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FIRST/SECOND QUARTER 2025

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VOLUME 30 ■ NUMBER 1
FIRST/SECOND QUARTER 2025

ECON FOCUS

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

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PUBLISHED BY
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P.O. Box 27622
Richmond, VA 23261
www.richmondfed.org
www.x.com/RichFedResearch

Subscriptions and additional copies: Available free of charge through our website at www.richmondfed.org/publications.

ISSN 2327-0241 (Print)
ISSN 2327-025x (Online)

FEATURES

DEPARTMENTS

Cover: North Anna Power Station in Louisa County, Va.
Photo courtesy Dominion Energy

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Which Way for the Inflation Winds?

In 2018, when I joined the Richmond Fed, few Americans had inflation on their radar. Why should they have? We'd had a generation of stable prices, supported by the growth of e-commerce, the rise of globalization, favorable workforce demographics, and innovations like the development of fracking.

My predecessors on the Federal Open Market Committee (FOMC) also deserve credit; their commitment to an explicit inflation target earned the confidence of businesses and consumers, helping to anchor inflation expectations. If anything, in the years before the pandemic, the concern had been whether inflation was too low. That sure seems like a long time ago.

You remember what happened next. COVID-19 and the associated shutdowns unleashed a series of material and labor supply shocks. Then, the successful vaccine rollout, federal stimulus, and excess savings combined to turbocharge demand. There weren't enough chips to put into cars, not enough workers to fill jobs, not enough houses to meet people's desire for more space. We also saw a slew of non-pandemic shocks complicate supply chains further, from winter storms to stuck ships to the Russian invasion of Ukraine. Prices soared.

The historical wisdom was that the Fed shouldn't overreact to short-term supply shocks; don't constrain the economy to address cost pressures that will resolve on their own. But high inflation didn't fade. In part, that was because it took much longer to get chips into cars, boats into ports, and workers into jobs than anyone anticipated. But it's also fair to say that the unprecedented scale of the fiscal and monetary policy response to the pandemic accommodated this price pressure.

Pretty soon, inflation started coming up in every conversation. The message was clear: Everybody hates inflation.

High inflation creates uncertainty. As prices rise unevenly, it becomes unclear when to spend, when to save, or where to invest. Inflation is also exhausting. It takes effort to shop around for better prices or to handle complaints from unhappy customers.

THE INFLATION FIGHT

In March 2022, the FOMC began our rate hiking cycle, the steepest in recent history. Accordingly, inflation has been coming down. The Fed's preferred inflation measure — the 12-month personal consumption expenditures price index (PCE) — peaked at 7.2 percent in June 2022; "core" PCE — inflation without the more volatile numbers for food and energy — was at 5.3 percent. This February, those measures came in at 2.5 percent and 2.8 percent, respectively. We aren't yet back to our 2 percent target, but we've come a long way.

While I would love to give the FOMC full credit for the fight against inflation, and I do hope you think our efforts have been of value, we've had a lot of help.

First, the supply side has finally healed. Supply chain shortages have been largely resolved. The labor force has come back into balance. Second, productivity has been moving up as firms realize the benefits of the investments they've made in automation and more efficient processes. Additionally, we are getting help from consumers. They've been frustrated by high prices, but now they're taking action: trading down from beef to chicken, from sit-down restaurants to fast casual, from brand names to private labels. They're waiting for promotions or moving to lower-priced outlets. As the saying goes, "The cure for high prices is high prices." That's exactly what we're seeing. Price-setters are finding that their ability to raise prices is now limited by consumers' price sensitivity. (See "How the Pandemic Era Changed Price-Setting," *Econ Focus*, Fourth Quarter 2023.) It's elasticity in action.

Where does that leave us today? In general, the economy is in a good place. GDP grew 2.5 percent last year, a healthy level. Unemployment is low, near most estimates of its natural rate. Consumers have jobs and real wages are growing. In that context, consumers keep spending. Recession fears have dissipated. And as I noted, inflation is down.

While I see considerable progress being made with inflation, I know many Americans see it differently. The Fed is concerned with year-over-year price growth, but individuals care more about the price level. And the level of prices is still a frustration. That's particularly true because it has risen so fast recently. I remember my grandparents telling me that you used to be able to buy a Coke for a nickel. But they seemed ancient. If I could exaggerate a bit, it seems like we experienced in four years what they saw in a lifetime.

Now, it's true that wages have gone up at the same time. The overall price level is 18 percent higher than four years ago, while average wages have increased slightly more at 19 percent. But individuals aren't like firms, which can track their relative rise in revenues versus costs through their profit margins. Individuals don't have that kind of mental ledger. They see wages going up as the reward for their hard work and see higher prices as arbitrarily taking that away.

THE PATH FORWARD

In late 2024, we cut the federal funds rate by a full percentage point to 4.3 percent. Labor market conditions remain solid, while inflation remains somewhat elevated. It makes sense to stay modestly restrictive until we are more confident inflation is returning to our 2 percent target. I recognize the fight against inflation has been long, but it is critical that we remain steadfast. We learned in the '70s that if you back off inflation too soon, you can allow it to reemerge. No one wants to pay that price.

The challenge we have is uncertainty. There are many unknowns. Have price-setters come to accept that their pricing power has receded? How will geopolitical conflicts play out? What will be the impact of natural disasters? And — of course — how will all the policy changes in Washington affect the economy?

It's hard to know how policies will shake out. Will we see significant additional tariffs implemented, and with what response from affected countries, firms, and consumers? Which industries will see deregulation that changes their decision-making? What impact will immigration changes have on the workforce? How much energy production will be unleashed? What changes will be made to taxes and spending?

History gives us some guidance, but it's unclear how applicable it'll be to the present environment. I've seen economic analysis of the 2018 tariffs concluding that they increased inflation by about three-tenths of a percent. But the policies this time aren't exactly the same, and we don't know whether the recent experience of consumers and businesses with inflation will exacerbate or mitigate the effects. Will firms be more willing to pass costs along this time, or will consumer frustration with higher prices lead them to resist further price increases?

It is tempting to focus on gaming out these short-term factors, but it's hard to make significant monetary policy changes amid such uncertainty. So, I prefer to wait and see how this uncertainty plays out and how the economy responds.

I spend more time thinking about the longer term. As I mentioned earlier, for many years, we have had the wind at our back when it came to containing inflation. Today, the direction of the wind is less clear.

Over the last few years, we've seen tariffs, the pandemic, and geopolitical conflict expose the vulnerabilities associated with globalization. We may see more countries and firms rethink their trading relationships to prioritize resiliency, not just efficiency. At the same time, we may be seeing the labor force transition to being in shorter supply. Our population is aging, birth rates are declining, and it's unclear what will happen with net migration. Similarly, deficits have been running at historic levels, and entitlement and defense spending likely will grow further as our population ages and if geopolitical tensions rise. All these trends suggest we could see our tailwinds replaced by inflationary headwinds.

That shift in the winds is not guaranteed. You can never, for example, count out technology's potential to improve productivity and help rein in costs and prices. And, as you know, monetary policy has the power to respond and keep inflation under control. But all this uncertainty argues for caution as we look to wrap up the inflation fight. If headwinds persist, we may well need to use policy to lean against that wind.

But for now, I take comfort in the significant drop of inflation from its peak and look forward to further progress.

Tom Barkin
President and Chief Executive Officer

A longer version of this essay was delivered as an address to the Rotary Club of Richmond on Feb. 25, 2025.

BY DAVID A. PRICE

New from the Richmond Fed's Regional Matters blog

Marina Azzimonti, Zach Edwards, Sonya Ravindranath Waddell, and Acacia Wyckoff. "How Might Fifth District Firms React to Changing Tariff Policies?"

In March 2025, the United States imposed broad tariffs on imports from China, along with specific tariffs on steel and aluminum, and announced more tariffs targeting Canada, Mexico, the European Union, and auto imports. The Richmond Fed's March regional business surveys found that more than 80 percent of firms expect to be affected by these tariffs, with a higher share of manufacturers (90 percent) than services firms (about 75 percent) expecting to be affected. Most firms said they cannot replace their tariffed suppliers for all of their affected inputs, and previous survey results indicate that about three-quarters of firms would seek to pass increased costs on to customers.

Taylor Pessin. "Taking Stock of Community Development Financial Institutions."

Community Development Financial Institutions (CDFIs) are mission-driven lenders that provide financial services to lower-income households and small businesses and help to finance community development projects. The Fed seeks to better understand CDFIs through a biennial survey, led by the Richmond Fed, that helps to assess industry trends, funding sources, and challenges. Recent research indicates that while the number of federally certified CDFIs has grown significantly over the past 15 years, the number that have achieved certification since 2023 has declined slightly due to a revised certification process. Loan funds and credit unions make up most CDFIs; loan funds tend to focus on small business and real estate financing, while credit unions primarily serve individual consumers. The upcoming 2025 survey aims to further explore industry shifts, certification costs, and funding challenges to better support CDFIs' role in economic and community development.

Joseph Mengedoth. "Farming Creates Value and Employment for Rural Areas."

Farming plays a crucial role in the rural economy of the Fifth District, contributing significantly to local GDP and employment. While agriculture accounts for only about 1 percent of the national GDP, in rural areas of the district, it can reach nearly 30 percent. Farming also provides a higher share of jobs in these regions, sometimes as much as 20 percent of total employment. Many small farms struggle with profitability, however, due to high operational costs, often requiring supplemental income sources to remain viable. Larger commercial farms tend to generate positive net income. Ultimately, while farming remains a key economic driver in rural areas, its financial sustainability varies, especially for smaller farms.

Stephanie Norris, Santiago Pinto, and Sonya Ravindranath Waddell. "What Might Cuts to the Federal Government Workforce Mean for the Fifth District?"

The Fifth District, particularly Washington, D.C., and the surrounding counties in Virginia and Maryland, has a significant concentration of federal government employees; around one-fifth of all federal employment is in the D.C.-Maryland-Virginia region. Defense-related agencies dominate federal employment in Virginia, while health and research agencies have a strong presence in Maryland. These jobs, often well paying and long tenured, provide economic stability to the region, but also pose risks of elevated unemployment from cuts to agency staff. Smaller counties with military bases or federal installations are particularly vulnerable to economic disruptions from such changes.

Stephanie Norris, Santiago Pinto, and Sonya Ravindranath Waddell. "What Might Cuts in Federal Government Spending Mean for the Fifth District?"

The Fifth District relies economically on federal government spending beyond just employment. Federal contracts, grants, transfers to state and local governments, and payments to individuals (such as Social Security) are also important. In 2023, the federal government spent $4.8 trillion nationally in these categories. Within the Fifth District, from 2008 to 2023, Washington, D.C., and South Carolina have relied the most heavily on such payments as a share of personal income, at an average of 65 percent and 38 percent, respectively, compared to a national average of 19 percent. Additionally, Virginia, Maryland, and Washington, D.C., benefit heavily from federal contracts — in 2023, they were three of the top five states in the country in federal contract dollars. Transfers to state and local governments also play a role, especially in North Carolina, South Carolina, and West Virginia. **EF**

BY TIM SABLIK

Good Data is Hard to Find

New challenges have emerged to the production of economic statistics. How are Fed researchers and policymakers adjusting?

Fed officials frequently describe their monetary policy decisions as data dependent. As the central bank has navigated the recovery from the COVID-19 pandemic, a common refrain in its policy statements is that the Federal Open Market Committee (FOMC) will "carefully assess incoming data, the evolving outlook, and the balance of risks" when considering further adjustments.

"We are looking at the data to guide us in what we should do," Fed Chair Jerome Powell said at the press conference following the FOMC's meeting at the end of January.

The demand for data in economics as a whole has only grown in recent decades. A 2017 article in the *American Economic Review* found that the profession has become increasingly empirical since 1980, relying more on data analysis over theoretical models. This "empirical turn," as some economists have called it, has been facilitated by computerization, which has both increased the supply of data and aided in its analysis. At the same time, challenges around data quality and timeliness have emerged. How does the Fed ensure it's getting the best information to guide monetary policy?

SURVEYS TO THE RESCUE

For much of the 20th and 21st centuries, gold-standard U.S. economic data have been publicly produced. The federal government's entrance into the realm of data collection was driven by both public and private demand to better understand the industrializing economy. According to a 2019 article by Hugh Rockoff, an economic historian at Rutgers University, workers and employers wanted statistics on prices in order to resolve mounting wage disputes in the late 19th and early 20th centuries. And lawmakers sought to better understand the ramifications of their policies as well as the evolution of the economy through the crises of the first half of the 20th century — two World Wars and the Great Depression.

The U.S. Bureau of Labor, later renamed the Bureau of Labor Statistics (BLS), was established in 1884 and produced its first indices of prices and wages in the 1890s. In 1918, the BLS conducted a national survey on the cost of living, releasing the results the following year. The BLS also started work on more frequent estimates of unemployment around the same time. Previously, national employment was measured only every decade as part of the census.

The newly formed Fed was an eager consumer of this new economic data. "From its beginnings more than a century ago, the Federal Reserve has gone to great lengths to collect and rigorously analyze the best information to make sound decisions for the public we serve," Powell said in a 2019 speech.

The Fed was also a key early player in the dissemination of national economic data. According to a 2021 article by Diego Mendez-Carbajo and Genevieve Podleski of the St. Louis Fed, the Fed began publishing banking data the same year it opened its doors in 1914. In 1919, the same year the BLS released its first national cost of living estimates, the Fed Board of Governors began publishing monthly data on the manufacturing of several goods. In 1922, these data were collected into three monthly indexes capturing activity in manufacturing, mining, and agriculture. These measures of aggregate economic activity predate the concept of gross domestic product, developed by economist Simon Kuznets in the 1930s, and are still updated and published today.

"The Federal Reserve System is an important producer of unique economic data and has recognized the value of sharing data with the public in an organic way that reflects its federated structure," says Mendez-Carbajo.

The government's rising interest in collecting better information about the economy coincided with advances in survey methodology. Robert Groves, director of the U.S. Census Bureau from 2009 to 2012 and currently interim president of Georgetown University, catalogued the history of survey research in a 2011 *Public Opinion Quarterly* article. The theory of probability sampling, or random sampling, developed in the 1930s offered researchers a means of using surveys to obtain bias-free inferences about a population.

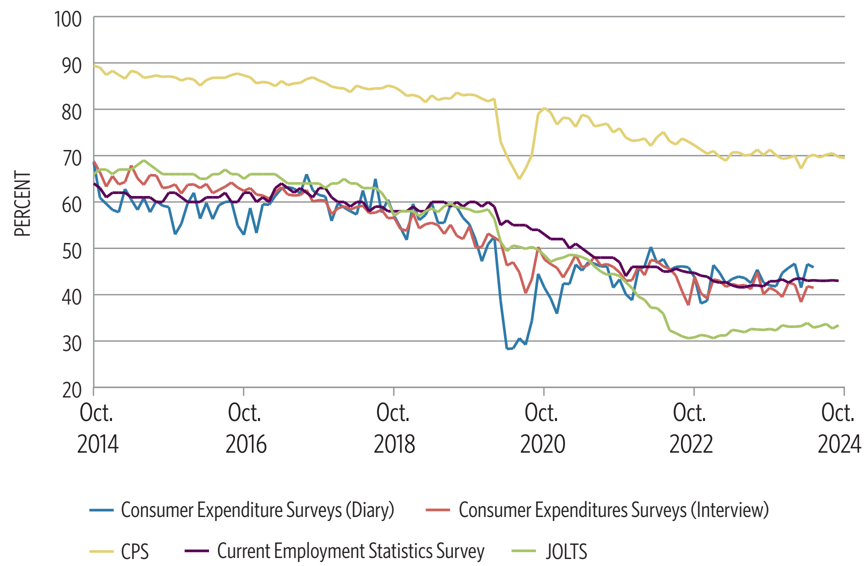
Surveys provided, and continue to provide, the underlying data used in the calculation of many key economic indicators. Information about the labor force, including the unemployment rate and labor force participation rate, is collected via the monthly Current Population Survey (CPS) administered by the Census Bureau and the BLS. The Consumer Price Index, a commonly cited measure of inflation, is also computed using data gathered from surveys. In addition to households, the BLS also surveys businesses. Examples include measures of job openings and separations from the Job Openings and Labor Turnover Survey (JOLTS) and the Producer Price Index.

The Fed also uses surveys to collect national and regional economic information. For example, the Richmond

Fed launched its surveys of manufacturing and service sector activity in 1993 and continues to update them today. In addition, Fed policymakers look at the CFO Survey, which gathers insights from business leaders about the challenges and outlook for their own business and the overall economy. That survey, started by Duke University's Fuqua School of Business in 1996, has been conducted since 2020 by the Richmond and Atlanta Feds in partnership with Duke.

Survey Participation Wanes

BLS establishment and household survey response rates



SOURCE: U.S. Bureau of Labor Statistics

CRACKS EMERGE

In recent decades, however, researchers have faced mounting challenges to using surveys for data collection. One of the biggest is falling survey response rates. Early in the 20th century, most surveys were conducted face-to-face. From the 1960s to the 1990s, the proliferation of phones in households offered a new method for sampling large populations. While phones initially made it easier to reach survey participants, inventions like the answering machine and caller ID (which smartphones have made ubiquitous) made it easier for households and businesses to avoid such calls. The rise of phone and text scams may have also contributed to the growing unwillingness of individuals to respond to requests from unknown numbers. Finally, surveys may have become a victim of their own success. Between the 1980s and 2000s, the number and length of government and private surveys exploded. Some researchers suggest that this has led to survey fatigue among households, contributing to lower response rates.

The COVID-19 pandemic only intensified these trends. Even response rates from businesses, which had generally been more robust than household response rates, dropped sharply. In January 2020, the JOLTS response rate was 58 percent. In April 2020, it fell by about 10 percentage points and never recovered; as of September 2024, it was 33 percent. On the household side, the CPS response rate did recover after the initial COVID-19 shock, but it has continued a longer-running decline. It was nearly 70 percent in October 2024, roughly 20 percentage points lower than a decade earlier. (See chart.)

A 2015 article in the *Journal of Economic Perspectives* by Bruce Meyer of the University of Chicago, Wallace Mok of the Chinese University of Hong Kong, and James Sullivan of the University of Notre Dame highlighted other problems. The likelihood that survey respondents fail to answer each question, known as item nonresponse, has gone up. So has measurement error, which is when respondents provide inaccurate information. This is a particular problem for opt-in online surveys. Such surveys are typically cheaper and easier to produce, but they don't capture a true random sample, limiting the conclusions researchers can draw about the larger population. Work by Andrew Mercer, Courtney Kennedy, and Scott Keeter of Pew Research Center found that online survey participants who report being under the age of 30 are particularly likely to be what the researchers called "bogus respondents." In one opt-in survey, 12 percent of respondents ages 18 to 29 said they were licensed to operate a nuclear submarine.

These trends, alongside rising nonresponse rates, have increased worries about the introduction of bias into survey results. Researchers at the BLS and elsewhere track this issue carefully and have statistical methods of adjusting for lower response rates. Nevertheless, obtaining an adequate sample to produce unbiased insights even with these methods is becoming more difficult.

"Survey sponsors are finding it harder to obtain survey cooperation," says Jonathan Mendelson, a research statistician at the BLS. "This can increase the level of effort necessary to obtain interviews, which can potentially lead to increased data collection costs."

In 2023, the BLS announced plans to modernize the CPS to address falling response rates. This five-year plan includes careful testing of different surveying methods, culminating in the introduction of an online self-response mode by 2027. Such adjustments take time and resources, and according to a 2024 article from the Center for American Progress (a progressive think tank), the budget of the BLS has been shrinking in real terms since 2010. In the face of these financial constraints, BLS officials have said they might be forced to start shrinking the CPS sample. In October 2024, the BLS announced that such plans were on hold for now but that they could still happen in the future depending on the budget situation.

Researchers at the Fed have also grappled with constructing good survey samples amid declining response rates. Jason Kosakow, the Richmond Fed's survey director, published an article with Pierce Greenberg of Clemson University examining the effectiveness of different strategies for recruiting participants for the Richmond Fed business surveys via email. They found that a standard notification with no appeal to the benefits of taking the survey worked best, but conversion rates were still low — less than 2 percent. Kosakow is also working with researchers at the Richmond Fed to collect better information on Fifth District businesses using multiple data sources. This helps ensure that surveys are capturing a truly representative sample of regional business voices.

"The number one thing you need to do when creating a quality survey is have a good sample frame," says Kosakow. "You want it to be reflective of your population. And that's really hard to do, because people respond at different rates. So, one way to improve surveys is to use different technologies to find people or businesses who are less likely to respond, to mitigate these issues."

THE PROMISES AND PITFALLS OF BIG DATA

These challenges can increase the likelihood that preliminary economic indicators are subject to significant revisions later as new data become available. Last August, the BLS revised the number of jobs created from April 2023 to March 2024 down by more than 800,000. Such revisions pose a clear challenge for monetary policymakers trying to get a real-time picture of the economy to guide their decisions.

This has led Fed researchers to explore alternative data sources. In addition to helping survey-based research, the growing computerization of household and business activity has led to an explosion of new economic data. Often referred to as "big data," these datasets offer the potential to give researchers a much more granular and timelier snapshot of economic activity.

During the initial weeks and months of the COVID-19 pandemic, researchers across the Federal Reserve System turned to a variety of such nontraditional data sources to get a better understanding of what was happening to the economy. According to a 2022 book chapter by Tomaz Cajner, Laura Feiveson, Christopher Kurz, and Stacey Tevlin of the Fed Board of Governors, Fed researchers looked at employment data from payroll processors, retail sales from Fiserv card swipe data, restaurant reservations from OpenTable, and airport departures from the Transportation Security Administration, among other nontraditional data sources.

"Alternative data can help provide an additional signal that can either corroborate or question the indications coming from preliminary official statistics," says John O'Trakoun, a senior policy economist at the Richmond Fed. "In the case of high-frequency data, it can help provide a sneak peek of turning points or changes in momentum that the standard data would not be able to show until well after the fact."

Even outside of crises, Fed researchers are exploring how non-survey data might improve their ability to forecast changes in economic conditions. In a February article in *Economics Letters*, O'Trakoun and Adam Scavette of the Philadelphia Fed developed a new recession indicator based on the Sahm rule, which was created in 2019 by economist Claudia Sahm. The Sahm rule uses changes in the three-month moving average of the unemployment rate to predict the start of recessions. Rather than using the unemployment rate, which is based on responses to the CPS, O'Trakoun and Scavette used state claims for unemployment insurance. These are administrative data that are released weekly, while the survey-based unemployment rate is updated monthly. O'Trakoun and Scavette found that using these data improves the timeliness and accuracy of the Sahm recession indicator.

Alternative data sources can come with their own set of challenges, however, as highlighted by Cajner, Feiveson, Kurz, and Tevlin in their account of data lessons learned from the COVID-19 pandemic. They noted that a lot of big data are the byproduct of economic activity, meaning that they typically aren't collected to answer a particular research question. Therefore, it can require more work from researchers to understand the data well enough to extract useful insights about a larger population. Data collected by private companies are also typically not made freely available to the public, potentially making them expensive for researchers at policymaking institutions to access. Data owners may also place conditions on how the data can be used, limiting analysis. Finally, nontraditional data series may be new, making historical comparisons and seasonal adjustments difficult. This can make it hard to know how well these data series perform relative to traditional sources over the long run.

This latter challenge can apply to newer government statistics as well. The Business Formation Statistics data series was created by the Census Bureau in the 2010s. It provides information on filings for Employer Identification Numbers (EIN), a tax identification number used by businesses. Researchers at the Fed and in academia have explored using the Business Formation Statistics as an indicator of business and entrepreneurial activity, since individuals planning to start a new business often file for an EIN. During the COVID-19 pandemic, there was a significant surge in EIN applications, suggesting an uptick in new business formation. As new businesses tend to grow faster than older ones, this presented the possibility for a wave of innovation and hiring. But subsequent research by Chen Yeh, a senior economist at the Richmond Fed, found that much of this new entry was concentrated in industries with low or even negative productivity growth, suggesting a modest impact on overall productivity. The short history of the Business Formation Statistics made it hard to discern in real time whether the COVID-19 episode was representative of past spikes in EIN filings.

All told, the trade-offs inherent to big data make it most likely to serve as a complement to surveys rather than a replacement.

"I don't think surveys are going to go away," says Mercer of Pew Research. "What we're going to see, and are already seeing, is increasing use of big data to improve the quality of survey estimates."

STAYING DATA DEPENDENT

In 2011, the FOMC introduced calendar-based forward guidance into its policy statement. The United States was in the midst of a slow recovery from the Great Recession, and the FOMC wanted to communicate its expectation that monetary policy would likely remain accommodative for at least a couple more years. Although this was intended to communicate the committee's expectations about future economic conditions and appropriate policy, some Fed watchers took it as a commitment to keep rates low for a prescribed period regardless of the data. In late 2012, the committee clarified this, changing the wording in the statements to more clearly indicate that future policy decisions would depend on economic data, not dates.

Fed policymakers have given little indication that they plan to deviate from this data-driven approach, despite the challenge of piecing together an accurate picture of the economy from various imperfect indicators. Members of the FOMC have spoken about how they weigh the strengths and weaknesses of each incoming data point, incorporating them into their own views of the economy. Meanwhile, researchers at the Fed and federal statistical agencies continue to explore new sources and methods for generating more accurate inputs to that process.

"Despite the many challenges, the future of economic measurement is bright," Fed Gov. Adriana Kugler said in a July 2024 speech at the National Association for Business Economics Foundation. "The statistical agencies have already proven their ability to innovate and adapt, even under tight resource constraints. And the wealth of private-sector data sources will only expand in the future." **EF**

READINGS

Cajner, Tomaz, Laura Feiveson, Christopher Kurz, and Stacey Tevlin. "Lessons Learned from the Use of Nontraditional Data during COVID-19." In Wendy Edelberg, Louise Sheiner, and David Wessel (eds.), *Recession Remedies: Lessons Learned from the U.S. Economic Policy Response to COVID-19*. The Hamilton Project and the Hutchins Center on Fiscal and Monetary Policy at Brookings, April 27, 2022.

Groves, Robert M. "Three Eras of Survey Research." *Public Opinion Quarterly*, December 2011, vol. 75, no. 5, pp. 861-871.

Mendez-Carbajo, Diego, and Genevieve M. Podleski. "Federal Reserve Economic Data: A History." *American Economist*, March 2021, vol. 66, no. 1, pp. 61-73.

Meyer, Bruce D., Wallace K. C. Mok, and James X. Sullivan. "Household Surveys in Crisis." *Journal of Economic Perspectives*, Fall 2015, vol. 29, no. 4, pp. 199-226.

BY MATTHEW WELLS

Rural Free Delivery

The free delivery of mail changed daily life for millions of rural Americans

"Rural free delivery, taken in connection with the telephone, the bicycle, and the trolley, accomplishes much toward lessening the isolation of farm life and making it brighter and more attractive."

—From President Theodore Roosevelt's 1903 Message to Congress

For much of the nation's history, rural Americans had to travel — sometimes great distances — to send and receive their mail or they had to hire a private courier to deliver it. When the weather made travel on country roads difficult, rural families could sometimes go weeks without any contact or communication with the outside world. This situation was in stark contrast to that of Americans who lived in urban areas, where mail had been delivered daily since 1863. In 1890, however, there were far more people living in the countryside than in cities: 41 million Americans, or 65 percent of the population, called rural America home.

Advocates of free delivery of rural mail in the late 19th century argued that it wasn't right for so many Americans to be left behind with limited access to news and information, as well as to new economic opportunities made available through the daily free delivery of mail. Through the Post Office Department, the federal government would eventually act in the mid-1890s, implementing Rural Free Delivery (RFD), which brought daily mail to millions of rural homes. As President Roosevelt pointed out, the program positively transformed rural life, ushering in changes in the relationship between rural residents and each other, the economy, and their government.

FIRST CLASS PATRONAGE

Getting anywhere in rural America in the second half of the 19th century wasn't easy. Assuming a walking pace of a little over three miles per hour, someone who lived five miles from the nearest town with a post office could expect to spend about three and a half hours just on travel alone. If going by wagon, the traveler was unlikely to be comfortable; historian Wayne Fuller noted in his 1964 book, *RFD: The Changing Face of Rural America*, that as of 1906, only about 7 percent of the country's roads were anything other than dirt. It isn't hard to see why getting the mail in rural America over 100 years ago was a lot more difficult than simply walking to the end of the driveway.

When they did make the trip into town, rural citizens in the early 1890s would stop by the post office to pick up their mail, which was usually housed in a local general store. There, they'd undoubtedly encounter the store owner, who frequently doubled as the local postmaster. These fourth-class postmasters were paid a small government stipend and made money from selling stamps and other mail services, but most of their money came from the sale of all the other goods in the store to the traffic using the postal services.

Theirs were patronage positions. Local postmasters were appointed by the district's representative in Congress and acted as part of the party machine in the area, placing the representative's literature in newspapers and serving as eyes and ears on the ground, reporting any problems or concerns back to him. The arrangement was mutually beneficial, as the representative developed a constituency that depended on — and worked hard for — his success and the postmaster gained the rewards of machine politics. About 77,000 political appointees served as fourth-class postmasters around the country in the early 1890s. This was by far the largest source of patronage in the federal government, and the Post Office held more patronage positions than all other government departments combined.

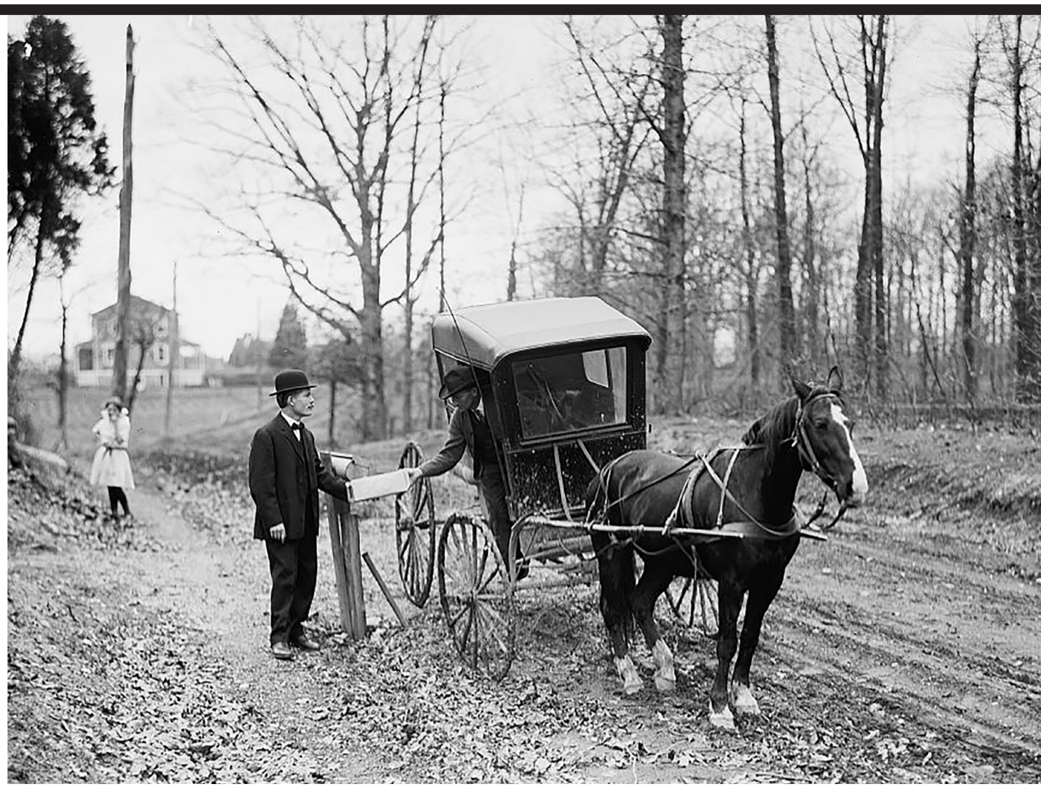
At the same time, the Post Office was beginning to crumble under its own weight, running million-dollar deficits annually in the 1880s. Daniel Carpenter, a political scientist at Harvard University, argued in a 2000 *Studies in American Political Development* article that much of that bloating stemmed from the local postmasters, referring to them as "the favored children of congressional and presidential largesse" who "held their jobs with the favor of the party in the White House."

A SPUTTERING START

Local postmasters were an entrenched interest who supported the status quo, but pressure for free mail delivery to rural residents had been building for some time. One of the most prominent rural advocacy organizations, the National Grange, first made it a national legislative goal as early as the 1870s, but it gained little traction in Washington until the late 1880s, when John Wanamaker was appointed postmaster general by newly elected Republican President Benjamin Harrison.

As the founder of Wanamaker's Department Store, Wanamaker had a reputation as an innovator with his introduction of mail-order catalogues and the "money-back guarantee." He brought that innovative spirit to his job as postmaster general, advocating for radical changes like government ownership of telegraph wires, parcel post, and a postal savings bank. He also was a strenuous advocate for free rural mail delivery, thinking it made more sense for one person to deliver the mail than for 50 households to travel into town to get it. While he wasn't a progressive populist, Wanamaker met with the National Grange and other groups, spoke with business and civic leaders, and published essays urging farmers to petition Congress to put RFD on its agenda. RFD may have been a policy idea in the abstract before Wanamaker, but his efforts and commitment brought it to life.

Congress extended the Post Office Department a $10,000 appropriation to be used for RFD on an experimental basis in 1891. By April 1892, Wanamaker reported that 40 of the 46 offices in the experiment had increased revenues, and the department was generating a profit of $10,000 per year. Newspapers around the country announced these statistics, resulting in even more interest and demand for the program.



The Rural Free Delivery program allowed rural residents who often lived along poorly maintained dirt roads to receive regular mail and parcel delivery for the first time. RFD mail carriers often made their deliveries in horse-drawn postal delivery wagons, as seen here during a 1914 delivery.

Despite what appeared to be clear success, Congress remained skeptical of the program and sent mixed messages regarding its future. In 1892, the House Committee on the Post Office and Postal Roads declared "that rural free delivery will aid materially in stopping much of the growing discontent that now seems to exist among the farming population." But it also stated in the same year that while RFD had been successful in other countries, "the expediency of trying it" seemed "somewhat doubtful." (Rural delivery had started in Great Britain, Canada, and France around that same time, if not before.) Nonetheless, Wanamaker asked Congress for $6 million in 1893 to expand the program, but he was only given $10,000. The same year, a new Democratic administration brought in a new postmaster general, Wilson Bissell, who opposed the program and sought to curtail its funding and experimentation.

The Post Office bureaucracy, however, persisted in its support for RFD thanks to the enthusiasm of August Machen, the new superintendent of free delivery. After Bissell resigned in 1895, Machen continued small-scale trials through small appropriations, and in 1899, a trial experiment in Carroll County, Md., proved decisive for the program's future. In the trial, 63 of the county's 94 post offices were closed and 33 star routes (that is, private couriers contracted to carry mail between post offices and deliver it to private mailboxes along the way) were eliminated, replaced with a total of four postal wagons and 26 letter carriers. The trial's results revealed that the post offices and star routes were both unnecessary and overly costly, as postal revenue in the county jumped 23 percent during the year-long experiment and the net cost of the program was just $236. In the trial's report, Machen declared that "the results achieved are far beyond the expectations of the most enthusiastic advocates of rural free delivery." At this point, RFD's expansion and permanence was probably inevitable.

BENEFITS OF BEING LITERATE AND REPUBLICAN

By 1900, the Post Office Department had created a stand-alone RFD division, which had 1,259 routes servicing rural residents. Two years later, President Roosevelt signed legislation making it a permanent federal program. By 1908, the number of rural routes had ballooned to 39,277. For a rural community to get one of these routes, it had to petition its local congressional representative, and any proposed route had to meet a set of conditions: It had to reach a minimum of 100 households, be between 20 and 25 miles long, and use roads that were passable year-round. Demand for routes outpaced the supply, forcing the Post Office Department to decide where the routes would go, which required information regarding a proposed route's economic feasibility.

Washington bureaucrats had no such knowledge, forcing them to rely on railway-trained inspectors on the ground. But two of the Post Office's key criteria in making route determinations after those requirements were met didn't require inspections — a district's partisanship and literacy rate. Under Republican presidents William McKinley and Theodore Roosevelt, routes proliferated across wealthier northern districts and rural communities that had been key to their 1896 and 1900 electoral victories. Kansas, for example, was staunchly Republican and ended up with over 1,000 more routes than Democratic South Carolina. Political scientists Samuel Kernell and Michael McDonald reported in a 1999 *American Journal of Political Science* article that Republicans newly elected to the House of Representatives who defeated an incumbent Democrat in 1898 received 11 times the routes given to newly elected Democrats who beat an incumbent Republican.

Why literacy rates? Postal officials needed to show profits so Congress would continue to fund RFD, and the ability to read was seen as a crucial determinant of consumption. In other words, more mail was likely to flow in areas where people could read it. As a result, the department denied requests from low-literacy districts, and those petitioning for routes made sure to highlight their abilities. Residents in Hardin County, Iowa, for example, claimed the "distinguished honor of having the smallest percent of illiteracy of any county in the nation."

NEWSPAPERS AND VICK'S VAPORUB

It was clear that while rural residents benefited from RFD, the local postmasters stood to lose thanks to the post office closures that accompanied the program. The Carroll County experiment demonstrated that they were no longer necessary, but for the time being, they were still quite influential. One congressman worried he couldn't "outlive the resentment of the men who would thus be deprived of their annual income" if he supported RFD, viewing it as political suicide. Fuller noted, "[Postmasters] put their congressmen in the unenviable position of having to choose between their post offices and the new rural routes since it was the Department's policy not to have both if they duplicated one another." Still, in some areas, postmasters were able to convince delivery route agents to allow the post office to remain open, while in other areas, they were incorporated into the bureaucracy and given salaried positions. To pacify lawmakers who felt they might be left open to retribution, the Post Office in some cases hired more carriers to cover the routes, negating any adverse effect that might arise from a disgruntled former postmaster.

As the postmasters' lives changed, so did the lives of rural residents. In 1899, a former postmaster reflected, "Before free delivery was started, there were thirteen daily newspapers taken at Turner post office. Today, there are 113. With the general extension of rural free mail delivery there will be less talk about the monotony of farm life."

The newspaper deliveries made a difference. In a 2016 article in the *Journal of Economic History*, Bitsy Perlman of the Census Bureau and Steven Sprick Schuster of Middle Tennessee State University suggested that because RFD regularly delivered newspapers into millions of homes that previously did not have access to them, rural voters were better able to coordinate their support for parties and candidates and to advocate for specific policies. At the same time, smaller parties like the Greenbacks and Populists could better reach farmers through regular mail contact via increased newspaper circulation. Outside of the South, where increasing routes led to Democratic party consolidation, they found that as the number of routes in a county increased, so did the vote share of a wider variety of parties beyond Democrats and Republicans. They also found that in areas where there was active newspaper distribution, elected representatives changed their voting behavior to better reflect their constituents' evolving political preferences, particularly in the areas of temperance and immigration.

"There's an ability for mass media to create concerns that may not otherwise exist," suggests Sprick Schuster. "The expansion of rural free delivery and newspaper circulation is really the mechanism through which immigration restrictions would gain more support."

Beyond this political effect, the increased transmission of information via the mail, both through newspapers and mailers, heightened rural residents' awareness of new goods and services available to them. In a 2017 working paper, James Feigenbaum of Boston University and Martin Rotemberg of New York University argued that RFD lowered the cost of advertising, allowing manufacturers to reach more potential customers at a cheaper price. They cited the example of Vick's Chemical, founded in 1890 in rural Selma, N.C. While the firm originally just sent salesmen to neighboring counties to advertise and sell, their model changed significantly in 1903 when the first RFD route went through Selma. Two years later, Vick's developed its famed VapoRub, manufactured it on a mass scale, and used the RFD system to cheaply send advertising material. Rotemberg succinctly summarizes the logic adopted by manufacturers: "Here's this thing you might want to buy. You don't know about it yet, but RFD allows you to learn about it."

RFD also led to other positive changes. Rural mail delivery required passable roads, and efforts to secure federal funding for road creation and maintenance culminated in the Federal Aid Road Act of 1916, which contained provisions benefiting rural Americans in ways beyond simply receiving mail. In a 1912 debate on the issue, one representative argued, "These roads will enable our farmers to get their products to market more promptly and cheaply, thus giving to the consumer his food fresher and at lower cost. These roads will give to our rural communities better schools and churches. These roads will give our farmers more opportunities for the benefits and joys of social intercourse."

"IT HAS GOT ME SPOILED"

As a result of RFD's popularity, the Post Office's legitimacy, reputation, and authority also increased, allowing it to further expand its activities, though not without a struggle. After a 10-year wait following the 1902 authorization of RFD, the Post Office received the go-ahead from Congress to take up parcel delivery in 1912. The long wait was thanks to a strong opposition campaign mounted by retail associations that argued the Post Office was ill-equipped to deliver packages and that doing so would only increase the department's overall budget deficits. The parcel delivery service fulfilled one of John Wanamaker's early aspirations for the department and a goal of populists who called for the public provision of the country's communication and transportation infrastructure. In doing so, the government entered markets that had previously been the domain of private actors. Middlemen like wholesalers and rural storekeepers could be bypassed with a transaction taking place directly between the manufacturer and consumer.

The department's budget deficits, however, had disappeared by 1911, with the *Outlook*, a Progressive Era magazine, declaring, "THE POSTAL SERVICE WAXES PROFITABLE." In his 2000 article, Carpenter argued that this outcome was likely due to increased efficiency in the delivery of city mail, not rural delivery, which stemmed from inspectors tasked with reducing the unnecessary proliferation of urban post offices and mail carriers. Indeed, while trials showed it was cost effective at a local level, RFD deployment nationally brought large operating costs that overwhelmed any revenue increases it generated. The Post Office's deficit as a percentage of revenue spiked in the years immediately following RFD's 1902 authorization and again in 1908 until ultimately declining in 1909.

Even today, rural post office deficits have persisted: The Post Office reported in 2022 that 63 percent of rural post offices failed to cover their costs. The government is forbidden by law, however, from closing small post offices simply because they operate in the red.

Indeed, free mail delivery generally is now taken for granted as an element of government service, as the Post Office estimated in 2012 that nearly 41 million homes and businesses receive service from rural mail carriers. Some rural communities, however, such as Burlington, Ill., remain unserved, a reality that complicated the Census Bureau's efforts to administer the 2020 Census surveys to households during the COVID-19 pandemic.

At the same time, Santiago Pinto, a senior economist and policy advisor at the Richmond Fed, suggests the story of RFD is a reminder that rural areas face persistent challenges when it comes to reducing isolation and improving connectivity to the broader economy and political system. "In the past, rural communities lacked reliable mail service. In the present, many rural areas face limited broadband availability, restricting economic opportunities and access to information," he says. "The RFD experience offers valuable insights into the economics of market access and 'last-mile delivery.' Serving rural areas remains more expensive and less profitable than urban markets."

RFD's creation was the product of a combined effort. First, the Post Office Department's leadership sought to make more efficient the rural delivery of mail and reduce the power of local postmasters. At the same time, groups that would benefit from free mail delivery — businesses and their customers and would-be customers, as well as farmers — also advocated for change. Lastly, progressive reformers championed a new form of government where representatives shifted from systems of patronage to a belief that electoral success could be won by working to improve the lives of everyday Americans. The comments of Nathan Nicholson of Newcastle, Ind., included in the 1898 Postmaster General's Annual Report demonstrate that those collective efforts paid off: "It [RFD] has got me spoiled. I would rather it had not started if it is going to stop now. If I was going to buy a farm, I would give more per acre on a free-delivery route than I would where there was not any. Let it come. My neighbors and I are willing to pay our part." **EF**

READINGS

Carpenter, Daniel. "State Building through Reputation Building: Coalitions of Esteem and Program Innovation in the National Postal System, 1883-1913." *Studies in American Political Development*, October 2000, vol. 14, no. 2, pp. 121-155.

Feigenbaum, James J., and Martin Rotemberg. "Communication and Manufacturing: Evidence from the Expansion of Postal Services." Working Paper, 2017.

Fuller, Wayne E. *RFD: The Changing Face of Rural America.* Bloomington, Ind.: Indiana University Press, 1964.

Kernell, Samuel, and Michael P. McDonald. "Congress and America's Political Development: The Transformation of the Post Office from Patronage to Service." *American Journal of Political Science*, July 1999, vol. 43, no. 3, pp. 792-811.

Perlman, Elisabeth, and Steven Sprick Schuster. "Delivering the Vote: The Political Effect of Free Mail Delivery in Early Twentieth Century America." *Journal of Economic History*, September 2016, vol. 76, no. 3, pp. 769-802.

BY NATHAN ROBINO

Bank Runs and Reactions

Marco Cipriani, Thomas M. Eisenbach, and Anna Kovner. "Tracing Bank Runs in Real Time." Federal Reserve Bank of Richmond Working Paper No. 24-10, Revised September 2024.

Silicon Valley Bank (SVB) and Signature Bank failed in March 2023, two of the largest bank failures since the Great Recession. Using intraday Fed payments data, Richmond Fed Research Director Anna Kovner and her co-authors Marco Cipriani and Thomas Eisenbach of the New York Fed identified 22 banks that experienced a run around the same period, over 10 times the number of banks that failed. Furthermore, the researchers also studied the balance sheet characteristics of banks that experienced runs, tracked the dispersion of deposits flowing out of the run banks, and examined actions of run banks to avoid failure.

The authors defined run banks as "banks with unusually large net payment outflows" in interbank wholesale payments, which transact over the Fed's payment system known as Fedwire. In the fourth quarter of 2022, Fedwire transfers accounted for an average of over $4 trillion per day via more than 750,000 transactions. Even in the absence of a bank run, there is substantial volatility in the number and value of payments made by a bank on a given day. The authors found that after accounting for this variation, 22 banks experienced a significant increase in net outflows on either Friday, March 10 (the day of SVB's failure) or the following Monday, March 13 (the day of Signature Bank's failure).

On the day of SVB's failure, the median run bank sent out payments worth over 4 percent of its assets on Fedwire, compared to the daily average of 1 percent. Yet the number of payments made stayed relatively constant, implying that the runs were driven by a small number of large depositors. The researchers also analyzed the outflows based on the size of the receiving bank, finding that on Friday, March 10, payments by run banks went predominantly to the very largest banks, with payments sent to those banks increasing more than sixfold, whereas the increase in payments on the following Monday was more evenly spread across the sizes of receiving banks.

Banks that were run had "worse fundamentals" on average — that is, their portfolios exposed depositors to more risk.

As run banks face withdrawals, how do they avoid failure? In general, banks either allow their cash balance to drop or regain liquidity during a run in two ways: by selling securities or loans in exchange for cash or by borrowing from the Fed or the Federal Home Loan Banks (FHLBs). By using weekly balance sheet data, the researchers found that over the weekend of March 10-13, run banks increased their borrowing from FHLBs and the Fed rather than selling assets. Banks seemed to prefer borrowing from FHLBs: Nearly all the run banks borrowed from FHLBs, whereas the median run bank did not use the Fed's discount window at all. Those that used the discount window borrowed much more heavily, however. At the 90th percentile of total borrowing, run banks borrowed 33.6 percent of assets from the discount window, compared to only 10.5 percent from FHLBs. Thus, FHLBs acted as a "lender of next-to-last resort," and the Fed as a true last resort. (See "Central Bank Lending Lessons from the 2023 Bank Crisis," *Econ Focus*, Third Quarter 2024.)

By looking at the observable characteristics of banks that were run, Kovner and her co-authors estimated that banks that were run had "worse fundamentals" on average — that is, their portfolios exposed depositors to more risk. They found that an increase in the share of deposits not insured by the Federal Deposit Insurance Corporation, and a higher concentration of these deposits among a few large depositors, significantly increases the probability of experiencing a run. Further, banks whose assets totaled less than $250 billion were much more likely to be run, consistent with government regulations for banks that are "too big to fail," and the banks that were run were also disproportionately publicly traded on the stock market.

To further understand the relationship between stock prices and depositor behavior, the authors explored how stock prices influence runs. They found that there was a significant relationship between banks with a negative stock return and suffering net outflows during this time, particularly on Friday, March 10.

Using rich intraday financial data, Kovner, Cipriani, and Eisenbach provided detailed evidence of the scope and dynamics of the March 2023 bank run. They suggested that while there remains unexplained variation, the main predictors of a run were balance sheet size, the share of deposits that were uninsured, and whether a bank was publicly traded. Moreover, banks that were run avoided failure via borrowing more assets to offset their losses in cash deposits. Additionally, the signals present in the stock prices of publicly traded banks create additional risk of a bank run. **EF**

BY CHARLES GERENA

Telling the Story of Community Colleges

Community colleges are an important part of the higher education landscape, offering unique educational and training opportunities to workers at all stages of their careers. Nearly half of American workers between the ages of 24 and 64 have attended a community college at some point in their lives.

Aside from this workforce development role, community colleges also serve as anchor institutions in local economies, especially in rural communities where they are often one of the largest employers, a major investor in local economic development, and a provider of training facilities and other educational resources that wouldn't be available otherwise. They also support students in various ways to help them complete their studies, from emergency financial aid to mental health services.

Yet according to Richmond Fed researchers, the full story about community colleges and their contributions isn't often told. For students who enroll in for-credit programs at colleges and universities, their outcomes are tracked by the National Center for Education Statistics, a part of the U.S. Department of Education. However, traditional graduation rates only include students who are enrolled full time. But what happens to students outside of that traditional path — the divorced mom attending school part time to get her nursing degree, or the computer programmer with a bachelor's degree under his belt seeking an additional certification to qualify for a better job?

"The consequences of not having full information on community colleges are many, largely characterized by incentive misalignment that leads to undervaluing these institutions," says Stephanie Norris, a senior research analyst at the Richmond Fed. As associate director of the Bank's Community College Initiative, she studies this higher ed segment with Laura Ullrich, director of the initiative and a regional economist and senior manager in the Richmond Fed's Charlotte branch.

One example of this undervaluing of community colleges is how states allocate higher education funding to schools. Such funding is typically based on a complicated calculation of full-time equivalents (FTEs) rather than a simple headcount of enrolled students. "Not only do community colleges receive less per FTE generally than four-year public colleges," Norris explains, "they also have many part-time students, which deflates their FTE." (See "Zooming in on Community Colleges," *Econ Focus*, Fourth Quarter 2024.)

To fill the information gap, the Richmond Fed launched a new Survey of Community College Outcomes (SCCO), applying its survey expertise as it did back in 2009 to gain a better understanding of community development financial institutions. The Bank formed a team led by Ullrich, who has years of experience working in and studying higher ed. (Before joining the Richmond Fed in 2019, she was a professor of economics and administrator at Winthrop University.) Other members of the team include Jason Kosakow, the Richmond Fed's survey director, and survey analysts Davy Sell, Nathan Sumner, and Anthony Tringali.

The SCCO team began with a pilot survey in 2022 of nine community colleges in the Fifth District. They collected data on every student who remained enrolled in a credit program over a given four-year period — regardless of whether they were full time or part time, attending college for the first time, or were ready to graduate or transfer. They also included information on non-credit students who want to gain new skills, dual enrollment students taking for-credit classes in high school to get a head start on college, and support or "wraparound" services offered to all students.

Before starting the pilot survey, the team conducted in-depth interviews with the president and institutional research leaders of each school to learn about the data they were reporting — and the data they wished they were able to collect and report. At the same time, the team wanted to avoid burdening community colleges with an extensive survey that would take weeks to fill out.

Based on feedback from the pilot participants and other community college officials who appreciated the relevance of the initial results, the SCCO survey team conducted an extended pilot with 63 colleges in 2023. In 2024, the first year of the full-scale survey, the team received responses from 121 community colleges in Maryland, Virginia, North Carolina, South Carolina, and West Virginia — nearly every community college identified in the Fifth District.

The preliminary findings for the 2019-2020 cohort of community college students reveal variations in success rates by enrollment status, geography, age, gender, race/ethnicity, and Pell Grant status. For example, there were larger than expected differences in the success rates between full-time and part-time students, especially in Virginia. The survey team attributes some of this trend to COVID-19 disruptions that may have been particularly hard on older part-time students at community colleges trying to balance school, work, and home responsibilities.

In 2025, the SCCO team plans to expand the survey to states outside of the Fifth District. In the meantime, they will continue to share their data as broadly as possible, primarily with survey participants to help them benchmark their success and identify best practices to improve student outcomes. **EF**

A look into the turbine room at the Oconee Nuclear Station in Seneca, S.C. Oconee's three reactors produce over 2,500 megawatts of energy, enough to power more than 1.9 million homes.

Has Nuclear Energy's Time Come?

Growing demand for carbon-free energy has put nuclear back in the spotlight, but hurdles to new development remain

By Tim Sablik

Last year, Baltimore-based Constellation Energy Corp. announced it would be restarting the undamaged reactor at the Three Mile Island Nuclear Generating Station in Pennsylvania. The site is famous for a partial reactor meltdown in 1979 that raised public concerns about the safety of nuclear energy. Perhaps less well known is that only one of the two reactors at Three Mile Island suffered damage during that incident. Unit 1 continued operating safely for decades and only shut down in 2019 due to cost considerations. Now, thanks to growing demand for reliable carbon-free energy, owner Constellation Energy is rethinking that decision.

For the last three decades, new nuclear power projects have been sparse. Things looked poised to change in the early 2000s when concerns about climate change and rising natural gas prices led to predictions of a nuclear energy revival. Energy companies applied for permits to build two dozen new nuclear reactors. But the 2007-2009 recession squashed both economic growth and energy demand, advances in fracking during the 2010s greatly reduced natural gas prices, and damage to the Fukushima Daiichi Nuclear Plant in Japan following a tsunami in 2011 reignited global safety concerns about nuclear energy. In the end, only four of the 24 planned new reactors proceeded to the construction phase: two reactors in Burke County, Ga., and two in Fairfield County, S.C. (See "Nuclear Reactions," *Econ Focus*, First Quarter 2016.) Both projects ran into numerous delays and cost overruns. Construction in South Carolina ultimately stalled in 2017, and the Georgia reactors were finally completed in 2024 at a cost of more than double initial estimates.

IMAGE: COURTESY DUKE ENERGY

Today, technology companies investing in artificial intelligence (AI) are scrambling to secure clean energy to power their data center expansions. Indeed, Constellation Energy's decision to restart Unit 1 at Three Mile Island was driven by such an agreement with Microsoft. Environmental considerations have renewed interest in nuclear energy as well. In 2023, more than 20 countries (including the United States) pledged to triple nuclear energy capacity by 2050 to reach net-zero greenhouse gas emissions. Major tech companies, including Amazon, Meta, and Google, recently signed on to the same pledge. Has nuclear power's moment finally arrived — again?

SURGING DEMAND

The growing electricity demand from the technology sector is a key reason for the renewed sense of optimism about nuclear energy.

"One of the major differences between now and the last nuclear renaissance is the support of all the major tech companies," says Aaron Ruby, director of Virginia and offshore wind media at Dominion Energy, a utility company whose service area includes Virginia, North Carolina, and South Carolina. "When people were talking about a nuclear energy renaissance 25 years ago, the tech sector didn't exist as it does today."

The growth of "Data Center Alley" in Northern Virginia exemplifies this rapid change. The region's proximity to Washington, D.C., and early internet infrastructure made it an attractive spot for some of the first large-scale commercial data centers in the late 1990s. (See "Virginia's Data Centers and Economic Development," *Econ Focus*, Second Quarter 2023.) Today, Virginia has around 150 data center sites, with 80 percent of them concentrated in three northern counties: Loudoun, Prince William, and Fairfax. Collectively, Virginia's data centers consume about 5,050 megawatts of electricity, or enough to power around 2 million homes. Despite this, energy demand in the state stayed largely flat from 2006 to 2020, according to a 2024 report from the Virginia Joint Legislative Audit and Review Commission (JLARC). This is because the increased demand was offset by efficiency gains elsewhere — but that dynamic is now set to change.

"We expect to see a doubling of our power demand over the next 15 years," says Timothy Eberly, a senior communications specialist at Dominion Energy. "When it comes to data centers specifically, we expect power demand to quadruple. It's the largest growth in demand we've seen since World War II."

The authors of the 2024 JLARC report came to similar conclusions, predicting that energy demand in Virginia will double within the next decade if all the necessary infrastructure for supplying that power can be built. This is largely due to the investments tech companies are making in AI applications that can answer questions and compose writing, art, photos, music, and videos all in response to user requests. These applications use power-hungry computer chips to quickly analyze enormous stores of data. According to a 2024 white paper from the Electric Power Research Institute, a nonprofit think tank, processing a request through ChatGPT (a popular AI application developed by OpenAI) takes 10 times the electricity of a traditional Google search. A December 2024 report from Lawrence Berkeley National Laboratory estimated that AI could cause the share of total U.S. energy consumption used by data centers to reach as high as 12 percent by 2028, compared to 4.4 percent in 2023.

"Over the last five years, we've connected nearly 100 data centers to the grid," says Eberly. "Not only are we connecting more of them, they're also getting larger. Five years ago, a typical data center might request 30 megawatts for full operation. Now, we're seeing requests for two or three times that amount and sometimes over 100 megawatts."

The growing electrification of vehicles and household appliances such as HVAC systems are also contributing to higher expected future energy demand. At the same time, many states have set goals to reduce reliance on fossil fuels for energy in the coming decades. Tech companies building new data centers have announced their own clean energy goals as well. Nuclear, with its sizeable and consistent energy output and zero carbon emissions, seems uniquely positioned to meet both growing energy demand and clean energy goals.

On average, a nuclear power plant can operate at full capacity around 93 percent of the time, making it a much more reliable source of energy than other carbon-free options. Wind power operates at full capacity around 36 percent of the time and solar power about 25 percent of the time. Because of this reliability gap, attempting to achieve decarbonization using only renewable energy and battery technology would be more expensive than using a mix of renewable and nuclear energy, according to a 2024 report by the U.S. Department of Energy (DOE). Additionally, nuclear power may be particularly well suited to replacing coal power plants. A 2022 DOE study of 237 coal plants found that 80 percent of coal plant sites have the necessary characteristics to be converted into nuclear power sites.

"Data centers want reliable, around-the-clock power with zero emissions, and there's only one source of power that offers that," says Ruby.

Nuclear energy provides about 20 percent of electricity in the United States, but close to 50 percent of carbon-free power. These shares are even higher for most Fifth District states. (See graphic on next page.) But tripling nuclear capacity by 2050, as the United States and other nations pledged to do in 2023, would mean building around 200 additional reactors — a daunting task for a country that has only started and completed two in the last three decades.

HURDLES TO NEW CONSTRUCTION

One of the bottlenecks confronting nuclear projects is the lack of trained workers. With decades passing between projects, many have retired or transitioned to new fields. To triple nuclear energy capacity by 2050, the DOE says the United States would also need to more than triple its nuclear workforce. But training new nuclear engineers takes years, and the number of programs equipped to do so has nosedived since the industry's heyday.

"When I started graduate school in nuclear engineering in 1978, there were nearly 100 such programs in the United States," says Alireza Haghighat, director of the nuclear engineering program at Virginia Tech. "Today, there are around 30. If we want to build the next generation of nuclear power technology in the United States, we have to provide the necessary environment and resources for our engineers and scientists."

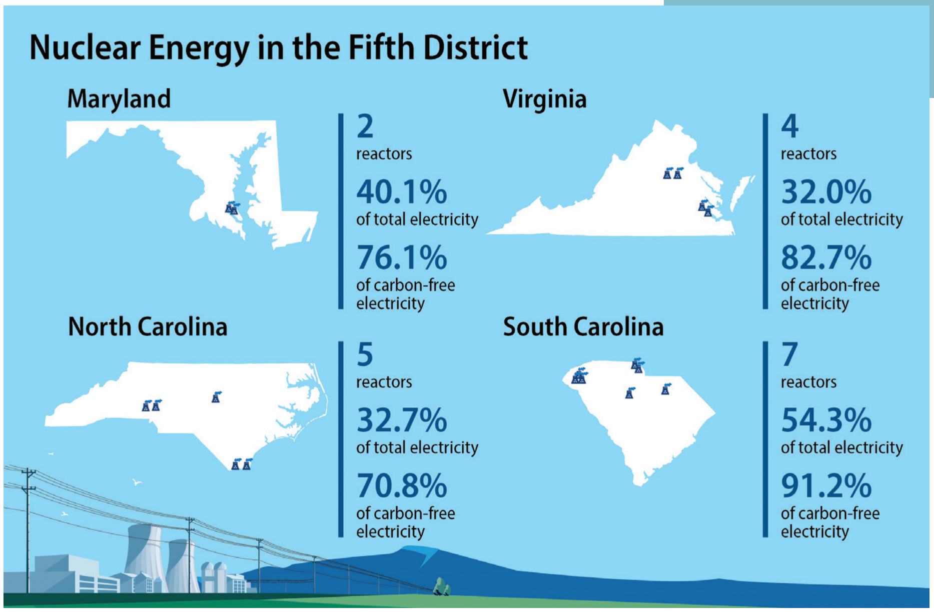
In its 2024 report, the DOE notes that the industry could capitalize on the roughly 30,000 workers trained in the course of completing the two reactors in Georgia. And when it comes to actually running new nuclear plants, some experts have suggested that workers in plants using other energy sources, like coal, could be retrained to be a part of the nuclear workforce. Nuclear reactors currently operating in the United States use fission to heat water and produce steam that moves a turbine to generate electricity. The second part of that process is similar to how other types of power plants convert heat into energy, meaning there would be some overlap in the skills needed to oversee that portion of the operation.

But taking advantage of the knowledge and supply chains developed for the Georgia reactors would require companies to greenlight new projects quickly, and moving quickly has not been the industry's strong suit. Regulatory oversight is another source of delays for new nuclear energy plants. All reactor designs must obtain approval from the U.S. Nuclear Regulatory Commission (NRC) before any construction can even begin.

"There's a reason why the NRC is so thorough," says Anna Erickson, a professor of nuclear engineering at Georgia Tech. "Reactors have much higher safety standards now than before 1979. The flip side of that is that companies looking to license new reactor technologies face significant delays, raising the barrier to entry."

Many experts like Erickson and Haghighat have called on the industry to coalesce around a small number of already approved designs, such as the AP1000 reactor designed by Westinghouse and used in both the recent Georgia and South Carolina projects. This would, in theory, shorten the time for regulatory approval and allow firms to move more quickly to construction. But this has proven difficult for the industry in practice, both here and in Europe. Even reactors on the same site have slight differences, making each build unique from start to finish.

"Cost is a function of how scalable the process is," says Erickson. "The costs are enormous the first time you build something, and if you only build it once, you have no opportunity to reduce costs."



SOURCE: Data from the Nuclear Energy Institute

PROMISES OF NEW TECHNOLOGY

One of the reasons the industry has struggled to coalesce around a single design is that the technology continues to evolve, and new designs hold the promise of solving other challenges that have held the sector back. Although nuclear power is relatively cost efficient once it is up and running, the upfront costs of building a new reactor are substantial. This increases the risks for investors should the project fail to finish, reducing incentives to begin the work in the first place. A relatively new class of nuclear power generators known as small modular reactors (SMRs) promise to come in much cheaper.

As their name suggests, SMRs are smaller than the types of nuclear reactors operating in the United States today, in terms of both energy output and physical footprint. The "modular" in the name refers to the fact that the components needed to build the unit are standardized and can be built at a factory, reducing the time and cost of construction. Many SMRs also use passive features for cooling, meaning they don't require a backup power source to ensure safety in the event of an emergency.

Although the underlying technology is not entirely new — it is similar to the types of nuclear engines that have powered submarines and other ships for decades — it has yet to be used for commercial power generation in the United States. In 2023, an SMR design by Oregon-based NuScale

Power became the first in the country to be certified by the NRC. In Virginia, Dominion has begun exploring the possibility of adding SMRs to its North Anna nuclear site in Lousia County, and last October it entered into an agreement with Amazon to explore SMR development in the state.

"We're still in the exploratory phase of SMRs right now, so even if we did move forward, Virginians likely wouldn't see an operational SMR for another decade," cautions Dominion's Eberly.

Companies are also exploring reactor designs that utilize different cooling methods and fuels. Some types of nuclear fuel are more efficient, which could allow reactors to operate for even longer stretches of time, and some fuel types have better safety features that allow them to withstand higher temperatures. However, the United States currently lacks a domestic supply chain for the high-assay low-enriched uranium fuel required for these advanced reactor designs. Last October, the DOE awarded contracts to six companies to start building those supply chains.

In addition to advances in nuclear fission technology, companies are also racing to develop commercially viable nuclear fusion plants. Nuclear fusion replicates the energy-generating process of stars, combining atoms rather than splitting them apart. It offers an even cleaner source of reliable power, since no radioactive waste is produced by the process, but scientists have not found a way to sustain a large-scale fusion reaction that generates enough energy to be commercially viable. Commonwealth Fusion Systems, a Massachusetts-based company, claims to have solved this problem using an array of powerful magnets. It is building a test reactor at its campus in Massachusetts that is scheduled to be completed in 2027. Late last year, it announced the site of its first planned commercial fusion reactor: James River Industrial Park in Chesterfield County, Va., outside Richmond. Assuming the test is successful, Commonwealth says it expects to build the operational plant in the 2030s. Still, many experts remain skeptical.

"The saying in the industry is that fusion is a technology that's always 30 years away," says Erickson. While she thinks the magnetically confined approach being researched by Commonwealth is probably closer to reaching commercial energy production than other methods, the technology is unlikely to be in a position to scale up fast enough to meet energy demand over the next 10 to 15 years.

INFLECTION POINT?

Can new nuclear capacity come online fast enough to meet expected demand over the next decade? So far, utility companies have focused on extending the life of existing reactors or even bringing decommissioned ones, like Three Mile Island, back into service. The latter comes with its own set of costs and delays. Constellation Energy expects to pay $1.6 billion to get Unit 1 at Three Mile Island back up and running by 2028. Until now, the United States has never reopened fully shut reactors that were in the process of being decommissioned. While active reactors periodically go offline to conduct maintenance and refuel, decommissioning a nuclear reactor is an expensive and lengthy process that takes 15 to 20 years. In Virginia, Dominion Energy announced last year that it had received approval from the NRC for a second 20-year extension for the two nuclear reactors at the North Anna Power Station.

When it comes to tripling nuclear energy capacity by the middle of the century, experts like Haghighat worry the United States is already behind in making the necessary investments. Recognizing these uncertainties, utilities and tech companies have also announced plans to meet the data center energy demand by expanding natural gas power capacity.

Other factors could also change the equation on power demand in the coming years. Earlier this year, Chinese company DeepSeek made headlines by launching a generative AI model that they claimed performed as well or better than American competitors but was more efficient. It's possible, then, that AI applications could require less electricity than initially thought, but it's too early to tell. Many experts still expect that energy demand will grow as the economy continues to find more uses for data.

"Data has become a utility," says Erickson. "To keep growing the applications for data, like AI, we need to supply the energy." **EF**

READINGS

"Data Centers in Virginia." Joint Legislative Audit and Review Commission Report to the Governor and the General Assembly of Virginia, Dec. 9, 2024.

"Pathways to Commercial Liftoff: Advanced Nuclear." U.S. Department of Energy, September 2024.

"Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption." Electric Power Research Institute White Paper, May 28, 2024.

Shehabi, Arman, Sarah J. Smith, Alex Hubbard, Alex Newkirk, Nuoa Lei, Md Abu Bakar Siddik, Billie Holecek, Jonathan Koomey, Eric Masanet, and Dale Sartor. "2024 United States Data Center Energy Usage Report." Lawrence Berkeley National Laboratory, December 2024.

Vance-Granville Community College operates in several state prisons across North Carolina, as well as in the Butner Federal Correctional Complex in Butner, N.C., shown here. Vocational programs offered include welding and commercial driver's license training.

IMAGE: ASSOCIATED PRESS PHOTO/GERRY BROOME

Community Colleges and Workforce Training in the Criminal Justice System

Programs within and beyond prison walls provide opportunities for a new beginning

By Matthew Wells

Darrin Casper was ready to start fresh.

"I was just tired of doing the things I was doing. I needed to do something different because I kept winding up in the same place," says Casper, who was released in April 2024 after serving four and a half years in prison in North Carolina. "My family members have always been there for me, and I just needed to make the change."

Casper's aunt had been looking for local programs that could help him with the transition and eventually discovered the Craven-Pamlico Re-entry Council. Operated by Craven Community College, the council provides a range of services to formerly incarcerated individuals in Craven and Pamlico counties in eastern North Carolina, including housing and transportation assistance, skill development, and job placement. Casper, who now works as a heating and air systems installer with the Coastal Carolina Disaster Resiliency Agency, credits the council with helping him manage his reentry.

"You have to make up in your mind that you're ready," he says. "But if you have people there to support you like the Craven-Pamlico Council, it makes it a lot easier."

The adverse effects of incarceration can span generations. People who have served time in prison have lower employment and high school graduation rates, as do their dependents. Lower education levels have also been linked to an increased likelihood of being arrested and incarcerated, meaning those dependents are also more likely to spend time behind bars. At the same time, people exposed to the criminal justice system – both the incarcerated individuals and their families – are more likely to isolate themselves from others, spending less time participating in civic and social life.

That isolation can translate into an absence of personal and professional networks and a lack of confidence, making successful reintegration difficult. These individuals also face the stigma that comes with being convicted of a crime and sentenced to prison. Potential employers may not be willing to take a chance on hiring someone with such a background. A recent experimental study at the University of California, Berkeley found evidence for this stigma: College-educated men with criminal records received callbacks for a job opportunity half as often as those without a criminal record.

Criminal justice reformers have long advocated for policies and programs that might remove these kinds of barriers, allowing former prisoners the opportunity to find fulfilling work while contributing to the overall economic well-being of their communities. Community colleges, with their focus on local workforce training programs and a deep knowledge of their regions' employment needs of, are well situated to play a central role in those efforts. In the Fifth District, community colleges offer a variety of programs, some working within a state's prison system and others serving individuals like Casper who have recently been released. Both types of programs offer a combination of education, training and skill certification, and employment assistance.

PREPPING FOR A NEW BEGINNING

Each year, about 10,000 people enter Virginia's labor force upon their release from the state's prison system. That's roughly the same number of people who graduate from George Mason University, the state's largest public postsecondary institution. To have a chance at successful reentry, these new labor force participants must have the necessary education and training. Community colleges like Southside Virginia Community College based in Emporia, Va., and Vance-Granville Community College in Henderson, N.C., offer programs for incarcerated individuals, giving them a chance to compete upon their release. Started in 1985, Southside's Campus Within Walls program currently operates in five correctional facilities in Virginia and offers associate degrees in general studies and business management, as well as vocational training in HVAC, solar panel installation and maintenance, and electricity. Vance-Granville operates in several state prisons across North Carolina, as well as the federal prison in Butner, N.C., near the Virginia border. The college offers several vocational programs, such as welding and what is commonly known as CDL, or commercial driver's license training.

Behind-the-wheel training is difficult in prison facilities for a host of reasons, but Vance-Granville makes sure that CDL students have completed all the classroom-based work they need while incarcerated and are lined up with on-the-road training soon after their release. Jerry Edmonds, the college's vice president of workforce and community engagement, notes that during a typical Vance-Granville academic year upward of 20 incarcerated students receive a completion certificate for the written portion of the CDL course. These students are then better equipped to enter the workforce or enroll in the full Vance-Granville CDL program upon their release from incarceration.

Of the program's job fairs, "the students are saying, 'Wow, I really like what that truck organization had to say.' And those organizations can say, 'Hey, that student asked a great question,' and then ask the instructor about how they're doing," notes Edmonds.

Security concerns are one of the primary challenges confronting the community college administrators overseeing these programs. What is allowed in terms of instruction materials and technology can vary from facility to facility, and even within facilities. According to Angela Simmons, Vance-Granville's dean of workforce readiness, health, and public safety, one portion of the federal prison in Butner has a full welding operation, while in another portion with a higher level of security, she is working to bring in a robotics simulator that can mimic welding without any threat to security. Similarly, for the hands-on lab portion of its courses, Southside uses a mobile training unit at its campuses that is a tiny shed shaped like a house, with electrical wiring, a heat pump, and solar panels on the top. Amanda Cox, coordinator of Campus Within Walls, says Virginia's Department of Corrections has worked closely with her to ensure students at multiple facilities would have access to this training prior to their release.

These programs can face additional logistical hurdles. Classes can be canceled because of incidents beyond students' control elsewhere in the prison. Inmates, particularly in state prisons, can be transferred at any moment to a new facility outside of the community college's service area, meaning work can be lost or courses left incomplete. Additionally, space to conduct classes or study can be scarce, making it difficult to scale programs.

Prisons also typically do not give inmates internet access, and while instructors can work around that limitation, it can complicate students' efforts to file their Federal Application for Student Aid (FAFSA) and receive funding to pay for classes. When done online, the process takes a matter of days. Paper filings, which inmates typically use, can take six to eight weeks. This can cause significant delays for the programs themselves. Cox, however, notes that, again, the Department of Corrections has been working with her to find a way forward so that classes can begin on time and keep up with the college's calendar.

These programs rely on a mix of full-time community college professors and adjunct instructors hired through job postings or word of mouth. At Campus Within Walls, Cox provides instructors who are new to the program with a 10-page manual full of what they need to know — from what they should wear, to expectations regarding fraternization, to whether plastic or metal paper clips are allowed.

FINDING YOUR FOOTING ON THE OUTSIDE

To assist in an individual's reentry into society, correctional facilities might offer counselors in the months leading up to their release, helping them find housing, employment, substance abuse counseling (if applicable), and other assistance. In the Fifth District and beyond, inmates might also receive a reentry resource packet, with information about benefits eligibility and links to additional resources and services, such as a local reentry council. Many of these reentry councils operate at the county or regional level and are run by various nonprofit organizations or the local community college, such as Craven Community College in the case of Craven and Pamlico counties.

Established in 2011 as a Department of Justice program, the Craven-Pamlico Re-entry Council has been funded by the North Carolina Department of Adult Corrections since 2017. It operates on a $225,000 annual budget and currently has over 200 active clients with 18 to 20 new individuals starting each month. Angela Wilson, the council's coordinator at Craven Community College, says the "intention is for the individual to find out about us while they're still incarcerated, so they have a path to us when they get out. But because jails and prisons are short staffed, they don't always get that information, and they find out mostly through their probation officers once they're on the outside."

The Craven-Pamlico Re-entry Council and similar programs offer a full range of support services for individuals who have been released from the criminal justice system. Perhaps its hallmark offering is a free, intensive two-week Job Readiness Boot Camp, where participants learn basic computer skills (such as word processing and internet and email use), gain some economic literacy (such as learning how to open a bank account), identify potential career paths, craft a resume, and practice interviewing for jobs. Darrin Casper participated in the boot camp, and he notes that everything from brushing up on computer skills and learning how to use a cell phone to participating in practice interviews was invaluable, likening the experience to time with a life coach.

"Everything was designed to get you back out there," he says. "I was able to be around other people in my situation who were just as determined as I was to do something right and get back on the right track."

Boot camp participants also get connected with NCWorks, the state's career center and job board. Toward the end of the two weeks, the boot camp arranges worksite visits for participants to meet with hiring managers for in-demand jobs, such as forklift operator or truck driver. While the boot camp originated at Craven, it is now available statewide at all 58 of North Carolina's community colleges.

Whether an individual wants to enroll in school or enter the workforce, the boot camp is also an opportunity for individuals to gain familiarity with everyday social interactions and to develop coping skills. Life in prison operates along a different set of social norms and "if you take someone who has been incarcerated for 10, 15, or 20 years, you just can't bring them into a workplace or classroom and expect that they're going to know how to function overnight," says Edmonds of Vance-Granville Community College.

Beyond the boot camp, the Craven-Pamlico Re-entry Council also has a part-time job placement specialist, Bonita Simmons, whose commitment extends well beyond lining up employment. She also ensures newly released individuals have stable housing (she started My Sister's House, a group home for women in the program) and can secure basic needs like food, clothing, and child care. Participants are also registered as Craven Community College students, allowing them to earn continuing education credits and have their participation noted on their transcripts. Those continuing education courses can include CDL classes, forklift certification, and HVAC training, all of which are paid for by the council. The CDL and forklift classes are the most popular, as they are closest thing to a direct pipeline to employment thanks to the high demand. Forklift operators can make anywhere from $17 to $30 an hour, while CDL drivers can earn between $40,000 and $76,000 annually.

These initiatives require the participation of the local community, which means the council's outreach to businesses is a high priority. Simmons, the job placement specialist, also does the lion's share of that work, helping eliminate stigma and assisting employers in understanding the value these job applicants bring to the workplace. A crucial selling point is that the council uses a federal bonding program that protects employers from any responsibility should a participant engage in any unlawful actions while on the job.

EVIDENCE OF SUCCESS

The direct costs of incarceration are high. With almost 2 million people currently behind bars in the United States, the Prison Policy Initiative estimates that after accounting for housing, health care, policing, and other expenses, the total annual system cost comes out to at least $182 billion. A 2023 report by the Vera Institute of Justice, a criminal justice reform advocacy organization, found that participating in prison-based college education could reduce recidivism rates by 66 percent, and a 2019 Vera report estimated that increasing education access could collectively save states over $365 million annually.

Other studies also support the effectiveness of educational investments for those serving time behind bars. A 2020 study by Rebecca Silbert, now of the University of California, Berkeley, and Debbie Mukamal of Stanford University looked at how inmates throughout California's correctional facilities performed in their coursework relative to their nonincarcerated counterparts across the state community college system. They found that incarcerated students taking the same courses as those on campus earned a higher proportion of As, and a higher proportion passed those courses with a grade of C or better. The study also looked at formerly incarcerated students taking courses on campus and found that the median semester grade for those students was higher than the median grade for the whole student body. The authors of the study argued the results "reinforce research demonstrating the strength and potential of this new generation of students and justify increased public and private support for college programs."

Recent research has also found evidence that these programs reduce recidivism and increase the likelihood of post-release employment. In a 2023 article in the *American Journal of Criminal Justice*, economists Ben Stickle and Steven Sprick Schuster of Middle Tennessee State University found that vocational training like that offered by community colleges yields the largest returns, with a $3.05 total benefit for every dollar spent per student. When looking at the effects of these programs on keeping people from reoffending and returning to prison, Stickle and Sprick Schuster found that vocational education reduces recidivism by 4.17 percent, while college education does so by 12.74 percent. Further, in-facility programs decrease recidivism by between 16 percent and 19 percent and increase post-release employment by 3.1 percentage points and quarterly wages by $141.

Beyond the benefits accruing to these individuals looking to start anew, community college-led education and workforce training programs can also benefit local and regional businesses and economies. Terri Erwin, the director of the Virginia Consensus for Higher Education in Prison, argues that this population is important to economic growth.

"The business community is starting to really tune in to the idea that we simply can't afford to miss this population in terms of workforce contribution," she says.

Community colleges see themselves as an integral part of that effort, creating wins for individuals, employers, and larger communities. Craven Community College, for example, takes pride in what it sees as a reputation for making good things happen for the community.

"We're stable. We've been here 60 years. All the doors are always going to be open," says Gery Boucher, Craven's vice president for development. "We're not just coming and going like some nonprofits. A lot of people entrust the college to make things work within the community. Community members – county managers, the sheriff, residents — all have a vested interest. That's the power of the community college. It's local."

OBSTACLES TO OVERCOME

Despite indications of success, administrators of these programs highlight some hurdles. Cox of Campus Within Walls notes that colleges can have difficulty tracking participants' progress once they are no longer incarcerated unless they choose to continue their education at Southside.

Additionally, these programs rely on a diverse range of funding sources that are not always consistent or guaranteed. In North Carolina, community colleges like Vance-Granville receive a set amount of funding from the state annually, and then the colleges work with the correctional institutions to develop a course schedule based off that amount. This can lead to fluid program offerings that change regularly. Additional funding for job placement services can come through other state and federal government grants, and private philanthropy also plays a role.

Perhaps most crucially, many inmates seeking to continue their education while in prison receive a significant portion, if not all, of their funding through the Pell Grant program, which provides Department of Education grants for low-income students. The 1994 Violent Crime Control and Law Enforcement Act barred incarcerated individuals from receiving Pell Grants, but a pilot project begun in 2015, Second Chance Pell, made these grants available on a limited basis, including to Southside's Campus Within Walls students. In 2023, the federal government announced full Pell eligibility would be restored to incarcerated individuals enrolled in an approved prison education program, but it will not be available for all inmates until 2026. For programs like Southside's Campus Within Walls and the ones at Vance-Granville, as well as any postsecondary institution offering instruction within prison walls, the Pell program is crucial to their survival.

When asked how things might have been different if he didn't connect with the Craven-Pamlico Re-entry Council, Casper says, "I can't imagine what I would have been doing. I'm sure I would have been lost because with the background that I have, jobs would have been extremely hard to find." **EF**

READINGS

Couloute, Lucius. "Getting Back on Course: Educational Exclusion and Attainment among Formerly Incarcerated People." Prison Policy Initiative, October 2018.

Sawyer, Wendy, and Peter Wagner. "Mass Incarceration: The Whole Pie 2025." Prison Policy Initiative, March 11, 2025.

Silbert, Rebecca, and Debbie Mukamal. "Striving for Success: The Academic Achievements of Incarcerated and Formerly Incarcerated Students in California Community Colleges." Stanford Criminal Justice Center and Corrections to College, January 2020.

Stickle, Ben, and Steven Sprick Schuster. "Are Schools in Prison Worth It? The Effects and Economic Returns of Prison Education." *American Journal of Criminal Justice*, October 2023, vol. 48, no. 6, pp. 1263-1294.

Alan Auerbach

On the federal debt, the Social Security trust fund, and how Uncle Sam discourages seniors from working

IMAGE: COURTESY OF GENEVIEVE SHIFFRAR

Alan Auerbach enrolled in college at Yale planning to focus on math and science. But in his second year, he figured he should sign up for a course in something else for the sake of the school's distribution requirements. So he tried introductory economics without having a clear idea of what economics was — and discovered he enjoyed it.

"It was nice to see applications of mathematical tools to real-world situations," he recalls. "It was far less abstract than the math or even the physics that I'd been studying, and I kind of liked that."

Several of his professors encouraged him to pursue an economics Ph.D. Arriving at Harvard, he had another shift in store: He expected to focus on either macroeconomics or mathematical economics — economic theory — but once he was there, he found himself drawn to public finance.

"What got me interested in focusing on taxation and fiscal policy and other things like that was that I ended up working with Marty Feldstein" — Martin Feldstein, a future chair of the Council of Economic Advisers — "first as his research assistant, and then he was my dissertation advisor. Those are the kind of things he worked on. So I was exposed to the frontier of thinking in the area, which made it very interesting for me."

In the years since, Auerbach has been on the economics faculties of Harvard, the University of Pennsylvania, and, since 1994, the University of California, Berkeley. Additionally, he is the director of Berkeley's Burch Center for Tax Policy and Public Finance. Among his research interests are the economic effects of taxation, the differing effects of fiscal policy measures on different generations, the effectiveness and long-term implications of the economic policy response to the COVID-19 pandemic, and the sustainability of rising public debts.

David A. Price interviewed Auerbach by videoconference in January.

EF: As you know, the federal debt stands at $36 trillion, more than 120 percent of gross domestic product. While high federal debt isn't new, it has grown enormously during the pandemic and post-pandemic eras. Should we be worried?

Auerbach: Yes, I think we should be worried.

I do have the problem of having said we should be worried a long time ago, when the situation wasn't as bad as it is now. I would say I think even more strongly now that we should be concerned about it.

One factor that clouds the issue is that some of the warnings that we've had — not from me — about huge spikes in interest rates, runaway inflation, and things like that haven't really happened. We haven't seen the sudden bad outcomes that some people might have expected.

Some people have argued that the debt is just not an issue. I think one of the problems is that it's not an issue you have to worry about until you do. And when you do, it's too late, really. At least, it's much more difficult to do things because by that time, you've gotten to a point where you really have to start cutting in very painful ways instead of making adjustments over a longer period of time that can be more subtle.

EF: Is that the bad outcome — that interest debt servicing displaces other priorities?

Auerbach: Yes. There are different ways that debt can lead to bad outcomes in countries that are less central to the world economy than the United States and don't have a reserve currency and are historically less trustworthy. It can cause a crisis in terms of lack of access to capital markets and things like that.

That's not what I anticipate for the U.S. What I anticipate more is just a gradual tightening of the vise, where more and more of the revenue we raise goes to debt service. And we're in less of a position to raise taxes because they're already creeping up. And our spending commitments are growing faster than our ability to tax.

One of the reasons why we haven't done more politically about the debt in recent years is that until the last couple of years, we've had low interest rates relative to our growth rate. They came down for several years below what was expected. And so it made people more and more sanguine. But if you look over the longer reach of time, such favorable interest rate outcomes are not something that one can anticipate.

It's better to start dealing with it now when we have a little bit of wiggle room than to wait until we're really up against it.

EF: An optimist's argument might be that productivity growth is going to be great, and we're going to be able to grow ourselves out of this situation. What is your reaction to that?

Auerbach: I think part of the problem is that historically interest rates and growth rates tend to move together. In the shorter run, of course, that's not true, but there are good reasons why stronger economies with faster growth would have higher interest rates. There are more opportunities for investment.

That means that, at least over the longer term, the government's not likely to come out that far ahead. If the growth rate picks up maybe in the short run, it will. So there's been a lot of emphasis and thinking about the difference between interest rates and growth rates.

EF: Can we take comfort from the fiscal situation in Japan, where public debt exceeds 250 percent of GDP?

Auerbach: I think not. First of all, some of the difference is that a lot more of the Japanese government bonds are held within government accounts. If you look at net debt-to-GDP ratios, which exclude debt held by the national government, Japan is still substantially higher than the U.S., but I don't think the gap is quite as big.

I think more importantly, the institutional differences between Japan and the U.S. make it easier for Japan to have a big debt-to-GDP ratio. Almost all Japanese government debt is held domestically, which is not true of the United States. So in terms of thinking about having willing holders of the debt, that's more true in Japan than it is in the U.S. Second, I think much more of the debt is held by financial institutions in Japan. The government's not simply going into debt markets the way it does in the U.S. A lot of it's held in financial institutions. It's not necessarily that they're required to, but it is part of the Japanese culture or custom that the debt is held that way.

And again, I think it means that the ability of the government of Japan to issue debt is higher for a given debt-to-GDP ratio. That won't necessarily always be true. Japan could also encounter serious problems at some point and it's hard to know when.

Also, if you look at some of the things that are going to press on the national debt, they're more problematic in the U.S. In particular, we spend a lot more in the U.S. on health care as a share of GDP than Japan does, and health care expenditures, both private and public, are growing faster than GDP. We're at 19 percent of GDP or something like that on health. That's substantially higher than Japan and at least the government component of it is growing and occupying a larger and larger share of our federal budget. That's adding a lot of pressure in addition to the debt service coming from the debt that's already been issued.

EF: Do you anticipate fiscal pressures will lead policymakers here toward so-called financial repression — measures to push Americans and American institutions to hold public debt, such as capital controls and regulatory requirements for financial institutions?

Auerbach: I don't. The U.S. went through a lot of financial deregulation. We've had financial repression in the past, but it was many decades ago, and it's hard to imagine imposition of capital controls or other requirements that essentially force lower interest rates on households to help finance the federal budget.

There hasn't been any movement in that direction in the political sphere from either side. I haven't heard any mention of it, and so I'm kind of doubtful that that's going to be one of the channels we use to deal with the federal debt.

EF: We've been talking about the federal debt broadly. When you think more specifically about Medicare and Social Security, do you see a crisis on the horizon for either of those programs?

Auerbach: The problems in those programs are a little bit like the problems with the federal debt itself. There is one important difference, which is that Medicare — at least Medicare Part A, the hospital insurance — and Social Security have trust funds. By law, Social Security, for example, can't pay benefits once the trust fund hits zero; they can only pay benefits that can be financed by current revenues, which would be substantially lower than the benefits that are currently promised.

The Social Security trust fund is projected by the Social Security trustees to run out of money in less than a decade. If that continues to be true, and it hasn't really changed much in the last few years, then we're going to get to a point where either there has to be a change in the Social Security system or benefits have to be cut.

I doubt that benefits will be cut across the board. That's what would happen if nothing were done. So in that sense, you might say there's a manufactured crisis in store. The same thing is true of Medicare Part A, which has a trust fund that also will eventually run out of money.

That said, I'm not as confident as some other people that this will lead to a reform of these programs. It's true that in 1983, which was the last time the Social Security trust fund was nearing exhaustion, we had the Greenspan Commission that recommended changes in Social Security, which were then adopted, which raised the retirement age very slowly and increased payroll taxes. That put the Social Security system on a better financial footing for many decades.

That could happen again. But it could also be the case that Congress and the government don't have the appetite for providing this kind of bad news to people in the Social Security system. They could just say, well, we'll use general revenue funding to cover the shortfalls of Social Security. We already do that for Medicare Part B, the health insurance, and Medicare Part D, the drug benefit. They are not self-sustaining; we have premiums paying for a small part of the benefits and the rest comes from general revenues.

Some of the traditional supporters of Social Security say it's good to have it be a self-financing system because it makes people feel that they have a stake in it when they're paying their payroll taxes and so forth. But if the choice of the government is to cut benefits, raise payroll taxes, or use general revenue funding, given their behavior in recent years, I'm fearful that they'll choose general revenue funding and just kick the can down the road.

EF: General revenue funding meaning, implicitly, debt funding?

Auerbach: Yes, that's exactly what it means. Right now, Social Security is walled off from the rest of the government in the sense that it has dedicated funding that including taxes on benefits as well as payroll taxes. That supports the system and, although we include Social Security in the unified federal budget, it is self-sustaining for the moment. Whether it remains so, we will find out in the not-too-distant future.

Alan Auerbach

PRESENT POSITIONS

Robert D. Burch Professor of Economics and Law, University of California, Berkeley; Director, Burch Center for Tax Policy and Public Finance, University of California, Berkeley

SELECTED ADDITIONAL AFFILIATIONS

Research Associate, National Bureau of Economic Research; Member, American Academy of Arts and Sciences; Fellow, Econometric Society

EDUCATION

Ph.D. (1978), Harvard University; B.A. (1974), Yale University

EF: Also related to retirement, you found in your research that the federal tax system and federal programs discourage the elderly from working. In what way?

Auerbach: Both the additional taxes that they pay when working and the benefits that they lose.

We always think of taxes discouraging work with increases in taxes as people work more. That's certainly one of the things that discourages work. It's true for the elderly just as it's true for everybody else. But in addition, especially for the elderly, there are some pretty large benefit programs that are means tested. This includes Medicaid, for example. We think of Medicaid as a program for the poor, but a large share of Medicaid benefits go to the elderly — for example, through coverage of long-term care. It's not covered by Medicare, but it is covered by Medicaid. But if your resources are too high, you don't qualify. And so if you have more income and more assets, you may not qualify for Medicaid. Supplemental Security Income is another transfer program that the elderly benefit from that is means tested, and of course there are others.

There are potentially pretty big disincentives to work if you are at risk of losing some of these benefits. They can swamp the effects of just the explicit taxes that you pay.

Moreover, there's a question of whether people really understand the way Social Security works for people who are below the normal retirement age, which is now essentially 67. For people who are retired, you can receive benefits as early as age 62 — unless you're disabled, in which case you can get them earlier. And then for roughly the next five years, you're subject to an earnings test, which says you lose benefits once your earnings go up above a certain amount. What's essentially a secret as far as most people are concerned is that you do get credits for the additional earnings. That is, your benefits go up in the future because you're earning money now. So if I am earning money at age 64, which wipes out all of my benefits, those benefits aren't gone. It's just deferring the benefits I'm going to get. There's an adjustment that essentially gives me the benefits back at a later date when I do fully retire.

But whether people understand that is quite doubtful. The evidence suggests they don't because there's a lot of bunching of earnings just below where the earnings test starts to kick in — which wouldn't be there if they understood. That is a potentially very large disincentive. It's a particularly unfortunate one because there already is in place an adjustment designed so it won't discourage people from working. But given that people don't seem to understand it, I think there's probably room for reform to make it more explicit, perhaps by getting rid of the earnings test entirely.

EF: Do you see taxation of Social Security benefits the same way?

Auerbach: Taxation of Social Security benefits affects people above a certain income, $25,000 if they're single, $32,000 if they're married. It's not indexed for inflation. So more and more people now have to pay taxes on their Social Security benefits.

Not only does that discourage retirees from working, it discourages them before they receive Social Security because if they have higher assets that they've saved, they're going to have higher income from those assets — interest, dividends, and so forth. And that's going to contribute to the income that might cause them to be subject to taxes on their Social Security benefits.

EF: We've had elevated inflation for about five years. You've argued that this has had significant hidden effects on households because federal fiscal policies don't fully take inflation into account. Please explain.

Auerbach: Well, there are different ways in which inflation interacts with the fiscal system to affect the taxes that people pay and the benefits that they receive. It could help them or hurt them; it mostly hurts them.

Some things are not indexed for inflation at all. I just mentioned one, which was the threshold over which you're taxed on your Social Security benefits. That threshold has been fixed in nominal terms since it was implemented. That means that the more inflation we have, the more people are going to be subject to tax on some or all of their Social Security benefits.

Where we do have indexing for a lot of elements of the tax system and benefits, there are delays before the system catches up. For example, once you're receiving Social Security, your benefits go up every year because of inflation. On the tax side, the federal tax brackets are indexed for inflation so that if your income goes up by 10 percent because inflation is 10 percent, it's not going to change your bracket because the bracket's indexed for inflation. However, there's a delay in the indexing. What that means is that if there's a sudden surge in inflation, the first year or so is going to happen before the brackets and the benefits start reacting to it. For example, if we went from an inflation rate of zero to an inflation rate of 10 percent on a permanent basis, that would cause a 10 percent decline in people's Social Security benefits because it would happen once and then we'd be forever one year behind.

The final thing is that capital income — interest, capital gains, things like that — are mismeasured because of inflation. For example, if I buy an asset for $100 and the price level doubles over the period that I hold it, and I sell the asset for $200, my real gain is zero. But I'd be taxable on a gain of $100, because we don't index capital gains for inflation. We don't index interest income. If the inflation rate is 4 percent and I'm getting 4 percent nominal interest, my real interest is zero, yet I'm still taxable on the 4 percent.

So through lack of indexing, delayed indexing, mismeasurement of capital income, as well as similar effects on the benefits side in terms of delayed indexing, people in general — not every person — have a reduction in resources as a result of inflation.

In one sense, that makes inflation a more effective tool for dealing with the deficit. It's traditional to think about sudden inflation as a tool governments use, particularly in less developed countries with very high debt-to-GDP ratios. They often may be tempted to try to inflate some of the debt away. Indeed, the U.S. debt-to-GDP ratio improved somewhat over the last few years, or at least it didn't get worse, even though we were running very large deficits, because we had a surge in inflation. This is an additional reason or channel through which inflation could help the government finance its deficits.

I don't think it's a particularly attractive way to do it because it's quite arbitrary. If you look at the distribution of effects, it varies a lot across households depending on the type of income they have. We wouldn't say it's very well designed.

EF: You've been paying close attention to fiscal policy for quite a while now. When you see the situation with the debt and debt-to-GDP play out, how does that affect you personally? Do you have some sort of gut reaction to all this?

Auerbach: Well, I am sad that the problems that I think are very, very important and should be at the top of the list of things government is dealing with don't interest the government at all.

You might say one of the frustrations of being an economist is that we often see, regardless of the thing we work on — we could be working on environmental policy, where I think there must be an enormous amount of frustration too — is that we have policies we think would work well, which the government doesn't seem very interested in. I think the best we can do is continue putting forward ideas of what we think government should be doing, the problems that we think it should be dealing with. And hope that somebody gets interested in them.

EF: What are you working on now?

Auerbach: I'm working on a few things. One of my most recent papers was on the national debt, looking at projections based on the last century or so and asking what kinds of government reactions to debt will put us on a stable path.

It's the case, as I've said in recent years, that the U.S. doesn't pay any attention to the national debt. That was not true if you go back, say, 20, 25 years or more. If you look, for example, during the Reagan administration as well as the first Bush and Clinton administrations, it was the case that when debt or projected deficits went up, government undertook actions to reduce them, either by increasing taxes or by cutting spending.

That ended sometime in the early 2000s. In the last 20 years or so, it's just not there. If we went back to the way we were behaving then, the kinds of shocks that are going to keep hitting the budget, either because of interest rates or pandemics or financial crises or other things, could be dealt with by those kinds of government reactions.

So it's both good news and bad news. It's good news in the sense that we've been there before. It's not as though we have to undertake an approach that's never been contemplated or practiced. But on the other hand, we lost religion sometime in the last 20 to 25 years. And it's not exactly clear how we're going to get that back because we lost it in a bipartisan way. There used to be bigger constituencies in Congress and in the White House for dealing with national debt, at least when problems became more apparent.

Another paper I've been working on estimates fiscal multipliers, in a broad sense — looking at the effects of, say, a fiscal expansion not just on earnings, employment, and GDP, but also looking at broader measures of social outcomes like mortality, divorce, homeownership, receipt of public benefits, and so forth. This is because my co-authors and I felt that we're taking a too-narrow view of the potential benefits of a fiscal expansion.

These broader benefits are substantial. That is, another dollar of government spending might increase social benefits by maybe 25 or 30 cents in ways that are not accounted for by the way we usually measure fiscal multipliers, that is, looking at effects on income or effects on employment.

EF: What do you think are the biggest unanswered research questions today in public finance?

Auerbach: I would say it's this point we were talking about before: We have a lot of information about the effects of policies and the design of policies, but we seem to lack a way of connecting those to actual policy adoptions.

One example has to do with redistribution; economists for a long time have thought about the optimal ways of redistributing resources in order to overcome inequality. We tend to focus on the outcome, that is, the resources that a household will have. And that's clearly not the way a lot of non-economists think about it. They tend to think about the income that they get before government. So, for example, people would seem to be much more interested in having a job that pays them a higher income than having a job with lower income and a government transfer payment. People tend to think more about what they get in the market as somehow an indication of their well-being and not necessarily equating that with what we give them. That has important implications.

Think, for example, about international trade. We say that free trade can be beneficial for all if those who are losers are compensated. The standard problem with that is we may not compensate people enough. But perhaps the bigger problem is that people may not view that compensation in the same way that they would view having a job. And therefore, as we're now moving away from free trade, governments seem to be more interested in trying to help people in ways that don't actually work through taxes and transfers.

Or think about environmental policy. Every economist thinks some sort of carbon tax would be the best way of dealing with it. We believe in pricing to get people to adopt the right behavior, given the problem of global warming and other externalities. But as much as there's been a bipartisan consensus among economists and attempts to interest policymakers in this, it's been very hard. We've instead adopted policies that are much less effective and much more costly from a social perspective.

So economists need to understand what's missing there — how people perceive problems like this, why they think the approaches that are being adopted are preferable. You might say these are questions of political economy rather than public finance. But ultimately, they are questions of public finance because they involve trying to design policies that are most socially beneficial in ways that can actually be adopted. **EF**

BY SONYA RAVINDRANATH WADDELL

Early Childhood Education in the Fifth District: The Challenges and the Opportunities

Quality, affordable early care and education (ECE) serves a dual purpose. First, quality child care enables parents, particularly mothers, to work outside the home — an option that may be important both to families and, in a tight labor market, to the economy as a whole. Second, research shows that early education and a high-quality environment contribute to a child's success in kindergarten, which is a predictor of future achievement in school and ultimately in the workforce. Still, most parents in the U.S. struggle to find quality ECE at an affordable price — a challenge that spans the Fifth District and, indeed, the nation.

There are multiple reasons why the private market might provide too little quality child care. First, while research suggests a high rate of return on investments in early childhood education, that return includes societal benefits that don't accrue directly to the parents — for example, increased future tax revenues from higher earnings, reduced adult health or incarceration costs, and productivity gains from higher educational attainment. One might call this a textbook example of a positive externality, where the price of child care does not account for all the benefits it confers on society. The presence of positive externalities results in an underinvestment because providers are unable to collect payments for all of the benefits they produce if parents alone bear the burden.

But there is more to this than just a classic market failure. ECE is a labor-intensive industry, making it difficult to reduce cost through technological innovation. Combining that with the costs that accompany regulatory requirements — often necessary for children's well-being — makes it difficult to reduce the cost while maintaining the quality that fosters healthy development and accrues those long-run social benefits. Parents in low-income households are most likely to face binding income and credit constraints that prevent them from investing optimally in high-quality ECE, but societal benefits are largest when all families have access to the affordable quality child care that enables them to enter the workforce, should they need or choose to. Since most households cannot afford the full cost of high-quality ECE, it is unlikely that the private sector alone would increase supply to a level that fully meets the needs of families and communities.

According to the Census Bureau's 2023 American Community Survey, more than 14.6 million children under the age of 6, or almost 70 percent of that population, have all available parents in the workforce. But the evidence indicates that our current national model for ECE provision is not working. What is the cost of this failure? And what programs and policies have states and communities put in place to enable parents to work outside the home while children benefit from high-quality preparation for kindergarten?

THE CHILD CARE SHORTAGE AND WHY IT MATTERS

According to a 2021 report from the Bipartisan Policy Center, the supply of child care in the United States in 2019-2020 filled only about 70 percent of the potential need (children under 6 years of age with all parents in the labor force) across the 35 states in their analysis. This gap was worse in rural areas than in urban areas. Estimates of the child care gap vary, and in many areas during the pandemic, but the continued existence of gaps in the nation and in every Fifth District state is consistent across estimates.

For example, a 2023 report by Virginia's Joint Legislative Audit and Review Commission (JLARC) indicated that Virginia needed, at minimum, 140,000 more child care slots to meet demand and most child care providers had a waitlist, some with hundreds of children. In West Virginia, a report prepared for the state's Department of Human Services found that more than half of West Virginia residents lived in a census tract with more than 50 children under the age of 5 that contained either no child care providers or three times as many children as licensed child care slots. Jennifer Trippett, who owns Cubby's Child Care Center, the largest licensed child care center in West Virginia, reported more than 400 children on her waiting list. And centers continue to close.

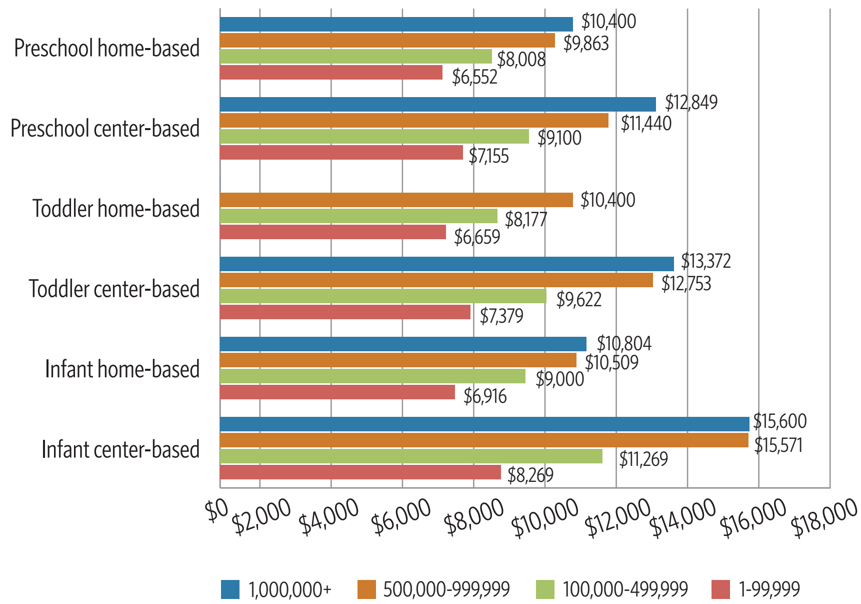
Ready Nation, an organization of business executives that is advised by child care experts and researchers, estimated that 71 percent of Maryland children under age 6 have both parents in the workforce. Yet more than half of Marylanders lived in census tracts with more than 50 children under age 5 that contained either no child care providers or more than three children for every licensed child care slot. The North Carolina Early Education Coalition (NCEEC) classified North Carolina as a child care desert, with an average of more than five families competing for every one available licensed child care slot in the state. Meanwhile, the First Five Years Fund estimated a gap of at least 16 percent in South Carolina. The bottom line to all of this reporting is consistent: Every Fifth District state is struggling to find enough child care to support working parents.

One concern about inadequate child care is that we need parents in the labor force. The U.S. labor force participation (LFP) rate for prime-age men and women (aged 25-54) has been falling. Male prime-age LFP has been falling since the 1950s; female LFP rose from the 1950s to the 1990s but stagnated in the 1990s. Women, whose participation is more likely to be affected by child care duties, have been losing ground in the United States relative to other counties: In 1990, the U.S. ranked number five in female LFP among Organisation for Economic Co-operation and Development countries. By 2019, American women ranked 21st out of 22 countries. A report by the NC Chamber Foundation and NC Child indicated that inadequate child care was costing the North Carolina government and employers billions of dollars in revenue from employee absenteeism and turnover.

There is widespread agreement that policies targeted at young children can improve lifetime educational attainment and other outcomes, including labor market performance. The strongest evidence of the value of ECE comes from small-scale randomized controlled trials (RCTs) where young children from similar backgrounds are randomly sorted into groups and provided quality ECE. One of the most widely cited of these RCTs is the Perry Preschool Project, a high-quality early education program in Michigan in the 1960s that was designed to foster development of cognitive and socio-emotional skills. It is well documented that attending the Perry Preschool program improved several outcomes of participants relative to the control group through age 40. A more recent study showed that the benefits carried through to the children of program participants, who had higher levels of education and employment, lower levels of criminal activity, and better health than the children of control group members. Other examples include the Carolina Abecedarian (ABC) project started in the 1970s in Chapel Hill, N.C., and the Tulsa, Okla., universal pre-K program provided by Tulsa Public Schools. Economist James Heckman and his colleagues found a 13 percent return on investment for comprehensive, high-quality birth-to-5 early education, using a variety of life outcomes such as health, crime, income, schooling, and the increase in the mother's income. Not surprisingly, studies have also shown that the impact of quality early care matters more for low-income families and single-parent households. (There is also research that showed the importance of paid parental leave for the health of the mother and infant in the first months after birth.)

Median Annual Price of Child Chare for One Child

by County Size (population), Child Age, and Care Setting



SOURCE: National Database of Childcare Prices 2022, Women's Bureau, U.S. Dept of Labor.

WHAT DO FAMILIES HAVE TO PAY?

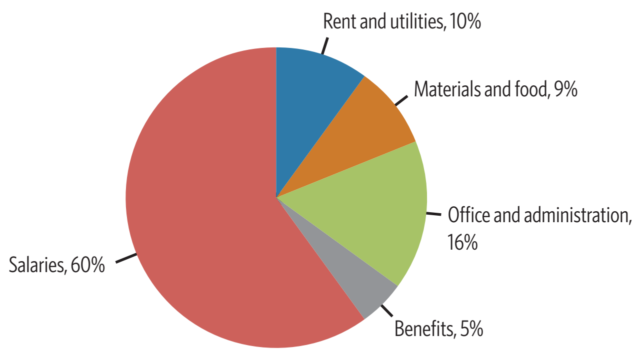
ECE is difficult for most households in the U.S. to afford. According to the National Database of Childcare Prices from the Department of Labor, the median annual price of care for one infant in 2022 ranged from $6,916 per year for infant home-based care in the counties with a population below 100,000 to $15,600 per year for center-based care in counties with over 1 million people. (See chart.) U.S. families spent between 8.9 percent and 16 percent of their median income on full-day care for just one child in 2022. JLARC found that the cost of infant and toddler care exceeded the federal government guideline for affordable child care (7 percent of household income) for more than 80 percent of Virginia families.

Not surprisingly, low-income parents are less likely to have child care. According to a 2022 Census Bureau survey, 67 percent of households with annual household incomes under $50,000 reported not having child care, compared with 52 percent of households earning more than $200,000 annually.

Why does child care cost so much, and why is it more expensive for infants than for toddlers? The answer is primarily labor. According to a report from the Center for American Progress, about 60 cents of every dollar spent at a child care center goes to salaries, not including benefits. (See chart on next page.) Importantly, the labor-intensive nature of early childhood education also makes it difficult to find the technology-driven productivity improvements that have driven down costs over time in other industries, such as manufacturing.

Even with the high share of costs going toward salaries, early care

Costs of Running A Child Care Center



SOURCE: Center for American Progress (2021).

workers have some of the lowest wages in our economy. According to the Bureau of Labor Statistics, the median hourly wage for child care workers was only $14.60 — less than the median wage for food preparation and serving occupations, which was $15.50. Anecdotally, child care service providers report losing workers to food preparation services and to the public school system. The median wage for preschool and kindergarten teachers was $18.91 in 2023. It is not surprising, then, that work by the Cleveland Fed indicated that child care workers had turnover that was 65 percent higher than in a typical job, while attrition among preschool and kindergarten teachers was on par with the typical occupation.

"Solving the conundrum of competitive compensation for a skilled early educator workforce is a top priority to ensure working families can access quality child care for their young children," says Kathy Glazer of the Virginia Early Childhood Foundation, a Richmond-based nonprofit.

The COVID-19 pandemic greatly exacerbated the turnover in ECE. From 2019 to 2021, the number of child care workers in the U.S. declined by more than 20 percent, from around 560,000 workers to less than 440,000 workers. By 2024, the number had risen to around 490,000 workers — still well below the pre-COVID number. Anecdotally, finding qualified workers willing to build a career in the low-wage field of ECE is the single largest challenge in the child care industry.

INNOVATIONS AND POLICY SOLUTIONS

There are a number of ways that states and localities have tried to address the labor challenges. In Virginia, for example, the Virginia Early Childhood Foundation created the Virginia Early Educator Fast Track program that not only helped child care facilities recruit applicants, but also helped with applicant vetting, training, compensation, wraparound support, and ongoing professional development. According to Rupa Murthy, president and CEO of the YWCA of Richmond, which runs the Sprout Schools, an early childhood education program in the Richmond, Va., metropolitan area, "The Fast Track cohort program helped us to hire almost 25 new teachers that had a 55 percent retention rate in the first year — much higher than we were seeing through other recruitment methods." Community colleges have also gotten involved, both in partnership on child care provision and in provider training. It is difficult, however, to unilaterally address the low wages in child care — and without higher wages, providers will continue to spend considerable time recruiting, maintaining high quality will be difficult, and both parents and children will continue to pay the cost of losing quality care.

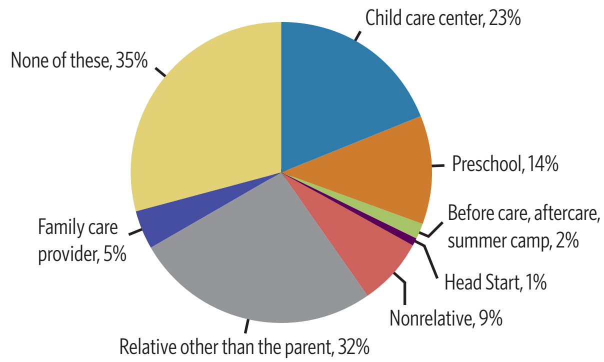
Another challenge of running ECE centers is that centers need both enough children enrolled and the right mix of children to profitably provide child care services. Most centers, for example, lose money on infants because of the low child-to-teacher ratio required for infant care, and thus they rely on having enough 3- and 4-year-old classrooms to make up the difference. Some well-intentioned policy solutions — for example, state-level universal pre-K — can create obstacles for providers looking to offer affordable infant care. In 2002, for example, the West Virginia legislature enacted a law that by the 2012-2013 school year, all 55 counties in the state had to provide a universal pre-K space to all 4-year-olds and certain 3-year-olds with special needs. On one hand, there is evidence that universal pre-K has lasting positive effects on parental earnings and child outcomes. On the other hand, there is evidence that the policy actually resulted in a decrease in supply of infant and toddler care because the publicly provided pre-K programs reduced the number of older children in private care, which made it harder for those private programs to stay in business.

A policy in Maryland addressed this problem. After the COVID-19 pandemic, Maryland started to offer universal pre-K through a mixed delivery system in which parents can choose where to send their child — be it a child care center, a home-based care facility, a Head Start program, or a program housed in their local public school facilities. This has helped to ensure kindergarten readiness while helping private center- or home-based providers to serve a mix of children that enables a sustainable program.

Home-based care — that is, child care in a residential, non-institutional setting — is also a critical piece of the ECE landscape. The 2022 Census Pulse Survey provided evidence that about 45 percent of respondents with children under age 5 had child care arrangements that relied on a nonrelative, relative other than the parent, or a family care provider — all arrangements that would qualify as home-based care. (See chart on next page.) According to Home Grown, an organization that represents home-based care providers, 30 percent of infants and toddlers are in home-based care, compared with 12 percent in centers.

Home-based care can often be the first choice for rural communities, as well as families of children with

Child Care Arrangements for Children Age 0-4



SOURCE: U.S. Census Bureau, 2022 Household Pulse Survey, public-use weighted data on child care, weeks 49-52.
NOTE: Parents can specify multiple options.

special needs or low-income families. For a rural household in a region without a critical mass of households to sustain a center, home-based care might be the only option. Home-based care is often more affordable, but it is also attractive to families because of the small size, the mixed ages of children, more flexible hours, and an opportunity to form a lasting bond with a caregiver. According to Erica Phillips of the National Association for Family Child Care, some of the biggest challenges faced by home-based or family child care providers are the aging workforce without retirement benefits, the lack of health insurance and paid time off, and the low compensation in the home-based care industry. "Higher paying and less challenging jobs can lure home-based providers out of the child care business, especially when labor markets are tight," says Rob Grunewald, a policy and economics consultant who previously worked on ECE issues at the Minneapolis Fed.

THE PRICE VERSUS THE COST

The business model for ECE is difficult to maintain without public or philanthropic support, which is why so many parents and providers rely on it. According to the Center for American Progress (CAP), the high price of child care that full-paying households face often cannot cover even a base quality of care, much less the highest-quality, developmentally appropriate, safe, and reliable child care that provides the best opportunity for the positive social benefits outlined above. According to CAP, the national average for the true cost of licensed child care for an infant is 43 percent more than what providers can be reimbursed for through the federal child care subsidy program and 42 percent more than the price programs currently charge families. This gap exists throughout the Fifth District. (See charts on next page.) The providers with financially sustainable programs rely on federal, state, philanthropic support, and household payments. "This public-private model ensures families pay a share while enabling providers to close the gap between the true cost of high-quality early care and education and available revenue," says Murthy of the YWCA of Richmond.

The biggest gap between base cost (that is, the cost of just meeting licensing requirements) and high-quality cost comes from increasing the compensation provided to professionals. However, cost for higher quality also includes lower child-teacher ratios, more planning time for teachers, and a larger and better-resourced learning environment for children.

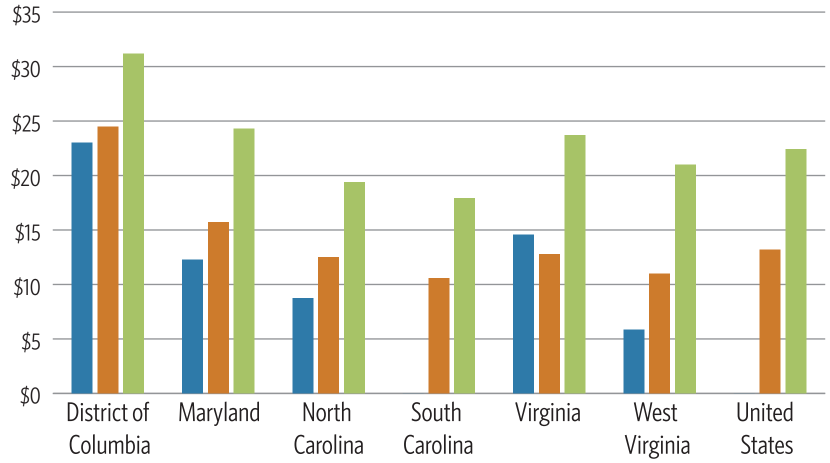
FUNDING ECE AND PARTNERING FOR SUCCESS

Unlike countries where ECE is primarily offered through publicly funded programs, the United States relies on privately provided care and then offers a variety of subsidies and tax credits, with a particular focus on low-income families. (In almost all states, subsidy rates are based on a regional average of price paid by families, not the individual family's cost of care, as outlined above — the District of Columbia, Virginia, and New Mexico are prominent exceptions.) The primary public funding source to help low-income families access high-quality child care is the federal Child Care and Development Fund (CCDF). There are other federal programs, too, such as the Child and Dependent Tax Credit, FSAs for dependent care, and Head Start, which uses a mix of federal, state, and local funding. One important source of federal funding in the last few years has been the $39 billion allocated by the federal government to states and territories for child care through the American Rescue Plan Act (ARPA) signed by President Biden in 2021. That funding was intended to stabilize the child care industry during the pandemic and was used to great effect in many Fifth District states — in fact, ARPA dollars funded the pilot of the Virginia Fast Track program mentioned above. But that funding source is expiring: All ARPA funds had to be obligated by the end of 2024.

There are challenges with the federal subsidy programs. First, depending on your state and income level, the CCDF eligibility criteria and funding availability vary. In addition, some Head Start programs have long wait lists while others have unfilled slots — perhaps in part because parents are not aware of the program, the enrollment process is complicated, or sometimes because the timing of Head Start programs, like many ECE programs, are not consistent with parents' work hours. Second, many families who need support do not meet the eligibility criteria. Third, the value of the subsidy is insufficient to cover the true cost of operating a high-quality child care program. In part for these reasons, almost all states provide additional funding beyond what is required for the federal funding. For example, the Virginia Preschool Initiative delivers state funding to school districts and community groups to provide pre-K to

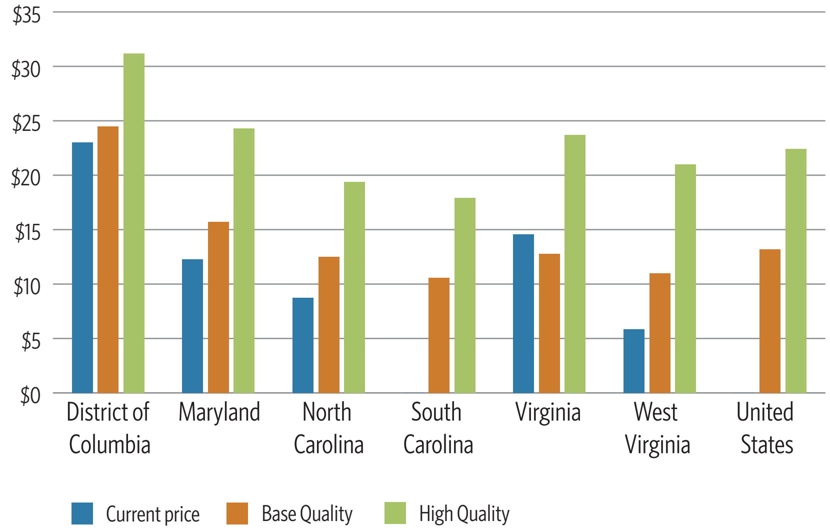
The Price of High-Quality Infant Care

Annual, By State and Quality Level



The Price of High-Quality Preschool Care

Annual, By State and Quality Level



SOURCES: Center for American Progress. Base quality scenarios use default data from www.costofchildcare.org representing a program meeting state licensing regulations.

NOTE: The high-quality scenario includes all quality variables available in the interactive model.

at-risk 3- and 4-year-olds who are not served by Head Start federal grants. The Virginia Department of Education also provides the Child Care Subsidy Program and mixed delivery grant subsidies.

Expanding funding streams has been another source of innovation. Both North Carolina and Virginia are piloting a cost-sharing model that has been successful in Michigan. This model relies on sharing the cost of ECE provision among three primary partners: the government, parents, and employers. In fact, through both chambers of commerce and individual partnerships, employers have increasingly become a critical partner in the search for solutions. Some employers have opened new facilities on or near bases of employment. For example, medical device manufacturer Arthrex partnered with Bright Horizons to open a licensed child care center for children of its employees at its Pendleton, S.C., location.

Sometimes, the regulatory environment can get in the way. Yadkin County, N.C., was looking to house multiple child care centers in one location to reduce non-labor costs for existing child care providers and enable new providers to emerge while increasing the pay offered to workers. To do this, the county partnered with the state to change the regulatory structure in a way that would protect child safety while allowing for multiple small child care centers at one location. Shared administrative services, philanthropic support for food or diapers, and providing opportunities for home-based care to access support through licensure are other ways that states, localities, and individual programs have tried to expand the supply of care. The ubiquitous nature of child care challenges, and the cost to local and regional economies, has created a space for communities to find solutions that work for them. Grunewald notes, "Child care benefits communities, not only families with young children, so it makes sense to foster collaboration among local businesses, economic development, community development financial institutions, and other stakeholders to address child care issues."

CONCLUSION

Quality early childhood education offers a two-generation solution: It is a way for parents to work outside of the home if they want or need to, and it is a way to help children get quality developmental support before entering the public school system. The benefits of quality early care and education are well known and innovations in the space abound. And everyone — from employers to policymakers to parents to taxpayers — has a vested interest in finding a system that works to ensure we have the labor force to meet demand today and the early care and education that prepares our children and lays the foundation for tomorrow. **EF**

BY ANNA KOVNER

Digital Assets and Blockchain Through an Economics Lens

It seems like everyone is talking about "crypto" these days. The word spans a diverse array of financial products and services, which collectively I'll refer to as "digital assets." Digital assets have developed into a complicated ecosystem, with a foundation in blockchain technology. Blockchain is a decentralized and distributed database, similar to a massive virtual ledger where each block is an entry. A blockchain can often be public and permanent, meaning no one owns it, everyone can see everyone's accounts, and transactions, which are updated in real-time, cannot be reversed once they are confirmed.

Building upon this ledger are an array of components: *applications* connecting crypto to the traditional financial system; *smart contracts*, including decentralized exchanges and lending; *assets*, such as tokens, stablecoins, and cyptocurrencies; and finally, settlement in the blockchain. Assets like Bitcoin and Ethereum receive the most attention, but without the other components of the ecosystem, the impact of cryptocurrencies and stablecoins would be limited.

Money is a payments mechanism and store of value. This is why measures of the money supply extend beyond the amount of currency in circulation to include balances in bank accounts (M1) and retail money market mutual fund shares (M2). Private money was prevalent in U.S. history before the 1930s when private banks issued circulating bank notes. The variety of notes led to challenges, including counterfeiting, volatile exchange rates, and redemption risks arising from risky banks.

Digital technologies solve some of these issues. Some digital assets are decentralized and "distributed," meaning that data are stored across peer-to-peer networks without a centralized official database. The result can be a dataset that facilitates settlement (transactions are public and recorded as public blocks) and is resilient (if any node goes down, the network remains robust).

Distribution may add resilience, but blockchain approaches to currency can be inefficient as data are replicated across the network, a more costly approach than relying on a trusted central intermediary. Some of the earliest crypto currencies like Bitcoin have had values that fluctuate widely, impairing their use as money but making them potentially valuable assets for a diversified investment portfolio. In response, we have seen dramatic growth in stablecoins since 2020. Stablecoins (for example, Tether, USDC, and Binance) are usually pegged to a reference asset like the U.S. dollar, allowing their holder to use them as a dollar-denominated asset and potentially as payment in cross-border transactions. Currently, the most common use case for stablecoins is within the digital ecosystem, where they are involved in 80 percent of trading.

Late last year, the overall value of digital assets approached $3.8 trillion, reflecting continued growth in cryptocurrencies, stablecoins, and other related financial products. Why are so many people interested in them?

First, digital assets can be an investment. As institutional asset managers develop the ability and legal framework to hold digital assets, cryptocurrencies may become part of the saving strategies of institutional investors and private individuals. University endowments, in particular, have been leaders in allocating assets to novel investments with higher risk and higher returns, and they have been increasingly allocating parts of their portfolios to these assets. Digital assets could be similar to commodities such as gold whose value exceeds its intrinsic value due to scarcity, its historical use as a store of wealth, and its properties as an inflation hedge. Further harmonization of the regulation of digital assets may also affect their investment value.

Second, such technologies can allow for the tokenization — or digitization — of real and financial assets. Tokenization would allow for trading outside of market hours, real-time settlement, and fractional ownership, as transactions, settlement, and custody are facilitated by the blockchain. Through decentralized physical infrastructure networks (DePIN), individuals may contribute their own physical resources like data storage, mobile hotspots, or even EV chargers to be shared and tokenized.

Third, digital assets can allow for smart contracts and reduce inefficiencies associated with institutional financial markets settlement and cross-border frictions. It is worth noting here that unless stablecoins or cryptocurrencies take over from traditional currencies completely, traditional exchange rate variability would remain a cross-border issue.

Finally, digital technologies can allow for increased financial inclusion and fractional payments. More than 4 percent of U.S. households do not have a bank or credit union account, with the share of unbanked much higher among Black, Hispanic, and American Indian or Alaska Native Americans. Almost a quarter of American households do not have credit cards, preventing them from making digital purchases and restricting access to credit. If adopted in scale, digital assets may result in lower payment costs for these groups and for all of us. **EF**

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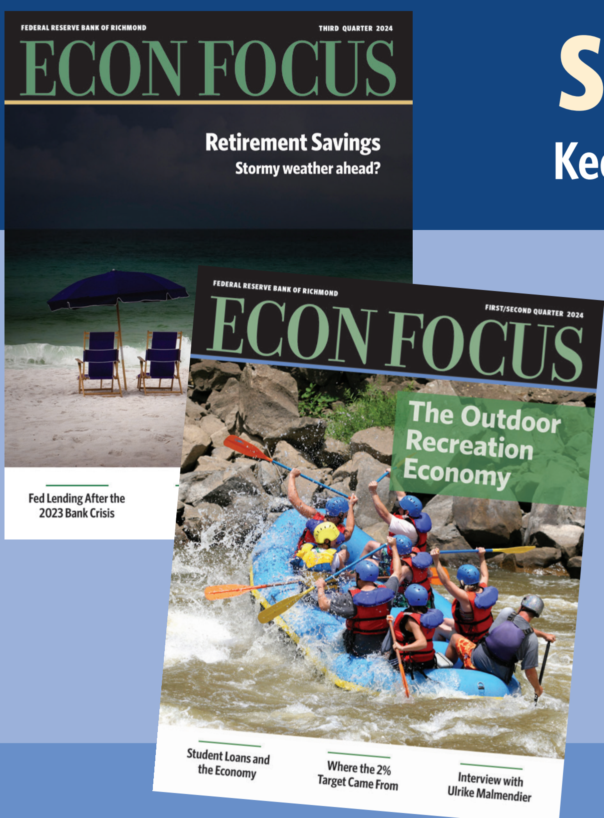

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