailers. Credit card issuers and major automobile lenders, who needed a reliable measure of credit quality for a nationwide pool of customers, began relying on credit scores during this period.

A final step in spurring widespread adoption of credit scoring was their adoption by the behemoths of the mortgage market, Freddie Mac and Fannie Mae, which began requiring credit scores for their new automated mortgage underwriting systems in the mid-1990s.

### Changing Consumer Lending

Today, all three major consumer credit-reporting agencies — Experian, Equifax, and TransUnion — use credit-scoring models created for them by the company that Fair and Isaac founded, now known as FICO. The scores that the agencies report may include not only generic scores (that is, scores not keyed to a particular type of financial product), but also educational scores (the ones provided to consumers) and industry-specific scores for auto loans or bank cards. In addition to FICO-based scores, the agencies also offer VantageScores, which are calculated using models created by VantageScore Solutions, a FICO rival that the agencies jointly own. (FICO scores are generally on a scale from 300 to 850; the VantageScore scale is 501 to 990.)

The now-universal use of credit scores in consumer lending has had a number of effects. In addition to the obvious one, faster and cheaper processing of applications, it has changed the way credit is priced. Several studies have found that the rise of credit scoring has been associated with an increase in the dispersion of interest rates — that is, an increase in the variations in rates charged to different consumers. One of these studies, published in *American Economic Journal: Macroeconomics* in 2012 by Athreya, Xuan Tam of the City University of Hong Kong, and Eric Young of the University of Virginia, found that the variance in credit card interest rates more than tripled from 1983 to 2004. Researchers attribute this trend to the improved ability of lenders to distinguish borrowers with different levels of credit risk; risky borrowers are paying more interest on their balances and safe borrowers are paying less. Within the credit card industry, the value of this information has been further increased by regulatory changes that have reduced restrictions on credit card rates.

The question of whether this is good or bad is up for grabs. In one sense, risk-based pricing is more equitable, rewarding consumers for responsible management of their finances. At the same time, there are distributional implications that may be troubling to some. (A weak credit history may also prove costly in the homeowners and auto insurance markets, where companies look at “insurance scores” based on credit information to estimate a consumer’s risk of loss.)

Credit scoring may also affect other terms of a loan. Such effects were highlighted in a recent study of a large auto finance company by Liran Einav and Jonathan Levin of Stanford University and Mark Jenkins of the University of Pennsylvania. In a 2013 article in the *RAND Journal of Economics*, they looked at the adoption of credit scoring by the unnamed company, which specializes in lending to consumers with low incomes or poor credit records; they found that with credit scores, the company offered higher loans to low-risk borrowers and required larger down payments from high-risk borrowers. The result: an increase in profits of over \$1,000 per loan, on average.

With the ability to distinguish risk levels of borrowers has come a greater amount of consumer lending overall. The more lenders know about borrowers, the more confident they are in their ability to price credit profitably. Juan Sánchez of the St. Louis Fed noted in a 2010 working paper that the credit card balances of consumers — credit card balances and other credit lines, but not including secured debt — rose as a share of income from 2.6 percent in 1983 to 4.2 percent in 2004, nearly a 50 percent increase. Even these figures, moreover, do not include the dramatic rise in home equity lines and cash-outs from mortgage refinancings during the later years of the period.

One might assume that if lenders have more information about borrowers, the result will be fewer defaults. But that has not been the case: The widespread adoption of credit scoring by the financial services industry coincided with a rapid rise in consumer bankruptcies. Bankruptcy filings increased more than fivefold from 1983 to 2004, and far faster than the growth of consumer credit. Not only have bankruptcies become more frequent, they have become larger.

Those changes are no accident, researchers have found. Better information, by enabling greater access to large amounts of credit, appears to be giving more borrowers the rope, so to speak, with which to hang themselves. The study by Athreya, Tam, and Young estimated that the availability of more information about borrowers accounts for around 46 percent of the increase in bankruptcies.

Like other developments of the digital revolution, credit scoring can prove either helpful or damaging from one person to another, from one situation to another. “There has been a democratization of credit,” says Canner. “It’s true that more people will go bankrupt. On the other hand, more people will have had access to credit to do lots of things that are very productive for them, including going to school and starting businesses. There’s a lot of upside.” **EF**

### READINGS

Athreya, Kartik, Xuan S. Tam, and Eric R. Young. “A Quantitative Theory of Information and Unsecured Credit.” *American Economic Journal: Macroeconomics*, July 2012, vol. 4, no. 3, pp. 153-183.

Board of Governors of the Federal Reserve System. *Report to the Congress on Credit Scoring and its Effects on the Availability and Affordability of Credit*. August 2007.

Hunt, Robert M. “A Century of Consumer Credit Reporting in America.” Philadelphia Fed Working Paper no. 05-13, June 2005.

Miller, Margaret J. (ed.), *Credit Reporting Systems and the International Economy*. Cambridge, Mass.: MIT Press, 2003.

*A Norfolk Southern train  
hauls coal across Dryfork  
Bridge near Bluefield, W. Va.*



# THE FUTURE OF COAL

## Prospects for West Virginia's Highest-Paying Industry Appear Bleak

BY KARL RHODES

Forty years ago, President Richard Nixon announced Project Independence, a series of steps to make the United States energy self-sufficient by 1980. At the top of the list, Nixon wanted factories and utilities to burn less oil and more coal.

Four years later, President Jimmy Carter declared “the moral equivalent of war” on the energy crisis and echoed Nixon’s call for “the renewed use of coal.” Oil and natural gas supplies, Carter said, were “simply running out.”

Fortunately, the nation did not run out of oil and natural gas — quite the opposite. In recent years, U.S. producers have learned how to economically extract vast new supplies, mostly from hydraulic fracturing (fracking), a process that breaks apart shale to release oil and natural gas.

Now the U.S. Energy Information Administration (EIA) is predicting that the United States will become a net exporter of liquefied natural gas by 2016 and dry natural gas

by 2019. EIA also notes that U.S. crude oil production has increased 30 percent from 2008 through 2012, causing net imports of petroleum and other liquid fuels to decrease significantly. Energy independence, defined as becoming a net exporter of energy, will arrive in 2023, according to energy consultant and author Philip Verleger Jr.

Verleger and other analysts who are forecasting energy independence cite burgeoning supplies of domestic oil and natural gas. They barely mention the nation’s vast coal reserves. To be sure, dramatic predictions regarding fossil fuel production and consumption have been notoriously wrong over the years. But the U.S. coal industry seems to be facing unprecedented economic and regulatory challenges, including substantially lower natural gas prices, more stringent environmental standards for coal-fired power plants, and higher costs for mining methods that are common in West Virginia.

Tony Yuen, a global energy strategist for Citi, is pessimistic about the future of coal — especially thermal coal mined in West Virginia. “If electricity demand is basically flat, and renewables are continually rising, then something has to give,” he says, and coal already is losing ground.

The days when presidents from both major parties recommended burning more coal are long gone — primarily

PHOTOGRAPHY: NORFOLK SOUTHERN CORP.

because coal-fired power plants emit about twice the carbon dioxide of gas-fired plants. Federal regulations have made it more costly to mine coal in recent years, and the Environmental Protection Agency (EPA) has proposed CO<sub>2</sub> emission standards that would make it nearly impossible for electric utilities to build profitable coal plants in the United States. In an effort to extend that policy throughout the world, the Treasury Department announced in October 2013 that it was “ending U.S. support for multilateral development bank funding for new overseas coal projects except in narrowly defined circumstances.” The announcement was largely symbolic, since the United States has no such veto power, but it put developing nations on notice that they should not attempt to replicate the United States’ coal-fired path to industrialization.

### West Virginia Gold

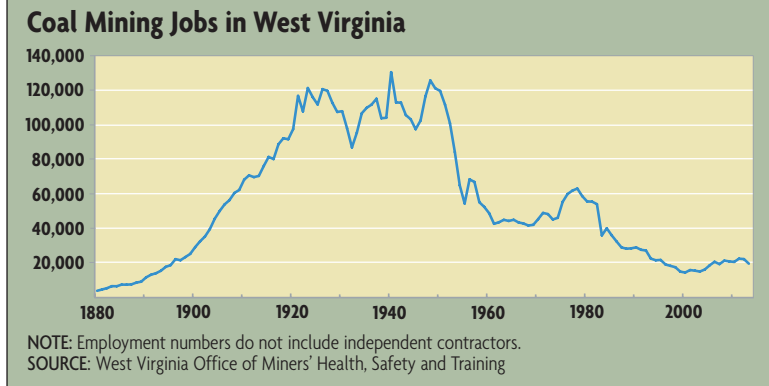
Coal fueled the industrial revolution, and in the United States much of that coal came from West Virginia. For heating buildings and fueling steam engines, burning coal was much more efficient than burning wood. Also, metallurgical (met) coal helped produce the steel that supported the nation’s flourishing factories and soaring skylines.

There is some overlap between thermal coal and met coal, but met coal generally has higher carbon content and fewer impurities. Met coal is primarily used to produce coke (nearly pure carbon), a key ingredient for making steel. West Virginia continues to be a major producer of met coal.

By the early 20th century, coal barons were making vast fortunes in West Virginia, and by mid-century, the labor movement was beginning to spread more of that wealth to miners and other residents of the state. Coal mining remains West Virginia’s highest-paying industry, but coal mining jobs in the state have plummeted from an all-time high of 130,457 in 1940 to a 100-year low of 14,281 in 2000. (See chart.) Technological improvements accounted for the vast majority of that 88 percent decline.

During the 1960s and 1970s, the environmental movement began to affect the coal industry. The Clean Air Act clamped down on six common pollutants — particulate matter, sulfur oxides, nitrogen oxides, carbon monoxide, ground-level ozone, and lead. The new emission standards initially helped West Virginia’s thermal coal producers because West Virginia coal generally burned cleaner than coal from the Illinois Basin. But as more coal plants added scrubbers to remove these pollutants from their emissions, West Virginia lost much of its “clean coal” competitive advantage.

In the years that followed, the coal industry passed through boom and bust cycles. Most recently, downward trends in domestic demand were more than offset by a surge in exports that helped keep West Virginia’s unemployment rate below the national average during the recession of 2007-2009. As the U.S. economy slumped, China was swinging from a net exporter to a net importer of coal. At the same time, there were massive floods in Queensland, Australia,



which produced far more met coal than any other region.

“You had a classic price spike,” recalls Jeremy Sussman, a coal analyst for Clarkson Capital Markets in New York. “Companies at the peak were selling metallurgical coal for \$400 a ton. It was something they had never really witnessed.”

The Dow Jones U.S. Coal Index soared to its all-time high of 741 in June 2008, but it plunged to 111 by that November and has stayed below 200 since May 2012. (See chart on next page.) Clearly the market is not expecting another domestic coal boom, but the market also has demonstrated that prospects for the industry can change quickly. Even so, energy analysts are pessimistic about the long-term outlook for West Virginia coal.

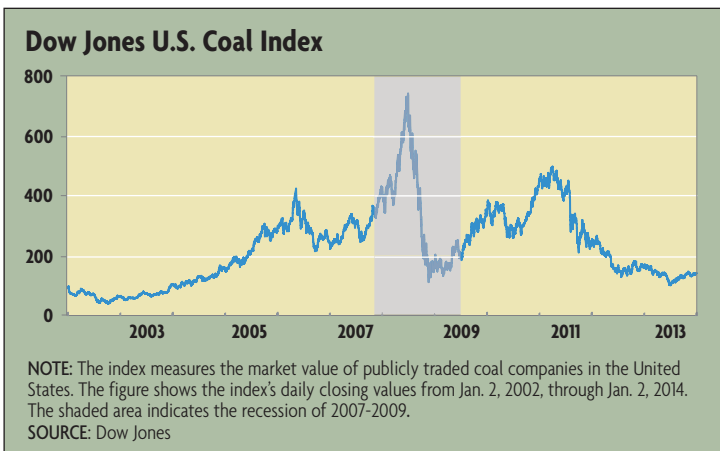
“You won’t see metallurgical coal prices like you did before the financial crisis, but you will see metallurgical coal prices where companies can make a healthy margin,” Sussman says. “I could easily envision a scenario where, in the not-too-distant future, West Virginia is producing almost all metallurgical coal, and only the absolute lowest-cost thermal mines survive.”

### Energy Mix

Carter’s “moral equivalent of war” speech traced 200 years of energy consumption — from wood to coal to oil and natural gas and back to coal.

But fracking has shaken up the energy mix. The availability of natural gas has increased dramatically, and prices have come down accordingly. Some environmentalists have claimed that fracking has contaminated ground water. (See “The Once and Future Fuel,” *Region Focus*, Second/Third Quarter 2012.) But few, if any, peer-reviewed studies have reached that conclusion.

The federal government is researching contamination claims but doing nothing to slow down the fracking frenzy, Yuen notes. To the contrary, the Department of Energy (DOE) has been approving more export terminals for liquefied natural gas, and the Obama administration’s Climate Action Plan relies heavily on burning less coal and more natural gas. “It looks like the government is supportive of natural gas development,” Yuen says, “and the whole of natural gas development right now is based on the ability to drill and hydraulically fracture.”



In the long run, natural gas will fare better than coal under more stringent CO<sub>2</sub> standards, but the more immediate problem for West Virginia's thermal coal is the relative price of coal and natural gas. After spiking above \$13 per million Btu in 2008, the price of natural gas generally has ranged from \$2.50 to \$5.

"At \$3 gas or below, coal that is produced west of the Mississippi can compete with natural gas, but coal east of the Mississippi just absolutely cannot compete," Sussman says. During a few weeks in 2012, the gas price dipped below \$2, and electric utilities generated more power from natural gas than coal for the first time in U.S. history. Since then, the gas price has recovered to \$4.50, but that's still not high enough to put the majority of West Virginia's thermal coal in the money, and no one is predicting a large increase anytime soon. "Assuming the status quo for regulations and so on, it's tough to imagine natural gas prices getting anywhere close to the levels where they were before fracking," Sussman says.

As a result, electric utilities are shutting down old, inefficient coal plants and increasing production at gas plants. Yuen expects the coal shutdowns to peak in 2015, but in that year alone, there could be 15 plant retirements, he says. A lot of those old plants are in Pennsylvania, New Jersey, Maryland, and the Southeast, where power companies tend to use West Virginia coal.

"As long as the natural gas price stays low, it can hide many sins, but gas prices will go up sooner or later," says Howard Herzog, senior research engineer in the MIT Energy Initiative in Cambridge, Mass. Herzog believes the United States should continue developing "clean coal" technologies that would create a more robust electricity-generation system by keeping coal in the energy mix.

He cites the example of New England: "We are at the end of the gas pipeline, and we were never big on coal anyway, and a lot of our coal plants went away," he says. "We have some nuclear, but we are very dependent on natural gas. Two winters ago, this was no problem because it was a very mild winter. Then we had a pretty cold winter last year, and the price of natural gas to utilities went up" — driving wholesale electricity prices four times higher than they were during the previous winter.

Population centers in the Mid-Atlantic region might

get caught in the same trap if they become too reliant on natural gas. West Virginia coal has served Mid-Atlantic utilities for many years, but coal transportation costs are higher than natural gas transportation costs via pipeline, "especially now that the heart of Pennsylvania has one of the largest gas fuel reserves in the world," Yuen says.

Nuclear power also competes with West Virginia coal, and nuclear plants emit almost no CO<sub>2</sub>, but no one has built a new nuclear plant in the United States in more than 30 years, and utilities have been closing down some older reactors. A few new units are under construction, but the Fukushima disaster has put a damper on nuclear power — much like the Three Mile Island accident did in 1979, less than two years after Carter's speech.

### Bleak Prospects

The proposed CO<sub>2</sub> standards do not apply to existing coal plants, so the United States will continue burning coal for a long time. About 40 percent of the nation's electricity still comes from coal, and EPA officials have indicated that CO<sub>2</sub> proposed standards for existing coal plants — due out in 2014 — will be far less stringent than proposed requirements for new plants.

EPA officials realize that coal plants remain a necessary part of the electricity-generation mix, Sussman says, but West Virginia's thermal coal has lost key competitive advantages. Thermal coal supplies from the Illinois Basin and Wyoming's Powder River Basin are significantly cheaper because open-pit mining is less costly than the underground mining and mountaintop removal that are common in West Virginia. Also, West Virginia mining accidents in 2006 and 2010 prompted new regulations that have made underground mining and mountaintop removal even more expensive relative to open-pit mining.

Sussman estimates the gap by comparing Alpha Natural Resources, the largest Eastern producer, with Arch Coal, a large producer in the Powder River Basin. From 2007 to 2012, Alpha's cost per ton increased 64 percent, while Arch's cost per ton increased only 37 percent, he says. "The majority of that difference can be attributed to increased mining regulations" that affect Eastern coal mining more than Western coal mining.

East of the Mississippi River, "low-cost regions, like parts of Pennsylvania and parts of Illinois, will be just fine," Sussman predicts. "Higher-cost regions, which unfortunately would encompass West Virginia, are going to have a much more difficult time."

West Virginia remains, however, a large producer of metallurgical coal. West Virginia's production is currently split roughly 50-50 between thermal and met coal, but nearly two-thirds of the state's coal sales come from met coal.

The state has exported more met coal in recent years, but global demand for U.S. coal softened in 2013. China continues to drive worldwide demand for met coal, and West Virginia has exported more coal to China in recent years, but Yuen expects that trend to decline as well.



“A lot of steel-making happens in China these days, but there is an economic transition from this investment-led growth model in China toward something a little more consumer-led,” he says. “Then the demand for steel may not really be there as strong as what other people expect.”

### Clean Coal

The future of West Virginia’s thermal coal may hinge on new technologies for carbon capture and sequestration (CCS) — a way to capture CO<sub>2</sub> from coal plants and inject it into rock formations far below the earth’s surface.

“The U.S. appears to have considerable capacity for carbon sequestration located suitably in relation to coal plants,” wrote Ernest Moniz in 2007, while he was director of the MIT Energy Initiative. (He has since become secretary of energy.) Carbon capture, however, presents a bigger challenge. “A dramatic cost reduction is needed, and this calls for a large-scale research program that emphasizes new concepts and scales the promising ones to commercial demonstration,” Moniz wrote. “If this is not accomplished, coal would eventually be squeezed out of the U.S. electricity mix by future stringent CO<sub>2</sub> emission constraints.”

Six years later, the CO<sub>2</sub> constraints are imminent, but only one large-scale coal plant with CCS technology is under construction in the United States. Mississippi Power is building a 582-megawatt plant in Kemper County, Miss., but the project has been plagued by delays and cost overruns despite a DOE grant of \$270 million and another \$133 million in tax credits.

MIT’s Herzog advocates a market-based approach instead of relying on subsidies from the DOE and “command-and-control” standards from EPA. “The only way you are going to get markets that are big enough and pay enough to make these CCS projects commercial is through climate policy, and the climate road we are on now — new-source

performance standards — gives gas a free ride,” he argues. “If gas gets a free ride and coal takes a hit, it just widens that gap.” Instead, Herzog believes the government should tax all CO<sub>2</sub> emissions. This approach would affect coal plants about twice as much as gas plants, but it could narrow the regulatory gap compared with a system that requires expensive CCS for new coal plants and nothing for new gas plants.

CCS projects start to look attractive if carbon is taxed between \$50 and \$100 per ton of CO<sub>2</sub>, according to Herzog. “The question is how would the competitors do — such as nuclear and the like. It’s hard to tell, but there is a strong feeling in the CCS community that we would see modern coal plants.”

Herzog concedes, however, that the politics of carbon taxation are extremely difficult. “It’s internal U.S. politics and also international politics,” he says. “You have China just building coal plants without CCS. If you can’t get them into the fold, then you start to have issues of international competitiveness.”

A sustained period of cheap and abundant natural gas would give many U.S. industries a new competitive advantage, but the economic consequences for thermal coal mining in West Virginia would be dire. Researchers at West Virginia University’s College of Business and Economics expect overall coal employment in the state to decline gradually through 2018, but private sector analysts anticipate far more severe job losses.

“If gas prices stay where they are, Central Appalachian production will be down somewhere between 25 percent and 40 percent five years from now,” Sussman says. If productivity continues to decline due to increased regulation and coal-seam depletion, coal mining employment in West Virginia likely will decline substantially as well. “The companies have to focus on low-cost production, and you don’t lower your cost by hiring more miners.” **EF**

### READINGS

“Annual Energy Outlook 2013 with Projections to 2040.” U.S. Energy Information Administration, April 2013.

“Energy 2020: Independence Day.” Citi Global Perspectives and Solutions, February 2013.

Verleger, Philip K. Jr. “The Amazing Tale of U.S. Energy Independence.” *The International Economy*, Spring 2012, p. 8.

“West Virginia Economic Outlook 2014.” Bureau of Business and Economic Research, West Virginia University College of Business and Economics.

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# Mark Gertler

Mark Gertler, one of the most cited researchers in macroeconomics, has spent much of his career looking at how conditions in financial markets affect the real economy — Main Street. In doing so, he has shed light on one of the curious properties of modern economies: Setbacks to an economy that seem relatively minor in the overall scheme of things can nonetheless lead to large negative effects across the system. His work on these issues, with collaborators, innovatively combined elements of microeconomics, banking and finance, and business cycle theory.

Gertler met one of those collaborators in the early 1980s when he was an economics Ph.D. student at Stanford. Gertler and a new junior professor, one with an outsized interest in the Great Depression, took a liking to each another and became frequent co-authors. Among the concepts that emerged from their partnership was that of “financial accelerators” — mechanisms that could cause a short-lived shock to financial conditions to translate into persistent fluctuations in the economy. Later, in 2007 and 2008, Gertler’s collaborator, Ben Bernanke, would put the lessons of their work to practical use as Bernanke led the formulation of the Fed’s responses to the financial crisis.

Apart from an advisory role at the New York Fed and a one-year stint as a visiting scholar there, Gertler himself has never walked the well-trodden path between university economics departments and positions in the Fed, the White House, the Treasury Department, and elsewhere in government. He has spent most of his career at New York University, where — in addition to his research and teaching — he led an aggressive long-term effort as department chairman to upgrade the school’s status within the discipline. Formerly “a solid small-market team,” in the words of the *New York Times Magazine*, NYU became, in the eyes of many, a top-tier department.

In addition, Gertler performed a signal service to the Richmond Fed by serving on the dissertation committee of its future president, Jeffrey Lacker, when Lacker was a doctoral student at the University of Wisconsin-Madison.

David A. Price interviewed Gertler at his office at Columbia University, where he is visiting for the academic year, in December 2013.



**EF:** How did you become interested in economics in general and macroeconomics in particular?

**Gertler:** When I was an undergraduate, like most undergraduates in my day, I was interested in law school. But I realized in my junior year that my heart wasn’t completely in it. I happened to take intermediate macroeconomics and I had a great teacher, Don Nichols. He was inspiring. What I liked about macroeconomics was that it was math applied to real-world problems. It was interesting to see how you could set up a model, shift some curves around, and possibly do some good with it in terms of economic policy.

It just seemed like a nice combination of mathematics, in which I was interested, and something that seemed socially useful. I found it both interesting and relevant, so I figured maybe it was my calling.

**EF:** Is there anything you’ve learned from the Great Recession about the role of finance that you weren’t aware of before?

**Gertler:** I liken the crisis to 9/11; that is, there was an inkling that something bad could happen. I think there was some sense it was going to be associated with all the financial innovation, but just like with 9/11, we couldn’t see it coming.

When we look back, we can piece everything together and make sense of things, but what we didn't really understand was the fragility in the shadow banking system, how it made the economy very vulnerable. I always think of the Warren Buffet line, "You don't know who's naked until you drain the swimming pool." That's sort of what happened here.

I think when we look back on the crisis, we can explain most of what happened given existing theory. It's just we couldn't see it at the time.

**EF: What should policymakers have done differently in the run-up to the crisis?**

**Gertler:** Perhaps the biggest mistake involved regulation in the subprime lending market. We all thought homeownership sounded like a very appealing idea, but getting everybody into the housing market involved lowering lending standards, which meant risky mortgage lending. Second, we let a largely unregulated intermediary sector grow up outside the commercial banking sector. The biggest mistakes probably involved too much deregulation.

**EF: What do you think is the best explanation for the policies that were pursued?**

**Gertler:** At the time, I think it was partly unbridled belief in the market — that financial markets are competitive markets, and they ought to function well, not taking into account that any individual is just concerned about his or her welfare, not about the market as a whole or the exposure of the market as a whole. And so you had this whole system grow up without any outside monitoring by the government. It just had individuals making these trades and making these bets; nobody was adding everything up and understanding the risk exposure. And there was this attitude that we ought to be inclusive about homeownership — that was going on as well.

Plus, complacency set in. We had the Great Moderation of the 1980s and 1990s, and we all thought we'd solved the major problems in macroeconomics. There were some prominent macroeconomists saying, "Look, we shouldn't be wasting our time on these conventional issues; we've already solved them." That led to most people just being asleep at the wheel.

**EF: Do you think that monetary policy should have been different during this period?**

**Gertler:** It's possible that short-term interest rates contributed to the growth of the subprime market, because there were a number of borrowers taking variable rate mortgages, but I think that consideration was second order,

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relative to the deregulation. That is, if we had adequate regulation of subprime lending, then I don't think the low interest rates would have contributed to the crisis at all.

Also, people fail to take into account the trade-offs. We had a very weak employment situation. Had we raised interest rates only a

little bit, we would have done nothing to curb the housing bubble, and if we'd raised them quite a bit, we would have killed the economy.

**EF: Speaking of interest rates, would you say the low interest rates today are a result of monetary policy levers that are being adjusted in Washington, or do they simply ratify conditions in the real economy?**

**Gertler:** I think it's a little bit of both. The economy is weak. The natural rates of interest are low, and they're arguably negative now, so the Fed has pushed down short-term rates as far as it can; we're at the zero bound, or about. As for longer-term rates, I think they're influenced both by where the economy naturally is and by policy. I think there's an expectation that three to four years from now the economy will recover, pushing future short rates up, which puts upward pressure on long rates. On the other hand, we've had a lot of quantitative easing, which puts downward pressure on long rates, so I say for longer-term rates it's both policy and the natural forces of the economy at work.

**EF: Along with Ben Bernanke and Simon Gilchrist, you helped to develop the concept of financial accelerators, linking financial market conditions with those of the real economy. Can you explain what you found?**

**Gertler:** I think the way we got started was that I had done some earlier work with Bernanke, and we were interested in understanding why there was such a sharp contraction in the Great Depression and why it was so persistent. We were drawn to a theory originally put forward by Irving Fisher in 1933, the debt-deflation theory. Fisher argued that the deflation at the time increased the real debt burden of borrowers, and that led to a reduction in their spending, which put downward pressure on the economy, and further deflation, and so on. What we saw in that was a kind of feedback mechanism between the real sector and the balance sheets in the financial sector that amplified the cycle.

That's what we wanted to capture with the financial accelerator, that is, the mutual feedback between the real sector and the financial sector. We also wanted to capture the primary importance of balance sheets — when balance sheets weaken, that causes credit to tighten, leading to downward pressure on the real economy, which further weakens balance sheets. I think that's what

one saw in the financial crisis.

So we were inspired by Fisher's debt-deflation theory, and we were trying to formalize that idea using modern methods. Then we found some other implications, like the role of credit spreads: When balance sheets weaken, credit spreads increase, and credit spreads are a natural indicator of financial distress. And again, you saw something similar in the current crisis — with a weakening of the balance sheets of financial institutions and households, you saw credit spreads going up, and the real economy going down.

I didn't speak to Bernanke a lot during the height of the crisis. But one moment I caught him, asked him how things were going, and he said, "Well, on the bright side, we may have some evidence for the financial accelerator."

**EF: That sounds like gallows humor, and not —**

**Gertler:** No, not enthusiasm, no. [Laughs.] Not enthusiasm at all. He would have been happy to find the theory completely wrong.

**EF: When you and Bernanke started this work, were you drawn to the Great Depression as a subject because it's like Mount Everest for mountaineers, or what was the attraction?**

**Gertler:** It was Bernanke who was originally inspired to work on the Depression, and his motivation was that if you're interested in geography, you study earthquakes. I got really interested in it through him. At the time we started working together, you were starting to see financial crises around the globe, some in emerging markets, and then also the banking crises in the late 1980s in the United States. That made us think, wow, maybe this stuff is still relevant. Maybe it's not just a phenomenon of the Great Depression.

**EF: How did you get to know each other?**

**Gertler:** We had a mutual friend, Jeremy Bulow. Jeremy was a student at MIT, where Bernanke studied, but he would spend time at Stanford, where I studied. In the early 1980s, Bernanke was coming to Stanford as I was leaving. Jeremy had actually sublet his house from Bob Hall; it was a rather huge house, so he needed roommates. He invited Bernanke and his wife and me to sublet the house with him, which we

## Mark Gertler

### ► Present Position

Henry and Lucy Moses Professor of Economics, New York University (on leave); Wesley Clair Mitchell Visiting Professor of Economics, Columbia University

### ► Selected Previous Positions

Visiting Professor, MIT (2002); Visiting Professor, Yale University (1997); Visiting Professor, Princeton University (1993); Assistant Professor, Associate Professor, and Professor, University of Wisconsin (1981-1989); Assistant Professor, Cornell University (1978-1981)

### ► Education

B.A. (1973), University of Wisconsin; Ph.D. (1978), Stanford University

### ► Selected Publications

"The Financial Accelerator and the Flight to Quality," *Review of Economics and Statistics*, 1996 (with Ben Bernanke and Simon Gilchrist); "Agency Costs, Net Worth, and Business Fluctuations," *American Economic Review*, 1989 (with Ben Bernanke); numerous other articles in such journals as the *Journal of Money, Credit and Banking*, *Journal of Monetary Economics*, *Journal of Political Economy*, and *Quarterly Journal of Economics*

did, and that's how I got to know Bernanke.

**EF: The Fed, as you know, has been buying and selling private securities on a significant scale since the financial crisis. You've suggested that once a crisis calms down, the buying and selling of private securities should be carried out by the Treasury Department rather than the Fed. Why is that?**

**Gertler:** There are politics involved in the holding of private securities, and you'd like to keep the Fed as independent of politics as possible. On the other side of the coin, the Fed is the only agency in Washington that can respond quickly to a crisis. In this case, the mortgage market was collapsing, the mortgage-backed securities market was collapsing, and so I think it was important for the Fed to go in and act as a lender of last resort, as it did. But then, as time passes, this job should be taken over by a political entity, that is, by the Treasury. That's what happened in the savings and loan crisis; we set up the Resolution Trust Corporation that acted like a public

financial intermediary. Right now, the Fed is acting like a public financial intermediary, and I think that for political reasons, the Treasury is unwilling to assume responsibility for the mortgage portfolio.

So I think it was entirely appropriate for the Fed to get into that market, because it had to fulfill its responsibilities as a lender of last resort, but now it would be better for the Treasury to take it over.

**EF: As a result of its asset purchase programs, the Fed now has about \$2.4 trillion in excess reserves from depository institutions. But since the Fed now pays interest on reserves, the money doesn't flow into the real economy. Have policymakers found a free lunch?**

**Gertler:** The way I think about it is that we had a collapse of the shadow banking system, a drastic shrinkage of the shadow banking system. What were shadow banks doing? They were holding mortgage-backed securities and issuing short-term debt to finance them. What's happened is that that market has moved to the Fed. The Fed now is acting as an investment bank, and it's taking over those activities. Instead of Lehman Brothers holding these mortgage-backed

securities, the Fed is. And the Fed is issuing deposits, if you will, against these securities, the same way these private financial institutions did. It's easier for the Fed, because it can issue essentially risk-free government debt, and these other institutions couldn't. I don't think there's any free lunch going around, other than that it's easier for the Fed to borrow in a crisis than it is for a private financial institution.

**EF: Does the fact that the quantity of reserves is so high matter for how the economy is going to perform in the future?**

**Gertler:** It's possible, as interest rates go up, that the Fed could take some capital losses, as private financial institutions do. But the beauty of the Fed is it doesn't have to mark to market; it can hold these assets until maturity, and let them run off. So I'm in a camp that thinks there's been probably a little too much preoccupation with the size of the balance sheet. It could be a problem if the economy continues to grow slowly, and the balance just keeps growing without bound, but I don't think we're quite there yet.

**EF: Your work with Jordi Gali and Richard Clarida in the 1990s helped to reorient the debate on the Great Inflation and the Great Moderation. The role of monetary policy in these episodes seems self-evident now, looking back. But it wasn't then, was it?**

**Gertler:** I certainly think there was the notion going around that the Fed was highly accommodative in the 1970s, and then Volcker and Greenspan changed that with more focus on inflation. What we did was fairly simple; we basically used the Taylor Rule analysis as just a way to say sharply what was going on.

So I think what we did was kind of straightforward. We just happened to be at the right place at the right time. The Taylor Rule apparatus was there, and the econometrics techniques of Lars Hansen's that we used were there. We were in a good position to say something.

**EF: There was a perception in the 1970s that the price pressure was coming from negative shocks, namely oil price shocks. Did you feel you were swimming upstream to some extent in telling your story that it was monetary policy?**

**Gertler:** Not really. I think the conventional wisdom of the time was that oil shocks, and this goes back to Friedman, had put on transitory pressure, but that you needed monetary policy to accommodate it and make it persistent. We were able to use this really simple setup to clearly show

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When we intervene, we want to help prevent a crisis, but on the other hand, there's an issue of moral hazard. Just knowing we are going to intervene is going to make some financial institutions take more risk.

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what was going on, but I think the ideas were certainly floating around at the time.

**EF: What do you think are the most important questions about the role of finance in the macro-economy that are still open at the moment?**

**Gertler:** I think that the basic questions are still open. The first is,

what do we do ex ante before a crisis? How should regulation be designed? That's a huge question that we still haven't figured out. For example, what's the optimal capital ratio for a financial institution? And, second, how far should the regulatory net be spread to cover every systemically relevant financial institution? How do we figure out which ones are and which aren't? When we lay down a regulation, how do we figure out whether some financial institutions are going to get around it?

Then what do we do ex post? When we intervene, we want to intervene to help prevent a crisis from creating a recession or depression, but on the other hand, there's an issue of moral hazard. Just knowing we are going to intervene is going to make some financial institutions take more risk. I think those questions still largely haven't been answered.

**EF: As you know, Congress addressed many of those questions in the Dodd-Frank Act. Are there aspects of it that you think are particularly ill advised or well advised?**

**Gertler:** The first order thing is we needed to do something like Dodd-Frank. If we had gone through this crisis, one where we bailed out many large financial institutions, and then left it at that, it would have been laying the seeds for the next crisis. So something like Dodd-Frank was desperately needed. There was no simple way to do it cleanly, and there's still a long way to go, but it was an important first step.

**EF: You mentioned capital requirements. Is there a sense that capital requirements and related requirements in places like Basel III are chosen in a way that isn't firmly grounded in empirical work?**

**Gertler:** I'm reminded of a comment Alan Blinder makes. There are two types of research: interesting but not important, and incredibly boring but important. And figuring out optimal capital ratios fits in the latter category.

The reality is that we don't have definitive empirical work, and we don't have definitive theory that gives us a clear answer.

**EF: Moving to another side of your work, you reportedly persuaded the president of NYU, John Sexton, in**

**the early 2000s to make a major bet on NYU's economics department. Is that what happened, and if so, how did you make the case?**

**Gertler:** It's nice to tell the story that way, but let me set the record straight: It came from Sexton. He saw that our department had been doing well, and there were a number of people who contributed to our department doing well in recruiting over the years. Jess Benhabib played an important role. I was also involved. Douglas Gale was another; he was chairman before me.

Because our department had been doing well, and because Sexton was looking to make a splash, he turned to economics. He figured economics was a high-profile field and we'd shown good judgment in our hiring. He also figured out that economics is relatively cheap because we have so many students.

**EF: Having reached the decision to invest in economics, what guidance did he give you to build up the department?**

**Gertler:** Just to be aggressive. We were lucky Tom Sargent came along. Nobody could believe it at the time; usually, when you recruit, the batting average isn't very high, and it's lower the greater the stature of the person you're going after. But Sargent had expressed some interest. He had offers at the time from MIT and Chicago, and we thought there was no way he was interested in us, but he kept telling us he was. Sure enough, it worked out, and that was probably the key. Then we had a number of other good people come.

**EF: What were the biggest challenges in attracting talent to an economics department that wasn't yet in the top tier?**

**Gertler:** In my own case, what attracted me to NYU in 1990 was that they had a couple of really good researchers, Boyan Jovanovic and Jess Benhabib. I looked at them and said, "Well, these guys are very successful, so even though it's not a top-ranked department, I could come here and do well."

Part of the recruiting strategy was to play off of New York. The city was very attractive to Europeans and South Americans. You look at our department and see there's a large mixture of people from these countries. And then of course when Sargent came in 2002, that kind of changed things. [Sargent received the Nobel Prize in economics in 2011 with Christopher Sims of Princeton University.]

Another thing we did at NYU is we were very eclectic. We didn't want to be in one camp or the other; we just wanted people who were good, and whose work everybody would read. I think a number of other departments, if I may

say, are following that style. When I first came out, you had "freshwater" economists from the Midwest — Minnesota, Chicago, and so on; you had "saltwater" economists on the East Coast. If you look at the field now, those distinctions have just blurred, and I would say our department was one of the first to make a strong effort to blur that distinction. You have an honest competition of ideas.

**EF: Was there a time, as this was unfolding, when you realized that people seemed to be looking at NYU differently?**

**Gertler:** I found the most interesting barometer was the graduate students, when the quality of graduate students we were drawing really improved. Now the faculty jokes, but it's not completely joking, that they're not sure they could even get accepted into our department now. I would say that the clearest signal was our ability to attract graduate students.

**EF: What do you think about the role of blogs in facilitating or hindering communication among economists? And between economists and non-economists?**

**Gertler:** I occasionally read the blogs, but more for entertainment than to learn something. When they're describing different opinions about the economy and what might be going on, I find that kind of interesting. As a place to have scientific debates, I'm not so sure.

**EF: With regard to your influences, you mentioned Professor Nichols at the outset. Were there others who were strong influences on you in your development as an economist?**

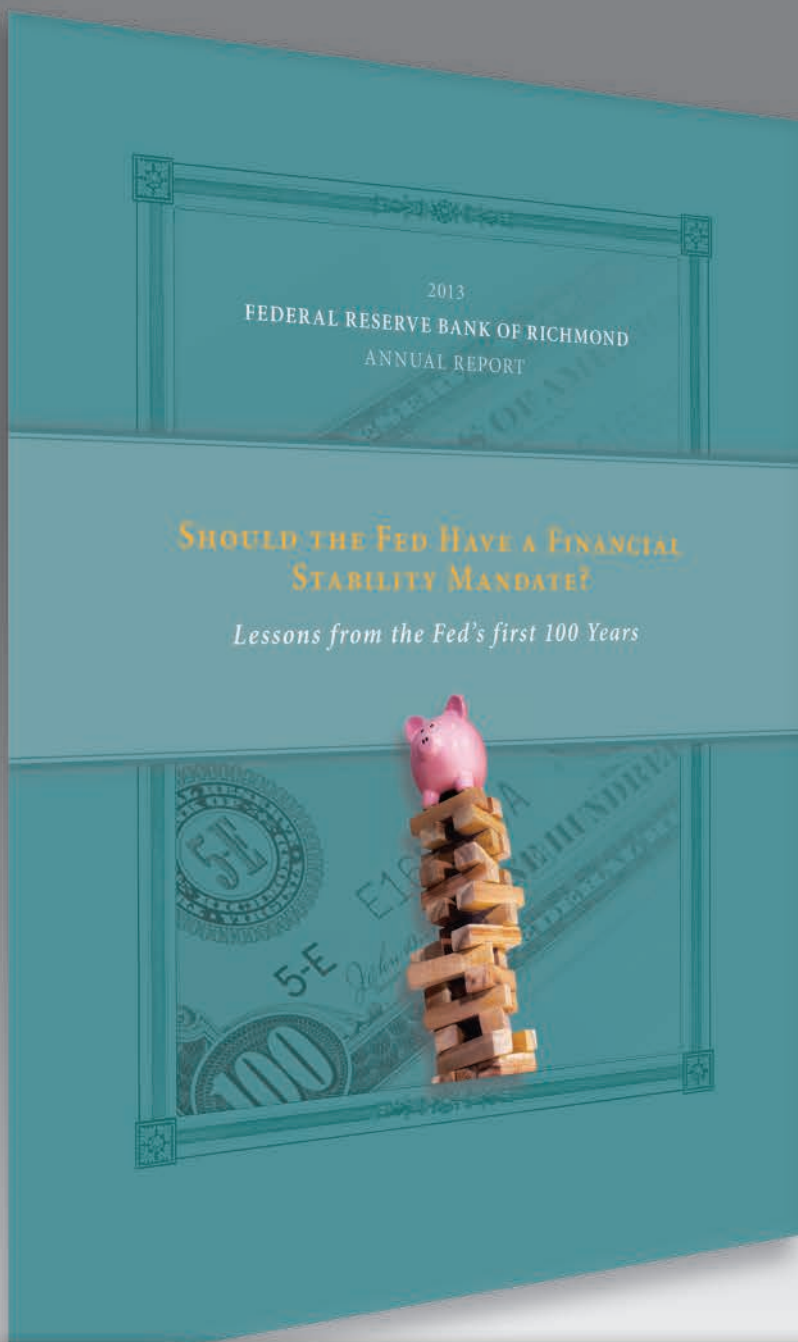
**Gertler:** There was a spectacular group of macroeconomists in the cohort ahead of me. I think there were three in particular who had a lot of influence, namely Tom Sargent, Bob Hall, and John Taylor. The common denominator of the three is they all engaged in significant debates in macroeconomics; they all asked significant questions. And they all in their work used a mix of state-of-the-art theory and empirical methods. For me, they were very good role models.

Then, I've been fortunate to have, throughout my career, excellent co-authors. Early on, I met Rao Aiyagari when I was an assistant professor at Wisconsin, and he really educated me as to the developments and methodology coming out of Minnesota, which I had totally missed out on in my Ph.D. training. Then I also associated with Ben Bernanke, and of course that was a great experience. For me, working with Bernanke highlighted most of all the importance of asking good questions and backing up the answers with data.

**EF**

# Coming in May

The Federal Reserve Bank of Richmond's **2013 Annual Report** will feature an essay by Jeffrey Lacker, the Bank's president, and Renee Haltom, the Bank's research publications content manager. They will highlight lessons learned from the Federal Reserve's first 100 years — especially the unintended consequences of the Fed's increasing role in restoring financial stability during times of crisis.



In addition to the essay and the Bank's financial statements, the **Annual Report** will include a summary of the Fifth District's economic performance in 2013 and an overview of the Bank's workforce development research and initiatives.

The **Annual Report** will be available **May 22** on the Bank's website.

# ECONOMIC HISTORY

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## Water Wars

BY JESSIE ROMERO

Fighting over water  
is as American as  
apple pie

**W**hiskey is for drinking, and water is for fighting.” It’s a saying often heard in the arid American West, where precipitation in some states averages as little as five inches per year, and multiple states may depend on a single watershed to supply their homes, farms, and industry. But over the past two decades, water wars have become a staple of politics in the relatively water-rich Southeast as well. In the Fifth District alone, competition for water has pitched Maryland against Virginia, Virginia against North Carolina, and North Carolina against South Carolina. Farther south, Georgia, Alabama, and Florida have been battling over the Apalachicola-Chattahoochee-Flint river basin since 1990, a dispute that also affects South Carolina.

Historically, the South’s rivers and lakes have provided ample water to satisfy the needs of both city dwellers and farmers, fishermen and manufacturers. But the region’s rapid

economic development, combined with a series of droughts beginning in the 1990s, has increased the tensions among the various interest groups. The result has been a series of prolonged and expensive lawsuits. As population growth and climate change place new demands on the country’s water supplies, states and metro areas may need to develop new solutions to allocate an increasingly scarce resource.

### Go West, Young Man

In 1845, journalist John O’Sullivan wrote that it was Americans’ “manifest destiny” to migrate westward, carrying the “great experiment of liberty” to the Pacific Ocean. Millions of Americans heeded his call in the decades that followed, as gold was discovered in California, the Homestead Act gave free land to new settlers, and the Transcontinental Railroad connected the coasts. Between 1860 and 1920, the population of California grew from 380,000 to nearly 3.5 million.

All those people needed water, and miners, farmers, and city officials competed fiercely to divert water from the region’s rivers and streams. Sometimes those competitions turned violent. In 1874, for example, a Colorado man named Elijah Gibbs got into a fight with a neighboring rancher, George Harrington, about drawing water from a nearby creek. Later the same night, someone set fire to one of Harrington’s outbuildings. When he went out to investigate, he was shot and killed. The killing led to a year-long feud known as the Lake County War that took the lives of several more men, including Judge Elias Dyer, who was shot in his own courtroom.

In the early 1900s, the farmers and ranchers of Owens Valley, in eastern California, were supposed to be the beneficiaries of a federal irrigation



*Western gold miners, such as these in El Dorado, Calif., circa 1850, built elaborate ditch systems throughout the countryside to divert water for panning gold and operating mines.*

PHOTOGRAPHY: LIBRARY OF CONGRESS



project that would bring the Owens River to their land. But more than 200 miles away, officials in Los Angeles realized that the city couldn't grow unless it found a new source of water, so they began buying up land and water rights in Owens Valley — using quite a bit of bribery and deception, according to many accounts. By 1913, Los Angeles had completed building an aqueduct that diverted nearly all of the Owens River to the San Fernando Valley, and just a decade later the Owens Lake had dried up. Owens Valley residents twice blew up sections of the aqueduct to protest the loss of their water, but the aqueduct was repaired, and Los Angeles grew into the second-largest city in the United States.

Less violent but no less notorious is the ongoing battle for water from the Colorado River, which supplies water for 30 million people in seven different states and in Mexico. In 1922, after years of disagreement, then-Secretary of Commerce Herbert Hoover negotiated the Colorado River Compact. The compact divided the states into the Upper Division (Colorado, New Mexico, Utah, and Wyoming) and the Lower Division (Arizona, California, and Nevada) and apportioned the water equally between the two divisions.

The compact was controversial from the start: Arizona refused to ratify it until 1944, and even called out the National Guard in 1934 in an unsuccessful attempt to block California from building a dam. Over the years, numerous lawsuits have been filed by tribal groups, environmental organizations, and the states themselves, and every few years the states have had to renegotiate certain details of the compact. (During the 2008 presidential election, John McCain was leading in Colorado until he said in an interview that the compact should be changed to give the Lower Division states more water — infuriating Colorado politicians and perhaps costing him the state's electoral votes.) Recently, it has become clear that the compact was signed during a period of unusually heavy rainfall, making the current appropriations unrealistic. That fact, combined with rapid population growth and more than a decade of severe drought, has left federal and state authorities scrambling to manage the existing supply and uncertain about how the water will be allocated in the future.

### Oysters and Office Parks

The first water war in the Fifth District predates the existence of the United States. In 1632, King Charles I of England granted all of the Potomac River to the colony of Maryland, giving it access to the river for transportation, fishing, and, most lucratively, oyster dredging. Virginia was somewhat mollified by getting rights to part of the Chesapeake Bay in exchange, but the truce didn't last for long, and for more than three centuries there was periodic violence between oyster dredgers, fishermen, and the state governments. As recently as 1947, the *Washington Post* wrote about the fights between Marylanders and Virginians: "Already the sound of rifle fire has echoed across the Potomac River. Only 50 miles from Washington men are shooting at one another. The night is quiet until suddenly

shots snap through the air. Possibly a man is dead, perhaps a boat is taken, but the oyster war will go on the next night and the next."

By the end of the 20th century, Northern Virginia's economy was booming and the region depended on the Potomac River to power its looming office towers and hydrate its rapidly increasing population. Between 1993 and 2003, water withdrawals from the Potomac by the Fairfax County Water Authority, which serves Northern Virginia, increased 62 percent, compared to an increase of 19 percent for the D.C. metro area as a whole.

In 1996, Virginia wanted to build an additional withdrawal pipe, but Maryland denied the request because it was concerned about the effects of Virginia's sprawl on the region. Virginia spent several years filing administrative appeals with Maryland's Department of the Environment, to no avail, and finally filed a complaint with the U.S. Supreme Court in 2000. (The Court has original jurisdiction over lawsuits between states.) The court ruled in Virginia's favor in 2003, granting it equal access to the river, and Northern Virginia's growth has continued unabated.

### On Second Thought, Young Man, Go South

It's not only Northern Virginia that is growing. In the South as a whole, the population has more than doubled over the past 50 years, growing about 30 percent faster on average than the nation as a whole. Just since 2001, the population of the Southeast has grown twice as fast as the Northeast. Today it is the largest population region in the country, with 60 million people.

Many factors have contributed to that growth — the advent of air conditioning, for example, made the hot climate tolerable — but a major draw has been jobs, especially in manufacturing. First, textile and furniture manufacturing companies moved from the Northeast to the South in search of cheaper labor. As those industries moved overseas in search of even cheaper labor, the region started attracting automobile manufacturers from the Midwest and from overseas. Most recently, a cluster of aerospace manufacturing companies has formed in South Carolina, and numerous advanced manufacturing firms have located around Charlotte, N.C.

Over the past three decades, Charlotte also has become the second-largest financial center in the country. The population more than doubled between 1980 and 2011, and from 2000 to 2010 Charlotte was the fastest-growing city in the country, with population growth of more than 64 percent, compared to less than 10 percent in the country as a whole.

That growth has placed serious demands on the Catawba River, which supplies more than 30 cities in the Carolinas with drinking water. The Catawba River begins in the Blue Ridge Mountains in North Carolina and turns into the Wateree River in South Carolina before reaching the Atlantic Ocean. In 2007, North Carolina's Environmental Management Commission approved the diversion of 10 million gallons of water per day from the Catawba to two

Charlotte suburbs, in addition to the 33 million gallons that were already being diverted for the city. (Industrial users in the area, including Duke Energy, withdraw an additional 40 million gallons per day.) The transfers reduced the amount of water available for downstream users in South Carolina, which sued to stop them. The U.S. Supreme Court ruled on procedural matters early in 2010, and the states eventually reached a settlement later that year. (The settlement laid out ground rules for future water transfers but did not limit current transfers.)

In the 1980s, North Carolina was on the opposite side of a dispute with Virginia over the water in Lake Gaston, which straddles the North Carolina-Virginia border. At that time, Virginia Beach did not have an independent source of freshwater and bought surplus water from Norfolk. In 1982, concerned about the reliability of that surplus, city officials decided that the city needed to find its own water and set out to build a 76-mile pipeline from Lake Gaston. North Carolina sued, Virginia Beach countersued, and over the next 15 years, the states fought about the effects of the pipeline on Lake Gaston's striped bass population, the definition of the word "discharge," and alleged collusion between federal agency officials and North Carolina officials. The case eventually reached the U.S. Court of Appeals for the D.C. Circuit, where more than 40 states' attorneys general and the Justice Department filed friend-of-the-court briefs in support of North Carolina's right to block the pipeline. Still, the court ruled in Virginia Beach's favor, and today the city is powered by 60 million gallons per day of Lake Gaston water.

Perhaps the most contentious water fight in the South is occurring outside the Fifth District, among Georgia, Alabama, and Florida. Known as the "tri-state water war," the dispute is over the Apalachicola-Chattahoochee-Flint basin, which begins in northwest Georgia, flows along the border with Alabama, and empties into the Apalachicola Bay in Florida. In 1956 the Army Corps of Engineers completed the Buford Dam on the Chattahoochee River, creating Lake Lanier in northwest Georgia. Since 1990, the three states have been involved in multiple lawsuits and failed negotiations over how the Corps should allocate the lake's water. Georgia wants the water for booming Atlanta; Alabama is worried about Atlanta getting more than its fair share; and Florida is concerned that reduced water flows will hurt the oysters in the Apalachicola Bay. The dispute appeared close to resolution in 2011, after the U.S. Court of Appeals for the 11th Circuit ruled in favor of Georgia on various issues, but Florida filed a new suit against Georgia in the U.S. Supreme Court in October 2013. The Court has yet to decide whether it will hear the case.

Some people are concerned that Georgia might turn to

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the Savannah River, along the border with South Carolina, to meet Atlanta's water needs. Georgia officials assert that they remain focused on Lake Lanier, but South Carolina has threatened legal action over Georgia's withdrawals from the Savannah. Last February, legislators from the two states formed the Savannah River Basin Caucus to try to settle their

differences outside the courts. So far, no one has sued.

### **Who Owns the Water?**

The rules governing water are a jumble of common law, state legislation, federal environmental regulations, interstate compacts, and private deals. But underlying that complicated mix are two basic principles: riparian rights, common in the East, and prior appropriation, common in the West.

In the East, where water is plentiful, "riparian" rights are accorded to whomever owns the land through which the water flows. That person or entity does not own the water itself, but has a right to use it as long as they do not infringe on usage by other riparian owners, such as other homeowners along a lakefront or a city farther downstream. Under the riparian system, water rights can only be transferred with the sale of the land.

Riparian rights were borrowed from English common law, and U.S. courts initially maintained the English tradition that a riparian owner could not disturb the "natural flow" of the water. But by the mid-1800s, more and more industrial users needed water to power their mills, and conflict abounded between mill owners who wanted to build dams and other users up- and downstream, who might see their fields flooded or their own power source diminished. In their efforts to settle these disputes, the courts began to allow riparian owners to divert water for any "reasonable use," generally defined as economically productive use. "In pre-industrial times, the focus was on the rights of a riparian user to the quiet enjoyment of their property," says Richard Whisnant, a professor in the School of Government at the University of North Carolina at Chapel Hill and the former general counsel for the North Carolina Department of Environment, Health and Natural Resources. But as industry grew, "the courts were trying to figure out ways that they could turn these disputes into something that promoted development. They wanted to give priority to water users who were generating economic activity."

Economic activity also was at the center of the Western system of prior appropriation, or "first in time, first in right." Under this system, the first person to divert a water source for "beneficial use," such as farming or industry, becomes the senior rights holder, regardless of who owns the land adjacent to the water. Each year the user with the most senior appropriation gets their allotment first, and users with later appropriation dates get the leftovers. In a dry year,

that might mean that more junior rights holders don't get as much water as they need. Unlike a riparian right, a prior appropriation right can be bought, sold, and mortgaged like other property.

The system was the invention of miners in California, whose camps were often in remote areas far from any water source. To get the water they needed for panning gold and later for operating hydraulic mines, they built elaborate ditch systems throughout the countryside. To the miners, the riparian system of tying water rights to land ownership didn't make any sense: "If two men, or companies, came in and diverted a whole stream, so be it. If just one took the whole stream, so be it. They needed it; they depended on it; they had rights to it," wrote Charles Wilkinson in his 1993 book *Crossing the Next Meridian: Land, Water, and the Future of the West*. Prior appropriation also made sense to the region's new farmers and ranchers, who, like the miners, needed water from wherever they could find it. Prior appropriation quickly became the de facto law of the land. States across the West officially adopted the doctrine after 1882, when Colorado's Supreme Court ruled that the Left Hand Ditch Company could divert the South Saint Vrain creek to another watershed, depriving a farmer downstream of water for his land.

### Let the Market Decide

Perhaps the most fundamental tenet of economics is that the allocation of a resource is best achieved through the price mechanism, by allowing buyers and sellers to negotiate a price that reflects the good's relative scarcity. "If you don't price water, or any scarce resource for that matter," says Jody Lipford, an economist at Presbyterian College in South Carolina, "you don't force the consumers of that resource to prioritize use."

But in both the eastern and western United States, the allocation of water is largely a political process, fought over in statehouses and debated in courtrooms. Legislators and judges are unlikely to have all the necessary information to determine the most productive use of the water, however, and legislators in particular might be subject to interest-group influence. That argues for letting price, rather than politics, decide who gets the water.

In the mid-2000s, Lipford studied the Apalachicola-

Chattahoochee-Flint conflict and proposed several market-based solutions to resolve it, including charging a higher price to people in Atlanta; giving the Army Corps of Engineers the authority to charge users higher fees during times of drought or increased demand; or issuing marketable permits to water users, allowing them to buy and sell their allocations. Many people are resistant to the idea of buying and selling water rights, however. "There's this idea that we're talking about water. Water belongs to all of us; you can't make people pay for it. And in the East, where water has been abundant, people don't want to pay for it," Lipford says.

Water markets may also involve significant transactions costs. In many cases, the markets might be thin, composed of only a few buyers and sellers who bargain infrequently. Water trades also can be highly idiosyncratic, depending on a multitude of factors that vary with each transaction. Both these conditions make it difficult for people to know what prices to charge or to offer. In addition, a water trade could have significant externalities that complicate the negotiations, both positive (for example, if a new lake is created for people to enjoy boating or fishing) and negative (if farmland is fallowed).

In the West, where people are more used to thinking of water as a scarce resource and where water rights can be sold, some markets have been established. In 2003, for example, San Diego County in California began buying water from Imperial Valley, a primarily agricultural area; the county is paying \$258 per acre-foot (a measure of water equal to approximately 325,000 gallons) for water that cost the farmers about \$16 per acre-foot. Overall, however, markets remain rare.

The question of how best to allocate water is unlikely to go away. Many scientists predict that during this century, climate change will alter the water supply in the United States, and the U.S. Forest Service projects that water yields across the United States could decline more than 30 percent by 2080. At the same time, the U.S. population is expected to grow more than 30 percent by 2060. As water becomes more scarce and people become more abundant, states and other interest groups will be forced to figure out who gets how much — whether they decide via bullets, lawsuits, or dollars. **EF**

### READINGS

Libecap, Gary D. "Transaction Costs: Valuation Disputes, Bi-Lateral Monopoly Bargaining and Third-Party Effects in Water Rights Exchanges. The Owens Valley Transfer to Los Angeles." National Bureau of Economic Research Working Paper No. 10801, September 2004.

Lipford, Jody W. "Averting Water Disputes: A Southeastern Case Study." Property and Environment Research Center Policy Series No. PS-30, February 2004.

Schmidt, Paul. "Un-Neighborly Conduct: Why Can't Virginia Beach and North Carolina Be Friends?" *William & Mary Environmental Law and Policy Review*, 1999, vol. 23, no. 3, pp. 893-920.

Wilkinson, Charles F. *Crossing the Next Meridian: Land, Water, and the Future of the West*. Washington, D.C.: Island Press, 1993.

## The Power of Words

BY CHARLES GERENA

“A Short History of FOMC Communication.” Mark A. Wynne, Federal Reserve Bank of Dallas *Economic Letter*, vol. 8, no. 8, September 2013.

“Forward Guidance 101A: A Roadmap of the U.S. Experience.” Silvio Contessi and Li Li, Federal Reserve Bank of St. Louis *Economic Synopses* No. 25, September 2013.

Decades ago, business reporters and financial market participants had to play detective to discern changes in monetary policy. They monitored the activities of the open market desk at the New York Fed, which buys or sells securities to reach the goals of the Federal Open Market Committee (FOMC). They even scrutinized the size of the briefcase that former Fed chair Alan Greenspan carried.

Today, Fed watchers can view the chair’s quarterly press conferences and pore over increasingly detailed statements released after every meeting. Much has changed about how the Fed communicates the decisions that affect the nation’s economic well-being. Two recent reports chronicle these changes, especially the issuance of “forward guidance,” an indication of when the FOMC might change the direction of monetary policy.

“Best practices in central banking call for transparency in policy deliberations and communicating the outcome in a timely manner,” notes Mark Wynne, associate director of research at the Dallas Fed and author of a September 2013 *Economic Letter*. “Over the past two decades, the FOMC has gone from being quite secretive in its deliberations to very transparent.”

The FOMC’s first major move towards greater transparency occurred on Feb. 4, 1994. To help explain why it was acting to push up interest rates for the first time in five years, the committee issued a 99-word statement after its meeting. A year later, the FOMC started announcing its intended range for the federal funds rate. It would take another four years, until 1999, before the committee would declare the target level for the funds rate. It also began releasing a statement after every meeting regardless of whether monetary policy had changed.

The year 1999 was significant for another reason — the FOMC started including forward guidance in its post-meeting statements. Since then, the committee had crafted this guidance to lay out a near-term course for monetary policy that was consistent with its past policy regime, but that allowed for course corrections if there was a change in the economic outlook.

Today, the FOMC uses forward guidance a bit differently, making a stronger commitment to a likely course of action. Until its March 2014 post-meeting statement, the

committee had agreed to keep the federal funds rate low at least as long as the unemployment rate remained above 6.5 percent, inflation was projected to be no more than a half percentage point above the committee’s 2 percent longer-run goal, and long-term inflation expectations continued to be well anchored.

According to Silvio Contessi and Li Li at the St. Louis Fed, such forward guidance may have been a useful tool at a time when interest rates are already close to zero. “A credible promise to continue accommodative monetary policy until a certain date or after the recovery strengthens (and the policy rule calls for higher policy rates) amounts to influencing expectations and long-term yields and providing additional monetary stimulus today,” write Contessi and Li in the September 2013 edition of the *Economic Synopses* essay series.

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“Are Households Saving Enough for a Secure Retirement?” LaVaughn Henry, Federal Reserve Bank of Cleveland *Economic Commentary* 2013-12, October 2013.

Figuring out whether you have enough retirement savings is a lot harder than checking under your mattress. Many variables affect this critical decision and standard economic models can account for only some of them, notes a recent commentary published by the Federal Reserve Bank of Cleveland.

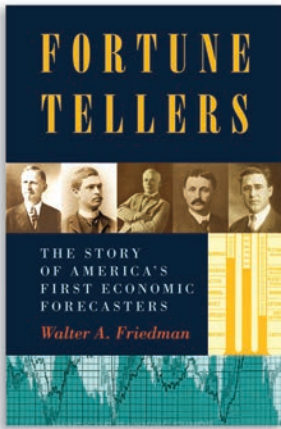
According to the “life-cycle hypothesis” (LCH) model, all of us make rational choices about how much to spend or save based on what we expect to earn from our jobs and investments during different periods of our lives. The model assumes that we smooth out consumption over time, saving enough during our working years in order to maintain our level of spending many years into the future.

That assumption isn’t true for every person, however. “While the LCH model may apply for many households, nearly half of households do not behave the way the model says they will,” notes LaVaughn Henry, vice president and senior regional officer at the Cleveland Fed, in his October 2013 report. “Those households end up with inadequate savings for a retirement that maintains their standard of living.”

A growing body of research in behavioral economics offers fresh insights into this issue. “Most households do not pay enough attention to financial planning,” says Henry. “It may be because the decisions that need to be made are just too complex for the typical household. Many are aware of this and seek the advice of a financial planner [but] others may not be able to afford such advice.” That is why automatic enrollment in savings plans or automatic escalation of investments in such plans can help people have a more financially secure future.

EF

## The Past of Forecasting



### **FORTUNE TELLERS: THE STORY OF AMERICA'S FIRST ECONOMIC FORECASTERS**

BY WALTER A. FRIEDMAN  
PRINCETON, N.J.: PRINCETON  
UNIVERSITY PRESS, 2014, 215 PAGES

REVIEWED BY DAVID A. PRICE

As a world financial crisis unfolded in November 2008, a London School of Economics professor spoke at a university event about the debacle's causes. Afterward, guest of honor Queen Elizabeth II demanded of him, with understandable peevishness, "If these things were so large, how come everybody missed them?"

Economic forecasting continued to be troublesome following the crisis. For instance, the economics department of the Organisation for Economic Co-operation and Development (OECD) released a report in February 2014 stating that its estimates of GDP growth during 2007-2012 were consistently too high across countries and time periods. The main difference between the OECD economists and those elsewhere may have been their willingness to admit their mistakes.

The high uncertainty surrounding economic forecasts has been well known for a long time. Indeed, the enterprise of prophecy has been associated with insanity at least since the Oracle at Delphi. Still, forecasts about the economy are central to business planning, investing, and, of course, economic policymaking. How the art and science of forecasting emerged is the subject of *Fortune Tellers*, a new history by Harvard Business School professor Walter Friedman.

If economic forecasting had an inventor, it was Roger Babson, son of a Gloucester, Mass., storekeeper. Babson became interested in business statistics at the dawn of the 20th century while working as a clerk at an investment firm. In 1904, at the age of 29, he founded the Babson Statistical Organization. Initially, he sold information on current stock and bond offerings, but the sudden onset of a financial crisis — the Panic of 1907 — led him to recognize a market for a different kind of information: analysis of what the latest statistics portended for the future.

Babson was an early believer in the existence of a business cycle that was distinct from the ups and downs of securities markets and was not caused simply by the weather and outside shocks. While others had proposed the existence of business cycles before — among them France's Clément Juglar and Russia's Nikolai Kondratiev — the concept had not been widely shared before Babson's work, Friedman notes. His prediction methods, though, were crude.

The work of infusing economic theory and higher mathematics into forecasting was done by others. Foremost among them was Yale economist Irving Fisher, who, in the early 20th century, gained fame for his work on the roles of changes in prices, credit, and interest rates as signs of changes to come in the real economy. "As a sign of his stature," Friedman recounts, "in 1924 the *Wall Street Journal* introduced John Maynard Keynes to its readership as 'England's Irving Fisher.'"

Another early contender in forecasting was the Harvard Economic Service, an arm of the university created in 1918 by economist Charles Bullock, who ran it with statistician Warren Persons. Their service, aimed at academics and business executives, brought more sophisticated statistics to bear on the subject and it gathered information on business conditions overseas as well as in America. Like Babson, however, Bullock and Persons were more interested in uncovering empirical relationships than in building theories to explain them.

Despite the greater sophistication of the academic forecasters compared with Babson, the Great Depression gave them their comeuppance. On Oct. 15, 1929, Fisher famously declared that stocks had reached "what looks like a permanently high plateau." The stock market crash began nine days later. Afterward, the *Weekly Letter* of the Harvard Economic Service advised that "serious and prolonged business depression, like that of 1920-21, is out of the question." Only Babson had warned that autumn of a crash, as he had been doing for the previous two years, contrary to the euphoria of the time. (On the other hand, although Fisher was wrong about the 1929 stock market, he was right in pointing out that the Depression was greatly worsened by the Fed's tightening of the money supply — a finding that only his more theory-based approach could have yielded.)

Another victim of the Depression was Herbert Hoover. Less well known than the turn in his political fortunes after the stock market crash is his role, documented by Friedman, in establishing government collection of business-cycle data. As secretary of commerce in the 1920s, he had enlisted Columbia University economist Wesley Mitchell to lead a committee on business cycles and to improve forecasting, believing that the private sector could use such information to avert future crises. Mitchell's work as the longtime director of research at the National Bureau of Economic Research would lay the foundations for modern business-cycle analysis.

Friedman provides a brisk, nontechnical view of crucial figures in American economic history — most of whom went through dramatic and wrenching swings of success and failure. In this, their lives resembled the business cycle to which they had given so much of their energies. **EF**

## Urban Crime: Deterrence and Local Economic Conditions

BY SANTIAGO PINTO

Evidence shows that crime, both property and violent, has been declining in the United States since the beginning of 1990. The data also suggest that despite a general downward trend, the variation in crime rates across regions is considerable. A growing academic literature has been studying the causal factors explaining changes in crime rates. Most of this work attempts to determine whether the decline in crime can be attributed to more effective deterrence policies or to better economic conditions that facilitate access to legitimate labor market opportunities. The conclusions of this research may provide guidance concerning the kinds of policies that are most effective in controlling crime.

### Economic Determinants of Crime

The economic theory of crime, proposed by University of Chicago economist Gary Becker in 1968, assumes that crime is a rational act. Economic agents engage in criminal activities if the expected psychic and monetary rewards of crime (taking into account, among other things, the return to legal labor market activities) are greater than the costs (determined by factors such as apprehension, conviction, and severity of punishment). Two hypotheses flow from this theory. The deterrence hypothesis claims that as more law-enforcement resources are targeted to fight crime, the probability of arrest increases, and the crime rate should therefore decrease. The economic-conditions hypothesis states that weak legitimate labor market opportunities should lead to lower opportunity costs of a crime (represented by foregone wages, employment, etc.), and a higher supply of criminal activities. Conversely, under this view, improving economic conditions should result in less crime.

The empirical literature on crime is far from conclusive about the importance of these effects. A few studies find evidence that higher criminal sanctions, which include policy arrests, incarceration, and other sanctions imposed through the justice system, reduce criminal activity. Others claim that the relationship between the two is either weak or non-existent. Some papers even find a positive association between sanctions and crime. Research shows that the relationship between crime and a number of variables that capture the opportunity costs of crime (such as unemployment and real minimum wage) is not particularly strong either. Furthermore, it has been claimed that police hiring is related to local economic conditions, suggesting that the two factors cannot really be disentangled.

Conflicting results are generally explained by a number of empirical problems inherent in the crime research. The two most important issues cited in the literature are measure-

ment errors in crime statistics and simultaneity between crime and sanctions. Measuring crime and sanctions accurately is a complicated task. Empirical models of crime are commonly estimated using official reported crime statistics. The FBI's Uniform Crime Reports (UCR) are the most widely used source of crime data. Measurement errors may arise from the fact that offenses are self-reported and the number of arrests is provided by local agencies. Indeed, the accuracy of the data depends on both the victims' willingness to report crimes and on police recording practices and procedures, which may differ across agencies. Additionally, measurement errors may arise simply because hiring more police leads to more crimes being reported.

Only a limited number of papers have directly addressed the problem of measurement errors. Recent work by Aaron Chalfin and Justin McCrary of the University of California, Berkeley re-examines this issue. Their work not only confirms that the UCR dataset suffers from a high degree of measurement errors, but it also quantifies this effect. They claim that estimates of the impact of arrests on crime rates obtained using the UCR dataset tend to be too small by a factor of five when they are not corrected for measurement error bias.

The problem of simultaneity between sanctions and crime is also central in the crime deterrence academic debate. According to the deterrence hypothesis, higher expected sanctions should decrease crime rates. But the causation operates in both directions: Increases in sanctions may also be observed in response to higher crime rates. Bruce Benson of Florida State University and his co-authors claim that it is plausible that police resources are reallocated to deal with higher levels of crime. When crime rates rise, citizens tend to demand more police, a view known as the "reallocation hypothesis." If it is true, then more crime would lead to a larger number of arrests. Thomas Garrett, an economics professor at the University of Mississippi, and Lesli Ott, a statistician at Yale CORE's Quality Measurement Group, seek to test this hypothesis. They use monthly data for 20 large U.S. cities during 1983-2004 and find strong support for the reallocation hypothesis and weak support for the view that arrests reduce crime. They also find that the crime-arrest relationship is very heterogeneous across the cities in their sample and across types of crimes.

In addition, the use of the minimum wage in these studies is indeed problematic. Changes in the minimum wage may have other unintended effects on crime. For instance, if a higher minimum wage increases unemployment, then some people (especially those more likely to be

affected by changes in the minimum wage and with weak labor attachment) may decide to rely on criminal activities for income. A recent work by Andrew Beauchamp and Stacey Chan, from Boston College, focuses on this precise issue. In their study, they find evidence that an increase in the minimum wage tends to displace youth from legal to illegal activities. Thus, according to their results, the effect of a higher minimum wage on employment and, consequently, on crime, dominates the wage effect.

Greater public law enforcement and crime may also be observed in a more general setup that considers both private and public crime prevention and explicitly allows for potential criminals to be mobile across geographical areas. Kangoh Lee of San Diego State University and the author of this article have developed a theoretical spatial model of crime that incorporates some of these features.

In the model, criminals allocate their illegal activities across geographical areas depending on the relative expected benefits of crime. At the local level, the probability of being apprehended is determined by the interplay between public law enforcement and private precautionary measures. Our research determined that in this context, and when the provision of local public law enforcement is decided strategically by a local agency, it is possible to obtain a positive relationship between local public law enforcement and crime. The conditions under which this result holds depend on how residents respond to the relative levels of local public law enforcement. For instance, if residents respond to an increase in local public law enforcement by decreasing private precautions significantly, then the overall level of local protection would be perceived as being too low relative to other regions, attracting more criminals into the area. It is also possible to infer from this analysis that when relevant factors are overlooked (in other words, when the spatial dependence between variables such as private security measures and local law enforcement is neglected), it is likely to obtain results that seem counterintuitive at first glance.

In order to identify the effects of sanctions on crime, some research work uses quasi-experimental methods. A few recent studies use terrorism-related events to test the deterrent effect of police. One example is the work by Rafael Di Tella, an economist at the Harvard Business School, and Ernesto Schargrotsky of the University Torcuato Di Tella. A terrorist attack on the main Jewish center in Buenos Aires, Argentina, in July 1994 led to an increased police presence in geographical areas with Jewish and Muslim institutions. The decision to protect these areas is assumed to be independent of the previous levels of crime in the respective areas. In this context, the authors examine the police-crime relationship before and after the terrorist attacks and find that more police decreases auto theft by about 75 percent. They also show, however, that such effect takes place only in the blocks where those institutions are located, and, in fact, little or no changes are observed one or two blocks away.

Most research work does not fully isolate the impact of

labor market variables and deterrence on criminal activities. Even though disaggregated micro-level data generally contain information on individuals' criminal behavior, wages, and unemployment spells, it does not include information on deterrence measures. When researchers employ aggregate data, they generally do not use extensive deterrence and economic variables. Therefore, the conclusions concerning the relative impact of economic conditions and sanctions on crime are far from conclusive mostly because they rely on different data sets and empirical methods.

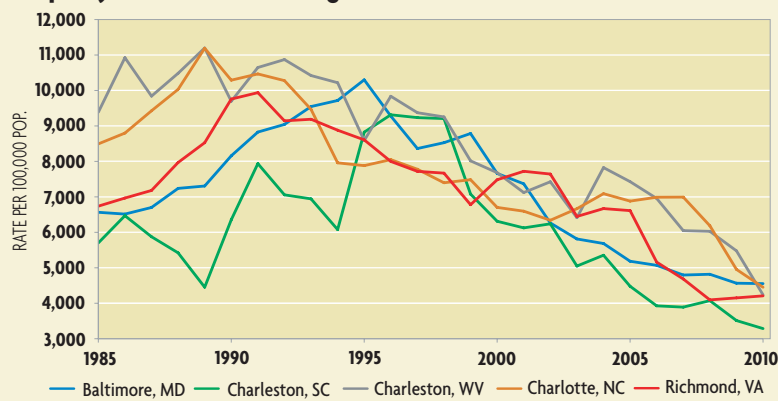
Using state-of-the-art statistical techniques and better data, more recent research has found a significant effect of sanctions on criminal activity and a stronger effect of labor market conditions on crime rates than previous work. Hope Corman of Rider University and Naci Mocan of the University of Colorado Denver examine the impact of several measures of deterrence (past arrests, police force size, and prison population) and local economic conditions (unemployment and real minimum wage) on different categories of crime. They use monthly data for New York City spanning the period 1977-1999. Their approach consists precisely of using this high-frequency data to distinguish between the short-run and long-run effects of police on crime rates. The authors conclude that both deterrence and economic variables help explain part of the decline in crime rates, but the contributions of deterrence measures seem to be larger. Also, according to their findings certain categories of crime are more responsive to changes in economic conditions than others. For instance, the unemployment rate affects burglary and motor vehicle theft, and the minimum wage has an impact on murder, robbery, and larceny. So even though it is not always the same economic factor, it seems that economic conditions affect most categories of crime except for rape and assault.

The work by Chalfin and McCrary also calculates the percentage change in crime rates due to a 1 percent increase in the number of police, or the elasticity of crime rates with respect to police, for similar categories of crime. They do not explicitly examine the impact of economic variables on crime rates, though. They use a panel data set of 242 cities and year-over-year changes in crime rates and police during the period 1960-2010. Their approach proposes various statistical procedures to control for both measurement and simultaneity error biases. They find that additional resources devoted toward law enforcement tend to reduce violent crime more than property crime. More precisely, the police elasticity of crime is -0.34 for violent crime and -0.17 for property crime.

### **Crime Statistics in the Fifth District**

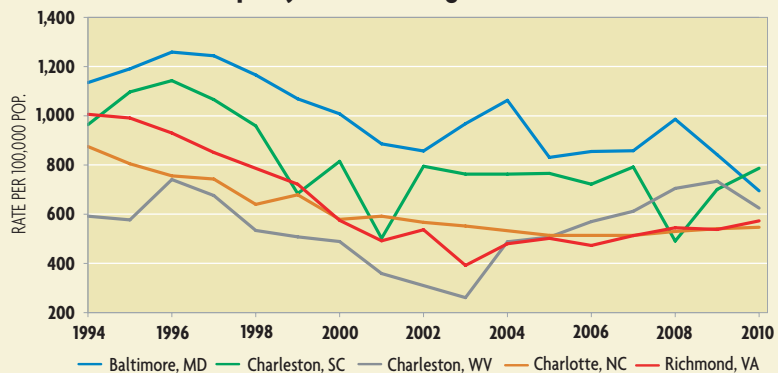
A few interesting observations result when we apply some of the above techniques to examine the impact of deterrence policies and economic conditions on crime rates in the Fifth District. We begin by describing the behavior of crime and arrests aggregated at the state level. Next, we focus on the relationship between crime, arrests, and local economic

### Property Crime Rates in Large Fifth District Cities



SOURCE: FBI Uniform Crime Reports

### Arrest Rates for Property Crime in Large Fifth District Cities



SOURCE: FBI Uniform Crime Reports

conditions in five of the largest cities within the district: Baltimore, Md.; Charleston, S.C.; Charleston, W.Va.; Charlotte, N.C.; and Richmond, Va. We use state- and city-level crime data from the UCR. We obtain the number of offenses and arrests for seven categories of crime and combined them into two broader categories: violent crime (murder, rape, assault, robbery) and property crime (burglary, larceny, and motor vehicle theft).

In general, crime rates in the Fifth District follow the same declining pattern since the beginning of the 1990s as the one observed in the entire country. Yet their behavior shows a few differences across states. In Virginia and West Virginia, property and violent crime rates are below the U.S. rates, but in Maryland and South Carolina, the rates are above the country's rates. Crime rates in North Carolina are very much in line with those observed in the United States. In recent years, South Carolina has been showing the highest property and violent crime rates within the group.

As with crime rates, arrest rates for both property and violent crimes also show a declining trend during the 1990s. Arrest rate trends have started to flatten out since the beginning of the 2000s, however. Compared with the country's average arrest rate, rates are generally lower in Virginia and West Virginia and higher in Maryland, North Carolina, and

South Carolina. North Carolina exhibits the highest arrest rates for both property and violent crime.

Overall, crime and arrest rates significantly decline from the early 1990s until 2000, but since the year 2000 the downward crime trend is less pronounced and arrest rates become fairly constant.

The five cities in the study generally have higher property and violent crime rates than their respective states' averages. (See charts.) The exception is Charleston, S.C., which since 2005 exhibits a property crime rate lower than the state average. Property crime rates decline sharply since the beginning of the 1990s in all cities. Violent crimes also decline but less markedly, and in Charleston, S.C., Richmond, Va., and Charleston, W.Va., the trends are relatively flat. Even though arrest rates in the cities are also generally higher than their respective states' averages (with the exception of Charlotte, N.C., where the property crime arrest rate is below the state's average), the differences tend to be smaller than the ones observed for crime rates. Also, arrest rate trends in all these cities become flat (in Baltimore, Md., Charlotte, N.C., and Charleston, S.C.) or show a positive slope (in Richmond, Va., and Charleston, W.Va.) since the beginning of the 2000s.

### Crime, Deterrence, and Economic Conditions in the Fifth District

We use monthly data during the period 1998–2010 to examine the relationship between criminal offenses and crime deterrent policies (measured by police arrests), and between criminal offenses and local economic conditions (measured by the local unemployment rate the real minimum wage). We adopt a similar approach to that of Cormann and Mocan. One difference, however, is that while they look at the impact of deterrence and economic factors on seven different categories of crime, we aggregate offenses into property and violent crimes. Specifically, we use different lag structures to estimate the impact of monthly changes in the number of arrests, unemployment rates, and real minimum wages on the changes in the number of property and violent offenses for each one of the cities.

The table presents the results of a preliminary analysis. The table only reports the signs of the coefficients that are statistically different from zero. The deterrence hypothesis would predict a negative sign for arrests. To the extent that unemployment and real minimum wages capture legitimate labor market opportunities in the cities examined here, a positive sign is expected in the unemployment column and a negative sign in the real minimum wage column.

The results reveal that the relationship between crime and arrests and between legal labor market opportunities and crime are far from consistent across cities and types of crime. For instance, arrests appear to have a negative impact on property crime in Baltimore, Md., and a negative impact

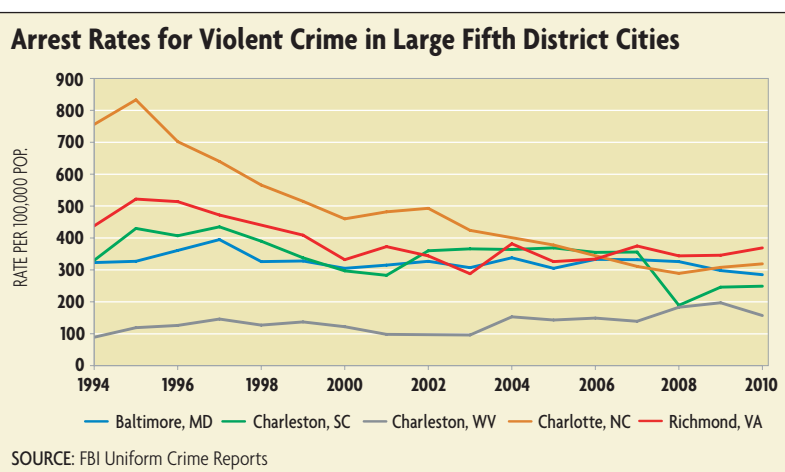
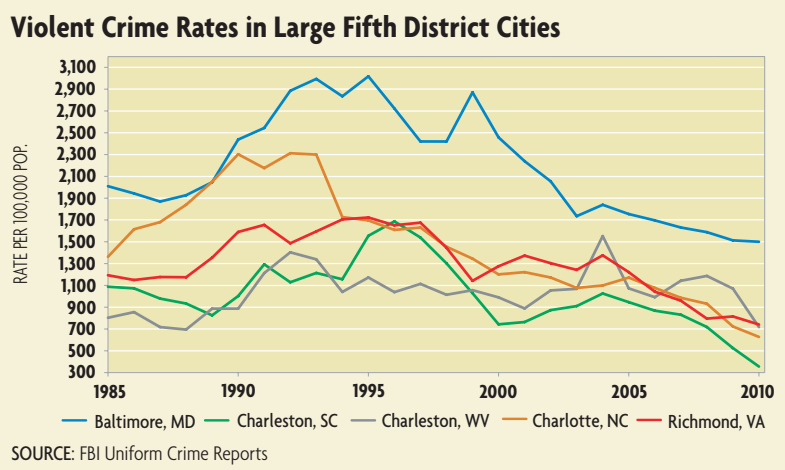


on violent crime in Charleston, W.Va., and Charlotte, N.C. Higher unemployment increases property crime in Charlotte, N.C., and violent crime in Richmond, Va. Finally, when the real minimum wage increases, property and violent crime decrease in Charlotte, N.C., and property crime decreases in Charleston, S.C.

The fact that the table shows a few empty cells reveals the lack of a robust connection between the variables included in the analysis. This kind of outcome, however, is consistent with the conclusions of the research cited earlier. It has been argued that the weak connection between arrests and crime is to some extent expected because the use of arrests to test the deterrence hypothesis is already built on strong assumptions. Not only does it assume the number of arrests for a specific crime accurately reflects the likelihood of apprehension for committing that crime, but it also requires that potential criminals have timely access to this information and are capable of assessing the likelihood of being arrested based on this data.

The literature also justifies the weak effect of unemployment and wages on crime rates in various ways. Work by Richard Freeman of Harvard University describes some of these explanations. First, when deciding to become criminals, individuals consider the labor opportunities available specifically to them. Aggregate information about unemployment and wages may not necessarily reflect these opportunities. The weak connection between these aggregate measures and crime does not invalidate the rational theory of crime; it simply reflects the fact that more disaggregated data would be required. Second, legal work and crime are not necessarily exclusive activities. There is some evidence suggesting that individuals, especially young men, participate at any point in time in both the legal and illegal labor market depending on the opportunities available to them. This type of behavior suggests that the elasticity of the supply of crime is relatively high. As a result, significant changes in the level of criminal activities will only be observed when wages and unemployment rates change in very large amounts. In other words, small fluctuations in these variables will not necessarily affect crime rates.

In summary, after many years of research, there is still no consensus on the effect of arrests and legitimate labor market opportunities on crime rates. The research on crime faces numerous challenges. Recent work has attempted to overcome some of the limitations using micro-level data and applying novel statistical techniques. Following a similar approach as the one developed by Corman and Mocan, we conduct a preliminary study on the determinants of crime in five of the largest cities in the Fifth District. From the analysis, we conclude that the relationship between crime and arrests and



between crime and legitimate labor market opportunities are very heterogeneous across cities and types of crimes. Even though arrests seem to lower crime, they only have an effective deterrent impact in some cities. Lower unemployment and higher real minimum wages contribute to decreased crime rates, but their impact is not significant for all types of crime and for all cities. Needless to say, further research is required to identify the factors underlying criminal activities. Developing such understanding is critical for the design of appropriate crime-reduction policies. **EF**

### Effects of Deterrence and Legitimate Labor Market Opportunities

City	Type of Crime	Arrests	Unemployment	Real Minimum Wages
Baltimore, MD	Property Violent	(-)		
Charleston, SC	Property Violent			(-)
Charleston, WV	Property Violent	(-)		(-)
Charlotte, NC	Property Violent	(-)	(+)	
Richmond, VA	Property Violent		(+)	

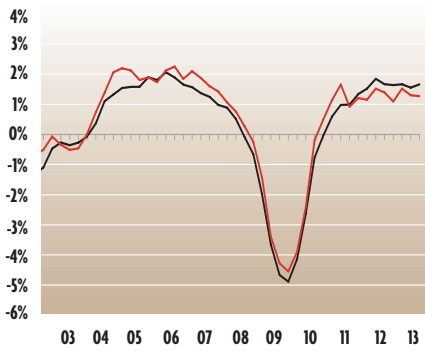
SOURCE: Author's estimates

## STATE DATA, Q2:13

	DC	MD	NC	SC	VA	WV
<b>Nonfarm Employment (000s)</b>	<b>733.2</b>	<b>2,610.4</b>	<b>4,045.3</b>	<b>1,881.6</b>	<b>3,765.0</b>	<b>767.8</b>
Q/Q Percent Change	-0.1	0.2	-0.1	0.2	0.3	-0.1
Y/Y Percent Change	0.4	1.5	1.5	1.3	1.2	0.4
<b>Manufacturing Employment (000s)</b>	<b>0.9</b>	<b>106.9</b>	<b>441.8</b>	<b>221.2</b>	<b>232.4</b>	<b>48.9</b>
Q/Q Percent Change	0.0	1.1	-0.9	0.2	-0.6	0.2
Y/Y Percent Change	-10.0	-2.5	0.4	0.4	0.4	-0.9
<b>Professional/Business Services Employment (000s)</b>	<b>156.2</b>	<b>423.4</b>	<b>548.5</b>	<b>235.8</b>	<b>681.1</b>	<b>64.8</b>
Q/Q Percent Change	0.6	0.8	0.9	3.7	0.3	0.1
Y/Y Percent Change	2.5	3.5	2.6	-1.0	0.5	-0.3
<b>Government Employment (000s)</b>	<b>237.3</b>	<b>509.0</b>	<b>714.9</b>	<b>350.4</b>	<b>716.1</b>	<b>152.8</b>
Q/Q Percent Change	-1.5	0.7	-0.2	0.2	-0.2	-0.9
Y/Y Percent Change	-2.4	0.8	0.2	1.3	0.5	-0.3
<b>Civilian Labor Force (000s)</b>	<b>372.1</b>	<b>3,142.0</b>	<b>4,716.6</b>	<b>2,168.3</b>	<b>4,229.6</b>	<b>803.1</b>
Q/Q Percent Change	-0.2	0.0	-0.9	-0.4	0.0	-0.7
Y/Y Percent Change	3.6	0.8	0.1	0.0	0.6	-0.1
<b>Unemployment Rate (%)</b>	<b>8.5</b>	<b>6.7</b>	<b>8.8</b>	<b>8.0</b>	<b>5.3</b>	<b>6.3</b>
Q1:13	8.6	6.6	9.4	8.6	5.5	7.2
Q2:12	9.1	6.8	9.5	9.3	5.9	7.3
<b>Real Personal Income (\$Bil)</b>	<b>45.1</b>	<b>301.0</b>	<b>352.9</b>	<b>157.3</b>	<b>376.5</b>	<b>61.8</b>
Q/Q Percent Change	1.1	0.9	0.8	0.9	0.8	1.0
Y/Y Percent Change	1.4	1.1	1.1	1.0	1.2	0.4
<b>Building Permits</b>	<b>875</b>	<b>5,091</b>	<b>13,705</b>	<b>6,260</b>	<b>8,261</b>	<b>786</b>
Q/Q Percent Change	161.2	33.3	21.6	20.2	19.1	52.9
Y/Y Percent Change	-12.1	53.3	13.2	14.1	20.5	34.6
<b>House Price Index (1980=100)</b>	<b>629.1</b>	<b>411.5</b>	<b>302.5</b>	<b>305.6</b>	<b>400.3</b>	<b>216.3</b>
Q/Q Percent Change	3.3	1.1	0.6	0.4	1.1	0.4
Y/Y Percent Change	8.8	2.8	2.1	1.2	2.7	1.1

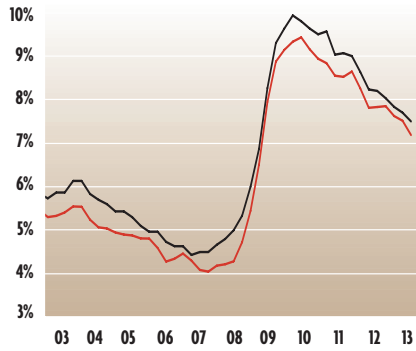
### Nonfarm Employment

Change From Prior Year  
Second Quarter 2002 - Second Quarter 2013



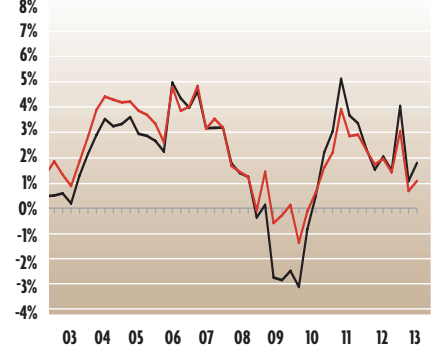
### Unemployment Rate

Second Quarter 2002 - Second Quarter 2013



### Real Personal Income

Change From Prior Year  
Second Quarter 2002 - Second Quarter 2013

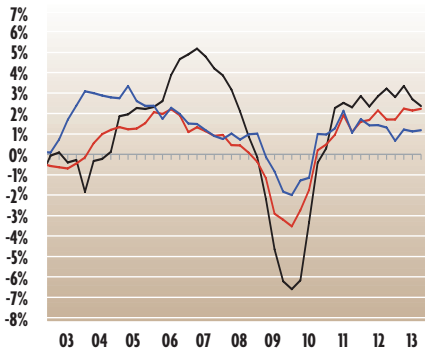


— Fifth District

— United States

### Nonfarm Employment Metropolitan Areas

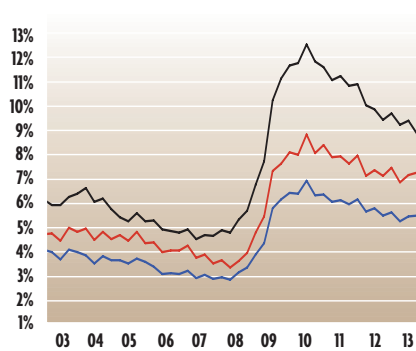
Change From Prior Year  
Second Quarter 2002 - Second Quarter 2013



— Charlotte — Baltimore — Washington

### Unemployment Rate Metropolitan Areas

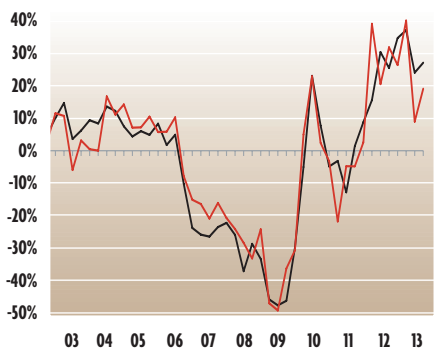
Change From Prior Year  
Second Quarter 2002 - Second Quarter 2013



— Charlotte — Baltimore — Washington

### Building Permits

Change From Prior Year  
Second Quarter 2002 - Second Quarter 2013



— Fifth District — United States

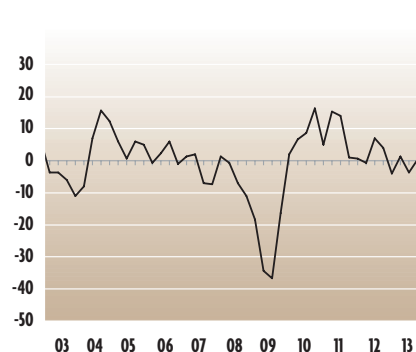
### FRB—Richmond Services Revenues Index

Second Quarter 2002 - Second Quarter 2013



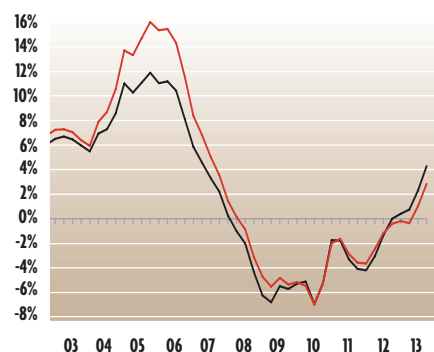
### FRB—Richmond Manufacturing Composite Index

Second Quarter 2002 - Second Quarter 2013



### House Prices

Change From Prior Year  
Second Quarter 2002 - Second Quarter 2013



— Fifth District — United States

**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) Building permits and house prices are not seasonally adjusted; all other series are 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, <http://stats.bls.gov>.  
Employment: CES Survey, Bureau of Labor Statistics, U.S. Department of Labor, <http://stats.bls.gov>.  
Building permits: U.S. Census Bureau, <http://www.census.gov>.  
House prices: Federal Housing Finance Agency, <http://www.fhfa.gov>.

## METROPOLITAN AREA DATA, Q2:13

	Washington, DC	Baltimore, MD	Hagerstown-Martinsburg, MD-WV
<b>Nonfarm Employment (000s)</b>	<b>2,507.0</b>	<b>1,349.4</b>	<b>104.0</b>
Q/Q Percent Change	1.7	2.1	2.0
Y/Y Percent Change	1.2	2.2	0.3
<b>Unemployment Rate (%)</b>	<b>5.4</b>	<b>7.2</b>	<b>7.2</b>
Q1:13	5.4	7.0	7.5
Q2:12	5.6	7.2	7.9
<b>Building Permits</b>	<b>6,832</b>	<b>2,083</b>	<b>248</b>
Q/Q Percent Change	60.1	15.1	43.4
Y/Y Percent Change	18.0	33.4	62.1
	Asheville, NC	Charlotte, NC	Durham, NC
<b>Nonfarm Employment ( 000s)</b>	<b>176.3</b>	<b>872.1</b>	<b>288.1</b>
Q/Q Percent Change	2.1	1.6	0.6
Y/Y Percent Change	3.2	2.4	1.8
<b>Unemployment Rate (%)</b>	<b>6.9</b>	<b>8.9</b>	<b>6.8</b>
Q1:13	7.5	9.4	7.2
Q2:12	7.7	9.5	7.4
<b>Building Permits</b>	<b>427</b>	<b>3,598</b>	<b>1,011</b>
Q/Q Percent Change	54.7	0.8	95.2
Y/Y Percent Change	15.7	15.2	115.1
	Greensboro-High Point, NC	Raleigh, NC	Wilmington, NC
<b>Nonfarm Employment (000s)</b>	<b>345.9</b>	<b>528.7</b>	<b>141.2</b>
Q/Q Percent Change	1.9	1.1	3.5
Y/Y Percent Change	0.5	1.2	2.0
<b>Unemployment Rate (%)</b>	<b>9.4</b>	<b>7.1</b>	<b>9.4</b>
Q1:13	9.9	7.6	9.7
Q2:12	9.9	7.8	9.8
<b>Building Permits</b>	<b>555</b>	<b>3,476</b>	<b>922</b>
Q/Q Percent Change	48.4	32.5	33.0
Y/Y Percent Change	16.4	14.8	37.4

	Winston-Salem, NC	Charleston, SC	Columbia, SC
<b>Nonfarm Employment (000s)</b>	<b>206.6</b>	<b>310.6</b>	<b>360.1</b>
Q/Q Percent Change	0.6	2.6	1.6
Y/Y Percent Change	0.4	1.0	1.9
<b>Unemployment Rate (%)</b>	<b>8.5</b>	<b>6.6</b>	<b>7.1</b>
Q1:13	8.8	6.9	7.6
Q2:12	9.0	7.7	8.2
<b>Building Permits</b>	<b>337</b>	<b>1,284</b>	<b>1,140</b>
Q/Q Percent Change	24.4	-13.9	21.9
Y/Y Percent Change	-33.3	-32.0	-1.6
	Greenville, SC	Richmond, VA	Roanoke, VA
<b>Nonfarm Employment (000s)</b>	<b>311.1</b>	<b>633.7</b>	<b>160.2</b>
Q/Q Percent Change	1.4	1.8	1.7
Y/Y Percent Change	1.0	1.3	1.1
<b>Unemployment Rate (%)</b>	<b>6.6</b>	<b>5.9</b>	<b>5.6</b>
Q1:13	6.9	6.1	5.8
Q2:12	7.7	6.5	6.2
<b>Building Permits</b>	<b>771</b>	<b>1,485</b>	<b>277</b>
Q/Q Percent Change	10.1	55.8	154.1
Y/Y Percent Change	29.8	59.3	128.9
	Virginia Beach-Norfolk, VA	Charleston, WV	Huntington, WV
<b>Nonfarm Employment (000s)</b>	<b>760.4</b>	<b>148.6</b>	<b>112.8</b>
Q/Q Percent Change	2.4	2.2	0.5
Y/Y Percent Change	2.0	0.2	0.0
<b>Unemployment Rate (%)</b>	<b>5.9</b>	<b>6.1</b>	<b>7.1</b>
Q1:13	6.1	7.1	7.3
Q2:12	6.6	6.8	7.4
<b>Building Permits</b>	<b>1,525</b>	<b>47</b>	<b>13</b>
Q/Q Percent Change	-23.0	4.4	30.0
Y/Y Percent Change	22.2	-2.1	44.4

For more information, contact Jamie Feik at (804) 697-8927 or e-mail [Jamie.Feik@rich.frb.org](mailto:Jamie.Feik@rich.frb.org)

# Down But Not Out

BY JOHN A. WEINBERG

Historically, the United States has rebounded strongly from deep recessions. During the two years following the 1981-1982 recession, for example, GDP growth averaged nearly 7 percent. Many people predicted a similar trajectory for the U.S. economy following the most recent recession, but that has not been the case: Annual average GDP growth since 2010 has been just 2.3 percent. Not only is growth slower than might be expected following a severe recession, it's also a departure from our postwar experience. Between 1946 and 2006, annual GDP growth has averaged 3.2 percent. During no other non-recessionary period has GDP growth been as slow as at present — leading some observers to conclude that U.S. economic growth is “over.”

Why might this be? One argument is that the remarkable improvement in living standards that began around 1750 was an anomaly in American history, not to be repeated. During this period we witnessed extraordinary innovations that greatly increased our economy's productivity, such as the steam engine, electricity, and indoor plumbing, to name just a few. But the innovations of today — touchscreens, streaming video, and new networking platforms — are unlikely to produce the same kinds of gains.

Before assessing these claims, it will help to talk about the factors influencing economic growth in a bit more detail. Basically, growth is a function of employment and labor productivity, that is, how many people are working and how much they can produce. Labor productivity depends on the amount of capital inputs combined with labor, but it also depends on technology — the state of our knowledge about how to produce goods and services from the inputs we have. But it's very difficult to forecast advances in technology and knowledge, which means it's also difficult to forecast changes in productivity.

In the late 1930s, for example, Alvin Hansen, an economist at Harvard University and consultant to the Federal Reserve Board and the Treasury Department, predicted that declining population growth and slowing innovation would cause “secular stagnation” in the United States. But he was quickly proven wrong by the postwar economic boom, and productivity growth averaged 2.6 percent per year between 1947 and 1971.

Productivity changes are hard to quantify even when innovation would seem to be all around us. In the late 1980s and early 1990s, economists identified a “productivity paradox”: Despite tangible advances in computing and the adoption of new information technology by many businesses, productivity growth actually declined. As Nobel

laureate Robert Solow wrote in 1987, “You can see the computer age everywhere but in the productivity statistics.” Just a few years later, however, the computer age *did* show up in the statistics: Productivity growth averaged 2.7 percent between 1996 and 2001. The fact that we do not currently see the innovations of the past few years in productivity statistics might simply indicate that businesses need time to learn about the new technologies and fully incorporate them into their operations — not that the innovations are without value.

What this history suggests to me is that while qualitative observations on technology trends are interesting, it's hard to infer much from them about the future of average, economy-wide productivity growth. That's why I'm not yet ready to agree with those who believe that the current productivity slowdown finally heralds the secular stagnation predicted by Hansen eight decades ago.

That doesn't mean the United States doesn't face some significant headwinds at present. First, population growth is slowing, which means the size of the working-age population is growing more slowly as well. It's also the case that the fraction of the population that is working or looking

for work is near its lowest rate in decades, due to a combination of demographic factors, structural changes in the labor market, and lingering effects of the Great Recession. In addition, although government spending has declined recently, fiscal policy as described in current law is unsustainable, and uncertainty about how we will address our debt and deficit might be inhibiting consumer and business investment.

These factors could be contributing to the current slow rate of GDP growth, and they might restrain growth for some time. But even if growth is likely to be slower over the medium term, history suggests that we should be skeptical of our ability to predict with any confidence what's likely to happen over the long term. Persistence is not the same as permanence.

Moreover, there are a number of reasons to be optimistic about the country's future: America's colleges and universities are second to none and attract students from all over the world. Our public policy problems may be challenging, but they do have solutions. And our markets are flexible and have demonstrated their resiliency time and time again, as when we emerged from the Great Depression or from the stagflation of the 1970s. Economic growth might be slower for the foreseeable future, but in my opinion it is far from over.

EF

**John A. Weinberg is senior vice president and director of research at the Federal Reserve Bank of Richmond.**

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Some observers have concluded that American economic growth is over.

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# NEXT ISSUE

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## Securing Payments

Recent high-profile data breaches at major retailers have led many to question whether our payments system is as secure as it should be. But allocating resources to stop such crimes is more complex than it first appears.

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## Income Inequality

Some argue that economic inequality in the United States is high and increasing. But not everyone agrees about what the data reveal or whether inequality is inherently harmful.

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## Farmland Preservation

Farmland preservation programs are a popular way to protect working farmland and open space from development. But are they a good deal for taxpayers — or for farmers?

## Federal Reserve

The chair of the Fed is often referred to as the second most powerful person in the country. While monetary policy is set by committee, the views of the chair are believed to carry outsized weight in policy-making. But does the success of the Fed hinge upon who is at the helm?

## Interview

Richard Timberlake, emeritus professor at the University of Georgia, discusses the still-influential ideas of Walter Bagehot, the role of asset bubble policies in the Great Depression, and alternatives to fiat money.

## The Profession

One study after another confirms it: The United States has almost all of the world's top-tier economics departments. They attract students and scholars from around the globe. In a field that was more or less created by foreigners — from Adam Smith to Vilfredo Pareto to John Maynard Keynes, among others — how did universities in the United States come to be this dominant?

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