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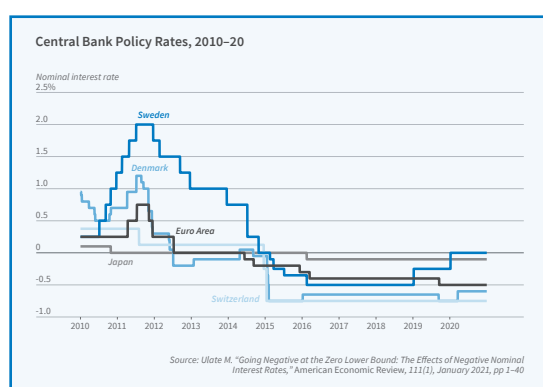
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Program Report

ALSO IN THIS ISSUE



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Trends in Earnings Volatility among US Men	6
Safety Net Program Interactions and Impacts on Low-Income Families	10
The Economic Impact of Climate Change over Time and Space	16
Asset Demand Systems in Macro-Finance	20
NBER News	25
Conferences	27
Program and Working Group Meetings	37
NBER Books	52

Monetary Economics

Emi Nakamura and Jón Steinsson*

For much of the last decade, policymakers in advanced economies have grappled with challenges resulting from the Great Recession of 2007–09 and sovereign debt problems in Europe. During this time, inflation was persistently below targets set by central banks in the United States, Europe, and Japan. As a consequence, a major focus of research and practice was how to further stimulate these economies through unconventional monetary policy and raise their rates of inflation toward target levels.

More recently, the global economic downturn and subsequent rebound associated with COVID-19 have shifted the focus of both research and practice. In 2021, advanced economies — and especially the United States — have experienced a substantial increase in inflation, to levels well above target. This has raised concerns about the reemergence of inflation that have been largely dormant for some time.

Alongside these macroeconomic developments, the field of monetary economics has been influenced by other societal changes, such as rising inequality, increasing concern about climate change, and the development of new technologies such as blockchains and cryptocurrencies.

Several strands of methodological and theoretical advances also have made a large imprint on the field of monetary economics over the past decade. On the empirical side, researchers have increasingly embraced new data sources, including high-frequency and cross-sectional data, and methods of identification. The increased use of forward guidance — statements by central banks about the future path of policy rates — has raised significant theoretical issues and resulted in a burst of innovative research. Also, the development of heterogeneous agent New Keynesian models — HANK models — has been important.

In this brief program report, we highlight several strands of innovative research on these issues, conducted by affiliates of the NBER's Monetary Economics Program.

**Emi Nakamura and Jón Steinsson are Chancellor's Professors of Economics at the University of California, Berkeley and directors of the Monetary Economics Program.*

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Negative Nominal Interest Rates

Conventional wisdom has long held that nominal interest rates cannot fall below zero. The reason for this is that once nominal interest rates are negative, cash earns a higher return than lending. Who would deposit their money in a bank or purchase a Treasury bill when these assets earn less than simply holding cash? This “zero lower bound” on nominal interest rates clearly affected policy during the Great Recession. Many central banks quickly lowered interest rates to zero or very close to zero, and stopped at that point.

Over the past decade, this conventional wisdom has been challenged. It is costly to hold large amounts of cash. It is therefore not clear that negative interest rates will lead to the rush for cash that conventional wisdom suggests. In the mid-2010s, several European central banks as well as the Bank of Japan decided to test negative waters. Figure 1—taken from work by Mauricio Ulate—shows the evolution of policy rates in the Euro area, Denmark, Sweden, Switzerland, and Japan since 2010.¹ Switzerland and Denmark have ventured farthest into negative territory, with policy rates reaching −0.75 percent.

An important concern with negative nominal interest rates is how they affect bank profitability. If deposit rates do not fall below zero—because of bank concerns regarding depositor reactions to such a move—while lending rates and yields on other bank assets fall, negative nominal rates will potentially squeeze bank interest rate margins. Banks may react to this by not reducing lending rates or, if they do cut rates, reduced profits may adversely affect their net worth and therefore their ability to lend. Markus Brunnermeier and Yann Koby present a formal model that captures these effects. In their model, if interest rates fall below a certain level, which they call the “reversal interest rate,” further reductions in interest rates become counterproductive.²

A major focus of research has been on the extent to which changes in policy rates pass through into deposit and lending rates once policy rates become negative. Gauti Eggertsson, Ragnar Juelsrud, Lawrence Summers, and Ella Getz Wold study this question using Swedish data.³ They find that pass-through of policy rate changes into both deposit and lending rates falls to zero once the policy rate becomes negative.

They also find that negative policy rates hurt bank profitability and conclude that negative rates are unlikely to be an effective tool for stimulating the economy. Ulate uses data from several countries to assess these same questions. He finds that pass-through to deposit rates collapses, but pass-through to lending rates remains substantial. He concludes that rate cuts are about 60 to 70 percent as effective when policy rates are negative as they are when policy rates are positive.

One conclusion from this research is that the lower bound on nominal interest rates is not zero. Acknowledging this, economists and policymakers now increasingly refer to the “effective lower bound” on nominal interest rates rather than the “zero lower bound.” But exactly what the effective lower bound is remains to be determined.

The Forward Guidance Puzzle

Over the past 20 years, central banks have made increasing use of forward guidance about interest rates and other aspects of policy. The increased use of forward guidance originally stemmed from a realization that transparent communication by central banks about how interest rates would react to economic developments could make monetary policy more effective. Research by Michael Woodford has significantly advanced our understanding of these ideas.⁴ Forward guidance became even more important when nominal interest rates in many countries hit what was perceived to be the effective lower bound. At that point, many central banks, including the Federal Reserve, were forced to rely more heavily on forward guidance and other unconventional

monetary policy instruments.

This development led researchers to analyze in more detail the effectiveness of forward guidance through the lens of standard macroeconomic models. Early work by researchers at the Federal

as innocuous contribute to these perverse implications. McKay, Nakamura, and Steinsson relax the common assumption of complete markets and show that uninsurable income risk and liquidity constraints make households less responsive

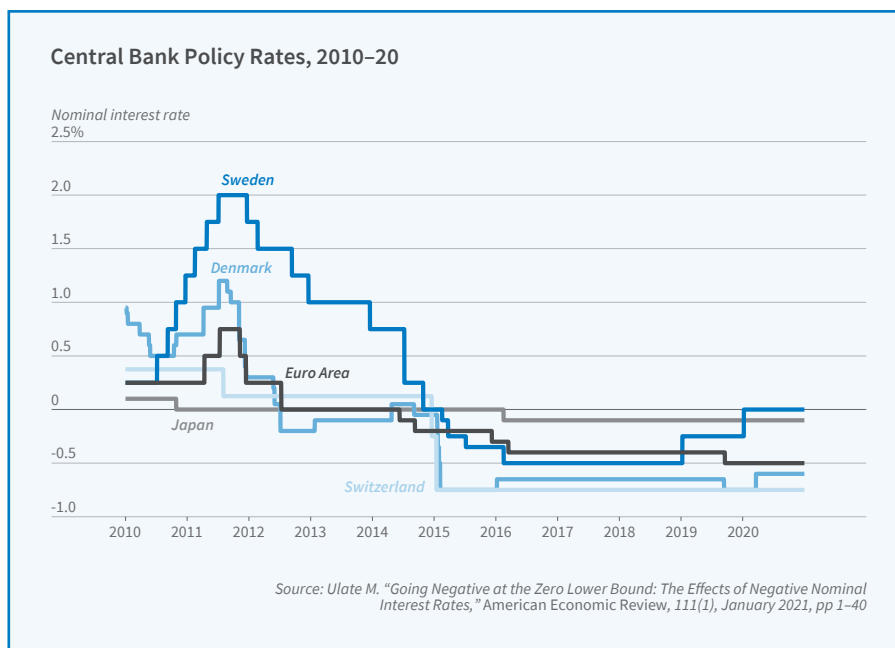
to interest rates in the distant future.⁷ Iván Werning shows that uninsurable income risk and liquidity constraints can amplify or mute the effects of forward guidance depending on the cyclical nature of risk.⁸ George-Marios Angeletos and Chen Lian show that modest deviations from the usual assumption that everyone has full common knowledge about future interest rates attenuate general equilibrium feedback associated with far-future interest rates.⁹

Emmanuel Farhi and Werning show that

the combination of uninsurable income risk, liquidity constraints, and a form of bounded rationality known as level-k thinking mitigates the effects of monetary policy and especially the effects of forward guidance at long horizons.¹⁰ Xavier Gabaix shows that another type of bounded rationality, partial myopia toward distant atypical events, has similar effects.¹¹ Finally, Pascal Michaillat and Emmanuel Saez show that incorporating wealth in household utility functions also mutes the effects of forward guidance about the distant future.¹²

What Is Going On with Inflation?

Inflation in the United States has risen sharply this year. There is a very lively ongoing debate about the causes of this rise and the extent to which it may persist. In this context, it is easy to forget that for most of the preceding several decades, research and policy discussions



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Figure 1

Reserve yielded puzzling results: modest amounts of forward guidance seemed to have implausibly large effects on output and inflation.⁵ Alisdair McKay, Emi Nakamura, and Jón Steinsson showed that this implication results from the extremely forward-looking nature of standard macroeconomic models and the assumption that consumers and firms can act on their beliefs through financial markets with frictionless borrowing and saving.⁶ In these models, an expected fall in interest rates far in the future creates a sustained output boom. The boom is highly inflationary and can easily result in extreme increases in both output and the price level.

This was soon recognized as an important defect of the class of models commonly used by researchers to analyze macroeconomic policy, with implications for many policy questions beyond forward guidance. A great deal of theoretical research has focused on how various simplifying assumptions that are often viewed

about inflation focused on why inflation was so stable despite substantial variation in unemployment and other measures of economic slack. Both the current and the prior inflation debates are to a large degree about the nature of the Phillips curve, which describes how much inflation rises in response to a decline in unemployment and an increase in labor market tightness.

Conventional wisdom about the Phillips curve was arguably shaped by the disinflation period in the 1980s when, under the leadership of Paul Volcker, the Federal Reserve tightened monetary policy sharply. Unemployment rose sharply and inflation fell sharply. Many view this as convincing evidence that the Phillips curve is “steep”—that high unemployment has a large, negative causal effect on inflation. But if this view is true, the history of inflation since 1990 presents a series of puzzles. Unemployment fell to very low levels both in the late 1990s and in the late 2010s without inflation rising appreciably. Furthermore, unemployment rose as much in the Great Recession as it did in the early 1980s without inflation falling nearly as much. This led many to argue that the Phillips curve had become flatter. Figure 2—taken from work by James Stock and Mark Watson—illustrates the flattening of the Phillips curve.¹³

Several explanations have been given for this apparent flattening. Laurence Ball and Sandeep Mazumder argue that a Phillips curve specification with inflation measured using median inflation and economic slack measured using the short-term unemployment rate fits the data well from 1985 onward.¹⁴ Olivier Coibion and Yuriy Gorodnichenko argue

that the apparent lack of responsiveness of inflation to economic slack in the aftermath of the Great Recession is due to an increase in inflation expectations from 2009 to 2011 resulting from rising oil prices over this period.¹⁵ In contrast, Ben Bernanke and Frederic Mishkin argue that the apparent flattening of the

slope of the Phillips curve has flattened only modestly since the 1980s.²⁰ We argue that about two-thirds of the fall in inflation during the Volcker disinflation period was caused by long-run inflation expectations shifting downward.

The rise of US inflation in the summer and fall of 2021 has been substantially larger and faster than in the last few US recoveries. Long-term inflation expectations have up to this point been relatively well anchored and therefore do not provide an explanation. An unusual feature of the COVID-19 recession and the recovery has been a large shift in demand from services to goods. Veronica Guerrieri, Guido Lorenzoni, Ludwig Straub, and Werning show that such a sectoral shift will manifest itself as a “cost-push” shock in the

Phillips curve, driving

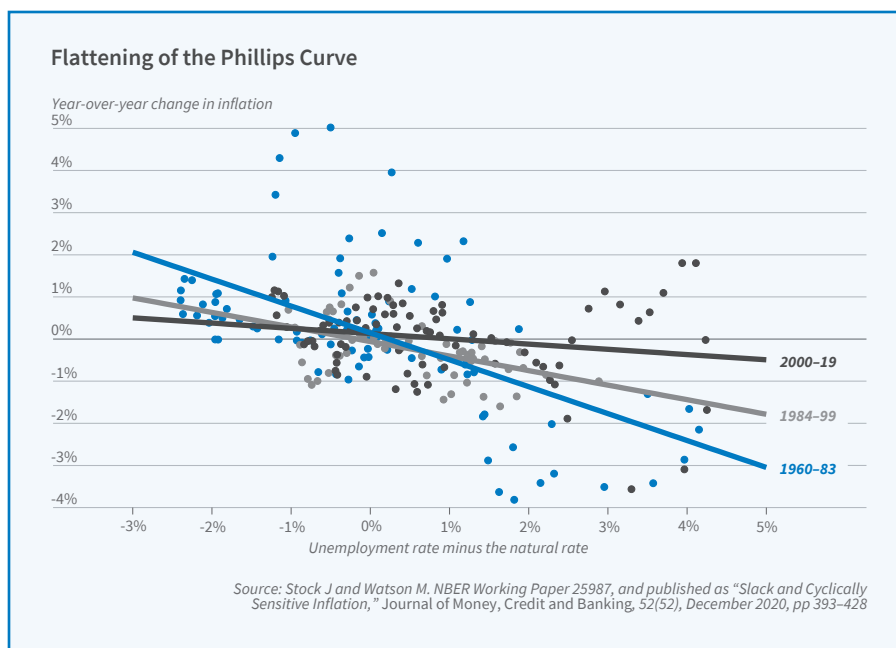


Figure 2

Phillips curve is due to inflation expectations becoming more firmly anchored.¹⁶

Recent research has used regional data to shed further light on the Phillips curve. Michael McLeay and Silvana Tenreyro argue that because monetary policy often offsets variation in aggregate demand, it is difficult to estimate the Phillips curve using aggregate data.¹⁷ They use regional data from 28 US metropolitan areas to estimate the Phillips curve. Peter Hooper, Mishkin, and Amir Sufi also use US metropolitan area data to estimate the Phillips curve.¹⁸ Both studies find that the slope of the Phillips curve is substantial in the cross section. Martin Beraja, Erik Hurst, and Juan Ospina consider the wage Phillips curve and find that it is steeper in the cross section than in the aggregate.¹⁹ Using newly constructed state-level inflation data, Jonathon Hazell, Juan Herreño, Nakamura, and Steinsson argue that the

inflation up at a given level of unemployment.²¹ Other forces that may be playing significant roles include a sustained fall in labor supply and highly expansionary fiscal policy. Analyzing these issues will be an important focus of research in the Monetary Economics Program over the next few years.

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[Return to Text](#)

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[Return to Text](#)

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[Return to Text](#)

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[Return to Text](#)

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[Return to Text](#)



Robert Moffitt is the Krieger-Eisenhower Professor of Economics at Johns Hopkins University, where he also holds a joint appointment at the Bloomberg School of Public Health. Previously, he was a faculty member at Brown University. He is a Fellow of the Econometric Society, the Society of Labor Economists (SOLE), and the American Academy of Arts and Sciences, and a member of the National Academy of Sciences. He is the past president of both SOLE and the Population Association of America, and received a MERIT award from the National Institutes of Health. He has been chief editor of *American Economic Review* and *Journal of Human Resources* and coeditor of *The Review of Economics and Statistics*. He is currently editor of the annual NBER *Tax Policy and the Economy* volume. He is a research associate in the NBER's Economics of Children and Public Economics programs, and a member of the Conference on Research in Income and Wealth.

Moffitt's research interests are in labor economics and applied microeconometrics, with a special focus on the economics of issues relating to the low-income population in the US. He has been particularly focused on the labor supply decisions of female heads of families and how they respond to the welfare system, on the behavioral effects of social insurance programs and income taxes, and on labor market volatility.

Moffitt lives in Baltimore with his wife, Emily Agree, a faculty member in sociology at Johns Hopkins. He was born in Houston, Texas and received his BA in economics from Rice University and his PhD in economics from Brown.

Trends in Earnings Volatility among US Men

Robert A. Moffitt

Economists have been concerned about the volatility of earnings and income for decades because it creates uncertainty for families and individuals and makes it more difficult for them to plan future consumption. Volatility may discourage investments financed by loans that have to be paid off by a future income stream. Education and training, which can be very costly at the college level, may be forestalled due to uncertainty about future earnings payoffs.

Sociologists and economists alike have shown that family income volatility has harmful effects on children and their development, especially younger children. Economists recognize that neither private insurance markets nor government programs like unemployment insurance can adequately protect individuals against most earnings risk. Consequently, those with sufficient income to forgo current consumption often attempt to self-insure by engaging in precautionary saving, but this is rarely enough to smooth future consumption in the face of significant volatility.

Whether earnings volatility has risen over time in the United States is an important question for economics and for government policy. One well-known development that may have led to such an increase is deindustrialization, which has reduced the number of stable, long-term blue-collar jobs and replaced them with jobs in the service sector, retailing, and other industries that often have high rates of turnover and unstable earnings. Some growing industries, like high tech, have several dominant firms and many smaller firms with high failure rates and intense competition, leading to unstable employment and earnings profiles for many individuals in those industries. But against these well-recognized forces has been a reduction in volatility at the macroeconomic level, commonly called the "Great Moderation." That term was used to describe the reduction in macro-level volatility that began in the 1980s and ran through 2007.¹

I have studied trends in the earnings volatility of US men for many years, beginning with my 1994 paper in the *Brookings Papers on Economic Activity*, coauthored with Peter Gottschalk.² The focus of this initial work was on men because their jobs are more concentrated in manufacturing and other industries hit particularly hard by deindustrialization. We took data from a well-known household survey, the Panel Study of Income Dynamics (PSID), which is the longest-running panel household survey in the world. It started in 1968 and is ongoing. We used the data to track White men's earnings from 1970 to 1987—focusing on White men because of small sample sizes for other groups—and used very simple techniques to see if their earnings had become more unstable. We found that earnings volatility, measured as the standard deviation of the change in earnings from one survey wave to the next, rose dramatically over that period, particularly among less-educated workers. Volatility rose by 50 percent for high school gradu-

ates and 96 percent for high school dropouts. The disproportionate increase among those less educated suggested a potential role for deindustrialization. We also noted that the increase in volatility was partly responsible for the growth in cross-sectional earnings inequality, because higher levels of earnings volatility and “transitory shocks” in a given year increase the dispersion of earnings.

Work since the Gottschalk-Moffitt Study

Gottschalk and I continued to update our work periodically with data from the PSID, still focusing on men but including all racial groups. Contrary to expectations of a long-term trend, from 1987 through the mid-1990s there was no evidence of an upward or downward trend, although there were strong countercyclical fluctuations as volatility rose in recessions and fell during recoveries. We found that volatility began to rise again just before, and then especially during, the Great Recession of 2008–09. In a further update, Sisi Zhang and I found that volatility in 2014 was higher than at any previous time since 1970.³

Despite the unquestionable value for volatility studies of the PSID’s 50 years following men, it has some disadvantages as a dataset. One problem with all surveys that ask the same individuals their earnings periodically — biennially in the PSID — is that workers misremember their previous years’ earnings. This can make it appear as though earnings are fluctuating, when this is just a result of reporting error. Another problem with most panel surveys is that they suffer from attrition: individuals drop out. This could lead to surveys becoming less representative of the population over time.

Coinciding with

these concerns with the PSID has been major growth in economics research in general using administrative data on earnings for the study of many issues, such as earnings inequality, poverty, and volatility. Researchers have gained access to earnings data held by the Social Security Administration, the unemployment insurance system, and the Internal Revenue Service. Because these earnings are reported by employers, they should be more accurate than survey responses. Indeed, some studies using administrative data have shown no increase in volatility or have even shown a decline.⁴

Cross Dataset Project

Several years ago, I began a project with several other economists — John Abowd, Christopher Bollinger, Michael Carr, Charles Hoxby, Kevin McKinney, Emily Wiemers, Sisi Zhang, and James Ziliak — to estimate earnings volatility trends of men (or all racial groups) with a number of datasets other than the PSID, including administrative datasets. We attempted to make our analyses as comparable as possible — calculating volatility the same way, selecting samples with similar demographic compositions, and generally using identical analytic methods.

In addition to updating the evidence from the PSID, the project brought three other datasets to bear on the question. Two of them used data from well-known household surveys that are intended to be representative of the US population: the Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP), both run by the US Census Bureau. In a key advance, the researchers using those data were able to link Social Security earnings data to the survey responses and therefore to compare these two reports on earnings. The third dataset used only administrative data, compiling earnings data from the unemployment insurance records in the Longitudinal Employer-Household Dynamics (LEHD) program. Unlike the other datasets, this one covers almost the entire US workforce and is not restricted to those who happened to participate in a survey like the CPS, SIPP, or PSID. Unfortunately, none of the other datasets are available as far back in time as the PSID (1968). The LEHD is the shortest data series; it is available only since 1998.⁵

The initial set of results from the project has appeared in several working papers.⁶ They address two separate sets of questions: First, do the different datasets show different patterns of volatility? Do the non-PSID

datasets show the same trends as the PSID? Do the most recently released data from the PSID — for additional years — continue to show the same findings as these PSID patterns over earlier periods? And second, if there are differences in volatility patterns across the datasets, can those differences be explained? Can we reconcile the differences to arrive at a consensus estimate?

On the first set of questions, the different datasets often show very different *levels* of male earnings volatility.

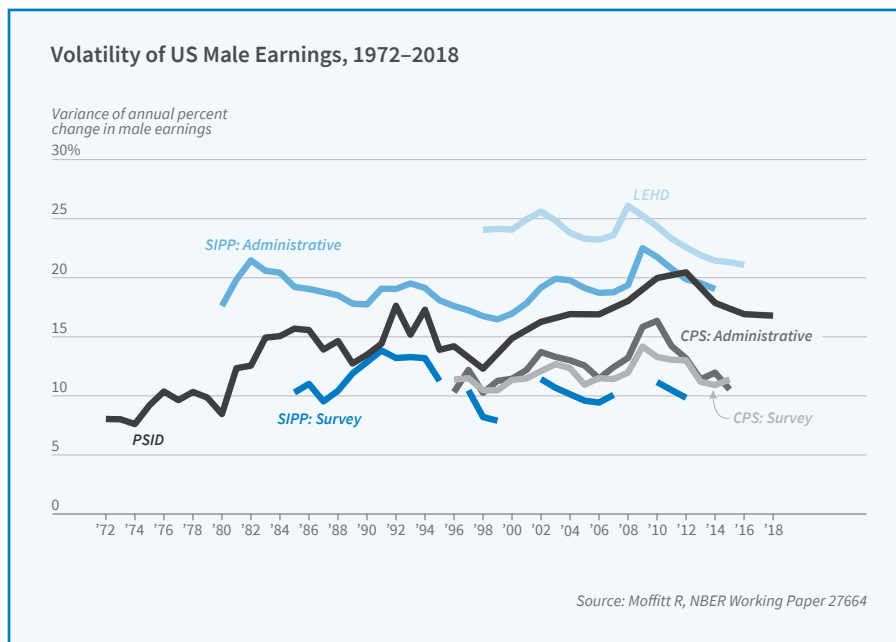


Figure 1

Figure 1 shows the measured volatility in all six data series—the PSID, the survey and administrative data from the CPS and the SIPP, and the LEHD. The vertical axis is the variance of the percentage change in earnings from one period to another so that, for example, a 15 percent value would mean that the standard deviation of percentage changes in earnings across the male working population is about 39 percent (the square root of 15 percent). The figure shows that the LEHD has much higher levels of earnings volatility than any of the other datasets, including the two administrative datasets matched to the CPS and SIPP surveys. Three of the data series—the two CPS series and the SIPP survey—have volatility levels less than half those in the LEHD. The other two data series—the PSID and the SIPP administrative data—lie between these extremes.

The trends in volatility are much more similar across the data series than the levels are, especially when the large increases in the late 2000s are treated as cyclical and are not interpreted as a trend. In the early years of the 1980s, the PSID shows the largest increase, but the two SIPP data series also show increases, although in rather different years. More importantly, all the data series available back to the 1980s show almost no trend from the mid-1980s to the late 1990s and early 2000s, consistent with much macroeconomic research on the Great Moderation.

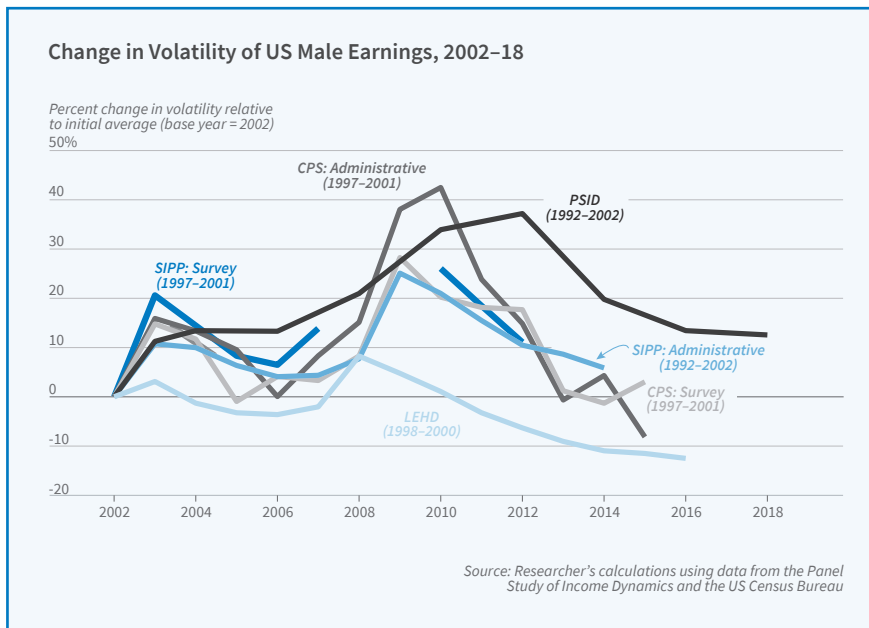


Figure 2

And after the early 2000s, when more datasets are available, no data series except possibly the PSID and the SIPP administrative data show much of a net trend if the last data point—at the end of volatility decline following the Great Recession—is used as the end point.

Nevertheless, visual detection of trends in data series that show fluctuations as large as those in some of the series is often difficult, and that is the case with Figure 1. This is made particularly difficult because

others, although the new post-recession data points for the PSID show volatility to have fallen greatly from its 2012 peak. The remaining data series all indicate essentially zero net growth by the ends of the data samples, and the LEHD shows only a very small decline, occurring only after 2011.

The second set of questions asks whether any of the large differences in volatility levels, or any of the remaining small differences in trends, can be explained, and those differing results reconciled.

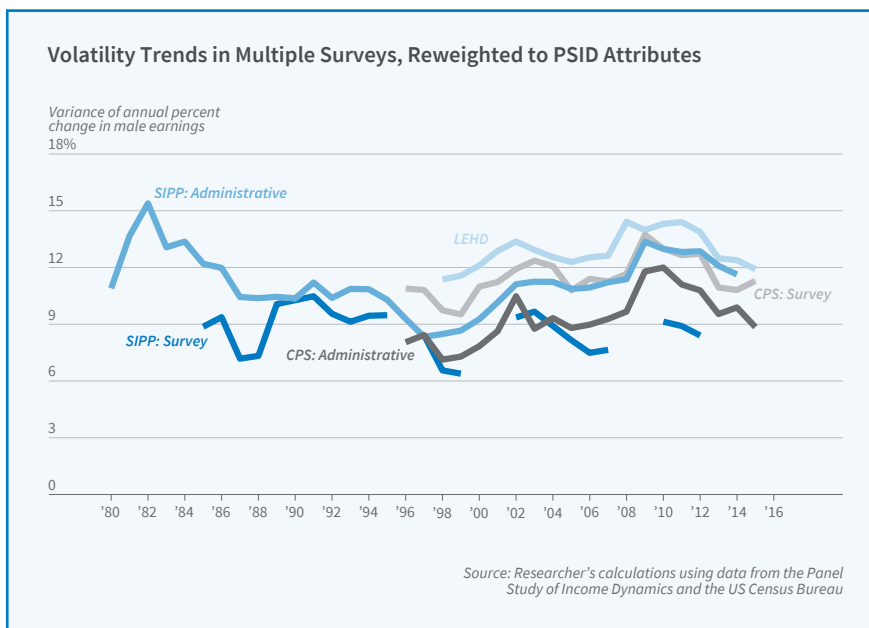


Figure 3

trends in the second half of the time frame appear quite different if, say, 1998 is used as the starting point rather than 1992. Figure 2 attempts to address this issue by using as the base period a full business cycle in the late 1990s and early 2000s for each of the data series, and then calculating volatility growth relative to that base. The PSID still is an outlier, showing volatility growth similar to that of most of the other series through about 2010, but then not falling nearly as much as the

The answer is yes. Our administrative datasets have a much larger left tail of the earnings distribution than our survey datasets—that is, larger fractions of men with low earnings. For example, 25 percent of the LEHD observations have annual earnings less than \$20,000 in 2010 but only 5 percent of PSID observations do. This pattern has been noticed in past work comparing survey to administrative data, with the most common hypothesis being that survey respondents often

fail to report short duration or part-time jobs when reporting last year's earnings.⁷

As part of the project, my colleagues and I conducted a simple exercise to estimate the impact of this difference on volatility: we benchmarked the earnings distributions in all our data series to the PSID distribution, reweighting the data to have the same distribution as that in the PSID. This down-weighted observations with low earnings. As Figure 3 shows, this dramatically changes the levels of volatility. All non-PSID data series' volatility levels are now very close to one another, and the LEHD has levels close to that of the others. This reflects the high volatility levels of low earners. But even more importantly, all the data series except the SIPP survey now show more evidence of an upward trend after the late 1990s. Even the LEHD now shows a positive trend instead of a negative one.

We conclude that earnings volatility for men, while having been flat over the mid-1980s to the mid-1990s after a rise in earlier years, was either flat or even possibly rising after the late 1990s through most of the earnings distribution. But volatility fell for low earners, resulting in either a flat average trend or even a declining one, depending on the dataset.

Moving Forward

Our findings raise many questions for further research. Why, for example, has earnings volatility declined for those with low earnings? Has deindustrialization run its course and low-skill workers settled into relatively stable jobs, possibly with lower average pay but not highly volatile? Has job mobility among low earners—one source of earnings volatility—declined? Have low-skill men with unstable jobs simply dropped out of the labor force altogether and no longer have earnings at all?

Moving beyond the focus of my colleagues' and my work on male earnings volatility, what have been the trends for women? And what have been the trends for family earnings of married men and women combined, given the well-known

interactions between their labor supply decisions?⁸ These and other questions will be pursued in the search for more insight on earnings volatility.

¹ McConnell M, Perez-Quiros G. "Output Fluctuations in the United States: What Has Changed Since the Early 1980s?" *American Economic Review* 90(5), December 2000, pp. 1464–1476.

[Return to Text](#)

² Gottschalk P, Moffitt R. "The Growth of Earnings Instability in the US Labor Market," *Brookings Papers on Economic Activity* 2, 1994, pp. 217–254.

[Return to Text](#)

³ Moffitt R, Zhang S. "Income Volatility and the PSID: Past Research and New Results," NBER Working Paper 24390, March 2018, and *AEA Papers and Proceedings* 108, May 2018, pp. 277–280.

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⁴ See my paper with Zhang for a review through 2017 on which administrative studies have shown a decline. For a more recent study, see Bloom N, Guvenen F, Pistaferri L, Salgado S, Sabelhaus J, Song J. "The Great Micro Moderation," Federal Reserve Bank of Minneapolis Working Paper, 2017.

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⁵ The LEHD began earlier, but only by 1998 did it have a sufficient number of states to make it accurate for the nation as a whole.

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⁶ Moffitt R, Zhang S. "Estimating Trends in Male Earnings Volatility with the Panel Study of Income Dynamics," NBER Working Paper 27674, August 2020; Moffitt R. "Reconciling Trends in US Male Earnings Volatility: Results from a Four Data Set Project," NBER Working Paper 27664, August 2020; McKinney K, Abowd J. "Male Earnings Volatility in LEHD before, during, and after the Great Recession," Cornell University Working Paper, 2020; Carr M, Moffitt R, Wiemers E. "Reconciling Trends in Volatility: Evidence from the SIPP Survey and Administrative Data," NBER Working Paper 27672, August

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[Return to Text](#)

⁷ Kornfeld R, Bloom H. "Measuring Program Impacts on Earnings and Employment: Do Unemployment Insurance Wage Reports from Employers Agree with Surveys of Individuals?" *Journal of Labor Economics* 17(1), January 1999, pp. 168–197; Juhn C, McCue K. "Comparing Measures of Earnings Instability Based on Survey and Administrative Reports," US Census Bureau Center for Economic Studies, Working Paper 10-15, 2010; Celik S, Juhn C, McCue K, Thompson J. "Recent Trends in Earnings Volatility: Evidence from Survey and Administrative Data," *The B.E. Journal of Economic Analysis & Policy* 12(2), 2012; Abraham K, Haltiwanger J, Sandusky K, Spletzer J. "Exploring Differences in Employment between Household and Establishment Data," *Journal of Labor Economics* 31(S1), April 2013, pp. 129–172; "Inequality Statistics from the LEHD," US Census Bureau Center for Economic Studies, Working Paper, 2014; Abowd J, McKinney K, Zhao N. "Earnings Inequality and Mobility Trends in the United States: Nationally Representative Estimates from Longitudinally Linked Employer-Employee Data," *Journal of Labor Economics* 36(S1), January 2018, pp. S183–S300; Carr M, Wiemers E. "The Role of Low Earnings in Differing Trends in Earnings Volatility," *Economics Letters* 199(C), February 2021.

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⁸ Dynan K, Elmendorf D, Sichel D. "The Evolution of Household Income Volatility," *The B.E. Journal of Economic Analysis & Policy* 12(2), 2012; Ziliak J, Hokayem C, Bollinger C. "Trends in Earnings Volatility Using Linked Administrative and Survey Data," US Census Bureau Center for Economic Studies, Working Paper CES 20-24, August 2020. Ziliak found declining mobility for women.

[Return to Text](#)

Safety Net Program Interactions and Impacts on Low-Income Families

Lucie Schmidt, Lara Shore-Sheppard, and Tara Watson

The US safety net is a patchwork of interacting programs providing cash and in-kind transfers to low-income individuals and families. Our research investigates how these programs interact with one another and how the generosity of the full safety net package affects well-being, taking into account these interactions.

The United States has a long history of federalism in its means-tested tax and transfer programs, as in other domains. The safety net includes a number of federally funded or partially state-funded programs with rules surrounding eligibility and generosity that vary at the state level. Among programs offering cash assistance, Temporary Assistance for Needy Families (TANF), which provides cash transfers and other supports to low-income families with children, is one in which states have particularly wide latitude to determine parameters. Supplemental Security Income (SSI) is a federal transfer program for low-income individuals with disabilities, but some states supplement the federal benefit with additional payments. Similarly, the Earned Income Tax Credit (EITC) is a federal refundable tax credit for low-income working households, and more than half of states offer additional EITC support through the state income tax code. The upshot is that similarly situated families may end up receiving different levels of cash transfers depending on the state in which they live.

In-kind safety net programs also

exhibit differences across states. For example, the Supplemental Nutrition Assistance Program (SNAP, formerly known as the food stamp program) has consistent eligibility and benefit formulas across the continental United States, but benefit amounts are affected by state-varying cash transfer program generosity. The Medicaid program (including the Children's Health Insurance Program, or CHIP) has varying income eligibility thresholds for public health insurance across states, partially driven by differ-

ences. In addition, participation in one program may directly affect eligibility for others: recipients of one program may be categorically eligible for another program, or transfers received from one program may count as income in determining eligibility and benefits for another program. Programs may also incentivize or disincentivize labor supply, thereby affecting income and eligibility for other programs. Furthermore, the act of applying for one program may lower the information or transaction costs associated with applying to other programs, which may impact take-up conditional on eligibility.

Figure 1 illustrates the 2016 participation in major safety net programs for a sample of single-mother families in which the mother has a high school degree or a lower level of education. For participants in each program, we show the conditional participation in other programs reported in the Current Population Survey (CPS), as well as the probability of participating in none

of the other programs considered. (We assume 100 percent take-up conditional on imputed eligibility for the refundable tax credits, EITC, and the Additional Child Tax Credit (ACTC), because the CPS does not report take-up for tax-related benefits.) Among less-educated single-mother families with a family member enrolled in Medicaid, 63 percent also receive SNAP, 21 percent receive SSI or TANF transfers, and 61 percent of families are eligible for refundable tax cred-

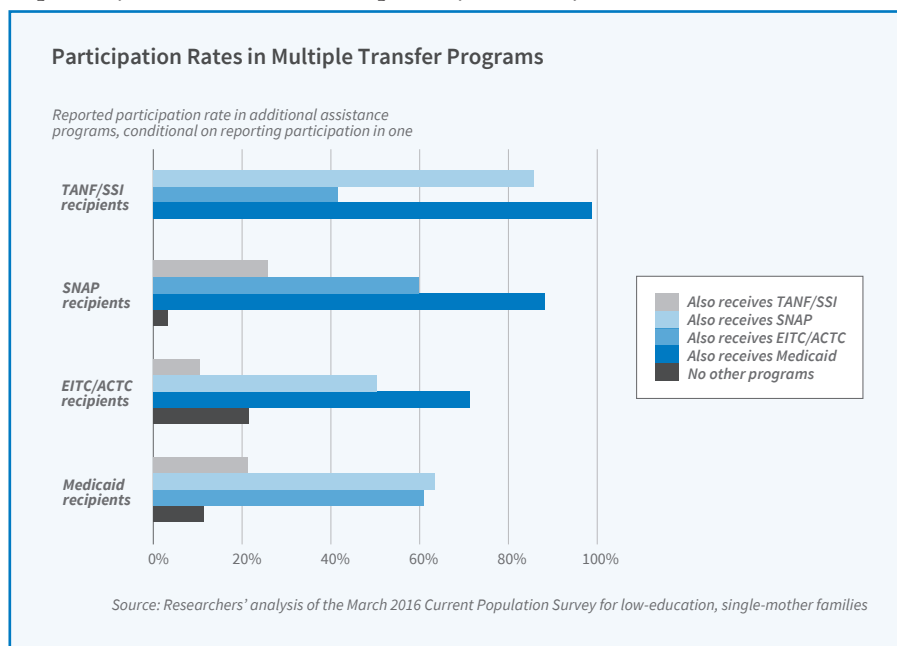


Figure 1

tial state expansion of eligibility under the 2010 Affordable Care Act (ACA).

Safety Net Generosity and the Relationships between Programs

Though each major safety net program has unique eligibility rules, there is considerable overlap in participation across programs, due in part to the fact that safety net programs target partially intersecting low-income populations. In



Lucie Schmidt is professor of economics at Smith College, a research associate affiliated with the NBER's Program on Children, and a coeditor of the *Review of the Economics of the Household*. She is an empirical microeconomist working in the fields of labor and health economics and the economics of the family.

Schmidt has worked extensively on social safety net programs in the United States, with a particular focus on programs for individuals with disabilities. Other research areas include retirement security and the economics of marriage and fertility decisions. She has received grants from the National Institute of

Child Health and Human Development, the University of Kentucky Center for Poverty Research, the Russell Sage Foundation, and the Social Security Administration-funded Retirement and Disability Research Centers at the University of Michigan and at the NBER.

Schmidt's work has been published in the *Journal of Human Resources*, *Journal of Public Economics*, *Journal of Health Economics*, *American Journal of Health Economics*, *Social Security Bulletin*, and *Demography*, among others. She has an AB in government from Smith College and a PhD in Economics from the University of Michigan.

Lara Shore-Sheppard is the Kimberly '96 and Robert '62 Henry Professor of Economics and chair of the Economics Department at Williams College. She is a research associate affiliated with the NBER's Programs on Children and the Economics of Education.

Shore-Sheppard is an applied microeconomist whose work focuses on assessing the impact of publicly provided health insurance and examining the interactions between public insurance, private insurance, cash and food assistance programs, and employment. She is currently researching the relationship between family living arrangements, the social safety net, and the well-being of children and seniors in

multi-generational families.

Shore-Sheppard has published in a number of academic journals, including the *Journal of Health Economics*, *American Journal of Health Economics*, *The Review of Economics and Statistics*, *The Journal of Human Resources*, *Journal of Labor Economics*, and *Journal of Public Economics*. Her research has been supported by grants from the National Institutes of Health, the National Science Foundation, the Department of Agriculture, the Robert Wood Johnson Foundation, and the Russell Sage Foundation, where she will be a visiting scholar in 2022–23. She received her BA from Amherst College and her MA and PhD from Princeton University.



Tara Watson is a research associate in the NBER Health Economics Program and Program on Children. She is an applied microeconomist whose work focuses on the US safety net, health, and immigration.

Watson is professor of economics at Williams College, where she has taught since 2004 and chaired the Program in Public Health and the Faculty Steering Committee. She was Deputy Assistant Secretary for Microeconomic Analysis at the US Department of the Treasury in 2015–16, and was a Robert Wood Johnson Scholar in Health Policy Research at the University of Michigan in 2007–09. In 2022–23, Watson will

be a David M. Rubenstein Fellow at the Brookings Institution. She is a coeditor of *The Journal of Human Resources*.

Watson's research has been supported by the Russell Sage Foundation, the University of Kentucky Center for Poverty Research, the Peter G. Peterson Foundation, and the National Institutes of Health, among others. Her forthcoming book, *The Border Within: The Economics of Immigration in the Age of Fear*, will be published by the University of Chicago Press.

Watson earned her BA from Wesleyan University in 1996 and her PhD from Harvard University in 2003. She enjoys hiking, cooking, and traveling.

its. Only 11 percent of families with a member enrolled in Medicaid do not participate in any of these other programs. Similar patterns arise among participants of other major programs. It is therefore important to understand and account for these relationships across programs when considering the design and impact of the safety net.

To model interactions across programs, we created a benefits calculator that accounts for these interactions for five major safety net programs (TANF, SSI, EITC/ACTC, SNAP, and Medicaid/CHIP). We use this calculator to illustrate state differences in safety net generosity in Figure 2. Specifically, we use the CPS to generate a national sample of single-mother families in which the mother is a US citizen and high school graduate without disabilities who has two or more children, including at least one under the age of 6. We then use our multiprogram calculator to estimate how much the families in this national sample would have been eligible for cash and in-kind benefits in each state in 2016 based on policy variation across states.

Panel A of Figure 2 shows the average annual potential cash benefits, including TANF transfers and state and federal refundable tax credits, for this simulated sample across the states. It reveals pronounced differences in state generosity. The bottom quintile of states in terms of generosity, which tend to be concentrated in the South, provide less than \$5,110 on average, whereas the 10 most generous states offer at least \$7,940 in average potential cash benefits to comparable families. State differences in TANF and EITC policies have a substantial impact on the average annual cash benefits available to low-income families.

In addition to these cash programs, in-kind benefits are an increasingly important component of the safety net. Though SNAP uses the same food assistance benefit formula across all states, other than Alaska and Hawaii, some state-varying cash transfers such as TANF are considered when determining SNAP eligibility and benefit amounts. The implication is that households in states with less generous cash welfare programs will tend to receive more in federal food benefits, as shown in Panel B of Figure 2. The southern states with low levels of cash benefits therefore have higher levels of food benefits. The fed-

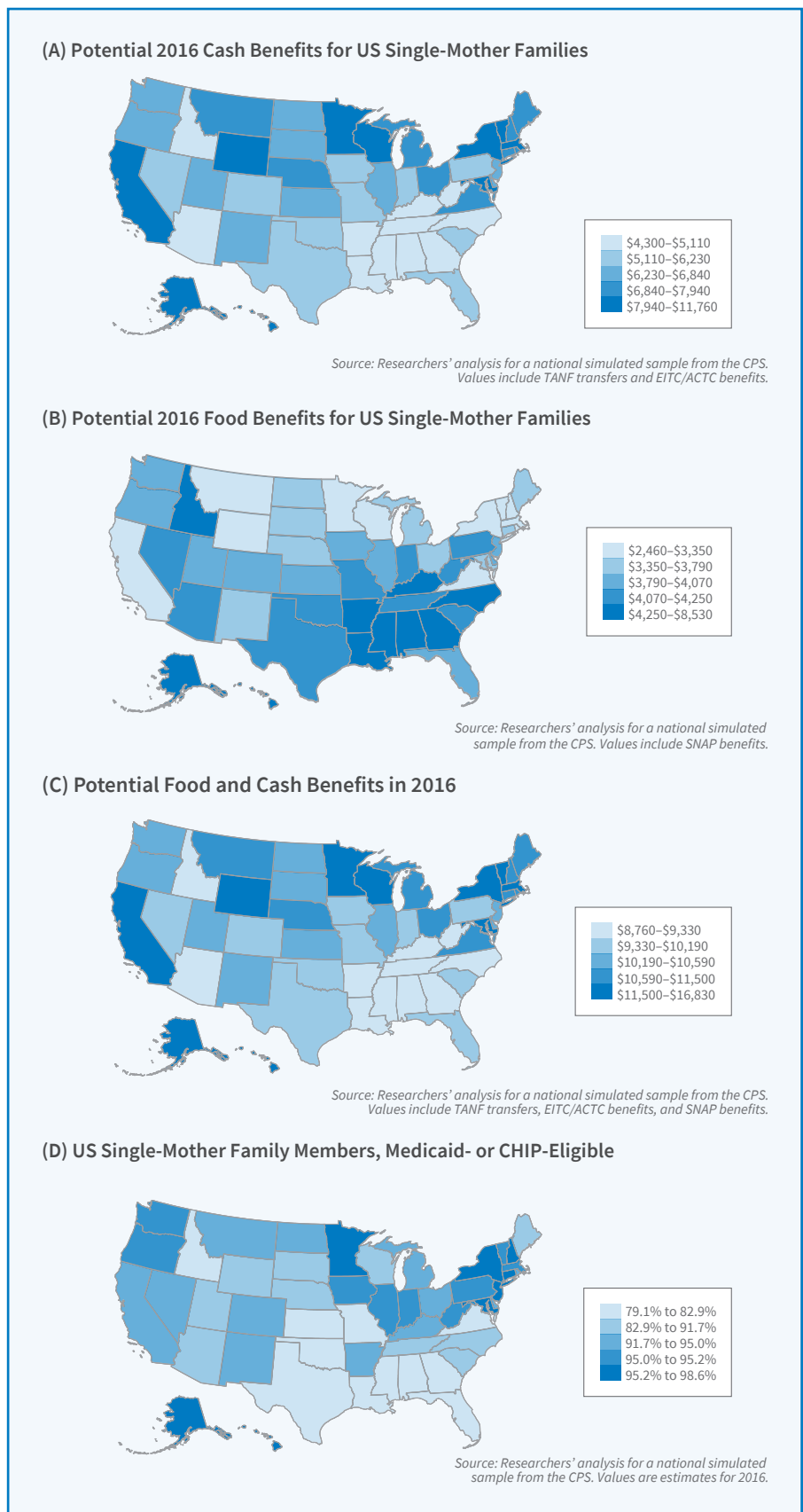


Figure 2

eral food benefits only partially offset inequity in state generosity, however, as shown in Panel C of Figure 2. The \$2,830 gap between the 20th and 80th percentile states in cash benefits is narrowed to \$2,170 when cash and food benefits are combined.

Medicaid is another in-kind program with eligibility thresholds for public health insurance varying across states for children, parents, and other adults. Using the same simulated sample, Panel D of Figure 2 shows the average fraction of family members imputed to be eligible for Medicaid (or CHIP) in 2016. A 2012 Supreme Court decision made ACA Medicaid eligibility expansions to all those with income under 138 percent of the federal poverty line optional, and states that had not taken up the ACA expansion are concentrated in the bottom two quintiles of Medicaid generosity. In states that have generous eligibility rules for parents and children and have also implemented the ACA expansion, most family members in the simulated sample are eligible for public health insurance.

How Does the Safety Net Affect Well-Being?

We use our multiprogram calculator to examine how the safety net affects the well-being of individuals and families. Taking into account interactions in program eligibility in the calculator, we use variation in generosity for a simulated sample. Figure 3 illustrates that policy-induced state safety net generosity varies not only across states but also differentially within states over time for a given demographic cell—in this

case, single-mother families in which the mother is not disabled, has a high school degree, and has at least two children, at least one of whom is under age 6. Further variation arises because policy changes differentially affect families of different family structures and education levels.

In one study, we use the changing generosity of the package of cash and food benefits across states, years, and demographic cells to examine food insecurity in single-parent families.¹ Food

mental health problems and to risky behaviors such as smoking and heavy drinking. By increasing family economic resources, the safety net may improve maternal well-being and mental health, but factors such as internalized stigma or a stressful assistance application process could cause psychological distress associated with program participation. The work incentives inherent in some programs may also have positive or negative mental health impacts. Mental health impacts

may materialize as increased risky behaviors, or there may be direct effects of increased resources on these behaviors. Examining reported psychological distress, smoking, and drinking behavior from government survey data, we find that higher cash and food benefits are associated with reductions in severe psychological distress of single mothers. Further analyses indicate that tax credits play a substantial role in reducing psychological

distress, especially in the first half of the year, when tax credits are typically received. Safety net benefits appear to have mixed effects on risky behaviors.

We are continuing our work in this area, using the calculator to explore impacts of the broad safety net on maternal labor supply, time use, and living arrangements, as well as examining the impact on the distribution of after-tax and transfer income.

How Changes in One Program Affect Participation in Others

A second strand of our recent work looks directly at the effects that a change in eligibility for one safety-net program can have on participation

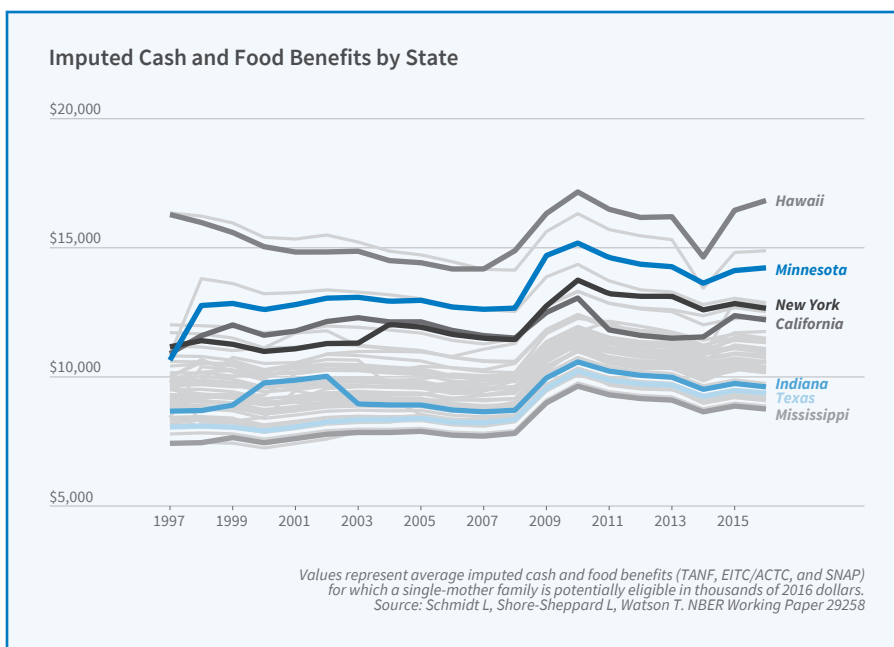


Figure 3

insecurity is measured by a standard battery of questions in the CPS and indicates inconsistent access to a sufficient quantity or quality of food for a healthy, active lifestyle. We estimate how the mean simulated benefits available in a state and year, and for a demographic cell, affect measured food insecurity. Among nonimmigrant, low-income single-parent families, \$1,000 in potential cash and food benefits reduces the incidence of food insecurity by 1.1 percentage points from a baseline level of food insecurity of 33 percent.

In a more recent study, we use a similar approach to examine maternal mental health and risky health behaviors.² The economic uncertainty that single parents face can lead both to

in other programs. We rely on quasi-experimental changes in Medicaid eligibility arising from differential state decisions regarding expansion under the ACA. Prior to the ACA, most working-age adults without dependent children were categorically ineligible for Medicaid, and many parents did not meet their state's income eligibility criteria. The substantial change in eligibility for public health insurance could impact participation in other programs.

One investigation focuses on disability programs, SSI and SSDI (Social Security Disability Insurance, a disability insurance program that is not means-tested and requires sufficient work history).³ To qualify for both programs, individuals must demonstrate that they have a physical or mental disability that limits their ability to conduct substantial gainful activity. However, individuals with disabilities may be reluctant to leave a job and apply for benefits because they would lose their employer-sponsored insurance. By offering an alternative source of health insurance coverage during the application period, expansions in Medicaid could increase applications to disability programs. On the other hand, if individuals were using SSI and SSDI to gain access to public health insurance for which they confer eligibility, expanded access to Medicaid might discourage participation.

We use county-level administrative data to estimate the relationship between Medicaid eligibility and applications to disability programs. In addition to a two-way fixed effects design comparing changing income eligibility

thresholds, we also implement a border county pair design, examining differential changes in Medicaid eligibility in adjacent counties on either side of a state border. This border county pair design limits spurious effects of local labor market conditions that may be correlated with Medicaid expansion decisions.

For example, Figure 4 illustrates the effect of being in an expansion state on uninsurance, based on the county-level Small Area Health Insurance

cent county across state lines. Our preferred specification, graphed in blue, represents effects after controlling for border-pair-by-year effects. Compared to adjacent counties in nonexpansion states, there are pronounced reductions in the number of uninsured around 2014 in counties of expansion states.

How did ACA expansions affect other programs? The standard fixed effects approach hints at a positive relationship between Medicaid expansion and SSI disability program applications. However, using the preferred border county design, the results suggest no net effects of Medicaid expansion on applications to either program. SSI applications did not systematically differ between expansion counties and adjacent, non-expansion counties. In the full study, a similar null effect is reported for SSDI.

In a different project, we examine impacts of Medicaid expansions on SNAP, EITC, and TANF participation, again focusing on changes in eligibility at state borders.⁴ Given income eligibility limits, theory predicts that a change in labor supply arising from the expansion would likely increase SNAP and EITC participation. Medicaid eligibility could also affect take-up of the other programs conditional on eligibility by reducing information or transaction costs. In addition to using administrative counts for both programs, we explore SNAP participation using American Community Survey (ACS) data. Instead of a county-border pair design, we rely on borders of consistently identified Public Use Microdata Areas. Using the preferred specification shown in Figure 5, the results

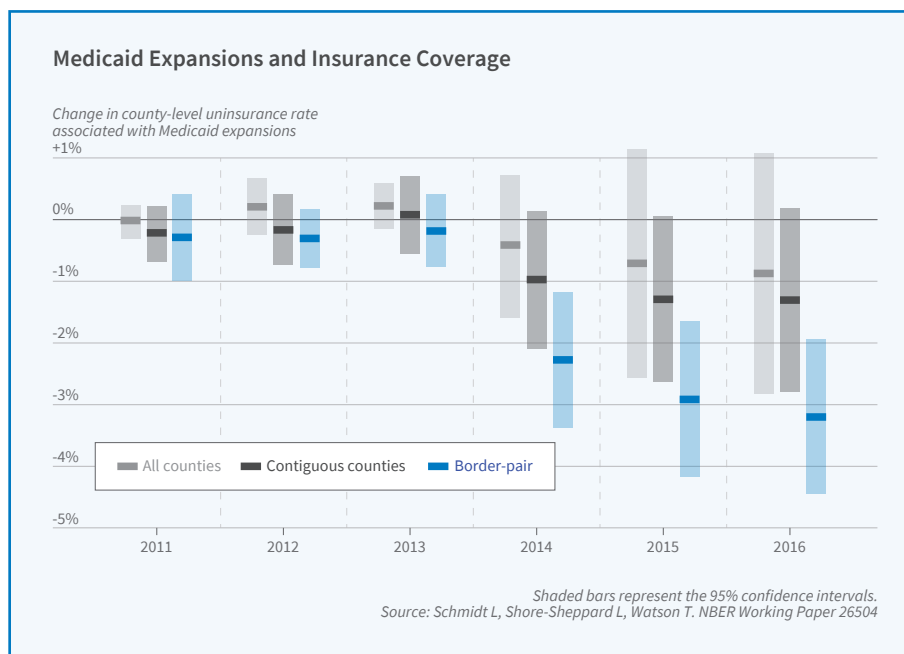


Figure 4

Estimates produced by the US Census Bureau. The figure shows coefficients from a regression that interacts a binary “ever-expanded” variable with year dummies to show the evolution of expansion counties over time, relative to 2010. The typical state expanded in 2014; the full analysis reported in the study also takes into account differential expansion timing and differing income eligibility limits. For the simplified analysis shown in Figure 4, the estimates shown in light grey are based on county fixed-effect regressions that include all counties in the continental United States, and the estimates in dark grey are based on regressions restricted to border counties that have an adja-

suggest substantial positive impacts on SNAP participation. We also find positive impacts on TANF and modest but imprecise impacts on EITC. We see little to no labor supply response; the results are driven primarily by Medicaid eligibility increasing SNAP participation among those who are income eligible.

Conclusion

There are three broad lessons we take away from this research. First, interactions across programs can be important and should not be overlooked. It is tempting for researchers to analyze one program at a time, but this misses the full picture in a system of partially overlapping safety net programs. For example, more generous cash benefits mechanically reduce food assistance, so related programs should be considered simultaneously when evaluating the impact of a policy change to one program. Second, it is important to take into account program interactions and integration when considering a change in policy. For example, states considering expanding public health insurance

eligibility might take into account spillovers onto rates of participation in federal food assistance. Such broad considerations can pose a challenge when programs have different historical origins, serve only partially overlapping client bases, and are institutionally housed in different agencies. Finally, taken as a whole, our research contributes to a growing body of evidence demonstrating that the safety net has measurable impacts on the well-being of low-income families.

¹ “The Effect of Safety Net Programs on Food Insecurity,” Schmidt L,

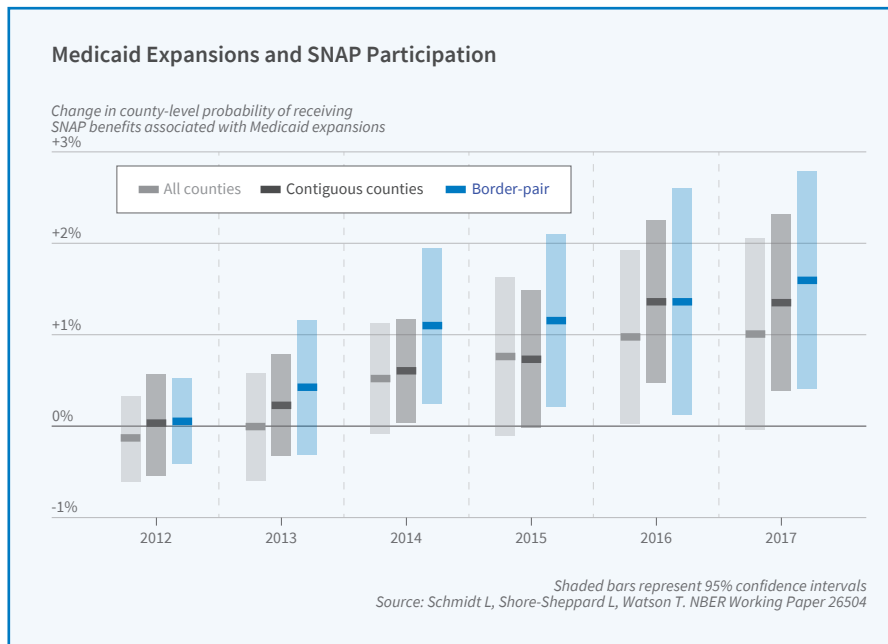


Figure 5

Shore-Sheppard L, Watson T. NBER Working Paper 19558, October 2013, and *Journal of Human Resources* 51(3), Summer 2016, pp. 589–614.

[Return to Text](#)

² “The Effect of Safety Net Generosity on Maternal Mental Health and Risky Health Behaviors,” Schmidt L, Shore-Sheppard L, Watson T. NBER Working Paper 29258, September 2021.

[Return to Text](#)

³ “The Impact of the ACA Medicaid Expansion on Disability Program Applications,” Schmidt L, Shore-Sheppard L, Watson T. NBER Working Paper 26192, August 2019, and *American Journal of Health Economics* 6(4), Fall 2020, pp. 444–476.

[Return to Text](#)

⁴ “The Impact of Expanding Public Health Insurance on Safety Net Program Participation: Evidence from the ACA Medicaid Expansion,” Schmidt L, Shore-Sheppard L, Watson T. NBER Working Paper 26504, revised December 2021.

[Return to Text](#)



Klaus Desmet is the Altshuler Professor of Cities, Regions and Globalization at Southern Methodist University, a research associate in the NBER's International Trade and Investment and Political Economy programs, and a research fellow at the Centre for Economic and Policy Research. He holds an MSc in business and engineering from the Université Catholique de Louvain and a PhD in economics from Stanford University.

Before joining the SMU faculty, Desmet was a professor of economics at Universidad Carlos III de Madrid. His research focuses on regional economics, economic growth, climate change, political economy, and international trade. His work has appeared in journals such as *American Economic Review*, *Journal of Political Economy*, *Journal of Economic Theory* and *Journal of Development Economics*. In 2010 he was the corecipient of the August Lösch Prize for outstanding academic research in the field of regional science and in 2019 was awarded the *Journal of Political Economy's* Robert E. Lucas Jr. Prize, with Esteban Rossi-Hansberg and Dávid Krisztián Nagy, for the paper "The Geography of Development."

The Economic Impact of Climate Change over Time and Space

Klaus Desmet and Esteban Rossi-Hansberg

Climate change is an unintended consequence of the industrialization of the world economy. The evidence that human activity has released large amounts of CO₂ into the atmosphere, leading to rising global temperatures, is by now uncontroversial. However, so far, the scientific and political recognition of this reality has not translated into a commitment to emissions reductions sufficient to stop further global warming. As a result, economists are tasked with evaluating the economic costs of climate change and designing policies to address them. These evaluations are essential: the world cannot embark on ambitious attempts to reduce carbon emissions if we are not reasonably confident that the benefits of these actions will outweigh their costs.

Evaluating the economic impact of climate change is difficult. First, there is the natural science. Models that map carbon emissions to changes in global and local temperatures are readily available, but the mapping of many other physical impacts, such as sea level rise, extreme weather events, or nonlinearities in the climate system, is more complex. While our understanding of these effects is rapidly improving, as shown by the recent Intergovernmental Panel on Climate Change report, there are still no good off-the-shelf models that we can easily plug into our economic analysis.

Second, climate change evolves relatively slowly, unfolding over decades and centuries rather than over months and years. While anthropogenic temperature change is already affecting our present-day reality, many of its more pernicious effects will only be felt in the distant future. Evaluating the implications of warmer temperatures in the far-off future requires dynamic models, as recognized since the pioneering work of William Nordhaus. These protracted effects limit the usefulness of reduced-form empirical studies: extrapolating so far out of sample is undesirable and does not recognize the capacity of humans to react, respond, and adapt to changing cir-

cumstances. The Lucas critique—that historical data on the results of economic policy cannot be used to accurately predict the consequences of future policy because people's behavioral responses also change over time—bites hard here.

Third, CO₂ emissions are a global externality with local economic impact. Because CO₂ mixes rapidly in the atmosphere, emissions from anywhere on the planet lead to changing temperatures across the globe. As a result, any attempt to evaluate the economic impact of climate change needs to be global in nature. At the same time, an aggregate dynamic model of the world economy is not sufficient if it ignores spatial heterogeneity. How can we discuss the impact of coastal flooding without recognizing the difference between Miami and Dallas, or without considering that people can move inland to escape inundation? And how can we evaluate the cost of a 1°C increase in global temperatures without recognizing that this will result in a more than 2°C increase in the most northern latitudes but only a 0.5°C increase in some equatorial regions? Perhaps more importantly, how can we do a comprehensive evaluation if we ignore the fact that higher temperatures are bound to have very different economic effects in the world's coldest and warmest areas? Recognizing this spatial heterogeneity is essential for an accurate assessment of not just the aggregate impact of climate change, but also the spatial inequality that it might generate.

The Need for Spatial-Dynamic Models

Motivated by these observations, we came to realize the need for economic climate assessment models that take both temporal and spatial dimensions explicitly into account. As temperatures and sea levels change, individuals and firms will respond, and an important part of that adaptation

will materialize between, rather than within, locations. Incorporating these behavioral responses requires models with a realistic geography of the world economy that include trade and migration linkages across space. Furthermore, such models also need to recognize that the geography of the world's productive capacity is not immutable. Where economic activity is concentrated varies significantly over time. The rise of China as a manufacturing powerhouse is but one example of these geographic shifts. As climate changes, areas that benefit from rising temperatures will attract investment and grow. To account for this, climate assessment models should allow growth to endogenously differ across regions.

Over the last decade we have undertaken a research agenda to develop quantitative dynamic spatial models with the goal of evaluating the economic impact of climate change. In doing so, we continue a long tradition of using assessment models that integrate the basic insights of climate science into economic modeling. The difference is that we bring the spatial-dynamic aspect to the forefront. There are various precedents, but we first introduced a model with some of these characteristics in 2014.¹ It features growth and investment in a one-dimensional framework with a continuum of locations, two sectors, costly trade, and free migration.

Temperature Change across Latitudes

In 2015, we used this framework to study the effect of global warming on sectoral specialization, trade, and mobility.² As a first pass, a one-dimensional framework that focuses on differences across latitudes and ignores differences across longitudes is reasonable: a mere 5 percent of the world's variance in temperature occurs within latitudes.

This research helped us realize the importance of the changing spatial distribution of economic activity in determining the economic cost of global warming. The logic is simple but, we believe, compelling. If moving across locations is cheap, particularly over decades or centuries, and if global warming hurts some places but not others, then changing the spatial distribution of economic activity can be a powerful way to mitigate the losses from climate

change. This adaptation mechanism is particularly strong if land is abundant in regions that might benefit from rising temperatures, such as Alaska, northern Canada, and Siberia.

The inevitable conclusion is that the losses from climate change must, to a large extent, be linked to the cost of moving economic activity across locations. These costs are related to moving people and firms. They also depend on trade barriers and on frictions associated with changing local specialization patterns. Additional costs involve leaving behind capital and past investments in local productivity. Losing the agglomeration economies linked to existing clusters of economic activity compounds these costs, even though new population centers sprout up elsewhere.

Modeling the World's Geography

To more precisely quantify these costs and the spatial frictions faced by agents adapting to climate change, we needed a model with realistic geography. Although a one-dimensional model may be enough to analyze the main effects of rising temperatures across latitudes, it does not suffice to convincingly assess the economic effects of climate change for specific regions in the world and it does not allow use of quantitatively realistic spatial frictions.

In 2018, we developed and quantified a dynamic spatial model with two dimensions, latitude and longitude. Importantly, it features firm investments in local technology that lead to differential local growth in the very protracted transition to a balanced growth path. We used this framework to understand the role of migration and trade frictions in shaping the evolution of the geographic distribution of activity in the world economy.³ Our findings indicate that completely unrestricted migration would increase world welfare by 306 percent. Lending credibility to the framework, a backcasting exercise performed well in predicting population changes across regions over time. More specifically, using a quantification based on data from the year 2000 at a 1° by 1° spatial resolution for the entire globe, we ran the model backward for 50 years and found a correlation between model-implied population changes and actual population changes of 0.74. The fundamental forces in the model can account for many of the changes in the distribution of the world population over half a century



Esteban Rossi-Hansberg is the Glen A. Lloyd Distinguished Service Professor in the University of Chicago's Kenneth C. Griffin Department of Economics. He previously was the Theodore A. Wells '29 Professor of Economics at Princeton University. Prior to Princeton, he was an assistant professor at Stanford University. He earned a PhD from the University of Chicago in 2002.

An NBER research associate, Rossi-Hansberg is affiliated with the programs in International Trade and Investment and Economic Fluctuations and Growth. His research focuses on international trade, regional and urban economics, growth, and organizational economics. Lately, he also has focused on developing frameworks to assess the cost of climate change. He has published extensively in all the major journals in economics. In 2007, he was awarded an Alfred Sloan Research Fellowship. In 2010 he received the August Lösch Prize and the Geoffrey Hewings Award, both for outstanding contributions to regional science. He has been an elected fellow of the Econometric Society since 2017 and won the *Journal of Political Economy's* Robert E. Lucas Jr. Prize in 2019 for the paper "The Geography of Development," with Klaus Desmet and Dávid Krisztián Nagy.

without introducing any of the specific local and aggregate shocks that the world economy experienced over this period. Because of these encouraging results, this framework has served as the core economic structure for our subsequent work on climate change.

The Economic Cost of Sea Level Rise

One of the main consequences of a warming world is the global rise in sea levels, expected to surpass half a meter on average by the year 2100. To assess the economic impact of the inundation of coastal areas, we joined forces with climate scientists who generated probabilistic sea level rise projections for various locations around the globe.⁴ Although all oceans are connected, the sea level does not rise uniformly across space, due to differences in factors such as ocean dynamics and tectonics. For example, because of high sub-

our economic model to analyze the economic effect of sea level rise. The result is a probabilistic assessment of the welfare cost of coastal flooding.

Naturally, the ability to move is an effective way to avoid the most harmful impact of rising oceans. Moving is expensive though, and past investments in coastal areas are lost. Still, these costs are substantially lower than when mobility is not considered. Figure 1 depicts the global welfare losses between the years 2000 and 2200 for the median sea level rise projection. Under our baseline estimate (in black), average welfare losses peak around 2150 at roughly 0.5 percent. The figure represents three more scenarios: the static equilibrium (in dark grey) does not allow for changes in firm investments in response to flooding, the fixed population equilibrium (in light grey) does not allow flooding-induced population mobility, and the naïve equilibrium (in blue) keeps the spatial distribu-

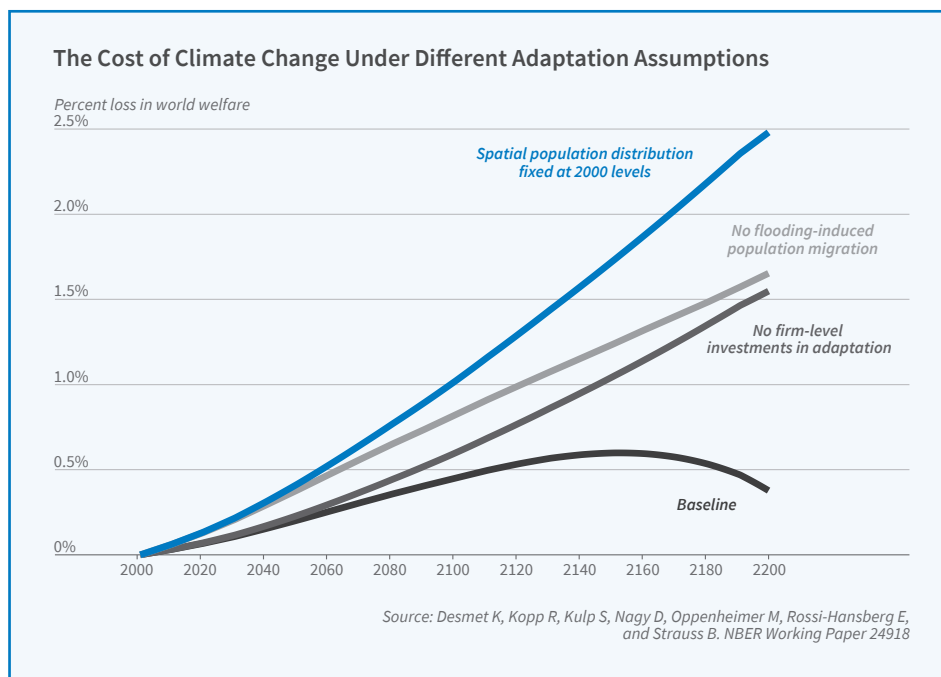


Figure 1

sidence, Galveston, Texas is predicted to experience twice the average sea level rise, whereas, because of solid earth responses to regional glacial mass loss, Juneau, Alaska is predicted to experience a drop in its sea level. We combine data on the range of possible paths for the extent of inundation of coastal regions over the next 200 years with

tion of population as observed in 2000. As expected, when we allow for more forms of adaptation, the negative effect of sea level rise on welfare declines. Going from the naïve scenario with no adaptation at all to our baseline reduces the welfare costs fivefold, from around 2.5 percent to less than 0.5 percent. Of course, sea level rise con-

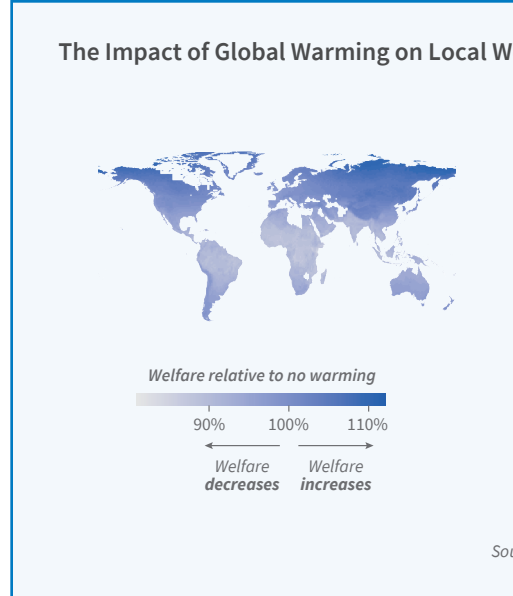


Figure 2

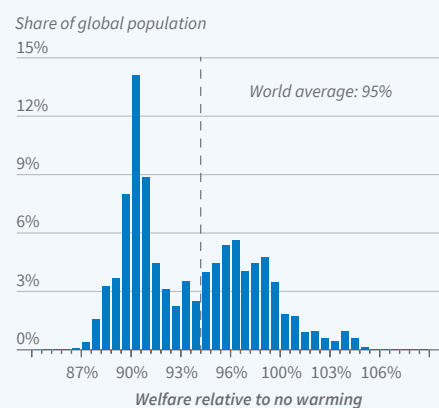
stitutes only one of the dimensions along which climate change affects the economic environment. It also happens to be a dimension where adapting by moving is particularly useful.

The Geography of Global Warming

In recent work, we have turned our attention from sea level rise to global warming, using a more comprehensive and sophisticated assessment model. We allow changes in local temperatures to influence three local characteristics.⁵ First, changes in temperature affect local productivity, with the impact depending on the location's initial temperature. Second, changes in temperature have an effect on the attractiveness of a location as a place to live — what is commonly referred to as a location's amenities. Third, temperature can influence the difference between birth and death rates. Where someone is born matters because migration is costly.

In addition, we incorporate the decision of how much energy to use in production, the choice of the intensity of fossil fuels in generating energy, and the resulting CO₂ emissions of these local choices. Together with a standard carbon cycle model, this yields a framework in which the behavior of the economy affects climate scenarios and vice versa. Incorporating this two-way feed-

Welfare



Source: Cruz J and Rossi-Hansberg E. NBER Working Paper 28466

Figure 2

back between local economies and climate is essential if a model is going to be useful in evaluating climate policy.

The spatial heterogeneity of the impact of global warming is stark. Figure 2 depicts the cost of global warming across the world's geography and is expressed as welfare under global warming relative to welfare in a counterfactual scenario where temperatures do not rise. Grey and light blue areas in the map lose, while dark blue areas gain. On average, the world experiences welfare losses of 5 percent, but in the world's poorest regions losses tend to be substantially larger, as much as 15 percent. The graph in the right panel of Figure 2 presents the population-weighted distribution of these gains and losses. The distribution is bimodal, with many areas of Central Africa, Latin America, and Southeast Asia losing about 10 percent, while many advanced economies lose only marginally and some of the northernmost regions gain. The big story is the spatial heterogeneity

of the effects of climate change, and the corresponding augmenting inequality, with the world's poorest regions being hardest hit.

A core part of the quantification of these welfare losses is the estimation of the damage functions that map changes in temperature to changes in productivity and amenities. Estimating damage functions requires using model-implied fundamental productivities and amenities, rather than final outcomes that already include the many adaptation margins that we are modeling. Using model-implied fundamentals for several periods, we can incorporate local fixed effects and regional trends when estimating the damage functions.

Our damage function estimates suggest that an increase of 1°C in local temperatures implies a decline in amenities of about 2.5 percent in the world's hottest areas, and a commensurate increase in the world's coldest areas. The effects of temperature on productivity are larger and asymmetric: a 1°C increase in local temperatures leads to a 15 percent decline in productivity in the warmest regions and a 10 percent increase in the coldest regions. The estimates of these semi-elasticities are statistically significant in the world's warmest and coldest areas, but the damage functions are estimated with sizable error. This implies uncertainty in the evaluation of global warming. Future research should focus on reducing this error by get-

ting a longer panel of data and by conditioning on not just the mean local temperature, but also on the variance and on the frequency of extreme temperatures.

Trade and Migration as Adaptation Mechanisms

In addition to migration, trade also has the potential to act as a powerful adaptation mechanism. There are, of course, situations where the scope for trade to mitigate the impact of climate change is limited. For example, if global warming affects the productivity of all local firms similarly and if changes in temperature are spatially correlated, trade may not be an effective adaptation mechanism. However, the effect of temperature on productivity likely varies by sector, so trade can help hard-hit locations switch to sectors that are less affected by climate change.

In recent research, we incorporate an agricultural and a nonagricultural sector and evaluate how changes in local specialization may operate as an adaptation mechanism.⁶ Our analysis shows that the role of trade is complex. On the one hand, freer trade increases the scope of local specialization, leading to smaller losses from global warming. On the other hand, freer trade weakens the incentives for people to migrate away from today's poorest regions, which are more affected by climate change. On balance, we find that freer trade increases losses from global warming in the near future but reduces losses in the far-off future.

As adaptation mechanisms, trade and migration are substitutes. Figure 3 depicts the climate-induced change in population in 2200 when trade costs are high compared to when trade costs are low. Areas marked in dark blue gain

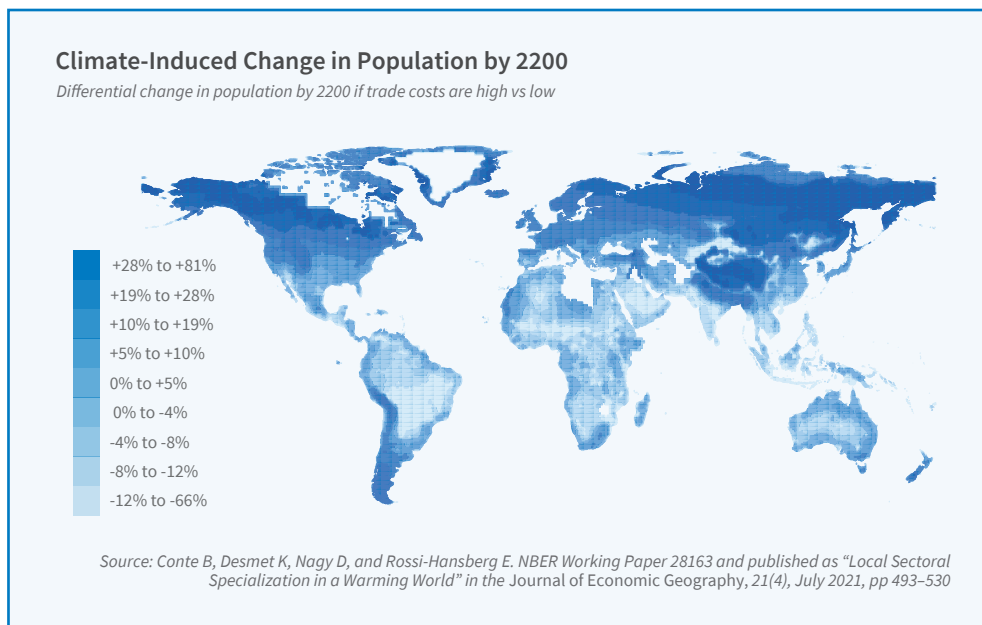


Figure 3

more population due to rising temperatures when trade costs are high, and areas marked in light blue and grey lose more population. The map shows that more people move away from highly affected areas in equatorial regions when trade costs are higher. That is, when trade has less scope to act as an adaptation mechanism, migration plays a bigger role.

What's Next?

We are continuing to improve our climate assessment model, estimating richer damage functions that incorporate episodic effects and their variance, incorporating anticipatory effects on investments, and adding a richer sectoral composition with input-output linkages. Our agenda includes a thorough evaluation of various environmen-

tal policies, including their spatial characteristics and implications.

¹ “[Spatial Development](#),” Desmet K, Rossi-Hansberg E. NBER Working Paper 15349, revised December 2011, and *American Economic Review* 104(4), April 2014, pp. 1211–1243.

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² “[On the Spatial Economic Impact of Global Warming](#),” Desmet K, Rossi-Hansberg E. NBER Working Paper 18546, November 2012, and *Journal of Urban Economics* 88, July 2015, pp. 16–37.

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³ “[The Geography of Development: Evaluating Migration Restrictions and Coastal Flooding](#),” Desmet K, Nagy D, Rossi-Hansberg E. NBER Working Paper 21087, April 2015, and *Journal of Political*

Economy, 126(3), June 2018, pp. 903–983.

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⁴ “[Evaluating the Economic Cost of Coastal Flooding](#),” Desmet K, Kopp R, Kulp S, Nagy D, Oppenheimer M, Rossi-Hansberg E, Strauss B. NBER Working Paper 24918, August 2018, and *American Economic Journal: Macroeconomics* 13(2), April 2021, pp. 444–486.

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⁵ “[The Economic Geography of Global Warming](#),” Cruz J, Rossi-Hansberg E. NBER Working Paper 28466, February 2021.

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⁶ “[Local Sectoral Specialization in a Warming World](#),” Conte B, Desmet K, Nagy D, Rossi-Hansberg E. NBER Working Paper 28163, December 2020, and *Journal of Economic Geography* 21(4), July 2021, pp. 493–530.

[Return to Text](#)

Asset Demand Systems in Macro-Finance

Ralph S. J. Koijen and Motohiro Yogo

Every asset pricing model starts with assumptions about investors' preferences, beliefs, and constraints, and firms' technology or cash flows. Market equilibrium requires that investors' asset demands be equal to the supply of various assets. Thus, asset demand systems play a critical role in determining asset prices.

In recent years, the availability of portfolio-holdings data and progress on longstanding identification challenges have revealed an important fact: asset demand for individual stocks, the aggregate stock market, government and corporate bonds, and exposure to common risk factors are much less elastic than standard asset pricing mod-

els predict. The large price reactions around events such as index additions and quantitative easing can only be explained by low-demand elasticities.

Many questions in financial economics and in the policy sphere require a well-specified asset demand system to understand how a shift in demand for specific assets or how a group of investors will affect asset prices. Examples include: How much of the secular decline in real interest rates is explained by the safe asset demand of foreign and wealthy investors? What is the convenience yield on US long-term bonds and equities? What is the impact of socially responsible investing or tighter capital regulation on the cross-section

of corporate bonds and equities?

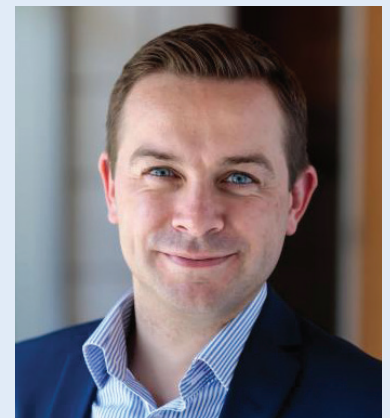
Here we summarize our research that uses a demand system approach to better understand the US stock market, the euro-area government bond market, and international bond and equity markets.

Asset Demand Is Surprisingly Inelastic

If asset supply is fixed in the short run, the average demand elasticity for a group of investors can be estimated through an exogenous demand shock to another group of investors. A classic example is an addition or deletion on the S&P 500 index.¹ Passive

Ralph S. J. Koijen is the AQR Capital Management Distinguished Service Professor of Finance and Fama Faculty Fellow at the University of Chicago's Booth School of Business. He is an NBER research associate and a research fellow of the Centre for Economic Policy Research. He is a coeditor of the *Review of Financial Studies*, codirector of the NBER Asset Pricing Program, and a director of the American Finance Association.

Koijen's research focuses on macro-finance, asset pricing, insurance, and econometrics. He was awarded the 2019 Fischer Black Prize by the American Finance Association for original research relevant to finance practice and the 2021 Germán Bernácer Prize for outstanding contributions in the fields of macroeconomics and finance. He received his undergraduate degree in econometrics and his PhD in finance from Tilburg University.



Motohiro Yogo is a professor of economics at Princeton University. He is an NBER research associate, a codirector of the NBER Insurance Working Group, and a research consultant at the Federal Reserve Bank of Minneapolis. Prior to joining the Princeton faculty in 2015, he held research and teaching positions at the Federal Reserve Bank of Minneapolis and the Wharton School of the University of Pennsylvania. He earned a PhD in economics from Harvard University in 2004 and an AB in economics from Princeton in 2000.

Yogo's fields of expertise are financial economics, insurance, and econometrics. He

teaches undergraduate financial investments and graduate asset pricing at Princeton, and is coauthor of the graduate-level book *Financial Economics of Insurance*, forthcoming from Princeton University Press. His research has received financial support from the National Science Foundation, the National Institute on Aging, and the Social Security Administration.

Yogo has received several awards for his work, including Japan's Government Pension Investment Fund Finance Award, the Swiss Finance Institute Outstanding Paper Award, and the Zellner Thesis Award in Business and Economic Statistics.

mutual funds and, to a lesser degree, active investors benchmarked to an index experience a demand shock when a stock is added to the index. This demand shock is a shift in the residual supply curve that serves as an instrument to estimate the average demand elasticity for the complementary group of investors that accommodate the demand shock.

Recent research has used novel identification strategies and extended the analysis of demand shocks beyond a small set of stocks that are affected by an index addition or deletion. Yen-Cheng Chang, Harrison Hong, and Inessa Liskovich use a regression discontinuity approach at the cutoff between Russell 1000 and 2000 indices.² Anna Pavlova and Taisiya Sikorskaya systematically extend this approach to all major stock indices.³ Simon Schmickler exploits variation from institutional investors' predictable rebalancing across stocks due to dividend payouts.⁴

We use variation in investment mandates across institutional investors to estimate a demand system for the entire cross-section of US stocks.⁵ The median demand elasticity across stocks in a given period averages to 0.4, but there is significant heterogeneity across stocks with elasticities up to 2. Our estimates, which agree with demand elasticities estimated by others, are three orders of magnitude smaller than those implied by calibrations of standard asset pricing models. For example, a calibration of the capital asset pricing model (CAPM) implies a demand elasticity for individual stocks that exceeds 5,000.⁶ Investors should easily arbitrage any deviation from the

CAPM because with limited idiosyncratic risk at the individual stock level, there is a high elasticity of substitution across stocks.

In addition to the fact that demand elasticities are low, we find that they vary across stocks and over time. Figure 1 reports the price impact in the cross-section of US stocks, which is inversely related to the demand elasticity. A price impact of 3 means that the stock price increases by 3 percent for a 1 percent demand shock to all investors. The

The Importance of a Well-Specified Asset Demand System

The foregoing evidence suggests two essential features of a well-specified asset demand system. First, asset demand curves must actually match the observed portfolio holdings of households, institutional investors, or countries. Second, the demand elasticities with respect to prices, asset characteristics, and investor attributes and constraints have to match the empirical estimates.

In this section, we give five examples of quantitative questions that require a well-specified asset demand system for credible answers. A common theme is that we would like to know how a shift in demand for specific assets or for a group of investors affects asset prices, which in turn affect the real resource allocation decisions of firms and households.

First, an active literature studies the secular decline in nominal and real interest rates, its possible connection to declining firm-level

investment, and its implications for the fiscal capacity of countries. Possible causes include foreign demand for safe assets (the global saving glut), the asset demand of wealthy households (the saving glut of the rich), and shifts in asset demand due to changing demographics (the rising share of the population at older ages). A well-specified asset demand system is necessary to quantify how such shifts in asset demand affect asset prices.

Second, an international finance literature studies the special role of the US dollar as a reserve currency and the convenience yield that US assets earn as a consequence.¹³ A well-specified asset demand system is necessary to estimate how a shift in foreign asset demand would affect asset prices if US assets

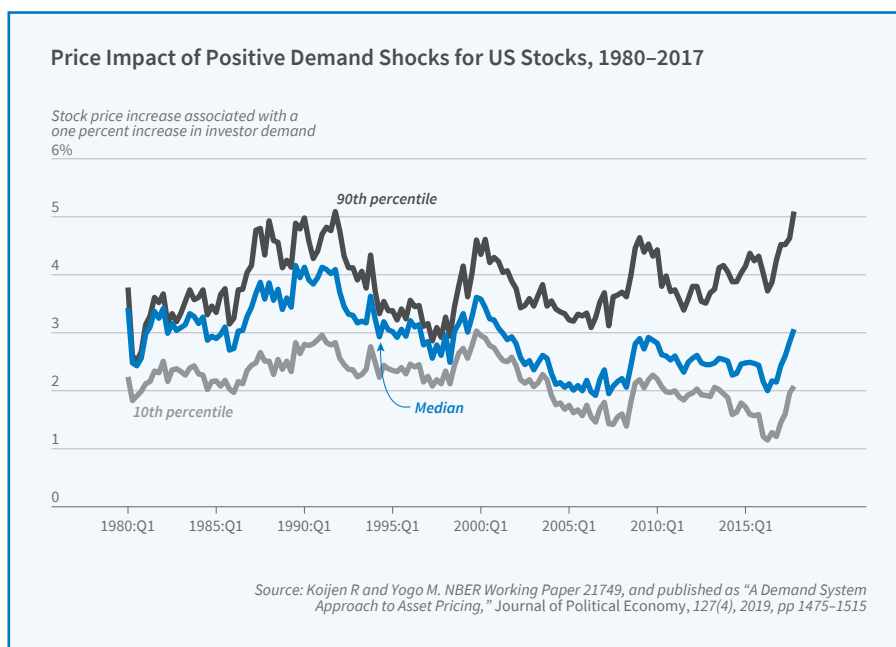


Figure 1

price impact is countercyclical because demand elasticities fall during recessions when investors are more constrained, more risk averse, or more uncertain about future returns.

The fact that demand elasticities are much lower than their model-implied counterparts extends beyond individual stocks to common risk factors such as size and value⁷ and the aggregate stock market.⁸ It also extends to bond markets, including the cross-section of US corporate bonds,⁹ government bonds across countries¹⁰ and the substitution between Treasury and AAA corporate bonds.¹¹ We estimate an international asset demand system based on country-level holdings and find low demand for long-term bonds and equities.¹²

were not special. We estimate an international asset demand system based on country-level holdings and find a large convenience yield of 2.15 percent for US long-term bonds and 1.70 percent for US equities.

Third, central banks have used quantitative easing in response to the global financial crisis, the European sovereign debt crisis, and the COVID-19 crisis. They purchase large quantities of long-term government bonds, corporate bonds, mortgage-backed securities, and even equities in some cases. A well-specified asset demand system is necessary to assess the impact of quantitative easing on asset prices and the distribution of duration and market risk across households and institutional investors. In work with François Koulischer and Benoît Nguyen, we estimate a demand system for euro-area government bonds to assess quantitative easing in the euro area since March 2015.¹⁴

Fourth, socially responsible investing has become increasingly popular. Investors could potentially affect firms' investment decisions by increasing their allocation to "green" firms or excluding "brown" firms. A well-specified asset demand system is necessary to assess how socially responsible investing affects firms' investment decisions through their cost of capital. In joint work with Robert Richmond, we estimate an asset demand system with environmental scores to quantify the impact of socially responsible investing on stock prices.¹⁵

Fifth, in the aftermath of the global financial crisis, regulators have tightened capital regulation for banks, insurance companies, and even asset managers through liquidity requirements and redemption gates. The portfolio choice of institutional investors appears to be sensitive to capital regulation, especially when these investors are financially constrained. Because insurance companies are the largest institutional investors in the corporate bond market, risk-based capital regulation of insurers could have an important impact on corporate bond yields.¹⁶

US Stocks from the Perspective on an Asset Demand System

Our research makes three contributions that operationalize a demand system approach to asset pricing.¹⁷ First, we show that traditional mean-variance portfolio choice implies a logit demand function under empirically supported assumptions of a factor structure in returns and factor loadings depending on asset characteristics. To match the observed portfolio holdings, we allow asset demand to depend on unobserved characteristics that capture beliefs about risk and profitability, which we call latent demand. Second, we propose an instrumental variables estimator for the asset demand system based on the variation in investment mandates across institutional investors. Third, we use the asset demand system for applications such as liquidity measurement, variance decomposition, and return prediction.

Our analysis yields four key findings. First, institutional investors' portfolios are remarkably heterogeneous, both in the extensive margin—which stocks they hold—and in the intensive margin—how much they hold of the stocks they own. The median investor holds only 70 stocks at a given point in time and has held only 110 stocks over the previous three years. The set of stocks ever held is remarkably stable over time—consistent with the presence of investment mandates—and this motivates our identification strategy.

Second, most of the cross-sectional variance of stock returns is explained by latent demand rather than observed asset characteristics. Although this result is consistent with a longstanding puzzle of excessive nonfundamental volatility in financial markets, our approach opens new avenues for research and suggests the value of connecting latent demand to measures of beliefs and constraints through analyst forecasts or textual analysis of earnings calls and media coverage.

Third, households and smaller institutional investors explain a higher share of the cross-sectional variance of stock returns than larger institutional investors

during the global financial crisis. Although the top 30 institutional investors manage about a third of the US stock market, they explain only 4 percent of the cross-sectional variance of stock returns. Larger institutional investors are actually buy-and-hold investors that do not trade much across stocks during market stress.

Fourth, reversion to the mean in latent demand generates predictable variation in the cross-section of stocks. Stocks with high latent demand are relatively expensive and have low expected returns. This new source of predictability cannot be explained by conventional factors such as the market beta, size, value, and momentum.

Potential Directions for Future Research

Arbitrage pricing theory and consumption-based asset pricing have had very successful runs over the last 30 years, with both empirical successes and deep puzzles documented by researchers. Research on demand system asset pricing that attempts to learn about asset prices based on portfolio holdings data has only begun.

As we have discussed, a logit demand function could be micro-founded by mean-variance portfolio choice. However, a more realistic model of asset demand is possible by incorporating the objectives and constraints of specific groups of investors. For example, mutual funds care about benchmarking, and insurance companies care about risk-based capital regulation. Thus, micro data on such constraints would help us build a more realistic asset demand system.

An unresolved question is why empirical estimates of demand elasticities are so much lower than those implied by calibrations of standard asset pricing models. Benchmarking could lower demand elasticities for stocks included in an index, but the empirical evidence on low elasticities is broader and cannot be entirely explained by benchmarking. An alternative hypothesis is that investors cannot estimate expected returns accurately and

consequently do not trade aggressively against large price movements (as in the model of Gabaix and Koijen).¹⁸ Asset pricing theories with heterogeneous priors, inattention, or costly information acquisition could explain heterogeneity in portfolios and potentially explain low demand elasticities. Making these models both tractable and realistic enough to explain actual portfolio holdings data should be high on the macro-finance research agenda.

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⁶ “Why Do Demand Curves for Stocks Slope Down?” Petajisto A. *Journal of Financial and Quantitative Analysis* 44(5), October 2009, pp. 1013–1044.

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⁹ “Institutional Corporate Bond Pricing,” Bretscher L, Schmid L, Sen I, Sharma V. London Business School Working Paper, revised December 2021.

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¹⁰ “Inspecting the Mechanism of Quantitative Easing in the Euro Area,” Koijen R, Koulischer F, Ngyuen B, Yogo M. NBER Working Paper 26152, revised March 2021, and *Journal of Financial Economics* 140(1), April 2021, p. 120. “The Impact of Pensions and Insurance on Global Yield Curves,” Greenwood R, Vissing-Jorgensen A. Harvard University Working Paper, December 2018.

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¹² “Exchange Rates and Asset Prices in a Global Demand System,” Koijen R, Yogo M. NBER Working Paper 27342, June 2020.

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¹³ “From World Banker to World Venture Capitalist: US External Adjustment and the Exorbitant Privilege,” Gourinchas P, Rey H. NBER Working Paper 11563, August 2005.

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¹⁴ “Inspecting the Mechanism of Quantitative Easing in the Euro Area,” Koijen R, Koulischer F, Ngyuen B, Yogo M. NBER Working Paper 26152, revised March 2021, and *Journal of Financial Economics* 140(1), April 2021, pp. 1–20.

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¹⁷ “A Demand System Approach to Asset Pricing,” Koijen R, Yogo M. NBER Working Paper 21749, revised July 2019, and *Journal of Political Economy* 127(4), August 2019, pp. 1475–1515.

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[Return to Text](#)

Angrist, Card, and Imbens Share 2021 Nobel Prize in Economic Sciences

Long-time NBER research associates [Joshua D. Angrist](#), [David Card](#), and [Guido W. Imbens](#) have been awarded the 2021 Nobel Prize in Economic Sciences in recognition of their contributions to labor economics and the analysis of causal relationships in economics.

In announcing the prize, the Royal Swedish Academy of Sciences explained that “Card’s studies of core questions for society, and Angrist and Imbens’ methodological contributions, have shown that natural experiments are a rich source of knowledge. Their research has substantially improved our ability to answer key causal questions, which has been of great benefit to society.”

Angrist is the Ford Professor of Economics at MIT, Card is the Class of 1950 Professor of Economics at the University



Joshua D. Angrist



David Card



Guido W. Imbens

of California, Berkeley, and Imbens is the Applied Econometrics Professor and Professor of Economics at the Stanford University Graduate School of Business. All three are affiliated with the NBER Labor Studies Program, which Card directed for nearly a decade. Angrist and Card are also

affiliated with the NBER programs on Children and Education, and Card with the Economics of Aging Program.

The Academy released both a high-level summary of the [laureates’ contributions](#) and a longer [explanation of their work](#).

The laureates delivered their prize lectures on December 8, 2021.

- [Joshua D. Angrist’s prize lecture](#): “Empirical strategies in economics: Illuminating the path from cause to effect”
- [David Card’s prize lecture](#): “Design-based research in empirical microeconomics”
- [Guido W. Imbens’ prize lecture](#): “Causality in econometrics: methods in conversation with practice”

NBER research by [Joshua D. Angrist](#), by [David Card](#), and by [Guido W. Imbens](#)

Reports on the prize announcement and the economists’ work were featured in [The Wall Street Journal](#), [The New York Times](#), and [The Washington Post](#).

With this year’s awards, 35 current or past NBER research affiliates, and an additional six current or past members of the NBER board of directors, have received the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. Affiliates previously awarded the prize are Abhijit Banerjee, Esther Duflo, and Michael Kremer, 2019; William Nordhaus and Paul Romer, 2018; Richard Thaler, 2017; Oliver Hart and Bengt Holmström,

2016; Angus Deaton, 2015; Lars Hansen and Robert Shiller, 2013; Alvin Roth, 2012; Thomas Sargent and Christopher Sims, 2011; Peter Diamond, 2010; Paul Krugman, 2008; Edward C. Prescott and Finn Kydland, 2004; Robert F. Engle, 2003; Joseph E. Stiglitz, 2001; James J. Heckman and Daniel L. McFadden, 2000; Robert C. Merton and Myron S. Scholes, 1997; Robert E. Lucas, Jr., 1995; and the late Dale Mortensen, 2010; Robert

W. Fogel, 1993; Gary S. Becker, 1992; George J. Stigler, 1982; Theodore W. Schultz, 1979; Milton Friedman, 1976; and Simon Kuznets, 1971. In addition to this group, the six current or past members of the NBER Board of Directors who have received the prize are: George Akerlof, 2001; Robert Solow, 1987; and the late William Vickrey, 1996; Douglass North, 1993; James Tobin, 1981; and Paul Samuelson, 1970.

Four NBER Researchers Go on Leaves to CEA, SEC



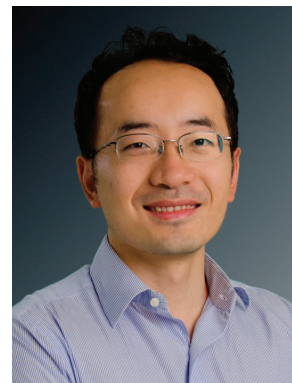
Gopi Shah Goda



Susan Helper



Damon Jones



Haoxiang Zhu

Three NBER researchers have joined the Council of Economic Advisers (CEA) as senior economists, and a fourth has been appointed the director of the Division of Trading and Markets at the US Securities and Exchange Commission (SEC). All have taken leave from the NBER for the duration of their public service.

Gopi Shah Goda of Stanford University, an affiliate of the Economics of Aging Program, Susan Helper of Case Western Reserve University, a Productivity Program affiliate, and Damon Jones of the University of Chicago, who is affiliated with the Economics of Aging and Public Economics programs, will provide

economic analysis on a range of issues that come before the CEA.

Haoxiang Zhu of the Sloan School of Management of the Massachusetts Institute of Technology will direct the SEC division that is responsible for overseeing the efficient and fair operation of capital markets.

Gita Gopinath Tapped for New IMF Role



Gita Gopinath

Gita Gopinath, the former director of the NBER's International Finance and Macroeconomics Program, has been tapped to become the first deputy managing director of the International

Monetary Fund in early 2022. Gopinath has been on leave from the NBER, where she is a research associate, and from Harvard University, where she is the John Zwaanstra Professor of

International Studies and Economics, since 2019, when she became Chief Economist at the IMF. The first deputy managing director is the second highest ranking official at the organization

Conferences

Tax Policy and the Economy

An NBER conference on Tax Policy and the Economy took place September 23 online. Research Associate Robert A. Moffitt of Johns Hopkins University organized the meeting, which was supported by Lynde and Harry Bradley Foundation Grant 20211142. These researchers' papers were presented and discussed:

- **Natasha Sarin**, University of Pennsylvania; **Lawrence H. Summers**, Harvard University and NBER; **Owen M. Zidar**, Princeton University and NBER; and **Eric Zwick**, University of Chicago and NBER, "Rethinking How We Score Capital Gains Tax Reform" (NBER Working Paper [28362](#))
- **Nora E. Gordon**, Georgetown University and NBER, and **Sarah J. Reber**, University of California, Los Angeles and NBER, "Federal Support for Elementary and Secondary Education in the COVID-19 Recession and Beyond" (NBER Working Paper [27550](#))
- **Jacob Goldin**, Stanford University and NBER; **Elaine Maag**, The Urban Institute; and **Katherine Micheltore**, University of Michigan, "Designing a Child Allowance for the United States"
- **Alan J. Auerbach**, University of California, Berkeley and NBER, and **William Gale**, The Brookings Institution, "Tax Policy Design with Low Interest Rates"
- **Ethan Rouen**, Harvard University; **Suresh Nallareddy**, Duke University; and **Juan Carlos Suárez Serrato**, Duke University and NBER, "Do Corporate Tax Cuts Increase Income Inequality?" (NBER Working Paper [24598](#))

Summaries of these papers are at <https://www.nber.org/conferences/tax-policy-and-economy-2021>

Economics of Artificial Intelligence

An NBER conference on the Economics of Artificial Intelligence took place September 23–24 online. Research Associates Ajay K. Agrawal, Joshua S. Gans, and Avi Goldfarb of the University of Toronto and Catherine Tucker of the Massachusetts Institute of Technology organized the meeting, which was supported by Alfred P. Sloan Foundation Grant G-2018-10104. These researchers' papers were presented and discussed:

- **Emilio Calvano**, **Vincenzo Denicolò**, and **Sergio Pastorello**, University of Bologna, and **Giacomo Calzolari**, European University Institute, "Product Recommendations and Market Concentration"
- **John Asker**, University of California, Los Angeles and NBER; **Ariel Pakes**, Harvard University and NBER; and **Chaim Fershtman**, Tel Aviv University, "Artificial Intelligence and Pricing: The Impact of Algorithm Design" (NBER Working Paper [28535](#))
- **Emily Aiken** and **Joshua Blumenstock**, University of California, Berkeley; **Suzanne Bellue**, University of Mannheim; and **Dean Karlan** and **Christopher R. Udry**, Northwestern University and NBER, "Machine Learning and Mobile Phone Data Can Improve the Targeting of Humanitarian Assistance" (NBER Working Paper [29070](#))
- **Thomas W. Bates** and **Jessie Jiaxu Wang**, Arizona State University, and **Fangfang Du**, California State University, Fullerton, "Workplace Automation and Corporate Financial Policies"

- **Sukwoong Choi**, Massachusetts Institute of Technology; **Namil Kim**, Harbin Institute of Technology; **Junsik Kim**, KAIST; and **Hyo Kang**, University of Southern California, “How Does AI Improve Human Decision-Making? Evidence from the AI-Powered Go Program”
- **Ruyu Chen** and **Chris Forman**, Cornell University, and **Natarajan Balasubramanian**, Syracuse University, “How Does Labor Mobility Affect Business Adoption of a GPT? The Case of Machine Learning”
- **Sean Cao** and **Baozhong Yang**, Georgia State University; **Wei Jiang**, Columbia University and NBER; and **Junbo L. Wang**, Louisiana State University, “From Man vs. Machine to Man + Machine: The Art and AI of Stock Analyses” (NBER Working Paper [28800](#))
- **Yiding Feng**, **Jason Hartline**, and **Aleck Johnsen**, Northwestern University; **Ronen Gradwohl**, Ariel University; and **Denis Nekipelov**, University of Virginia, “Bias-Variance Games”
- **David J. Deming**, Harvard University and NBER, “The Growing Importance of Decision-Making on the Job” (NBER Working Paper [28733](#))
- **Jaehan Cho** and **Hanhin Kim**, Korea Institute for Industrial Economics and Trade; **Timothy J. DeStefano**, Harvard University; and **Jin Paik**, Laboratory for Innovation Science, “What Determines AI Adoption?”
- **Philippe Aghion** and **Xavier Jaravel**, London School of Economics; **Céline Antonin**, Sciences Po; and **Simon Bunel**, Banque de France, “What Are the Labor and Product Market Effects of Automation? New Evidence from France”
- **Yizhou Jin**, University of Toronto, and **Zhengyun Sun**, Harvard University, “AI Training for Online Entrepreneurs: An Experiment with Two Million New Sellers on an E-Commerce Platform”
- **Gordon H. Hanson**, Harvard University and NBER, “Immigration and Regional Specialization in AI” (NBER Working Paper [28671](#))
- **James Bessen**, Boston University; **Iain M. Cockburn**, Boston University and NBER; and **Jennifer Hunt**, Rutgers University and NBER, “Is Distance from Innovation a Barrier to the Adoption of Artificial Intelligence?”
- **Alexander L. Copestake**, **Ashley Pople**, and **Katherine A. Stapleton**, University of Oxford, “AI, Firms and Wages: Evidence from India”

Summaries of these papers are at <https://www.nber.org/conferences/economics-artificial-intelligence-conference-fall-2021>

Business Taxation in a Federal System

An NBER conference on Business Taxation in a Federal System took place October 7 online. Research Associates Joshua Rauh of Stanford University and Juan Carlos Suárez Serrato of Duke University organized the meeting, which was supported by Smith Richardson Foundation Grant 2017-1532. These researchers’ papers were presented and discussed:

- **Felipe Lobel**, University of California, Berkeley, “The Incidence of Payroll Taxation”
- **Katarzyna A. Bilicka**, Utah State University and NBER, and **Daniela Scur**, Cornell University, “Organizational Capacity and Profit Shifting” (NBER Working Paper [29225](#))

- **Paul Michael Kindsgrab**, University of Michigan, “The Effects of Local Business Taxes on Establishment Entry and Exit”
- **Audrey Guo**, Santa Clara University, “Payroll Tax Incidence: Evidence from Unemployment Insurance”
- **Eric C. Ohrn**, Grinnell College; **Daniel G. Garrett**, University of Pennsylvania; and **Juan Carlos Suárez Serrato**, “Effects of International Tax Provisions on Local Labor Markets”
- **Sebastian Siegloch**, University of Mannheim; **Nils Wehrhöfer**, Bundesbank Research Centre; and **Tobias Etzel**, Deutsche Bundesbank, “Direct, Spillover and Welfare Effects of Regional Firm Subsidies”
- **Pablo Garriga**, Brown University, and **Dario Tortarolo**, University of Nottingham, “Tax Collection and Firm Trade Decisions: Direct and Network Effects”
- **Juliette Fournier**, Massachusetts Institute of Technology, and **Cailin R. Slattery**, Columbia University, “Tax Discrimination and Competition in the Market for Firms”
- **Jeffrey L. Hoopes**, University of North Carolina; **Daniel Klein**, University of Mannheim; **Rebecca Lester**, Stanford University; and **Marcel Olbert**, London Business School, “Foreign Aid through Domestic Tax Cuts? Evidence from Multinational Firm Presence in Developing Countries”
- **Kate Smith** and **Helen Miller**, Institute for Fiscal Studies, “Capital Taxation and Entrepreneurship”
- **Michael Love**, University of California, Berkeley, “Equity Financing, Dividend Taxes and Corporate ‘Non-Capital’ Investment”
- **Jordan W. Richmond**, Princeton University, “Firm Responses to Book Income Alternative Minimum Taxes”

Summaries of these papers are at <https://www.nber.org/conferences/business-taxation-federal-system-fall-2021>

Economics of Mobility

An NBER conference on the Economics of Mobility took place October 22 online. Research Associates Sandra E. Black of Columbia University and Jesse Rothstein of the University of California, Berkeley organized the meeting, which was supported by Bill & Melinda Gates Foundation Grant INV-003434. These researchers’ papers were presented and discussed:

- **Myra Mohnen**, University of Ottawa; **José-Alberto Guerra**, Universidad de los Andes; and **Julián Costas-Fernández**, University College London, “Train to Opportunity: The Effect of Infrastructure on Intergenerational Mobility”
- **Daniel Aaronson**, **Daniel Hartley**, and **Bhashkar Mazumder**, Federal Reserve Bank of Chicago; **Shari Eli**, University of Toronto and NBER; **Adriana Lleras-Muney**, University of California, Los Angeles and NBER; and **Martha Stinson**, US Census Bureau, “The Long-Run Effects of the 1930s HOLC ‘Redlining’ Maps on Children”
- **Jonathan M. Colmer** and **Brennan Williams**, University of Virginia, and **John L. Voorheis**, US Census Bureau, “Air Pollution and Economic Opportunity in the United States”

- **Andrew C. Barr**, Texas A&M University; **Jonathan Eggleston**, US Census Bureau; and **Alexander A. Smith**, United States Military Academy at West Point, “The Effect of Income during Infancy: Evidence from a Discontinuity in Tax Benefits”
- **Santiago Pérez**, University of California, Davis and NBER, and **Diana Moreira**, University of California, Davis, “Who Benefits from Meritocracy?”
- **Valerie Michelman**, University of Chicago; **Joseph Price**, Brigham Young University and NBER; and **Seth D. Zimmerman**, Yale University and NBER, “Old Boys’ Clubs and Upward Mobility among the Educational Elite” (NBER Working Paper 28583)

Summaries of these papers are at <https://www.nber.org/conferences/economics-mobility-meeting-fall-2021>

Investments in Early Career Scientists: Data and Research Gaps

An NBER conference on Investments in Early Career Scientists: Data and Research Gaps took place November 5 online. Kaye Husbands Fealing of the Georgia Institute of Technology and Research Associates Donna K. Ginther of the University of Kansas and Bruce A. Weinberg of The Ohio State University organized the meeting, which was supported by Alfred P. Sloan Foundation Grant G-2020-14066. These researchers’ papers were presented and discussed:

- **Stephanie D. Cheng**, Edgeworth Economics, “What’s Another Year? The Lengthening Training and Career Paths of Scientists”
- **Sofia Patsali** and **Michele Pezzoni**, Université Côte d’Azur, and **Fabiana Visentin**, Maastricht University, “The Impact of Research Independence on PhD Students’ Careers: Large-Scale Evidence from France”
- **Holden A. Diethorn**, NBER, and **Gerald R. Marschke**, State University of New York at Albany and NBER, “Task Mismatch and Salary Penalties: Evidence from the Biomedical PhD Labor Market”
- **Alberto Corsini** and **Michele Pezzoni**, Université Côte d’Azur, and **Fabiana Visentin**, “What Makes a Productive PhD Student?”
- **Davut Ayan**, University of Kansas; **Donna K. Ginther**; and **Laurel Haak**, Mighty Red Barn, “How Many Researchers Are There in the World?”
- **Shulamit Kahn**, Boston University, and **Megan MacGarvie**, Boston University and NBER, “Does US Science Underinvest in International Postdoctoral Scholars? Evidence from the ECDS”
- **Jodi E. Basner** and **Anand Desai**, Clarivate Analytics, and **Wan-Ying Chang** and **Kelly Phou**, National Science Foundation, “Does Postdoctoral Training Raise the Likelihood of Pursuing a Career in Research and Development?”

Summaries of these papers are at:

<https://www.nber.org/conferences/investments-early-career-scientists-data-and-research-gaps-fall-2021>

Measuring and Reporting Corporate Carbon Footprints and Climate Risk Exposure

An NBER conference on Measuring and Reporting Corporate Carbon Footprints and Climate Risk Exposure took place November 12 online. Research Associates Meredith Fowlie of the University of California, Berkeley, Christian Leuz of the University of Chicago, and Laura Starks of the University of Texas at Austin organized the meeting. These researchers' papers were presented and discussed:

- **Stefano Giglio**, Yale University and NBER; **Georgij Alekseev**, **Quinn Maingi**, and **Julia Selgrad**, New York University; and **Johannes Stroebe**, New York University and NBER, "A Quantity-Based Approach to Constructing Climate Risk Hedge Portfolios"
- **Henry L. Friedman**, University of California, Los Angeles, and **Mirko Heinle** and **Irina M. Luneva**, University of Pennsylvania, "A Theoretical Framework for Environmental and Social Impact Reporting"
- **Joop Huij**, Erasmus University Rotterdam, and **Dries Laurs**, **Philip Stork**, and **Remco Zwinkels**, Vrije Universiteit Amsterdam, "Carbon Beta: A Market-Based Measure of Climate Risk"
- **Zacharias Sautner**, **Laurence van Lent**, and **Grigory Vilkov**, Frankfurt School of Finance and Management, and **Ruishen Zhang**, Shanghai University of Finance and Economics, "Firm-Level Climate Change Exposure"
- **Lubos Pastor**, University of Chicago and NBER; **Robert F. Stambaugh**, University of Pennsylvania and NBER; and **Lucian A. Taylor**, University of Pennsylvania, "Dissecting Green Returns" (NBER Working Paper [28940](#))
- **Shirley S. Lu**, Harvard University, and **Anya Nakhmurina**, Yale University, "Measuring Cities' Climate Risk Exposure and Preparedness"
- **Sorabh Tomar**, Southern Methodist University, "Greenhouse Gas Disclosure and Emissions Benchmarking"

Summaries of these papers are at:

<https://www.nber.org/conferences/measuring-and-reporting-corporate-carbon-footprints-and-climate-risk-exposure-fall-2021>

COVID-19 and Health Outcomes

An NBER conference on COVID-19 and Health Outcomes took place November 18 online. Research Associates David M. Cutler of Harvard University and Kosali I. Simon of Indiana University and Faculty Research Fellow Maria Polyakova of Stanford University organized the meeting, which was supported by National Institute on Aging Grants P30AG012810 and P01AG005842. These researchers' papers were presented and discussed:

- **Maria D. Fitzpatrick**, Cornell University and NBER, and **Katharine Sadowski**, Cornell University, "Are Schools Protective of Health, Even during a Pandemic? The Effects of School Openings during the COVID-19 Pandemic on Children's Health Care Usage"
- **Sarah J. Reber**, University of California, Los Angeles and NBER; **Cyrus M. Kosar**, Brown University; and **Shekinah Fashaw**, University of Minnesota, "Nursing Home Use As a Risk Factor for COVID-19 Mortality: Implications for Racial Disparities"

- **Arindrajit Dube**, University of Massachusetts Amherst and NBER; **Suresh Naidu**, Columbia University and NBER; and **Raymond Kluender** and **Michael Stepner**, Harvard University, “Early Withdrawal of Pandemic Unemployment Insurance: Effects on Earnings, Employment and Consumption”
- **Amalia R. Miller**, University of Virginia and NBER; **Carmit Segal**, University of Zurich; and **Melissa K. Spencer**, University of Richmond, “Effects of COVID-19 Shutdowns on Domestic Violence in US Cities” (NBER Working Paper [29429](#))
- **Felix Koenig**, Carnegie Mellon University, and **Massimo Anelli**, Bocconi University, “Willingness to Pay for Workplace Safety”
- **Anne Case** and **Angus Deaton**, Princeton University and NBER, “Mortality Rates by College Degree before and during COVID-19” (NBER Working Paper [29328](#))
- **Matthew Goodkin-Gold**, Harvard University; **Michael Kremer**, University of Chicago and NBER; **Christopher Snyder**, Dartmouth College and NBER; and **Heidi L. Williams**, Stanford University and NBER, “Optimal Vaccine Subsidies for Epidemic and Endemic Diseases”
- **Kate Bundorf**, Duke University and NBER; **Salama Freed** and **Nancy Allen Lapointe**, Duke University; **Sumedha Gupta** and **Hailemichael B. Shone**, Indiana University; and **Kosali I. Simon**, “How Did the COVID-19 Health Care Delivery Disruption Affect Medication Use among People with Chronic Conditions?”

Summaries of some of these papers are at <https://www.nber.org/conferences/covid-19-and-health-outcomes-fall-2021>

Improving Health Outcomes for an Aging Population

An NBER conference on Improving Health Outcomes for an Aging Population took place November 30–December 1 online. Research Associate Katherine Baicker of the University of Chicago organized the meeting, which was supported by National Institute on Aging Grant P01AG005842. These researchers’ papers were presented and discussed:

- **Leila Agha**, Dartmouth College and NBER; **Keith Marzilli Ericson** and **James B. Rebitzer**, Boston University and NBER; **Kimberley Geissler**, University of Massachusetts Amherst, “Team Relationships and Performance: Evidence from Healthcare Referral Networks” (NBER Working Paper [24338](#))
- **Maya M. Durvasula** and **Lisa L. Ouellette**, Stanford University; and **Heidi L. Williams**, Stanford University and NBER, “Private and Public Investments in Biomedical Research” (NBER Working Paper [28349](#))
- **Martin B. Hackmann**, University of California, Los Angeles and NBER; **Juan S. Rojas**, University of California, Los Angeles; and **Nicolas R. Ziebarth**, Cornell University and NBER, “Creative Financing and Public Moral Hazard: Evidence from Medicaid Supplemental Payments”
- **William N. Evans**, University of Notre Dame and NBER; **Sarah A. Kroege** and **Grace Ortuzar**, University of Notre Dame; **Elizabeth L. Munnich**, University of Louisville; and **Kathryn Wagner**, Marquette University, “Reducing Readmissions by Addressing the Social Determinants of Health”
- **Janet Currie**, Princeton University and NBER; **Anastasia Karpova**, Princeton University; and **Dan Zeltzer**, Tel Aviv University, “Do Urgent Care Centers Reduce Medicare Spending?” (NBER Working Paper [29047](#))
- **Jessica Van Parys**, Hunter College, and **Itzik Fadlon**, University of California, San Diego and NBER, “Primary Care Physician Practice Styles and Patient Care: Evidence from Physician Exits in Medicare” (NBER Working Paper [26269](#))

- **Zarek C. Brot-Goldberg**, University of Chicago; **Timothy Layton**, Harvard University and NBER; **Boris Vabson**, Harvard University; and **Adelina Yanyue Wang**, NBER, “The Behavioral Foundations of Default Effects: Theory and Evidence from Medicare Part D” (NBER Working Paper [28331](#))
- **Danea Horn**, University of California, Davis; **Adam Sacarny**, Columbia University and NBER; and **R. Annetta Zhou**, RAND Corporation, “Technology Adoption and Market Allocation: The Case of Robotic Surgery” (NBER Working Paper [29301](#))
- **Martin Gaynor**, Carnegie Mellon University and NBER; **Adam Sacarny**, **Raffaella Sadun**, Harvard University and NBER; **Chad Syverson**, University of Chicago and NBER; and **Shruthi Venkatesh**, Carnegie Mellon University, “The Anatomy of a Hospital System Merger: The Patient Did Not Respond Well to Treatment” (NBER Working Paper [29449](#))

Summaries of these papers are at:

<https://www.nber.org/conferences/improving-health-outcomes-aging-population-fall-2021>

Innovation Information Initiative

Members of the NBER’s Technical Working Group on the Innovation Information Initiative met December 3–4 in Cambridge and online. Research Associate Adam B. Jaffe of Brandeis University organized the meeting, which was supported by the Alfred P. Sloan Foundation through a subcontract with Code for Science and Society. These researchers’ papers were presented and discussed:

- **Jonathan Ashtor**, Yeshiva University, “Modeling Patent Clarity”
- **Matt Marx**, Cornell University and NBER, and **Michael Ewens**, California Institute of Technology and NBER, “Matching Patent Assignees to Startups”
- **Heather Piwowar** and **Jason Priem**, OurResearch, “Introducing OpenAlex”
- **Britta Glennon**, University of Pennsylvania and NBER; **Daniel P. Gross**, Duke University and NBER; and **Lia Sheer**, Tel Aviv University, “Intellectual Property Theft”
- **Tania Babina**, Columbia University; **Anastassia Fedyk**, University of California, Berkeley; **Alex Xi He**, University of Maryland; and **James Hodson**, Jozef Stefan International Postgraduate School, “Measuring Firms’ Technology Use with Employees’ Job Data”
- **Daniel P. Gross**; **Jorge Guzman**, Columbia University; and **Innessa Colaiacovo**, Harvard University, “US Entrepreneurship over the Long Run: New Data and Approaches to Measurement”
- **Bernhard Ganglmair**, ZEW Mannheim; **W. Keith Robinson**, Wake Forest University; and **Michael Seeligson**, Southern Methodist University, “The Rise of Process Claims: Evidence from a Century of US Patents”
- **Sam Arts** and **Jianan Hou**, KU Leuven, and **Bruno Cassiman**, IESE, “Technology Differentiation and Firm Performance”

The Rise of Global Supply Chains

An NBER conference on The Rise of Global Supply Chains took place December 10 online. Research Associates Laura Alfaro of Harvard University and Chad Syverson of the University of Chicago organized the meeting, which was supported by the US Department of Homeland Security through a subaward from Cross-Border Threat Screening and Supply Chain Defense (CBTS), a Department of Homeland Security Center of Excellence at Texas A&M University. These researchers' papers were presented and discussed:

- **Diego A. Comin**, Dartmouth College and NBER, and **Robert C. Johnson**, University of Notre Dame and NBER, "Supply Chain Constraints and Inflation"
- **Kyle Handley**, University of California, San Diego and NBER; **Fariha Kamal**, US Census Bureau; and **Ryan Monarch**, Syracuse University, "Trade Shocks and US Firms' Global Supply Chains"
- **Xiaodong Du**, University of Wisconsin-Madison, and **David A. Hennessy**, Michigan State University, "Sustainability and Risk Management of Meat Supply Chains in a COVID-19 World"
- **George A. Alessandria**, University of Rochester and NBER, and **Kim J. Ruhl**, University of Wisconsin-Madison and NBER, "Mitigating International Supply-Chain Risk with Inventories and Fast Transport"
- **Paula deWitte** and **Joan Mileski**, Texas A&M University, "Incorporating Cyber Resiliency in Maritime Supply Chains: Best Practices and Principles"
- **Federico Esposito**, Tufts University; **Joaquin Blaum**, Brown University; and **Sebastian Heise**, Federal Reserve Bank of New York, "Shipping Time Volatility and Supply Chains: Evidence from US Manufacturing Firms"

The agenda of this conference is at <https://www.nber.org/conferences/rise-global-supply-chains-fall-2021>

Innovative Data in Household Finance: Opportunities and Challenges

An NBER conference on Innovative Data in Household Finance: Opportunities and Challenges took place December 10 online. Research Associates Joseph S. Vavra of the University of Chicago and Stephen P. Zeldes of Columbia University and Faculty Research Fellow Jialan Wang of the University of Illinois at Urbana-Champaign organized the meeting, which was supported by Alfred P. Sloan Foundation Grant G-2019-12501. These researchers' papers were presented and discussed:

- **Sabrina T. Howell**, **Theresa Kuchler**, and **Johannes Stroebe**, New York University and NBER; **David Snitkof**, Orolus; and **Jun Wong**, University of Chicago, "Racial Disparities in Access to Small Business Credit: Evidence from the Paycheck Protection Program" (NBER Working Paper [29364](#))
- **Scott R. Baker** and **Efraim Benmelech**, Northwestern University and NBER; **Zhishu Yang**, Tsinghua University; and **Jacky Zhang**, Durham University, "Fertility and Savings: The Effect of China's Two-Child Policy on Household Savings"
- **Amir Kermani**, University of California, Berkeley and NBER, and **Francis Wong**, NBER Postdoctoral Fellow, "Racial Disparities in Housing Returns" (NBER Working Paper [29306](#))
- **Motohiro Yogo**, Princeton University and NBER; **Andrew Whitten**, Department of the Treasury; and **Natalie Cox**, Princeton University, "Financial Inclusion across the United States"

- **Tetyana Balyuk**, Emory University, and **Emily Williams**, Harvard University, “Friends and Family Money: P2P Transfers and Financially Fragile Consumers”
- **Alejandro del Valle** and **Stephen H. Shore**, Georgia State University, and **Therese C. Scharlemann**, Federal Reserve Board, “Household Financial Decision-Making after Natural Disasters: Evidence from Hurricane Harvey”
- **Taha Choukmane**, Massachusetts Institute of Technology; **Lucas Goodman**, Department of the Treasury; and **Cormac O’Dea**, Yale University and NBER, “Efficiency in Household Decision-Making: Evidence from the Retirement Savings of US Couples”
- **David C. Low**, Consumer Financial Protection Bureau, “What Triggers Mortgage Default? New Evidence from Linked Administrative and Survey Data”

Summaries of these papers are at:

<https://www.nber.org/conferences/innovative-data-household-finance-opportunities-and-challenges-fall-2021>

Big Data and Securities Markets

An NBER conference on Big Data and Securities Markets took place December 10 online. Research Associates Itay Goldstein of the University of Pennsylvania, Chester S. Spatt of Carnegie Mellon University, and Mao Ye of the University of Illinois at Urbana-Champaign organized the meeting, which was supported by National Science Foundation Grant 1838183. These researchers’ papers were presented and discussed:

- **Maryam Farboodi**, Massachusetts Institute of Technology and NBER; **Dhruv Singal**, Columbia University; **Laura Veldkamp**, Columbia University and NBER; and **Venky Venkateswaran**, New York University and NBER, “Valuing Financial Data”
- **Suzie Noh**, Stanford University; **Eric C. So**, Massachusetts Institute of Technology; and **Christina Zhu**, University of Pennsylvania, “Financial Reporting and Consumer Behavior”
- **Bradford Lynch** and **Daniel J. Taylor**, University of Pennsylvania, “The Information Content of Corporate Websites”
- **Robert P. Bartlett III**, University of California, Berkeley; **Justin McCrary**, Columbia University and NBER; and **Maureen O’Hara**, Cornell University, “The Market inside the Market: Odd-Lot Quotes”
- **Lin William Cong**, Cornell University; **Ke Tang**, Tsinghua University; and **Jingyuan Wang** and **Yang Zhang**, Beihang University, “AlphaPortfolio: Direct Construction through Deep Reinforcement Learning and Interpretable AI”
- **Bryan T. Kelly**, Yale University and NBER; **Semyon Malamud**, Swiss Finance Institute; and **Theis I. Jensen** and **Lasse H. Pedersen**, Copenhagen Business School, “Machine Learning about Optimal Portfolios”
- **Terrence Hendershott** and **Dmitry Livdan**, University of California, Berkeley; **Dan Li**, Federal Reserve Board; **Norman Schurhoff**, University of Lausanne; and **Kumar Venkataraman**, Southern Methodist University, “Quote Competition in Corporate Bonds”

The agenda for this conference is at <https://www.nber.org/conferences/big-data-and-securities-markets-fall-2021>

Japan Project Meeting

The NBER Japan Project held an online conference December 15–16. Shiro P. Armstrong of the Australian National University, Tsutomu Watanabe of the University of Tokyo, and Research Associates Charles Yuji Horioka of Kobe University, Takeo Hoshi of the University of Tokyo, and David Weinstein of Columbia University organized the meeting. These researchers' papers were presented and discussed:

- **Kozo Ueda**, Waseda University; **Kota Watanabe**, Meiji University; and **Tsutomu Watanabe**, “Household Inventory, Temporary Sales, and Price Indices”
- **Shotaro Yamaguchi**, University of Maryland; **Serguey Braguinsky**, University of Maryland and NBER; and **Kentaro Nakajima**, Hitotsubashi University, “Science and Engineering Education and Invention in Japan’s Industrialization”
- **Taiyo Fukai**, **Hidehiko Ichimura**, **Sagiri Kitao**, and **Minamo Mikoshiba**, University of Tokyo, “Medical Expenditures over the Life Cycle: Persistent Risks and Insurance”
- **Kentaro Nakajima** and **Kensuke Teshima**, Hitotsubashi University, and **Junichi Yamasaki**, Kobe University, “From Samurai to Skyscrapers: How Transaction Costs Shape Tokyo”
- **Sylvain Chassang**, Princeton University and NBER; **Kei Kawai**, University of California, Berkeley and NBER; **Jun Nakabayashi**, Kindai University; and **Juan M. Ortner**, Boston University, “Using Bid Rotation and Incumbency to Detect Collusion: A Regression Discontinuity Approach”
- **Kyogo Kanazawa**, **Daiji Kawaguchi**, and **Yasutora Watanabe**, University of Tokyo, and **Hitoshi Shigeoka**, Simon Fraser University and NBER, “AI, Skill, and Productivity: The Case of Taxi Drivers”
- **Yoko Okuyama**, Uppsala University, and **Ayumi Sudo**, Yale University, “Electoral Institutions, Women’s Representation, and Policy Outcomes”
- **Shuhei Kitamura**, Osaka University, and **Toshifumi Kuroda**, Tokyo Keizai University, “Media Trust and Persuasion”
- **Yuhei Miyauchi**, Boston University; **Kentaro Nakajima**; and **Stephen J. Redding**, Princeton University and NBER, “Consumption Access and the Spatial Concentration of Economic Activity: Evidence from Smartphone Data” (NBER Working Paper 28497)

Summaries of these papers are at <https://www.nber.org/conferences/japan-project-meeting-fall-2021>

Program and Working Group Meetings

Chinese Economy

Members of the NBER's Chinese Economy Working Group met October 7–9 online. Research Associates Hanming Fang of the University of Pennsylvania, Zhiguo He of the University of Chicago, Shang-Jin Wei of Columbia University, and Wei Xiong of Princeton University organized the meeting. These researchers' papers were presented and discussed:

- **Hanming Fang**, **Jing Wu** and **Rongjie Zhang**, Tsinghua University; and **Li-An Zhou**, Peking University, "Anticorruption Campaign, Stereotyping, and the Resurgence of the SOEs: Evidence from China's Real Estate Sector"
- **Greg Buchak**, Stanford University; **Jiayin Hu**, Peking University; and **Shang-Jin Wei**, "FinTech as a Financial Liberator"
- **Shumin Qiu**, East China University of Science and Technology, and **Claudia Steinwender** and **Pierre Azoulay**, Massachusetts Institute of Technology and NBER, "Who Stands on the Shoulders of Chinese (Scientific) Giants? Evidence from Chemistry"
- **Simon Alder**, Swiss National Bank, and **Zheng Michael Song** and **Zhitao Zhu**, Chinese University of Hong Kong, "Unequal Returns to China's Intercity Road Network"
- **Shaoda Wang**, University of Chicago, and **David Y. Yang**, Harvard University and NBER, "The Political Economy of Policy Experimentations in China"
- **Guilong Cai**, Sun Yat-sen University; **R. David McLean**, Georgetown University; **Tianyu Zhang**, City University of Hong Kong; and **Mengxin Zhao**, University of Alberta, "Short Sellers in the Realm of Social Media: Arbitrageurs or Manipulators?"
- **Kaiji Chen** and **Yiqing Xiao**, Emory University, and **Tao Zha**, Emory University and NBER, "Bank Wholesale Funding, Monetary Transmission and Systemic Risk: Evidence from China"
- **Pengjie Gao** and **Peter Kelly**, University of Notre Dame; **Allen Hu**, Yale University; **Cameron Peng**, London School of Economics; and **Ning Zhu**, Tsinghua University, "Exploited by Complexity"
- **Pengfei Han**, Peking University; **Wei Jiang**, Columbia University and NBER; and **Danqing Mei**, Cheung Kong Graduate School of Business, "Mapping US-China Technology Decoupling, Innovation, and Firm Performance"

Summaries of these papers are at <https://www.nber.org/conferences/chinese-economy-working-group-meeting-fall-2021>

Political Economy

Members of the NBER's Political Economy Program met October 14–15 online. Research Associates Katherine Casey of Stanford University, Alessandro Lizzeri of Princeton University, and Pierre Yared of Columbia University organized the meeting. These researchers' papers were presented and discussed:

- **Julia Cagé**, Sciences Po; **Nicolas Hervé**, Institut National de l'Audiovisuel; and **Béatrice Mazoyer**, CentraleSupélec, "Social Media and Newsroom Production Decisions"

- **Leonardo Bursztyn**, University of Chicago and NBER; **Georgy Egorov**, Northwestern University and NBER; **Ruben Enikolopov**, New Economic School; and **Maria Petrova**, Universitat Pompeu Fabra, “Social Media and Xenophobia: Theory and Evidence from Russia” (NBER Working Paper 26567)
- **Martin Beraja**, Massachusetts Institute of Technology and NBER; **Andrew Kao**, Harvard University; **David Y. Yang**, Harvard University and NBER; and **Noam Yuchtman**, London School of Economics, “AI-tocracy: The Symbiosis of Autocrats and Innovators”
- **Charles Angelucci**, Massachusetts Institute of Technology, and **Andrea Prat**, Columbia University, “Is Journalistic Truth Dead? Measuring How Informed Voters Are about Political News”
- **Jorg L. Spenkuch** and **Edoardo Teso**, Northwestern University; and **Guo Xu**, University of California, Berkeley and NBER, “Ideology and Performance in Public Organizations” (NBER Working Paper 28673)
- **Steven Callander**, **Dana Foarta**, and **Takuo Sugaya**, Stanford University, “Market Competition and Political Influence: An Integrated Approach”

Summaries of these papers are at <https://www.nber.org/conferences/political-economy-program-meeting-fall-2021>

Economic Fluctuations and Growth

Members of the NBER’s Economic Fluctuations and Growth Program met October 15 online. Research Associates Daron Acemoglu of the Massachusetts Institute of Technology and Stefanie Stantcheva of Harvard University organized the meeting. These researchers’ papers were presented and discussed:

- **Nicholas Bloom**, Stanford University and NBER; **Tarek Alexander Hassan**, Boston University and NBER; **Aakash Kalyani**, Boston University; **Josh Lerner**, Harvard University and NBER; and **Ahmed Tahoun**, London Business School, “The Diffusion of Disruptive Technologies” (NBER Working Paper 28999)
- **Gabriel Chodorow-Reich**, Harvard University and NBER; **Adam Guren**, Boston University and NBER; and **Timothy McQuade**, University of California, Berkeley, “The 2000s Housing Cycle with 2020 Hindsight: A Neo-Kindlebergerian View” (NBER Working Paper 29140)
- **Peter Ganong**, **Pascal J. Noel**, and **Joseph S. Vavra**, University of Chicago and NBER, and **Fiona E. Greig** and **Daniel M. Sullivan**, JPMorgan Chase Institute, “Spending and Job Search Impacts of Expanded Unemployment Benefits: Evidence from Administrative Micro Data”
- **Spencer Yongwook Kwon**, Harvard University; **Yueran Ma**, University of Chicago and NBER; and **Kaspar Zimmermann**, Leibniz Institute for Financial Research SAFE, “100 Years of Rising Corporate Concentration”
- **Erik Hurst**, University of Chicago and NBER; **Yona Rubinstein**, London School of Economics; and **Kazuatsu Shimizu**, Massachusetts Institute of Technology, “Task Based Discrimination” (NBER Working Paper 29022)
- **Maryam Farboodi**, Massachusetts Institute of Technology and NBER, and **Laura Veldkamp**, Columbia University and NBER, “A Model of the Data Economy”

Summaries of these papers are at <https://www.nber.org/conferences/efg-research-meeting-fall-2021>

Market Design

Members of the NBER's Market Design Working Group met October 21–23 online. Program Directors Michael Ostrovsky of Stanford University and Parag A. Pathak of the Massachusetts Institute of Technology organized the meeting. These researchers' papers were presented and discussed:

- **Eric Budish**, University of Chicago and NBER; **Peter Cramton**, University of Cologne; **Albert Kyle** and **David Malec**, University of Maryland; and **Jeongmin Lee**, Washington University in St. Louis, “Flow Trading”
- **Nikhil Agarwal**, Massachusetts Institute of Technology and NBER; **Charles Hodgson**, Yale University; and **Paulo J. Somaini**, Stanford University and NBER, “Choices and Outcomes in Assignment Mechanisms: The Allocation of Deceased Donor Kidneys” (NBER Working Paper [28064](#))
- **Itai Ashlagi** and **Amin Saberi**, Stanford University; **Jacob D. Leshno**, University of Chicago; and **Pengyu Qian**, Purdue University, “Price Discovery in Waiting Lists: A Connection to Stochastic Gradient Descent”
- **Mohammad Akbarpour**, **Yeganeh Alimohammadi**, and **Amin Saberi**, Stanford University, and **Shengwu Li**, Harvard University, “The Value of Excess Supply in Spatial Matching Markets”
- **Julien Grenet**, Paris School of Economics; **YingHua He**, Rice University; and **Dorothea Kübler**, WZB Berlin Social Science Center, “Decentralizing Centralized Matching Markets: Implications from Early Offers in University Admissions”
- **Michael Ostrovsky**, Stanford University and NBER, “Choice Screen Auctions”
- **Kyle Greenberg**, United States Military Academy at West Point; **Parag A. Pathak**; and **Tayfun Sönmez**, Boston College, “Mechanism Design Meets Priority Design: Redesigning the US Army’s Branching Process” (NBER Working Paper [28911](#))
- **Omer Edhan**, University of Manchester; **Ravi Jagadeesan**, Stanford University; and **Elizabeth C. Baldwin**, **Paul D. Klemperer**, and **Alexander Teytelboym**, University of Oxford, “The Equilibrium Existence Duality: Equilibrium with Indivisibilities and Income Effects”
- **Xintong Wang**, Harvard University; **David Pennock** and **David M. Rothschild**, Microsoft Research; **Nikhil Devanur**, Amazon; **Biaoshuai Tao**, Shanghai Jiao Tong University; and **Michael Wellman**, University of Michigan, “Designing a Combinatorial Financial Options Market”
- **Julien Combe**, CREST-École polytechnique; **Umut M. Dur**, North Carolina State University; **Olivier Tercieux**, Paris School of Economics; **Camille Terrier**, University of Lausanne; and **M. Utku Ünver**, Boston College, “Mechanism and Priority Design for Distributional Objectives: An Application to Improve the Distribution of Teachers in Schools”
- **Paul Milgrom** and **Mitchell L. Watt**, Stanford University, “Linear Pricing Mechanisms without Convexity”
- **Francisco Castro**, University of California, Los Angeles; **Hongyao Ma**, Columbia University; **Hamid Nazerzadeh**, University of Southern California; and **Chiwei Yan**, University of Washington, “Randomized FIFO Mechanisms”

Summaries of these papers are at <https://www.nber.org/conferences/market-design-working-group-meeting-fall-2021>

Development Economics/BREAD

A joint meeting of the NBER's Development Economics Program and the Bureau for Research and Economic Analysis of Development (BREAD) was held October 22 online. Robin Burgess of the London School of Economics, Program Director Benjamin A. Olken, and Research Associates Samuel Bazzi of the University of California, San Diego, Jing Cai of the University of Maryland, Arun G. Chandrasekhar of Stanford University, Chang-Tai Hsieh of the University of Chicago, and Tavneet Suri of the Massachusetts Institute of Technology organized the meeting. These researchers' papers were presented and discussed:

- **Martin Beraja**, Massachusetts Institute of Technology and NBER; **Andrew Kao**, Harvard University; **David Y. Yang**, Harvard University and NBER; and **Noam Yuchtman**, London School of Economics, "AI-tocracy: The Symbiosis of Autocrats and Innovators"
- **Lucie Gadenne**, Warwick University; **Samuel Norris**, University of British Columbia; **Monica Singhal**, University of California, Davis and NBER; and **Sandip Sukhtankar**, University of Virginia, "In-Kind Transfers as Insurance" (NBER Working Paper [28507](#))
- **Jacob Moscona**, Harvard University, and **Karthik Sastry**, Massachusetts Institute of Technology, "Inappropriate Technology: Evidence from Global Agriculture"
- **John J. Conlon**, Harvard University; **Malavika Mani**, Columbia University; **Gautam Rao**, Harvard University and NBER; **Matthew W. Ridley**, Massachusetts Institute of Technology; and **Frank Schilbach**, Massachusetts Institute of Technology and NBER, "Learning in the Household" (NBER Working Paper [28844](#))
- **Christoph Albert** and **Paula Bustos**, Center for Monetary and Financial Studies, and **Jacopo Ponticelli**, Northwestern University and NBER, "The Effects of Climate Change on Labor and Capital Reallocation" (NBER Working Paper [28995](#))
- **Sabrin A. Beg**, University of Delaware; **Anne E. Fitzpatrick**, University of Massachusetts Boston; and **Adrienne Lucas**, University of Delaware and NBER, "Improving Public Sector Service Delivery: The Importance of Management"
- **Matthew Grant**, Dartmouth College, and **Meredith Startz**, Dartmouth College and NBER, "Cutting Out the Middleman: The Structure of Chains of Intermediation"
- **Michael Kremer**, University of Chicago and NBER; **Jack Willis**, Columbia University and NBER; and **Yang You**, University of Hong Kong, "Converging to Convergence"
- **Saad Gulzar**, Stanford University, and **Muhammad Yasir Khan**, University of Pittsburgh, "'Good Politicians': Experimental Evidence on Motivations for Political Candidacy and Government Performance"
- **Mark Buntaine**, University of California, Santa Barbara; **Michael Greenstone**, University of Chicago and NBER; **Guojun He**, University of Hong Kong; **Mengdi Liu**, University of International Business and Economics; **Shaoda Wang**, University of Chicago; and **Bing Zhang**, Nanjing University, "Citizen Participation and Government Accountability: National-Scale Experimental Evidence from Pollution Appeals in China"
- **Natalia Rigol**, Harvard University and NBER, and **Benjamin N. Roth**, Harvard University, "Strategic Disclosure of Loan Officers and Graduation from Microfinance: Evidence from Chile"
- **Tahir Andrabi**, Pomona College; **Natalie Bau**, University of California, Los Angeles and NBER; **Jishnu Das**, Georgetown University and NBER; **Naureen Karachiwalla**, International Food Policy Research Institute; and **Asim Ijaz Khwaja**, Harvard University and NBER, "Crowding In Private Quality: The Equilibrium Effects of Public Spending in Education"

Summaries of these papers are at <https://www.nber.org/conferences/development-economics-bread-program-meeting-fall-2021>

Insurance

The NBER's Insurance Working Group met October 22 in an online session organized by the group's directors, Benjamin R. Handel of the University of California, Berkeley and Motohiro Yogo of Princeton University. The following papers were presented and discussed:

- **Naoki Aizawa**, University of Wisconsin-Madison and NBER, and **Ami Ko**, Georgetown University, "Dynamic Pricing Regulation and Welfare in Insurance Markets"
- **Marco Cosconati**, Bank of Italy and Institute for the Supervision of Insurance (IVASS), "The Effect of Insurance Telematics and Financial Penalties on Market-Wide Moral Hazard"
- **Mark L. Egan**, Harvard University and NBER; **Shan Ge**, New York University; and **Johnny Tang**, Harvard University, "Conflicting Interests and the Effect of Fiduciary Duty: Evidence from Variable Annuities" (NBER Working Paper [27577](#))
- **Sangmin Oh**, University of Chicago; **Ishita Sen**, Harvard University; and **Ana-Maria Tenekedjieva**, Federal Reserve Board, "Pricing of Climate Risk Insurance: Regulatory Frictions and Cross-Subsidies"
- **Erasmus Giambona**, Syracuse University; **Anil Kumar**, Aarhus University; and **Gordon M. Phillips**, Dartmouth College and NBER, "Hedging and Competition" (NBER Working Paper [29207](#))

Summaries of these papers are at <https://www.nber.org/conferences/insurance-working-group-meeting-fall-2021>

Public Economics

Affiliates of the Public Economics Program met October 28 online. The meeting was organized by Research Associates Hunt Alcott of Microsoft Research and Juan Carlos Suárez Serrato of Duke University. The following papers were presented and discussed:

- **Kristoffer B. Hvidberg** and **Claus Kreiner**, University of Copenhagen; and **Stefanie Stantcheva**, Harvard University and NBER, "Social Position and Fairness Views" (NBER Working Paper [28099](#))
- **Colleen Carey**, Cornell University and NBER, and **Nolan H. Miller** and **David Molitor**, University of Illinois at Urbana-Champaign and NBER, "Why Does Disability Increase during Recessions? Evidence from Medicare"
- **Santosh Anagol**, University of Pennsylvania; **Fernando V. Ferreira**, University of Pennsylvania and NBER; and **Jonah M. Rexer**, Princeton University, "Estimating the Economic Value of Zoning Reform" (NBER Working Paper [29440](#))
- **Ellora Derenoncourt**, Princeton University and NBER, and **Chi Hyun Kim**, **Moritz Kuhn**, and **Moritz Schularick**, University of Bonn, "The Racial Wealth Gap, 1860–2020"
- **Amir Kermani**, University of California, Berkeley and NBER, and **Francis Wong**, NBER Postdoctoral Fellow, "Racial Disparities in Housing Returns" (NBER Working Paper [29306](#))
- **Antoine Ferey**, University of Munich; **Benjamin Lockwood**, University of Pennsylvania and NBER; **Dmitry Taubinsky**, University of California, Berkeley and NBER, "Sufficient Statistics for Nonlinear Tax Systems with Preference Heterogeneity"

Summaries of these papers are at <https://www.nber.org/conferences/public-economics-program-meeting-fall-2021>

Insurance and Public Economics: Joint Meeting

The Insurance Working Group and the Public Economics Program met jointly online on October 29. The following papers were presented and discussed in the joint session:

- **Mark Shepard**, Harvard University and NBER, and **Myles Wagner**, Harvard University, “Reducing Ordeals through Automatic Enrollment: Evidence from a Health Insurance Exchange”
- **Paul J. Eliason**, Brigham Young University, **Riley J. League**, Duke University, **Jetson Leder-Luis**, Boston University, **Ryan C. McDevitt**, Duke University, and **James W. Roberts**, Duke University and NBER, “Ambulance Taxis: The Impact of Regulation and Litigation on Health Care Fraud” (NBER Working Paper [29491](#))
- **Zarek C. Brot-Goldberg**, University of Chicago; **Timothy Layton**, Harvard University and NBER; and **Samantha Burn** and **Boris Vabson**, Harvard University, “Rationing Medicine through Bureaucracy: Authorization Restrictions in Medicare”
- **Abe Dunn**, Bureau of Economic Analysis; **Joshua D. Gottlieb**, University of Chicago and NBER; **Adam Shapiro**, Federal Reserve Bank of San Francisco; **Daniel J. Sonnenstuhl**, University of Chicago; and **Pietro Tebaldi**, Columbia University and NBER, “A Denial a Day Keeps the Doctor Away” (NBER Working Paper [29010](#))
- **Marta Lachowska**, W. E. Upjohn Institute for Employment Research; **Isaac Sorkin**, Stanford University and NBER; and **Stephen A. Woodbury**, Michigan State University, “Firms and Unemployment Insurance Take-Up”
- **Daniel Herbst**, University of Arizona, and **Nathaniel Hendren**, Harvard University and NBER, “Opportunity Unraveled: Private Information and the Missing Markets for Financing Human Capital” (NBER Working Paper [29214](#))

Summaries of some of these papers are at <https://www.nber.org/conferences/insurance-working-group-meeting-fall-2021>

International Finance and Macroeconomics

Members of the NBER’s International Finance and Macroeconomics Program met October 29 online. Research Associates Mark A. Aguiar of Princeton University and Linda Tesar of the University of Michigan organized the meeting. These researchers’ papers were presented and discussed:

- **George A. Alessandria** and **Yan Bai**, University of Rochester and NBER, and **Soo Kyung Woo**, University of Rochester, “Rising Current Account Dispersion: Financial or Trade Integration?”
- **Bruno Pellegrino**, University of Maryland; **Enrico Spolaore**, Tufts University and NBER; and **Romain Wacziarg**, University of California, Los Angeles and NBER, “Barriers to Global Capital Allocation” (NBER Working Paper [28694](#))
- **Ozge Akinci**, Federal Reserve Bank of New York; **Şebnem Kalemli-Özcan**, University of Maryland and NBER; and **Albert Queralto**, Federal Reserve Board, “Uncertainty Shocks, Capital Flows and International Risk Spillovers”
- **Luca Fornaro**, Centre de Recerca en Economia Internacional (CREI); **Martin Wolf**, University of St. Gallen; and **Gianluca Benigno**, Federal Reserve Bank of New York, “The Global Financial Resource Curse”
- **Pablo Ottonello**, University of Michigan and NBER; **Diego J. Perez**, New York University and NBER; and **Paolo Varraso**, New York University, “Are Collateral-Constraint Models Ready for Macroprudential Policy Design?”

Summaries of these papers are at:

<https://www.nber.org/conferences/international-finance-and-macroeconomics-program-meeting-fall-2021>

Asset Pricing

Members of the NBER's Asset Pricing Program met November 5 in Cambridge and online. Research Associates Martin Lettau of the University of California, Berkeley and Laura Veldkamp of Columbia University organized the meeting. These researchers' papers were presented and discussed:

- **Toomas Laarits**, New York University, "Precautionary Savings and the Stock-Bond Covariance"
- **Pulak Ghosh**, Indian Institute of Management Bangalore; **Boris Vallee**, Harvard University; and **Yao Zeng**, University of Pennsylvania, "FinTech Lending and Cashless Payments"
- **Vimal Balasubramaniam**, Queen Mary University of London; **John Y. Campbell**, Harvard University and NBER; **Tarun Ramadorai**, Imperial College London; and **Benjamin Ranish**, Federal Reserve Board, "Who Owns What? A Factor Model for Direct Stock Holding"
- **Samuel M. Hartzmark**, University of Chicago and NBER, and **David H. Solomon**, Boston College, "Predictable Price Pressure"
- **Jinfei Sheng**, **Zheng Sun**, and **Wanyi Wang**, University of California, Irvine, "Partisan Return Gap: The Polarized Stock Market in the Time of a Pandemic"

Summaries of these papers are at <https://www.nber.org/conferences/asset-pricing-program-meeting-fall-2021>

Corporate Finance

Members of the NBER's Corporate Finance Program met November 5 in Cambridge and online. Research Associates Thomas Philippon of New York University and Joshua Rauh of Stanford University, and Program Directors Amir Sufi of the University of Chicago and Antoinette Schoar of the Massachusetts Institute of Technology organized the meeting. These researchers' papers were presented and discussed:

- **Sylvain Catherine**, University of Pennsylvania, and **Constantine Yannelis**, University of Chicago and NBER, "The Distributional Effects of Student Loan Forgiveness" (NBER Working Paper [28175](#))
- **Greg Buchak**, Stanford University; **Gregor Matvos**, Northwestern University and NBER; **Tomasz Piskorski**, Columbia University and NBER; and **Amit Seru**, Stanford University and NBER, "Why Is Intermediating Houses So Difficult? Evidence from iBuyers" (NBER Working Paper [28252](#))
- **Francesco D'Acunto**, Boston College; **Pulak Ghosh**, Indian Institute of Management Bangalore; and **Alberto G. Rossi**, Georgetown University, "How Costly Are Cultural Biases? Evidence from FinTech"
- **Will Gornall** and **Xing Liu**, University of British Columbia; **Oleg Gredil**, Tulane University; and **Sabrina T. Howell**, New York University and NBER, "Do Employees Cheer for Private Equity? The Heterogeneous Effects of Buyouts on Job Quality"

- **Daniel G. Garrett**, University of Pennsylvania; **Eric C. Ohn**, Grinnell College; and **Juan Carlos Suárez Serrato**, Duke University and NBER, “Effects of International Tax Provisions on Domestic Labor Markets”
- **Ivo Welch**, University of California, Los Angeles and NBER, “Ratios of Changes: How Real Estate Shocks Did Not Affect Corporate Investment”
- **Marina Gertsberg**, Monash University; **Johanna Mollerstrom**, George Mason University; and **Michaela Pagel**, Columbia University and NBER, “Gender Quotas and Support for Women in Board Elections” (NBER Working Paper 28463)
- **Sergey Chernenko**, Purdue University, and **David S. Scharfstein**, Harvard University and NBER, “Racial Disparities in the Paycheck Protection Program”

Summaries of these papers are at <https://www.nber.org/conferences/corporate-finance-program-meeting-fall-2021>

Behavioral Finance

Members of the NBER’s Behavioral Finance Working Group met November 12 online. Research Associate Nicholas C. Barberis of Yale University, the director of the working group, organized the meeting, which was supported by Bracebridge Capital and Fuller and Thaler Asset Management. These researchers’ papers were presented and discussed:

- **Nicholas C. Barberis**, and **Lawrence J. Jin**, California Institute of Technology, “Model-Free and Model-Based Learning As Joint Drivers of Investor Behavior”
- **Tony Qiaofeng Fan**, Stanford University; **Yucheng Liang**, Carnegie Mellon University; and **Cameron Peng**, London School of Economics, “The Inference-Forecast Gap in Belief Updating”
- **Gabriel Chodorow-Reich**, Harvard University and NBER; **Adam Guren**, Boston University and NBER; and **Timothy McQuade**, University of California, Berkeley, “The 2000s Housing Cycle with 2020 Hindsight: A Neo-Kindlebergerian View” (NBER Working Paper 29140)
- **Stefan Nagel**, University of Chicago and NBER, and **Zhengyang Xu**, City University of Hong Kong, “Dynamics of Subjective Risk Premia”
- **Joao Paulo Valente**, **Kaushik Vasudevan**, and **Tianhao Wu**, Yale University, “The Role of Beliefs in Asset Prices: Evidence from Exchange Rates”
- **Ricardo Barahona**, Erasmus University, and **Stefano Cassella** and **Kristy A. E. Jansen**, Tilburg University, “Do Teams Alleviate or Exacerbate Behavioral Biases? Evidence from Extrapolation Bias in Mutual Funds”

Summaries of these papers are at <https://www.nber.org/conferences/behavioral-finance-meeting-fall-2021>

Organizational Economics

Members of the NBER's Organizational Economics Working Group met November 12–13 in Cambridge and online. Research Associate Robert S. Gibbons of the Massachusetts Institute of Technology, the director of the working group, organized the meeting. These researchers' papers were presented and discussed:

- **Ruixue Jia**, University of California, San Diego and NBER; **Gérard Roland**, University of California, Berkeley and NBER; and **Yang Xie**, University of California, Riverside, “A Theory of Power Structure and Institutional Compatibility: China vs. Europe Revisited”
- **Michael Raith**, University of Rochester, “Employment As a Relational Obligation to Work”
- **Joshua Schwartzstein**, Harvard University, and **Adi Sunderam**, Harvard University and NBER, “Shared Models in Networks, Organizations, and Groups”
- **Shaoda Wang**, University of Chicago, and **David Y. Yang**, Harvard University and NBER, “The Political Economy of Policy Experimentations in China”
- **Nemanja Antic**, Northwestern University; **Archishman Chakraborty**, Yeshiva University; and **Rick Harbaugh**, Indiana University, “Subversive Conversations”
- **Ali Hortaçsu**, University of Chicago and NBER; **Olivia Natan**, University of California, Berkeley; **Hayden Parsley**, University of Texas at Austin; **Timothy Schweig**, University of Chicago; and **Kevin R. Williams**, Yale University and NBER, “Organizational Structure and Pricing: Evidence from a Large US Airline”
- **Nicholas Argyres** and **Giorgio Zananone**, Washington University in St. Louis, and **Ricard Gil**, Queen's University, “Outsourcing Scope and Cooperation: Evidence from Airlines”
- **Maria Guadalupe**, INSEAD; **Veronica Rappoport** and **Catherine Thomas**, London School of Economics; and **Bernard Salanié**, Columbia University, “The Perfect Match: Assortative Matching in Mergers and Acquisitions”
- **Jorg L. Spenkuch** and **Edoardo Teso**, Northwestern University, and **Guo Xu**, University of California, Berkeley and NBER, “Ideology and Performance in Public Organizations” (NBER Working Paper 28673)
- **Alan Benson**, University of Minnesota; **Danielle Li**, Massachusetts Institute of Technology and NBER; and **Kelly Shue**, Yale University and NBER, “Potential and the Gender Promotion Gap”
- **Cagatay Bircan**, European Bank for Reconstruction and Development, and **Guido Friebel** and **Tristan Stahl**, Goethe University Frankfurt, “Knowledge Teams, Careers, and Gender”
- **Niko Matouschek**, **Michael L. Powell**, and **Bryony Reich**, Northwestern University, “Organizing Modular Production”
- **Laura E. Boudreau**, Columbia University; **Rocco Macchiavello** and **Virginia Minni**, London School of Economics; and **Mari Tanaka**, Hitotsubashi University, “Union Leaders: Experimental Evidence from Myanmar”
- **Shan Aman-Rana**, University of Virginia; **Clement Minaudier**, University of Vienna; **Brais Álvarez Pereira**, Universidade NOVA SBE; and **Shamyla Chaudry**, Lahore School of Economics, “Gender and Choice over Coworkers: Experimental Evidence”

Summaries of these papers are at <https://www.nber.org/conferences/organizational-economics-fall-2021>

Monetary Economics

Members of the NBER's Monetary Economics Program met November 12 online. Research Associates Anna Cieslak of Duke University and Olivier Coibion of the University of Texas at Austin organized the meeting. These researchers' papers were presented and discussed:

- **Chengcheng Jia**, Federal Reserve Bank of Cleveland, and **Jing Cynthia Wu**, University of Notre Dame and NBER, "Average Inflation Targeting: Time Inconsistency and Intentional Ambiguity"
- **Igor Makarov**, London School of Economics, and **Antoinette Schoar**, Massachusetts Institute of Technology and NBER, "Blockchain Analysis of the Bitcoin Market" (NBER Working Paper [29396](#))
- **John Coglianesi**, Federal Reserve Board; **Maria Olsson**, BI Norwegian Business School; and **Christina Patterson**, University of Chicago and NBER, "Monetary Policy and the Labor Market: A Quasi Experiment in Sweden"
- **Fernando E. Alvarez**, University of Chicago and NBER; **Andrea Ferrara**, Northwestern University; **Erwan Gautier** and **Hervé Le Bihan**, Banque de France; and **Francesco Lippi**, LUISS Guido Carli University, "Empirical Investigation of a Sufficient Statistic for Monetary Shocks"
- **Cecilia R. Caglio** and **Matthew Darst**, Federal Reserve Board, and **Şebnem Kalemli-Özcan**, University of Maryland and NBER, "Risk-Taking and Monetary Policy Transmission: Evidence from Loans to SMEs and Large Firms"
- **Christian K. Wolf**, Massachusetts Institute of Technology and NBER, and **Alisdair McKay**, Federal Reserve Bank of Minneapolis, "What Can Time-Series Regressions Tell Us about Policy Counterfactuals?"

Summaries of these papers are at <https://www.nber.org/conferences/monetary-economics-program-meeting-fall-2021>

Labor Studies

Members of the NBER's Labor Studies Program met November 19 in Cambridge and online. Program Directors David Autor of the Massachusetts Institute of Technology and Alexandre Mas of Princeton University organized the meeting. These researchers' papers were presented and discussed:

- **David Card** and **Jesse Rothstein**, University of California, Berkeley and NBER, and **Moises Yi**, US Census Bureau, "Location, Location, Location"
- **Sara Heller**, University of Michigan and NBER, and **Judd B. Kessler**, University of Pennsylvania and NBER, "The Effects of Letters of Recommendation in the Youth Labor Market"
- **Daron Acemoglu**, Massachusetts Institute of Technology and NBER, and **Pascual Restrepo**, Boston University and NBER, "Tasks, Automation, and the Rise in US Wage Inequality" (NBER Working Paper [28920](#))
- **Joshua D. Gottlieb**, University of Chicago and NBER; **Maria Polyakova**, Stanford University and NBER; **Hugh Shiple**, University of British Columbia; and **Kevin Rinz** and **Victoria Udalova**, US Census Bureau, "Who Values Human Capitalists' Human Capital? The Earnings and Labor Supply of US Physicians"
- **Arindrajit Dube**, University of Massachusetts Amherst and NBER; **Suresh Naidu**, Columbia University and NBER; and **Adam D. Reich**, Columbia University, "Power and Dignity in the Low-Wage Labor Market: Theory and Evidence from Wal-Mart Workers"

- **Jonathon Hazell**, Massachusetts Institute of Technology; **Christina Patterson** and **Heather Sarsons**, University of Chicago and NBER; and **Bledi Taska**, Emsi Burning Glass, “National Wage Setting”

Summaries of these papers are at <https://www.nber.org/conferences/labor-studies-program-meeting-fall-2021>

Health Care

Members of the NBER’s Health Care Program met December 2–3 in Cambridge and online. Program Directors Amy Finkelstein of the Massachusetts Institute of Technology and Heidi L. Williams of Stanford University and Research Associates Sean Nicholson of Cornell University and Emily Oster of Brown University organized the meeting. These researchers’ papers were presented and discussed:

- **Mattan C. Alalouf**, University of Michigan; **Sarah Miller**, University of Michigan and NBER; and **Laura Wherry**, New York University and NBER, “What Difference Does a Diagnosis Make? Evidence from Marginal Patients” (NBER Working Paper [26363](#))
- **Jonathan A. Holmes**, University of California, Berkeley, “Does Medicaid Make Private Health Insurance Cheaper?”
- **Elisa Jacome**, Stanford University, “Mental Health and Criminal Involvement: Evidence from Losing Medicaid Eligibility”
- **Alyce S. Adams**, Stanford University; **Raymond Kluender**, Harvard University; **Neale Mahoney**, Stanford University and NBER; **Jinglin Wang**, New York University; **Francis Wong**, NBER Postdoctoral Fellow; and **Wesley Yin**, University of California, Los Angeles and NBER, “The Impact of Financial Assistance Programs on Health Care Utilization” (NBER Working Paper [29227](#))
- **Hannes Schwandt**, Northwestern University and NBER; **Janet Currie**, Princeton University and NBER; **James Banks**, University of Manchester; **Paola Bertoli**, University of Verona; **Sarah Cattan**, **Lucy Kraftman**, and **Sonya Krutikova**, Institute for Fiscal Studies; **Beatrice Zong-Ying Chao**, Northwestern University; **Claudia Costa** and **Paula Santana**, University of Coimbra; **Libertad González**, Universidad Pompeu Fabra; **Veronica Grembi**, Copenhagen Business School; **Kristiina Huttunen**, Aalto University School of Economics; **Stefano Lombardi**, VATT Institute for Economic Research; **Marlies Bär** and **Carlos Riumallo-Herl**, Erasmus University; **Ana Rodríguez-González**, Lund University; **Aline Bütikofer**, **Kjell Salvanes**, and **René Karadakic**, Norwegian School of Economics; **Josselin Thuilliez**, Université Paris 1; **Eddy van Doorslaer**, **Tom Van Ourti**, and **Bram Wouterse**, Erasmus University Rotterdam; **Joachim Winter** and **Peter Redler**, University of Munich; and **Amelie Wuppermann**, University of Halle-Wittenberg, “Inequality in Mortality between Black and White Americans by Age, Place, and Cause, and in Comparison to Europe, 1990–2018” (NBER Working Paper [29203](#))
- **Yiqun Chen**, University of Illinois at Chicago, “Team-Specific Human Capital and Team Performance: Evidence from Doctors”
- **Martin B. Hackmann**, University of California, Los Angeles and NBER; **Roman Klimke**, Harvard University; **Maria Polyakova**, Stanford University and NBER; and **Holger Seibert** and **Jörg Heining**, Institute for Employment Research (IAB), “General Equilibrium Effects of Insurance Expansions: Evidence from Long-Term Care Labor Markets”
- **Hoa Vu**, University of Wisconsin-Madison, “I Wish I Were Born in Another Time: Unintended Consequences of Immigration Enforcement on Birth Outcomes”

Summaries of these papers are at <https://www.nber.org/conferences/health-care-program-meeting-fall-2021>

Education

Members of the NBER's Education Program met December 2–3 in Cambridge and online. Program Director Caroline M. Hoxby of Stanford University organized the meeting. These researchers' papers were presented and discussed:

- **Christopher Campos**, Princeton University, and **Caitlin Kearns**, University of California, Berkeley, “Neighborhood School Choice and Competition in Public Schools: Evidence from Los Angeles’ Zones of Choice”
- **Emily E. Cook**, Tulane University, and **Sarah Turner**, University of Virginia and NBER, “Progressivity of Pricing at US Public Universities”
- **John J. Conlon**, **Spencer Yongwook Kwon**, **William E. Murdock**, and **Dev A. Patel**, Harvard University, “Beliefs, Preferences, and Student Effort”
- **Mari Tanaka** and **Chiaki Moriguchi**, Hitotsubashi University, and **Yusuke Narita**, Yale University, “Meritocracy and Its Discontents: Long-Run Effects of Repeated School Admission Reforms”
- **Alex Eble**, Columbia University, and **Feng Hu**, University of Science and Technology Beijing, “(Mis)Information and the Value of College Names”
- **Jorge Agüero**, University of Connecticut; **Marta Favara**, University of Oxford; **Catherine Porter**, Lancaster University; and **Alan Sánchez**, GRADE, “Do More School Resources Increase Learning Outcomes? Evidence from an Extended School-Day Reform”
- **Tareena Musaddiq**, University of Michigan; **Kevin M. Stange**, University of Michigan and NBER; **Andrew Bacher-Hicks**, Boston University; and **Joshua Goodman**, Boston University and NBER, “The Pandemic’s Effect on Demand for Public Schools, Homeschooling and Private Schools” (NBER Working Paper [29262](#))
- **Joshua Angrist** and **Parag A. Pathak**, Massachusetts Institute of Technology and NBER; **Guthrie Gray-Lobe**, University of Chicago; and **Clemence Idoux**, Massachusetts Institute of Technology, “Is Busing Worth the Trip? School Travel Effects in Boston and New York”

Summaries of some of these papers are at <https://www.nber.org/conferences/education-program-meeting-fall-2021>

Entrepreneurship

Members of the NBER's Entrepreneurship Working Group met December 3 in Cambridge and online. Research Associates Josh Lerner of Harvard University and David T. Robinson of Duke University, who directs the working group, organized the meeting, which was supported by Ewing Marion Kauffman Foundation Grants RG-202003-8269 and 20140669. These researchers' papers were presented and discussed:

- **Celine Yue Fei**, University of North Carolina at Chapel Hill, and **Keer Yang**, University of Minnesota, “Fintech and Racial Barriers in Small Business Lending”
- **Shai Bernstein**, Harvard University and NBER; **Kunal Mehta**, AngelList; **Richard R. Townsend**, University of California, San Diego and NBER; and **Ting Xu**, University of Virginia, “Reputation Spillovers in Venture Capital: Evidence from a Randomized Field Experiment”

- **Andrea Coali** and **Alfonso Gambardella**, Bocconi University, and **Elena Novelli**, Bayes Business School, “Understanding Probabilistic Reasoning in Entrepreneurship”
- **Sergey Chernenko**, Purdue University, and **David S. Scharfstein**, Harvard University and NBER, “Racial Disparities in the Paycheck Protection Program”
- **Camille Hebert**, University of Toronto, “Learning from Errors in Entrepreneurship”
- **Laura Chioda**, **David Contreras-Loya**, and **Dana Carney**, University of California, Berkeley, and **Paul Gertler**, University of California, Berkeley and NBER, “Making Entrepreneurs: Effect of Training Youth in Business Skills on Enterprise and Employment Creation” (NBER Working Paper [28845](#))
- **Jessica Jeffers** and **Kelly Posenau**, University of Chicago, and **Tianshu Lyu**, Yale University, “The Risk and Return of Impact Investing Funds”

Summaries of these papers are at <https://www.nber.org/conferences/entrepreneurship-working-group-fall-2021>

International Trade and Investment

Members of the NBER’s International Trade and Investment Program met December 3–4 in Cambridge and online. Program Director Stephen J. Redding of Princeton University organized the meeting. These researchers’ papers were presented and discussed:

- **Kala Krishna**, Pennsylvania State University and NBER; **Carlos A. Salamanca** and **Yuta Suzuki**, Pennsylvania State University; and **Christian Volpe Martincus**, Inter-American Development Bank, “Learning to Use Trade Agreements” (NBER Working Paper [29319](#))
- **Nicolas de Roux** and **Marcela Eslava**, Universidad de los Andes; **Santiago Franco**, University of Chicago; and **Eric Verhoogen**, Columbia University and NBER, “Estimating Production Functions in Differentiated-Product Industries with Quantity Information and External Instruments” (NBER Working Paper [28323](#))
- **David Atkin** and **Arnaud Costinot**, Massachusetts Institute of Technology and NBER, and **Masao Fukui**, Massachusetts Institute of Technology, “Globalization and the Ladder of Development: Pushed to the Top or Held at the Bottom?” (NBER Working Paper [29500](#))
- **James E. Anderson**, Boston College and NBER, “Nonparametric Gravity”
- **Laura Alfaro**, Harvard University and NBER; **Cathy Ge Bao** and **Junjie Hong**, University of International Business and Economics; **Maggie Chen**, George Washington University; and **Claudia Steinwender**, Massachusetts Institute of Technology and NBER, “Omnia Juncta in Uno: Foreign Powers and Trademark Protection in Shanghai’s Concession Era”
- **Stephan Heblich**, University of Toronto; **Stephen J. Redding**; and **Yanos Zylberberg**, University of Bristol, “The Distributional Consequences of Trade: Evidence from the Repeal of the Corn Laws”
- **Nuno Limão**, University of Maryland and NBER, and **Yang Xu**, Xiamen University, “Size, Trade, Technology and the Division of Labor” (NBER Working Paper [28969](#))
- **George A. Alessandria**, University of Rochester and NBER; **Shafaat Y. Khan**, World Bank; **Armen Khederlarian**, University of Connecticut; **Kim J. Ruhl**, University of Wisconsin-Madison and NBER; and **Joseph B. Steinberg**, University of Toronto, “Trade-Policy Dynamics: Evidence from 60 Years of US-China Trade”

- **Sebastian Heise**, Federal Reserve Bank of New York; **Justin R. Pierce**, Federal Reserve Board; **Georg Schaur**, University of Tennessee; and **Peter K. Schott**, Yale University and NBER, “Tariff Rate Uncertainty and the Structure of Supply Chains”
- **Antoine Gervais**, Université de Sherbrooke; **James R. Markusen**, University of Colorado Boulder and NBER; and **Anthony Venables**, University of Oxford, “Regional Specialization: From the Geography of Industries to the Geography of Jobs”

Summaries of some of these papers are at <https://www.nber.org/conferences/iti-program-meeting-fall-2021>

Health Economics

Members of the NBER’s Health Economics Program met December 10 in Cambridge and online. Program Director Christopher S. Carpenter of Vanderbilt University and Research Associate Johanna Catherine Maclean of Temple University organized the meeting. These researchers’ papers were presented and discussed:

- **Sherajum Monira Farin**, **Lauren Hoehn-Velasco**, and **Michael F. Pesko**, Georgia State University, “The Impact of Legal Abortion on Maternal Health: Looking to the Past to Inform the Present”
- **Andrew I. Friedson**, University of Colorado Denver; **Moyan Li** and **Daniel W. Sacks**, Indiana University Bloomington; **Katherine Meckel**, University of California, San Diego and NBER; and **Daniel I. Rees**, Universidad Carlos III de Madrid, “Cigarette Taxes, Smoking, and Health in the Long Run” (NBER Working Paper 29145)
- **Monica Deza**, City University of New York and NBER; **Thanh Lu**, Cornell University; and **Johanna Catherine Maclean**, “Office-Based Mental Healthcare and Juvenile Arrests” (NBER Working Paper 29465)
- **Alon Bergman** and **Hummy Song**, University of Pennsylvania, and **Guy David**, University of Pennsylvania and NBER, “I Quit’: The Role of Schedule Volatility in Employee Turnover”
- **Alex Hollingsworth**, Indiana University Bloomington and NBER; **Krzysztof Karbownik**, Emory University and NBER; **Melissa A. Thomasson**, Miami University and NBER; and **Anthony Wray**, University of Southern Denmark, “A Gift of Health: The Duke Endowment’s Impact on Hospital Care and Mortality”
- **Paul J. Eliason**, Brigham Young University; **Riley J. League** and **Ryan C. McDevitt**, Duke University; **Jetson Leder-Luis**, Boston University; and **James W. Roberts**, Duke University and NBER, “Ambulance Taxis: The Impact of Regulation and Litigation on Health Care Fraud” (NBER Working Paper 29491)
- **Christopher Carpenter**; **Brandyn F. Churchill**, Vanderbilt University; and **Michelle M. Marcus**, Vanderbilt University and NBER, “Bad Lighting: Effects of Youth Indoor Tanning Prohibitions” (NBER Working Paper 29443)
- **Emily C. Lawler**, University of Georgia, and **Katherine G. Yewell**, University of Louisville, “The Effect of Hospital Postpartum Care Regulations on Breastfeeding and Maternal Time Allocation”
- **Michael L. Anderson** and **Lucas W. Davis**, University of California, Berkeley and NBER, “Uber and Alcohol-Related Traffic Fatalities” (NBER Working Paper 29071)
- **Stephanie G. Coffey** and **Amy Ellen Schwartz**, Syracuse University, “Towering Intellectuals? Sizing Up the Relationship between Height and Academic Success”

Summaries of these papers are at <https://www.nber.org/conferences/health-economics-program-meeting-fall-2021>

NBER Books

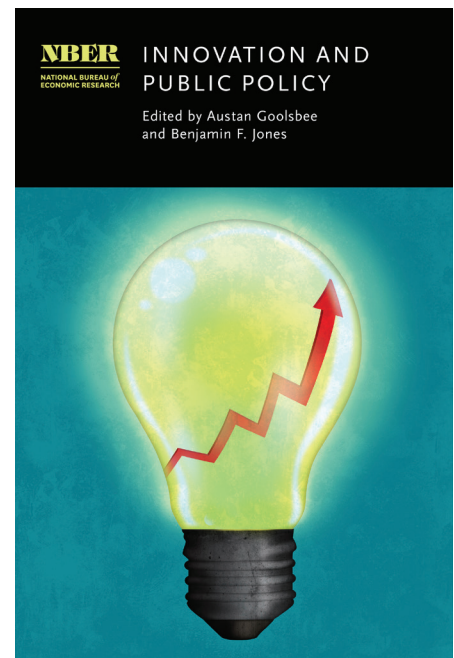
Innovation and Public Policy

Austan Goolsbee and Benjamin F. Jones, editors

<https://press.uchicago.edu/ucp/books/book/chicago/I/bo138500594.html>

In advanced economies like the United States, innovation has long been recognized as a central force for increasing economic prosperity and improving human health. The US government promotes innovation through various mechanisms, from tax credits for private sector research, to grant support for basic and applied research, to institutions like the Small Business Innovation Research Program of the National Science Foundation.

This book surveys the key components of innovation policy and the social returns to innovation investment. Its authors discuss mechanisms that can advance innovative activity, including expanding the innovative labor supply through schooling and immigration policy, and funding basic research. They also consider the role of policies that promote scientific breakthroughs and entrepreneurship.



Big Data for Twenty-First-Century Economic Statistics

Katharine G. Abraham, Ron S. Jarmin, Brian C. Moyer, and Matthew D. Shapiro, editors

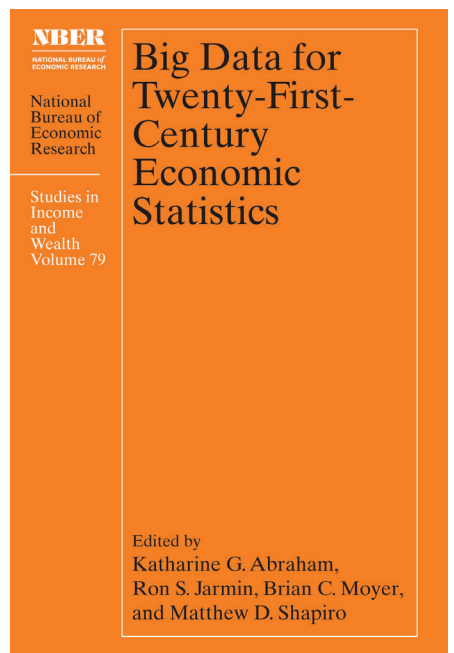
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The existing infrastructure for production of key economic statistics relies heavily on data collected through sample surveys and periodic censuses, together with administrative records generated in connection with tax administration. The increasing difficulty of obtaining survey and census responses threatens the viability of these approaches.

The growing availability of new sources of Big Data—such as scanner data on purchases, credit card transaction records, payroll information, and prices of various goods scraped from the websites of online sellers—has changed the data landscape. These new sources of data hold the

promise of allowing the statistical agencies to produce more accurate, more disaggregated, and more timely economic data to meet the needs of policymakers and other data users.

This volume documents progress made toward that goal and the challenges to be overcome to realize the full potential of Big Data in the production of economic statistics. It describes the deployment of Big Data to solve both existing and novel challenges in economic measurement, and will be of interest to statistical agency staff, academic researchers, and other serious users of economic statistics.



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