

SECOND QUARTER 2015

ECON FOCUS

FEDERAL RESERVE BANK OF RICHMOND

Private Debt and its Public Effect

When can household
and corporate debt
harm the economy?

What's a
Life Worth?

The Fed's 1994
Rate Hikes

Interview with
James Poterba

ECON FOCUS

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DIRECTOR OF RESEARCH
Kartik Athreya

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Rence Haltom

SENIOR EDITOR
David A. Price

MANAGING EDITOR/DESIGN LEAD
Kathy Constant

STAFF WRITERS
Helen Fessenden
Jessie Romero
Tim Sablik

EDITORIAL ASSOCIATE
Lisa Kenney

CONTRIBUTORS
Joseph Mengedoth
Eamon O'Keefe
Santiago Pinto
Franco Ponce de Leon
Karl Rhodes
Michael Stanley

DESIGN
Janin/Cliff Design, Inc.

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PRESIDENT'S MESSAGE

Scaling Back Debt Subsidies

As individuals, we love debt and we hate it. More precisely, we love what it enables us to do — use tomorrow's income to pay for something we want today — while we don't like the burdens it places on us, especially if we haven't managed it well or we've been financially unlucky.

Private debt has constructive uses, such as allowing households to pay for large purchases like housing or education over time and allowing owners of firms to borrow against future earnings to finance projects. Meanwhile, lenders enjoy a steady stream of interest payments, which is attractive to more risk-averse investors. But private debt can be very costly as well. As we saw during the financial crisis of 2007-2008, highly leveraged balance sheets made it very difficult for households and firms to adjust to the unexpected shock to the housing market. Many households were unable to keep up with their mortgage payments and were forced into foreclosure or bankruptcy. Financial firms that had taken on large amounts of short-term debt to finance long-term investments found themselves under significant stress when credit markets suddenly dried up.

Why did those households and firms become so highly leveraged in the first place? One contributing factor is that the United States — like many other countries — encourages the use of debt through its tax code. For example, households are able to deduct the interest payments on their home mortgages from their taxable incomes. While this policy has remained in place to encourage greater homeownership, it is likely not the most effective way of achieving that goal. It encourages households that do decide to purchase a home to take out larger mortgages than they otherwise would, leaving them more vulnerable to adverse movements in housing prices. Another criticism is that the tax break is regressive, since it mostly benefits more affluent households that can afford to buy homes in the first place.

Private firms also enjoy favorable tax treatment for debt. The interest they pay on debt is considered a deductible business expense — unlike dividends paid out on equity. Economic research suggests that firms do respond to this incentive. As their marginal tax rate increases, so does their ratio of debt to assets. And even though banks are subject to minimum capital requirements, research by economists at the International Monetary Fund suggests that they also increase their leverage as a result of this tax distortion. By encouraging financial and nonfinancial firms to take on greater leverage, these tax policies increase the risk of insolvency in the event of economic shocks, as we saw during the financial crisis. Moreover, banks made use of hybrid borrowing arrangements that qualified as capital for regulatory purposes but qualified as debt for tax purposes.

Of course, tax policy is not the only factor that encourages private-sector overindebtedness. Financial firms that

feel either implicitly or explicitly protected from losses by government guarantees have greater incentives to increase leverage and rely on risky funding. And prior to the housing market crash, government home mortgage guarantees contributed to lowered lending standards that helped fuel home mortgage borrowing. Additionally, some economists have argued that there are inherent characteristics of debt that encourage its overuse (see “The Public Perils of Private Debt,” p. 11), although I am a bit skeptical of these claims.

At a minimum, subsidizing debt through the tax code is likely to exacerbate these problems. In my view, we would be better off scaling back the tax preferences that favor the use of debt over equity. For housing, there are ways to encourage homeownership (assuming that is a goal policymakers want to pursue) without encouraging the buildup of private debt. Establishing tax-preferred savings vehicles that homebuyers can use as down payments would encourage them to build equity instead of debt, which would better insulate the economy from the negative effects of price changes in the housing market. The government already does this to some degree by allowing first-time homebuyers to withdraw some funds without penalty from their IRA to help make a down payment.

For firms, either eliminating or capping the corporate interest deduction would help to remove the artificial bias toward debt financing. Alternatively, the government could give equity financing equal treatment by providing an equivalent deduction for dividends. A recent study of six large countries in the European Union by economists at the European Commission's Joint Research Center suggests that fully eliminating the corporate debt bias could cut the financial losses associated with banking crises by as much as half. Moreover, reducing excessive household indebtedness would reduce the likelihood of costly and burdensome workouts when borrowers get in trouble. Regardless of the exact size of the effect, it seems clear that reducing the tax favoritism for debt would help reduce the negative effects of credit booms and busts.

EF



A handwritten signature in black ink, appearing to read "Jeff M Lacker". The signature is fluid and cursive.

JEFFREY M. LACKER
PRESIDENT
FEDERAL RESERVE BANK OF RICHMOND



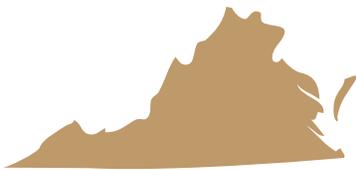
MARYLAND — Montgomery and Prince George's counties agreed in August to contribute more funding to the Washington Metro Purple Line, a proposed 16-mile light rail line extending from Bethesda to New Carrollton. Gov. Larry Hogan had demanded more county money as a condition for the project to proceed. The state has committed \$168 million, compared with \$347 million from the two counties. More federal and private funding is necessary to fully finance the project, estimated at \$2.45 billion. If private money comes through and Congress approves federal funding later this year, construction may begin as early as May 2016.



NORTH CAROLINA — Blue Cross and Blue Shield, North Carolina's largest health insurer, announced in August that it wanted a premium hike of 34.6 percent for customers under 65 who buy individual plans under the Affordable Care Act (ACA). The company said the reason was that older and sicker customers continue to outnumber the healthy ones and use more expensive health care services than anticipated. The proposed rate increase, effective Jan. 1, would apply only to individual plans under the ACA, not employer plans, and for most customers, much of the cost would be covered by ACA subsidies. The North Carolina Department of Insurance reviewed the request and announced its approval on Nov. 1.



SOUTH CAROLINA — Project leaders in South Carolina and Georgia agreed in August to start seeking permits so the Army Corps of Engineers can begin surveying the land on which the Jasper Ocean Terminal, a 1,500-acre facility that will be located on the South Carolina side of the Savannah River, will be built. The \$4.5 billion project, which is expected to be completed in 2029, will be the largest single-site container terminal upon completion, easing volume off neighboring ports in Charleston and Savannah. By 2040, it has the potential to support more than 1 million jobs in both states, according to a 2010 study by the University of Georgia and the consulting firm Wilbur Smith & Associates.



VIRGINIA — According to the Virginia Department of Motor Vehicles, registered in-state ride-sharing drivers for companies like Uber and Lyft are close to 19,000 as of Aug. 3. Last February, Gov. Terry McAuliffe signed a bill legalizing ride-sharing services provided they abide by state regulations, and since then they have expanded throughout the state. Meanwhile, Uber has cut prices in Richmond and is looking at ways to price its services with more flexibility in different parts of Virginia.



WASHINGTON, D.C. — City officials approved in July a proposal to place a minimum-wage hike on the ballot in November 2016. If the measure is adopted, D.C.'s minimum wage — which currently stands at \$10.50 per hour — would rise to \$15 per hour by 2020, making it one of the highest minimum wages in the country. The minimum wage would also be annually indexed to inflation. The next step for supporters is to gather the 23,200 signatures needed to ensure the proposal is placed in front of voters.



WEST VIRGINIA — Declining coal production and lower natural gas prices have caused West Virginia's tax receipts to fall, according to the state's Department of Revenue. In July, the first month of the 2016 fiscal year, receipts totaled \$251.78 million, an 8.2 percent drop over the previous July. The state attributed this to a shortfall in severance tax collection, which has fallen by almost half, year-on-year, due to lower gas and coal prices and declining coal production.

Economists Learn to Grapple with Big Data

BY JESSIE ROMERO AND AARON STEELMAN

Most of us have had the experience of shopping online and receiving a recommendation for an item that caught our eye — and wondered how the suggestion was generated. You have “big data” to thank for it. If you go on to make the additional purchase, so does the retailer. And increasingly, it isn’t just companies that are interested in big data; economists are too.

Our browsing and purchasing experiences, along with those of other consumers with similar tastes and interests, generate an enormous amount of information that can be collected and filtered to provide us with something like a tailor-made shopping environment. As gathering that information has gotten easier and analyzing it has gotten cheaper, businesses are aiming to use it to boost sales. The recommendations we receive may not always be hits, but they don’t have to be. In baseball, a batter who is successful just 30 percent of the time is often an all-star — and most retailers would be happy with an average much lower than that.

What exactly is “big data”? There is no consensus definition, in part because big data is relatively new and in part because people use it for many different purposes. But for economists who work with big data, there is broad agreement on what features make it valuable. Linnet Taylor of the University of Amsterdam and Ralph Schroeder and Eric Meyer of the Oxford Internet Institute have surveyed more than 125 social scientists on various issues related to big data. In a 2014 article published in the journal *Big Data & Society*, they reported that the economists they have talked to are most interested in “granular, population-level data with multiple dimensions that allow researchers to analyse cases along many variables,” which permit them “to test theories of behaviour that were previously untestable, creating a new set of metrics for issues of economic interest which were previously in the realm of theory.”

Economists have worked with big data, both public and private, in almost all areas of their discipline, from historical tax data to look at economic inequality to Medicare rolls to examine the efficiency of the health care industry. But if there is one area where big data may be especially promising, it is labor economics. Indeed, John Horton and Prasanna Tambe of New York University’s Stern School of Business recently noted that we are “clearly entering a golden age for empirical labor market research,” one where there is “a growing opportunity to revisit old questions with new and better data and to answer new questions raised directly by these new contexts.”

Horton and Tambe point to several recent papers that have employed big data to interesting effect. For instance, Iona Marinescu of the University of Chicago and Roland

Rathelot of the University of Warwick used ZIP code level data from 500,000 job seekers who sent out more than 5 million applications through CareerBuilder.com in 2012 to examine the extent to which geographic mismatch is a driver of unemployment. They found that job seekers are 35 percent less likely to apply for a job 10 miles away from their ZIP code of residence — but because there are enough job openings on average, this local preference has been fairly unimportant in the aggregate. In a similar vein, Scott Baker of Northwestern University’s Kellogg School of Management and Andrey Fradkin, a postdoctoral associate at MIT’s Sloan School of Management, used Google search data to look at online job search patterns in Texas and how those patterns change as people come close to exhausting their unemployment insurance benefits.

Of interest to macroeconomists, including monetary policymakers, is the Billion Prices Project at MIT, which collects price data daily from hundreds of online retailers. Those data are used for a variety of research purposes, perhaps most notably to construct a complementary inflation measure to the Consumer Price Index. Such data are collected internationally, too, and could be particularly helpful for countries that do not have as reliable government measures.

Most economists are optimistic about the use of big data in academic research and in the evaluation of public policy. At the same time, most also agree that the size and complexity of some of those data sets will require new statistical techniques to get beyond mere correlation and to the identification of causal relationships that help us test theory. As Jonathan Levin of Stanford University notes, “Everywhere you look you can generate an interesting fact. But figuring out how to turn that into ... a researchable question is really challenging.”

Privacy concerns will loom large, too, as researchers avail themselves of data sets containing sensitive information. “De-identification” methods will need to be robust to ensure appropriate anonymity. Moreover, the proper use of predictive modeling to achieve public policy ends will need to be determined. Big data could be helpful, suggest Levin and his colleague Liran Einav, in helping the government identify people with a high marginal propensity to consume — people who could then be targeted for tax rebates as part of an “economic stimulus” package. Private firms routinely engage in similar activities, of course, but people’s reaction to such measures by the public sector likely would be more circumspect.

What is not in doubt is that big data is going to keep getting bigger. As it does, economists will have to figure out, often in collaboration with colleagues in other disciplines, such as computer science, how to make the best use of it. **EF**

Shifting Into Neutral

BY HELEN FESSENDEN

In 1994, the Federal Reserve launched a pre-emptive strike against inflation in a series of interest-rate hikes that drew controversy at the time

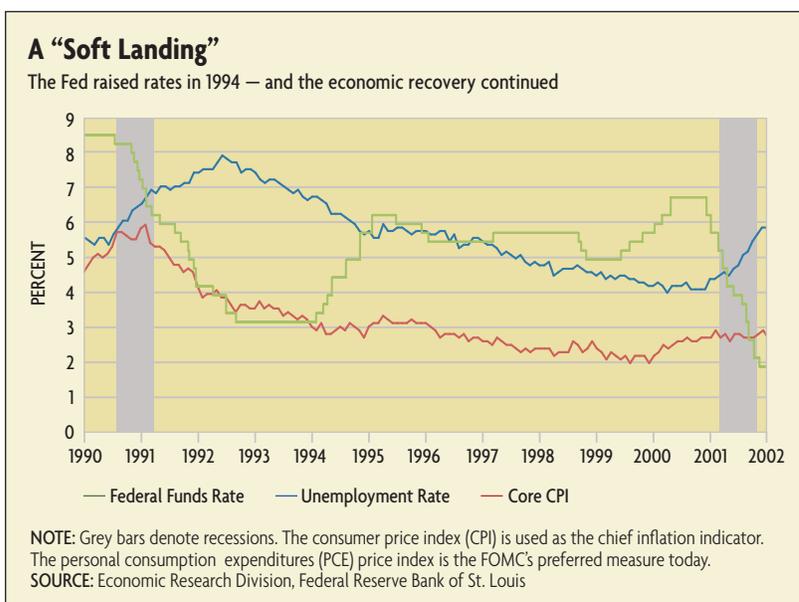
How does a central bank normalize monetary policy after a long spell of unusually low interest rates? This may seem like a question very much of the present, as Fed leaders ponder interest-rate policy following the Great Recession of 2007-2009 and the tepid U.S. recovery. But it's also a challenge the Fed confronted two decades ago. In 1994, the Federal Open Market Committee (FOMC) wrestled with a similar dilemma as it considered emerging from a sustained period of low interest rates, amid signs of a reviving economy, growing aggregate demand, and no obvious signals of inflation. At the time, a pre-emptive strike had never been done before. As then-Chairman Alan Greenspan put it in his 2007 memoir, *The Age of Turbulence*, such a strategy carried great risk. "Let's jump out of this sixty-story building and try to land on our feet," is how he described the feeling.

Many Americans remember the 1990s as remarkable boom years, when unemployment dropped to record lows, productivity kept climbing, and inflation barely nudged. But the early years of the 1990s were a different story. In 1990-1991, the United States suffered a

recession, followed by a sluggish recovery and rising unemployment. Facing this environment, the FOMC repeatedly cut the federal funds rate until real short-term interest rates had effectively dropped to zero in the fall of 1992.

The picture improved substantially in 1993, especially by the fall, most notably in business investment and housing starts, while leading indicators of inflation — such as low inventory levels and rising inflation expectations reflected in longer-term bonds — began to appear. By year-end, the FOMC coalesced around the view that such historically low rates were no longer needed to spur spending and investment. But the good economic news also posed a new dilemma: How gradually should the FOMC dial back its accommodative stance, given that the recession and high unemployment were still recent memories? How could it take its message to the public when inflation appeared contained? And what would be the impact of making such a move given that it had been five years since the FOMC last tightened policy?

Over the course of the next year, from January 1994 to January 1995, the FOMC raised the fed funds rate seven times, from 3 percent to 6 percent, in what was later seen as a turning point. Many economists view this episode as the first major tightening action by the FOMC that was truly pre-emptive, moving ahead of concrete evidence of inflation. The 1994 cycle was also the first time that the FOMC issued a statement to announce policy changes as a way to explain its decision to the public as well as signal its anti-inflation commitment to markets. Even though the FOMC at the time did not view the statement as a sea change, it turned out to be the first in a series of moves establishing greater transparency and anchoring public expectations about monetary policy over the medium and long run.



The 1994 hikes provoked strong political resistance — especially in Congress — as well as ongoing turmoil in bond markets. But as the year went on, the fundamentals bore out the FOMC’s assessment that reverting to tighter monetary policy would not stop the recovery in its tracks. The economy continued to expand, rising from 2.7 percent real GDP growth in 1993 to 4 percent in 1994. Growth did eventually decelerate in 1995 — as Fed forecasts had expected — but it was a “soft landing” rather than a hard fall. In fact, the economy expanded by 2.7 percent in 1995, although it slowed down in the fourth quarter to less than 1 percent. Meanwhile, inflation stayed contained, with the core consumer price index (which omits volatile food and energy prices) generally hovering around or below 3 percent in 1994 and 1995. To the surprise of many, the unemployment rate kept on falling, from 6.6 percent in January 1994 to 5.6 percent in early 1995 — more than a full percentage point below FOMC forecasts in early 1994. (See chart.) And long-term bond rates — after rising in the spring and summer — started falling by late 1994 and eventually stabilized by early 1996. This movement indicated to the FOMC that long-term inflation expectations had been anchored by the series of hikes and the accompanying announcements. The Fed’s oft-stated intention that it would contain inflation appeared at long last to be attaining credibility.

J. Alfred Broaddus Jr., president of the Richmond Fed from 1993 to 2004, had his first rotation as an FOMC voting member in 1994. The tightening decision, he explains, came out of a fundamental shift in the 1980s, as economists began thinking about how Fed monetary policy could stabilize prices by focusing on inflation expectations and central bank credibility.

“What you say and what you do before inflation breaks out affects the Fed’s ability to control inflation at minimum cost,” Broaddus says. “This understanding grew out of the mistakes of the 1970s. Back then, inflation psychology was so embedded, the only thing that would break inflation was a hit to the economy. By taking a pre-emptive approach, we learned, you can minimize the fallout from tightening.”

A Gradual Healing

A chief source of the concern to the FOMC in late 1993 and early 1994 was that the federal funds rate had been unusually low for more than a year. At 3 percent, that rate might not seem so low relative to today’s near-zero levels. However, the FOMC compares the inflation-adjusted (or “real”) fed funds rate to the economy’s long-run “natural” real rate — the rate that will neither stimulate nor depress economic activity — and it sets the real fed funds rate relatively low to support economic activity during a recession. (See “Jargon Alert,” p. 8.) Since the Great Recession, economists estimate the natural rate has fallen close to zero, but in the early 1990s, most calculations put it at 3 percent or higher. In 1994, with roughly 3 percent inflation, the 3 percent fed funds rate thus represented an “accommodative” stance rather than a neutral one.

One reason for the persistence of such low rates was the legacy of the 1990-1991 recession, which saw real GDP contract in the fourth quarter of 1990 by an annualized 3.5 percent, followed by a 2 percent drop in the next quarter. FOMC members were especially concerned over the troubled banking and thrift industry, as hundreds of financial institutions collapsed in the late 1980s and early 1990s under the weight of bad loans. Another factor was the recessionary effect of the spike in oil prices following the Iraqi invasion of Kuwait in 1990. Regional downturns in places such as New England and Texas were especially severe.

The FOMC had responded to these conditions by cutting the fed funds rate a full 3 percentage points, from 6 percent to 3 percent, from mid-1991 to late 1992. Despite the official end to the recession in March 1991, however, employers kept shedding jobs, causing unemployment to rise through June 1992, up to 7.8 percent. Absent any early signs of inflation, and with the FOMC’s internal “Greenbook” forecast pointing to ongoing slack in the labor market, these conditions had convinced Greenspan and a majority of FOMC members that low real interest rates were appropriate, especially since businesses and households were struggling to repair their balance sheets.

By 1993, however, the economy had turned the corner. GDP growth rapidly picked up, while the unemployment rate fell below 7 percent by fall 1993. Meanwhile, several leading indicators caught the FOMC’s notice, notably, the yield on 30-year Treasuries, which jumped by almost half a percentage point in the fourth quarter. To some members, this indicated that long-term inflation expectations were on the rise even though measured inflation was holding steady.

‘A Slightly Shabby Notion’

Although the FOMC was largely united on the need for a policy shift by the winter of 1993, many on the committee, including Greenspan, were concerned about the market impact of even a modest tightening. As a way to ease the surprise, Greenspan decided to make public comments just ahead of the FOMC’s first meeting of the year. “Short term rates are abnormally low,” he stated in congressional testimony in January 1994. “At some point, absent an unexpected and prolonged weakening of economic activity, we will need to move them.”

When the FOMC gathered for its first meeting of the year on Feb. 3-4, the discussion focused on the fourth-quarter strength of a number of indicators, including housing starts, consumer durables, business fixed investment, and a jump in the hours of an average workweek. Business inventories remained at low levels, which caused some members to worry that tight supply would not be able to keep up with growing consumer demand. More broadly, the accelerating pace of GDP growth in the fourth quarter — initially estimated at an annualized 5.9 percent, later revised to 7.0 percent — suggested to the committee that the economy was ready for a shift away from zero real interest rates.

“We have had an extraordinarily successful run in restoring balance to a disturbed economic system,” Greenspan told his FOMC colleagues at the February meeting as he concluded his case for a rate hike. “We haven’t raised interest rates in five years, which is in itself almost unimaginable ... The presumption that inflation is quiescent is getting to be a slightly shabby notion.”

Greenspan laid out two possibilities to the committee. One was to raise the federal funds rate by half a percentage point, or 50 basis points, from 3 percent to 3.5 percent. The economic fundamentals, in Greenspan’s view, merited such a shift, but this risked considerable market disruption, given that it would be the first rise in five years. The other risk was that 50 basis points might be seen as a one-off measure, when in fact the FOMC expected that it would have to conduct a series of hikes through the year that were commensurate with rising output and rising demand.

A better approach, argued Greenspan, would be to lift the fed funds rate by only 25 basis points but then make an announcement after the meeting — an unprecedented move at the time — to signal that this was a first step in a broader strategy to move ahead of inflationary pressures. Furthermore, he argued, the shock to markets would be less severe than with an immediate move of 50 basis points. As the discussion unfolded, this view prevailed among the committee members, including those who thought the initial hike should be higher, and they voted unanimously in favor.

Despite its great significance in retrospect, the FOMC members generally viewed the decision to state the policy change publicly as an ad hoc move that addressed the specific conditions of their announcement. Greenspan, who had in the past opposed the idea of public announcements on grounds that they limited the Fed’s flexibility, made clear to the committee he did not view this move as establishing a new practice.

“We don’t have to announce our policy moves; there’s nothing forcing us to do so,” argued Greenspan. “The issue is not whether if we do something, we will be forced to do it again. I think we can avoid that. ... I see no reason for such an announcement to be a precedent.”

As it turned out, the decision to issue an announcement was the first in many steps toward greater transparency during Greenspan’s tenure. It was not only the first time the FOMC offered to the public a summary and brief explanation after meetings that formalized a policy change; it was also the first year that most policy changes were made at the meetings. Previously, it was common for the FOMC to make the policy decisions during conference calls between sessions. Another major step occurred in 1999, when the FOMC decided to issue statements, in addition to more precise language on its near- and mid-term policy intentions (or “tilt”) after every meeting, not just after those when a policy change occurred. And three years later, it started making the vote count and dissents public.

The ‘Bond Bloodbath’

Despite Greenspan’s public signals and the calming intention behind the first-ever statement, markets met the news of the rate hike with surprise, with the Dow Jones Industrial Average dropping almost 2.5 percent. A more unusual reaction, however, occurred in the bond markets. The yield on 30-year Treasuries — which had been one measure, in part, of longer-term inflation expectations and generally was not prone to sudden movements — jumped by 40 basis points, compared with only 25 for short-term Treasuries. This move was the start of a long, massive sell-off in the U.S. bond market, which wound up losing \$600 billion in value from January to September of that year. (Because bond values and yields have an inverse relationship, the increase in yields corresponds to a decline in bond prices.)

To some on the committee, including Broadus, that jump meant the FOMC’s move had not been sufficient in anchoring expectations firmly on the Fed’s anti-inflation commitment and, in fact, showed that the markets still believed that long-term inflation was a threat. In retrospect, what also may have been going on was an early harbinger of the dynamics at play in 2008, although on a much smaller scale. Highly leveraged institutions such as hedge funds had been borrowing short-term to buy longer-term, higher-yielding debt. As long as bond spreads were stable, these firms could offer their investors double-digit returns because they could keep on financing their debt. But once the Fed moved in February 1994, even a modest rise in short-term financing costs could upend this strategy. As a result, these bondholders were forced to sell the securities they held, including higher-yielding long bonds, to cover the borrowing costs of their short-term debt. A long-bond sell-off, in turn, drove those yields higher and steepened the yield curve. Banks and insurance companies were also badly affected. That year is still known among investors as “the bond bloodbath.”

The FOMC discussed this turbulence as it weighed its options at its March meeting. Generally, the indicators that it noted in late 1993 — housing, business fixed investment — were still strong. Inflation itself remained moderate, as were wage gains. The consensus was that the FOMC should announce a further tightening, with the only question being how much.

Assessing the recent market turmoil, Greenspan said he saw an analogy to the 1987 crash, which he said “stripped out a high degree of overheating.” Before the Feb. 4 decision, he said, “I don’t think we were aware of the apparent underlying speculative elements involved in the markets on a worldwide basis that ... our February move unearthed.” But the pattern was otherwise similar. “While this capital gains bubble in all financial assets had to come down, instead of the decline being concentrated in the stock area, it shifted over into the bond area,” he argued.

Given this market volatility, Greenspan concluded that the FOMC should only take another modest 25 basis point step. The committee agreed, although this time two members — Broadus and Cleveland Fed President Jerry Jordan —

dissented on grounds that a 50 basis point increase was needed to adequately pre-empt emerging inflation pressures.

Looking back today, Broaddus said he still believes his dissent was the right decision, in large part due to his concern over the movement in long bond yields. But he also notes that one tool economists today use to gauge inflation expectations — the difference between yields on a particular inflation-protected Treasury (known as TIPS) and non-indexed Treasuries — was not available yet; TIPS were not issued until 1996.

“Instead of TIPS, we had to look at long bond rates. But this was enough to put us on alert,” he says. “That spring and summer, I still thought we needed to be more aggressive.”

The Glide Path

By July 1994, the FOMC had taken the fed funds rate to 4.25 percent and decided to take a pause at its meeting that month on the grounds that the effects of its action in the spring were starting to be felt. More broadly, global currency markets had become volatile, and the committee did not want to add to those pressures. The committee also decided to hold off on issuing a public announcement this time — since there was no policy change to announce — and to revisit later the broader question of issuing statements. (It decided in January 1995 to issue public statements when it had voted for a policy change and to reserve the right to issue statements even when there was no policy change.)

Regardless of the intent of greater transparency, the move did not mitigate broader criticism from lawmakers over the change in policy. During Greenspan’s semiannual Humphrey-Hawkins testimony before Congress in July, Sen. Paul Sarbanes (D-Md.) charged that the Fed had “engineered a slowdown in the economy despite the absence of an inflation problem. The domestic economy is generating less inflation than it has in three decades.”

Another target was the Fed’s 12 regional Reserve Bank

presidents, who were brought in to testify over the course of that year and were seen by some lawmakers as excessively hawkish. Rep. Henry Gonzales (D-Texas) introduced a bill that would, among other things, remove the presidents as voting members of the FOMC. The legislation failed to gain traction, but some of its other proposals, including a broader audit of the Fed, remain in circulation today.

The FOMC went on to lift rates again in August and November as the economy looked increasingly robust. Altogether, the fed funds rate had risen to 5.5 percent by year-end, with the committee voting for one final increase in January to bring the rate to 6 percent. Unemployment was steadily dropping, while consumer spending and business fixed investment stayed at brisk levels. Despite higher mortgage interest rates (a result of rising long-term bond yields), the housing market was picking up. Reflecting the committee’s ongoing concern that fall, the November hike, in fact, was the biggest of the year — a full 75 basis points.

Former Fed Vice Chairman Alan Blinder, who served on the FOMC from 1994 to 1996, describes the episode as remarkable for several reasons. One was the degree of unity in the final votes, even though the actual debates preceding them had “a lot less cohesion,” in his words.

“Greenspan was very good in using the wording of the statement to tack one way or the other, making sure as many members were on board as possible,” says Blinder. “He would use the ‘bias’ very skillfully. But there was a lot more disagreement in those debates than the final votes would suggest.”

During his time on the FOMC, Blinder notes, he had his differences with Greenspan over transparency issues. But he still considers the 1994 cycle “a complete success in capping inflation.

“We held inflation at 3 percent while engineering a soft landing with the economy at full employment,” he says. “That is as perfect as you could get.” **EF**

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Real Interest Rate

BY HELEN FESSENDEN

When baseball great Yogi Berra noted that “a nickel ain’t worth a dime anymore,” he was restating a central fact of economics: Inflation erodes the purchasing power of money. By extension, we need to adjust interest rates for inflation to understand their value over time. The nominal interest rate is the stated rate you pay on a loan, or that a bank pays on a deposit. The real interest rate is the nominal rate adjusted for the change in purchasing power over time, or inflation. The real interest rate is what truly affects borrowing, lending, and investment.

One of the first economists to closely examine the interaction between interest rates and inflation was Irving Fisher (1867-1947). He concluded that inflation and nominal rates are closely associated: When the money supply goes up, both inflation and the nominal interest rate rise in the long run, a relationship known as the Fisher effect.

Even though inflation and nominal rates are closely tied, real and nominal interest rates can diverge, namely, when prices change quickly and dramatically. For example, when U.S. inflation (as measured by the consumer price index) began picking up in 1973, nominal interest rates went up while real rates fell, as inflation rose more quickly than nominal rates. Real interest rates fell below zero and generally stayed there until 1980, when nominal rates (as measured by the three-month Treasury bill) reached 15 percent. Then inflation finally began to fall. By autumn 1983, the real interest rate had risen to more than 4 percent (compared with a 9 percent nominal interest rate), as inflation fell more rapidly than nominal interest rates.

Conversely, deflation will push real interest rates above nominal interest rates. Japan has held nominal interest rates near zero since the mid-1990s, while its economy has gone through spells of deflation. In 2013, for example, when the average bank deposit interest rate was 0.5 percent, Japan’s real interest rate reached 1.9 percent, according to the World Bank. In such cases, economists become concerned that relatively high real interest rates will dampen growth in an environment that is already trending toward deflation.

The real interest rate reflects the true return on savings as well as the true cost of investment and therefore is the key rate that influences the economy. For example, an investor assessing a capital investment decision makes that calculation by adjusting the rate of return for expected inflation. However, as many economists, including former Fed Chairman Ben Bernanke, point out, monetary policy does not determine the real interest rate in the long run. Rather, a

range of factors, including an economy’s potential for growth and the productivity of its workforce, establish the real rate over the medium to long term. Under a concept introduced in 1898 by the Swedish economist Knut Wicksell, this long-run rate is where the real interest rate settles when labor and capital are fully utilized, a condition known as the equilibrium or “natural” interest rate. In a robust economy, the equilibrium rate is high because the return on investment is high, while the opposite holds in a sluggish economy. For central bankers, Bernanke argued recently on his blog, the goal is to influence market rates so that they match up with the equilibrium rate.

Today, economists are engaged in a debate over how to measure the equilibrium rate, including which variables to use and how to disentangle long-run factors from short-term ones. Richmond Fed economists Thomas Lubik and Christian Matthes recently analyzed three variables — real gross domestic product growth, the core personal consumption expenditures inflation rate (adjusted for energy- and food-price fluctuation), and the real interest rate — and found that the natural rate has fallen from about 3.5 percent in the early 1980s to 0.5 in the second quarter of 2015, while never dropping below zero. In their calculation, the natural rate has stayed above the real rate since 2009, which can support the idea that monetary policy may have been too loose.

While the best measure of the real natural rate is under debate, a longer-term trend is clear: Both real and nominal rates have been falling across the globe. Some drivers are transitory factors tied to the financial crisis response, such as quantitative easing policies (which lowered long-term bond yields) and private-sector deleveraging (which dampened consumption). But this drop started well before 2008 (in some countries, it began as early as the 1980s) and has also affected long-term rates. For these reasons, argue some economists, the trend is a sign of factors that are bound to persist for a while. Possible explanations include expectations of sluggish long-term growth, especially in China, and slowing global productivity. Demographics are also in play, as aging populations save more and spend less. Meanwhile, Bernanke has pointed to a “savings glut” in emerging markets, especially in Asia, while former Treasury Secretary Lawrence Summers has argued that a trend known as “secular stagnation” is at work, in which aggregate global demand has become suppressed. In short, the persistence of low rates can be a good thing — cheaper borrowing for public and private investment, for example — but it could also be a symptom of underlying economic fragility. **EF**



Where Are the Grocery Stores?

BY EAMON O'KEEFE

According to the Centers for Disease Control and Prevention, more than one-third of all Americans are obese, costing the nation an estimated \$147 billion per year. Some research has linked obesity to poverty, perhaps because access to healthful foods is limited in many low-income communities. Often called food deserts, these areas contain few or no grocery stores, leaving residents with only fast-food restaurants and convenience stores.

To combat poor nutrition among low-income households, policymakers have implemented laws aimed at improving access to healthful food in these food deserts. The Agricultural Act of 2014 included \$125 million per year to be spent on increasing access in underserved communities, and states have taken similar actions. But is improving access an effective approach to improving nutrition among low-income households?

In a new National Bureau of Economic Research working paper, Jessie Handbury of the Wharton School at the University of Pennsylvania, Ilya Rahkovsky of the Economic Research Service of the U.S. Department of Agriculture, and Molly Schnell of Princeton University take a closer look at whether food deserts are indeed driving poor nutrition in low-income communities. They find that access is responsible for very little of the socioeconomic disparities in the nutritional value of household purchases. As a result, improving access will not necessarily increase the healthfulness of the purchases made by the lower-income and less-educated residents of these neighborhoods.

The researchers begin by combining data from market research firms Nielsen, Gladson, and IRI to create a data set of grocery store purchases of more than 100,000 households in 52 U.S. markets between 2006 and 2011. By comparing purchase data to Food and Drug Administration (FDA) nutrition guidelines, the researchers find that households with lower incomes and less education made less healthful purchasing decisions than their higher-income and better-educated counterparts. The top third of households based on income and education were 40 percent closer to FDA nutrition guidelines than households in the bottom third of the income and education distributions.

Not surprisingly, Handbury and her co-authors find that access to high-quality nutritious food is much greater in high-income neighborhoods. Using data from 30,000 U.S. food retailers, they identify a small but statistically

significant relationship between the income and education levels of a community and access to more nutritious foods, in terms of both the number of stores in a given area and the products offered at those stores.

But is limited access driving unhealthy food purchasing decisions in food deserts or are retailers responding to a lack of local demand? As the authors suggest, if there is little demand for healthful food in poorer neighborhoods, supermarkets are unlikely to stock it. The researchers attempt to answer this question of causation by controlling for the location of food purchases. To do so, they compare purchases by consumers within both the same census tract and

the same store. They find that the majority of the socioeconomic disparities in food purchases remain after controlling for location.

The link between education and food purchases is much stronger than the link between income and food purchases. Controlling for location

reduces the association between income and the nutritional quality of food purchases by about half but reduces the association between education and food quality by only 10 percent.

The researchers also find that when new stores offering more healthful food options enter food deserts, people don't change their buying habits very much. Their research shows residents of food deserts are aware of new stores entering and even adjust where they shop, but they don't change what they buy. As a result, the gap in nutritional consumption between low-income and high-income consumers closes by only about 1 percent to 3 percent.

Although the authors don't provide a definitive explanation of why access to healthful food seems to play such a limited role, they do offer some ideas. They suggest these differences might be attributed to tastes and preferences, differences in price sensitivities, and budget constraints. In future research, the authors aim to determine which of these factors are most important.

The findings in this paper, if representative, may have important implications for policy. If a public policy goal is to improve the nutritional value of low-income households' food purchases, this research indicates that a focus on improving access may not yield meaningful results. As the authors conclude, "Our results provide strong evidence that policies which aim to reduce nutritional disparities by improving access to healthful foods will leave much of the disparity unresolved." **EF**

"What Drives Nutritional Disparities? Retail Access and Food Purchases Across the Socioeconomic Spectrum." Jessie Handbury, Ilya Rahkovsky, and Molly Schnell. National Bureau of Economic Research Working Paper No. 21126, April 2015

Net Neutrality 2.0

BY TIM SABLİK

On Feb. 26, 2015, the Federal Communications Commission (FCC) announced a new version of what it calls its Open Internet rules. The rules, which went into effect on June 12, reclassify broadband Internet as a “telecommunications service” and make fixed and wireless Internet Service Providers (ISPs) subject to Title II of the Communications Act. Under these rules, ISPs are prohibited from blocking or slowing any legal Internet content or delivering some content faster in exchange for payment from the content provider (known as “paid prioritization”).

Collectively, these principles are often referred to as “network neutrality” or “net neutrality,” an idea that has been a point of contention in the United States for roughly a decade. The FCC issued its first rules aimed at enforcing net neutrality in 2010, but they were struck down by the U.S. Court of Appeals for the D.C. Circuit in a 2014 decision. The court held that the FCC did not have the authority to ban paid prioritization under its existing classification of ISPs. Reclassifying ISPs as “common carriers” under Title II is intended to give the FCC that authority.

Proponents of this regulation say that, in the absence of such rules, ISPs with market power could act as gatekeepers of Internet content. Currently, content providers pay only their own ISPs to transmit content. Without a net neutrality rule, content providers might also have to pay a fee to consumers’ ISPs to avoid having their content transmitted more slowly. Alternatively, ISPs could block content providers who refuse to pay.

“Practically speaking, the ISPs would be able to determine the leading company in various sectors, such as search, video, and so on,” says Nicholas Economides, a New York University economist who studies net neutrality.

The fixed broadband market is highly concentrated. While nearly all urban residents have at least two providers to choose from, fewer than 60 percent of rural residents do, according to the National Broadband Map maintained by the National Telecommunications and Information Administration in collaboration with the FCC. And only 60 percent of urban and 20 percent of rural areas have at least three providers.

Economides says that ISPs have a strong incentive to delay all but the highest paying content producer, creating monopolies in all of the various content sectors. “Monopolists make the highest profits. So as an ISP, if I create a content monopolist, I will be able to reap a large percentage of his profits through paid prioritization,” he says.

But not everyone agrees that ISPs could get away with such behavior. If wireless providers are included, the market looks much more competitive: Nearly all urban and about 70 percent of rural residents have access to at least

five ISPs. “How you view the market and its structure is really key to what you think about the FCC and what it has done,” says Robert Litan, formerly a nonresident senior fellow at the Brookings Institution.

Economides notes that wireless is not currently a perfect substitute for fixed broadband given its much higher cost for comparable service. But he agrees that greater competition would likely prevent many of the concerns raised by net neutrality proponents. “If we had more competition in fixed broadband, it would be a different story,” he says.

Critics of the new rules argue that, in spite of this, there have been relatively few cases of anticompetitive behavior by ISPs over the last decade. Moreover, Litan and others say that any anticompetitive actions could be handled on a case-by-case basis through existing rules and regulators. The FCC has used its Enforcement Bureau to investigate ISPs and address claims of anticompetitive behavior in the past. And former Federal Trade Commission Commissioner Joshua Wright testified before the House Judiciary Committee in May 2015 that the new rules are unnecessary because existing antitrust laws are already “well-suited to handle any such problems as they arise.”

The new rules could also lead to unintended costs. Under Title II, the FCC has the authority to regulate ISP prices or mandate the unbundling of services. Although the FCC explicitly stated that it would not use these powers on broadband ISPs, Litan and others argue that it has nevertheless had a chilling effect on network investments. Capital expenditures by several major broadband ISPs declined in the first half of 2015, after the rules were announced. That has only happened in two other periods: the dot-com crash and the Great Recession. Some have suggested this is just a response to recent changes in consumer behavior such as cable “cord cutting,” but there is evidence that a similar decline in investment occurred when Title II was applied to telephone companies in the mid-1990s.

The net effect of paid prioritization on innovation by content producers is also unclear, according to a 2014 paper by Litan and Hal Singer of the Progressive Policy Institute. While some startups might be discouraged from competing with prioritized incumbents, the availability of “fast lanes” could also encourage the development of some high-value, speed-dependent applications like telemedicine. “I view paid prioritization as price discrimination based on different levels of service, which is a core feature in all kinds of markets that are competitive,” says Litan, pointing to different tiers of package shipping as an example.

The ultimate impact of the FCC’s new rules remains to be seen. Like the original 2010 rules, they are facing legal challenge in federal court. **EF**



The Public Perils of Private Debt

Debt makes the wheels of commerce turn. But under certain circumstances, it can also heighten financial crises and recessions

BY TIM SABLİK

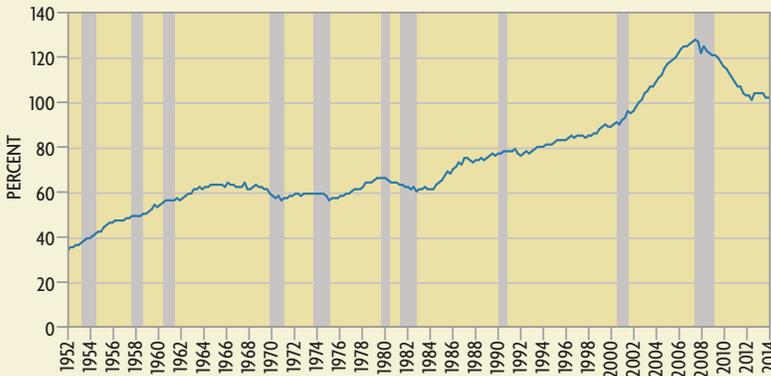
The story of the Great Recession is, in many ways, a story about debt — private debt that borrowers did not repay.

In the United States, household debt grew rapidly in the 1990s and 2000s. In the early 1990s, average household debt burden was about 80 percent of disposable personal income. By 2000, it had reached 90 percent, and in 2007 it peaked at 129 percent. Most of this increase came in the form of housing debt, which grew from about \$6 trillion in 2004 to nearly \$10 trillion in 2008, according to data from the New York Fed. As a percentage of gross domestic product (GDP), non-financial corporate debt also grew in the years leading up to the recession of 2007-2009 (see charts on next page).

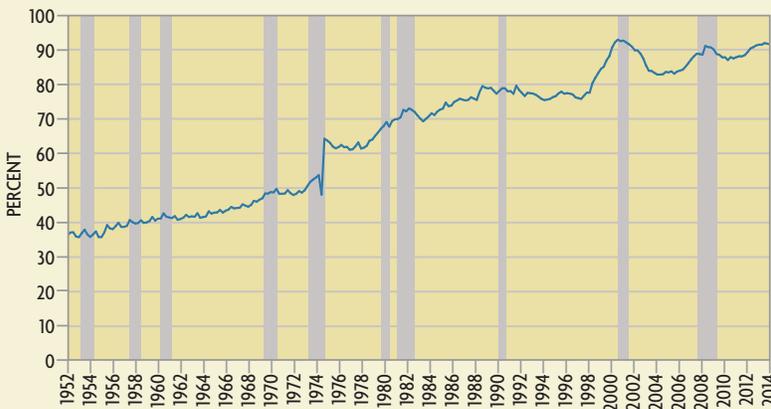
These developments were not unique to the United States. A 2014 study by Òscar Jordà of the San Francisco Fed, Moritz Schularick of the University of Bonn, and Alan Taylor of the University of California, Davis examined the growth in public and private debt in 17 advanced economies between 1870 and 2011. For the first half of the 20th century, public debt surpassed bank lending (an indicator of private debt) as a percentage of GDP. But starting in the 1960s, private debt began outpacing public debt rapidly. By the 2000s, private debt was well over 100 percent of GDP, while public debt remained close to 70 percent.

“There seems to be a striking difference between what was going on before World War II and what has been going on since then,” says Jordà.

Household Debt Relative to Disposable Personal Income



Nonfinancial Corporate Debt Relative to Gross Domestic Product



SOURCE: Federal Reserve Board of Governors and Haver Analytics

The authors found that economic expansions characterized by rapid growth in private debt were often followed by deeper recessions with slower recoveries. Comparing the dot-com crash of 2000 to the recession of 2007-2009 illustrates this. In the former case, losses were concentrated in corporate equities, while in the latter they were concentrated in real estate. Both fell by similar magnitudes: about \$5 trillion for stocks from 1999 to 2002, and \$5.5 trillion for real estate from 2006 to 2009. Yet the dot-com crash resulted in only a mild recession, while the recession of 2007-2009 was the most severe since the Great Depression.

How can the debt held by individuals and firms affect the overall economy so dramatically? And if debt is truly so damaging, why is it so widely used?

Credit Boom

Individuals generally prefer to smooth their consumption over time, and debt helps make that possible. In general, younger households borrow more than older households because they anticipate that their peak earning years are in the future. Rather than scrape by today and live large tomorrow, borrowing helps them enjoy a comfortable lifestyle

in both periods. Similarly, firms might borrow to finance investments that they expect will pay off in the future. Debt also plays an important role in the financial system. If both parties have faith in the collateral underlying debt contracts, that debt can act as a private form of money to facilitate transactions even if the parties don't have information about the collateral's fundamental value, according to work by Gary Gorton of the Yale School of Management.

Collateral, which helps ensure debt repayment, in turn influences borrowers' access to credit. For example, a private firm might issue debt backed by the value of its machinery or factories. If the value of those assets goes up, the firm can borrow more against them. Moreover, those assets can serve a dual role, according to a seminal 1997 *Journal of Political Economy* article by Nobuhiro Kiyotaki of Princeton University and John Moore of the University of Edinburgh. Kiyotaki and Moore analyzed a model in which certain assets served as both collateral and factors of production for firms. In their model, productive firms borrow to increase their investments in those assets, and the increased demand increases asset prices. That allows those assets to then be used as collateral for more borrowing to fund more investment, which in turn pushes asset prices up further. Kiyotaki

and Moore show how this feedback loop can multiply the effects of an initial price increase for the assets, leading to a credit "boom."

A similar dynamic can be seen in household debt during the housing boom of the early 2000s. Households were able to borrow more against the value of their appreciating homes. According to the 2014 book *House of Debt* by Atif Mian of Princeton University and Amir Sufi of the University of Chicago Booth School of Business, "Over half of the increase in debt for home owners from 2002 to 2006 can be directly attributed to borrowing against the rise in home equity." Some of those funds were then reinvested in home improvements. But when the value of the assets underlying all this debt falls suddenly or is called into question, as happened with housing, the boom turns to bust.

Collateral Damage

In the financial system, uncertainty over the true value of collateral breaks down the mutual trust that allowed securitized debt to function as currency. Bengt Holmstrom of the Massachusetts Institute of Technology (MIT) noted in a 2015 paper that because debt may be opaque in ordinary

times, there is no infrastructure to verify its true value in a crisis, and financial markets panic.

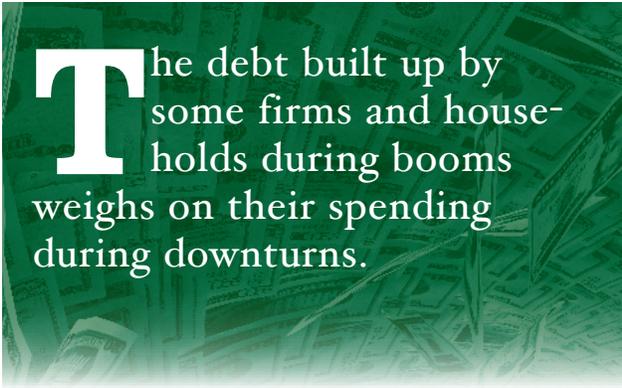
The collapse in assets serving as collateral also hurts the firms and households that invested most heavily in those assets. Additionally, their ability to borrow further against those declining assets is constrained, cutting off one means of servicing their debt. Debt contracts are designed to be fairly rigid to enforce repayment. Most require regular minimum payments for the borrower to avoid default. And many financial debt contracts require borrowers to put up additional collateral or cash if the existing collateral loses value, increasing the costs of falling collateral for borrowers.

The debt built up by some firms and households during the boom weighs on their spending during downturns. In a 2009 paper, Mian and Sufi found that households with the highest debt growth going into the Great Recession cut their consumption sooner and more deeply than households with less debt. Similarly, highly leveraged firms were the first to make cuts. Xavier Giroud of MIT's Sloan School of Management and Holger Mueller of New York University's Stern School of Business found in a 2015 working paper that highly leveraged firms were more likely to lay off employees in response to falling consumer spending; in contrast, low-leverage firms were able to borrow to cover shortfalls and avoid cutbacks. Moreover, highly leveraged firms may forgo investing in profitable projects because they know that most of the proceeds would go to pay their creditors. Economists call this effect "debt overhang," and it can also slow recovery from a recession.

Some believe that when borrowers cannot cut spending enough to meet their obligations and are forced to default or sell assets into a distressed market, prices could fall through "fire sales," as other borrowers and creditors are unloading similar assets on the market at the same time. Andrei Shleifer of Harvard University and Robert Vishny of the University of Chicago's Booth School of Business wrote in a 2011 *Journal of Economic Perspectives* article that fire sales occur in part because the buyers that would place the highest value on the assets being sold are in the same boat as the sellers. They too are highly leveraged from investing during the credit boom and are also liquidating assets. The only available buyers, Shleifer and Vishny wrote, are "nonspecialists" who place a much lower price on the assets.

Such distress sales lower the prices other sellers can receive for similar assets. "It creates a chain reaction where the price of the asset you're trying to sell just keeps spiraling down," explains Jordà. "Pretty quickly, everyone is caught in the same net."

Yale University economist Irving Fisher first described such a downward spiral in 1933. He argued that "debt-deflation" cycles could explain how a financial shock turns into a recession or depression. In his view, the first wave of fire sales is driven by the most cash-strapped households and firms. Their actions depress the prices on similar assets, which increases the burden on the households and firms with the next highest level of debt, starting the cycle anew.



The debt built up by some firms and households during booms weighs on their spending during downturns.

Economists disagree about the effects of fire sales on the markets for those assets. To study the effect of fire sales on the housing market during the Great Recession, Mian and Sufi along with Francesco Trebbi of the University of British Columbia compared states with different foreclosure laws. Some require mortgage lenders to go through the courts to evict defaulted borrowers, while other states do not. In the latter case, foreclosures can happen more quickly, and Mian, Sufi, and Trebbi found that house prices fell more deeply in those states during the recession of 2007-2009. On the other hand, a 2012 working paper by Kristopher Gerardi of the Atlanta Fed, Eric Rosenblatt and Vincent Yao of Fannie Mae, and Paul Willen of the Boston Fed found that the negative effect of foreclosed houses on nearby home properties was fairly small, ranging from between a half a percent to slightly more than 1 percent drop in sale prices.

Regardless of magnitude, it seems that higher levels of household debt wreaked at least some harm on economic growth. Such an effect "is the opposite of the traditional view," says Mian. "In the traditional model, if you see higher household debt today, it must be that people are smoothing consumption by borrowing against even higher future income. So higher household debt growth predicts higher income going forward. But that's not what we find in the data at all. That tells us that there is something missing from those traditional models."

Debt Externalities?

What's missing from some standard models, says Mian, is the possibility that borrowing could be too high from a social perspective. Recently, some economists have proposed models where agents overborrow during credit booms because they ignore or underestimate the costs that their deleveraging will have on the rest of the economy during a downturn. A 2012 *Quarterly Journal of Economics* paper by Gauti Eggertsson of Brown University and Nobel laureate Paul Krugman of the City University of New York proposes one such model of these "aggregate demand externalities." When borrowers cut consumption to reduce their debt, interest rates fall as the demand for debt goes down. Eventually, low interest rates lead households and firms that did not borrow previously to begin borrowing, which helps counteract the drop in demand. Eggertsson and Krugman

argue that, in the recent crisis, private debt had grown so substantially that the subsequent deleveraging pushed interest rates to zero, and this created new challenges for monetary policymakers.

“A key insight of these models is that when people are deciding how much to borrow at the individual level, they are less likely to take into account the implications of their decisions for the macroeconomy,” says Mian. “So in a decentralized world where financial markets allow people to borrow as much as they like, you can often end up in situations where they overborrow from a macro perspective.”

Mian and his colleagues also view fire sales as a potential source of debt’s social costs. If debt is priced in a manner that ignores the possibility of fire sales, they argue, borrowers and creditors could use debt in a way that contributes to a deflationary spiral in asset prices during a downturn. On the other hand, there is some evidence that borrowers and lenders do consider the costs that future fire sales could have on them when writing debt contracts, at least to some degree. A 2010 paper by Hernán Oritz-Molina of the University of British Columbia and Gordon Phillips of the University of South Carolina’s Marshall School of Business found that firms in industries with more buyers for their assets (making fire sales less likely) had lower borrowing costs.

Additionally, the extent to which borrowers and lenders disregard fire-sale risks could be driven more by policy actions taken to minimize the damage of fire sales after the fact rather than by inherent characteristics of debt. Like the moral hazard associated with insurance, protecting borrowers and lenders from fire sales gives them less incentive to worry about those risks upfront.

Economists generally agree that institutional factors already play a role in promoting the overuse of debt. In the United States, many forms of debt enjoy tax subsidies that encourage their use. Homeowners who itemize can deduct the interest on their mortgages from their taxable income; firms can deduct the interest on their debt as a business expense, but not dividend payments to shareholders. (See “President’s Message,” p. 1.)

To be sure, equity holders also receive some tax benefits, which may be partly passed through to firms in the form of cheaper equity financing. For example, the tax collector doesn’t recognize increases in the value of stock holdings as income until the shares are actually sold.

Also, long-term capital gains are taxed at preferential rates. Still, the consensus is that the differing tax treatment of debt and equity has put debt financing at an artificial advantage.

“At a minimum,” says Mian, “we should remove the biases favoring debt currently in place. But there is also good reason to actually flip that bias in the opposite direction.”

The Goldilocks Level

During a downturn, equity financing has some advantages over debt. It spreads the risks of asset price changes more evenly between both parties, which could help to soften the blow of economic shocks. From the parties’ point of view, however, this distribution of risk is not always desirable.

For instance, firms funded entirely by equity would have an incentive to conceal the truth about their prospects in order to pay less to their shareholders. Managers of those firms may be less likely to take on profitable risks if most of the rewards would accrue to shareholders. It would be prohibitively costly for investors to constantly monitor those firms to ensure they are behaving honestly at all times. As MIT economist Robert Townsend demonstrated in a seminal 1979 *Journal of Economic Theory* article, debt aligns the incentives of creditors and borrowers and its fixed payment structure removes the need for constant monitoring. (For a more detailed discussion, see “Building a Better Market,” *Region Focus*, Winter 2008.)

That makes determining the right balance between debt and equity from society’s perspective “a very difficult question to address,” says Taylor. “At the moment, there’s no theory to say what the ‘optimal’ level of debt is.” A 2011 paper by Stephen Cecchetti of Brandeis University’s International Business School and Madhusudan Mohanty and Fabrizio Zampolli of the Bank for International Settlements attempted to shed some empirical light on that question by studying debt levels in 18 developed countries between 1980 and 2010. The authors estimated that household debt starts to become a drag on economic growth once it reaches 85 percent of GDP, but they noted the effect was very imprecisely measured.

Even if it were possible to calculate the optimal level of debt, Taylor says that that figure would likely vary dramatically “across countries and possibly across time.”

A New Kind of Contract

Since debt is here to stay, should policymakers attempt to contain its negative amplifying effects during a crisis? One option proposed in the immediate aftermath of the recession of 2007-2009 was to encourage lenders to renegotiate mortgages with borrowers. Modifying the terms of the mortgage



in line with the borrower's ability to pay would reduce the need for them to cut consumption, which, in turn, would reduce the number of defaults. Since foreclosures and forced sales can depress the value of similar assets, it may even be in a lender's best interests to renegotiate rather than attempt to sell the collateral into a depressed market.

But lenders, like borrowers, will fail to internalize the macroeconomic costs of their decisions. It may be preferable from a lender's perspective not to renegotiate a loan, since doing so opens the door to renegotiations with other borrowers. Seizing and selling collateral from borrowers who default can also be the optimal choice for an individual lender, even if such decisions impose costs on the rest of the economy.

If the drop in home prices is exacerbated solely because of the inability to swiftly renegotiate loan terms, policies spurring such dealmaking could offer social benefits. Indeed, the Making Home Affordable Program of 2009 was adopted with such a goal in mind. But despite the policy, few renegotiations took place. Many attributed this to the securitization of loans, which split individual mortgages into securities held by many different parties; most borrowers could not just negotiate with their local bank to modify their mortgages. Even in the absence of such obstacles, policymakers must also weigh the possibility that changing the terms of debt contracts after the fact could have unintended consequences on the pricing and availability of loans in the future.

Given these challenges, some have suggested that a better approach might be to restructure debt contracts so that they adopt the risk-sharing characteristics of equity during downturns, potentially preventing spillovers from occurring in the first place. Unlike firms, individuals cannot readily issue equity to finance long-term purchases or investments. Hybrid contracts such as these could grant them access to the beneficial risk-sharing aspects of equity during a crisis,

while retaining the positive contractual form of debt in normal times. In their book, Mian and Sufi proposed such a change for mortgages. The "shared-responsibility mortgage," as they call it, would tie mortgage repayments to local house price indices. When prices are steady or increasing, the mortgages act as traditional debt. But when housing prices in an area fall, homeowners' monthly payments would automatically shrink by the same proportion. Tying this adjustment to a local index preserves the incentives homeowners have to maintain their property, since they cannot influence their payments by reducing their home's value alone.

"Our proposal looks like standard debt in most scenarios because debt is often the optimal contract," says Mian. "The economics literature shows that you want to impose risks on the borrower to the extent those risks are under his or her control. What we are trying to do in our proposal is address the negative aspects of debt that are macro in nature."

To give lenders an incentive to provide this downside insurance to borrowers, Mian and Sufi propose allowing lenders to reap some of the reward of rising house prices by earning a portion of the proceeds when households sell or refinance their homes. So far, few lenders have experimented with such contracts. Mian suggests that because the government has historically driven housing policy, shared-responsibility mortgages might require support from policymakers before they become more widespread. At the same time, he acknowledges there may be many other solutions worth considering.

Ultimately, improving private debt requires a greater understanding of debt's role in the economy. And on that front, Jordà says economists still have much to learn. "I don't think we have fully appreciated the role that credit plays in the economy," he says. "As a consequence, events like the recession of 2007-2009 may be more repeatable than we think." **EF**

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Building a Smarter Grid

Can “smart grid” technology change the way we use electricity?

BY EAMON O’KEEFE

On the hottest days of summer, when many Americans turn down their thermostats and crank up their air conditioners, electric utilities have to boost production to meet high demand. The power plants they bring online often are more expensive to operate, yet electricity prices rarely change. Economists envision an electricity marketplace in which prices reflect the true cost of producing electricity so that consumers and producers are constantly adapting to real-world conditions. When demand increases, prices would rise and demand would decrease accordingly. New “smart grid” technologies could make that vision a reality.

“The ‘smart grid’ encompasses a lot of different things,” says Paul Joskow, president of the Alfred P. Sloan Foundation and professor emeritus of economics at the Massachusetts Institute of Technology. But in general, it covers a variety of technologies that include computerized metering, control, and sensors. When implemented in homes, power lines, electrical substations, and transformers, these technologies could facilitate better monitoring and management of electricity consumption and distribution throughout the grid. The goal is to build a grid that allows for two-way communication between electricity consumers and producers. In addition to time-varying rates that could lead to more efficient energy use, potential benefits of a smart grid include improving the grid’s resilience and better accommodating renewable energy sources.

Utilities have begun rolling out components of the smart grid, and pilot programs for dynamic pricing have begun to pop up around the country. A host of companies are building new technologies for grid modernization; in the Fifth District, North Carolina’s Research Triangle has become a hub for such innovation. Home to more than 50 smart grid companies and a number of supporting research institutions, Wake County, N.C., has dubbed itself the “smart grid capital of the world.”

“It’s a driver of the future,” says Michael Haley, director of business recruitment and expansion for Wake County Economic Development. “It has a disruptive, exciting, changing nature to it.”

But building the smart grid is expensive, and changing the way electricity is priced could have unintended consequences. Can smart grid technology live up to the expectations?

The History of the Grid

America’s electrical grid began with Thomas Edison and his Pearl Street Station in New York City. Built in 1882, this energy system relied on a 100-volt coal-burning generator to power a few hundred lamps. As demand for electricity grew and the technology for electrical generation increasingly favored large producers, competition between small power companies gave way to larger consolidated firms that began to exercise monopoly power in the market. Federal regulations in the 1930s reformed these electric power holding companies by subjecting them to regulation by the

Securities and Exchange Commission or to regulation by state utility commissions if they limited their operations to a single state. These moves ushered in the era of vertically integrated utilities operated as regulated monopolies. Regulated utility companies managed a large portion of the generation, distribution, and retail services in the electricity market for much of the remainder of the 20th century.

Amid growing enthusiasm for free markets in the late 1980s and into the 1990s, the United States began restructuring certain electricity markets to encourage market-based competition. In 1992, the Energy Policy Act allowed for greater competition in electricity generation by opening up access to the transmission system. This encouraged some states to change their regulatory structures to allow for competition in generation and retail services while maintaining strict regulation on transmission and distribution. Today, the electrical grids in these regions are managed by Regional Transmission Organizations (RTOs) or Independent System Operators (ISOs), which are independent from market participants.

The California electricity crisis of 2000-2001 slowed the move toward restructuring as the country observed spikes in electricity prices from market manipulation that followed partial deregulation in the state. RTOs and ISOs operate in California and much of the country east of the Rocky Mountains, with the exception of parts of the Southeast. The remaining states have maintained their vertically integrated monopolies, but even many of these areas now allow for more competition in generation by allowing independent power-generating companies to sell electricity under contract to distribution utilities.

Another major change in the electricity market has been the growth of renewable energy. These sources accounted for 13 percent of total U.S. production in 2014 compared with roughly 9 percent in 2004, and the U.S. Energy Information Administration (EIA) estimates that renewable energy will account for 18 percent of total electricity generation by 2040. Renewable energy is highly variable: Unlike a traditional power plant that can be turned on and off as demand changes, wind and solar power generation can fluctuate widely as environmental conditions change. Renewable energy also has contributed to the decentralization of power generation as distributed energy, the term for generating power at one's home, continues to gain popularity in the form of rooftop solar panels. These developments pose challenges to America's aging electricity grid infrastructure, which was not built to accommodate these changes in supply.

The Smart Grid and Pricing

To economists, prices are the fundamental guide to decision-making in the economy. When prices go up, economic theory says consumers will respond by demanding less. But the price

Types of Time-Varying Pricing Schemes for the Electricity Market

Time-of-Use Pricing (TOU)	Utilities set higher peak (and sometimes peak shoulder) prices months in advance, usually for certain predetermined summer afternoons.
Critical Peak Pricing (CPP)	Utilities call a certain number of peak demand periods, usually a day before or the day of an event, in which customers pay a higher rate for a certain number of hours.
Real-Time Pricing (RTP)	Utilities adjust prices to reflect cost changes in nearly real time, often hourly.
Variable Peak Pricing (VPP)	Utilities set predetermined peak periods, like time-of-use pricing, but charge variable rates as in real-time pricing.
Critical Peak Rebates (CPR)	Utilities pay customers a predetermined rebate for reducing demand during a peak demand period.

SOURCE: U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability

mechanism is distorted in much of the electricity market because prices fail to reflect the true marginal cost of producing electricity at any given time.

Most consumers are billed a flat rate, or in some instances, "increasing block pricing," in which prices rise on a tiered basis over the course of the billing cycle as a customer uses more energy. But during periods of high demand, such as hot summer afternoons when many households run energy-intensive appliances like air conditioners, base load capacity is inadequate to meet demand. When this happens, utility companies have to bring more costly power plants online. These "peaker" power plants usually run on natural gas, diesel, or jet fuel and, because of their high variable cost, are often more expensive to run than base-load power plants that operate all the time. During these peak demand periods, the marginal cost of electricity is much higher than at other times, but consumers still pay the same price. Because consumers don't pay the true cost of generating electricity, they aren't incentivized to use less energy during peak times.

Economists have been exploring ways to price electricity more efficiently for at least 50 years, but until recently, these attempts have been met with limited success. With the arrival of more sophisticated and cheaper smart grid technology, however, utilities can now know the demand profiles of each customer in nearly real time. Coupled with advances in computing power, this has allowed utilities to develop time-varying pricing schemes that reflect changes in supply and demand. "There are 8,766 hours in a year, and if you read the meter every 10 minutes, that's over 50,000 data points per household per year. That's a lot of data to analyze and match with the billing factors," Joskow says. "You couldn't do it for millions and millions of customers 20 years ago, but now you can."

The most basic time-varying pricing scheme, time-of-use pricing, involves setting time periods, months in advance, during which utilities will charge a higher peak price and a lower off-peak price (and sometimes a moderate peak shoulder price). A more dynamic pricing scheme, called critical peak pricing, allows utilities to designate a certain number of days per year as peak periods right before the event occurs



Even with highly dynamic pricing, how likely are consumers to turn off their air conditioners when prices go up?

and then charge a higher price for a few hours. Because utility companies can't know what days will truly be peak period situations until shortly before they occur, critical peak pricing ideally helps power companies charge higher peak prices just on those days that warrant them. In the most dynamic pricing model, real-time pricing, prices are adjusted hourly to reflect the true marginal cost of generation.

A fourth pricing program, called peak time rebates, involves paying consumers for reducing their demand during a peak usage period. For example, Baltimore Gas and Electric has an optional "Smart Energy Rewards" program that pays consumers \$1.25 for every kilowatt hour saved during a peak period compared with one's typical usage during those times. But Severin Borenstein, an economist at the Haas School of Business at the University of California, Berkeley and director emeritus of the University of California Energy Institute, notes that peak time rebates may distort incentives because of the baseline used to calculate the reduction in usage. If customers' baselines are calculated based on their usage during other peak periods, they could have an incentive to increase consumption in order to make their baseline higher than it normally would be.

How Do Consumers Respond?

Studies have found real-time pricing to be more effective than time-of-use pricing at changing people's behavior. "But realistically for most customers, it's a pretty foreign concept, and it's something that most of them are not very excited about doing because there is a lot of volatility," Borenstein says. "There are ways to hedge that volatility, but when you're to the point of saying 'hedging' to residential customers, you've lost 95 percent of them." Critical peak pricing, although less granular than real-time pricing, may be easier for customers to understand and could be an effective transition to more dynamic electricity pricing.

But even with highly dynamic pricing, how likely are consumers to turn off their air conditioners when prices go up? Estimates vary for the elasticity of demand for electricity, but Borenstein estimates it could be as little as -0.025 , meaning a 1 percent increase in price leads to only a 0.025 percent reduction in demand. But given that low value, he still demonstrated in a 2005 study that dynamic pricing could deliver at least 3 percent to 5 percent cost savings in electricity generation.

One reason for the low elasticity could be that consumers don't pay a lot of attention to their energy use. "Most people aren't going to spend their lives in their basements looking

at their meters," Joskow says. But for consumers who don't want to track their usage closely, demand response could give them the option to have the utility reduce their demand for them. Southern California Edison, for example, offers a program called the "Summer Discount Plan" that provides residential customers with up to \$200 in bill credits per year to give the company the ability to cycle off their home air-conditioning units.

Some customers have resisted smart metering technology due to concerns over privacy and the alleged health effects of radiation from wireless transmissions of digital smart meters. Opposition is also likely to come from consumers who use a large quantity of electricity during peak demand times and thus would see their electricity bills soar, or from those who simply don't like the idea of being forced onto a time-varying price scheme. It's also possible that confusion over dynamic pricing might lead to much higher bills for customers who fail to understand how time-varying pricing affects the amount they pay for electricity.

Borenstein and other economists have studied how consumers would respond if companies offered an option to remain on a flat-rate pricing model or transition to a time-varying one. He found that if the utility didn't use profits from one pool to subsidize the other, the flat rate pool would progressively become more expensive. This is because customers who don't strain the grid as much during peak hours would see the greatest benefit to switching to a dynamic pricing model, leaving only the highest peak-use customers in the flat-rate pool and causing the utility to raise the flat rate. In theory, this could encourage more people to reduce their energy use and switch to the dynamic pricing pool. "You get sort of a virtuous cycle," Borenstein says.

Dynamic pricing could have unintended consequences with regard to energy use. Economists note an interesting feature of dynamic pricing: During a majority of hours, customers would actually see a lower electricity price because peak periods don't occur all that often. Would consumers respond by increasing demand during off-peak hours? Borenstein thinks that although this might be the case, there would still be a small overall reduction in demand because turning off a light during a peak demand time wouldn't necessarily induce a customer to turn that same light on later when the price was lower. Still, it's possible that the overall effect of the smart grid could be to shift rather than reduce electricity demand.

Other Benefits

In addition to enabling more efficient pricing, the smart grid would bring other advantages. One of them would be better responses to power outages. Without smart grid technology, many power companies rely on customers to call in and report an outage. In contrast, two-way communication throughout the distribution system, including at substations, power lines, and transformers, would allow for "intelligent distribution": Switches would sense power outages immediately and reroute electricity to isolate affected

sections of the grid. This “self-healing” network would be able to almost instantly reroute power so that most consumers would hardly know an outage has occurred. Such an improvement in grid resilience might help ameliorate the growing strain on the electrical grid from natural disasters and heavy storms. Such technology could have helped utilities respond more quickly to outages in 2003, when Hurricane Isabel touched down off the coast of North Carolina with 100 mph winds and wreaked havoc on the electrical grid in the affected region. An estimated 3.5 million people in the Fifth District lost power, and some didn’t see their electricity restored for more than two weeks.

Smart grid technology could also help grid operators adapt to fluctuating supply from renewable energy sources. Dynamic pricing would encourage customers to reduce their demand when a dip in supply from renewable sources — when the sun isn’t shining or the wind isn’t blowing — strains the grid. In addition, adjustments to dips in supply could be enhanced by digital meters that communicate with household appliances to reduce demand during these times.

Making the Business Case

Utilities are asking themselves a number of questions about the smart grid. “How is this going to be better for our customers, how are we assured that it’s going to be a reliable new technology, and is there a business case around it that we can actually implement?” asks Jason Handley, director of smart grid technology and operations for Duke Energy.

The case can be difficult to make. Duke Energy in North Carolina is still a vertically integrated utility, and therefore any changes to its rate structure have to be approved by the state’s public service commission. If Duke Energy wants to roll out digital meters, it has to justify it based on projections of the company’s ability to recover the cost through rate increases. But because Duke Energy has already eliminated the costly process of sending people to read each individual meter by installing automatic meter reading technology, in which signals from meters can be picked up from a vehicle, new smart grid technologies deliver relatively fewer gains.

There are other major roadblocks to implementing the smart grid, such as a lack of grid interoperability or the ability of the components of the smart grid to seamlessly communicate with one another. Today, smart grid technologies are often proprietary, meaning that they weren’t built to communicate with technology from other companies. Handley says this lack of shared communication standards is one of the main challenges of rolling out the smart grid for many utilities.

There’s also the fact that building a smart grid is very expensive. A 2011 report by the Electric Power Research Institute (EPRI) found that the 20-year net investment for rolling out the smart grid would be between \$338 billion and \$476 billion. But in the same report, researchers also estimated that the technology would deliver \$1.2 trillion to \$2 trillion in benefits from lower costs and enhanced reliability, among other aspects.

Some economists remain skeptical of such projections. Joskow thinks the estimates from the EPRI overvalue the reliability benefits from smart grid implementation. And “the payoff for residential is probably not that great in the short run,” according to Borenstein. This is because a considerable amount of peak demand reduction could come from dynamic pricing programs with commercial and industrial customers, some of whom have already enrolled in such programs. Further peak reduction from these consumers could reduce a fair amount of peak demand without the costly step of rolling out smart grid technology to residential customers. But Borenstein also notes that in the long run, there may be more appliances and smart home devices that respond automatically, reducing the cost and hassle associated with dynamic pricing for residential customers.

Despite the economic challenges of smart grid implementation, utilities have ramped up their efforts nationwide. The U.S. EIA estimates that power companies have installed about 46 million smart meters for residential customers in the United States as of May 1, 2015. President Obama’s 2009 stimulus package included \$4.5 billion for grid modernization, and \$8 billion has been invested in 99 smart grid projects nationwide with the help of combined government and private sector funds.

The stimulus funds fall far short of the total cost of implementing the smart grid, and it’s not clear that utilities will be willing to make up the difference. Although better reliability would be a large benefit for the utilities, Luciano De Castro of the University of Iowa and Joisa Dutra of Fundação Getúlio Vargas contended in a 2013 paper that aspects of reliability have public good characteristics; that is, utilities may tend to underinvest in reliability because consumers often aren’t willing to pay for improved reliability for other customers if they don’t have to.

The smart grid has the potential to improve the reliability of the electrical grid, better integrate alternative energy, and facilitate pricing that reflects the marginal cost of generation. What remains uncertain is how consumers will respond to the promise of dynamic pricing and whether the benefits of the smart grid will outweigh its considerable cost. **EF**

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What's a Life Worth?

How to allocate our health care dollars is a challenging question, but economics could help

BY JESSIE ROMERO

In 2008, an Oregon woman dying of lung cancer was denied coverage for Tarceva, a drug costing \$4,000 a month. She received health insurance through the Oregon Health Plan (OHP), the state's Medicaid plan, which in the early 1990s had made radical changes to its coverage decisions in an effort to increase the number of enrollees while also curbing spending growth. One of the most controversial measures was a list of 668 medical procedures, ranked according to their cost-effectiveness; the OHP would cover only the first 568. Tarceva, which extended life by a few months for a small percentage of patients, didn't make the cut.

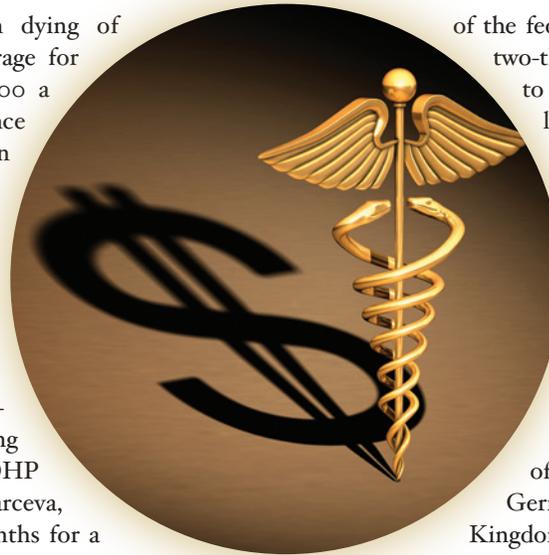
(In response to the public outcry, the drug's manufacturer, Genentech, provided the drug free of charge; the woman died a short time after starting it.)

Oregon's list of treatments was based on cost-effectiveness analysis, a technique used to compare both the efficacy and cost of different medical treatments. The technique is politically controversial and methodologically challenging, but many health care experts believe it is a valuable tool for helping to allocate resources in the face of mounting health care spending.

Are We Spending Money Wisely?

Americans spend a lot of money on health care: \$2.9 trillion in 2013 (the most recent year for which the Centers for Disease Control and Prevention has data), or 17.4 percent of GDP. That's an increase from just 5 percent of GDP in 1960, and the Centers for Medicare and Medicaid Services (CMS) projects that health spending will continue to outpace GDP, reaching 19.6 percent of GDP by 2024. Rising spending reflects the rapid increase in health care costs, which have been well above overall inflation since the mid-1980s. Health care inflation slowed somewhat as a result of the 2007-2009 recession, but the CMS expects health care inflation to return nearly to pre-recession levels over the next five years.

Federal, state, and local governments provide a substantial portion of health care spending: Medicare, Medicaid, the Children's Health Insurance Program, and insurance subsidies from the Affordable Care Act make up about one-quarter



of the federal budget, or \$836 billion. (About two-thirds of that money, \$511 billion, went to Medicare.) In 2013, federal, state, and local governments paid for 43 percent of all national health spending, a share the CMS projects will rise to 47 percent by 2024.

The United States spends significantly more than other developed countries. In 2013, for example, the United States spent about \$8,700 per capita on health care, compared with an average of about \$3,900 for the other Group of Seven countries (Canada, France, Germany, Italy, Japan, and the United Kingdom). Growth in U.S. per capita spending also has outpaced growth in other countries.

In part, the high level of spending reflects the United States' relatively high per capita incomes; research has shown that health spending tends to increase with income. But in a 2008 report, researchers at the McKinsey Global Institute calculated that the United States spends about \$2,000 more per capita than expected based on income levels.

High and increasing health care expenditures are not necessarily a cause for concern in and of themselves. "Increasing spending is usually a signal that the product or service is one that brings people more benefits than they could derive from spending the same amount of money on other available commodities," says Henry Aaron, a senior fellow in economic studies at the Brookings Institution. "The issue with health care is that most of us don't pay market prices, which can lead to the purchase of health care services where the value is less than the total cost of producing them. We may be consuming some services with only a slight marginal value."

That view is borne out by multiple studies of Medicare data showing that regional variation in spending is uncorrelated with the quality of health care or with health outcomes. Patients in higher-spending areas see more specialists, get more tests, and spend more time in the hospital, but they aren't healthier. Many researchers believe that the absence of a link between spending and outcomes reflects a high level of unnecessary care — as much as 30 percent of all health care costs, according to the authors of one Medicare study.

Many potential health care reforms, such as high-deductible insurance programs where consumers bear more

of the cost, or salaries for doctors rather than fees per service, are aimed at lowering spending overall. That's not necessarily the goal of cost-effectiveness analysis, says Milton Weinstein, a professor at the Harvard T.H. Chan School of Public Health and Harvard Medical School. "It's about spending money wisely. Whatever we spend on health care, are we getting the most value that we can?" Still, he notes, there is the potential to lower spending. "If we reallocated resources from less cost-effective to more cost-effective health services, we might end up spending less money and having better health at the same time." But determining what's cost-effective, and how to make use of that knowledge, is the challenge for researchers and policymakers.

Calculating a "QALY"

In medical research, cost-effectiveness is a ratio that expresses health outcomes in terms of dollars spent. The numerator of the ratio is the cost of one unit of outcome and the denominator is the unit of outcome, such the number of illnesses prevented by a vaccine or the number of new diagnoses made by a screening test. One widely used denominator is a Quality Adjusted Life Year, or QALY, which takes into account not only extending life, but also the quality of a person's health during that life. (Technically, research using QALYs is a subset of cost-effectiveness analysis known as cost-utility analysis, but researchers generally use the broader term.)

A QALY is based on a number known as a "health utility," which runs on a scale of 0 to 1, with 0 being death and 1 being perfect health. This utility value is then multiplied by a number of years. If a treatment increases health utility, extends life, or both, the number of QALYs increases. For example, Aaron Carroll and Stephen Downs of the Indiana University School of Medicine have estimated that mild intermittent asthma in children has an average utility value of .91 and severe seizure disorder in children has a much lower average utility value of .70. Thus, returning a child with asthma to perfect health for 60 years would gain 5.4 QALYs, and the child with the seizure disorder 18 QALYs.

In the view of researchers using this approach, such calculations enable doctors and policymakers to compare different health problems and their treatments. Hypothetically, if curing intermittent asthma and curing severe seizure disorder both cost \$1 million, the cost-effectiveness would be about \$185,000 per QALY for curing asthma and about \$55,500 per QALY for curing severe seizure disorder, making it more cost-effective to cure the latter.

There are several different techniques for calculating health utilities. One is based on the "standard gamble," which was developed by mathematician John von Neumann and economist Oskar Morgenstern in their 1944 book, *Theory of Games and Economic Behavior*. An individual is given a choice between a certain health state and a gamble that could lead to a better or worse outcome. The probability of the better outcome that would make them indifferent between their current state or taking the risk is the utility of their current state.

Another method is the "time trade-off," in which individuals are asked how many years of life they would be willing to give up in order to live without a certain condition. For example, a recent study that used the time trade-off to calculate health utilities for epilepsy asked respondents to choose between living for 10 years with frequent seizures or living for X years in perfect health. They found a utility of .303, meaning respondents would prefer living for about three years in perfect health to living for 10 years with frequent seizures.

The standard gamble and time trade-off are both direct methods, where researchers ask people about specific diseases. But researchers might also use indirect methods, where people are given a simple questionnaire and asked to rank generic health states, such as living with reduced mobility or requiring assistance with daily tasks. Several indirect questionnaires are widely used by researchers. In general, they are developed by asking a sample of the public how they value a certain limited number of health states and then applying an algorithm to map those health states onto other conditions to derive utility values for a wide range of conditions.

In much of economics, utility is an ordinal value; a consumer might get more utility from buying oranges than from buying apples, but it's not possible to actually measure how much more utility they get. Such ordinal utility values cannot be compared from person to person. In the QALY methodology, however, a health utility is a cardinal value; a utility of .08 is four times better than a utility of .02. As a result, it is mathematically possible for researchers to compare utilities across individuals and calculate an aggregate health utility for a given disease state.

Proceed with Caution

Health utilities can vary widely from study to study depending on the method used to calculate them and on the survey sample. For example, patients already living with a certain disease tend to place a higher utility value on that health state than respondents who are asked to imagine living with that disease. Or a young athlete might assign a much lower utility value to a torn ligament than an elderly person. In addition, the standard gamble generally results in higher utility values than the time trade-off. That's because people tend to be risk averse and thus require a high probability of an improved outcome in order to take the gamble.

QALYs can also vary in context depending on how a certain technology is used. For example, as Weinstein noted in a 2005 lecture at Syracuse University, many people who have suffered a heart attack routinely receive an angiogram to check for blocked arteries. For patients who are at high risk of having a blocked artery, the procedure gains between 20 and 50 QALYs per \$1 million. But for patients who are at low risk, the procedure gains less than 10 QALYs per \$1 million.

It also can be difficult to determine how effective a treatment is because, as Weinstein says, "You can't conduct a randomized controlled trial of every intervention, or with every potential category of patient." For that reason, researchers have begun tapping into other data sources,

such as insurance claims and coordinated medical records, to establish an evidence base for evaluating effectiveness. And even treatments deemed to be effective might have lower-than-expected returns given the deleterious effects the treatments themselves can have on life quality.

Ethical questions also arise about whether different weights should be assigned to people of different initial health states or of different ages. For example, as Steven Pinkerton of the Medical College of Wisconsin and several co-authors noted in a 2002 article, people with substance abuse problems tend to be in worse health on average, so a given intervention might bring them to a health state with a lower utility value than the same intervention would for a person in better health. But by that logic, substance abusers would be less deserving of health care. And, Weinstein asks, “Should we assign more weight to people at the end of life because their remaining years are precious? Or should we assign more value early in life, because once a person has reached a certain age they’ve already had an opportunity to live a healthy life?”

Some researchers have argued that these methodological questions render the QALY useless as a metric. But many health care experts believe that while QALYs should be interpreted with caution, they are a valid tool. “Decisions about resource allocation are being made all the time,” says Weinstein. “We can make them on an ad hoc basis, or we can make them with the benefit of some sensible analysis about the benefits and harms.”

Cost-Effectiveness in Practice

Many industrialized countries use cost-effectiveness research to make coverage and reimbursement decisions for their national health insurance plans. In the United Kingdom, for example, the National Institute for Health and Care Excellence (NICE) generally recommends that treatments be covered by the National Health Service beneath a threshold of between £20,000-£30,000 (\$30,300-\$45,500) per QALY. (NICE’s threshold has been the source of considerable controversy, particularly with respect to expensive treatments for rare or terminal illnesses.) Other countries do not define a threshold as explicitly as the United Kingdom, although they do have implicit thresholds that inform coverage decisions. The World Health Organization’s rule of thumb is that one to three times GDP per capita is cost-effective, which in the United States would be between roughly \$55,000 and \$164,000.

But in the United States, cost-effectiveness prompts fears of rationing and “death panels” that would deny access to lifesaving treatment. In 1989, Medicare proposed using cost-effectiveness as one of several criteria, but the proposal met with significant opposition and was never adopted. In 2010, the Patient Protection and Affordable Care Act (ACA) created the Patient-Centered Outcomes Research Institute (PCORI) to conduct comparative effectiveness research, a method of conducting direct comparisons of different medical treatments that does not take into account cost. In

establishing PCORI, Congress prohibited the institute from funding any research that considers cost at all and barred Medicare and Medicaid from considering cost-effectiveness as well. (The one exception is the Oregon Health Plan, which received special federal approval in 1993 for reforms including a treatment list based on cost-effectiveness and continues to use a prioritized list of treatments when determining coverage.)

Aaron notes that although the government monetizes life in a variety of circumstances, such as when it decides whether the “cost per life saved” justifies mandating a new safety standard for automobiles, people tend to find the idea unsettling. “When one monetizes the value of medical services, one is placing a value on either the extension of life or on improvements in the quality of life. And that’s something that a lot of people are very loath to do,” says Aaron.

Cost-effectiveness is widely accepted in the academic medical community; leading journals regularly publish studies on CEA, to the tune of 567 published studies in 2013, according to data from the Center for the Evaluation of Value and Risk in Health, a nonprofit research group. And among practitioners, says Weinstein, “there is considerably more acceptance of the need to consider cost and the limitations on resources when making recommendations for clinical practice.”

In 2007, the American Medical Association endorsed “value-based decisionmaking” as a strategy to achieve better value for the amount of spending, and specifically mentioned cost-effectiveness research as “essential” to provide doctors and patients with the information they need to make value-based decisions. In 2014, the American College of Cardiology recommended the use of cost-effectiveness analysis as one consideration in treatment guidelines, noting that “Despite [methodological] challenges ... the need for greater transparency and utility in addressing resource issues has become acute enough that the time has come to include cost-effectiveness/value assessments and recommendations in practice guidelines and performance measures.” The American Society of Clinical Oncology followed suit with a similar statement in 2015, although it noted that considerable research remains to be done.

Private insurers also may include cost-effectiveness as one of several factors in deciding what to cover. The clinical policy at Aetna, for example, the third-largest insurer by market value in the United States, states that “when effectiveness and safety are equivalent, we may consider the cost-effectiveness among therapies to determine medical necessity or to require certain therapies to be tried before covering equivalent, but more expensive options.” Still, overall, cost-effectiveness plays a limited role in the United States health care market.

Does Cost-Effectiveness Work?

Given the complexity of medical care and of the health care market, it’s difficult to determine how much health outcomes might improve, or how much money might be

saved, if cost-effectiveness were more widely considered by insurers and practitioners. There are trade-offs with respect to health outcomes. As Weinstein and Jonathan Skinner, an economist at Dartmouth College, noted in a 2010 article in the *New England Journal of Medicine*, some treatments for late-stage pancreatic cancer might be considered cost-ineffective, while diabetes treatment is very cost-effective. Reallocating resources from one to the other might improve aggregate health outcomes, but it wouldn't improve outcomes for patients with late-stage pancreatic cancer.

Research suggests the spending benefits could be large. In a 2009 *New England Journal of Medicine* article, Elliot Fisher and Julie Bynum of the Geisel School of Medicine at Dartmouth College and Jonathan Skinner found significant regional differences in the growth of Medicare spending, even after controlling for differences in health outcomes. Between 1992 and 2006, for example, spending rose 2.4 percent in San Francisco versus 4 percent in East Long Island. Over the course of the study, that difference accounted for more than \$1 billion in extra Medicare spending just from East Long Island. If 30 percent of that spending could be cut

without worsening health care quality, as other research has found, considering cost-effectiveness could help slow spending growth. Fisher and his co-authors estimated that reducing overall annual growth in per capita spending from the national average of 3.5 percent to the rate in San Francisco could save Medicare \$1.42 trillion.

At the same time, however, research suggests that the Oregon Health Plan, the one real example of explicitly using cost-effectiveness data in the United States, did not succeed in reducing expenditures. An analysis by the Cascade Policy Institute, a nonpartisan libertarian research group, found that growth in Oregon's Medicaid expenditures closely tracked the growth across the United States. In addition, the ultimate benefit of any savings resulting from cost-effectiveness analysis depends on how, or if, those dollars are reallocated to more cost-effective treatments or to other higher-value uses in the public or private sector.

Still, the potential is there, and as spending continues to rise, it will become more important to ensure that the money is being put to its best use — and that likely means paying attention to costs. **EF**

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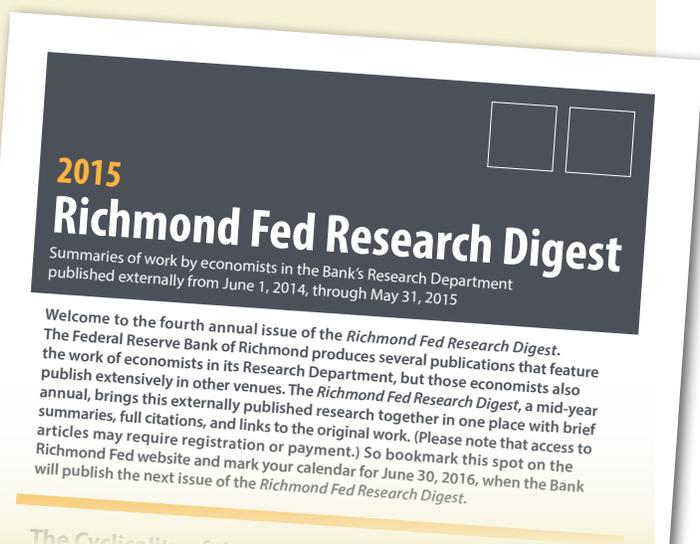
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James Poterba

Over the past generation, retirement finance in the United States has undergone a revolution. While defined benefit plans (pensions that pay retirees a pre-defined amount) were once commonplace, they are now rare for private-sector workers — having been displaced by defined contribution plans, such as those based on 401(k) accounts and Individual Retirement Accounts (IRAs). Defined contribution plans do not require the long job tenure that is typically needed to earn substantial benefits in defined benefit plans, but they do require workers to make their own investment decisions and to live with the consequences, for better or worse. These changes in the private pension landscape have taken place at the same time that policymakers have been discussing the funding and even the structure of the Social Security system.

James Poterba of the Massachusetts Institute of Technology (MIT) has been a leading researcher of retirement finance since entering the field in the 1990s. His findings have led to a reconsideration of the simplest versions of the “life cycle” model of savings and consumption, in which individuals seek to smooth their consumption over their lifetimes, building assets during high-earning years and drawing them down steadily during retirement. With his frequent collaborators Steven Venti of Dartmouth and David Wise of Harvard, he has found that some households arrive at retirement with few assets, while others continue to maintain high levels of assets throughout much of retirement. Earlier in his career, as a junior member of the MIT economics faculty, he focused his research primarily on tax policy. His transition from taxation research to a focus on retirement issues began with an examination of tax incentives for retirement saving in 401(k) plans and IRAs.

In addition to his work at MIT, since 2008, Poterba has been president and chief executive officer of the National Bureau of Economic Research. He is also a trustee of the College Retirement Equity Fund (CREF) and an independent director of the TIAA-CREF mutual funds. David A. Price interviewed him in Washington, D.C., in June 2015.



EF: How did you become interested in economics?

Poterba: My path to economics began with high school debate. When I was a freshman in high school, the national debate topic was “Resolved: that the federal government should finance primary and secondary education in the United States.” My high school offered a ninth-grade economics course, and my teacher, Paul Larson, encouraged me to join the debate team. When I did, I needed to learn how to discuss issues like whether the value-added tax was regressive and what disincentives for labor supply were created by the income tax. My sophomore year, the high school debate topic was “Resolved: that the federal government should guarantee a minimum annual income to all households.” This topic also involved taxes and transfers and a lot of economic analysis. My senior year in high school, the topic was “Resolved: that an international organization should allocate scarce world resources.” Economics again! I really enjoyed high school debate, in large part because I enjoyed learning about the economic issues, and my debate experience was central to my early interest in economics.

In high school, I also liked science a lot and I thought I might be a chemist or a chemical engineer — a field that relies a lot on equilibrium, as economics does. But when I got to college, I realized the power of economic tools. I had a very engaging freshman economics instructor, Jane Katz, who later worked for many years at the New York Fed. And as a college sophomore, I was in just in the right spot at the right time when I got to know Larry Summers, who was then a graduate student at Harvard. Larry was working with Marty Feldstein on several projects. I worked as a research assistant for Larry Summers and Kim Clark. They were studying labor market dynamics. Later, I worked

with Marty Feldstein on issues involving unemployment insurance and taxation policy. Marty and Larry launched me into a research career in economics.

After college, I was fortunate to win a Marshall Scholarship for graduate study in England. When I was there, graduate training in Oxford relied less on coursework than a top U.S. Ph.D. program would have, but it also threw you more into the deep end of the pool in terms of doing research early on. So I knew less economics than a comparably aged U.S. graduate student when I finished my doctorate, but I had a little more experience at doing research because I'd started as an undergrad and I'd been able to continue that work right through my graduate experience.

I have been lucky to live under a charmed star and to have wonderful mentors, terrific colleagues and students, and great opportunities throughout my career.

EF: Much of your early work looked at the economics of taxation. Are the major challenges to tax policy different now than they were then?

Poterba: One difference is that tax policy discussions and research on the economics of tax policy in the late 1970s and early 1980s were set in an environment with marginal tax rates that were significantly higher than those today. The United States had a top tax rate on capital income of 70 percent until 1981. The top marginal tax rate on earned income in the United States at the federal level was 50 percent until 1986. Today, the top statutory rate is 39.6 percent, although with some add-on taxes, the actual rate can be in the low 40s. We have been through periods when the top rate was as low as 28 percent. There was a lot more concern about the distortions associated with the capital income tax and with taxation in general.

At the same time, the opportunities for studying how behavior was affected by the tax system when I started in this field were dramatically different than they are today. We relied primarily on cross-sectional household surveys. It's hard to study how taxation affects behavior when the variation in the tax system is coming in differences in household incomes that place different taxpayers in different tax brackets, because income variation is related to so many other characteristics. Today, by comparison, the field of public finance has moved forward to use large administrative databases from many countries, often including tax returns. It is possible to do a much more refined kind of empirical analysis than when I started.

The other thing that's happened is that we've devoted more attention to spending programs. Public finance in the late 1970s and early 1980s was heavily focused on taxation, at least in the empirical work. But today, health economics is an enormous subfield of public economics, and there is broad interest in Social Security and many other programs. I think this reflects the evolving reality of

Over time, firms came to a greater recognition of the true cost of defined benefit plans.

how important government programs in the United States and other developed countries are in delivering health care, income support, education, and other vital functions.

With regard to entitlement programs, one exciting line of research has compared countries and tried to use as a data point not an individual but in some cases a nation to look at how the labor force participation rate, for example, of men in their early 60s, is related to the generosity of the social security or the disability insurance system. And the combination of access to administrative data plus interesting international comparisons has generated remarkably interesting new insight into the operation of a number of programs the government has managed.

EF: One public finance issue is the home mortgage interest deduction. Many economists oppose the deduction based on equity and efficiency concerns. What do you think should be done about the deduction, if anything?

Poterba: I began studying various aspects of the tax code and the housing market in my undergraduate thesis research in 1979-1980. This is an issue that's near and dear to my heart. Let me note several things about the way we currently tax owner-occupied housing in the United States.

First, because mortgage interest is deductible only for households that are itemizers on their tax returns and then is deductible at the household's marginal income tax rate, this results in a larger subsidy to households at a higher income and higher marginal tax rate than for those at lower levels.

Second, the real place where the tax code provides a subsidy for owner-occupied housing is not by allowing mortgage deductibility, because if you or I were to borrow to buy other assets — for instance, if we bought a portfolio of stocks and we borrowed to do that — we'd be able to deduct the interest on that asset purchase, too. If we bought a rental property, we could deduct the interest we paid on the debt we incurred in that context. What we don't get taxed on under the current income tax system is the income flow that we effectively earn from our owner-occupied house, what some people would call the imputed income or the imputed rent on the house. The simple comparison is that if you buy an apartment building and rent it out, and you buy a home and you live in it, the income from the apartment building would be taxable income, but the "income" from living in your home — the rent you pay to yourself — is never taxed. This is the core tax distortion in the housing market: the tax-free rental flow from being your own landlord.

The natural way to fix this would be to compute a measure of imputed income on your home and include that in the income tax base. As a matter of practical tax policy, creating an income flow that taxpayers don't see and saying they're going to have to report that on their tax return

is probably a nonstarter. A number of European countries tried in the past to do something in this direction, typically in a very simple way, saying something like 3 percent of the value of the home is included in your income for the year. Almost all of those countries have moved away from this. It therefore seems that the tax reform that one might like on conceptual grounds is probably not politically realistic.

Given that situation, other policy reforms that might move in the same direction probably deserve some attention. Property tax rates vary from place to place in the United States, but they are typically proportional to the value of the property. They are currently deductible from the income tax base. Disallowing property tax deductions would be one way of trying to move gently toward a tax system that was closer to one that taxed imputed rent. One could think about other potential reforms along similar lines, but eliminating the mortgage interest deduction turns out not to be the most natural fix here because it would create distortions between borrowing to buy a home and borrowing to buy other assets.

EF: If we tried to address the issue of imputed rent in the way that you suggest, what effect would we see on house prices? Or if we tried some of the reforms that have been discussed concerning the mortgage interest deduction itself?

Poterba: Todd Sinai at the Wharton School and I have looked at the consequences of changing some of the tax provisions, and we typically find that if the market was fully forward-looking, and recognized the changes in housing investment that would be associated with tax changes, current house prices would decline by only a few percentage points. There would be variation across types of houses, related to the typical tax circumstances of their buyers. The tax benefits, while important, are not a large fraction of the total cost of an owner-occupied home. Of course, that doesn't say that you'd want to pile on and make a tax reform of this kind when house prices are not performing very well. Today, house prices have recovered somewhat from the financial crisis of 2008-2009, but a better time to adopt a reform like this would have been 2005, after a period of strong price appreciation.

EF: More recently, one of your areas of research has been retirement finance and the investment decisions of workers thinking about their retirement. In recent decades,

James Poterba

► Present Positions

Mitsui Professor of Economics, Massachusetts Institute of Technology
President and Chief Executive Officer, National Bureau of Economic Research

► Education

D.Phil. (1983) and M.Phil. (1982), University of Oxford
A.B. (1980), Harvard College

► Selected Publications

"Retirement Security in an Aging Population," *American Economic Review*, 2014; "The Composition and Drawdown of Wealth in Retirement," *Journal of Economic Perspectives*, 2011 (with Steven Venti and David Wise); "Tax Expenditures for Owner-Occupied Housing," *American Economic Review*, 2008 (with Todd Sinai); numerous other articles in such journals as the *National Tax Journal* and the *Journal of Public Economics*; and numerous book chapters.

we've seen a tremendous shift in the private sector from defined benefit retirement programs to defined contribution programs. Was this mainly a response by firms to the tightening of the regulatory environment for defined benefit plans, to changing demand from workers, or to something else?

Poterba: I think it's a bit of everything. A number of factors came together to create an environment in which firms were more comfortable offering defined contribution plans than defined benefit plans. One factor was that when firms began offering defined benefit plans, in World War II and the years following it, the U.S. economy and its population were growing rapidly. The size of the benefit recipient population from these plans relative to the workforce was small. It was also a time when life

expectancy for people who were aged 65 was several years less than it is today. Over time, the financial executives at firms came to a greater recognition of the true cost of defined benefit plans.

I also think the fiduciary responsibilities and the financial burdens that were placed on firms under the Employee Retirement Income Security Act of 1974, or ERISA, have discouraged firms from continuing in the defined benefit sector. ERISA corrected a set of imbalances by requiring firms to take more responsibility for the retirement plans they were offering their workers and to fund those plans so that these were not empty promises. ERISA was enacted in the aftermath of some high-profile bankruptcies of major U.S. firms and the discovery that their defined benefit plans were not well-funded, leaving retirees with virtually no pension income.

But ERISA and the growing recognition of the costs of defined benefit plans are probably not the full story. The U.S. labor market has become more dynamic over time, or at least workers think it has, and that has led to fewer workers being well-suited to defined benefit plans. These plans worked very well for workers who had a long career at a single firm. Today, workers may overestimate the degree of dynamism in the labor market. But if they believe it is dynamic, they may place great value on a portable retirement structure that enables them to move from firm to firm and to take their retirement assets with them.

Most workers who are at large firms, firms that have 500 employees or more, have access to defined contribution plans. Unfortunately, we still don't have great coverage at smaller firms, below, say, 50 employees. For workers who will spend a long career at a small firm, the absence of these

Nearly half of the population is relying on a one-legged stool for retirement, with Social Security as the sole leg.

employer-based plans can make it harder to save for retirement. A key policy priority is pushing the coverage of defined contribution plans further down the firm size distribution. That's hard, because smaller firms are less likely to have the infrastructure in place in their HR departments or to have the spare resources to be able to learn how to establish a defined contribution plan and how to administer it. They are probably also more reluctant to take on the fiduciary burdens and responsibilities that come with offering these plans.

Another concern, within the defined contribution system, is the significant amount of leakage. Money that was originally contributed for retirement may be pulled out before the worker reaches retirement age.

EF: What is causing that?

Poterba: Say you've worked for 10 years at a firm that offers a 401(k) plan and you've been contributing all the way along. You decide to leave that firm. In some cases, the firm you are leaving may encourage you to take the money out of their retirement plan because they may not want to have you around as a legacy participant in their plan. They may not want the fiduciary responsibility of having you in the plan. In this case, the former employer may be encouraging the departing worker to withdraw funds from the retirement space. Sometimes, the worker may choose to move the funds from the prior 401(k) plan to a retirement plan at their new employer, or to an IRA. Those moves keep the funds in the retirement system. But sometimes, the worker just spends the money. When an individual leaves a job, they may experience a spell of unemployment, or they may have health issues. There may be very good reasons for tapping into the 401(k) accumulation. Using the 401(k) system as a source of emergency cash, sort of as the ATM for these crises, diminishes what gets accumulated for retirement.

EF: Did you venture into this area initially simply because you thought it was an interesting set of questions, or was there anything in particular that pushed you in this direction?

Poterba: My interest in retirement saving began with my interest in tax policy. A critical feature of the savings landscape in the United States is the role of tax policy in encouraging various kinds of retirement arrangements. In my research on retirement issues, tax-related questions have continued to attract my interest. I have also become interested, however, in the question of how households formulate and carry out their financial plans, particularly in retirement.

For example, some work that Venti, Wise, and I have done looks at the distribution of asset holdings for individuals who are very close to death. The University of Michigan

Health and Retirement Study, which is a comprehensive database on older individuals in the United States, begins tracking survey respondents in their mid-50s. It follows them until they die, so the last survey is typically filed about a year before the

individual's death. Nearly half of the respondents in the survey turn out to have very low levels of financial assets, under \$20,000, as they get close to death. For any economist who's been steeped in the life cycle model, the notion that you would reach such a low level of asset holdings, even at old ages and when health is poor, is surprising, particularly given the risk of out-of-pocket expenses for medical care or nursing homes. This empirical pattern is a bit of a challenge to the life cycle model of my late colleague Franco Modigliani.

I have been quite interested in how individuals arrive at such low levels of financial assets. Many of those who have very little financial wealth as they approach death also reached retirement age with very little wealth. Nearly half of American retirees rely overwhelmingly on Social Security as their source of income. One often hears references to a three-legged stool of retirement support, which involves Social Security, private saving, and employer-based saving in a retirement plan. The reality is that nearly half of the population is relying on a one-legged stool, with Social Security as the sole leg. Only in the top half of the retiree wealth distribution does one start to see substantial amounts of support from private pension plans, and only in the top quarter is there substantial support from private saving outside retirement accounts.

EF: Knowing what you've learned over the years, what advice would you give to a 30-year-old worker today about retirement?

Poterba: Save early and save a lot.

At MIT, I have a lot of engineering colleagues who are accustomed to answering questions with precise and definitive answers. If I ask one of them how big a solar array I should put on my roof to generate enough energy for my home, they are able to do a calculation that gives a pretty accurate answer to that question. They can design an array so that I'll have energy 95 percent of the time. If they ask me in return how much they should be saving for retirement, I don't think I can give them an answer with an analogous level of precision.

There is a lot of heterogeneity across individuals in their relative tastes for retirement versus pre-retirement consumption. Some people may regard the availability of more time in retirement as an opportunity to ramp up their spending, to travel, or to enjoy a second home. Others, particularly lower-income retirees, may devote more time to shopping sales for groceries and for other products they buy. They may spend more time cooking at home relative

to consuming food away from home. They may scale back on clothing purchases because they are not required to buy clothes for work. The notion that spending time can save money is very evident in the behavior of some retirees.

One of the notable examples of this is that early research on the well-being of retirees pointed to the fact that expenditures on food declined for a number of retirees lower in the income distribution. That was often viewed as evidence that these individuals must be worse off when they retired than they were when they were working — they could not even sustain their food consumption. Yet more refined analysis of the food expenditure data found that caloric intake did not decline very much even for those for whom food expenditure declined. What happened? They shifted from buying takeaway meals at the grocery store or stopping at a restaurant to purchasing more food to prepare at home. Spending declined, but the ultimate objective — nutritious meals — was not affected nearly as much as the spending decline suggested. This is microeconomics in action, right? When money becomes scarce relative to time, individuals alter the way they choose to produce things.

Many individuals also have some reason for preserving financial assets until late in life. Textbook life cycle theory would lead you to expect that peak assets are basically observed at the moment when someone retires. After that, leaving aside bequest considerations and the possible need for late-life precautionary saving, retirees should begin to draw down assets as they move toward the end of life. But in fact, at least in the early years of retirement, the late 60s and into the 70s, many households that have financial assets experience relatively stable assets over that time. Some even appear to save more during this period. What's happening here? Well, either they are planning to leave these assets to the next generation or to make charitable gifts late in life, or they are saving for precautionary reasons like health care costs.

The times when financial assets are drawn down significantly are often when one spouse in a married couple dies, which may be associated with medical and other costs, and at the onset of a major medical episode. Health care shocks may lead to costs for caregivers who may not be covered by Medicare and other insurance. Retirement is not a homogeneous period from the standpoint of financial behavior: Behavior for the “young elderly” can be quite different from the behavior of those who are in their 80s and 90s.

EF: You've been called the de facto historian of MIT's economics department. What did MIT do differently in economics that helped it become pre-eminent?

Poterba: Let me first explain why I have been interested for a long time in the history of MIT economics. I arrived at MIT in 1982, just before the retirement of the postwar faculty who built the modern department. As a brand new assistant professor, I attended retirement parties for Evsey Domar, Cary Brown, Charlie Kindleberger, and Paul

Samuelson, and then a bit later for Morris Adelman and Bob Solow. The MIT economics department was a close-knit group of faculty. Attending these retirement parties, one couldn't help but be swept up in the incredible sense of dedication to economics, and dedication to each other, that this group had in building the department. That got me very interested in the history of the department.

If you compare a rough ranking of economics departments in 1940 or 1950 with a ranking in 2000, there is a lot of stability, but the one department that jumps into the ranks is MIT. MIT has actually had an economics department for a very long time. The first president of the American Economic Association, Francis Amasa Walker, was the president of MIT. He was an economist who was recruited from Yale to lead MIT, and he introduced a required undergraduate economics course — maybe the first such course at an American college or university.

The MIT economics department was a service-oriented undergraduate department until 1940 when it introduced a master's program. In the mid-1940s, it started a Ph.D. program. Paul Samuelson's arrival at MIT in 1940 coincided with a ramping up of the department's interest in graduate training. There were some important hires in the early postwar years that made it possible to build a core faculty that was involved in graduate training.

Several things helped MIT. First, because it was a rapidly growing department, it was possible to hire many leading young economists and bring them to MIT. This created a great atmosphere and a critical mass of active, research-oriented faculty. Some of the key figures had an enormous influence on the development of the department. I am sure that it wasn't unique to MIT, but the faculty consisted of a group of good friends who were all very active in research, all committed to building a Ph.D. program, and all engaged in building the department.

Second, MIT's economics department always had a good balance between teaching and research. The graduate program was well-integrated with research activity.

Finally, in the 1940s into the 1950s, MIT probably benefited from anti-Semitism that was still prevalent in many other universities. MIT's department was prepared to hire leading economists who happened to be Jewish, and it stole a march on a number of other departments as a result.

EF: You taught introductory macroeconomics at MIT last spring for the first time. What was that like?

Poterba: I loved it. When I first came to MIT, I taught undergraduate statistics, but that's not a course in which you can convey a lot of economics to the students. Then for many years, I had administrative assignments that crowded out undergraduate teaching. I recently decided that I was at a career stage when it might be fun to teach a large introductory course, and our department needed someone to cover the macro course, so I volunteered. I hope the students liked it as much as I did. I found it invigorating to try to distill the

core questions in macro and bring those questions to the students. There are just so many exciting topics in macro today. Why are global interest rates so low? What is happening in the eurozone? How do we think about long-term fiscal policy and sustainability in the United States? Why is growth in the U.S. economy slower than it has been? How does recent work on long-term inequality and the relationship between rates of return and growth rates connect to the changing distribution of resources in the United States? I hope I succeeded at least a bit in conveying some of my excitement about these questions.

EF: You've been president of the NBER since 2008. What do you see as the role of the NBER in economics?

Poterba: The NBER presidency is an extraordinary experience. It's a window on economic research and the economics profession that is very hard to get in any other way. The NBER is devoted to carrying out and to supporting economic research, to disseminating research, and to helping educate the academic, policy, and business communities, and to some degree the public, about economic activity and economic analysis. While the NBER is best known for the dating of the U.S. business cycle, there's an enormous amount of research activity that takes place in the 20 distinct research programs that focus on everything from corporate finance and asset pricing to labor economics, education, and development economics. The span is remarkable.

I look at each working paper that is submitted for distribution in the NBER working paper series. When the NBER was founded, one of the key charter provisions was that it would not make policy recommendations. One of the founders was the chief statistician at AT&T, one of the largest U.S. companies of the day. Another was a Marxist labor organizer. They had rather different views about many economic issues. They had interacted with each other on some commissions during the 1910s that had looked at policy questions such as should there be a minimum wage and should there be an hours limit. They realized that even though they might have different answers to those questions, there wasn't enough data on the distribution of working hours or wages to permit reasoned discussion. Together,

they supported the creation, in 1920, of the NBER to collect and disseminate information on the economy.

One reason the NBER is well-regarded is that it doesn't get involved in policy debates, although it certainly carries out research that is relevant for policy. I review working papers to make sure we stay true to the no-policy-recommendation rule. I learn a great deal of economics in the process. In some cases, I need to reach out to the researchers to ask them to drop a passage in their paper that makes a policy statement. Almost always, the researchers are very agreeable and understanding.

The most enjoyable part of the job is trying to launch and direct research projects on particular topics. There have been NBER projects recently on high-skilled immigration, on the macro consequences of the financial crisis, on sovereign debt markets and crises, and on energy infrastructure. These projects provide an opportunity for me to work with an array of researchers to develop research proposals and to seek funding for these initiatives. I also have the chance to shape where the research is headed and what questions will get attention. My NBER role provides a bit of leverage; it's a way of going beyond what I can do myself as a researcher and influencing what others will do as well.

EF: What is the future of public finance economics?

Poterba: I tell incoming graduate students that in the field of public economics, the questions we confront are always fresh because economies go through periods of evolving policy mix, but our underlying analytical tools are remarkably stable. When public finance economists talk about the optimal design of a tax system, it is worth remembering that Adam Smith offered four maxims for a good tax system. One of them is that the tax system should impose the smallest possible burden beyond the revenue that is collected from the taxpayer. It's a very simple statement that the optimal tax code should minimize deadweight burden, and it remains a guiding principle that animates research to this day. The underlying trade-offs in public economics, between equity and efficiency and between raising revenue and creating distortions, have been with us a long time, and they are likely to remain the bedrock of the field. **EF**

Alchemy Island

BY KARL RHODES

Turning Dirt into Gold on Hilton Head

As a teenager in the late 1940s, Thomas Barnwell Jr. earned money raising butter beans and “bogging” for crabs along the muddy shores of Skull Creek on Hilton Head Island, S.C. In those days, before any bridge connected the island to the mainland, most islanders still lived off the land and water.

“The land will take care of you,” Barnwell’s grandfather often advised. “Don’t sell it. And if you ever have to sell it — if you hold on long enough — you can sell it by the foot instead of by the acre.” Barnwell and his cousins used to laugh at such an idea. “Who in the world,” they asked, “would want to come to Hilton Head and buy this dirt by the foot?”

Who indeed?

Development of Hilton Head Island, named by Capt. William Hilton in 1663, has transformed one of the poorest and most isolated corners of South Carolina into a popular refuge for wealthy people from all over the world. This economic miracle was set in motion during the 1950s by Charles Fraser, an innovative young developer whose vision for Hilton Head set a new standard for upscale resort, retirement, and residential communities across the nation. He employed land covenants and deed restrictions to

preserve the natural beauty of the island and control every aspect of Sea Pines Plantation, his 5,000-acre masterpiece of master planning.

“The modern American resort and retirement community was invented on Hilton Head by Charles Fraser,” wrote Michael Danielson in his 1995 book, *Profits and Politics in Paradise: The Development of Hilton Head Island*. “Sea Pines triggered a remarkable and rapid transformation of Hilton Head into a world-class resort.”

As Sea Pines won national and international acclaim, Fraser’s ambition, reputation, and access to financing grew exponentially. In the early 1970s, he borrowed hundreds of millions of dollars to jumpstart similar projects in Florida, South Carolina, Virginia, and Puerto Rico. Lenders took over most of those projects after the mid-1970s recession, and Fraser lost much of his personal fortune. But the Sea Pines style of development created a lot of wealth for other people, especially Fraser’s former employees. They call themselves the alumni of “Sea Pines University,” where they acquired human capital that has enabled them to continue turning dirt into gold on Hilton Head and in many other areas of the United States.

The success of Sea Pines also created a wide socioeconomic gap between native islanders and the wealthy people who have flocked to the place since the 1950s. But unlike many low-income people in similar situations throughout the United States, Hilton Head’s native islanders own a significant share of the land that surrounds them. And in recent years, Barnwell and his family have demonstrated how to tap the economic potential of that land without selling it.

Before the Bridge

For nearly 100 years, Hilton Head was populated primarily by descendants of former slaves who claimed freedom on the Union-occupied island during

From the left, Charles Fraser, Jack Nicklaus, and Pete Dye discuss the layout of Harbour Town Golf Links with Donald O’Quinn, who oversaw construction of the course in the 1960s.



PHOTOGRAPHY: COURTESY OF THE SEA PINES RESORT

the Civil War. These native islanders, also called Gullah, farmed and fished and maintained a language and culture that reflected strong African roots. The Gullah people owned less than one-third of the land, but they generally ran the whole island. Hilton Head was isolated from the mainland — not only was there no bridge, there was no telephone, electricity, or running water.

Things started to change in 1949 when the Hilton Head Company, a timber partnership from Hinesville, Ga., purchased a large portion of the island for \$60 an acre. Fraser, son of the company's majority partner, worked in his father's timber camp one summer and fell in love with the place. To maximize the island's development potential, he persuaded his father to preserve many mature pine trees along the island's southern shores. The other timber partners also recognized that Hilton Head had strong development potential. They also cut down trees selectively, but none of them envisioned the island's future the way Fraser did.

As a student at Yale Law School, he started making grand plans to develop an upscale resort and residential community on Hilton Head. "Fraser studied design and planning as well as law; and he persistently asked 'law school colleagues, law and architecture professors what could be done with four miles of virgin South Carolina beachfront and adjacent forests,'" Danielson wrote, quoting Fraser. He was "strongly influenced by a course at Yale called 'Land Use Planning and Allocation by Private Agreement' taught by Myres McDougal, a specialist in the use of private covenants to implement comprehensive land use planning." He also consulted "hundreds of landowners and planners along the east coast."

Fraser returned to Hilton Head in 1956 — the year when a privately financed toll bridge opened — and urged his father's partners to upgrade their plans for traditional beachfront development. He unveiled an ambitious proposal to build a world-class resort with at least two golf courses. Golf was vital to Fraser's alchemic equation — the catalyst that eventually would turn dirt into gold on the island's interior.

"We in the development business now assume there was a golf course in the Garden of Eden, but Charles was really the guy who figured out how to use golf courses to create real estate value," says Peter Rummell, a Sea Pines alumnus who later ran Disney Development and Walt Disney Imagineering. "He was always forward-looking — always trying to figure out what's going to happen next."

But the partners of the Hilton Head Company didn't see Fraser as a visionary. They still viewed him as the little kid next door in Hinesville. His innovative ideas were "hooted at in derision by many of the directors," Fraser wrote. In particular, they dismissed the notion that the island could eventually support two golf courses as "the 'wild visions' of an immature 25-year-old." (Hilton Head now has 21 golf courses.)

The conflict between Fraser and his father's partners ultimately tore the former timber company limb from limb. Soon after the bridge opened, Fraser's father broke away from his partners and put his 20-something son in charge of



This photo was taken near the spot shown on the preceding page. The Harbour Town golf course, lighthouse, and marina became world-famous features of Sea Pines and Hilton Head.

developing the family's acreage on the southern end of the island. They called the project Sea Pines Plantation.

After the Bridge

Native islanders bristled at the idea of working on anyone's "plantation," but other job opportunities on Hilton Head were sparse, and it was getting harder to make a living from small-scale farming and fishing.

Barnwell took a summer job with Sea Pines in the late 1950s helping to clear land for 50 cents an hour, significantly more than he had been earning raising beans and catching crabs. He operated a winch on the back of a truck to pick up tree stumps and haul them to an area where they were burned. Sea Pines sacrificed a few trees on this altar of economic progress, but Fraser hated to cut down trees.

"Trees were sacred," Rummell emphasizes. "We didn't take down one more tree than we had to." All that timber came in handy during the early days of development when Fraser was desperate to secure financing from the Travelers Insurance Co. He essentially mortgaged the trees on the property with a "timber loan" to keep Sea Pines afloat.

Financing high-dollar infrastructure and amenities on a remote island off the coast of South Carolina was difficult, so money was extremely tight. Quite often, Sea Pines sold just enough real estate during the week to make payroll on Friday. Even so, Fraser insisted that Sea Pines adhere to high standards of quality and conservation. His blend-with-nature vision arguably was focused more on aesthetics than ecology, but potential buyers liked what they saw, and word slowly started to spread about "Charlie Fraser's island paradise," a phrase *Fortune* magazine coined in 1967.

A turning point for publicity came in 1962, when the *Saturday Evening Post* ran a photograph of Fraser walking in perfect lock step with an eight-foot alligator. Newspapers in South Carolina and North Carolina picked up the story, and national publications chimed in with glowing reviews. Fraser was a gifted promoter. He changed the name of "Horse's Hole" — a small lake on the island — to "Audubon

Pond.” He called drainage ditches “lagoons.” Subdivisions were “plantations.” And Fraser never sold condos, he marketed “villas” — lots of them. As Sea Pines’ sales accelerated, Fraser secured significantly more financing from Travelers and started building Harbour Town, a picturesque marina surrounded by restaurants, shops, and condos. The marina’s yacht basin was designed to be a perfect circle, but Fraser refused to cut down a massive southern live oak that stood in the way of that plan. So the company spent an extra \$250,000 to preserve the tree on a small spit of land extending into the otherwise circular harbor. It was a defining moment for Fraser, Sea Pines, and Hilton Head.

Fraser was always willing to invest lavishly in Sea Pines’ visual appeal. For example, he built a 90-foot lighthouse — not to guide mariners, but to create a dramatic backdrop for the 18th green of Harbour Town Golf Links, a new course designed by Pete Dye and Jack Nicklaus. The course was so highly anticipated that it was placed on the PGA Tour’s 1969 schedule before the course was completed.

By then, other developers of Hilton Head were creating their own upscale “plantations” by copying many of Fraser’s ideas. “The Sea Pines or Hilton Head style became a generic term among architects and landscape designers,” Danielson noted. Sea Pines’ land-use covenants (including strict rules against cutting down trees) became a model for residential developments nationwide.

Sea Pines University

After earning his MBA from the Wharton School at the University of Pennsylvania, Rummell drove to Hilton Head for a job interview with Fraser. It was 1971, a year when the economic transformation of the island was creating dramatic visual contrasts. As he approached Sea Pines’ swanky

William Hilton Inn, Rummell was surprised to see a native islander plowing oceanfront land with a mule. That was his first clue that he was about to get an education unlike anything he had encountered at Wharton.

Fraser hired Rummell and many other Ivy League MBAs, and the company became, in effect, a postgraduate program for master-planned resort and residential development. “Charles was a huge believer in looking at what other people were doing,” Rummell recalls. “Just before we went public, he chartered a DC-9 and flew 45 employees and their spouses to Southern California to look at other people’s projects. This was a small company, and he spent a fortune doing that.”

The small company, however, was growing rapidly. Fraser assigned Rummell to the team that was developing Amelia Island Plantation off the coast of Florida. Other teams were cloning the Sea Pines model elsewhere: on the northern end of Hilton Head; on Kiawah Island, S.C.; at River Hills Plantation southwest of Charlotte, N.C.; at Brandermill in the suburbs of Richmond, Va.; and at Palmas del Mar (Sea Palms) on the southeastern coast of Puerto Rico.

The company’s liabilities soared from \$12.6 million in 1969 to \$283 million in 1975, and the interest rates Sea Pines was paying spiked into the teens. The Arab oil embargo and the recession of 1973-1975 also hit the company hard. Fraser publicly blamed the company’s problems on Federal Reserve Chairman Arthur Burns, but the bigger issue was cost overruns at Palmas del Mar, a resort that was extravagant even by Sea Pines’ standards. At one point, the company placed a third mortgage on the southern end of Hilton Head to make payroll at Palmas del Mar.

“Charles never met a debt instrument he didn’t want to hug,” Rummell says with a laugh. “Once financing became readily available, he got way ahead of his capability.” At Sea

Economic Development in Paradise

Residents of Hilton Head Island created a town government in 1983 to slow down growth and “preserve paradise” by imposing tighter land-use controls. Over the years, critics of this approach have caricatured the town’s initial strategy as: “Now that we are here, let’s blow up the bridge!”

The bridge, of course, is still standing, and for many years, Hilton Head continued to grow rapidly. The total assessed value of the island’s real estate nearly doubled from 1990 to 2000 and doubled again from 2000 to 2010 — due partly to growth and partly to appreciation of existing property. During the recession of 2007-2009, however, development slowed dramatically, and the average value of single-family homes fell from more than \$1 million to less than \$670,000, while the average value of condos dropped from \$449,000 to \$249,000. Those values have not recovered. Also, the average age of the town’s residents has increased from 40 in 1990 to 51 in 2010, and it is expected to move higher as the market continues to transition from second homes to retirement homes.

In light of these changes, there has been a growing view among town government leaders that the island should diversify its economy, attract and retain younger people, and become a “real town” with a full spectrum of job opportunities and housing options. Toward that end, the town has eased some zoning restrictions, created an economic development organization, and hired Don Kirkman as the organization’s first director.

Kirkman speaks passionately about creating the missing rungs on the island’s socioeconomic ladder by attracting small business owners who could live and work virtually anywhere that has good Internet access. “If you can locate your business anywhere,” he says, “why not locate it in a place where you would love to live?”

Kirkman says he is optimistic about the island’s future, but he concedes that it feels strange “to be hired as the first economic development director for a town that was formed for the specific purpose of opposing economic development.”

— KARL RHODES

Pines University, students learned what to do and what not to do by interacting with Fraser. “He had a wonderful optimism that was part of his creativity,” Rummell marvels. “He had the courage of his convictions, so he was hard to help when he got his mind set on something. Everybody told him not to go to Puerto Rico.”

During the next few years, the Sea Pines Company lost everything except its original properties. Fraser sold the company in 1983 for \$10 million, a fraction of what it was once worth. By then, Sea Pines was more of a resort management company than a development company, but the Sea Pines style had become a nationally prominent model for resort and residential development. Several alumni helped finish some of the bankrupt projects that Fraser had started, and many of his protégés developed highly successful projects on their own, both on Hilton Head and across the country.

Sea Pines alumni say they are the biggest beneficiaries of Fraser’s genius and Hilton Head’s success. Four of them — including Rummell — went on to chair the Urban Land Institute, which gave Fraser a Heritage Award, one of only nine given in the history of the institute, to recognize land-planning contributions of lasting importance. Several Sea Pines alumni remained on Hilton Head, including J.R. Richardson, a prominent local developer whose family owns and operates Coligny Plaza, the island’s oldest shopping center. When asked who benefited most from Fraser’s influence, Richardson just smiles and raises his hand.

Richardson was among the many Sea Pines alumni who were devastated when Fraser died in a boating accident in 2002. Richardson helped make arrangements to bury his mentor on Hilton Head at the Harbour Town marina — beneath the southern live oak that Fraser refused to cut down.

Gullah Gold

Development of Hilton Head gradually improved the quality of life for Barnwell and many other Gullah people.

They gained electricity, running water, better roads, better schools, and better medical care. But the economic gap between native islanders and wealthy newcomers remains enormous. At the end of one dirt road, there are small shacks and trailers about 100 yards from luxury homes that are visible through the woods.

“We have these fantastic people who are here from all over the world in this world-class community. Yet we still have people on Gumtree Road who are not connected to public sewer,” Barnwell says. “We still have people who are not in the economic mainstream.”

Over the years, many Gullah families have sold their land — including some prime oceanfront properties — but some native islanders have retained their acreage, following the advice of Barnwell’s grandfather and other Gullah elders. Selling land still goes against their culture, and it can be difficult for native islanders to develop their properties, partly because much of the land belongs to far-flung family members who inherited portions of it from generations of ancestors who died without wills. This encumbered land is called “heirs” property because it is titled to the unnamed “heirs” of someone who has died.

Today, a nonprofit organization in Charleston, S.C. — the Center for Heirs’ Property Preservation — is working to clear “heirs” land titles for families in the region who cannot afford lawyers and want to benefit economically from their land without selling it. In the meantime, Barnwell and his family have demonstrated how to use limited liability corporations and long-term land leases to generate income from their land. The family used both of those tools to facilitate the development of Bluewater Resort and Marina, an upscale timeshare on Skull Creek, where Barnwell used to bog for crabs. He concedes that turning Gullah dirt into Gullah gold can be tedious and complicated, but the economic payoff sure beats raising butter beans and digging up crabs. **EF**

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Economic Brief

October 2015, EB15-10

Calculating the Natural Rate of Interest: A Comparison of Two Alternative Approaches

By Thomas A. Lubik and Christian Matthes

The natural rate of interest is a key concept in monetary economics because its level relative to the real rate of interest allows economists to assess the stance of monetary policy. However, the natural rate cannot be observed; it must be calculated using identifying assumptions. This *Economic Brief* compares the popular Laubach-Williams approach to calculating the natural rate with an alternative method that imposes fewer theoretical restrictions. Both approaches indicate that the natural rate has been above the real rate for a long time.

The natural rate of interest is one of the key concepts for understanding and interpreting macroeconomic relationships and the effects of monetary policy. Its modern usage dates back to the Swedish economist Knut Wicksell, who in 1898 defined it as the interest rate that is compatible with a stable price level. An increase in the interest rate above its natural rate contracts economic activity and leads to lower prices, while a decline relative to the natural rate has the opposite effect. In Wicksell’s view, equality of a market interest rate with its natural counterpart therefore guarantees price and economic stability.

constantly react to economic shocks, gives rise to a natural rate of interest akin to Wicksell’s original concept. Woodford’s innovation was to show how the natural rate relates to economic fundamentals such as productivity shocks or changes in consumers’ preferences. Moreover, an inflation-targeting central bank can steer the economy toward the natural rate and price stability by conducting policy through the application of a Taylor rule, which links the policy rate to measures of economic activity and prices.

Naturally, monetary policymakers should have a deep interest in the level of the natural interest

Effect of the ‘Polar Vortex’ on Economic Activity

BY LISA KENNEY

“The Effect of Winter Weather on U.S. Economic Activity.” Justin Bloesch and Francois Gourio, Federal Reserve Bank of Chicago *Economic Perspectives*, vol. 39, First Quarter 2015.

The polar vortex that descended on parts of the United States in the winter of 2013-2014 brought cold temperatures, record snowfalls, and possibly an economic slowdown. Anecdotes about boats delivering iron ore being unable to traverse the frozen Great Lakes — thus causing a delay in steel production — seemed to draw a connection between the weather and economic activity. But how accurate is that assumption?

Economists at the Chicago Fed studied whether this unusual winter actually caused the decline of economic indicators such as industrial production, employment, and housing starts from December 2013 to March 2014. They found that while weather had a significant, but short-lived, impact on economic activity, the effect was not large enough to account fully for the weak economy during that period.

They looked at both national and regional data for the actual winter weather and economic indicators. They also use historical data to determine if the economy has become more or less sensitive to weather changes over time.

Both national and regional data lead to similar results, though the national data are less clear because they cannot take into account regional variations in the weather. Some patterns can be attributed in part to the weather, but they cannot explain the magnitude and timing of the slowdown. Indeed, the researchers find that “an important share of the slowdown in the first quarter was driven by an inventory correction and the effect of foreign trade.”

Also, the timing of the decline was uneven across indicators: Some declined in January, others did so in February, and still others declined in more than one month.

“Job Switching and Wage Growth.” R. Jason Faberman and Alejandro Justiniano, Federal Reserve Bank of Chicago *Fed Letter* No. 337, 2015.

In a recent *Chicago Fed Letter*, economists Jason Faberman and Alejandro Justiniano explore whether the worker quit rate is correlated with wage growth and inflation. They find it to be not only highly correlated, but also highly predictive of both future wage growth and future inflation.

Faberman and Justiniano use data from the Job Openings and Labor Turnover Survey (JOLTS) to estimate the aggregate quit rate — a proxy for the pace at which workers move to new jobs — in each month since 2000. They find that the quit rate, along with wage growth, is highly procyclical, meaning it rises

during economic expansions and falls during recessions.

The authors find that fluctuations in the quit rate appear to lead changes in the wage growth, peaking two to four quarters ahead. They also find that changes in the quit rate appear to lead changes in the inflation gap (the difference between actual inflation and long-run expected inflation). This suggests the quit rate may be a useful predictor of both future inflation and future wage growth.

“Is the Intrinsic Value of Macroeconomic News Announcements Related to their Asset Price Impact?” Thomas Gilbert, Chiara Scotti, Georg Strasser, and Clara Vega, Federal Reserve Board Finance and Economics Discussion Series No. 2015-046, April 23, 2015.

Some macroeconomic news announcements have a strong effect on asset prices and some do not. But there is not much literature on *why* this is the case. Fed researchers try to answer that question in a recent Finance and Economics Discussion Series paper.

First, they define and estimate novel measures of the intrinsic value of 36 macroeconomic announcements. The authors’ definition of the intrinsic value of each announcement is its ability to nowcast several fundamentals, namely GDP, the GDP price deflator, and the federal funds target rate. (Nowcasting involves a statistical model that produces predictions about these fundamentals in real time; the actual measures of these fundamentals are often released only after a long delay.) Next, the authors decompose each announcement’s intrinsic value into three characteristics: timing of the announcement, revision noise, and its relation to fundamentals using the same nowcasting framework. Finally, the paper relates the intrinsic value and the three characteristics to the announcements’ effect on asset prices.

They find that their novel measure of intrinsic value “explains between 8 and 22 percent of the variation in the heterogeneous response of asset prices.” When they estimate the importance of each of the three individual characteristics of the announcement, they find that tardiness — the loss of intrinsic value due to the time lag between the period covered by the announcement and the announcement’s release — is the most important factor in explaining the asset price impact. The announcement’s relation to fundamentals is less important and the revision noise is found to be insignificant.

Another takeaway from the research is that the relationship between the intrinsic value and the asset price impact is imperfect. Some announcements have a large impact on asset prices but are not found to have the biggest intrinsic value, which leads the authors to conclude that it is possible for financial markets to overreact to certain announcements. **EF**

Share and Share Alike

on inequality

ON INEQUALITY

BY HARRY G. FRANKFURT
 PRINCETON, N.J.: PRINCETON
 UNIVERSITY PRESS, 2015, 120 PAGES

HARRY G.
 FRANKFURT

REVIEWED BY HELEN FESSENDEN

For most of the postwar era, concerns about economic equality have been relegated to the sidelines of mainstream macroeconomics. In recent years, however, equality has become more salient in economics literature, one recent example being the surprise success of Thomas Piketty's *Capital in the Twenty-First Century*. Now, one of the country's most famous philosophers, Harry Frankfurt, joins this debate by asking the daring question: Is equality as important a moral good as other human values?

Frankfurt, a Princeton University professor (now emeritus), asserts that those who oppose economic inequality are making a misguided assumption. By defining equality as an inherent moral good, he contends, we mistakenly focus on a person's standing relative to others rather than addressing how we can meet that person's most basic material needs. As a result, our target is a certain level of wealth that has nothing to do with a person's actual circumstances and wants.

When we make such claims, Frankfurt explains, it is in part because it is much easier to define what is "equal" (everyone gets the same) than it is to define what is "enough." By "enough," Frankfurt emphasizes that he is not referring to subsistence levels, but what a person needs so that he feels reasonably satisfied, so that "he does not resent his circumstances," as Frankfurt puts it. Another common error among inequality opponents, to Frankfurt, is that they conflate the effects of inequality with inequality itself. "Whenever it is morally important to strive for equality, it is always because doing so will promote some other value rather than because equality itself is morally desirable," he argues.

But isn't a needy individual happier and better off if he or she gets more of a desired good that others have in abundance? Not necessarily, contends Frankfurt. We may try to distribute something valuable, such as food or medicine, to a group of impoverished individuals, and we can avoid inequality by making sure that everyone gets the same amount. But if the allotted portion of food isn't enough to end nutritional deprivation, or if the dosage of medicine isn't enough to bring people back to health, the group continues to suffer. This is one reason why defining what is "enough" is a moral imperative for Frankfurt.

Frankfurt goes on to dissect an economics term —

diminishing marginal utility — with the tools of a philosopher. He takes aim at the view of the late economist Abba Lerner that because one person's enjoyment of a particular good declines as he or she acquires more of it, equality will maximize aggregate happiness as more people share in the enjoyment of that good. This view is incorrect, Frankfurt argues, because there are many instances where each marginal unit is still equally desirable if it follows or is joined by another. A good example would be a collector who acquires one more item, but is far from being done and "satisfied." And sometimes there are cases when enjoyment increases with consumption — say, addiction.

Frankfurt makes clear to the reader that he is not arguing from an anti-egalitarian standpoint as such. He contends that his central case — egalitarianism has no inherent moral value — does not mean he opposes attempts to reduce inequality. In fact, he writes, he supports many of these efforts. But these steps are means to an end, namely, to achieve "socially or politically desirable aims" that *do* have an inherent value.

Frankfurt keeps his focus on the philosophical argument rather than policy prescriptions. But if a lawmaker or economist were to apply his reasoning to policy, it might imply that inequality opponents should look to improving resources and opportunities for the neediest rather than equalizing the material conditions of those on the middle and upper tiers of income and wealth.

Frankfurt closes by discussing the concept of respect, and why it should matter. As he defines it, equal treatment is quantifiable and unrelated to a person's circumstances; as such, equality is wholly impersonal. Respect, by contrast, is completely personal, because it is the acknowledgement by one person of another's unique needs and achievements. When someone complains that he or she is not respected, what they mean is that someone is refusing to "acknowledge the truth about them," Frankfurt explains. When someone is denied respect, "it is as though his very existence is reduced."

The reason why respect and equality need to be jointly defined and addressed is that most people confuse the two, Frankfurt concludes. And this personal angle is why the broader debate over inequality has taken on such resonance. When someone demands equal treatment, what he or she is most likely asking for is respect — that is, an acknowledgement of the reality of their personal lives.

With this book, as in his past work, Frankfurt has shown why it is so important to question common terms that are too often used reflexively. Regardless of one's own views on the past, present, and future of inequality, *On Inequality* is a salutary effort to help readers pause and think about the beliefs that motivate our rhetoric. **EF**

Show and TEL: Are Tax and Expenditure Limitations Effective?

BY JOSEPH MENGEDOTH AND SANTIAGO PINTO

More than half of the states in the United States are subject to some kind of limitation on their ability to raise taxes, spend money, or incur debt. Most states, at the same time, impose similar constraints on their local governments. These measures are commonly referred to as tax and expenditure limitations (TELS). TELS are part of a larger set of fiscal rules aimed at curbing the budget process with the objective of constraining decisions made by governments. Recent research has examined the effectiveness of TELS in achieving their intended objectives. This research mainly attempts to disentangle the effect of TELS on fiscal policies, policy outcomes, and economic performance. The findings are mixed: While a few studies assert that TELS do restrain governments, others hold exactly the opposite. Some research work even finds that TELS have been detrimental to the states' financial position.

Why Do TELS Exist?

State and local government budgets are constructed following certain fiscal rules defined in advance. While some of these rules define specific guidelines that should be obeyed throughout the budgeting process in order to guarantee fiscal transparency and accountability, others explicitly restrict the size of the government. Among the latter, TELS are perhaps the most widely used among state and local governments. Specifically, TELS establish a set of rules typically defined in terms of limits on the growth of tax revenues, spending, or both, with the ultimate objective of constraining the growth in the size of government. Other fiscal rules, such as balanced budget provisions and debt limits, do not necessarily intend to limit the size of government.

James Poterba of the Massachusetts Institute of Technology argues that the role of TELS and fiscal rules in general can be characterized by two contrasting views: the institutional irrelevance view and the public choice view. The institutional irrelevance view claims that budgetary institutions simply reflect voters' preferences and do not directly affect fiscal policy outcomes. States politically dominated by electorates manifestly opposed to a strong government presence in the economy would tend to limit government revenue and expenditure regardless of the existence of TELS, so in this sense the rules will necessarily be nonbinding and simply viewed, in Poterba's words, as "veils, through which voters and elected officials see, and which have no impact on ultimate policy outcomes."

The public choice view, on the other hand, supports the idea that fiscal rules can constrain fiscal policy outcomes. This view implies that politicians and governments, driven by self-interest motives, choose policies biased toward higher levels of taxes and expenditures, and these choices

do not necessarily benefit the public interest. In this context, fiscal limits, such as TELS, can potentially limit the set of alternatives that politicians may choose from and, consequently, influence policy outcomes. Even in this case, however, it is not clear which rules are effective and how the system should be designed.

Moreover, the implementation of TELS is challenging because it is subject to the well-known principal-agent or delegation problem. The idea is that once voters (the principals) set the limits through TELS, the implementation is ultimately delegated to politicians or government officials (the agents), who, as stated earlier, may prefer larger levels of taxes and spending. In order for TELS to achieve their intended objectives, voters should be able to follow the implementation of the rules and monitor governments' current and future actions. But such monitoring is not only costly but also imperfect. As a result, governments driven by self-interest motives might end up adopting alternative and circumventing actions that will partially offset the effects of the limitations. For instance, governments may strategically change their revenue structure and increase reliance on income sources not subjected to limitations.

State-Level TELS

As of 2010, some 30 states have enacted some kind of tax or expenditure limitations, of which 23 have only spending limits, four have only tax limits, and three have both spending and tax limits. The institutional differences across state-level TELS include the method of codification, approval procedures, type of limit, specification of the growth factors, treatment of surplus revenues, and provisions for overriding or waiving the limit. These institutional differences make some TELS more restrictive and binding than others.

Differences in the means of codification translate into differences in effectiveness. While in some states TELS are statutory, in others they are codified in the state constitutions. Statutory TELS can be more easily modified or rescinded by the legislature, so constitutional TELS are generally considered more effective tools to restrain the government's size.

The methods of approving TELS also vary across states. In general, one of the following procedures is used: citizen initiative (or referendum), legislative proposal, or constitutional convention. These alternatives are not mutually exclusive and a combination of the three may also be observed. For instance, the approval of a citizen initiative may require the approval by the legislature as well.

Differences in the type of limitation are also, of course, highly significant. States establish limits on expenditures, revenues, appropriations, or a combination of them. In principle,

since most states also have balanced-budget provisions in place, expenditure limits should be largely equivalent to revenue limits. In practice, however, revenue limits are more restrictive than spending limits, mostly because spending limits do not generally affect all spending categories, and the spending limits usually apply only to general fund expenditures, not special funds. The latter means that the legislature can always avoid the limits imposed by TELs by transferring funding allocations from one fund to the other. The limits on appropriations are typically set as a percentage of the general revenue estimates.

State TELs vary in how they allow tax revenue or spending to grow. TELs generally allow tax revenue or spending to increase according to some combination of three variables: personal income growth, population growth, and inflation. Since personal income growth is generally higher than inflation or population growth, limits based on the former factor are considered less restrictive.

The treatment of budget surpluses is another area of variation. Some state TELs include refund provisions that establish precisely what to do in case of a surplus. The most restrictive TELs require state governments to immediately refund any surplus to taxpayers through rebates. Others mandate governments to use the surplus in other ways such as the retirement of debt, the establishment of rainy day or emergency funds, or budget stabilization funds.

Most TELs also include extraordinary procedures to override the constraints. These procedures include, for instance, a specification of majorities required to change the tax or spending limits. More stringent TELs require supermajorities in typically smaller bodies (such as legislative) and/or simple majorities in larger bodies (such as the electorate).

Local-Level TELs

Currently, 41 states in the United States impose some kind of TELs on their respective local governments. The restrictions may fall on the county, municipal, or school district budgets. The table summarizes the types of TELs that typically apply to local governments. The most common form of TELs at the local level is a property tax rate limitation imposed on specific types of local governments.

As with state-level TELs, some of the limitations imposed on local governments are more restrictive than others depending on how easy it becomes for governments to circumvent or

Local-Level Tax and Expenditure Limitations (TELs)

Type of TEL	Description
Specific limits: Property tax limits	Overall property tax rate limit Apply to all local governments (applies to aggregate tax rate of all local government). Ceiling on the rate; cannot be exceeded without a vote of electorate.
	Specific property tax rate limit Apply to specific types of local government (municipalities, counties, school districts, and special districts) or specific functions.
	Limits on assessment increases Limit on the ability of local governments to raise revenue by reassessment of property or through natural or administrative increase of property values.
	Property tax levy limits Limit on the total amount of revenue that can be raised from the property tax. Generally enacted as an allowable annual percentage increase in the levy determined by population growth and/or inflation.
General limits	General revenue increase limits Limit on the amount of revenue that can be collected during the fiscal year. Usually enacted as a maximum allowed annual percentage increase from previous year or a maximum share of local income; typically tied to population growth and/or inflation.
	General expenditure increase limits Cap on the level of spending during the fiscal year. Usually enacted as a maximum allowed annual percentage increase from previous year or a maximum share of local income; typically tied to population growth and/or inflation.
Full disclosure	Requires public discussion and specific legislative vote prior to the enactment of tax increases. Requires formal vote (generally, simple majority) of the local legislative body to increase the tax.

SOURCE: Authors' analysis

override the constraints. For instance, consider a limit on the property tax rate. In this case, the restriction operates only when the rate reaches the ceiling. At this point, tax revenue may still increase, but it will be driven solely by the growth of the tax base. In other words, this limit by itself may not constrain tax revenues. To avoid this kind of outcome, most TELs at the local level combine a property tax rate limit with a limit on property assessment increases. The most restrictive limitations are those that apply to increases in total tax revenue (property taxes and other types of local tax revenue) or aggregate spending. Generally, the limit allows a given annual percentage increase in tax revenue or spending determined by population growth, inflation, or local income.

TELs in the Fifth District

North Carolina and South Carolina are the only two states in the District in which the state-level governments are subject to TELs. In 1991, North Carolina adopted a statute that limits general fund operating budget spending to 7 percent of the forecasted total state personal income for that same fiscal year. South Carolina's spending limit is mandated by the state constitution, which limits the annual increase in appropriations based on an economic growth measure that is determined by the general assembly. The current formula prescribes that an increase in appropriations be limited to either the prior fiscal year appropriations multiplied by the three-year average growth in personal income or 9.5 percent of total personal income reported in the previous calendar year, whichever is greater.

A larger number of Fifth District states impose TELs at the local level. In North Carolina, counties and municipalities are subject to property tax rate limits. Maryland also imposes

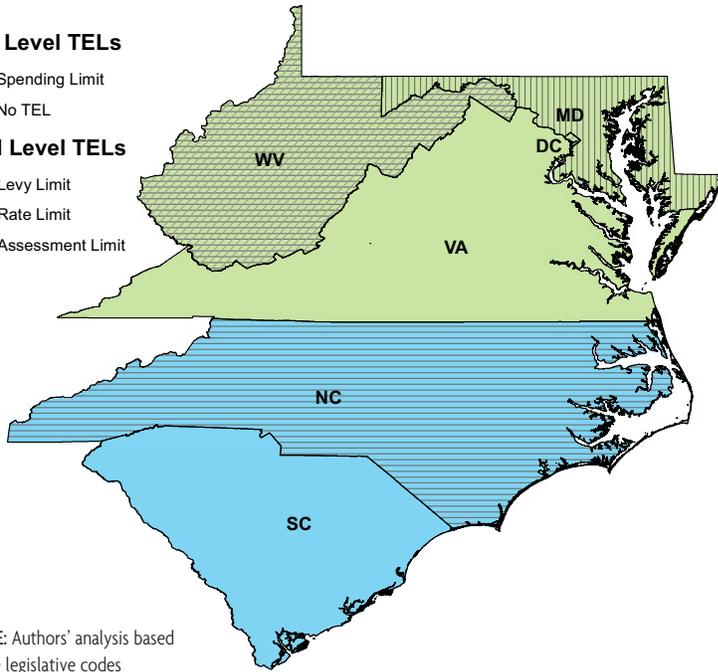
TELS in Fifth District States

State Level TELS

- Spending Limit
- No TEL

Local Level TELS

- Levy Limit
- Rate Limit
- Assessment Limit



SOURCE: Authors' analysis based on state legislative codes

property tax limits; however, the limit is on the assessment increase rather than on the rate. West Virginia has the most potentially restrictive set of TELS in the District, with limits on the overall property tax rate as well as specific property tax rates (for agricultural land, for example) and the amount of property taxes that can be collected. South Carolina and Virginia impose no TELS on their municipalities. The District of Columbia limits annual increases in the total property tax levy. (See map and table.)

Full disclosure laws, which require taxpayers to receive notice of anticipated tax rate increases, do not directly restrict or limit revenues or expenditures and are therefore not considered potentially binding. Such laws exist in three states in the District; Maryland, South Carolina, and Virginia each enacted full disclosure legislation around the same time period — between 1975 and 1977. In Maryland and Virginia, the full disclosure laws extend to counties and municipalities, while in South Carolina the measure also includes school districts.

Measuring Outcomes of TELS: Challenges

Evaluating the effectiveness of TELS is not easy for several reasons. First, the empirical analysis is subject to significant methodological challenges. Second, rules and limitations are very heterogeneous across states and local governments. Not only are some rules more restrictive than others, as highlighted earlier, but they have changed over time as well. Finally, when assessing the effectiveness of these constraints on fiscal policies, the evaluation should be performed in relation to their intended objectives.

For instance, do TELS aim to restrict the overall size of government? Do they intend to limit the growth of certain specific taxes or expenditures or alter the composition of government spending and tax revenue?

One of the methodological challenges in research on the effect of TELS is the problem of endogeneity or reverse causality. The problem becomes more significant when examining the impact of TELS on spending or taxes. It may be, for instance, that jurisdictions with relatively high long-run growth rates of taxes and spending would more likely adopt TELS as a tool to achieve stronger fiscal discipline. Ronald Shadbegian, an economist at the National Center for Environmental Economics, noted that “if voters in states with bigger governments are more likely to vote for a TEL and government spending patterns persist over time, then I would expect to find a positive relationship between a TEL and government size, even though a causal relationship does not exist.” Hence, failure to acknowledge the fact that the decision to adopt TELS by a government may be endogenous would seriously bias the conclusions of the analysis.

Second, the presence of unobservable factors, such as voters' preferences, which differ systematically across jurisdictions, may bias the results if they are not controlled for, as pointed out by the public choice view. The latter is commonly known as omitted variable bias. The main problem is that preferences are not observable. In order to address this issue and differentiate the effect of TELS on government taxes and expenditures from the corresponding effect of voters' preferences, some research work has relied on panel data regression models.

Measuring Outcomes of TELS: Results

Ideally, as when conducting any kind of policy evaluation, the effectiveness of TELS should be assessed by comparing the fiscal outcome with TELS to the counterfactual outcome that would have occurred in the absence of the limitations. Since it is not possible to carry out such an ideal experiment, the impact of TELS is assessed by comparing the outcomes of the treatment group (TEL states) to those of the control group (non-TEL states). For instance, the work by Poterba examines the different responses of TEL and non-TEL states to negative economic shocks that generate unexpected budget deficits (in his work, he considers the late 1980s and early 1990s).

Research has shown, however, that the robustness of the results and conclusions of such analysis depend on the choice of the control group. To overcome some of the weaknesses explained above, recent work by Paul Eliason of Duke University and Byron Lutz of the Federal Reserve Board of Governors relies on a novel approach known as the “synthetic control method” to construct the control group. The objective of their study is to examine the extent to which one of the most stringent TELS in the United States, Colorado's Taxpayer Bill of Rights (TABOR), constrains government size. Specifically, the synthetic control method relies on observed data to construct an artificial control group based on a weighted combination of non-TEL states. The weights for each state are chosen so that taxes and spending in the

control group match taxes and spending in the treatment group prior to the implementation of the limitations.

The earlier literature on TELs focused on how fiscal limits affect government growth. The findings of this research are mixed. For instance, while the work by Poterba concludes that when faced with fiscal distress, TEL states tend to increase taxes by less than non-TEL states, the work by Eliason and Lutz indicates that TABOR does not have any effect on government taxes or spending. To the extent that the institutional irrelevance view correctly assesses the effectiveness of budgetary rules, the absence of a strong relationship between TELs and fiscal policy outcomes should not be surprising. In fact, TELs, according to this view, should not be effective because they are essentially nonbinding.

The lack of association between TELs and government growth may also be attributed to other factors, however. Many researchers highlight the fact that earlier studies did not account for the rich institutional differences across TELs. As noted earlier, TELs are very heterogeneous. For instance, some TELs are more restrictive than others, and it is plausible that the ability of TELs to constrain government size depends precisely on their stringency. In an effort to account for this heterogeneity, Barry Poulson, distinguished scholar at the Americans for Prosperity Foundation, constructed an index of TEL restrictiveness for each of the 50 states. This methodology was later adopted and extended by other researchers. For instance, Lindsay Amiel and Steven Deller, both at the University of Wisconsin, and Judith Stallmann of the University of Missouri conducted several studies using indices like the one developed by Paulson and provide conclusive evidence in favor of following such an approach.

Even when TELs are effective at controlling the growth of specific tax revenues or expenditures, the implementation of TELs in a context where voters cannot fully monitor government actions ends up having numerous unintended effects not fully anticipated or envisioned by their proponents. These effects usually take place when governments take actions to avoid or circumvent the rules established by the legislation.

One way governments may circumvent the restrictions imposed by TELs is by issuing debt. Such a hypothesis is studied by Deller, Amiel, and Stallmann jointly with Craig Maher of the University of Nebraska Omaha. Specifically, they claim that when the limits are imposed only on revenues or only on expenditures, governments would be induced to issue debt. Unlike previous work, which was unsuccessful at documenting such a relationship, their work accounts for the heterogeneity of TELs. Specifically, they found that more restrictive revenue TELs and expenditure TELs are associated with higher levels of government debt. Only TELs that limit revenue and expenditure at the same time restrict the use of debt.

States may still find ways to operate within the limits imposed by TELs by shifting some of their fiscal responsibilities to local governments. James Cox of California State University, Sacramento and David Lowery of Penn State University study such a possibility. They empirically test this

hypothesis by comparing the behavior of pairs of TEL and non-TEL states. Their findings do not generally show that states decentralize responsibilities, with the exception of South Carolina. When comparing state revenue as a fraction of total state and local revenue in North Carolina, a non-TEL state at the time of the study, and the corresponding proportion in South Carolina, a TEL state, they found that the latter was remarkably lower. The authors also underscore that South Carolina did not explicitly prohibit the decentralization of fiscal responsibilities to local governments.

Costs of TELs

Even if TELs are successful at achieving their intended goal of restricting government growth, they may do so at the expense of generating other negative effects. It has been claimed, for instance, that TELs might negatively affect the financial stability of the states. A study by Tucker Staley of the University of Central Arkansas found that more restrictive TELs are strongly associated with higher levels of state revenue volatility. At the local level, work by Mathew McCubbins of Duke University and Ellen Moule, then at the University of South Carolina, indicates that the enforcement of property tax limits have induced state and local governments to rely on a system of revenues is generally more income-dependent, such as income taxes, charges, and fees. This means revenues would be subject to even greater fluctuations during the business cycle.

TELs may also affect the quality of services provided by governments. The relationship between TELs, particularly limitations imposed on property tax growth and school quality, has received a lot of attention in the literature. A few studies have found that reduced funding as a result of TELs negatively affects student achievement in public K-12 schools. The work of Thomas Downes of Tufts University and David Figlio of Northwestern University suggests that TELs “lead to reductions in student outcomes that are far larger than might be expected given the changes in spending.” Possible explanations for this result include disproportionate cuts in instructional rather than administrative expenditures, higher student-teacher ratios, and a shift especially of the more talented students to private schools. Matt Davis, Andrea Vedder, and Joe Stone of the University of Oregon claim that, in fact, the lower levels of education funding could have been compensated with school-finance equalization and other alternative revenues. They argue, however, that TELs may still have a negative impact on student achievement if these constraints make school funding more unpredictable and volatile, as suggested earlier.

The use of tax and expenditure limitations has spread since first implemented almost 40 years ago; however, the effectiveness of TELs in fulfilling their objectives is still in question. Recent research has led to inconclusive and, at times, contradictory results. Due to the heterogeneity and complexity of TELs, significant methodological challenges remain in answering the question of the effectiveness of these fiscal rules. **EF**

STATE DATA, Q4:14

	DC	MD	NC	SC	VA	WV
Nonfarm Employment (000s)	761.1	2,636.8	4,188.5	1,971.1	3,790.7	763.0
Q/Q Percent Change	1.2	0.6	0.9	1.1	0.4	0.1
Y/Y Percent Change	1.2	1.3	2.5	2.6	0.9	-0.2
Manufacturing Employment (000s)	1.0	102.9	454.7	233.0	232.1	47.6
Q/Q Percent Change	0.0	-0.4	1.3	1.2	0.1	-0.1
Y/Y Percent Change	0.0	-1.8	2.4	2.9	0.6	-1.5
Professional/Business Services Employment (000s)	160.3	426.6	583.8	260.6	676.0	67.9
Q/Q Percent Change	1.5	0.4	1.3	2.2	-0.6	1.1
Y/Y Percent Change	2.7	2.0	5.4	4.4	0.4	5.3
Government Employment (000s)	236.0	506.9	715.0	359.2	707.7	153.8
Q/Q Percent Change	0.9	0.6	-0.2	0.6	0.1	0.8
Y/Y Percent Change	-1.3	0.7	-0.3	1.7	0.4	0.4
Civilian Labor Force (000s)	383.7	3,104.6	4,625.7	2,212.5	4,234.3	778.4
Q/Q Percent Change	1.2	0.0	0.0	0.7	0.0	-0.8
Y/Y Percent Change	3.2	-0.1	-0.4	1.9	0.0	-2.1
Unemployment Rate (%)	7.7	5.5	5.5	6.6	4.8	6.0
Q3:14	7.8	5.7	6.0	6.5	5.0	6.4
Q4:13	8.1	6.2	6.9	6.6	5.4	6.6
Real Personal Income (\$Bil)	42.6	300.8	363.4	165.4	388.7	61.9
Q/Q Percent Change	0.8	1.0	1.3	1.4	1.1	0.9
Y/Y Percent Change	2.3	3.5	4.6	4.3	3.1	2.5
Building Permits	686	3,778	12,622	6,540	6,896	536
Q/Q Percent Change	0.0	-27.5	-11.6	-6.9	-6.1	-17.7
Y/Y Percent Change	0.0	-12.3	2.4	15.7	20.7	26.1
House Price Index (1980=100)	719.8	429.7	315.4	320.1	417.9	227.7
Q/Q Percent Change	3.0	0.7	0.4	0.9	1.2	0.6
Y/Y Percent Change	9.5	3.9	4.0	4.7	4.3	3.3

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.
- 3) Manufacturing employment for DC is not seasonally adjusted.

SOURCES:

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

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

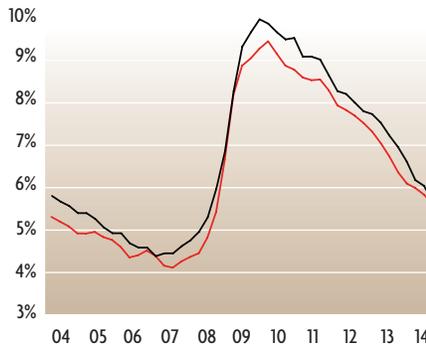
Nonfarm Employment

Change From Prior Year
Fourth Quarter 2003 - Fourth Quarter 2014



Unemployment Rate

Fourth Quarter 2003 - Fourth Quarter 2014



Real Personal Income

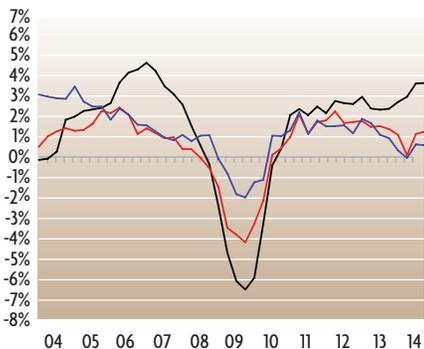
Change From Prior Year
Fourth Quarter 2003 - Fourth Quarter 2014



— Fifth District — United States

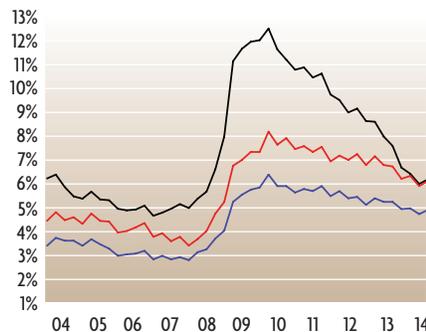
Nonfarm Employment Major Metro Areas

Change From Prior Year
Fourth Quarter 2003 - Fourth Quarter 2014



Unemployment Rate Major Metro Areas

Fourth Quarter 2003 - Fourth Quarter 2014



Building Permits

Change From Prior Year
Fourth Quarter 2003 - Fourth Quarter 2014



FRB—Richmond Services Revenues Index

Fourth Quarter 2003 - Fourth Quarter 2014



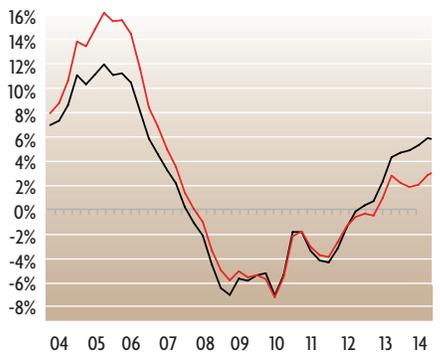
FRB—Richmond Manufacturing Composite Index

Fourth Quarter 2003 - Fourth Quarter 2014



House Prices

Change From Prior Year
Fourth Quarter 2003 - Fourth Quarter 2014



— Fifth District — United States

METROPOLITAN AREA DATA, Q4:14

	Washington, DC	Baltimore, MD	Hagerstown-Martinsburg, MD-WV
Nonfarm Employment (000s)	2,572.6	1,364.3	104.4
Q/Q Percent Change	1.4	1.3	1.3
Y/Y Percent Change	1.3	1.3	-1.0
Unemployment Rate (%)	4.8	5.9	5.7
Q3:14	5.1	6.1	6.0
Q4:13	5.3	6.6	6.4
Building Permits	4,967	1,694	331
Q/Q Percent Change	-31.2	-22.6	17.4
Y/Y Percent Change	-10.9	25.6	41.5

	Asheville, NC	Charlotte, NC	Durham, NC
Nonfarm Employment (000s)	182.3	1,089.5	294.2
Q/Q Percent Change	3.1	2.7	1.2
Y/Y Percent Change	2.8	3.6	1.5
Unemployment Rate (%)	4.4	5.5	4.7
Q3:14	4.9	6.0	5.0
Q4:13	5.5	7.0	5.5
Building Permits	320	4,083	1,055
Q/Q Percent Change	-14.2	-21.1	19.3
Y/Y Percent Change	-13.7	-1.8	53.1

	Greensboro-High Point, NC	Raleigh, NC	Wilmington, NC
Nonfarm Employment (000s)	355.0	573.4	117.7
Q/Q Percent Change	2.5	1.9	1.0
Y/Y Percent Change	1.4	3.9	2.7
Unemployment Rate (%)	5.8	4.5	5.3
Q3:14	6.5	4.9	6.0
Q4:13	7.5	5.6	6.9
Building Permits	687	3,016	621
Q/Q Percent Change	17.2	-5.7	-3.0
Y/Y Percent Change	39.4	-2.5	-39.6

NOTE:
Nonfarm employment and building permits are not seasonally adjusted. Unemployment rates are seasonally adjusted.

	Winston-Salem, NC	Charleston, SC	Columbia, SC
Nonfarm Employment (000s)	256.7	326.3	377.3
Q/Q Percent Change	1.9	1.1	1.4
Y/Y Percent Change	1.5	3.1	1.1
Unemployment Rate (%)	5.3	5.7	6.0
Q3:14	5.9	5.7	6.1
Q4:13	6.8	5.7	6.0
Building Permits	365	1,395	883
Q/Q Percent Change	-46.9	10.4	-33.6
Y/Y Percent Change	81.6	30.5	-1.0
	Greenville, SC	Richmond, VA	Roanoke, VA
Nonfarm Employment (000s)	395.6	640.7	162.2
Q/Q Percent Change	2.1	1.4	1.4
Y/Y Percent Change	2.0	1.7	1.1
Unemployment Rate (%)	5.9	5.1	4.8
Q3:14	6.0	5.4	5.2
Q4:13	5.9	5.8	5.5
Building Permits	1,295	824	136
Q/Q Percent Change	24.0	-34.2	17.2
Y/Y Percent Change	96.2	-15.1	-18.1
	Virginia Beach-Norfolk, VA	Charleston, WV	Huntington, WV
Nonfarm Employment (000s)	757.0	124.2	143.1
Q/Q Percent Change	-0.3	0.2	2.2
Y/Y Percent Change	0.2	-0.2	0.9
Unemployment Rate (%)	5.3	5.9	6.0
Q3:14	5.6	6.3	6.4
Q4:13	6.0	6.3	7.2
Building Permits	1,614	5	68
Q/Q Percent Change	30.0	-16.7	100.0
Y/Y Percent Change	99.0	-79.2	36.0

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

Why Do College Graduates Earn More?

BY KARTIK ATHREYA

In our research and writing on workforce development and on earnings differences among individuals, the Richmond Fed has often highlighted the importance of college-level training for those who are well-prepared for it. The economic benefits that workers receive from college completion are well-known: On average, college graduates earn almost twice as much over their lifetimes as high school graduates. Moreover, the size of the earnings gap between college (especially post-college) and high school graduates has been trending upward for decades. But where does this earnings premium from higher education come from?

The predominant view among economists is that a student's investment in higher education adds to his or her "human capital" in the form of new or improved skills. This interpretation, which economists Gary Becker and Theodore Schultz set out in the early 1960s, is an intuitive one: A college student who chooses a field of study wisely and who graduates will increase his or her value to employers through higher productivity. (Some other ways of building human capital include work experience and "on the job" training programs.) On this view, the question for policymakers is whether such investments are occurring in an efficient amount, and if not, whether policies like college subsidies and student-loan programs could achieve this.

The main rival view is the signaling model. This view, advanced by Michael Spence, Kenneth Arrow, and Joseph Stiglitz in the mid-1970s, is also intuitive: It holds that completion of educational programs, such as college, may simply demonstrate pre-existing attributes of the student, such as intelligence or motivation. Under the signaling view, an employer does not look upon a college degree as a sign of newly acquired skills so much as a clear signal for identifying workers with these traits, which they already had.

Thus, one disconcerting possibility is that we might see a college earnings premium even if education were totally useless in improving people's skills. This could happen if someone's true productivity is not directly observable and if higher education — even if not affecting productivity at all — is harder for low-productivity people to complete than for high-productivity people. In this case, the question for policymakers is whether time-consuming and resource-intensive education is really the most efficient way to assess someone's productivity — or whether education policies subsidizing education may in fact be *worsening* matters by creating a wasteful arms race.

Both human capital and signaling likely play some role in the way employers look at education, and in particular, college degrees. We can readily think of fields in which educational programs and degrees affect eventual job performance, such as law, engineering, architecture, and medicine. We can also

point to many jobs that have little to do with any specific college degree. But in perhaps the majority of cases, both human capital and signaling are driving the college premium. It's difficult to reach hard and fast conclusions about their relative importance, however, because their influence is observed only indirectly. Worse yet, almost any argument in favor of one interpretation of the data can be used in support of the other.

From an individual's perspective, the source of the college earnings premium doesn't matter. All that an individual needs to know is that college can be a worthwhile investment — depending, among other things, on his or her field and readiness. But from society's perspective, the question of human capital versus signaling has important implications. Are we under-investing in higher education, or over-investing? The greater the importance of human capital, the more promise higher education holds as a means of increasing individual incomes and the economy's productivity overall. The greater the importance of signaling, the more central other policies should become to workforce development.

My research and that of some of my Richmond Fed colleagues has focused on the human capital model and what it means for individuals and policymakers. For me, signaling carries less weight as a compelling explanation in most cases. This is for a few reasons. First, if the signaling model were largely true, one might expect more employers to seek to avoid paying the college premium — by looking for alternatives to the sheepskin, such as more use of job testing, apprenticeships, and the like. Second, the idea that employers derive value from the skills taught in higher education (both job-specific, like engineering skills, and general, like critical thinking) seems consistent with the trends we've seen in the skills demanded in today's knowledge-oriented economy. Lastly, one implication human capital theory has, which signaling does not, is the prediction that earnings will rise at a diminishing rate for much of working life and then decline — a pattern observed almost universally in the data.

Even if lengthy education serves largely as a signal, it may still be the most efficient screening method, yielding gains for the economy. But based on what we know now, the human capital model seems generally a helpful way to think about the investments that students make, and society makes, in higher education. And regardless of which explanation is right, I think most of us would agree it is still important to ensure that young people have the best information and preparation needed to make educational decisions wisely given their own particular attributes and circumstances. **EF**

Kartik Athreya is senior vice president and director of research at the Federal Reserve Bank of Richmond.

NEXT ISSUE

Trade with Cuba

The United States has recently taken steps to normalize relations with Cuba. While fully lifting the longtime trade embargo requires an act of Congress, some states (including Virginia) have been exporting food and medical products to Cuba for over a decade. Will they have a leg up if U.S. policy reopens a market that has been mostly closed for 55 years? What will be the challenges?

Puerto Rico's Debt Crisis

Puerto Rico defaulted on its debt in the second half of 2015, with no clear resolution to its budget imbalances or debt crisis in sight. What are the options for resolving the debt crisis, and how does the island's status as a U.S. territory affect the situation?

The Economist in the Machine

Major technology-oriented companies, such as Amazon, eBay, Google, and Microsoft, have been hiring in-house research economists. Going beyond corporate economists' traditional roles, such as forecasting, these researchers are providing insight into their companies' hard problems and, at the same time, publishing research like their academic counterparts. What's it like to be one of this new breed of researchers? What is motivating companies to bring them on board -- and economists to join them?

Policy Update

In August, the SEC finalized a rule requiring public companies to disclose the ratio of their CEOs' compensation to the median compensation of their employees. This "pay versus performance" rule is a requirement of the Dodd-Frank Act and complements the SEC's 2011 "say on pay" rule. These additional disclosures are intended to help shareholders better understand executive compensation, but some critics have argued they could create more confusion than clarity.

Economic History

With the immigration debate front and center in Europe, this is a good time to look back at the economic legacy of the wave of mass migration from Europe to the United States between the Civil War and World War I. What was immigration's role in the rapid growth of the U.S. economy, as industrialization and urbanization transformed the country? And what resources and challenges did newcomers bring to the United States?

Interview

Emi Nakamura of Columbia University on new methods of measuring price stickiness, explanations of why inflation didn't drop even further after the Great Recession, and the difficulty of measuring the effects of monetary and fiscal policy.

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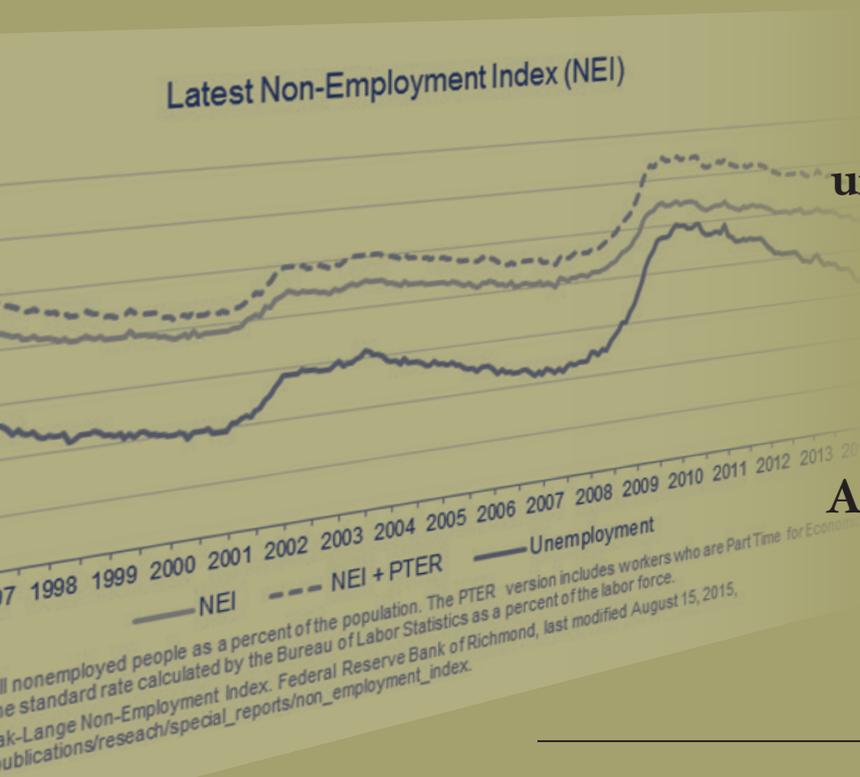
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The Hornstein-Kudlyak-Lange Non-Employment Index



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