

December 2022

Please Note

The NBER Digest will shift to primarily digital distribution in early 2023. To continue receiving a printed copy, please email subs@nber.org before December 31.

INSIDE THIS ISSUE

- The Real Interest Rate Decline in Long Historical Perspective
- Low-Skill Foreign Employees' Impacts on US Firms and Workers
- The Contribution of International Students to US Labor Supply
- Concentration of High-Tech Workers Has Benefits — and Costs
- Tracking a Decade-Long Appreciation of the US Dollar

Social Distancing Desires Keep Some Out of the Labor Force

Many Americans plan to continue social distancing even after the COVID pandemic ends, according to data from the Survey of Working Arrangements and Attitudes, and people with such plans are less likely to participate in the labor force. The effect is to reduce the size of the national workforce and potential GDP, [Jose Maria Barrero](#), [Nicholas Bloom](#), and [Steven J. Davis](#) find in [Long Social Distancing](#) (NBER Working Paper 30568).

To reach their conclusions, the researchers tap survey data from the first half of 2022 for nearly 27,500 persons, 20–64 years of age, who earned at least \$10,000 in 2021. In one analysis, the researchers focus on persons who are outside the labor force in the survey week. When asked why they are neither working nor seeking work, about one-fifth of the respondents point to “worries about catching COVID or other infectious disease” as a primary or secondary reason. The researchers use these self-assessed reasons for not working to estimate the impact of infection worries

About one in eight survey respondents say they will continue social distancing that began as a response to the COVID pandemic, reducing their willingness to work.

on labor force participation.

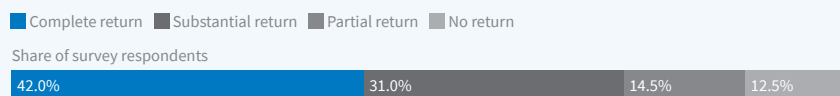
In a second analysis, they fit statistical models that relate current labor force status to social distancing intentions. They

stronger forms of social distancing are, other things equal, less likely to participate in the labor force.

The propensity for strong-form social distancing rises with age and falls with educational attainment and earnings. It is higher for women than men at all ages, perhaps because women take on greater care-giving roles for

children who are too young for vaccination, and others who are more vulnerable to COVID and other infectious diseases. Strong-form social distancing is also more common in industries and occupations that require a high volume of face-to-face encounters. For example, 17 percent of persons with current or most-recent work experience in transportation activities intend to continue strong-form social distancing, compared to less than 10 percent of those in manufacturing, construc-

Individuals' Plans on Returning to Pre-Pandemic Activities



Source: The Survey of Working Arrangements and Attitudes, February to July 2022

use the models to infer the effects of social distancing intentions on labor force participation. Forty-six percent of respondents intend to make a “substantial” or “partial” return to pre-pandemic work activities and another 42 percent anticipate a complete return, but about 12 percent plan “no return to pre-COVID activities, as I will continue to social distance.” This latter group embraces what the researchers call the strong form of long social distancing. Persons who plan

tion, information and finance, insurance, and real estate. Strong-form social distancing intentions are 3.5 times more common, relative to a plan to return to all pre-COVID activities, among those who cite infection worries as the primary rea-

son for not working or seeking work.

The researchers estimate that long social distancing reduced the US labor force participation rate by 2 percentage points in the period February–July 2022, and by 1.4 percentage points on

an earnings-weighted basis. They calculate that this labor supply reduction lowered potential output by 0.94 percentage point, which translates to a flow output drop of about \$250 billion a year.

— Brett M. Rhyne

The Real Interest Rate Decline in Long Historical Perspective

The real interest rate has dropped sharply in the twenty-first century. To what extent is this likely to be temporary, rather than persistent? In [Long-Run Trends in Long-Maturity Real Rates 1311–2021](#) (NBER Working Paper 30475), [Kenneth Rogoff](#), [Barbara Rossi](#), and [Paul Schmelzing](#) examine a rich dataset on long-maturity sovereign debt over the past seven centuries and find that long-term global real interest rates have exhibited a persistent downward trend of about 1.6 basis points per year. Although evident in the long time series, this pattern is not found in data covering the last 150 years. Further, over the full data sample, real interest rates appear to be stationary around a declining trend. This contrasts with the finding in more recent data that they exhibit a significant random walk component and contributes to resolving a longstanding puzzle in the literature — namely, that although most economic models assume interest rates to be stationary, the empirical literature typically could not reject a unit root.

The researchers focus on long-maturity interest rates because they are more important than short-maturity rates for key economic variables such as investment, and because long-maturity debt

has traditionally been the near-exclusive sovereign debt basis, and can therefore be measured over a longer historical time span. Italian city republics were issuing

Seven centuries of data suggest a gentle trend decline in long-term real interest rates and indicate that sharp declines, such as the one after the global financial crisis, are usually due to cyclical factors.

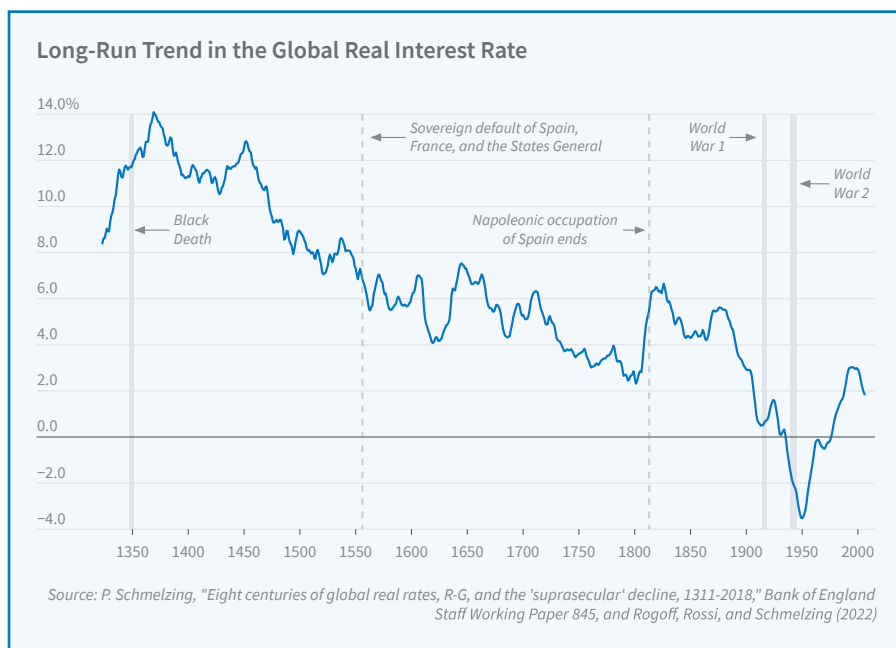
consolidated long-maturity debt by the 13th century, and a pan-European secondary market soon emerged. Until the late 19th century, roughly three-quarters of all sovereign consolidated debt con-

France, Germany, Spain, the US, and Japan. The average maturity of the bonds being analyzed closely approximates modern 10-year Treasury bonds. The

US and Japanese data series begin much later than those for other nations. In order to construct real rates, nominal interest rates are adjusted with a seven-year lagged inflation measure designed to approximate inflation expectations.

The researchers test for structural breaks, changes in the level of real interest rates, around five significant dates in economic and financial history: 1349, which corresponds to the Black Death; 1557, a year which saw a wave of European financial shocks; 1694, which captures the so-called revolution in “credible commitments” arising from institutional reform in Britain; 1914, which

corresponds to the end of the multi-century fixed exchange rate system, the outbreak of World War I, and the founding of the Federal Reserve; and 1981, which many analysts point to as an inflection point in advanced economies. When



sisted of long-maturity assets.

The researchers study a comprehensive sample of long-maturity liquid and voluntary interest rates for various intervals over the 1311–2021 period in eight economies: Italy, the UK, Holland,

interest rates are weighted by national GDP, the years 1349 and 1557 stand out for breaks in the trend rate of interest rate decline. The evidence does not point strongly to any recent break.

The researchers identify four eras of low real interest rates: prior to the

Black Death in 1311–53, after the Great Bullion Famine in 1483–1541, during a credit boom in 1732–1810, and during the foreign exchange transition era of 1937–85. Each of these eras ended abruptly. They also find that, until very recently, there is little evidence of a posi-

tive correlation between real rates and either output or population growth, and if anything some support for a negative association, which is inconsistent with popular explanations of the recent real interest rate decline.

—Whitney Zhang

Low-Skill Foreign Employees' Impacts on US Firms and Workers

The US has long limited admission of contract foreign laborers for low-skill work in order to avoid adversely affecting US workers. Some employers have claimed that the labor supplied by their foreign workers is critical for the success of their businesses. In [The Effect of Low-Skill Immigration Restrictions on US Firms and Workers: Evidence from a Randomized Lottery](#) (NBER Working Paper 30589), [Michael A. Clemens](#) and [Ethan G. Lewis](#) find that firms authorized to employ more low-skill immigrants significantly increase production. They do not find any decrease in employment of US workers.

The H-2B visa is the principal work visa for low-skill non-farm labor in the US. Major industries employing H-2B workers are administrative and support services — especially groundskeeping and landscaping;

hospitality; arts, entertainment, and recreation; and forestry, fishing, and hunting. Employers petition the Department of Labor and the Department of Homeland Security to hire H-2B workers. There is a statutory cap of 66,000 H-2B visas a year; in 2022 there were

Winning the H-2B lottery, which allows firms to hire low-skill immigrants, contributes to revenue growth and does not appear to reduce employment of US citizens.

over four times that many applicants. Three-quarters of H-2B workers are citizens of Mexico.

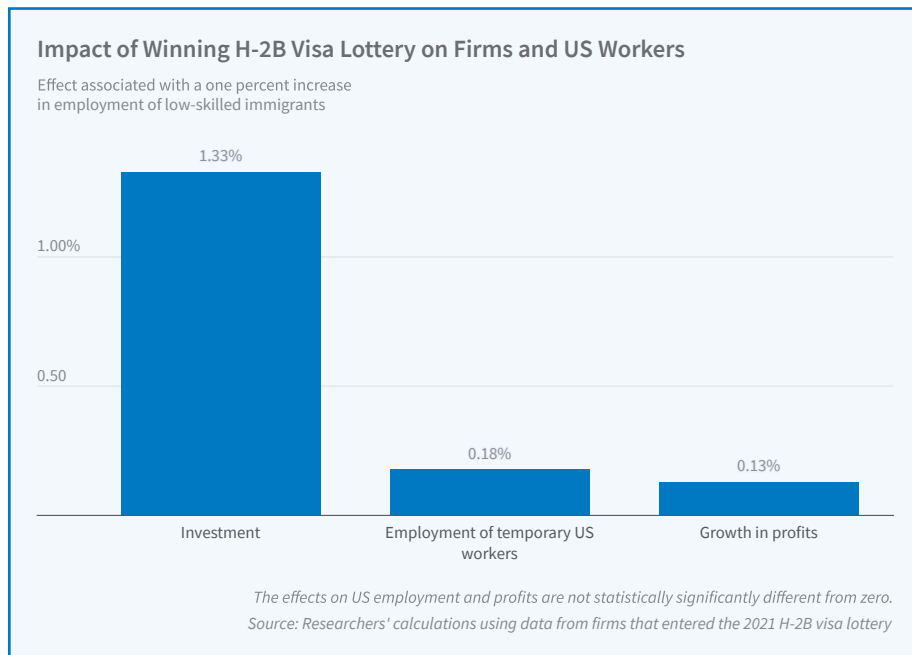
Since 2019, the Department of Labor has been randomly assigning H-2B petitions letters “A” through “E” and processing them in that order. “A” peti-

supplemental visa allocation after the initial processing.

The researchers survey members of four industry associations that hire H-2B workers: the National Association of Landscape Professionals, the Outdoor Amusement Business Association, the Seasonal Employment Alliance, and the American Seafood Jobs Alliance. They ask whether the firms were able to hire any H-2B workers in 2021, which lottery letters they received, how many different types of workers they employed, and how many workers they petitioned for. They also inquire about revenue, investments, and business conditions. The sample of 289 firms accounts for 8.9 percent of the universe of petitions in the 2021 H-2B lottery.

Firms that win the 2021 H-2B lot-

tery — that is, firms with petitions receiving an “A” — employ 2.3 times as many foreign workers as those who are assigned another letter. When a firm increases its number of foreign workers, there is also a positive but statistically insignificant increase in its US temporary worker hires.



tions are likely to be processed, whereas others are not. Workers who are already in the US are exempt from the cap. This means that, on average, some 12.7 percent of workers in the lottery are always given visas. Additionally, some workers are able to obtain an H-2B visa from a

Winning the lottery increased revenue by 18.5 percent in 2021, on average, across the distribution of firms. Firms that are growing slower, have more competitors, and are smaller, more rural, and in lower-population areas exhibit larger effects of foreign employment on revenue.

Additionally, winning the lottery causes investment in equipment and real estate to rise by a factor of 2.1, which cor-

responds to a 1 percent increase in foreign employment causing a 1.3 percent increase in investment. This effect is driven by small firms, for which a 1 percent increase in foreign employment leads to a 2.5 percent increase in investment.

The researchers estimate that a 1 percent increase in foreign employment causes a 0.1 percent increase in the growth in profits. Lottery losers do not shift into

black-market employment. Employers who are willing to hire on the black market have little incentive to pay the fees, fixed wages, and travel costs imposed on H-2B hiring.

On balance, the results suggest that raising capital investments, hiring US workers, and hiring unauthorized foreign labor are poor substitutes for legal low-skill foreign labor.

—Whitney Zhang

The Contribution of International Students to US Labor Supply

The United States is home to world-class universities that attract hundreds of thousands of international students each year. Between 2000 and 2015, the number of international students who received either a bachelor's or master's degree from a US college or university ranged between 500,000 and 1 million per year. Many of these students acquired substantial human capital in the course of their studies. Whether these graduates deploy their skills in the US labor market is the focus of [International College Students' Impact on the US Skilled Labor Supply](#) (NBER Working Paper 30431). In this study, Michel Beine, [Giovanni Peri](#), and [Morgan Raux](#) estimate the probability that international students find jobs after graduation in the state where they studied. They rely on enrollment variation that is driven by variation in the tuition charged to international students by US public universities to address this question. They analyze a new university-level database on international graduates merged with individual data on Optional Practical Training (OPT) permits. These

permits represent the primary way students on F-1 visas transition into the US labor market.

kets and immigration policy. For example, in 2020, foreign enrollment in US graduate and master's programs

Nearly one-quarter of the international students who earn master's degrees at US universities find post-graduation jobs in the state in which they graduated.

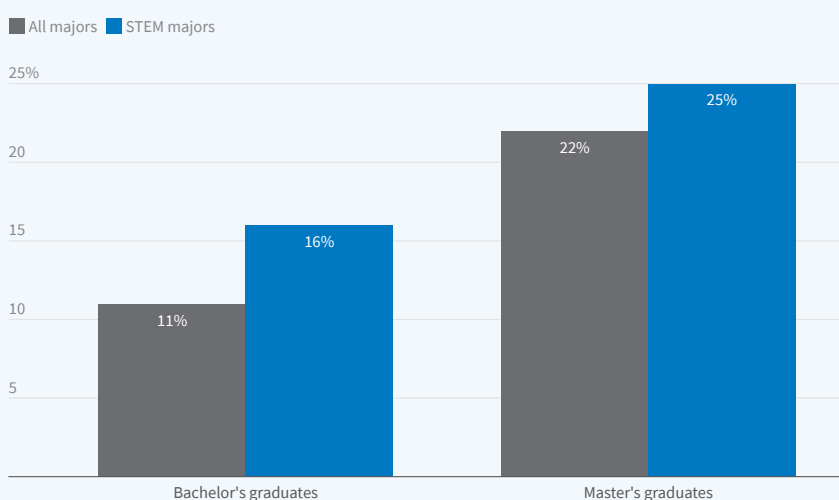
The researchers find that about 23 percent of international students who earn master's degrees and 12 percent of those who earn bachelor's degrees find a within-state job post graduation. The data suggest that most foreign graduates who transition into US employment find their first job in the state in which their universities are located.

These estimates have potentially important implications for labor mar-

ket and immigration policy. For example, in 2020, foreign enrollment in US graduate and master's programs dropped from 400,000 students on F-1 visas to about 100,000 due to the COVID-19 pandemic. The study's findings suggest that this decline of 300,000 students will translate into 30,000 to 60,000 fewer foreign graduates working in the US between 2022 and 2024. This is a time when some analysts forecast that the US labor market will experience labor shortages.

The researchers also find substantial differences across fields in the likelihood that a graduate remains in the US and finds a job. STEM graduates have a roughly 20 percent chance of joining the US labor force, but for non-STEM graduates, the researchers find employment rates that are not statistically different from zero. They also find that the

Foreign Students Taking Post-Graduation Jobs In-State



Source: Researchers' calculations using data from IPEDS and other sources

2008 reform that extended the duration of the OPT work permit from 12 to 29 months for STEM graduates

led to an increase in the probability that foreign graduates would become employees, while also extending the

period of time over which they could work.

—Lauri Scherer

Concentration of High-Tech Workers Has Benefits — and Costs

Scientists and engineers tend to work more productively in high-tech-intensive cities. With more opportunities to network with their peers, they appear to benefit from knowledge spillovers, and their firms benefit from a larger labor pool.

Productivity gains — defined as the number of patents produced in a year — increase steadily when firms in cities with smaller concentrations of research and development activity are compared to those in localities with larger concentrations, but production costs also increase. Gains outpace costs at low- to mid-level R&D concentrations, but the picture changes in urban areas with the highest agglomerations, such as Boston and San Francisco, where the difference between productivity gains and cost increases is close to zero.

In [Place-Based Productivity and Costs in Science](#) (NBER Working Paper 30416), [Jonathan Gruber](#), [Simon Johnson](#), and [Enrico Moretti](#) estimate R&D costs for 133 metro areas and assess how productivity varies with the density of scientists. They build on Moretti's [earlier work](#) to show that researchers located in an area with 10 percent more scientists in their field produce 0.7 percent more patents per year.

Productivity increases at a steady rate as clusters of R&D workers become more concentrated; however, R&D costs rise more rapidly at higher levels of agglomeration. This means that increased productivity delivers diminishing net returns to the firms carrying out this research.

The researchers find

that, overall, R&D spending in an area with 10 percent more scientists is 0.1 percent more costly — well below the productivity gains delivered by agglomeration. But while the productivity gains from adding more scientists do not vary much

Productivity increases at a steady rate as clusters of scientists and engineers grow larger, but associated R&D costs rise more rapidly at higher levels of agglomeration.

by area, the costs of R&D do vary. In particular, in the cities with the highest concentration of scientists, each additional 10 percent increase in the number of scientists increases costs by 0.53 percent. This estimate is somewhat less than the estimated increase in productivity in these cities, but the researchers cannot reject the possibility that the two effects are of the same magnitude, that is, that cost increases are equal to the productivity gains.

The most expensive US metro areas in which to conduct R&D are San Jose-San Francisco-Oakland; Honolulu;

and Boston-Worcester-Manchester. The least expensive are Dayton-Springfield-Greenville; Milwaukee-Racine-Waukesha; and Grand Rapids-Muskegon-Holland. The cost of doing business is 38 percent higher at the top than at the bottom, and

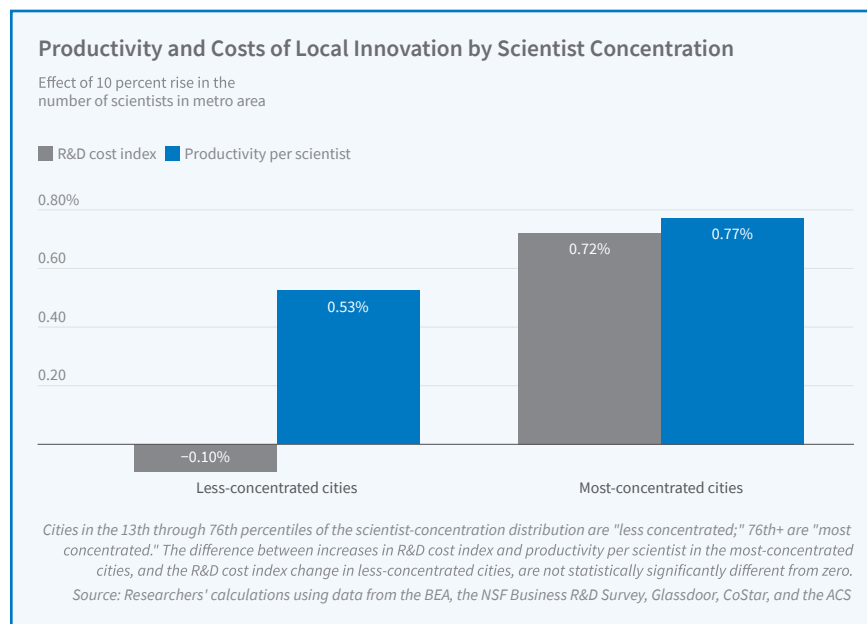
the difference in the cost of housing is even greater, ranging between 49 and 99 percent depending on the location.

R&D has become increasingly concentrated. As of 2009, the top 10 metro areas for computer science accounted for 70 percent of all US inventors, for semi-conductors 79 percent, and for biology and chemistry 59 percent.

Congress is considering legislation that could provide incentives for R&D activity in new tech hubs instead of what the study calls “existing coastal superstar cities.” The researchers identify, but

do not quantify, three potential benefits associated with greater dispersion of technology-intensive R&D jobs: bringing new jobs to depressed regions, reducing the national economy's vulnerability to geographic shocks such as hurricanes and earthquakes, and generating broader political support for science spending by increasing the voter base it would benefit.

—Steve Maas



Tracking a Decade-Long Appreciation of the US Dollar

The US dollar appreciated by 23 percent against a broad basket of other currencies between January 2011 and December 2019, and has continued its appreciation since then. In [Understanding the Strength of the Dollar](#) (NBER Working Paper 30558), [Zhengyang Jiang](#), [Robert J. Richmond](#), and [Tony Zhang](#) analyze factors that contributed to the dollar's rise. They estimate that global growth in investor savings accounted for appreciation of 8.7 percent, relatively tight US central bank monetary policy 5.8 percent, and shifting investor demand toward US assets 9.3 percent. Slowing of dollar reserve accumulation by other countries' central banks after the 2008 financial crisis was a net negative for the dollar and would have reduced the dollar's value by 1.3 percent in the absence of other factors.

To quantify how much each macro factor contributed to dollar appreciation, the researchers analyze a demand system for cross-border portfolio holdings using granular data from 32 countries. It maps changes in macroeconomic variables such as investor savings or asset fundamentals to shifts in asset demand and supply, and traces out how exchange

rates move to clear international financial markets.

The analysis relies upon three types of data: cross-country portfolio holdings,

struction, the researchers select the data that provide the most accurate representation of cross-border portfolio holdings and asset returns.

Rising global savings, higher US policy rates, and shifts in investor preferences boosted demand for dollar-denominated assets and contributed to the dollar's rise over the 2011–19 period.

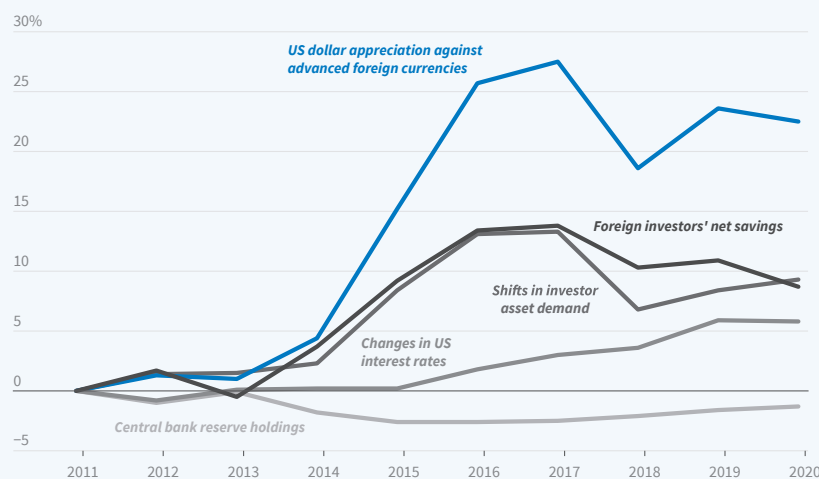
country/asset characteristics, and the realized returns in each asset class by country or country group. Data are drawn from a variety of sources, such as the International Monetary Fund's Coordinated Portfolio Investment Survey, the US Treasury International Capital System, the World Bank and the Bank for International Settlements. At each stage of the data con-

The findings suggest that the dollar may continue to strengthen as the Federal Reserve continues rate hikes, as global savers continue to search for safe harbors, and as US fundamentals remain relatively strong. For countries other than the US that are seeking to strengthen their exchange rates, higher rates and stronger economic fundamentals help. The dollar has the advantage, however, of being the default go-to place for rising global savings.

The researchers note that demand for dollar assets is quite stable. In the counterfactual scenario of one major foreign country selling all of its holdings of US assets, they find that other foreign buyers would purchase these assets at a very slight discount. This implies that, absent a coordinated global run, significant dollar depreciation is unlikely.

—Linda Gorman

Factors Contributing to US Dollar Appreciation, 2011–19



Source: Researchers' calculations using the IMF CPIS and Treasury TIC databases and other sources

NBER

The National Bureau of Economic Research is a private nonprofit research organization founded in 1920 and devoted to conducting and disseminating nonpartisan economic research. Its officers are:

James M. Poterba—President and
Chief Executive Officer

John Lipsky—Chair
Peter Blair Henry—Vice Chair
Robert Mednick—Treasurer

The NBER Digest summarizes selected Working Papers recently produced as part of the NBER's program of research. Working Papers are intended to make preliminary research results available to encourage discussion and suggestions for revision. Neither the

Working Papers nor The Digest have been subject to peer review or review by the NBER Board of Directors.

The Digest is free. It is not copyrighted and may be reproduced with appropriate attribution of source. Please provide the NBER's Public Information Department (caradin@nber.org) with copies of anything reproduced.

Requests for Digest subscriptions, changes of address, and cancellations may be sent to Digest, NBER, 1050 Massachusetts Avenue, Cambridge, MA 02138-5398 (please include the current mailing label), or emailed to subs@nber.org. Print copies of the Digest are only mailed to subscribers in the US and Canada; those in other nations may request electronic subscriptions at www.nber.org/dsubscribe/.

Individual copies of NBER Working Papers are available online free of charge to affiliates of subscribing organizations, such as universities and colleges, and to employees of NBER corporate associates. All visitors to the NBER website receive three free downloads each year, after which there is a charge of \$5 per downloaded paper. To place an order, please email the NBER's Subscriptions Department at subs@nber.org or call (617) 588-1405. A full subscription to the NBER Working Paper series entitles the subscriber to all new papers, recently more than 1,200 per year. The standard annual rate for a full digital subscription is \$2,995; the online academic rate is \$1,375. Partial subscriptions are also available; rates may be found at nber.org/wpsubscribe.html