The NBER Digest

NATIONAL BUREAU OF ECONOMIC RESEARCH

July 2023

*INSIDE THIS ISSUE*



# Rising Oil Prices, Loose Monetary Policy, and US Inflation

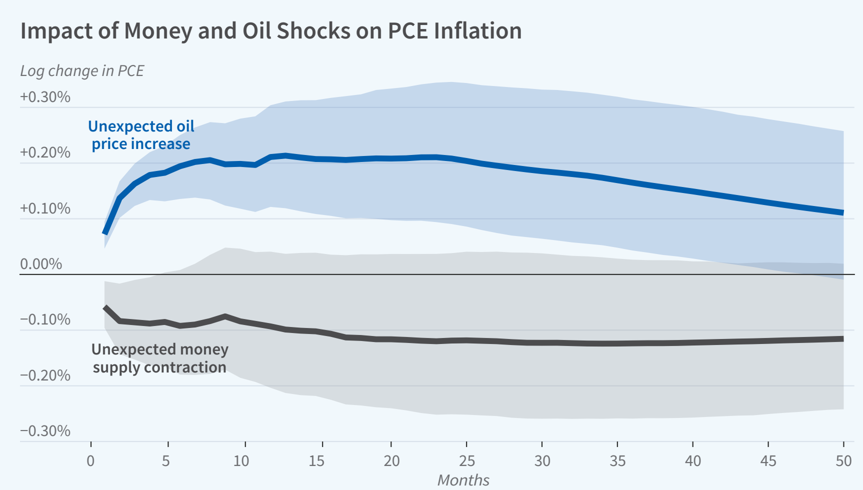
US inflation was relatively low and stable for three decades beginning in the 1990s. In sharp contrast, it has been relatively high since 2021. Many factors, including the COVID-19 pandemic, the war in Ukraine, expansionary fiscal policy, and loose monetary policy, have been cited as potential contributors to the recent inflation surge. In Oil Prices, Monetary Policy and Inflation Surges (NBER Working Paper 31263), Luca Gagliardone and Mark Gertler suggest that a combination of oil price shocks and easy monetary policy have been critical to the size and persistence of the recent inflation surge.

The researchers focus on the complementarity between the use of oil and labor as inputs to production by firms, and the related complementarity between the use of oil and other consumption goods by households. They embed their formulation of production and consumption in a macroeconomic model that allows for unemployment and wage rigidity and in which households have well-anchored long-run inflation expectations.

To estimate their model, they consider two types of macroeconomic shocks: changes in oil prices that constitute "supply shocks," and changes in the tightness of monetary policy that constitute "demand shocks." They identify the former from changes in the futures prices for oil on OPEC meeting days, and the latter from movements in interest rate futures around Federal Open Market Committee meeting dates. After constructing time series of both oil prices and monetary policy shocks over the period 1973 to 2019, they analyze the effects of these shocks on monthly measures of real gross domestic product (GDP), unemployment, real oil prices, the federal funds rate, the inflation rate for Personal Consumption Expenditures (PCE), and the excess return of private long-term bond yields over similar maturity government bonds.

> Historical data suggest that rising crude oil prices due to the Ukrainian conflict and expansionary monetary policy both contributed to the inflationary surge of 2021–23.

The researchers show that a monetary policy shock that entails an unexpected interest rate tightening of 15 basis points leads to a 10-basis-point decline in both real GDP and the price level, with effects persisting for approximately four years. A shock to oil prices that increases the real price of oil by 6 percent reduces GDP by 20 to 30 basis points and increases the price level by 20 basis points. In response to such an oil price increase, the federal funds rate increases by 20 basis points and real wages decline by 5 to 10 basis points.




*PCE inflation is the inflation rate calculated from the personal consumption deflator in the national income accounts. Oil shocks are identified using oil futures price from days when OPEC meet. Money shocks are identified using unexpected movements in interest rate futures around Federal Open Market Committee dates. Shading represent 95% confidence intervals.*

*Source: Researcher's calculations from multiple sources*

The researchers then estimate their economic model to match these empirical patterns, and show that it matches closely the evidence on the impact of oil and monetary shocks. They also illustrate how the complementarities they analyze, in conjunction with wage rigidity, greatly enhance the impact of oil shocks on inflation and unemployment.

The researchers use their model to identify the underlying drivers of the recent inflation. They consider four types of primitive shocks: shocks to oil prices, shocks to monetary policy, a general (nonmonetary) demand shock, and shocks to labor market tightness. They identify these four shocks by using their estimated model to fit movements in four variables—real oil prices, the federal funds rate, unemployment and labor market tightness—over the period from 2010 to the spring of 2023. Given the identified shocks, the researchers show that their model can track both core and headline inflation, even though inflation was not targeted in the estimation. In particular, the model captures both the magnitude and persistence of the recent inflation surge. It undershoots the rise in core PCE inflation in the latter part of 2021, a period when supply chain problems peaked, but otherwise fits well through the spring of 2023.

The researchers find that the two important underlying drivers of the recent inflation surge were positive oil price shocks and "loose" monetary policy shocks. The former are associated with both the global recovery from the pandemic recession and the Russia-Ukraine War. The latter reflect the prolonged period at the zero lower bound following the pandemic recession, which led to the federal funds rate being persistently below its historical policy rule. Part of the reason for the persistent effect of easy monetary shocks on inflation is that the model, like the US economy, exhibits a delayed effect of monetary policy on economic activity. Interestingly, the model also accounts for why during the period 2015 to 2019 inflation was low despite low unemployment. There were a series of negative oil price shocks and tight monetary policy shocks, the exact opposite of what happened recently.

Finally, the researchers show that their model predicts that absent new shocks, core PCE inflation should decline to 3 percent by the end of 2024. They also use their model to illustrate how the central bank could hasten the decline in PCE inflation by tightening monetary policy, but at the cost of higher unemployment.

—*Whitney Zhang*

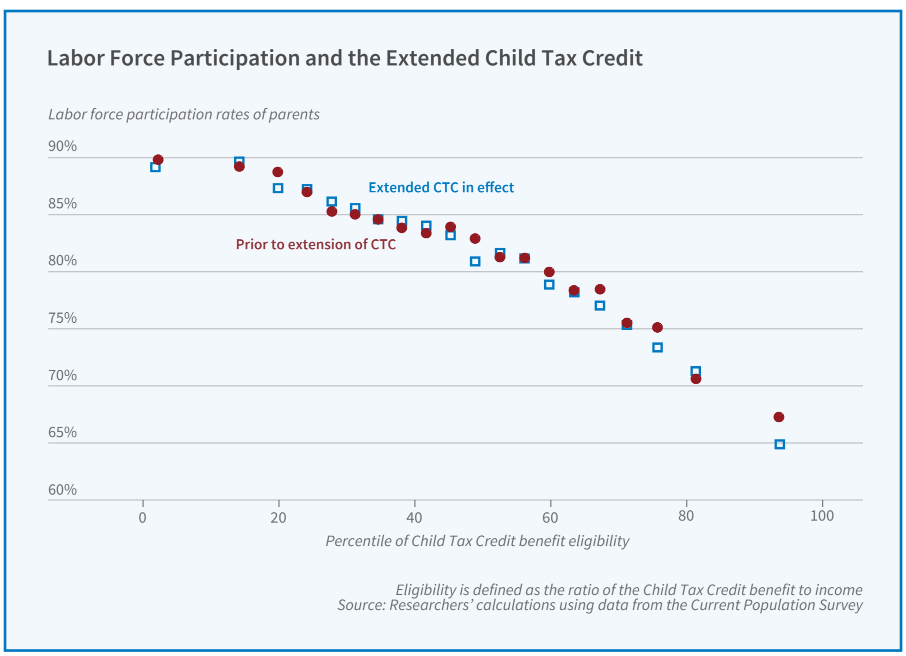
# Parental Labor Supply and the Expanded Child Tax Credit

> Neither labor force participation nor total hours worked changed significantly during the months when benefits were increased and work requirements were removed.

The American Rescue Plan Act of 2021 increased the maximum benefit per child of the Child Tax Credit (CTC) to between $3,000 and $3,600 for the period between July and December of 2021. It also removed the requirement that taxpayers earn income to receive this benefit. This temporary policy change provided a unique opportunity to study the effect on labor force participation of switching from a transfer with work requirements to an unconditional cash benefit.

In The Short-Term Labor Supply Response to the Expanded Child Tax Credit (NBER Working Paper 31110), Brandon Enriquez, Damon Jones, and Ernest V. Tedeschi find that the fully refundable child tax credit with no work requirement had no discernable effect on labor force participation or total hours worked of the low- and middle-income taxpayers who qualified for it.

Transfer programs typically involve a tradeoff between redistribution benefits and financing costs. In the US during the 1990s, there was a marked shift from so-called "traditional welfare programs" that provided cash transfers to beneficiaries but created potential work disincentives through income-related eligibility rules to transfer programs that required recipients to work. The Earned Income Tax Credit (EITC) and the CTC are both examples of programs with work requirements. The 2021 changes to the CTC temporarily shifted it from a program with a work requirement and phase-in to a fully refundable credit program that provided benefits to families with no earnings.




Labor Force Participation and the Extended Child Tax Credit

*Eligibility is defined as the ratio of the Child Tax Credit benefit to income*
*Source: Researchers' calculations using data from the Current Population Survey*

Drawing primarily on the monthly Current Population Survey of about 60,000 US households with detailed demographic and labor market outcome data, the researchers compare labor force participation and hours worked among households with children that qualified for different amounts of CTC benefits before the program's expansion and the associated drop of earnings conditioning, during the expansion period, and after work requirements were reinstated. They follow the Bureau of Labor Statistics' definition of labor force participation, namely including all those who are employed, actively seeking a job, or on temporary layoff or furlough. They consider hours worked for all respondents; individuals who are not employed and who are absent from work are coded as zero hours worked.

The researchers do not find significant labor supply differences across families over time as a function of the magnitude of the additional CTC benefits during the temporary expansion period. Their findings are similar for a variety of demographic subgroups. They conclude that neither labor force participation nor total hours worked appear to have responded to variation in eligibility for, or the magnitude of, the CTC.

*—Lauri Scherer*

## Lessons from the Federal Bank Holiday of 1933

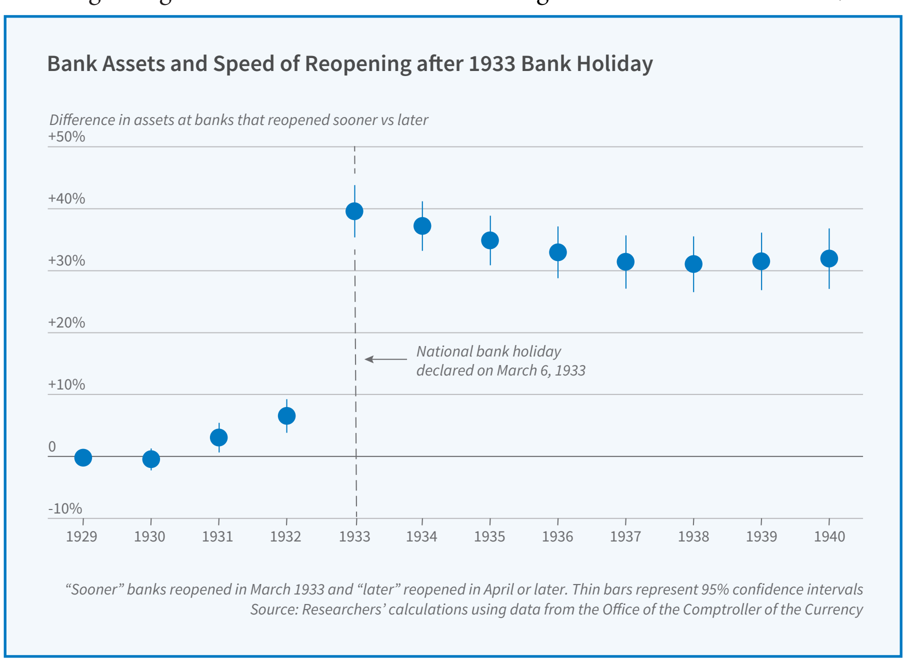
To reassure depositors during banking crises, policymakers sometimes extend guarantees that go beyond legal requirements. After the failure of Lehman Brothers in 2008, regulators provided assistance to a broad range of financial institutions, even lightly regulated money market mutual funds. When Silicon Valley Bank and Signature Bank failed earlier this year, federal regulators bailed out all depositors, including those whose balances vastly exceeded federal deposit insurance limits.

Such actions can incentivize riskier bank behavior if managers and depositors believe that the government will insure them against losses. Policymakers sometimes justify such moves, incentive effects notwithstanding, by arguing that the stigma of targeted government assistance would further weaken the least solvent banks, leading to a reallocation of funds to stronger financial institutions and a slowdown in economic recovery. In a new study of the bank holiday at the nadir of the Great Depression, Signals and Stigmas from Banking Interventions: Lessons from the Bank Holiday in 1933 (NBER Working Paper 31088), Matthew S. Jaremski, Gary Richardson, and Angela Vossmeyer find that discriminating interventions can stigmatize banks perceived as weak and push deposits elsewhere. However, they find little if any effect on economic growth.

> Sweeping government interventions to stem financial sector weakness can stigmatize banks perceived by the public to be weak and shift deposits towards banks believed to be healthier.

The financial panic in the winter of 1932/33 was among the most severe in American history. Within a few months, customers withdrew more than 20 percent of all deposits from the nation's financial system. Bank runs caused so many financial institutions to close that the Roosevelt administration had to intervene to a degree never seen before from the federal government.

After the Federal Reserve Bank of New York announced on March 3 it would not open the next day because its gold reserves had fallen to their legal limit, President Roosevelt declared a nationwide bank holiday beginning March 6. In his first fireside chat, on March 12, he outlined his plan to reopen sound banks supported by the government, and he emphasized that a "bank that opens on one of the subsequent days is in exactly the same status as the bank that opens tomorrow." As the plan was announced, some worried about the stigma of government assistance.




Roosevelt's reassurances worked to some degree. Deposits flowed back immediately. Inflows by mid-March exceeded the withdrawals associated with previous bank runs, and they continued through the end of March. But the gradual reopening of banks did generate stigma: the researchers found that the public used early reopening as a signal of a bank's strength and showered those institutions with their money.

To a large extent,

depositors were correct in drawing inferences from when a bank reopened. The biggest and best-capitalized banks did reopen first. In all, 11,793 of the 16,790 commercial banks operating right before the bank holiday had fully reopened by the end of March. In some cases, government officials were working so fast that they opened objectively weaker banks sooner than stronger ones. These weaker institutions also saw a big rebound in deposits while the laggards, even those with strong balance sheets, saw much less deposit growth. For some banks, the time to reopening was longer and nearly 4,000 banks never reopened.

The researchers found that banks that fully reopened in March had 15 percent more assets by July, relative to their pre-bank-holiday position, than those that reopened in April, May, or June. The quick-to-reopen banks also were able to operate with lower capital and reserve ratios. These effects were long-lived, persisting at least through 1940 and, in the case of deposits, through the early 1950s. The findings suggest that the timing of reopening had a substantial and persistent influence on perceived bank soundness, despite government guarantees that all reopened banks were sound.

*—Laurent Belsie*

# Measuring Academic Productivity of Chinese-American Collaboration

Since 2000, large numbers of Chinese citizens have spent time in the United States as students or researchers. In the 2018–19 academic year, slightly more than 35 percent of the roughly 1.1 million international students and researchers in the US were from China. Although some remained in the US, many went back to China.

In Creating and Connecting US and China Science: Chinese Diaspora and Returnee Researchers (NBER Working Paper 31306), Qingnan Xie and Richard B. Freeman use data from the Scopus database on authorship and citations to examine the productivity of the US-Chinese research connection. They focus on English language journal articles published in 2018 in 21 physical sciences.

A standard metric for measuring US-Chinese collaborative work has long been the number of coauthored papers with Chinese and US addresses in the group of authors. This study finds, however, that the share of Chinese authors with no address in China was almost four times that of authors with a Chinese address. This suggests that the main way China-born researchers contribute to US science is by working in the US.

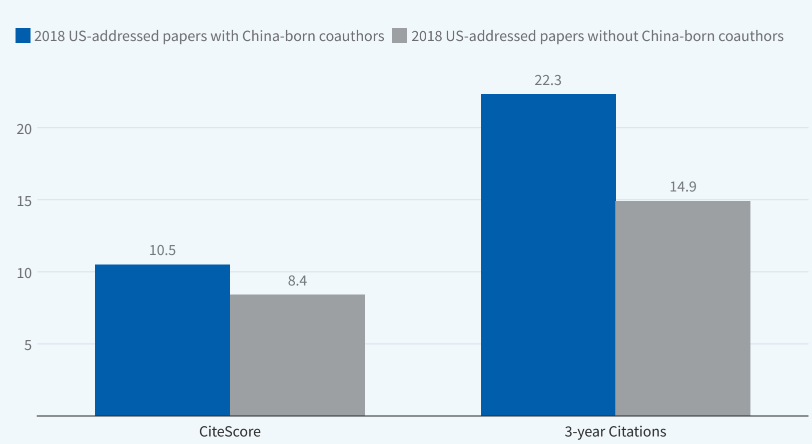
Joint authors of papers were grouped based on the addresses they listed on each paper. Chinese "returnee authors" were those born in China who published at least one paper with an address in the US and then published subsequent papers with a Chinese address. "Diaspora authors" were Chinese-named authors writing at a US address. They were classified as having been born in mainland China based on whether their last names were common Chinese last names in the Chinese Ministry of Public Security's list of Chinese last names, and whether their first names followed the grammar of mainland China's Hanyu Pinyin translation system. The list of Chinese last names covers 84.8 percent of the Chinese last names in the mainland population.

Because the basic Scopus online files list only authors' last names and first initials, random samples of 2,000 papers written by authors with ethnic Chinese names were drawn for each group of author addresses, and the complete first names given in this sample of papers were assessed for mainland Chinese origins. This exercise suggests that 78.5 percent of papers resulting from a US-Chinese collaboration have at least one diaspora or returnee author, a percentage that is 1.6 times greater than what would be predicted by chance.

Chinese-born researchers in the US, as well as those who have worked in the US and returned to China, contribute significantly to the quantity and quality of scientific papers in both countries.

An examination of paper quality using the number of citations three years after publication and CiteScore, a measure of journal impact, found that papers by Chinese diaspora authors averaged 7.4 more citations and 2.1 more CiteScore points than papers by non-diaspora authors. US addressed papers with diaspora authors averaged 22.3 citations compared to 14.9 citations for US addressed papers without diaspora authors, and 10.5 compared to 8.4 CiteScore points. For papers produced by authors with Chinese addresses, papers authored by returnees had 18.8 citations and 5.8

**Citations of Papers with and without China-Born Authors**




*CiteScore is the average number of citations in a 4-year window for an article published in the journal in which the paper is published.*

*Source: Researchers' calculations using data from Scopus*

CiteScore points. Authors with Chinese addresses who were not returnees had 13.2 citations and 3.9 CiteScore points.

Papers with both diaspora and returnee Chinese authors had more citations and higher CiteScores than all other papers, suggesting that diaspora and returnee researchers are complementary rather than substitute inputs in the research process. In 2018, 67 percent of articles in the journals *Science* and *Nature* had at least one US address, and 43 percent of those had diaspora authors. Of the *Science* and *Nature* articles with at least one author who listed a Chinese address, 76 percent of the Chinese authors were returnees.

*— Linda Gorman*

## Assessing Pandemic Learning Losses and Recoveries

Analysis of test scores in 21 states shows less than half of the losses have been regained overall, with wide variations across states.

Test scores at the end of the 2020–21 school year revealed dramatic declines in student performance during the COVID-19 pandemic. In a data sample including schools from 21 states, only a fraction of those losses — 20 percent in English language arts and 37 percent in math — were recovered by the end of the next school year.

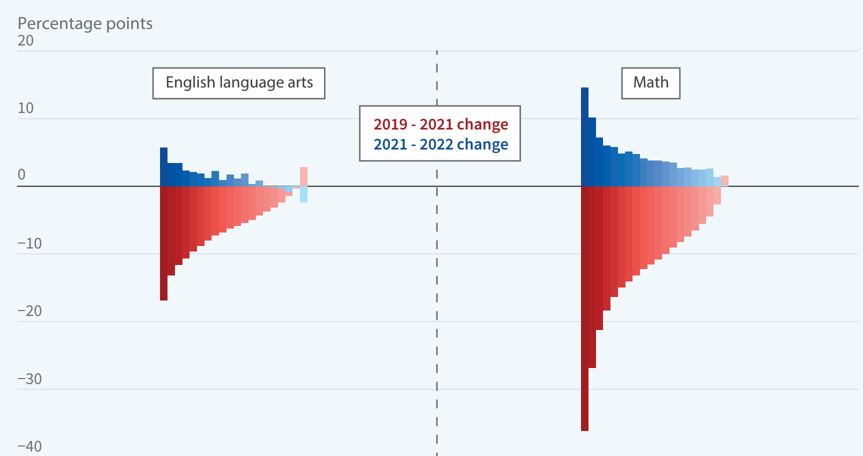
Those nationwide averages mask wide variations in student performance among individual states, according to Post COVID-19 Test Score Recovery: Initial Evidence from State Testing Data (NBER Working Paper 31113) by Clare Halloran, Claire E. Hug, Rebecca Jack, and Emily Oster.

The researchers focused on grades 3–8 and restricted their sample to states that maintained the same testing and scoring practices over the 2017–22 study period. The sample includes Arkansas, Colorado, Connecticut, Georgia, Idaho, Kansas, Louisiana, Massachusetts, Minnesota, Mississippi, Missouri, New Hampshire, Ohio, Pennsylvania, Rhode Island, South Carolina, South Dakota, Virginia, West Virginia, Wisconsin, and Wyoming.

Across states, recovery rates in English language arts varied much more than those in math. Student performance in two states, Mississippi and South Carolina, fully recovered from pandemic losses in English language arts while that in Kansas and Massachusetts, among other states, continued to decline. In math, student performance in all states experienced recovery, but none recovered completely. Mississippi and Rhode Island math scores recovered by over 70 percent, while in Arkansas and Minnesota the recovery was under 20 percent.

Changes in Standarized Tests Pass Rates, 2019 to 2022

Each bar represents a bin of districts within the relevant 20 quantiles of change between 2019 and 2021




Source: Researchers' calculations using state standardized assessment data from 21 states

The researchers analyzed data for individual school districts and found that recovery rates were highly idiosyncratic. They did not significantly correlate with demographic characteristics, baseline achievement, schooling mode during the pandemic, or how states chose to allocate federal recovery funds.

The researchers were particularly interested in whether the way a state allocated its share of the $122 billion in federal relief funds that were targeted toward education affected initial losses and subsequent recovery. States varied widely in how they addressed students' academic, social, emotional, and mental health needs. The researchers did not find any statistically significant links between intervention techniques and recovery rates, but they caution that some school districts may not yet have fully realized the benefits of programs financed by federal relief money, complicating the analysis of links between recovery rates and federal grants.

The researchers found a potential correlation between English language arts recovery and how long states have had legislation implementing reading improvement programs. The only two states that fully recovered pandemic learning losses by 2022 were also the earliest adopters of the science of reading (SOR) program: Mississippi (2013) and South Carolina (2014). Both states also took other steps to improve reading, including enhanced teacher preparation, professional development, and instruction. States that implemented the program more recently show mixed recovery rates.

*–Steve Maas*

# Medicare and the Incidence of Household Financial Distress

There are large regional differences in the US in the prevalence of consumer financial distress as indicated by debt collection rates, bankruptcies, and low credit scores. In The Great Equalizer: Medicare and the Geography of Consumer Financial Strain (NBER Working Paper 31223), Paul Goldsmith-Pinkham, Maxim Pinkovskiy, and Jacob Wallace explore the role that Medicare plays in mitigating these geographic disparities in the older population.

Nearly all Americans become eligible for free, federally administered health insurance through Medicare when they turn 65. Gaining Medicare coverage lets those who were previously on private health insurance reduce or eliminate their premium charges. It also helps eliminate the burden of direct payments for healthcare for those who were uninsured before turning 65. Both of these factors could improve Medicare recipients' financial health.

The researchers study the effect of Medicare eligibility on financial distress by comparing the incidence of such distress before and after age 65. Using data from the Federal Reserve Bank of New York's Equifax Consumer Credit Panel, they track rates of credit card delinquency and bankruptcy as well as the amount of debt in collection.

Medicare eligibility is associated with a drop in debts in collection. The average decline is just over $28, a 30 percent reduction. Medicare eligibility also reduces disparities in average debt size across different states. The cross-state variance falls by 67 percent. Debt sizes drop most in Southern states—which have the highest baseline debt collection amounts—and in commuting zones with more for-profit hospitals, higher poverty rates, and higher shares of Black residents or residents with disabilities. There is no evidence that Medicare eligibility affects the likelihood of credit card delinquency or bankruptcy.

**After individuals become eligible for Medicare, debts in collection decline and cross-state differences in debt burdens are reduced.**

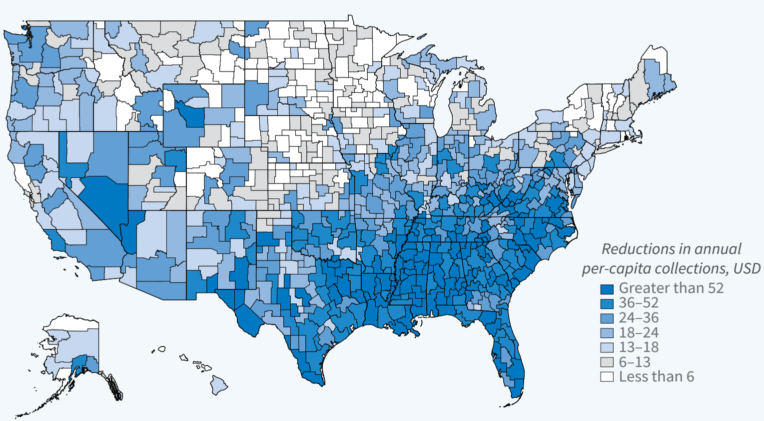
Medicare improves financial health more in some states than in others in part because states vary widely in the insurance rates of "near-elderly" individuals, those aged 55–64. In states with low rates of insurance among the near-elderly, Medicare eligibility significantly boosts the share of individuals with insurance. Increased health insurance coverage following Medicare eligibility explains about a third of the drop in debt collection magnitudes.

The researchers use their results to project what would happen if the Medicare eligibility age was reduced. Had such a change occurred prior to the passage of the Affordable Care Act (ACA), it would have lowered the cross-state variance of consumer financial distress, with particularly large effects in Southern states with more highly-distressed residents. Were such a change to occur today, after the passage of the ACA, the reduction in cross-state disparities would be smaller, but still substantial, because the ACA has increased coverage rates for individuals who are too young for Medicare.

—*Shakked Noy*

**Medicare Eligibility and Debt Collections**

*Reductions in per-capita collections debt at age 65 due to Medicare*




*Source: Researchers' calculations using data from the New York Fed Consumer Credit Panel, Equifax, and the American Community Survey*