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The Fed's Monetary Tightening and the Risk Levels of US Banks

Between March 7, 2022, and March 6, 2023, the Federal Reserve increased the federal funds rate by nearly 4.5 percentage points. This led to a \$2.2 trillion aggregate decline in the market value of long-term bank assets such as government bonds, mortgages, and corporate loans. These decreases are not fully reflected in banks' book values. In [Monetary Tightening and US Bank Fragility in 2023: Mark-to-Market Losses and Uninsured Depositor Runs?](#) (NBER Working Paper 31048) Erica Xuewei Jiang, Gregor Matvos, Tomasz Piskorski, and Amit Seru show how such declines in asset values can increase bank insolvency risk due to runs by uninsured depositors, as illustrated most dramatically by the failure of Silicon Valley Bank (SVB).

The researchers collect data on bank asset holdings, including bond maturities, for all 4,844 FDIC-insured banks from their regulatory filings from the first quarter of 2022 onward. They estimate banks' market values of assets by using data on traded indexes in real estate and US Treasury securities. They find that by the first quarter of 2023, the increase in interest rates had resulted in a 9 percent decline in the marked-to-market value of the median bank's assets. The worst 5 percent of banks had declines of about 20 per-

cent. These marked-to-market losses are similar in magnitude to the total book equity of the US banking system. Only about 6 percent of aggregate assets in the US banking system are hedged by interest rate swaps, too little to offset most of the market value losses.

them incentives to run. If the insured depositors are sticky and are content with low deposit rates, a bank's survival depends on market beliefs about the share of uninsured depositors who will withdraw their funds following a decline in the market value of bank assets. When inter-

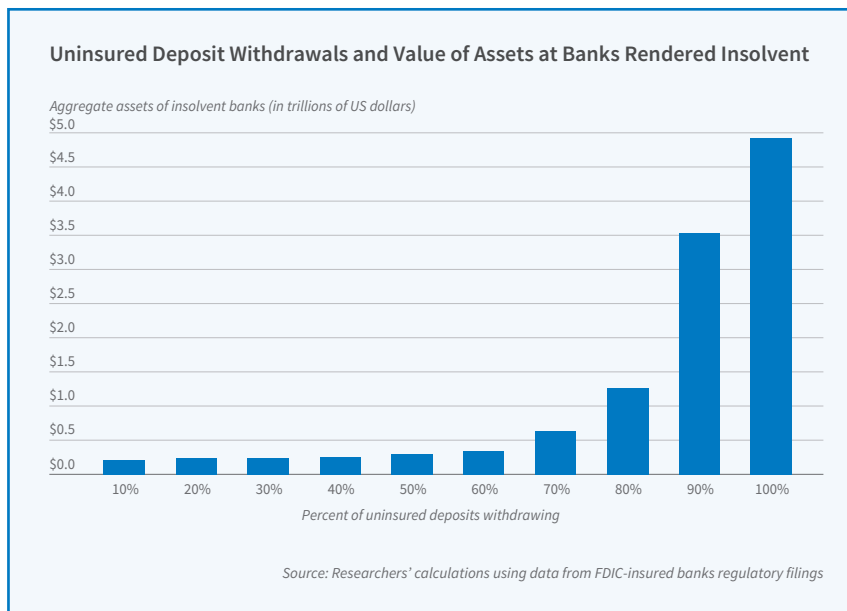
In early 2023, the market value of the assets of 4,844 FDIC-insured banks was \$2.2 trillion lower than their book value; these losses and banks' uninsured leverage exposed nearly 200 banks to potential solvency runs.

The researchers show that uninsured leverage, a bank's uninsured debt-to-assets ratio, is the key to understanding whether these declines in asset values could lead to insolvency through "solvency runs." Unlike insured depositors, uninsured depositors stand to lose a part of their deposits if their bank fails, potentially giving

est rate increases and the associated decline in the market value of the banks' assets are small, there is no risk of a run and banks can survive any withdrawals by the uninsured depositors. However, for larger increases in interest rates, there can be equilibrium outcomes in which uninsured depositors run and make banks insol-

vent. Banks with smaller initial capitalization and higher uninsured leverage are more likely to experience such outcomes, which increases their fragility to uninsured depositor runs. Such banks can remain solvent only if a relatively small share of the uninsured depositors is expected to withdraw; otherwise, there will be a run.

Uninsured deposits account for about half of all bank deposits and close to \$9 trillion of aggregate bank funding. The researchers estimate banks' vulnerability to self-fulfilling sol-



gency runs across a wide range of possible beliefs regarding the share of uninsured depositors who may withdraw their money. Prior to the recent rise of interest rates, even if all uninsured depositors withdrew their money, the insured deposit coverage ratio for all banks would have been positive. Banks were not very vulnerable to uninsured depositor runs. After monetary tightening raised rates, however, withdrawal by half of uninsured depositors would turn into a self-

fulfilling run for 186 banks with total assets of about \$300 billion.

The researchers also study the geographical distribution of exposure to bank failure risk using data on the counties in which each bank has branches. They compute the share of deposits in each county that are held at banks that would not have sufficient mark-to-market assets to cover their deposits if half of their uninsured deposits were withdrawn. Counties

with a greater share of residents from minority populations, with lower median income, and with a higher percentage of individuals without a college degree are more exposed to bank insolvency risk. Finally, the researchers show that a recent decline in banks' asset values also eroded their ability to withstand adverse credit events—focusing on commercial real estate loans.

—Whitney Zhang

Pandemic-Related Shifts in Low Wage Labor Markets

While the onset of the COVID-19 pandemic saw the sharpest drop in US employment of the post-WWII era, the post-2020 employment rebound has been as dramatic as the fall that preceded it. Amidst this labor market tightening, the relative standing of young, non-college-educated workers—who are disproportionately near the bottom of the earnings distribution—improved. Real wages of workers at the 10th percentile of the hourly earnings distribution rose by 6.4 percent between January 2020 and September 2022. Simultaneously, they fell by 0.7 percent at the median and 2.7 percent at the 90th percentile. This erased more than one-fourth of the growth in 90-10 log wage inequality in the US labor market over the past 40 years, and it contracted the wage premium for college-educated workers, David Autor, Arindrajit Dube, and Annie McGrew report in **The Unexpected Compression: Competition at Work in the Low Wage Labor Market** (NBER Working Paper 31010).

What's changed? A textbook interpretation is that the labor market has moved from one efficient competitive equilibrium to another, the latter featuring higher wages for young, non-college-educated workers. An alternative interpretation is that the low-wage labor market has become more competitive, with less-

productive firms less able to hold on to workers. The distinction matters: a more competitive labor market doesn't just raise pay; it improves

allocation. The “quit elasticity”—meaning the sensitivity of worker job changes to (low) wage levels—grows in magnitude, and the ensuing

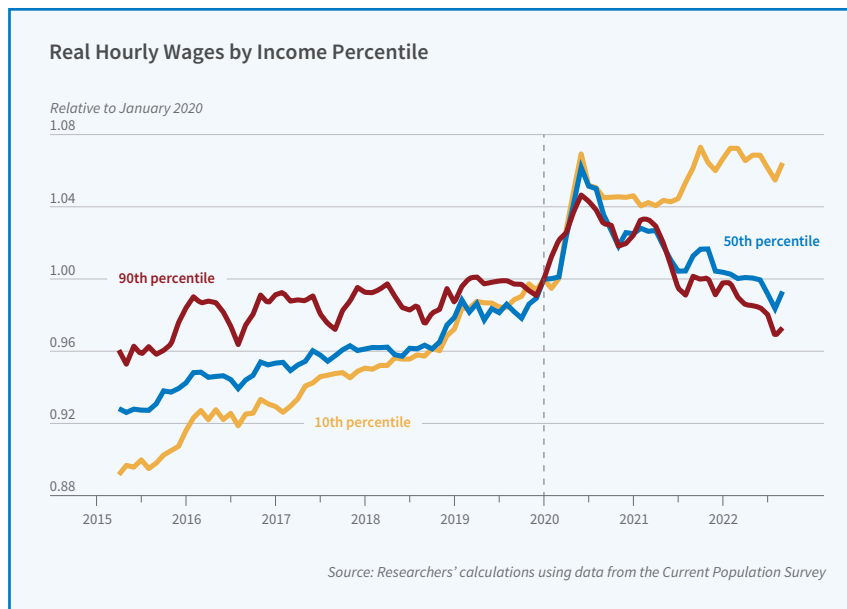
Job transitions increased in mid-2021 and remained above prepandemic levels, particularly among younger workers, high school educated workers, and workers in the service and hospitality industries.

allocative efficiency as workers decamp from less- to more-productive employers.

The researchers distinguish between these cases by analyzing the link between labor market tightness, job moves, and wage growth. In the textbook competitive model, a tightening labor market operates like a rising wage tide: all boats float higher at their moorings. In the imperfectly competitive setting, however, a tightening labor market accelerates realloca-

wage gains are concentrated among job-changers, not job-stayers.

This latter case appears consistent with the data. The researchers find that job-to-job transitions increased in mid-2021 and remained above prepandemic levels, particularly among younger workers, high school educated workers, and workers in the service and hospitality industries. While the quit elasticity in the overall workforce declined slightly, it increased among young, high school educated workers. Simultaneously, these workers saw significantly more mobility towards higher-wage industries. Although industry moves are less than one-fourth as frequent as industry stays, such moves account for 40 percent of the differential post-2020 wage growth among young, high school educated workers, with both the wage premium of industry movers and the rate of industry moves rising as the labor market tightened. This collage of



evidence suggests that the pandemic reduced employer market power, enabling young non-college-educated workers to disproportionately move from lower-paying to higher-paying

and potentially more-productive jobs.

The researchers caution that due to the small sample size of the monthly Current Population Survey dataset, which undergirds

their analysis, and the absence of consistent annual data on job separations, these inferences await further testing.

—Emma Salomon

Comparing Two Approaches to Procurement

Governments and multilateral institutions often implement policies through procurement contracts: agreements with private companies for building a piece of infrastructure or delivering a good or service. Procurement contracts are usually complex, and they often leave substantial discretion to the winning bidder. Some contracts simply instruct a private company to procure the required goods or services, while others detail additional requirements such as suppliers that may be used or quality specifications that must be satisfied. Procurement design choices can matter. When well crafted, procurement processes can help guide the private company towards the desired outcome; when imposing excessive bureaucratic requirements or lacking in enforcement mechanisms, they can hinder efficient project completion.

In **Donor Contracting Conditions and Public Procurement: Causal Evidence from Kenyan Electrification** (NBER Working Paper 30948), Catherine Wolfram, Edward Miguel, Eric Hsu, and Susanna Berkouwer provide new evidence on the effects of two kinds of design choices: procedural requirements and contract

“bundling.” They study the Last Mile Connectivity Project in Kenya, an ambitious \$600 million attempt by the government to extend electricity grids to unconnected houses in thousands of Kenyan villages. The extension work was implemented by Kenya Power—the national utility—which then contracted with private companies to provide the nec-

essary goods and services under two different procurement regimes. Specifically, 5,320 of the extensions were funded by the African Development Bank (AfDB). Contracts to complete these extensions were influenced by AfDB regulations and bundled together

A \$600 million electricity project in rural Kenya provided an opportunity to compare the speed and quality of contract completion under different procurement rules.

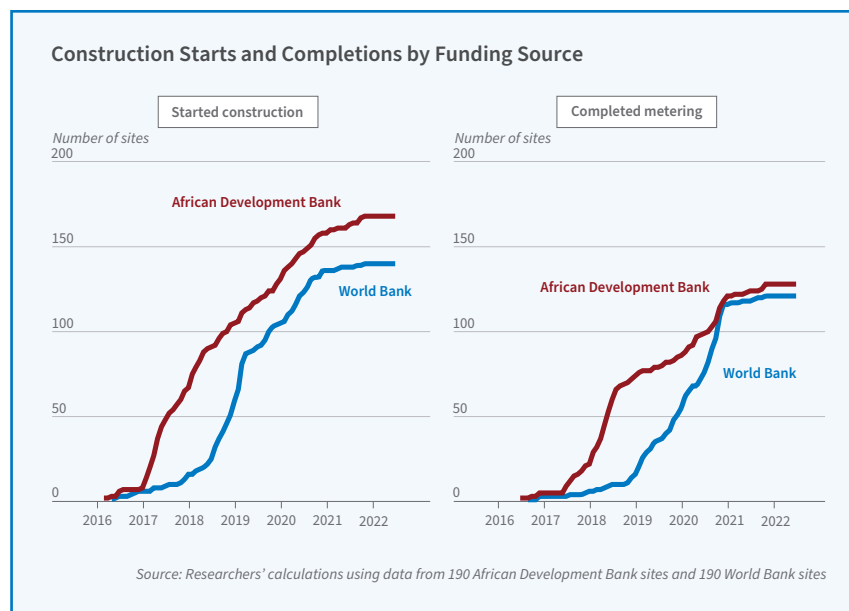
various stages of electricity extension, such as design, material sourcing, and installation, and imposed relatively few monitoring and procedural requirements. In contrast, 3,200 extensions were funded by the World Bank

quasi-random process. The researchers interpret differences in outcomes between AfDB- and WB-funded projects as causal effects of the differences in contracting structure. Since the procurement processes for AfDB- and WB-funded sites differed on two dimen-

sions—bundling and oversight—differences in outcomes could reflect the impact of either or both design choices. To disentangle the effects of bundling from those of oversight, the researchers randomly assign villages in both groups to be audited in a way that mimics the WB’s oversight requirements. Comparing unaudited AfDB-funded villages, which received bundled contracts with no additional oversight, audited AfDB-funded villages, which received bundled contracts and additional oversight, and WB-funded villages, which had both unbundling and additional oversight, allows separate identification of the effects of each design choice.

The results are nuanced, showing

both benefits and costs of the contracts for WB-funded sites relative to those for AfDB-funded sites. Construction at WB-funded sites proceeded far more slowly and was smaller in scope, as indicated by key metrics like the number of electricity poles installed or the number of households connected to the grid falling behind that of AfDB-funded sites by 12–14



work was implemented by Kenya Power—the national utility—which then contracted with private companies to provide the nec-

(WB). These extensions were completed using unbundled contracts that used different companies to complete different parts of the process and imposed procedural requirements such as additional inspections of completed sites.

Villages were assigned to be funded by the AfDB or the WB through an arbitrary,

percent. The slowdown may have been due to greater administrative demands in WB-funded projects that coordinated many different contractors. WB-funded construction was also more expensive than AfDB-funded construction, averaging \$728 versus \$563 per household.

The WB requirements, however, also led to higher-quality installations: a higher fraction of electricity poles with caps, without cracks, and with other characteristics indicating greater durability and lower maintenance costs. The higher quality of WB-funded

installations was due to both the monitoring requirements and the unbundling of contracts: audits of villages in the AfDB-funded group increased installation quality, but not by enough to catch up with the WB-funded sites. — *Shakked Noy*

When Clocks Say It's One Time and the Sun Says It's Another

Before rail and communication networks spurred the introduction of time zones in the late nineteenth century, most towns operated on “solar time,” with noon occurring around when the sun was at its apex. Today, solar noon occurs about an hour earlier in clock time at the east end of a time zone than at the west end. As a result, in winter, workers in Grand Rapids, Michigan, heading to work at 7:30 a.m. may be doing so in the dark, even though the sun has already risen on their counterparts in Boston, Massachusetts who are commuting at the same time. Both cities are in the Eastern Time Zone.

In **When We Change the Clock, Does the Clock Change Us?** (NBER Working Paper 30999), Patrick Baylis, Severin Borenstein, and Edward A. Rubin find that when clock time and solar time diverge, individuals adjust the clock time of some of their activities, but not by enough to keep them on a constant solar schedule. The researchers examine data from Twitter, the US Census, and cell-phone-based foot traffic to study the clock times at

which various activities occur among people living in the same time zone but under different solar times.

They collect 2.5 billion geolocated tweets for the period April 2014 to March 2019 and conclude that those who live in the far west of a time zone tweet about 22 minutes later on average than those at the far east end of the same time zone. They also analyze average

clock times for tweets containing the words “breakfast,” “lunch,” “dinner,” “good morning,” and “good night.” Breakfast tweets show the

smallest influence of solar time, adjusting by nearly half of the difference in solar time. Those on the west end of a time zone frequenting similar places 10 minutes later on aver-

On average, a one-hour differential between solar and clock time, which is the typical width of a time zone, shifts the timing of routine activities by between 9 and 26 minutes.

Analysis of long-form responses to the 2000 Census, which include information on when respondents typically go to work, pro-

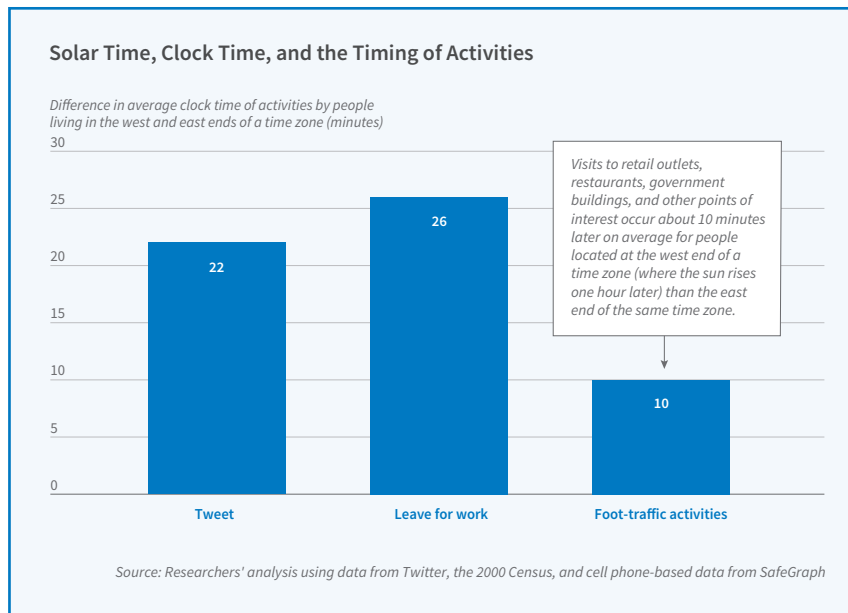
duces similar results: respondents offset clock time disparities by about 26 minutes for each one hour difference between clock and solar time. The effect was the same on weekdays and weekends, and the differential was greater at retailers, restaurants, and fitness centers—about the same as with tweet times—than at houses of worship, higher education institutions, and health offices where the effect of solar time was about zero.

Solar time appears more influential the further north one lives in a given time zone. The researchers suggest that because residents of higher latitudes experience larger seasonal variations in sunlight, they are more accustomed to departing from clock time. Surprisingly, however, counties that are more rural or have more outdoor workers do not consistently exhibit more

sensitivity to solar time than other areas.

The researchers conclude that the coordination value and social norms of organizing life around clock time are very powerful and dominate the timing of activities, though differences between clock time and solar time do pull activities somewhat in the direction of preferred solar times.

— *Steve Maas*



duces similar results: respondents offset clock time disparities by about 26 minutes for each one hour difference between clock and solar time.

Using cellphone-based foot traffic data, the researchers analyze visits to retail establishments in the pre-COVID years of 2018–19. They find that the effect of the differential between solar time and clock time was much

Patterns of Inventor Employment and Creative Output

Many analyses of economic growth have focused on presumably relevant ratios in the innovation pipeline, such as research and development spending as a share of GDP and the proportion of the labor force employed in the research sector. Recent data from the US raise questions, however, about the links. Total factor productivity growth has slowed markedly since 2005 even though the share of inventors in the labor force has grown by over 70 percent.

In *Where Have All the “Creative Talents” Gone? Employment Dynamics of US Inventors* (NBER Working Paper 31085), [Ufuk Akcigit](#) and [Nathan Goldschlag](#) find that innovative capacity also depends upon the distribution of inventors across firm types. Incumbent firms, defined as those over 21 years old with at least 1,000 employees, may shift their inventors from searching for breakthroughs to pursuing discoveries that will defend their competitive position. The researchers find that since 2000, the share of US inventors working for incumbent firms has increased. Comparing inventors hired by young firms, those five years or younger, to inventors hired by incumbents, the researchers find that incumbent hires experience 12.6 percent higher earnings, while innovative output, measured by patents granted, is more than 6 percent lower. Those patterns do not appear to be driven by older inventors moving to incumbent firms, occupational differences in young and incumbent firms, systematic age or life-cycle differences between young and incumbent firm hires, or differences in hiring during the Great Recession.

The results come from data on more than 760,000 US inventors named on 3.6 million patents issued by the US Patent and Trademark Office between 2000 and 2019. A measure of inventive productivity

jobs were determined by matching detailed inventor records with survey responses from the American Community Survey.

Over 60 percent of the inventors in the sample were aged 36 to 55. About 55

Since 2000, the share of US inventors working for older, larger firms has increased. Inventors hired by those firms have higher earnings and less inventive output than those hired by young firms.

was developed using the number of patents granted to an inventor weighted by the number of citations of the patent in the first five years after it was granted.

To create their inventor employment history database, the researchers linked the patent office’s data to the US Census Bureau’s anonymized individual-level identifiers. Individual employment and

percent of those in the sample held jobs at incumbent firms. Just 10 percent of inventors worked at firms less than six years old, and 9 percent started a business during the sample period. Roughly 12 percent of inventors were women, and 27 percent were born outside the United States.

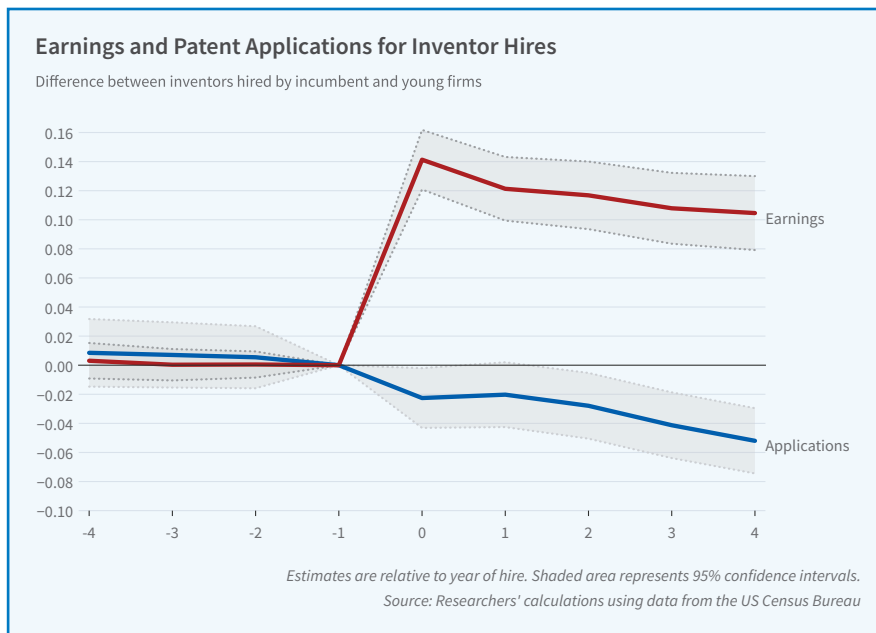
The share of inventors employed by incumbent firms rose from 48.9 percent in 2000 to 57.3 percent in 2016. Inventor hire and separation rates fell from about 7 percent in 2000 to less than 4 percent in 2016, while the comparable rates for noninventors were stable.

The data also suggest that inventors became less entrepreneurial. The share of inventors at young firms was 14 percent in 2000 and 7.5 percent in 2016. In addition, the share of inventors starting new firms also fell by roughly 44 percent,

or nearly 0.3 percentage points, during the sample period.

On average, inventors working for incumbent firms had more patent applications, but fewer citations. The researchers calculate that the shift in inventor share from young to incumbent firms is associated with almost 6 percent more patent applications but 5.3 percent fewer patent citations.

—Linda Gorman



quarterly earnings information was then drawn from the quarterly job-level observations in the unemployment insurance records of the 45 states covered by the Census Bureau’s Longitudinal Employer-Household Dynamics program. Firm age, size, and inventor entrepreneurship were added by linking to the Longitudinal Business Database, the Census Bureau’s frame of all nonfarm employer businesses. The occupations of over 100,000 inventor

The Worldwide Impact of US Macroeconomic News

While it has been widely documented that financial conditions are correlated across countries, less is known about the origins of this comovement. A new study explores the effect of US macroeconomic news on global markets, and analyzes how such news contributes to the correlation of global stock returns. In [The US, Economic News, and the Global Financial Cycle](#) (NBER Working Paper 30994), [Christoph E. Boehm](#) and [T. Niklas Kroner](#) find that US macroeconomic news is a key force behind the observed comovement. For example, it explains, on average, about 23 percent of the quarterly variation in foreign stock returns. This finding extends prior research on monetary policy by showing that nonmonetary news about the US business cycle also influences foreign markets.

To establish the link between macroeconomic news and global market returns, the researchers analyze high-frequency intraday market data on major stock indexes in 27 countries from 1996 to 2019 to pinpoint whether foreign markets move when such shocks occur in the US. Most indexes display a statistically significant response to US news. For example, a positive surprise in US payroll employment was associated with a statistically significant stock price increase in 26 of the 27 countries. The researchers also find that US macroeconomic news explains about 15 percent of the quarterly variation

in the VIX, the volatility index of the S&P 500 that is often interpreted as a proxy for global financial conditions, and about 25 percent of the quarterly variation in commodity prices.

In contrast, the researchers do not find a

substantively important effect of foreign macroeconomic news on US stock returns. The lack of an effect cannot be explained by less timely foreign news or lower measurement quality. A similar asymmetry exists for monetary policy. The effect of US monetary policy surprises on international equity markets is about three times as large as the effect of an equal-sized shock from the European Central Bank or the Bank of England, suggesting the greater impact of the Federal Reserve on global macroeconomic con-

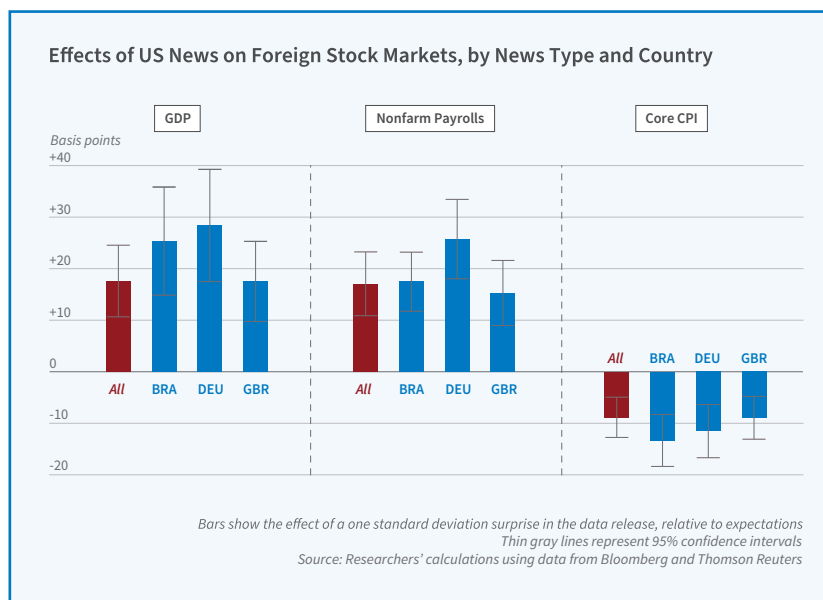
ditions. These asymmetric effects highlight the special role that the US economy plays in the international monetary and financial system.

The effect of US macroeconomic shocks on foreign stock markets can be decomposed into three components: (1) the impact of the foreign risk-free rate, (2) the impact on the country-specific risk premium, and (3) the impact on expectations of future cash flow growth. To shed light on the relative importance of these factors, the researchers study how bond yields and stock values, in the US and abroad, respond to news. Foreign bond yields respond to US macroeconomic news, though generally not in a way that can explain movements in stock prices. The researchers therefore downplay the role of

Positive surprises in US payroll employment, and other favorable macroeconomic news, raise stock prices in global markets.

changes in foreign risk-free rates and concentrate on risk premia and growth expectations. Changes in risk premia appear to be more important than changes in expected future cash flows in moving stock markets. After a positive macroeconomic surprise in the US, such as an unexpected surge in payroll employment, the risk premium for stocks falls while bond yields rise. This suggests that the news leads investors to increase their risk appetite and move from bonds to stocks.

The researchers therefore downplay the role of



—Laurent Belsie

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