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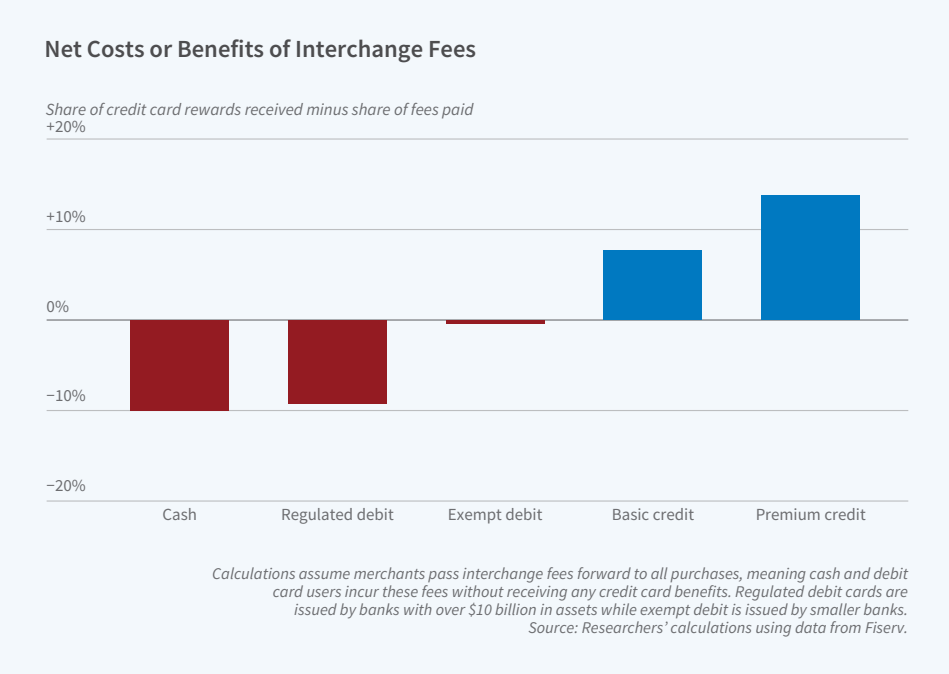
In This Issue

Who Ultimately Pays Credit Card Interchange Fees?

Every time a consumer swipes a credit card, the merchant pays an interchange fee—typically around 1.9 percent of the transaction value—most of which funds the rewards that cardholders receive. Because merchants generally charge the same prices regardless of how customers pay, consumers who use cash or debit cards effectively help finance the rewards enjoyed by credit card users. In Who Pays for Payments? (NBER Working Paper 35067), Mark L. Egan, Gregor Matvos, Amit Seru, Lulu Wang, and Vincent Yao use novel merchant-level data from Fiserv—one of the largest US merchant acquirers—to measure how the payment system redistributes resources.



The primary dataset contains establishment-level payment data from 2006 to 2022, including total payment values, transaction counts, and interchange fees paid for different card types. The data are organized at the merchant-sector-location level, allowing the authors to analyze geographic variation in payment activity and merchant pricing. The authors' cross-sectional analysis focuses on the 2022 cross-section, which covers approximately 1 million merchants and represents roughly one-fifth of all US card payments. A second dataset with about 800,000 merchants from 2019 to 2022 uniquely captures cash transactions alongside card payments, allowing the authors to study the full mix of payment methods used by consumers and merchants. The researchers supplement these with consumer survey data from the Federal Reserve Bank of Atlanta's Survey and Diary of Consumer Payment Choice and the MRI-Simmons national studies survey to link payment preferences to household income.

The researchers' analysis using these datasets suggests that interchange fees transfer approximately $30 billion annually from cash and debit card users to credit card users. Cash users lose about 96 basis points of purchasing power, and regulated debit card users lose roughly 47 basis points, while basic and premium credit card users gain approximately 48 and 59 basis points, respectively. Because credit card use rises with income, the system generates an estimated $9.2 billion annual transfer from households earning less than $150,000 to those earning more.

Two forces moderate this redistribution. First, the tendency for cash, debit, and credit card users to shop at different merchants limits the overlap necessary for cross-subsidization. Second, where overlap does occur, such as at large grocery stores and gas stations, interchange fees tend to be lower due to sector discounts and negotiated rates. Together, these forces reduce the transfer by approximately 25 percent relative to the transfer that would occur with homogeneous consumers and merchants.

The researchers also examine the redistributive consequences of two specific developments in the payment system. The first is the Durbin Amendment, which capped interchange fees on debit cards issued by large banks. The authors show that one perhaps unintended consequence of the amendment was that it primarily benefited credit card users through lower retail prices at the expense of regulated debit card users, who lost approximately $9.6 billion in rewards and free checking benefits. This was a net transfer from middle-income to higher-income households. The second development is the rise of premium credit cards, which grew from 15 percent of credit card volume in 2006 to 60 percent by 2022. This has also been a regressive development. While premium cardholders gained about $7.9 billion, debit card users—not cash users—bore the largest dollar losses because they shop most frequently alongside premium card users.

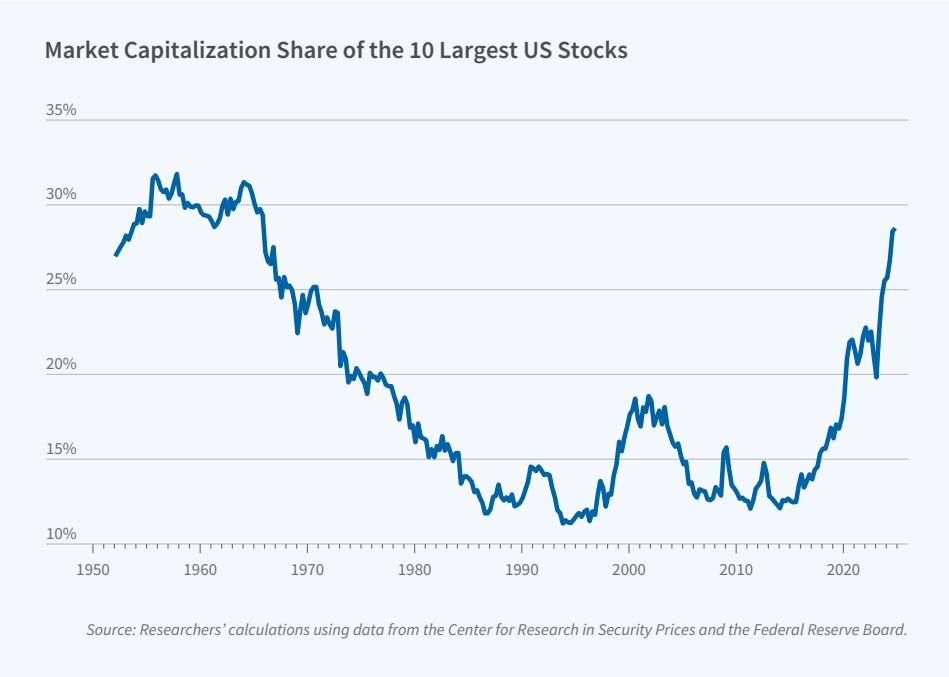
Regulatory Limits on the Concentration of Mutual Fund Portfolios

The US stock market has become more concentrated in recent years. Between 2015 and 2024, the share of the 10 largest stocks in total market capitalization rose from 13 to 31 percent, with the "Magnificent 7" companies alone accounting for roughly one-third of the S&P 500 by the end of 2024. This concentration poses a practical challenge for the thousands of investment funds that must comply with long-standing diversification rules designed for a far less top-heavy market.

In The Hidden Cost of Stock Market Concentration: When Funds Hit Regulatory Limits (NBER Working Paper 35007), researchers Lubos Pastor, Taisiya Sikorskaya, and Jinrui Wang investigate how a specific regulatory constraint—the "50/5/10 rule"—affects fund behavior and, ultimately, stock prices. The rule, codified in the Internal Revenue Code, requires that at least 50 percent of a fund's total assets be composed of positions in which no single issuer represents more than 5 percent of total assets and the fund holds no more than 10 percent of the issuer's voting securities. Virtually all US mutual funds and exchange-traded funds comply with this requirement to maintain their tax-advantaged status as Regulated Investment Companies.

The researchers analyze quarterly portfolio holdings for 4,745 US domestic equity funds between September 2019 and December 2024. For each fund and quarter, they compute a "buffer"—50 percent minus the aggregate weight of a fund's large positions—to measure proximity to breaching the rule. A fund is classified as "constrained" when its buffer falls between 0 and 5 percent.

The 50/5/10 constraint, historically a formality, has become increasingly binding. Constrained fund assets rose from negligible levels in the third quarter of 2019 to 6 percent of total fund assets by the fourth quarter of 2024. At the peak in the third quarter of 2024, 171 funds representing 4.5 percent of all domestic equity funds were constrained. These funds managed almost $1.4 trillion (8 percent of total fund assets). The effect was concentrated in large-cap growth: by the third quarter of 2024, approximately one-third of these funds were constrained, managing over $1.1 trillion—about half of the category's total assets.



Mutual funds approaching the IRS 50/5/10 portfolio concentration limit trim large positions, reduce equity exposure, and subsequently underperform.

When funds approach the constraint, they adjust their portfolios in two ways. First, they rebalance away from their largest holdings toward smaller-capitalization stocks and intensify trimming when large positions are near the 5 percent threshold and exhibit higher return volatility. Second, constrained funds reduce their overall equity exposure.

Large-cap growth funds that were constrained earned significantly lower risk-adjusted returns in the five months following their constrained quarter. Over the first three months following the constrained quarter, the average large-cap growth fund's four-factor-adjusted return was 28 basis points lower than that of the full sample. This underperformance deepened to 1.04 percent during the 2023–24 period, when the constraint was especially binding.

The researchers construct a "constrained ownership share" for each stock that measures the fraction of outstanding shares held as large positions by constrained funds. During 2023–24, stocks with positive constrained ownership significantly outperformed those with unconstrained ownership at horizons from 1 to 12 months. At the six-month horizon, these stocks earned cumulative abnormal returns that were 2.3 percent higher than stocks with unconstrained ownership.

These results are consistent with temporary underpricing of stocks with positive constrained ownership, which are among the largest-capitalization stocks in the market. The 50/5/10 rule effectively constrains funds' long positions, limiting the ability of optimistic investors to scale their positions. The researchers argue that, just like short-sale constraints can produce overpricing by limiting pessimistic investors' views, long-position constraints can generate underpricing by suppressing optimists' views.

The researchers acknowledge support from the Fama-Miller Center for Research in Finance at the University of Chicago Booth School of Business.

Banking Regulations and 1970s Stagflation

Between 1965 and 1982, the US economy endured four severe downturns, each accompanied by surging inflation—a combination known as stagflation. One prominent explanation of this experience points to unanchored inflation expectations and a series of adverse supply shocks, most notably the OPEC oil crises of 1973 and 1979, that were outside the control of monetary policy. A new study challenges that interpretation, arguing that an overlooked financial friction created by banking regulations played a central role.

In Credit Crunches and the Great Stagflation (NBER Working Paper 35057), Itamar Drechsler, Alexi Savov, and Philipp Schnabl contend that Regulation Q (Reg Q)—a banking law that capped deposit interest rates—triggered severe credit crunches whenever the Federal Reserve raised rates. These credit crunches disrupted firms' ability to finance production, thereby generating endogenous negative supply shocks that contributed to stagflation.

When the federal funds rate exceeded the Reg Q ceiling, households shifted savings out of bank deposits and into higher-yield alternatives like money market funds. Facing a loss of their primary funding source, banks contracted lending. Because firms rely on bank credit to finance working capital—materials, labor, and inventory needed before sales revenue arrives—the resulting credit squeeze raised production costs. Firms responded by increasing prices and reducing output, resulting in a supply shock. The researchers formalize this channel by developing an extended New Keynesian model in which monetary tightening reduces aggregate supply in addition to demand when Reg Q binds.

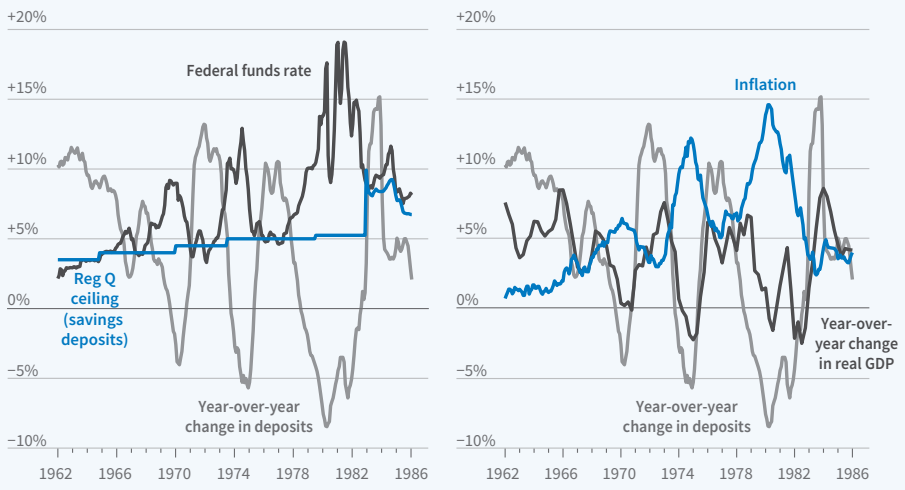
At the aggregate level, the researchers document that whenever the federal funds rate rose above the Reg Q ceiling, deposit growth fell sharply and bank credit contracted. These contractions coincided with declining GDP growth and rising inflation. Impulse response analysis confirms that credit-tightening shocks predicted lower output and higher inflation during the Reg Q period but not after this regulation was relaxed.

Industries with high external finance dependence—those less able to cover working capital costs from retained profits—raised prices and cut output relative to less dependent industries during each credit crunch. A 1 percentage point increase in the Reg Q spread led finance-dependent industries to raise prices by 1.9 percent and reduce output by 3.8 percent relative to industries that could self-finance.

Industries with greater working capital intensity also experienced higher prices and lower output during the credit crunches. A bank-level Reg Q spread constructed from variation in deposit composition across banks strongly predicts deposit outflows and contractions in commercial and industrial lending. Counties with banks that faced more binding Reg Q constraints also saw larger declines in manufacturing employment.

The researchers also study the period following the removal of Reg Q in 1982. While deposit rates were no longer capped, passthrough remained low due to the deposits channel of monetary policy. The authors estimate that their credit crunch mechanism was at least three times more powerful during Reg Q than after.

Deposit Growth, Inflation, and Real GDP Growth, 1962–1986



Source: Researchers' calculations using data from the Federal Reserve Bank of St. Louis.

Regulation Q's cap on deposit rates caused credit crunches that raised firms' production costs and contributed to the stagflation of the 1970s by turning monetary tightening into a negative supply shock.

Multimodal Freight Transport

Over half of US freight, measured in ton-miles, moves using more than one transport mode. Roughly two-thirds of shipments traveling over 500 miles rely on combinations of road, rail, and waterway networks connected by ports and inland terminals. Recent disruptions—from pandemic-era port congestion to the Panama Canal drought and threatened rail strikes—have shown how problems at local bottlenecks can ripple through this multimodal system, raising transport costs and affecting supply chains nationwide.

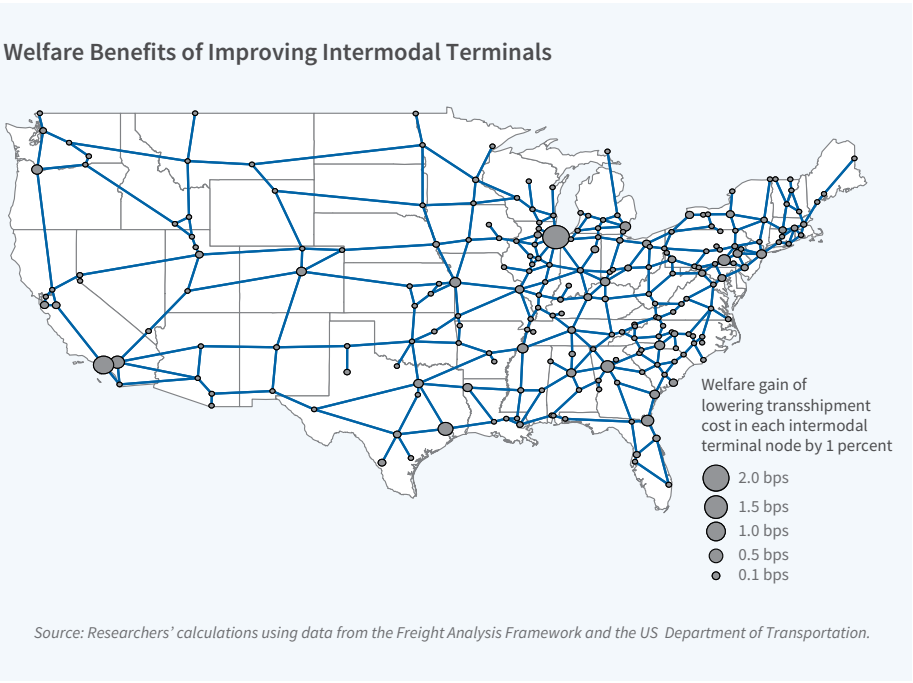
In Multimodal Transport Networks (NBER Working Paper 35065), Simon Fuchs and Woan Foong Wong develop a spatial equilibrium framework of multimodal transportation for evaluating infrastructure investments and disruptions. Their analysis embeds route choice, mode choice, and mode-specific congestion—particularly at intermodal terminals where freight switches between networks. The recursive framework of the model allows the researchers to tractably distinguish between substitution across transport modes and across routes, as well as account for the complexities of modeling multimodal transport networks within a general equilibrium setting.

To pin down the choice between transport modes, the researchers estimate an elasticity of modal substitution of 1.1 from studying how rail-to-truck traffic flows respond to increases in interstate highway capacity. To evaluate the impact of congestion at intermodal terminals, they use minute-level location data from more than 3,700 unique ships at the 30 largest US container ports and estimate that a 1 percent increase in port traffic prolongs ship dwell times by about 0.25 percent.

They quantify the importance of improving the integration of the multimodal transport network by simulating a 1 percent reduction in mode-switching costs at each terminal. The terminals where lower costs result in the highest welfare gains are interior hubs like Chicago, Atlanta, and Kansas City, rather than exclusively major coastal ports, highlighting their important role in connecting coastal and interior regions. Improving these central terminals could increase real GDP by $0.5–$1.9 billion, with additional environmental benefits from shifting away from carbon-intensive road transport.

A decomposition exercise using highway link improvements reveals that ignoring congestion when calculating potential welfare gains leads to an overestimate of 85 percent, while ignoring productivity and amenity externalities overstates them by 57 percent. Conversely, abstracting from multimodal flexibility or fixing routes understates gains by 22 percent, suggesting that most rerouting responses to highway improvements occur across modes rather than within a single mode.

Shutting down the rail network, as threatened during the fall 2022 strike, would reduce real GDP by approximately $230 billion with an additional $12 billion in environmental costs from shifting freight onto roads. The Jones Act requires domestic shipping to use US-built, US-crewed, and US-owned vessels. Repealing it to allow for cheaper foreign ships would generate welfare gains equivalent to roughly $3.2 billion in GDP. Panama Canal disruptions from drought conditions would impose welfare losses of about $2.7 billion. In all three scenarios, congestion at intermodal terminals compounds the welfare effects.



Source: Researchers' calculations using data from the Freight Analysis Framework and the US Department of Transportation.

Centrally located intermodal terminals like Chicago, Atlanta, and Kansas City are key bottlenecks in the US multimodal freight network. Targeted improvements could generate large welfare gains by improving the connections between coastal ports and interior regions.

Gender Disparities in College Enrollment and Marriage Patterns

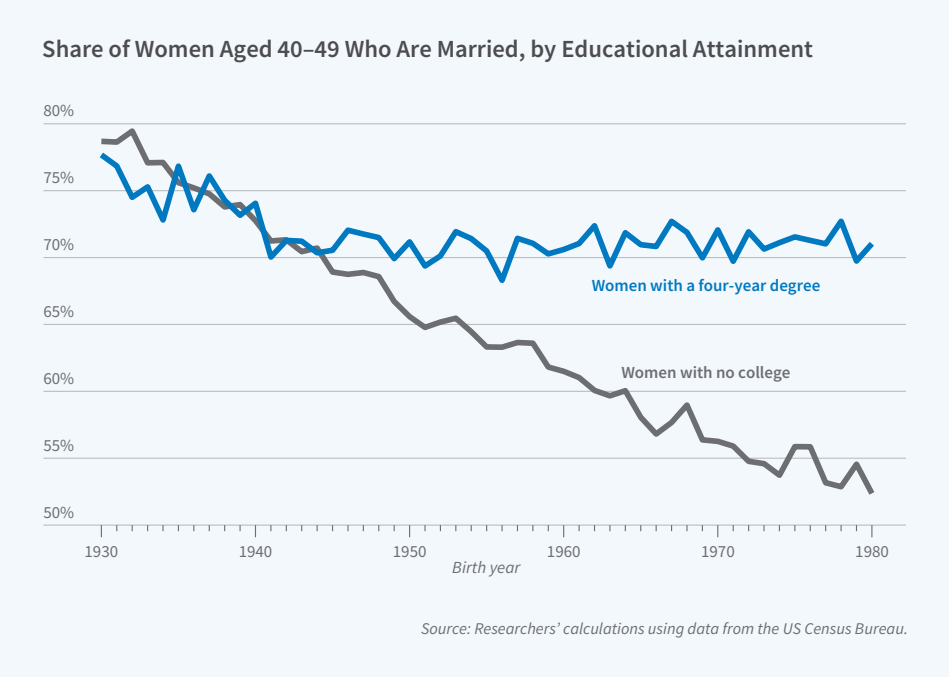
Over the past half-century, the gender composition of American college campuses has shifted from predominantly male to predominantly female. Today, 1.6 million more women than men attend four-year colleges in the US. Over the same time period, the economic status of men without college degrees has deteriorated.

In Bachelors Without Bachelor's: Gender Gaps in Education and Declining Marriage Rates (NBER Working Paper 35179), Clara Chambers, Benjamin Goldman, and Joseph Winkelmann investigate how these shifts in educational attainment and men's economic outcomes have altered marriage patterns for college and non-college women. They combine cohort-level data from the Current Population Survey and the American Community Survey with linked census and tax records from the Opportunity Atlas for individuals born between 1930 and 1980.

College-educated women have largely insulated their marriage rates from the declining relative supply of college-educated men by increasingly partnering with high-earning non-college men. Despite the ratio of college men to college women falling from 1.8 to 0.8 between the 1930 and 1980 birth cohorts, marriage rates among college women declined only modestly, from 77.7 to 71.0 percent. Over the same period, marriage rates among non-college women fell from 78.7 to 52.4 percent.

The researchers estimate that if marriage patterns of college women with regard to college and non-college men had remained stable at their 1930 levels, given the evolution of the pools of college-educated men and women, marriage rates for college women would have declined by 16.7 percentage points. As a result of the shrinking supply of college men and the growing number of college women, more college women would have remained single.

The actual decline in the marriage rate for college women was only 6.7 percentage points. An estimated gap of 10.0 percentage points was offset by a greater-than-predicted rise in marriages between college women and non-college men. The share of Americans in a marriage between college-educated women and non-college men quadrupled from 2.3 percent in the 1930 cohort to 9.6 percent in the 1980 cohort. These marriages typically involve economically successful non-college men. The average annual wage and salary earnings at age 45, measured in 2024 dollars and adjusted for inflation, for non-college men who marry college women rose from $61,400 for the 1930 cohort to $68,400 for the 1980 cohort, while earnings for all other non-college men fell from $56,400 to $46,100 over the same period. As a result, the share of non-college men who both earn above the median and are not married to a college woman fell from 72.9 to 35.3 percent, reducing the pool of economically viable partners available to non-college women.



Source: Researchers' calculations using data from the US Census Bureau.

College-educated women have maintained stable marriage rates by partnering with high-earning non-college men, shrinking the pool of economically viable partners available to non-college women.

In areas where non-college men have stronger employment outcomes, the marriage rate gap between college and non-college women is narrower. A 1 standard deviation decline (7.6 percentage points) in the employment-to-population ratio for non-college men is associated with a 4.2 percentage point decline in marriage rates for non-college women, compared to only 2.4 percentage points for college women. In the lowest-employment areas, non-college women's marriage rates average just 44.5 percent, versus 66.0 percent in the highest-employment areas.

The findings suggest that the educational and economic challenges facing non-college men have been a primary driver of widening class gaps in family formation. The researchers project that Americans born in the mid-1990s are on track to become the first cohort in which fewer than half of non-college women are married at age 45.

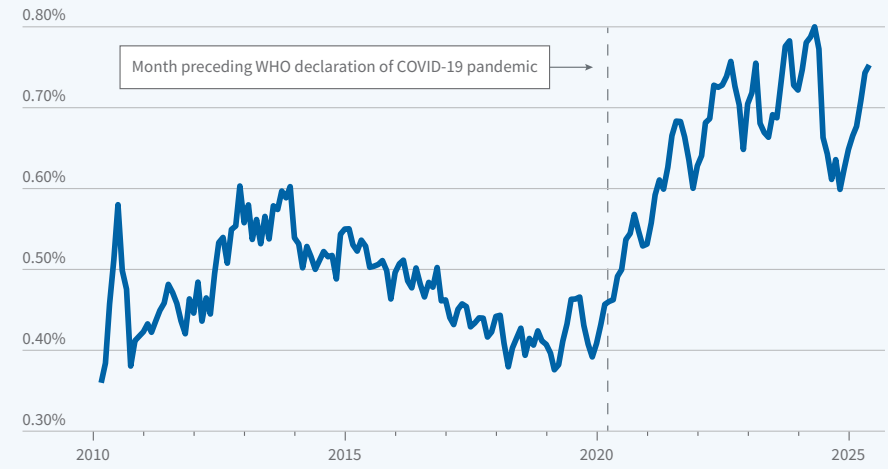
The researchers acknowledge support from the American Institute for Boys and Men and Cornell University.

The COVID-19 Pandemic and Innovation in Remote Work Technologies

In the spring of 2020, roughly half of all paid labor in the United States was performed from home. Although that share declined as the COVID-19 pandemic receded, the share of full paid workdays supplied remotely has remained over 25 percent since 2023, approximately four times the pre-pandemic level.

In Demand-Driven Technical Change: Evidence from WFH Technologies (NBER Working Paper 35083), Steven J. Davis, Nicholas Bloom, and Mihai A. Codreanu investigate whether the pandemic steered inventive activity toward technologies that facilitate working from home. They analyze the text of approximately 5.6 million US patent applications filed between January 2010 and July 2025 and published by March 2026. They construct a dictionary of 49 terms spanning four categories—communication and collaboration, remote access and digital infrastructure, home-based work, and flexible and mobile work—and search for these terms across patent titles, abstracts, claims, and descriptions. A patent application is classified as supporting work from home (WFH) if it contains at least one term from this dictionary.

The share of patent applications advancing WFH technologies rose by approximately 60 percent in the three years following the start of the pandemic. As of mid-2025, the share was still more than 50 percent above its pre-pandemic level of 0.42 percent. The persistence of the higher patent share suggests that the rise in this share was not due only to firms rushing to patent nearly completed WFH innovations in the first few months of the pandemic.



Source: Researchers' calculations of the share of technical expositions with Work from Home related terms using data from the United States Patent and Trademark Office.

The COVID-19 pandemic shifted innovation, particularly by corporations, toward technologies that are associated with remote work.

The largest gains in patent activity appear in audio and speech processing, telecommunications, computing, healthcare IT, and optics. At a more granular level, video telephony and transmission, telephone exchange systems, speech recognition, and audio signal processing show the most pronounced increases. These are precisely the technology areas underpinning platforms such as Zoom, Microsoft Teams, and Cisco Webex.

Corporations drove the WFH innovation response, with their WFH patent share rising from roughly 0.5 percent to about 0.8 percent. Universities, in contrast, showed no discernible increase. This pattern is consistent with the theory that profit incentives, rather than curiosity-driven research agendas, drove the innovation response. Among individual firms, Zoom showed the largest absolute increase in WFH patent volume, followed by Huawei, Sony, Beijing Dajia Internet Information Technology, and Dell.

The researchers acknowledge support from the University of Chicago Booth School of Business, the Hoover Institution, Stanford Economics, and the Stanford Institute for Economic Policy Research.