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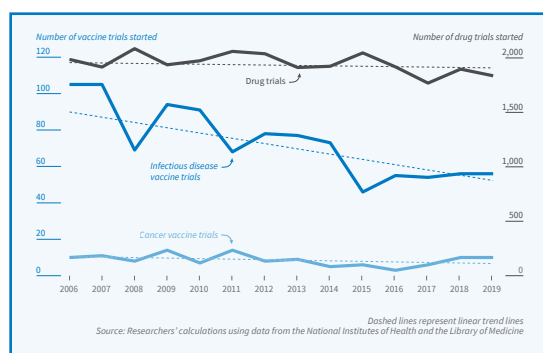
NATIONAL BUREAU OF ECONOMIC RESEARCH

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Project Report

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The NBER Retirement and Disability Research Center

Nicole Maestas *

The NBER Retirement and Disability Research Center (RDRC) conducts research on issues relevant to Social Security policy. It is part of a national consortium of competitively selected research centers supported by the Social Security Administration (SSA) under five-year cooperative agreements. In addition to the NBER center, the consortium includes research centers at the University of Michigan, Boston College, and the University of Wisconsin. The consortium helps inform the national debate on retirement and disability policy by providing rigorous evidence relevant to Social Security programs and their effects in the population. Consortium research is regularly used by the SSA and Congress to inform policy decisions.

The current RDRC was created in 2018 from the merger of NBER's Retirement Research Center (2003–18) and Disability Research Center (2012–18). It receives funding for between 15 and 20 new research projects each year. Projects last one year, with multiyear agendas proceeding as a sequence of one-year projects. More than 80 researchers are currently involved in RDRC projects. In addition, the RDRC has a training program that supports two graduate student fellows and two postdoctoral fellows each year, organizes workshops and conferences, and disseminates research findings through the [NBER Bulletin on Retirement and Disability](#).

The center's research agenda addresses five broad research themes as well as special topics that reflect current SSA priorities. They are 1) enrollment trends and determinants, 2) measuring sources of income and adequacy, 3) labor force participation, 4) program operations, and 5) related programs and program interactions.

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Special topics include the opioid epidemic and, most recently, the COVID-19 pandemic. This report highlights some recent research projects that have been carried out under the auspices of the RDRC. They represent only a small fraction of the large body of work by RDRC researchers.

Enrollment Trends and Determinants

One of the most hotly debated issues in disability policy has been the sources of Social Security Disability Insurance (SSDI) caseload growth over the last several decades. Has growth been a consequence of population health, economic factors, or demographics? Jeffrey Liebman sheds light on this debate by showing that the sources of program growth differed over time. From 1985 to 1993, the period immediately following the 1984 Social Security amendments, non-health factors such as economic incentives were the primary drivers of growth, with demographic factors playing little role. But from 1993 to 2007, demographic factors, such as population aging and women attaining insured status, accounted for two-thirds of the growth, while nonhealth factors such as economic incentives accounted for just one-third.¹

Education is an important mediating factor for SSDI enrollment. James Poterba, Steven Venti, and David Wise estimate a disability insurance (DI) participation rate of 12.3 percent for women aged 50–61 with less than a high school diploma, but only 2.4 percent for women with a college degree for the period 1992–2012.² The gap is even larger among men, with a DI participation rate of 16.9 percent among those without a high school diploma compared to just 2.6 percent among college graduates. About three-quarters of the education-participation gap among women is explained by differences in health, while health differences explain only 38 percent of the gap among men.

One highly relevant measure of population health for Social Security's programs is life expectancy. Raj Chetty, Michael Stepner, Sarah Abraham, Shelby Lin, Benjamin Scuderi, Nicolas Turner, Augustin Bergeron, and David Cutler analyze 1.4 billion de-

identified tax records for the US population to investigate the association between income and life expectancy.³ The researchers document wide variation in life expectancy by income and geography, finding that the gap in life expectancy between the richest and poorest 1 percent is 14.6 years for men and 10.1 years for women. Moreover, between 2001 and 2014, life expectancy among those in the top 5 percent of the income distribution grew by approximately 2.5 years, while life expectancy at the bottom of the income distribution grew very little.

Many RDRC studies have sought to understand enrollment trends by investigating geographic variations in DI application and participation. Research by John Friedman, Ithai Lurie, and Magne Mogstad finds that adult children from lower-income families have widely varying probabilities of DI enrollment depending on where they grew up.⁴ For example, the largest concentration of highest-DI enrollment areas is in New England, while the lowest-DI areas are in California, in or bordering Texas, and in New York City. In striking contrast, adult children from higher-income families show little geographic variation in their DI enrollment rate. Studying the effect of moving across places as a way of learning how place affects DI application, the researchers find that about 30 percent of the place-based differences are causal.

A substantial fraction of the geographic variation in DI rates can be explained by local labor market conditions. For example, Kathleen Mullen, Alexander Strand, and I find that the

Great Recession led 1.4 million former workers to apply for DI benefits during 2008–2012; nearly 1 million (72 percent) were induced in the sense that they otherwise would not have applied, while the rest (28 percent) would have applied anyway, and the timing of their application was accelerated.⁵ These induced enrollments amount to more than 400,000 incremental beneficiaries with estimated DI benefit obligations of \$55 billion

well approximated by a system like that in the US, where there are three accounts: a completely liquid savings account, a completely illiquid account like Social Security, and a partially liquid account, such as a 401(k) account with an early withdrawal penalty.

Chetty, Friedman, Søren Leth-Petersen, Torben Heien Nielsen, and Tore Olsen investigate active versus passive savings behavior using features of the retirement savings system in Denmark and detailed administrative data.⁷ They find that 85 percent of individuals are passive savers who do not respond to savings incentives. As a result, policies such as automatic contributions to retirement accounts, which require no action on the part of individuals, result in greater wealth accumulation than do policies such as tax subsidies, which require individuals to take action to take advantage of the subsidy.

Income adequacy for disability beneficiaries has also been a focus of attention, in particular families who receive SSI payments for children with disabilities. Manasi Deshpande finds evidence that SSI payments have a stabilizing effect on household incomes, among other benefits; when children are removed from the program, parents fully replace lost benefits with earnings.⁸

Labor Force Participation

Labor force participation is another major area of RDRC research. Researchers have investigated population trends in labor force participation, which affect the financing of SSA programs, as well as the disincen-

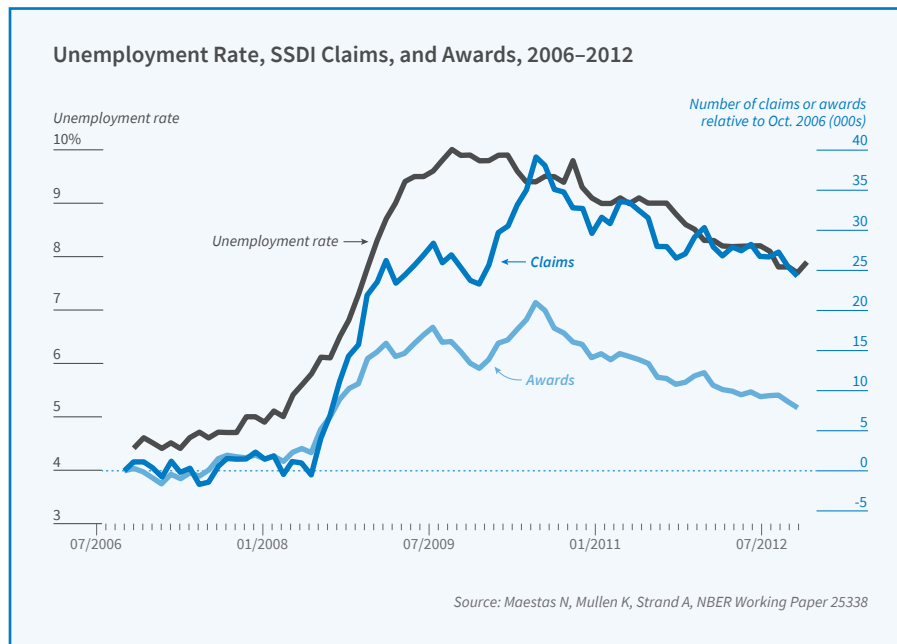


Figure 1

in present value. Including the value of Medicare benefits for which these DI beneficiaries are eligible, the cost is nearly \$100 billion.

Measuring Sources of Income and Adequacy

RDRC research projects have examined income adequacy for beneficiaries of Social Security programs. As just one recent example, John Beshears, James Choi, Christopher Clayton, Christopher Harris, David Laibson, and Brigitte Madrian calculate the socially optimal level of illiquidity in a retirement savings system in which households have heterogeneous present bias.⁶ Remarkably, they find that the social optimum is

tive effects of Social Security policies on labor supply. Axel Börsch-Supan and Courtney Coile are leading a long-running cross-national project investigating the relationship between social security policies and labor force participation at older ages. They find that Social Security reforms in the US and 11 other high-income countries during the last three decades reduced the effective tax on work at older ages, which provides a partial explanation for the rise in labor force participation at older ages that has occurred in these countries since 1990.⁹

Contract work is increasingly common at older ages, and is often undercounted in traditional surveys. Katharine Abraham, Brad Hershbein, and Susan Houseman find that self-employment is more prevalent at older ages than suggested by traditional surveys when contract work is accounted for. The share of employed workers whose main job is self-employment rises monotonically with age, from 20 percent at ages 18–49 to 68 percent for those ages 75–79.¹⁰ The self-employed are most commonly independent contractors, with one-quarter of independent contractors age 50 and older working for a former employer.

Richard Frank, Sherry Glied, Keith Marple, and Morgan Shields examine how

changes in the nature of work have impacted the employment rate of people with mental illnesses. They find that over the past 20 years, people with serious mental health conditions have been less likely to work in part because the jobs they have traditionally held have been most at risk of being eliminated by mechanization and artificial intelligence.¹¹

Rates of workplace accommoda-

tion for US workers with disabilities are understood to be quite low, despite the legal requirement of the Americans with Disabilities Act. Mullen, Stephanie Rennane, and I find that measurement issues in survey data are partly to blame. We estimate that the rate of accommodation availability among individuals who are employed and for whom accommodation does or would increase the ability to work is 56

percent to 65 percent—two to three times higher than rates estimated in the existing literature.¹² Although this estimated unmet need for accommodation is lower than previous estimates, it is still economically large.

David Autor, Mogstad, Andreas Ravndal Kostøl, and Bradley Setzler estimate the causal effects of DI receipt in Norway on earnings, household income, consumption, and fiscal costs. Among other findings, DI benefits raise average household income and consumption expenditures by 16 and 18 percent, respectively, providing new evidence of the consumption smoothing benefits of disability payments.¹³ Most interesting, however, are sharp variations by marital status: income and consumption rise by 40 percent among unmarried applicants, but not at all among married applicants because of offsetting spousal labor supply adjustments.

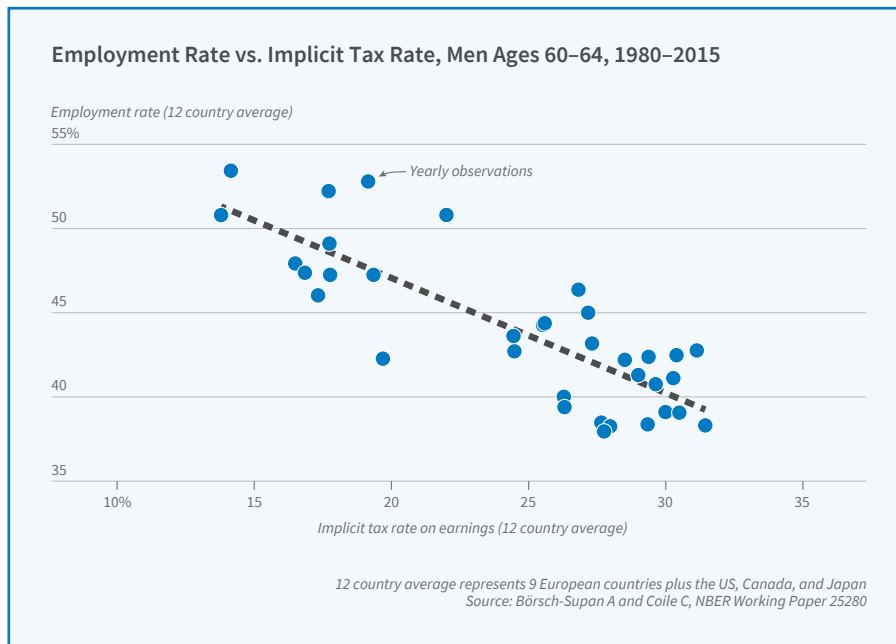


Figure 2

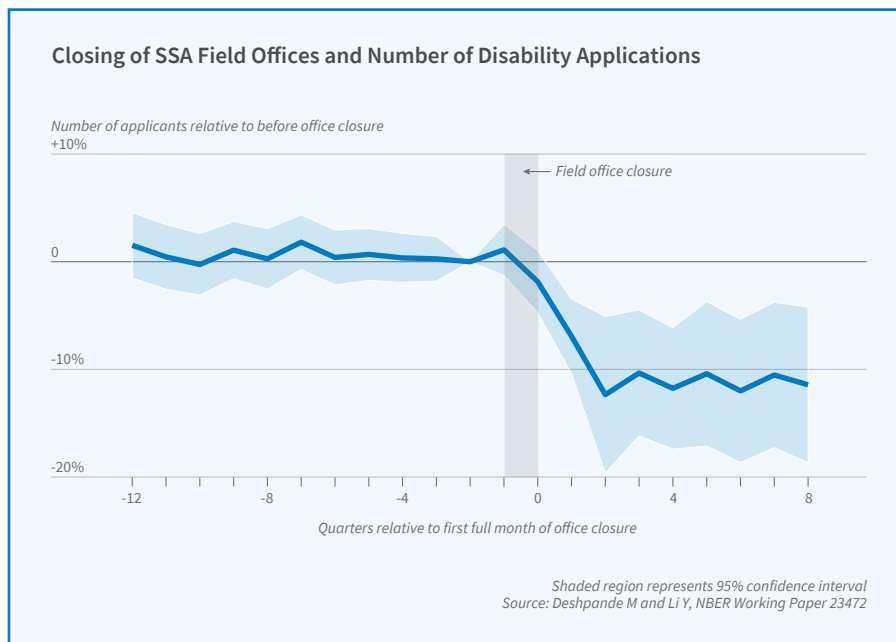


Figure 3

Program Operations

Deshpande and Yue Li investigate application costs and target efficiency in the context of the SSDI program. They find that closing a Social Security field office leads to a persistent 16 percent decline in the number of SSDI beneficiaries in the surrounding communities. However, disability applications fall by only 10 percent, and congestion increases at neighboring offices.¹⁴

Several RDRC projects have examined the labor supply effects of Social Security program parameters and rules, such as the SSDI benefit amount or rules that impose an implicit tax on earnings in disability and retirement programs. For instance, Alex Gelber, Timothy Moore, and Alexander Strand find that as SSDI benefits rise by one dollar, earnings fall by only three cents.¹⁵ Gelber, Damon Jones, Daniel Sacks, and Jae Song use administrative data to revisit the effect

of the Social Security annual earnings test on labor supply. They find that the earnings test reduces the employment rate of workers ages 63–64 by at least 1.2 percentage points.¹⁶ Kostøl and Mogstad analyze a benefit offset program introduced in Norway in 2005 that allowed beneficiaries to keep more of their earnings by reducing their benefits by approximately \$0.60 for every \$1 earned above an exempt threshold. They find the benefit offset increased the labor force participation of beneficiaries by 8.5 percentage points and reduced program costs.¹⁷

Related Programs and Program Interactions

Potential interactions between the SSDI program and other programs, such as unemployment insurance, have

been of considerable interest. Focusing on the Great Recession, Andreas Mueller, Jesse Rothstein, and Till von Wachter explore whether individuals are more likely to apply for SSDI benefits once their eligibility for unemployment benefits is exhausted. They find no indication that the expiration of unemployment benefits causes SSDI applications to rise.¹⁸

RDRC projects have also inves-

Special Topics

Public health crises have wide ramifications for Social Security programs. The coming year will see new RDRC research on the impacts of the COVID-19 pandemic. In recent years, however, researchers have focused on the opioid epidemic. Cutler, Ellen Meara, and Susan Stewart investigate whether expanded use of opioid ther-

apy to treat pain led to reduced participation in the SSDI program. They find little variation over time in the proportion of those diagnosed with back pain who enroll in DI, despite the dramatic rise in use of opioids.²⁰ In other words, if opioids made back pain less debilitating, their increasing use did not translate into reductions in DI participation. Rather, a closely related paper by these researchers finds that a 30 percent rise in opioid

shipments to a state is associated with a 5 percent increase in DI applications.²¹ The percentage of DI beneficiaries receiving high-dosage opioid drugs varies dramatically across states, from 1.6 percent to 11.5 percent. Amy Finkelstein, Matthew Gentzkow, and Heidi Williams estimate that a quarter of the variation in opioid abuse among SSDI beneficiaries is explained by place-specific factors such as local supply and behavior of physicians.²²

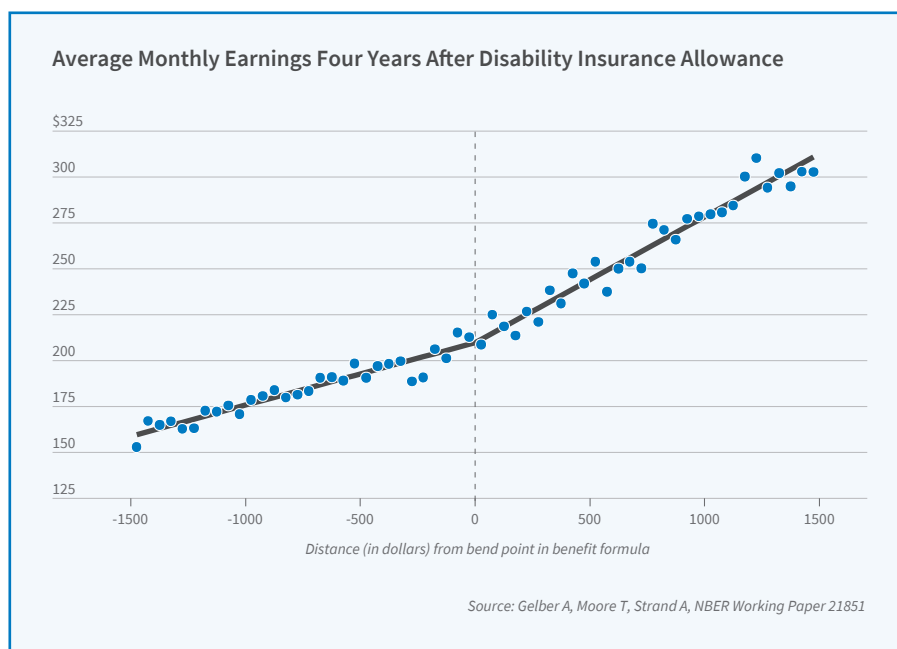


Figure 4

tigated retirement and disability programs that have different program rules than Social Security programs. One such program is Disability Compensation (DC) from the Department of Veterans Affairs, where, in sharp contrast to the SSDI program, DC benefits are paid regardless of other earnings. Focusing on a reform that raised DC benefits for some veterans and not others, Coile, Mark Duggan, and Audrey Guo find that veterans who were eligible for higher DC benefits reduced their labor force participation, hours of work, and earned income relative to those who were not.¹⁹ But self-employment among those with a benefit increase rose by 4.1 percentage points relative to those without an increase, offsetting a decline of 6.5 percentage points in wage and salary work.

¹ “Understanding the Increase in Disability Insurance Benefit Receipt in the United States,” Liebman J. *Journal of Economic Perspectives* 29(2), Spring 2015, pp. 123–150.

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² “The Long Reach of Education:

Health, Wealth, and Disability Insurance Participation,” Poterba J, Venti S, Wise D. NBER DRC Working Paper NB15-01, June 2016.

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³ “The Association between Income and Life Expectancy in the United States, 2001-2014,” Chetty R, Stepner M, Abraham S, Lin S, Scuderi B, Turner N, Bergeron A, Cutler D. *Journal of the American Medical Association* 315(16), April 2016, pp. 1750–1766.

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⁴ “Geographic Differences in Disability Insurance Rates,” Friedman J, Lurie I, Mogstad M. NBER DRC Working Paper NB17-01, September 2017.

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⁵ “The Effect of Economic Conditions on the Disability Insurance Program: Evidence from the Great Recession,” Maestas N, Mullen K, Strand A. NBER Working Paper 25338, December 2018.

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⁶ “Optimal Illiquidity,” Beshears J, Choi J, Clayton C, Harris C, Laibson D, Madrian B. NBER Working Paper 27459, July 2020.

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⁷ “Active vs. Passive Decisions and Crowd-Out in Retirement Savings Accounts: Evidence from Denmark,” Chetty R, Friedman J, Leth-Petersen S, Nielsen TH, Olsen T. *The Quarterly Journal of Economics* 129(3), August 2014, pp. 1141–1219.

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⁸ “The Effect of Disability Payments on Household Earnings and Income: Evidence from the SSI Children’s Program,” Deshpande M. *Review of Economics and Statistics* 98(4), October 2016, pp. 638–654.

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⁹ “Reforms and Retirement Incentives: Introduction and Summary,” Börsch-Supan A, Coile C. In *Social Security Programs and Retirement around the World: Reforms and Retirement Incentives*, Börsch-Supan A, Coile C, editors, pp. 1–42. Chicago: University of Chicago Press, 2021.

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¹⁰ “Contract Work at Older Ages,” Abraham K, Hershbein B, Houseman S. NBER Working Paper 26612, January 2020.

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¹¹ “Changing Labor Markets and Mental Illness: Impacts on Work and Disability,” Frank R, Glied S, Marple K, Shields M. NBER RDRC Working Paper NB19-05, November 2019.

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¹² “Unmet Need for Workplace Accommodation,” Maestas N, Mullen K, Rennane S. *Journal of Policy Analysis and Management* 38(4), May 2019, pp. 1004–1027.

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¹³ “Disability Benefits, Consumption Insurance, and Household Labor Supply,” Autor D, Kostøl A, Mogstad M, Setzler B. *American Economic Review* 109(7), July 2019, pp. 2613–2654.

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¹⁴ “Who Is Screened Out? Application Costs and the Targeting of Disability Programs,” Deshpande M, Li Y. *American Economic Journal: Economic Policy* 11(4), November 2019, pp. 213–248.

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¹⁵ “The Effect of Disability Insurance Payments on Beneficiaries’ Earnings,” Gelber A, Moore T, Strand A. *American Economic Journal: Economic Policy* 9(3), August 2017, pp. 229–261.

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¹⁶ “The Employment Effects of the Social Security Earnings Test,” Gelber A, Jones D, Sacks DW, Song J. *Journal of Human Resources*, March 9, 2020.

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¹⁷ “How Financial Incentives Induce Disability Insurance Recipients to Return to Work,” Kostøl A, Mogstad M. *American Economic Review* 104(2), February 2014, pp. 624–655.

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¹⁸ “Unemployment Insurance and Disability Insurance in the Great Recession,” Mueller A, Rothstein J, von Wachter T. *Journal of Labor Economics* 34(S1 Part 2), January 2016, pp. S445–S475.

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¹⁹ “To Work for Yourself, for Others, or Not At All? How Disability Benefits Affect the Employment Decisions of Older Veterans,” Coile C, Duggan M, Guo A. NBER Working Paper 23006, December 2016.

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²⁰ “The Rise of Prescription Opioids and Enrollment in Disability Insurance,” Cutler D, Meara E, Stewart S. NBER DRC Working Paper NB16-03, September 2016.

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²¹ “Has Wider Availability of Prescription Drugs for Pain Relief Affected SSDI and SSI Enrollment?” Cutler D, Meara E, Stewart S. Presented at Disability Research Consortium Annual Meeting, July 2017, Washington, DC.

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²² “Place-Based Drivers of Mortality: Evidence from Migration,” Finkelstein A, Gentzkow M, Williams H. NBER Working Paper 25975, June 2019.

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Research Summaries

Strengthening Incentives for Vaccine Development

Michael Kremer and Christopher Snyder

Along with improvements in sanitation and nutrition, vaccines have been given credit for substantial reductions in illness and death. Yet the level of research activity devoted to developing new vaccines, at least prior to COVID-19, raises concerns about whether the incentives to develop vaccines are commensurate with the benefits derived from them. Figure 1 shows counts of Phase 3 clinical trials registered annually from 2006 to 2019 by the National Institutes of Health. The number of vaccine trials (left scale), averaging about 75 per year for infectious diseases, is overshadowed by drug trials (right scale), averaging about 1,950 per year. Annual trials for infectious-

disease vaccines trend sharply downward compared with the relatively constant number for drugs and for cancer vaccines.

Vaccines versus Drugs

A list of reasons could be offered for why pharmaceutical manufacturers prefer developing drugs to vaccines despite the high social returns to vaccines. Vaccines are part public good: increasing the number of people who are vaccinated reduces the infection risk for those who are unvaccinated, reducing their willingness to pay. A drug that treats symptoms but does not reduce transmission would not raise this free-rider



Michael Kremer is a research associate in the NBER programs in Development Economics, Economic Fluctuations and Growth, Children, and Economics of Education. He is a University Professor in the Department of Economics at the University of Chicago and the Harris School of Public Policy. He also is the founding director of the Development Innovation Lab at the Becker Friedman Institute.

Kremer pioneered the use of randomized controlled trials to evaluate policy interventions in developing countries, with particular emphasis on education, health care, and technological innovation. He shared the 2019 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel in recognition of this work. He also has played a leading role in working with foundations, NGOs, and other key stakeholders to promote development and distribution of vaccines in emerging nations, with particular emphasis on malarial and pneumococcal diseases.

Kremer was an undergraduate and received his PhD in economics from Harvard University. He taught at Harvard for two decades prior to joining the University of Chicago faculty in 2020, and was also a member of the MIT faculty for several years at the start of his career. He has been honored with a MacArthur Fellowship and is a fellow of the American Academy of Arts and Sciences. He is married to Rachel Glennerster, who is currently the chief economist at the Department for International Development, the United Kingdom's ministry for international development assistance.

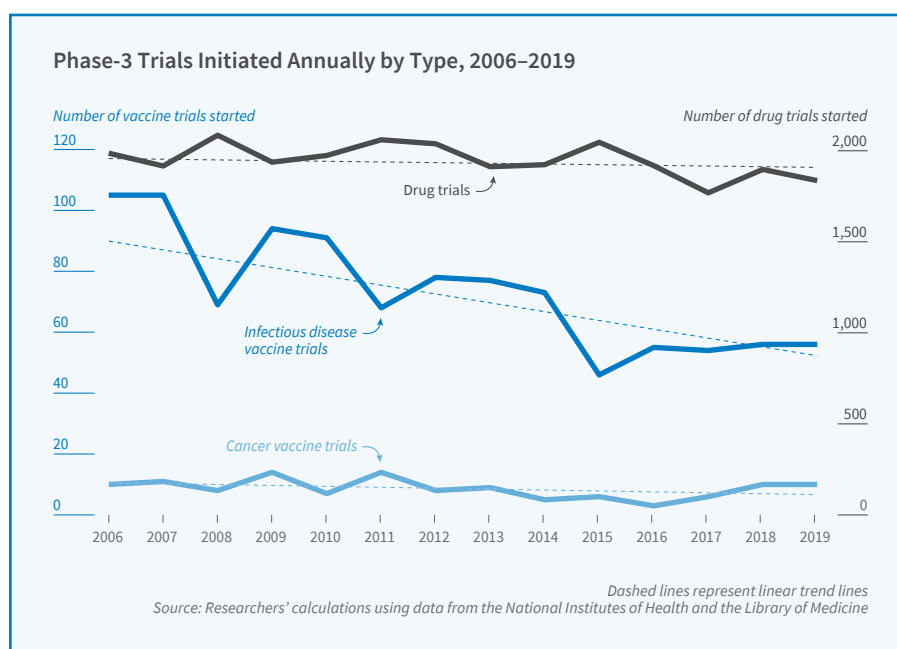


Figure 1



Christopher Snyder is the Joel Z. and Susan Hyatt Professor of Economics at Dartmouth College, where he has worked for the past 15 years. He graduated from Fordham University with a BA in mathematics and economics in 1989 and received his PhD in economics from MIT in 1994.

Snyder is a research associate in the NBER's Law and Economics Program. He is an editor of the *Journal of Law and Economics*, an associate editor of the *Review of Industrial Organization*, and the treasurer of the Industrial Organization Society.

Snyder specializes in the fields of industrial organization, law and economics, and microeconomic theory. He continues a general research interest in vertical contractual relations between firms with a recent focus on applications in healthcare markets. He is the coauthor with Walter Nicholson of two widely used textbooks in intermediate microeconomics.

Snyder served on expert committees that helped design the pilot Advance Market Commitment for pneumococcal vaccine and the Global Fund's program to stockpile drugs against multidrug-resistant tuberculosis. Most recently, he advised various international and US agencies on the design of the funding facilities to accelerate the development of a COVID-19 vaccine and coordinate its distribution.

Snyder lives in Hanover, New Hampshire, with his wife, Maura Doyle, who also teaches in Dartmouth's Economics Department. They enjoy hiking, cross-country skiing, and other aspects of outdoor life in Hanover. They have three daughters at various stages in their graduate and undergraduate educations.

problem and thus could be more lucrative. The free-rider problem associated with vaccines is well known, and indeed has in part justified widespread government involvement in the vaccine market via US programs such as Vaccines for Children. Such involvement may enhance incentives to develop and produce vaccines, but this is not guaranteed if negotiated prices end up being lower than what firms would charge on the private market. Another reason vaccines may be less lucrative than other drugs is that liquidity-constrained consumers may be better able to afford a sequence of periodic payments for a drug regimen spread out over several months than a large, up-front payment for a vaccine delivering the same health benefits. Behavioral economics might suggest that, owing to salience effects, willingness to pay is higher for a drug taken while an illness is experienced than for a vaccine taken as a preventative.

Our joint research on vaccines has provided another reason why drugs may be more lucrative than vaccines: even positing that the *level* of demand is the same for vaccines and drugs, the *shape* of the demand curves may differ.¹ The shape of vaccine demand

depends on the possibly quite skewed distribution of disease risk in the population. During the HIV epidemic in the United States, for example, a vaccine developer seeking to extract the high value concentrated in the high-risk population would find only a small market. Holding constant the average consumer value across the two products, the distribution of values differs across vaccines and drugs because disease-risk uncertainty is resolved once a person contracts the disease and becomes a customer for a drug. Although pharmaceuticals are not sold on pure private markets but are mediated through insurance policies and government programs, private-market outcomes still bear on equilibrium, presuming that prices are negotiated in the shadow of private markets.

To quantify this effect, Figure 2 illustrates the demand curve for a vaccine derived from a model of HIV risk that is linear in sexual partners reported in 2010 survey data. The curve shows that only a few of the potential buyers are prepared to pay high prices, which places a tight upper limit on the potential revenue that a vaccine developer can expect.²

In follow-on research, we employed

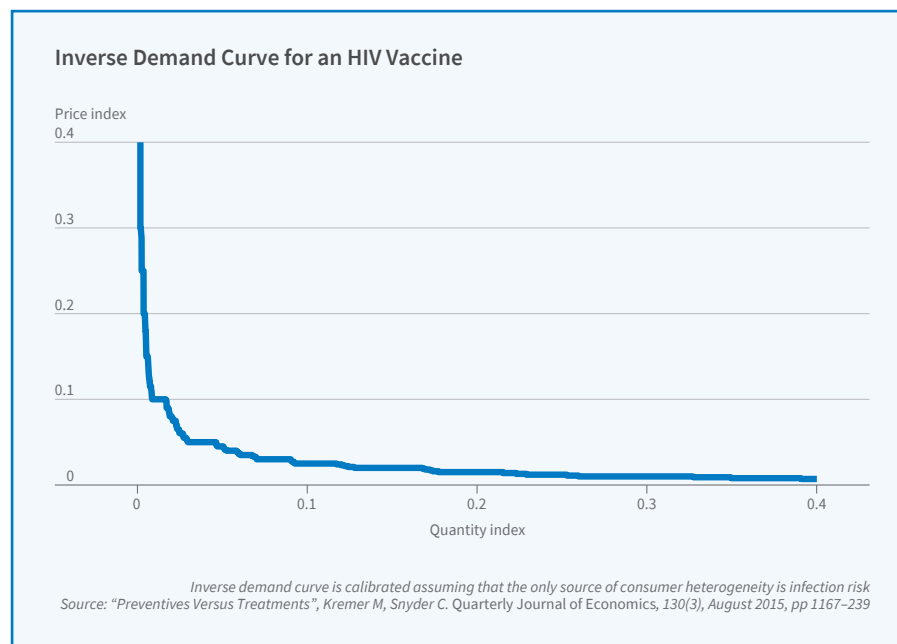


Figure 2

international data to calibrate HIV pharmaceutical demand.³ The distribution of income across countries is such that, for a range of estimates of the income elasticity of health-care expenditures, the calibration of international demand for both vaccines and drugs is similar to the demand curve that we show in Figure 2, and therefore entails weak incentives for pharmaceutical R&D. A variety of counterfactual exercises can be performed using calibrated demands. For example, we show that uniform pricing would only deliver 44 percent of the profit earned from price discriminating across countries.

Quantifying the Free-Rider Problem

We mentioned that the free-rider problem associated with vaccines is well known. Less well known is which diseases present the worst free-rider problems and thus are the most natural targets for subsidies. We investigate this question in work with Matthew Goodkin-Gold and Heidi Williams. We analyze a susceptible-infected-recovered (SIR) model, which is standard in epidemiology, and overlay a vaccine market populated by rational consumers and profit-maximizing firms.⁴

We start by analyzing the steady-state equilibrium for an endemic disease such as HIV or measles that requires every new cohort to be vaccinated. The key parameter is the index of disease infectiousness provided by the basic reproductive number R_0 , the expected number of people directly contracting the disease from an infected person introduced into a susceptible population. While it is natural to think prevalence is increasing in R_0 , in fact, prevalence is hump-shaped once economic incentives of consumers and producers are considered. For moderate values of R_0 , the disease is too infectious to die out but not so infectious as to eliminate free riding. In our benchmark scenario, prevalence is maximized for $R_0 = 4$, falling into the range that epidemiolo-

gists have estimated for HIV, leading to some pessimism regarding the impact of an HIV vaccine absent government subsidy.

But subsidies have shortcomings, too. The free-rider problem exacerbates monopoly incentives to distort quantity downward to keep prices high. We find that to counteract the severe distortions and achieve the first best when $R_0 = 4$ would require a per-dose subsidy for the vaccine that would be roughly three times estimates of the monetary value that those afflicted with the disease would be prepared to pay to recover. A more practical government policy would therefore involve negotiating a bulk purchase for the population.

Adapting this analysis to the COVID-19 pandemic requires recognizing the possibility of a vaccine campaign to quell the epidemic before it becomes endemic. We describe the values of R_0 and the susceptible proportion of the population under which a vaccine exhibits increasing social returns. Policymakers have proposed rolling out limited vaccine supplies evenly across jurisdictions. In our model, under conditions that appear to be satisfied by COVID-19, vaccinating one jurisdiction at a time may be more efficient. For a disease with enough explosive potential, vaccinating a small group in two places may do little to slow its spread in either. To be sure, there are good reasons to spread unlimited supplies evenly — to everyone — and to vaccinate highly vulnerable or super-spreading individuals everywhere first. However, the increasing social returns associated with vaccination programs provide a force in the opposite direction, toward concentrating limited supplies in fewer jurisdictions.

Advance Market Commitments

cines in rich and poor countries and the slow development of vaccines targeting diseases concentrated in poor countries suggests that private-market incentives to develop vaccines for poor countries may be particularly limited. Low-income consumers cannot afford the high prices that would make a market lucrative. Aid agencies stepping in to purchase on behalf of the countries may use their bargaining power or public pressure to push down prices.

To enhance firms' incentives to supply vaccines to poor countries, Kremer and Rachel Glennerster analyzed a funding mechanism called an advance market commitment (AMC).⁶ Through an AMC, donors set up a fund from which a subsidy is paid in exchange for firms' promise to supply the vaccine at a price close to marginal cost even in the "tail period" after the AMC subsidy fund is exhausted. The donors' commitment to pay a subsidized price above cost protects firms' investments from hold-up. The low price in the tail period mitigates market-power distortions. Since the purchase decision is ultimately made by client countries, the product must meet the market test, ensuring the program does not pay for products that satisfy the letter of contract terms, which are impossible to specify perfectly when set far in advance of production, but not user needs.

A pilot AMC directed by the Global Alliance for Vaccines and Immunization, now known as GAVI, was announced in 2007 for a vaccine against pneumococcal disease, which at the time was responsible for annual worldwide deaths of some 700,000 children under age 5. The AMC targeted a second-generation vaccine covering strains endemic in developing countries. Much R&D had already been done on these vaccines, which were well into Phase 3 trials; the pilot AMC was directed at incentivizing investment in capacity to satisfy the projected 200 million doses needed in developing countries.

In work with Jonathan Levin, with

whom we served on the Economics Expert Group tasked with finalizing design details for the pilot AMC, we explain the AMC idea, document the history of the pilot program, and provide a retrospective assessment of the program's 10-year run.⁷ Figure 3 shows that coverage in GAVI countries converged to global levels about five years faster for the pneumococcal vaccine than for the rotavirus vaccine, also rolled out by GAVI and funded at levels similar to the AMC but structured in a different way.

Further work with Levin provides the first theoretical analysis of AMCs.⁸ A key message is that AMC design

depends on the distance between the current technology and the development of full vaccine production at the time the AMC is introduced. An AMC designed to fund the R&D needed for technologically distant products like malaria vaccines may not work well to incentivize the capacity expansion needed for technologically close products like the pneumococcus vaccines in the pilot case. A naïve AMC may allow firms to extract all AMC funds without the expense of expanding capacity: if they do not expand capacity, funds will be extracted at a slower rate, but that just extends the subsidy period during which the fund accumulates interest. Indeed, a naïve AMC may be useless in incentivizing capacity in this setting. Incentives can be improved by adding a feature to the AMC called a supply commitment, limiting what firms can earn as a proportion of the target output they meet. The pilot AMC added a supply-com-

mitment feature on the recommendation of the Economics Expert Group. Incentives can be further improved by structuring the AMC as an advance purchase commitment, a forcing con-

AMC for a COVID-19 Vaccine

To mitigate illness and death during the COVID-19 pandemic, countries have gone into economic hibernation,

resulting in near-term losses of \$11 trillion and longer-term losses of \$28 trillion in economic output alone.⁹ Acceleration of the development and distribution of a vaccine can shorten the pandemic and thereby avoid some of these losses; this can entail spending billions to avoid trillions in losses.

Research with a team of economists, epidemiologists, and policy experts including Amrita Ahuja, Susan Athey, Arthur Baker, Eric Budish, Juan Camilo

Castillo, Glennerster, Scott Kominers, Jean Lee, Canice Prendergast, Alexander Tabarrok, Brandon Tan, and Witold Wiecek solves the optimal portfolio problem for a country selecting vaccines from the list of over 80 candidates in the pipeline at the outset of the pandemic.¹⁰ We account for correlation patterns in success across candidates based on a hierarchical model of technology families and platforms parametrized with input from industry experts. The optimal portfolio, which may include some lower probability candidates that are less correlated with other technologies, is of course larger for richer countries with more GDP at stake—a portfolio of over 20 candidates could be optimal for the United States—but even some of the poorest countries benefit from investing at risk in a handful of candidates. Shifting some funding from “pull” (paying for delivery of successful doses ex post, the standard way AMCs are structured) to

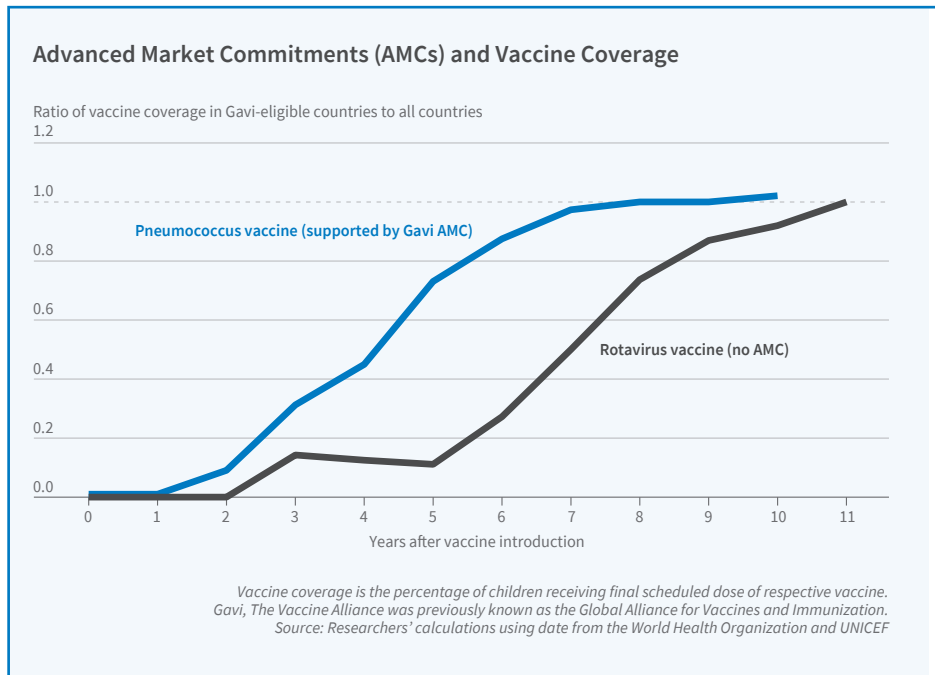


Figure 3

tract that in effect takes the option of producing less than the target output away from firms.

Firms are likely to have better private information about capacity and production costs for technologically closer products, which poses an asymmetric-information problem for the AMC designer. Principles of mechanism design suggest that AMCs should allow firms to earn some information rent when costs of discovery and production turn out to be low, in order to avoid having to distort incentives in the high-cost state of the world further than necessary. Firm rents nevertheless carry the political risk of being viewed as giveaways by those who ignore the asymmetric-information problem. The asymmetric-information problem may be so severe with a technologically close product that an AMC could be cheaper for a technologically distant product despite having to defray R&D in addition to capacity.

“push” (paying developers’ investment costs as they are expended) can reduce program costs, since inducing the marginal candidate to enter with pull funding means paying a potentially large rent to inframarginal candidates with higher success probabilities. Push funding entails its own problems, providing a weaker screen of candidates with unrealistic prospects (adverse selection) and less discipline of cost bloat (moral hazard).¹¹ So a mix of push and pull may be optimal. Indeed, this was the strategy employed in the international COVAX funding program launched by GAVI, and in Operation Warp Speed, launched by the US government. Both programs are designed to incentivize COVID-19 vaccine development. Members of the research team are currently designing an exchange on which allocations of multiple successful candidates could be traded, allowing countries to focus on vaccines best suiting their specific needs and avoid straining their health systems by rolling out too many different candidates.

¹ “Preventives versus Treatments,” Kremer M, Snyder CM. NBER Working Paper 21012, March 2015, and *The Quarterly Journal of Economics* 130(3), August 2015, pp. 1167–1239.
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² The distortions in pharmaceutical markets when consumer values have a distribution of this form carry over to general product markets, as we show in “Worst-Case Bounds on R&D and Pricing Distortions: Theory with an Application Assuming Consumer Values

Follow the World Income Distribution,” Kremer M, Snyder CM. NBER Working Paper 25119, October 2018.

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³ “Preventives versus Treatments Redux: Tighter Bounds on Distortions in Innovation Incentives with an Application to the Global Demand for HIV Pharmaceuticals,” Kremer M, Snyder CM. NBER Working Paper 24206, January 2018, and *Review of Industrial Organization* 53(1), August 2018, pp. 235–273.

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⁴ “Optimal Vaccine Subsidies for Endemic and Epidemic Diseases,” Goodkin-Gold M, Kremer M, Snyder CM, Williams H. NBER Working Paper 28085, November 2020.

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⁵ “Cost-Effectiveness and Economic Benefits of Vaccines in Low- and Middle-Income Countries: A Systematic Review,” Ozawa S, Mirelman A, Stack ML, Walker DG, Levine OS. *Vaccine* 31(1), December 2012, pp. 96–108.

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⁶ *Strong Medicine: Creating Incentives for Pharmaceutical Research on Neglected Diseases*, Kremer M, Glennerster R. Princeton, NJ: Princeton University Press, 2004. Additional work by Kremer on AMCs includes “Creating Markets for New Vaccines Part I: Rationale,” Kremer M. NBER Working Paper 7716, May 2000, and *Innovation Policy and the Economy* 1, pp. 35–72, “Creating Markets for New Vaccines Part II: Design Issues,” Kremer M. NBER Working Paper 7717, May 2000, and *Innovation Policy and the Economy* 1, pp. 73–118, and “Incentivizing Innovation: Adding to the Tool Kit,”

Kremer M, Williams H. *Innovation Policy and the Economy* 10, pp. 1–17.
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⁷ “Advance Market Commitments: Insights from Theory and Experience,” Kremer M, Levin J, Snyder CM. NBER Working Paper 26775, February 2020, and *American Economic Association Papers and Proceedings* 110, May 2020, pp. 269–273. An early assessment of the AMC was provided by “Economic Perspectives on the Advance Market Commitment for Pneumococcal Vaccines,” Snyder CM, Begor W, Berndt E. *Health Affairs* 30(8), August 2011, pp. 1508–1517.

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⁸ “Designing Advance Market Commitments for New Vaccines,” Kremer M, Levin J, Snyder CM. NBER Working Paper 28168, December 2020.

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⁹ “A Long, Uneven, and Uncertain Ascent,” Gopinath G. *IMF Blog*, October 13, 2020.

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¹⁰ “Investing in Accelerating a COVID-19 Vaccine,” Ahuja A, Athey S, Baker A, Budish E, Castillo JC, Glennerster R, Kominers SD, Kremer M, Lee J, Prendergast C, Snyder CM, Tabarrok A, Tan BJ, Więcek W. *American Economic Association Papers and Proceedings*, forthcoming 2021.

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¹¹ On the optimal design of a pure pull-funding mechanism, see “Designing Pull Funding for a COVID-19 Vaccine,” Snyder CM, Hoyt K, Gouglas D, Johnston T, Robinson J. *Health Affairs* 39(9), September 2020, pp. 1633–1642.
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Fairlie's research interests include entrepreneurship, education, racial inequality, information technology, labor economics, and immigration. Recent research projects explore questions around causes and consequences of racial inequality, barriers to business creation and growth, whether technology helps students, constraints in higher education, whether there have been disproportionate impacts of COVID-19 by race and gender, and water conservation policy.

Fairlie received his PhD and MA from Northwestern University and BA with honors from Stanford University. He has held visiting positions at Stanford, Yale University, UC Berkeley, and Australian National University. He has received funding for his research from numerous government agencies and foundations and has testified to the US Senate, US House of Representatives, the Department of Treasury, and the California State Assembly regarding the findings of his research, and received a joint resolution of appreciation from the California legislature. He is regularly contacted by major news media to comment on economic, small business, inequality and policy issues.

COVID-19, Small Business Owners, and Racial Inequality

Robert Fairlie

The widespread closing of businesses in the United States and around the world due to the coronavirus has been unprecedented. Stores, factories, and many other businesses have closed as a result of policy mandates, downward demand shifts, health concerns, or other factors. Although many have reopened since social distancing restrictions were relaxed, the revenues lost from the closures, the limited scale of current reopenings, and the potential for further closures in the future may lead to a wave of permanent small business closures with disproportionate impacts by race, gender, and nativity.

In several recent papers, I examine the impacts of COVID-19 on small business owners, using timely microdata from the Current Population Survey (CPS) and administrative data from the Small Business Administration. These new papers build on my longstanding research agenda on entrepreneurship, racial

inequality, and small business policy. This summary reviews selected papers from both recent and earlier work.

Early Stages of the Pandemic

On March 19, 2020, the state of California imposed shelter-in-place restrictions, with New York State following the next day. By early April, most states had imposed social distancing restrictions that closed “nonessential” businesses and added to consumer health concerns in the emerging pandemic. Using CPS microdata, I examine how COVID-19 impacted small business owners in mid-April 2020, the first month to capture these changes.¹ Figure 1 shows that the number of working business owners plummeted from 15 million in February 2020 to 11.7 million in April 2020, the largest drop ever; the entire Great Recession only resulted in a drop of 5 percent. Even incorporated business owners, who tend to be more stable and growth-oriented than

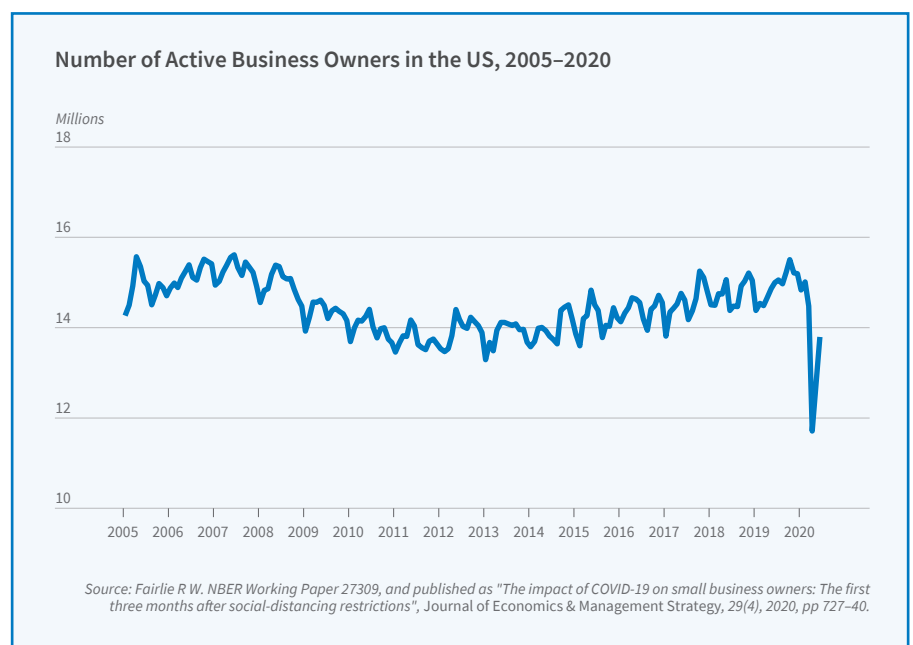


Figure 1

unincorporated owners, experienced a drop in work activity of 20 percent from February to April 2020.

Losses for businesses owned by women, racial minorities, and immigrants were especially severe [Figure 2]. African Americans experienced the largest losses: a 41 percent drop in the number of active business owners. Latinx business owners also experienced major losses: 32 percent. Immigrant business owners suffered a 36 percent drop, and female business owners 25 percent. Concentrations of female, Black, Latinx, and Asian businesses in industries hit hard by the pandemic, such as personal services, partly explain why the losses were higher for these groups than the national average. Extending the analysis into the second and third months following widespread shelter-in-place restrictions—May and June 2020—business owner activity partially rebounded, but the disproportionate impacts from COVID-19 by gender, race, and immigrant status lingered. African Americans continued to experience the largest losses, with 26 percent of formerly active business owners still not reactivated in May and 19 percent not active in June. Job losses were also higher for minority workers.²

Overall, these early estimates of the impact of COVID-19 on small businesses indicate that losses were spread across demographic groups and types of business—no group was immune—but some groups were hit harder than others. Although there is no way to determine at present whether these business closures will be permanent, each additional month of inactivity has an impact on the revenues, profits, and employees of these businesses, and on their likelihood of ever reopening.³

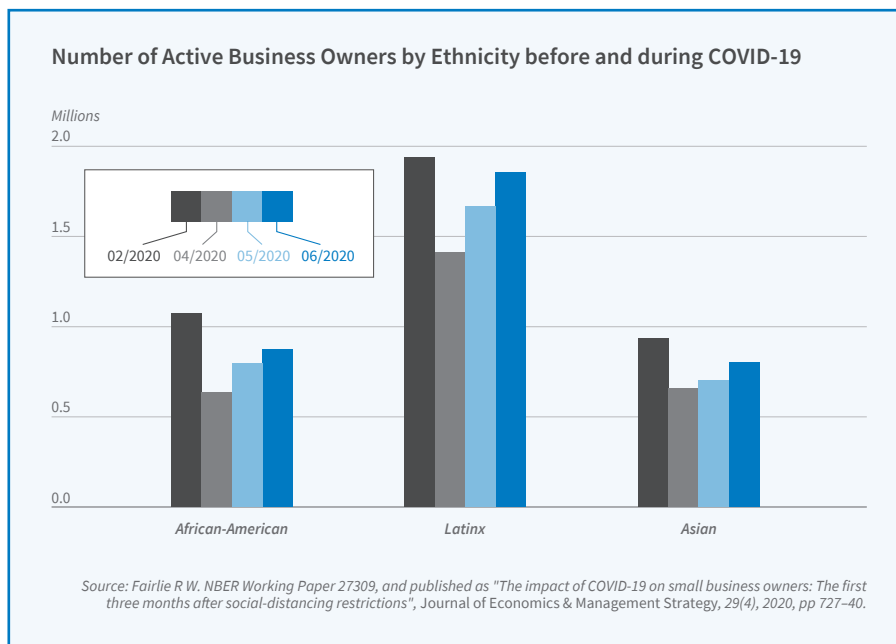


Figure 2

Policy Response to COVID-19

Given the severity of the pandemic, the federal government provided more financial assistance to small businesses than ever previously seen. The largest programs providing funds to small businesses were the \$660 billion Paycheck Protection Program (PPP) and the \$220 billion Economic Injury Disaster Loan (EIDL) program. One of the goals stated in the Coronavirus Aid, Relief, and Economic Security (CARES) Act, which included the PPP and EIDL programs, was to prioritize assistance to underserved markets and disadvantaged business owners.

But did the PPP and EIDL programs get disbursed to minority communities? Frank Fossen and I explore this question using administrative data on the universe of PPP loans, EIDL loans, and EIDL advances.⁴ We generally find a slightly positive relationship between PPP loan receipt per business and the minority share of the population. There is some evidence that the first round of funds was disproportionately disbursed to nonminority communities and that the second was disproportionately disbursed to minority communities. Focusing on PPP loan amounts per employee, we find a negative relationship with the minority share of

the population. In contrast, EIDL loans and advances, in both number and amounts, were provided positively to minority communities.

Ties to Broader, Long-Term Racial Inequality

In earlier research, I explore the link between racial inequality in business outcomes and broader racial inequality. Research on earnings inequality almost exclusively focuses on the wage and salary sector and ignores the other

major way to make a living—owning a business. Ten percent of the workforce, or 12 million people, own a business rather than holding a wage or salaried job. These owners hold a disproportionate amount of total wealth and create jobs for others.

Racial disparities in business formation raise concerns about lost economic efficiency. If minority entrepreneurs face liquidity constraints, discrimination, or other barriers to creating new businesses or expanding current ones, there will be efficiency losses in the economy. Barriers to entry and expansion are potentially costly to productivity and local job creation, especially as minorities represent a growing share of the population.

In a series of papers, I use various datasets to study the causes of racial and ethnic disparities in business ownership, formation, and outcomes, focusing on the constraints that limit productivity and cause inefficiencies in the economy. Work with Alicia Robb draws on confidential, restricted-access, business-level data from the US Census Bureau to explore why Asian American-owned firms perform well in comparison to White-owned businesses, while Black-owned firms typically do not.⁵ We find differential access to financial capital to be the largest factor. Family business experience also plays

a role in explaining differences in outcomes. In more recent work, I examine potential barriers created by human capital, wealth, demographic, geographic, and industry constraints for each group using CPS and American Community Survey data.⁶ I find that low levels of wealth contribute to lower rates of Black and Latinx business ownership, and that high levels of wealth increase Asian business ownership rates. Low levels of education contribute to lower business income for Blacks and Latinx, and high levels of education increase Asian business income. The Black, Latinx, and Asian populations are all relatively young compared to the White population; this also contributes to lower business ownership rates in these groups.

Using confidential and restricted-access panel data from the Kauffman Firm Survey, along with matched administrative data on credit scores, Robb, David Robinson and I explore disparities in capital use between Black- and White-owned startups.⁷ We find that Black-owned startups start smaller and stay smaller over the first eight years of their existence. Black startups face more difficulty in raising external capital, especially external debt. We find that disparities in creditworthiness constrain Black entrepreneurs; perceptions of treatment by banks also hold them back. Black entrepreneurs apply for loans less often than White entrepreneurs largely because they expect to be denied credit, even when they have a good credit history and in settings where strong local banks favor new business development.

Christopher Woodruff and I study why Mexican-American entrepreneurship is low in the United States even though self-employment rates are very high in Mexico.⁸ We find that low lev-

els of education and wealth explain the entire gap between Mexican immigrants and non-Latinx Whites in business formation rates; together with language ability, these factors explain nearly the entire gap in business income. Legal status represents an additional barrier for Mexican immigrants.

Using census microdata from the United States, Canada, and the United Kingdom, Harry Krashinsky, Julie Zissimopoulos and I provide the first comparative examination of the education levels, business ownership, and busi-

ness ownership and find evidence of crowd-out between immigrant and native owners.¹⁰

Small Business Policies

Governments and donors spend billions of dollars subsidizing entrepreneurship training and development programs around the world. Arguments for subsidizing training are manifold, and span theories of allocative and/or redistributive frictions in credit, labor, insurance, and human capital markets. Dean Karlan, Jonathan Zinman and I explore the effective-

ness of entrepreneurship training programs by working with US Department of Labor data from the largest random experiment ever conducted evaluating entrepreneurship training.¹¹ After controlling for selection into training, we find that entrepreneurship training has a sizable short-term impact on increasing business ownership and reducing unemployment, but no effect on business ownership or any business outcome such as

sales, exit rates, profits, or employment in the medium and long term.

Policymakers have sought to improve success among minority business owners. In the United States, for example, although they are sometimes controversial, a variety of federal, state, and local government programs offer contracting goals, price discounts, and loans to businesses owned by minorities, women, and other groups that are historically underrepresented among business owners. Aaron Chatterji, Kenneth Chay and I examine the effectiveness of affirmative action contracting programs for businesses owned by African Americans by using the staggered introduction of these contracting programs across cities in the

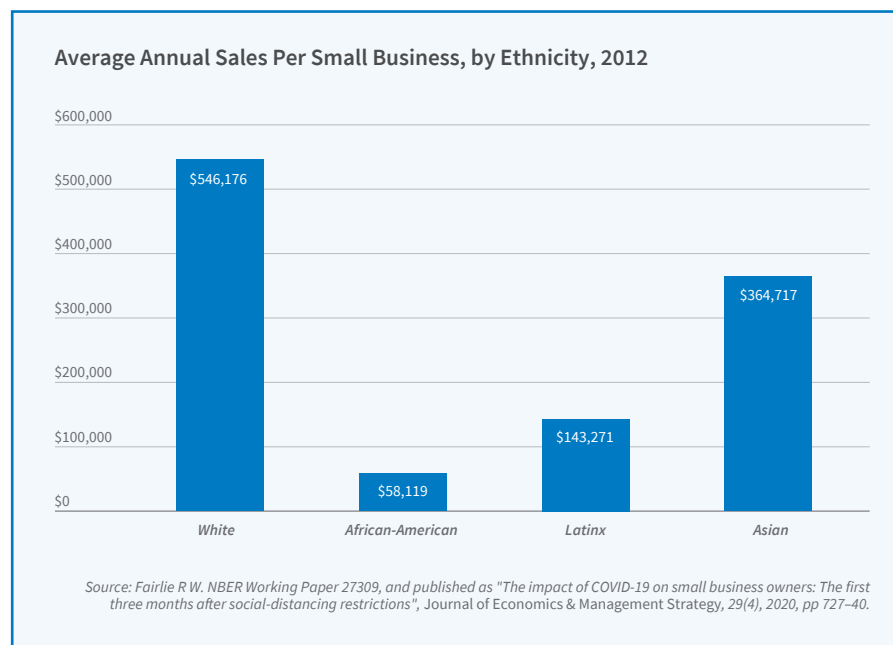


Figure 3

ness performance of Asian immigrants.⁹ We find that business ownership rates of Asian immigrants in the United States and Canada are similar to the national averages, and in the UK they are substantially higher than the national average and the highest among the three countries. Asian immigrants even from the same source country are generally much more educated in the United States than in Canada or the United Kingdom. Although there are many institutional, structural, and historical differences between the countries that might be responsible, one possibility is that the higher returns to education in the United States result in a more selective immigrant pool. Bruce Meyer and I study how groups interact in business own-

1980s.¹² Black business ownership rates increased significantly after program initiation. On average, the Black-White gap fell 3 percentage points. Black gains were concentrated in industries heavily affected by contracting programs, and they mostly benefited those who were better educated.

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⁵ *Race and Entrepreneurial Success: Black-, Asian-, and White-Owned Businesses in the United States*, Fairlie R, Robb A. Cambridge: MIT Press, 2008. “Why Are Black-Owned Businesses Less Successful than White-Owned Businesses? The Role of Families, Inheritances, and Business Human Capital,” Fairlie R, Robb A. *Journal of Labor Economics* 25(2), April 2007, pp. 289–323.

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⁷ “Black and White: Access to Capital among Minority-Owned Startups,” Fairlie R, Robb A, Robinson D. NBER Working Paper 28154, November 2020. [Return to Text](#)

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⁹ “The International Asian Business Success Story? A Comparison of Chinese, Indian and Other Asian Businesses in the United States, Canada and United Kingdom,” Fairlie R, Zissimopoulos J, Krashinsky H. In *International Differences in Entrepreneurship*, Lerner J, Schoar A, editors, pp. 179–208. Chicago: University of Chicago Press, 2010.

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¹⁰ “The Effect of Immigration on Native Self-Employment,” Fairlie R, Meyer B. NBER Working Paper 7561, February 2000, and *Journal of Labor Economics* 21(3), July 2003, pp. 619–650.

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¹¹ “Behind the GATE Experiment: Evidence on Effects of and Rationales for Subsidized Entrepreneurship Training,” Fairlie R, Karlan D, Zinman J. NBER Working Paper 17804, August 2012, and *American Economic Journal: Economic Policy* 7(2), May 2015, pp. 125–161.

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¹² “The Impact of City Contracting Set-Asides on Black Self-Employment and Employment,” Chatterji A, Chay K, Fairlie R. NBER Working Paper 18884, March 2013, and *Journal of Labor Economics* 32(3), July 2014, pp. 507–561.

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Central Banks' Ever-Expanding Tool Kit

Eric R. Sims and Jing Cynthia Wu

In December 2008, at the height of the Great Recession, the Federal Reserve lowered the federal funds rate, the short-term interest rate that is one of its central policy tools, to zero. Around the same time, it began large-scale purchases of long-term Treasuries and mortgage-backed securities issued by the three federal agencies that participate in mortgage lending, a practice commonly known as quantitative easing (QE). It also began to use more explicit forms of forward guidance to affect expectations regarding the future federal funds rate, which is the policy rate for the United States. The Fed was not unique among the world's major central banks in adopting programs like QE and explicit forms of forward guidance. Unlike several of the world's leading monetary authorities, however, the Fed did not

push the policy rate into negative territory.

At the time of their initial deployment, the Fed's unconventional policy actions were seen as extraordinary measures to provide monetary stimulus in an emergency and were viewed as temporary. In actuality, the federal funds rate remained at zero for seven years. From the end of 2015 until early 2020 it was positive, and the Fed began to slowly reduce the holdings of assets that it had accumulated during its various asset purchases. The onset of the COVID-19 pandemic in March 2020 caused the Fed to reverse course. The federal funds rate has been at zero since March, and the Fed has increased its balance sheet by nearly \$3 trillion via the resumption of QE programs.

Having lived at or near the zero lower bound (ZLB) on nominal interest rates

for the better part of 12 years, heretofore unconventional policies like QE, forward guidance, and negative policy rates are now considered a regular part of central banks' tool kits. Our research seeks to better understand the mechanisms through which these tools impact the macroeconomy, to quantify their effectiveness, to identify potential unintended consequences associated with their use, and to investigate their substitutability with conventional monetary policy as implemented via the adjustment of short-term policy rates.

Unconventional Policy Tools

In one paper, we build in a variety of real and nominal frictions, constrained financial intermediation, and long-term



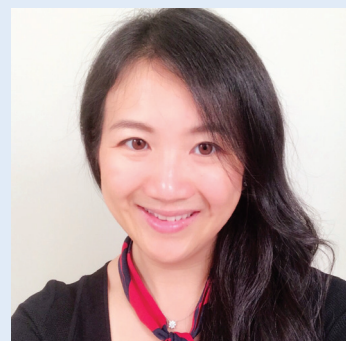
Eric R. Sims is a professor of economics at the University of Notre Dame and an NBER research associate affiliated with the Monetary Economics Program. He earned his PhD in economics from the University of Michigan in 2009. His research covers a variety of topics within macroeconomics, including the roles of news, uncertainty, and confidence in business cycles; fiscal policy and fiscal multipliers; and optimal monetary policy, particularly unconventional policies at the zero lower bound.

Sims' work has been published in leading academic journals, such as the *American Economic Review*, the *Journal of Monetary Economics*, the *American Economic Journal: Macroeconomics*, and the *Review of Economics and Statistics*, among others. Sims currently serves as an associate editor at the *Journal of Monetary Economics*. At Notre Dame, where he has been since 2009, he teaches a variety of classes in macroeconomics at both the undergraduate and graduate levels, and currently serves as the department chairperson.

Jing Cynthia Wu is the Dillon Hall Associate Professor of Economics at the University of Notre Dame and an NBER research associate affiliated with the Monetary Economics Program. Wu earned a PhD in economics from the University of California, San Diego. Her research is at the intersection of monetary economics and asset pricing, with specialization in monetary policy, the zero lower bound, uncertainty, term structure of interest rates, and commodity futures markets.

Wu has published in *American Economic Review*, *Journal of Monetary Economics*, *Journal of Econometrics*, *Journal of International Economics*, and *International Economic Review*, among other journals. She serves as an associate editor at *The Review of Economics and Statistics* and as a panelist at the National Science Foundation.

Her work has been cited by Federal Reserve Chairs Ben Bernanke, Janet Yellen, and Jerome Powell, as well as Bloomberg News/Businessweek/View, *The Wall Street Journal*, *The Financial Times*, *Forbes*, *The New York Times*, *Business Insider* and others. She proposed shadow interest rates to study the economic effects of unconventional monetary policy including quantitative easing. Her shadow rates are published by the Federal Reserve Bank of Atlanta, Haver Analytics, Thomson Reuters, and Bloomberg, and used for academic research and policy analyses.



debt to one of the standard tools for analyzing how monetary policy affects macroeconomic outcomes—a medium-scale dynamic stochastic general equilibrium model—to compare QE, forward guidance, and a negative interest rate policy (NIRP) to conventional policy-rate changes.¹ We find that in terms of macroeconomic outcomes, QE, forward guidance, and NIRP can each mimic the effects of a conventional rate cut, but the requisite forward guidance and NIRP interventions are large. We also find that the efficacy of forward guidance depends on a central bank’s credibility, and that there are a number of challenges to implementing deeply negative policy rates. QE appears to be the most effective tool for achieving central banks’ policy objectives.

The large balance sheets that central banks around the world amassed in the wake of the Great Recession have important implications for the efficacy of unconventional policy tools. We discuss exit strategies for unwinding large balance sheets, and show that private sector expectations of the exit strategy have important implications for the efficacy of QE programs at the ZLB. We also find that the effectiveness of negative interest rate policy depends on the size of the central bank’s balance sheet. A larger balance sheet makes NIRP less expansionary and could even result in it being contractionary; this is similar to the “reversal rate” highlighted in other work.² This result suggests that

central banks need to consider not only the design of unconventional policy tools, but also their sequencing. Negative rates were deployed well after central banks accumulated large balance sheets; our work suggests that the opposite ordering would have been more effective. Finally, our work shows that the size of a central bank’s balance sheet also has implications for how negative nominal interest rates can go, a parameter we label the effective lower bound.

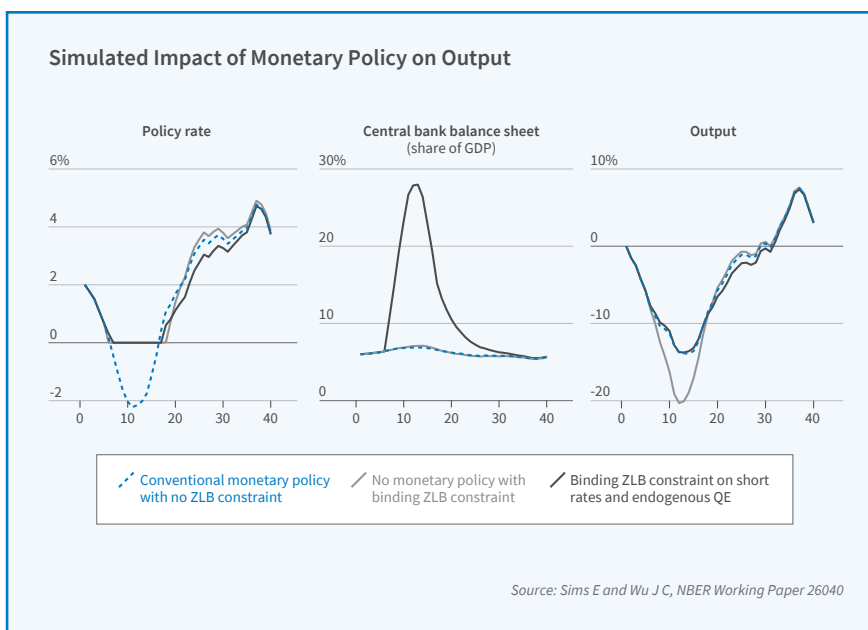


Figure 1

output to decline by 6 to 7 percentage points (or roughly 50 percent) more than it would if the ZLB were not binding. In Figure 1, we show that expanding the central bank’s balance sheet by about 25 percent of GDP can roughly re-create the path of output that would have prevailed were there no ZLB. This balance sheet expansion is the rough equivalent of pushing the policy rate to about -200 basis points.

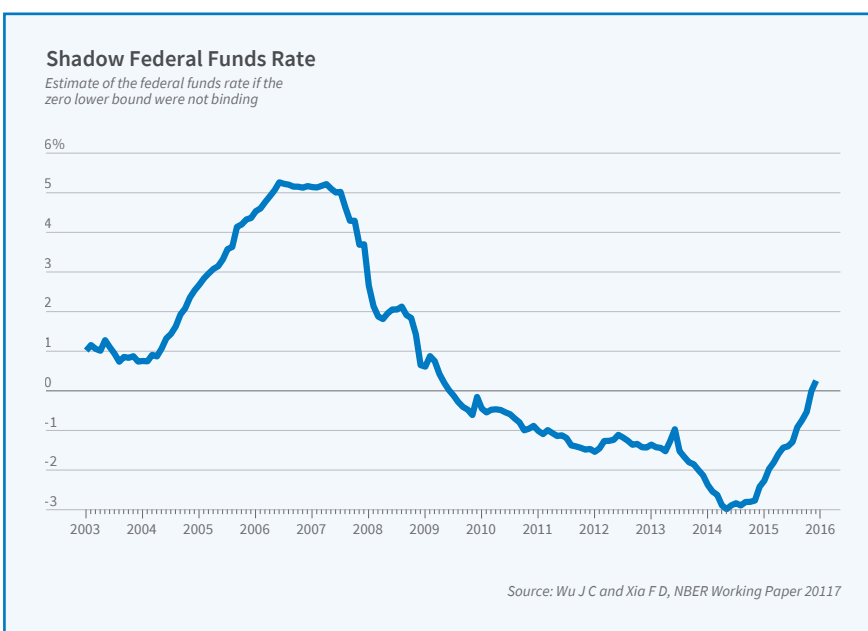


Figure 2

QE versus Conventional Policy

To understand the substitutability of QE with conventional policy rate cuts, we conduct an experiment that mimics the Great Recession in the United States.³ Using our model, we expose the economy to a sequence of negative credit shocks that would result in the ZLB binding for 2½ years. Absent any unconventional intervention, the constraint that the federal funds rate cannot fall below the ZLB causes

These simulation results from our model line up well with the experience in the United States. After the Fed completed its three major rounds of QE, its balance sheet had risen to about 25 percent of GDP. Wu and Xia estimate that the shadow federal funds rate—the rate that the policy rate would have been in the absence of the ZLB—was about -3 percentage points, which is roughly in line with our simulation. This shadow federal funds rate is plotted in Figure 2.⁴

A New Small Scale Macro Model for Monetary Policy

Our foregoing analysis was carried out within the confines of a medium-scale model with many shocks and frictions. While useful for quantitative analysis, such a framework lacks the elegance and tractability of small-scale models. In another paper, we develop a small-scale model to study QE that mimics as closely as possible another workhorse model, the three-equation New Keynesian model.⁵ We use this model to show, analytically, how QE can serve as a substitute for conventional policy rate movements when the ZLB binds. This result implies that the ZLB is not as costly as widely believed, and urges caution when considering dramatic policy proposals, such as raising the inflation target, designed to reduce the frequency of ZLB episodes. Contrary to conventional wisdom, we show that there is a case for using QE to counterbalance adverse credit market disturbances even when the economy is not at the ZLB.

In a follow-up paper, we use our small-scale model to compare the time series evolution of the Fed's QE programs and the observed Wu-Xia shadow federal funds rate series.⁶ Figure 3 shows the Wu-Xia shadow rate series (blue dashed

line) along with the shadow rate implied by our model (black line), constructed using the actual evolution of the Fed's balance sheet as an input. The two series track each other remarkably well.

What Happened to the Phillips Curve?

Many observers have been puzzled about the apparent breakdown of the

relationship between real economic activity and inflation over the last decade-plus. A traditional Phillips curve posits that a robust economy ought to be associated with high and rising inflation and vice versa. Yet this is not what we have seen. During 2008–2010, when the economy was quite weak, inflation did not decline significantly. This has been dubbed “missing deflation.” Conversely, in 2015–19, when the US unemployment rate approached all-time lows, inflation did not accelerate. The apparent breakdown in the Phillips curve lies behind some recent changes to the Fed's policy framework, in particular its new focus on shortfalls of employment from potential rather than on deviations relative to potential.⁷

The left panel of Figure 4 shows a simple scatterplot of the change in inflation and a measure of the output gap over the last decade. It displays the “wrong sign” for the standard Phillips curve theory: a positive output gap ought to put upward pressure on inflation. We use our model to analyze this apparently puzzling behavior of inflation⁸ and find that credit market disturbances are an important omitted factor that can confound the observed pattern of the output gap and inflation. Adverse credit market conditions put upward pressure on inflation

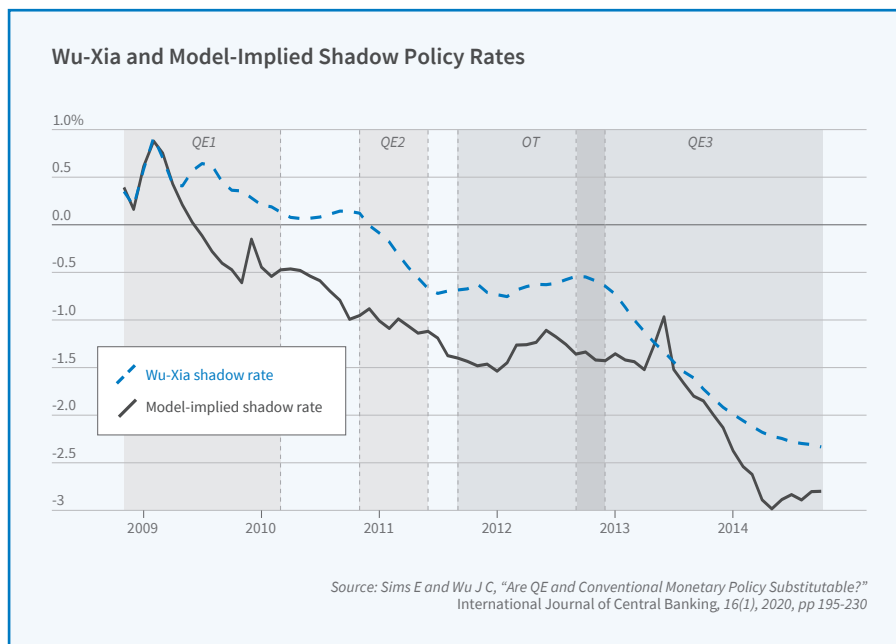


Figure 3

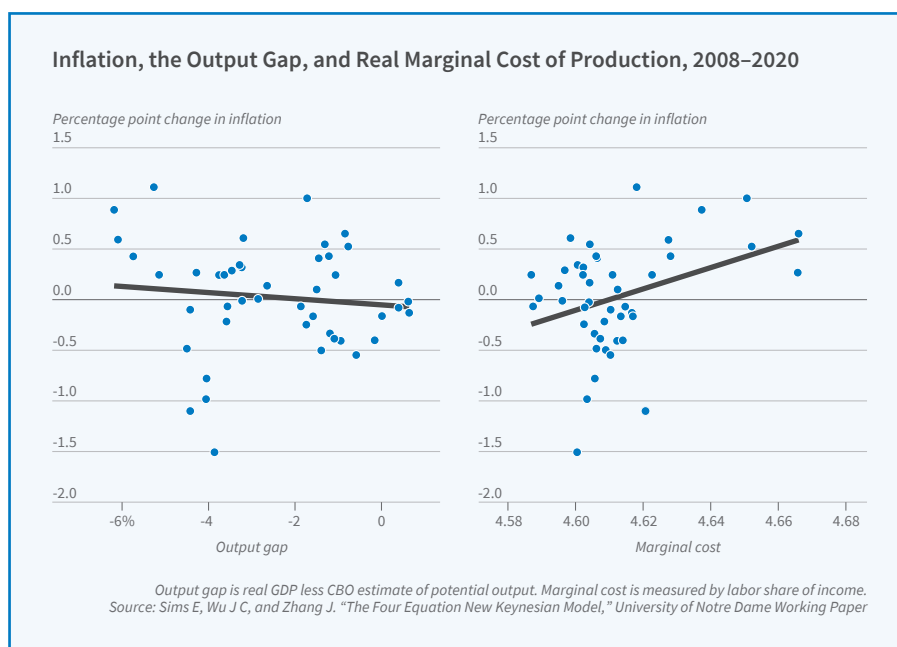


Figure 4

and vice versa. This potentially helps to explain both the missing deflation of 2008–10, when credit market conditions were poor, and the missing inflation of 2015–2019, when credit market conditions were more favorable. In our small-scale model, there is a direct relationship between the marginal cost of producing additional output and inflation that is not confounded by credit market disturbances. When we replace the output gap with a measure of marginal cost, as in the right panel of Figure 4, there is no anomalous behavior in the scatter plot—high marginal cost correlates with high inflation and vice versa.

Emergency Monetary Policy Responses to COVID-19

During the COVID-19 pandemic, there has been a resurgence in the Fed's use of large-scale asset purchases and other unconventional monetary policy tools. In addition to resuming its purchases of long-term Treasuries and mortgage-backed securities, in March 2020 the Fed announced its intention to purchase privately issued debt carrying credit risk, as well as to lend directly to nonfinancial firms. These actions mark a significant departure from past practice.

We study the Fed's newest asset purchasing and lending in comparison to the QE programs it deployed to combat the Great Recession using a model that features constrained financial intermediaries and long-term debt.⁹ We diverge from our previous framework¹⁰ in modeling nonfinancial firms as being subjected to a cash flow constraint. This constraint limits the amount that firms can borrow as a function of their current cash flows. Such

a constraint has empirical and theoretical support in the literature.¹¹ It also seems particularly relevant for the COVID-19 environment, where mandated lockdowns and voluntary social distancing have reduced cash flows for many firms to an unparalleled degree.

When nonfinancial firms are not subject to a binding cash flow constraint, we find that direct lending to such firms has results similar to more conventional asset purchasing programs. But in a situation in which these firms are cash flow constrained, conventional QE programs become almost completely ineffective, whereas direct lending and outright purchases of assets of these constrained industries maintain their efficacy. In our model, conventional QE works by easing leverage constraints on intermediaries. This only transmits to the real economy if firms are not cash flow-constrained. When firms are constrained, as we think plausibly characterizes the COVID-19 recession, direct lending has much greater effects.

¹ “Evaluating Central Banks’ Tool Kit: Past, Present, and Future,” Sims E, Wu JC. NBER Working Paper 26040, July 2019. Forthcoming in *Journal of Monetary Economics*.

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² “The Reversal Interest Rate,” Brunnermeier M, Koby Y. NBER Working Paper 25406, December 2018.

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³ “Evaluating Central Banks’ Tool Kit: Past, Present, and Future,” Sims E, Wu JC. NBER Working Paper 26040, July 2019. Forthcoming in *Journal of Monetary Economics*.

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⁴ “Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound,” Wu, JC, Xia FD. NBER Working Paper 20117, May 2015, and *Journal of Money, Credit, and Banking* 48(2-3), March–April 2016, pp. 253–291.

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⁵ “The Four Equation New Keynesian Model,” Sims E, Wu JC. NBER Working Paper 26067, July 2019.

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⁶ “Are QE and Conventional Monetary Policy Substitutable?” Sims E, Wu JC. *International Journal of Central Banking* 16(1), February 2020, pp. 195–230.

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⁷ “New Economic Challenges and the Fed’s Monetary Policy Review,” Powell J. Speech at Jackson Hole Symposium, Aug. 27, 2020.

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⁸ “The Four Equation New Keynesian Model,” Sims E, Wu JC, Zhang J. University of Notre Dame Working Paper, July 2020.

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⁹ “Wall Street vs. Main Street QE,” Sims E, Wu JC. NBER Working Paper 27295, June 2020.

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¹⁰ “Evaluating Central Banks’ Tool Kit: Past, Present, and Future,” Sims E, Wu JC. NBER Working Paper 26040, July 2019. Forthcoming in *Journal of Monetary Economics*.

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¹¹ “Earnings-Based Borrowing Constraints and Macroeconomic Fluctuations,” Dreschler T. University of Maryland Working Paper, October 2020.

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Empirical Analysis of Bargaining

Matthew Backus and Steven Tadelis



Matthew Backus is an industrial organization economist and a faculty research fellow in the NBER's Industrial Organization Program since 2016. He is the Phillip H. Geier Associate Professor in the Economics Division of Columbia Business School. Prior to starting his position at Columbia, he was an assistant professor at Cornell University, 2013–15, and a post-doctoral researcher at eBay Research Labs, 2012–13. He completed his PhD in economics at the University of Michigan in 2012.

Backus's research focuses on antitrust, productivity, communication, bargaining, and auctions. He has studied the relationship between competition and productivity, conduct testing and evaluation of the common ownership hypothesis, demand estimation in dynamic auction platform environments, as well as bargaining and negotiations using e-commerce data.

A resident of the Upper West Side in New York City, where he and his border collie are regulars at Riverside Park, Backus enjoys cooking, motorcycles, science fiction, and volunteering for good causes.

Our most important economic transactions are conducted through bargaining. This includes wage negotiations, large purchases from homes to cars and mattresses, the organization of the household, the sale of a company, and the terms of a supplier contract. It is therefore important to understand the determinants of bargained outcomes, as well as whether, and at what cost, bargaining will be successful.

A large body of theoretical and experimental work in economics endeavors to answer these questions. However, until recently, we have had little data on real-world bargaining interactions to hold this literature to account. The economics literature on bargaining has consequently grown increasingly distant from the practice and teaching of bargaining and negotiations in law schools and business programs.

Recently, however, a number of economists have found creative sources of data that permit the study of bargaining, including in hospital procurement of medical supplies, post-auction negotiations in wholesale auto sales, negotiations over homes, the GATT negotiations, and even documented historical records of negotiations between the Catholic Church in Spain and Tunisian pirates.¹ We contribute to this growing literature by studying bargaining on the eBay Best Offer platform. There are many limitations of this environment: it is small stakes as bargained transactions go, and the products bargained over are quite heterogeneous. But it also has many strengths, including the availability of detailed offer-level bargaining data, a rich and theoretically familiar bargaining protocol, and observable communication between buyers and sellers. We make a large amount of this data publicly available to foster empirical analysis of bargaining.² In what follows we describe the dataset, as well as what we learn from studying it.

Best Offer Bargaining

Best Offer is a free listing feature for sellers on the eBay marketplace. It is only available for buy-it-now (BIN) listings, eBay's fixed price format, and not for auction-style listings. If enabled, buyers arriving at the listing have two options: they may either purchase at the advertised BIN price or they can make the seller an offer. If an offer is submitted, the seller has 48 hours to accept, reject, or counter. If the seller counters, then the buyer, in turn, has 48 hours to accept, reject, or counter. And if the buyer counters that offer... and so on, for up to three rounds for each player. This structure is similar to the extensively studied Rubinstein-Stahl alternating sequential offers bargaining protocol.³

Behavioral and Rational Models

A large theoretical literature explores various aspects of alternating offers sequential bargaining games. In work with Thomas Blake and Brad Larsen, we present a series of descriptive analyses that seek to confirm or refute predictions from this literature.⁴

Many of the patterns in the dataset are broadly consistent with existing rational models of bargaining. For instance, two of the main theoretical predictions are, first, that buyers who are more patient will obtain better deals, and, second, that bargaining is costly. We confirm that buyers who select slower shipping methods, who may indeed be more patient, obtain lower prices. Also, bargaining does appear to be costly. In particular, for items listed for under \$50, buyers are relatively more likely to pay the seller's asking price rather than to make an offer. Furthermore, when the buyer does make an offer for cheaper goods, the seller is much more likely to

accept it than haggle. These patterns support the notion of fixed costs of bargaining. Importantly, such fixed costs create qualitative differences for items above and below \$50, which raises potential external validity concerns for the study of bargaining in laboratory settings, where stakes are typically low.

The basic Rubinstein model posits complete information and certain gains from agreement, which in equilibrium leads to immediate agreement between buyer and seller. Many theoretical papers have extended the basic Rubinstein model to incorporate asymmetric information, which in turn rationalizes many different behaviors including delayed agreements, immediate breakdown, and delayed breakdown, all of which we observe in the data. As described in Figure 1, about 17 percent of bargaining threads end in immediate agreement after the buyer's first offer, while a majority exhibits the full richness of outcomes. Still, other patterns in the data are more difficult to explain using standard theoretical models, even those that allow for incomplete information. Two prevalent behaviors in particular stand out, which we refer to as "reciprocal gradualism" and "split-the-difference" behaviors.

Reciprocal gradualism means that larger concessions by one party are met

with larger concessions by the other. This feature of real-life bargaining is notoriously difficult to explain in theoretical models. A second robust and even more puzzling pattern is the prevalence of splitting the difference behavior. The puzzle has two features. The first, perhaps the less surprising, is that bargaining parties are especially likely to make an offer that is halfway between the two prior offers. The second, however, is that these offers appear to work, and introduce a non-monotonicity in the empirical relationship between the generosity of offers and the frequency with which they are accepted. Namely, offers slightly higher than 50 percent — for example, 55 percent of the other party's most recent ask — are less likely to be accepted even though they are more generous. What is particularly puzzling about both of these phenomena is that the reference points according to which one splits the difference are determined within the context of the bargaining process, rather than on the basis of some external standard. The reference points are merely the prior two offers, one set by each bargainer. Anticipating such behavior, it seems one would do well to engineer extreme reference points in one's favor.

These descriptive results highlight both the strengths and weaknesses of bargaining theory, and offer paths for future empiri-



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Prior to starting his position at Berkeley-Haas, Tadelis was an assistant professor at Stanford University for eight years after receiving his PhD in economics from Harvard University. He also held positions as a senior director and distinguished economist at eBay Research Labs, 2011–13, and vice president of economics and market design at Amazon, 2016–17. At Amazon, he applied economic research tools to a variety of product and business applications, working with technologists, machine learning scientists, and business leaders.

He is affiliated with the NBER's Industrial Organization Program.

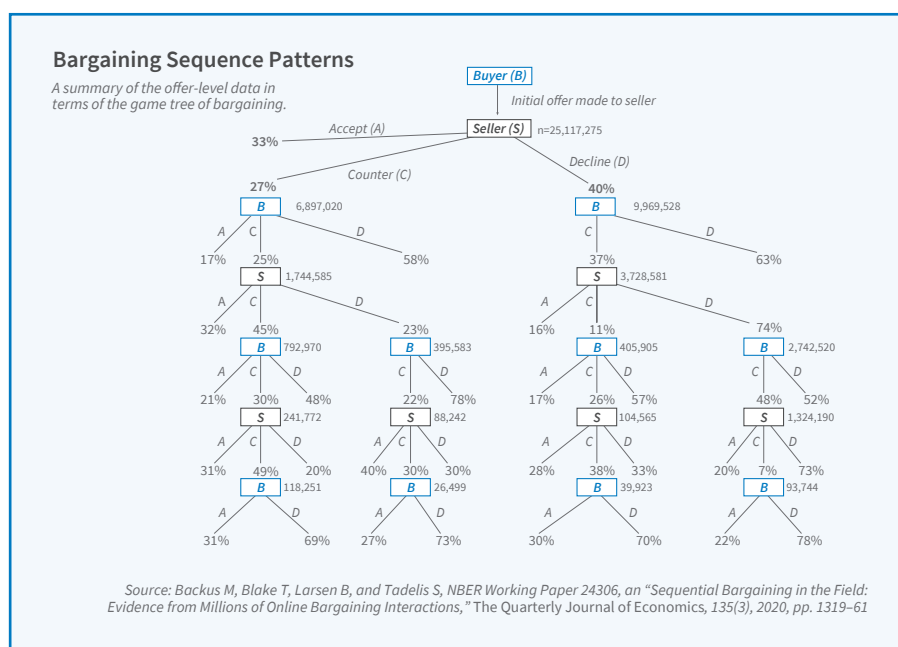


Figure 1

cal, experimental, and theoretical work. In particular, by highlighting features of real-world bargaining, they suggest research avenues that can productively engage with bargaining practitioners. There are, of course, myriad alternative settings in which we could learn more about bargaining. Even within our setting, however, we have focused exclusively so far on the offers, counteroffers, and outcomes, and neglected potential signaling and communication between buyers and sellers, to which we turn next.

Round Numbers in Bargaining

One of the most notable stylized facts we discover is well known to social psychologists: round numbers offers seem to perform poorly in bargaining. The result is depicted in Figure 2. Remarkably, sellers who use round-number listing prices on the 100s receive first offers from buyers that are 8 to 12 percentage points lower than sellers who use nearby round numbers. Prior work attributed this phenomenon to behavioral biases and offered a practical lesson: that round-number offers are to be avoided.

This is particularly puzzling because sellers disproportionately use round-number listing prices. If the social psychologists are right, these sellers are leaving money on the table. We conjecture an alternative explanation: using a round number offer is rational, a “cheap talk” signaling device.

This hypothesis offers a number of testable predictions, which we explore in our work with Blake.⁵ First, for it to be incentive-compatible for sellers to use round numbers, there must

be some other compensating factor. Indeed, there is; we find round-number sellers to be 15 to 25 percent more likely to successfully sell their products. Second, it must be that sellers of different types are sending different signals by choosing round or precise-number listing prices. Again, the evidence supports our hypothesis: buyers who make the same offer, measured by the discount as a fraction of the listing price, to round-number sellers are much more likely to have their offer accepted. Third, and finally, it must be that buyers observe the signal and

sort of model might seem far-fetched in the absence of empirical validation. Our findings illustrate how using rich data from real bargaining and negotiations can offer new directions for research about bargaining.

The Role of Cheap Talk

We also study the role of cheap talk more broadly, moving beyond signaling using round numbers to consider communication between potential buyers and sellers. With Blake and Jett Pettus, we study how communication affects the likelihood of bargaining success.⁶ Informed by prior experimental work, we had reason to believe that cheap talk communication may facilitate successful bargaining, which we are able to explore by taking advantage of a convenient natural experiment. On eBay.com, a buyer or seller can accompany an offer with a 250-character message. But for largely idiosyncratic reasons, on eBay.de (the German incarnation of eBay), no

such communication was allowed prior to May 26, 2016, when the site was adjusted to match the US counterpart. The rollout was immediate for buyers using the desktop version of the platform, but much later for mobile users, setting up a simple difference-in-differences identification strategy.

We find that the availability of text communication improves the probability of successful negotiation, in this case by 7 percent for bargainers who elect to send a message. This effect, however, was not immediate. It rose steadily over the first four weeks, and then stabilized.

We take advantage of the rich-

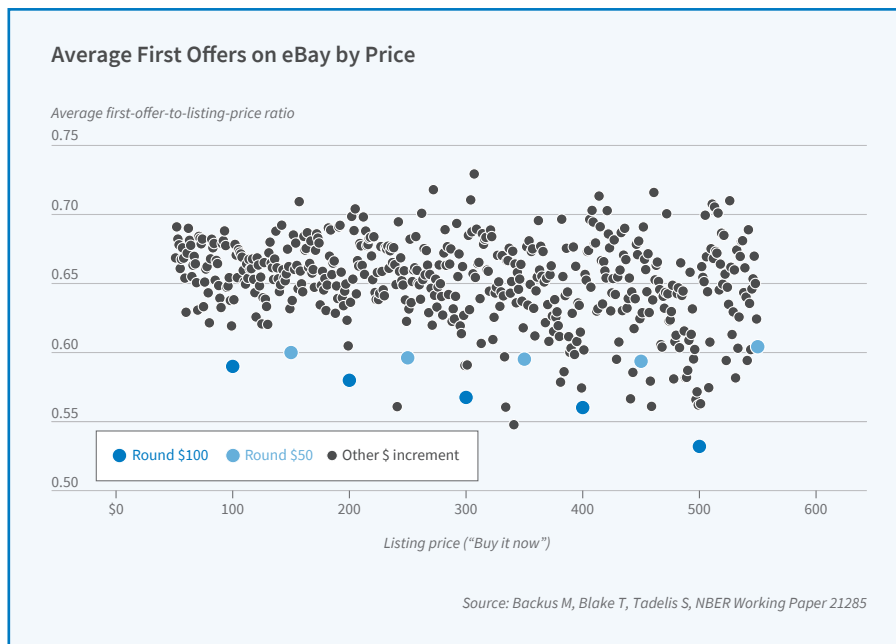


Figure 2

update their beliefs about seller types. Here the evidence is less direct, but still quite consistent: at the search results page, buyers are much more likely to click on round-number listings, consistent with both expectations of getting a lower price as well as our finding that those sellers are more likely to transact.

To summarize, on these and a few other points the evidence is starkly — and surprisingly — consistent with our “cheap talk” signaling model. The model rationalizes not only the finding in Figure 2, but a whole constellation of empirical regularities that match what we would expect from equilibrium cheap-talk signaling. This

ness of the data and use text analyses to make sense of this pattern. We find that while buyers are typically one-off participants in the mechanism, sellers are repeat players. Moreover, sellers who send multiple messages are adjusting the content of their messages, and doing so in a pattern that converges in those first few weeks. These findings suggest that what we are observing in these dynamics is bargainers learning what to say.

We find that sending a message that is closer in content to what sellers were sending 10 weeks after the introduction of messaging was substantially more likely to be successful in the first few weeks when communication was possible. Using text analysis, we can offer some cursory hints at what they were saying. We find that experienced sellers were polite but less effusive, and that they called particular attention to fees that buyers might not anticipate, such as money transfer processing fees.

Summary

Our research agenda explores the performance of game-theoretic models of bargaining and shows that some features of these models hold up surprisingly well. At the same time, however, it also raises new puzzles and opportunities for future research.

We hope that making the data public will encourage new research on bargaining behavior and outcomes. This research agenda will flourish further once new large-scale bargaining datasets become available, which seems like a reasonable aspiration given the growth of digitally recorded rich data. For

example, Kyle Bagwell, Robert Staiger, and Ali Yurukoglu have constructed a novel large-scale dataset on the trade negotiations behind GATT.⁷ We also expect that new tools will play a role in better understanding the ins and outs of bargaining behavior. Our work uses natural language processing tools to parse text documents, a method that we believe will be central to empirical attempts to understand bargaining.

¹ “[Transparency and Negotiated Prices: The Value of Information in Hospital-Supplier Bargaining](#),” Grennan M, Swanson A. NBER Working Paper 22039, February 2016, and *Journal of Political Economy* 128(4), April 2020, pp.1234–1268; “[The Efficiency of Real-World Bargaining: Evidence from Wholesale Used-Auto Auctions](#),” Larsen B. NBER Working Paper 20431, August 2014, and forthcoming in *The Review of Economic Studies*; “[The Microstructure of the US Housing Market: Evidence from Millions of Bargaining Interactions](#),” Mateen H, Qian F, Zhang Y. Stanford University Working Paper, November 2020; “[Multilateral Trade Bargaining: A First Look at the GATT Bargaining Records](#),” Bagwell K, Staiger R, Yurukoglu A. NBER Working Paper 21488, August 2015, and *American Economic Journal: Applied Economics* 12(3), July 2020, pp. 72–105; “[Pirates of the Mediterranean: An Empirical Investigation of Bargaining with Asymmetric Information](#),” Ambrus A, Chaney E, Salitskiy I. *Quantitative Economics* 9(1), April 2018, pp.

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² Data are available via NBER at <https://www.nber.org/research/data/best-offer-sequential-bargaining>.

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³ “[Perfect Equilibrium in a Bargaining Model](#),” Rubenstein A. *Econometrica* 50(1), January 1982, pp. 97–109.

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⁴ “[Sequential Bargaining in the Field: Evidence from Millions of Online Bargaining Interactions](#),” Backus M, Blake T, Larsen B, Tadelis S. NBER Working Paper 24306, February 2018, and *The Quarterly Journal of Economics* 135(3), August 2020, 1319–1361.

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⁵ “[Cheap Talk, Round Numbers, and the Economics of Negotiation](#),” Backus M, Blake T, Tadelis S. NBER Working Paper 21285, June 2015, and published as “On the Empirical Content of Cheap-Talk Signaling: An Application to Bargaining,” *Journal of Political Economy* 127(4), August 2019, pp. 1599–1628.

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⁶ “[Communication and Bargaining Breakdown: An Empirical Analysis](#),” Backus M, Blake T, Pettus J, Tadelis S. NBER Working Paper 27984, October 2020.

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⁷ “[Multilateral Trade Bargaining: A First Look at the GATT Bargaining Records](#),” Bagwell K, Staiger R, Yurukoglu A. NBER Working Paper 21488, August 2015, and *American Economic Journal: Applied Economics* 12(3), July 2020, pp. 72–105.

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New Working Group on Race and Stratification in the Economy Launched

The NBER has launched a Working Group on Race and Stratification in the Economy to explore, document, and disseminate research on the causes and consequences of racial disparities in economic outcomes, and to stimulate research on race in all aspects of economic analysis. Research Associate Trevon Logan, the Hazel C. Youngberg Distinguished Professor of Economics at The

Ohio State University, will serve as the inaugural director. The group will meet twice each year, beginning with a virtual meeting in April 2021.

The working group will take a broad approach to the economics of race, considering the factors that contribute to racial differences in income, wealth, housing, educational attainment, labor market outcomes, economic mobility, and a range

of other measures. It will explore economic models of discrimination and social stratification, as well as insights on these issues from other social sciences, and will consider the role of public policies and political institutions in contributing to, and ameliorating, racial differences. More broadly, it will encourage new approaches to economic analysis of race in a variety of settings.



Trevon Logan

Conferences

Business Taxation in a Federal System

An NBER conference on Business Taxation in a Federal System took place online October 2. Research Associates Joshua Rauh of Stanford University and Owen M. Zidar of Princeton University organized the meeting, which was supported by the Smith Richardson Foundation. These researchers' papers were presented and discussed:

- **Clemens Fuest**, Ifo Institute for Economic Research; **Felix Hugger**, University of Munich; and **Florian Neumeier**, CESifo, "Corporate Profit Shifting and the Role of Tax Havens: Evidence from German Country-by-Country Reporting Data"
- **Antonio Coppola**, Harvard University; **Matteo Maggiori**, Stanford University and NBER; **Brent Neiman**, University of Chicago and NBER; and **Jesse Schreger**, Columbia University and NBER, "Redrawing the Map of Global Capital Flows: The Role of Cross-Border Financing and Tax Havens"
- **Ole Agersnap**, Princeton University, and **Owen M. Zidar**, "The Tax Elasticity of Capital Gains and Revenue-Maximizing Rates" (NBER Working Paper [27705](#))
- **Pawel Doligalski**, University of Bristol; **Abdoulaye Ndiaye**, New York University; and **Nicolas D. Werquin**, Toulouse School of Economics, "Redistribution with Performance Pay"
- **Matthew R. Denes**, Carnegie Mellon University; **Sabrina T. Howell**, New York University and NBER; **Filippo Mezzanotti**, Northwestern University; **Xinxin Wang**, University of North Carolina, Chapel Hill; and **Ting Xu**, University of Virginia, "Investor Tax Credits and Entrepreneurship: Evidence from US States" (NBER Working Paper [27751](#))

- **Helen Miller, Thomas Pope, and Kate Smith**, Institute for Fiscal Studies, “Intertemporal Income Shifting and the Taxation of Business Owner-Managers”
- **Bodo Knoll** and **Nadine Riedel**, Ruhr-Universität Bochum; **Maximilian Todtenhaupt**, Norwegian School of Economics; and **Thomas Schwab** and **Johannes Voget**, University of Mannheim, “Cross-Border Effects of R&D Tax Incentives”
- **Cailin R. Slattery**, Columbia University, “The Political Economy of Subsidy-Giving”

Summaries of most of these papers are at www.nber.org/conferences/business-taxation-federal-system-fall-2020

Economics of Transportation in the 21st Century

An NBER conference on Economics of Transportation in the 21st Century took place online October 9. Research Associates Edward L. Glaeser of Harvard University, James M. Poterba of MIT, and Stephen J. Redding of Princeton University organized the meeting, which was supported by the US Department of Transportation. These researchers’ papers were presented and discussed:

- **Treb Allen**, Dartmouth College and NBER and **Costas Arkolakis**, Yale University and NBER, “Traffic in the City: The Impact of Infrastructure Improvements in the Presence of Endogenous Traffic Congestion”
- **Neil Mehrotra**, Federal Reserve Bank of New York; **Matthew Turner**, Brown University and NBER; and **Juan Pablo Uribe**, Brown University, “Does the US Have an Infrastructure Cost Problem? Evidence from the Interstate Highway System”
- **Prottoy Akbar**, University of Pittsburgh; **Victor Couture**, University of British Columbia; **Gilles Duranton**, University of Pennsylvania and NBER; and **Adam Storeygard**, Tufts University and NBER, “Mobility and Congestion in World Cities: Evidence from Google Maps”
- **Caitlin S. Gorback**, NBER, “Transportation Data Collection Initiative”
- **Nicholas Buchholz**, Princeton University; **Laura Doval**, California Institute of Technology; **Jakub Kastl**, Princeton University and NBER; and **Tobias Salz**, MIT and NBER, “The Value of Time: Evidence from Auctioned Cab Rides” (NBER Working Paper [27087](#))
- **Brad R. Humphreys, Margaret C. Bock, and Alexander J. Cardazzi**, West Virginia University, “Effects of Pavement Roughness on Traffic Outcomes: Evidence from California”
- **Jonathan Hall**, University of Toronto, and **Joshua Madsen**, University of Minnesota, “Can Behavioral Interventions Be Too Salient? Evidence from Traffic Safety Messages”

Summaries of most of these papers are at www.nber.org/conferences/economics-transportation-21st-century-fall-2020

Emerging and Frontier Markets: Capital Flows, Risks, and Growth

An NBER conference on Emerging and Frontier Markets: Capital Flows, Risks, and Growth, held in cooperation with the Banco de la República de Colombia, took place October 22–23 online. Research Associate Mark A. Aguiar of Princeton University, Cristina Arellano of the Federal Reserve Bank of Minneapolis, and Research Associate Sebnem Kalemli-Özcan of the University of Maryland organized the meeting. These researchers' papers were presented and discussed:

- **Vito Corman**, Boston College, and **Pierre De Leo**, University of Maryland, “Shocks and Exchange Rates in Small Open Economies”
- **Antonio Coppola**, Harvard University; **Matteo Maggiori**, Stanford University and NBER; **Brent Neiman**, University of Chicago and NBER; and **Jesse Schreger**, Columbia University and NBER, “Redrawing the Map of Global Capital Flows: The Role of Cross-Border Financing and Tax Havens”
- **Saki Bigio**, University of California, Los Angeles and NBER; **Javier Bianchi**, Federal Reserve Bank of Minneapolis; and **Charles Engel**, University of Wisconsin-Madison and NBER, “Bank, Liquidity and Exchange Rates”
- **Konstantin Egorov**, New Economic School, and **Dmitry Mukhin**, University of Wisconsin-Madison, “Optimal Monetary Policy under Dollar Pricing”
- **Lee E. Ohanian**, University of California, Los Angeles and NBER; **Paulina Restrepo-Echavarria**, Federal Reserve Bank of St. Louis; **Diana Van Patten**, Princeton University; and **Mark L.J. Wright**, Federal Reserve Bank of Minneapolis, “Bretton Woods and the Reconstruction of Europe”
- **Suman Basu**, **Emine Boz**, and **Francisco Roch**, International Monetary Fund; **Gita Gopinath** and **Filiz D. Unsal**, International Monetary Fund, “Integrated Monetary and Financial Policies for Small Open Economies”
- **Ozge Akinci**, Federal Reserve Bank of New York, and **Albert Queralto**, Federal Reserve Board, “Exchange Rate Dynamics and Monetary Spillovers with Imperfect Financial Markets”
- **Daniel A. Dias**, Federal Reserve Board; **Yi Huang**, The Graduate Institute, Geneva; **Hélène Rey**, London Business School and NBER; and **Miguel Sarmiento**, Banco de la República de Colombia, “Monetary Policy Transmission with and without Capital Controls: Micro-Evidence from Colombia”
- **Marek Kapička**, CERGE-EI, Prague; **Finn Kydland**, University of California, Santa Barbara and NBER; and **Carlos Zarazaga**, Federal Reserve Bank of Dallas, “Exploring the Role of Limited Commitment Constraints in Argentina’s ‘Missing Capital’” (NBER Working Paper [26359](#))
- **Damien Puy**, International Monetary Fund, and **Eric Monnet**, Paris School of Economics, “One Ring to Rule Them All? New Evidence on World Cycles”
- **Ricardo M. Reyes-Heroles** and **Eva Van Leemput**, Federal Reserve Board, and **Sharon Traiberman**, New York University, “Emerging Markets and the New Geography of Trade: The Effects of Rising Trade Barriers”

The agenda for this conference is at:

www.nber.org/conferences/emerging-and-frontier-markets-capital-flows-risks-and-growth-fall-2020

Economics of Mobility

An NBER conference on the Economics of Mobility took place October 23 online. Research Associates Sandra E. Black of Columbia University and Jesse Rothstein of the University of California, Berkeley, and Kosar Jahani of the Bill and Melinda Gates Foundation organized the meeting, which was supported by the Gates Foundation. These researchers' papers were presented and discussed:

- **Sandra E. Black**; **Adriana Lleras-Muney**, University of California, Los Angeles and NBER; **Nolan G. Pope**, University of Maryland; and **Joseph Price**, Brigham Young University and NBER, "Intergenerational Correlations in Longevity"
- **Alberto F. Alesina**, Harvard University; **Marlon Seror**, University of Bristol; **David Y. Yang**, Harvard University and NBER; **Yang You**, Harvard University; and **Weihong Zeng**, Xi'an Jiaotong University, "Persistence through Revolutions" (NBER Working Paper [27053](#))
- **Andrew Garin**, University of Illinois at Urbana-Champaign, and **Jonathan L. Rothbaum**, US Census Bureau, "Was the Arsenal of Democracy an Engine of Mobility? The World War II Industrial Expansion and the Roots of Mid-century Manufacturing Opportunity"
- **Elisa Jacome**, Princeton University; **Ilyana Kuziemko**, Princeton University and NBER; and **Suresh Naidu**, Columbia University and NBER, "US Intergenerational Mobility over the 20th Century: Evidence from Survey Data"
- **Zachary Bleemer**, University of California, Berkeley, "Affirmative Action and Economic Mobility in California"
- **Christina Brown**, University of California, Berkeley; **Supreet Kaur**, University of California, Berkeley and NBER; **Geeta Kingdon**, University College London Institute of Education; and **Heather Schofield**, University of Pennsylvania, "Attention as Human Capital"

The agenda for this conference is at www.nber.org/conferences/economics-mobility-fall-2020

COVID-19 and Health Outcomes

An NBER conference on COVID-19 and Health Outcomes took place November 13 and December 4 online. Research Associates Jonathan S. Skinner of Dartmouth College and David M. Cutler of Harvard University organized the meeting, which was supported by the National Institute on Aging. These researchers' papers were presented and discussed:

- **M. Keith Chen** and **Elisa F. Long**, University of California, Los Angeles, and **Judith A. Chevalier**, Yale University and NBER, "Nursing Home Staff Networks and COVID-19" (NBER Working Paper [27608](#))
- **Hanbat Jeong** and **Lung-Fei Lee**, Ohio State University; **Wei Cheng**, East China University of Science and Technology; and **Bruce A. Weinberg**, Ohio State University and NBER, "A Spatial Model of the Spread of COVID-19 and Economic Outcomes"
- **Andrew T. Levin**, Dartmouth College and NBER; **William P. Hanage**, Harvard University; **Nana O. T. Owusu**, Case Western Reserve University; and **Kensington B. Cochran** and **Seamus P. Walsh**, Dartmouth College, "Assessing the Age Specificity of Infection Fatality Rates for COVID-19: Systematic Review, Meta-Analysis, and Public Policy Implications" (NBER Working Paper [27597](#))
- **Anne Case** and **Angus Deaton**, Princeton University and NBER, "When Epidemics Collide"

- **Silvia H. Barcellos, Mireille Jacobson, and Arthur A. Stone**, University of Southern California, “Varied and Unexpected Changes in the Well-being of Seniors in the United States amid the COVID-19 Pandemic”
- **Jonathan Zhang**, Princeton University, “Hospital Avoidance and Unintended Deaths during the COVID-19 Pandemic”
- **David M. Cutler**, Harvard University and NBER, “The COVID-19 Pandemic and Motor Vehicle Deaths”
- **Engy Ziedan**, Tulane University; **Kosali I. Simon**, Indiana University and NBER; and **Coady Wing**, Indiana University, “Effects of State COVID-19 Closure Policy on Non-COVID-19 Healthcare Utilization and Health” (NBER Working Paper [27621](#))
- **Christopher J. Cronin**, University of Notre Dame, and **William N. Evans**, University of Notre Dame and NBER, “Nursing Home Quality, COVID-19 Deaths, and Excess Mortality” (NBER Working Paper [28012](#))
- **Maria Polyakova**, Stanford University and NBER; **Victoria Udalova** and **Keith Finlay**, US Census Bureau; **Geoffrey Kocks**, MIT; **Katie Genadek**, University of Minnesota; and **Amy Finkelstein**, MIT and NBER, “Differential Impact of Early COVID-19 Pandemic on Mortality by Race, Nationwide and State by State”
- **David Weir, Jessica Faul, Gábor Kézdi, and Keneth Langa**, University of Michigan, and **Helen G. Levy**, University of Michigan and NBER, “The Effect of COVID-19 on Older Americans: Preliminary Results from the HRS COVID-19 Project”
- **Jevay Grooms**, Howard University; **Alberto Ortega**, Indiana University; and **Joaquin Rubalcalba**, University of North Carolina at Chapel Hill, “Racial and Ethnic Disparities: Essential Workers, Mental Health, and the Coronavirus Pandemic”
- **Laurence C. Baker, Kate Bundorf, and Maya Rossin-Slater**, Stanford University and NBER, “Racial and Ethnic Disparities in Primary Care Use and the COVID-19 Pandemic”

Summaries of some of these papers are at www.nber.org/conferences/covid-19-and-health-outcomes-fall-2020

Facilitating Work at Older Ages

An NBER conference on Facilitating Work at Older Ages took place November 13 online. Research Associate Joanna Lahey of Texas A&M University and Kevin S. Milligan of the University of British Columbia organized the meeting. These researchers’ papers were presented and discussed:

- **Roberto M. Mosquera**, Universidad de las Americas, and **Joanna Lahey**, “Age and the Labor Market for Hispanics in the United States”
- **Robert L. Clark**, North Carolina State University and NBER; **John B. Shoven**, Stanford University and NBER; and **Sita Slavov**, George Mason University and NBER, “Firm and Worker Response to Proposals to Reduce the Tax Wedge on Working for Older Americans”
- **Damon Jones**, University of Chicago and NBER, and **David Molitor** and **Julian Reif**, University of Illinois at Urbana-Champaign and NBER, “Workplace Wellness Programs and Older Workers”
- **Simon Jäger**, MIT and NBER; **Benjamin Schoefer**, University of California, Berkeley; and **Michael Siegenthaler**, KOF Swiss Economic Institute, “The Labor Market Consequences of Barriers to Job Mobility: Evidence from Pension Portability”

Summaries of some of these papers are at www.nber.org/conferences/facilitating-work-older-ages-fall-2020

Big Data and Securities Markets

An NBER conference on Big Data and Securities Markets took place December 3–4 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 the National Science Foundation. The meeting was held in coordination with the *Review of Financial Studies*, which will consider publishing some of the papers presented. These researchers' papers were presented and discussed:

- **Jules H. van Binsbergen**, University of Pennsylvania and NBER; **Xiao Han**, University of Edinburgh; and **Alejandro Lopez-Lira**, BI Norwegian Business School, “Man vs. Machine Learning: The Term Structure of Earnings Expectations and Conditional Biases” (NBER Working Paper [27843](#))
- **Tyler Beason** and **Sunil Wahal**, Arizona State University, “The Anatomy of Trading Algorithms”
- **Dermot Murphy**, University of Illinois at Chicago, and **Edwin Hu**, New York University, “Vestigial Tails? Floor Brokers at the Close in Modern Electronic Markets”
- **Wei Jiang**, Columbia University and NBER, and **Sean Cao**, **Baozhong Yang**, and **Alan L. Zhang**, Georgia State University, “How to Talk When a Machine is Listening: Corporate Disclosure in the Age of AI”
- **William C. Gerken**, University of Kentucky, and **Marcus O. Painter**, Saint Louis University, “The Value of Differing Points of View: Evidence from Financial Analysts’ Geographic Diversity”
- **Thomas Ernst**, University of Maryland, “Stock-Specific Price Discovery from ETFs”
- **Alberto G. Rossi**, Georgetown University, and **Stephen Utkus**, Vanguard, “Who Benefits from Robo-advising? Evidence from Machine Learning”
- **Laurent Fresard**, University of Lugano and SFI; **Thierry Foucault**, HEC School of Management; and **Olivier Dessaint**, INSEAD, “Does Big Data Improve Financial Forecasting? The Horizon Effect”
- **Terrence Hendershott** and **Dmitry Livdan**, University of California, Berkeley; **Dan Li**, Federal Reserve Board; and **Norman Schurhoff**, University of Lausanne, “True Cost of Immediacy”
- **J. Anthony Cookson** and **Katie Moon**, University of Colorado; and **Joonki Noh**, Case Western Reserve University, “Imprecise and Informative: Lessons from Market Reactions to Imprecise Disclosure”
- **Talis Putnins**, University of Technology, Sydney, and **Joseph Barbara**, Australian Securities and Investments Commission, “The Good, the Bad, and the Ugly: How Algorithmic Traders Impact Institutional Trading Costs”
- **AJ Yuan Chen** and **Gerard Hoberg**, University of Southern California, and **Vojislav Maksimovic**, University of Maryland, “Life Cycles of Firm Disclosures”

Summaries of these papers are at www.nber.org/conferences/big-data-and-securities-markets-fall-2020

Innovative Data in Household Finance: Opportunities and Challenges

The NBER Working Group on Household Finance hosted a meeting on Innovative Data in Household Finance: Opportunities and Challenges online on December 4. Faculty Research Fellows Michaela Pagel of Columbia University and Christopher Tonetti of Stanford University and Research Associate Stephen P. Zeldes of Columbia University organized the meeting, which was supported by the Alfred P. Sloan Foundation and Vanguard. Diana Farrell of the JPMorganChase Institute, a member of the NBER Board of Directors, delivered a keynote address. These researchers' papers were presented and discussed:

- **Marie-Hélène Felt** and **Angelika Welte**, Bank of Canada; **Fumiko Hayashi**, Federal Reserve Bank of Kansas City; and **Joanna Stavins**, Federal Reserve Bank of Boston, “Distributional Effects of Payment Card Pricing and Merchant Cost Pass-through in the United States and Canada”
- **Kyle Coombs**, Columbia University; **Arindrajit Dube**, University of Massachusetts Amherst and NBER; **Raymond Kluender** and **Michael Stepner**, Harvard University; and **Suresh Naidu**, Columbia University and NBER, “Effects of Pandemic Unemployment Policies on Consumption, Savings, and Incomes of Workers: Evidence from Linked Survey-Transactions Data”
- **Nathanaël Vellekoop**, University of Toronto, and **Yuri Pettinicchi**, Munich Center for the Economics of Aging, “Job Loss Expectations, Durable Consumption and Household Finances: Evidence from Linked Survey Data”
- **Scott R. Baker**, Northwestern University and NBER; **Brian Baugh**, University of Nebraska-Lincoln; and **Marco C. Sammon**, Northwestern University, “Measuring Customer Churn and Interconnectedness” (NBER Working Paper 27707)
- **Huan Tang**, London School of Economics, “The Value of Privacy: Evidence from Online Borrowers”
- **Antonio Gargano**, University of Melbourne; **Marco Giacoletti**, University of Southern California; and **Elvis Jarnecic**, University of Sydney, “Local Experiences, Attention and Spillovers in the Housing Market”
- **Emily Breza**, Harvard University and NBER, and **Martin Kanz** and **Leora F. Klapper**, The World Bank, “Learning to Navigate a New Financial Technology: Evidence from Payroll Accounts”
- **Jonathan A. Lanning**, Federal Reserve Bank of Chicago, “Testing Models of Economic Discrimination Using the Discretionary Markup of Indirect Auto Loans”

Summaries of these papers are at

www.nber.org/conferences/innovative-data-household-finance-opportunities-and-challenges-fall-2020

Program and Working Group Meetings

Market Design

Members of the NBER Market Design Working Group met October 22–24 online. Research Associates Michael Ostrovsky of Stanford University and Parag A. Pathak of MIT, the co-directors of the working group, organized the meeting. These researchers' papers were presented and discussed:

- **Mohammad Akbarpour**, Stanford University; **Afshin Nikzad**, University of Southern California; **Michael A. Rees**, University of Toledo Medical Center; and **Alvin E. Roth**, Stanford University and NBER, “Global Kidney Chains”
- **Parag A. Pathak**, and **Tayfun Sönmez**, **M. Utku Ünver**, and **M. Bumin Yenmez**, Boston College, “Fair Allocation of Vaccines, Ventilators and Antiviral Treatments: Leaving No Ethical Value Behind in Health Care Rationing”
- **Federico Echenique**, California Institute of Technology; **Antonio Miralles**, Università degli Studi di Messina; and **Jun Zhang**, Nanjing Audit University, “Constrained Pseudo-Market Equilibrium”
- **Martin Bichler**, **Maximilian Fichtl**, **Stefan Heidekrüger**, **Nils Kohring**, and **Paul Sutterer**, Technical University of Munich, “Learning to Bid: Computing Bayesian Nash Equilibrium Strategies in Auctions via Neural Pseudogradient Ascent”
- **Adam Kapor** and **Christopher Neilson**, Princeton University and NBER, and **Mohit Karnani**, MIT, “Aftermarket Frictions and the Cost of Off-Platform Options in Centralized Assignment Mechanisms”
- **Marzena Rostek**, University of Wisconsin-Madison, and **Ji Hee Yoon**, University College London, “Exchange Design and Efficiency”
- **Xiang Han**, Shanghai University of Finance and Economics; **Onur Kesten**, University of Sydney; and **M. Utku Ünver**, “Blood Allocation with Replacement Donors”
- **Mohammad Akbarpour** and **Paul Milgrom**, Stanford University, and **Scott Duke Kominers** and **Shengwu Li**, Harvard University, “Investment Incentives in Near-Optimal Mechanisms”
- **Susan Athey**, Stanford University and NBER; **Juan Camilo Castillo**, University of Pennsylvania; **Rachel Glennerster**, UK Foreign, Commonwealth and Development Office; **Arthur Baker**, **Scott Duke Kominers**, and **Brandon Tan**, Harvard University; **Michael Kremer**, Harvard University and NBER; **Jean Nahrae Lee**, World Bank; **Christopher Snyder**, Dartmouth College and NBER; **Alex Tabarrok**, George Mason University; and **Witold Więcek** WAW Statistical Consulting Ltd., “Accelerating a COVID-19 Vaccine”
- **Yan Chen**, University of Michigan; **Ming Jiang**, Shanghai Jiao Tong University; and **Onur Kesten**, University of Sydney, “An Empirical Evaluation of Chinese College Admissions Reforms through a Natural Experiment”
- **David Delacretaz**, University of Oxford, “Processing Reserves Simultaneously”
- **Chiaki Moriguchi** and **Mari Tanaka**, Hitotsubashi University, and **Yusuke Narita**, Yale University, “Meritocracy and Its Discontents: Long-Run Effects of Repeated School Admission Reforms”

Summaries of some of these papers are at

www.nber.org/conferences/market-design-working-group-meeting-fall-2020

Economic Fluctuations and Growth

Members of the NBER Economic Fluctuations and Growth Program met October 23 online. Alessandra Fogli of the Federal Reserve Bank of Minneapolis and Research Associate Simon Gilchrist of New York University organized the meeting. These researchers' papers were presented and discussed:

- **Corina Boar** and **Virgiliu Midrigan**, New York University and NBER, "Efficient Redistribution" (NBER Working Paper [27622](#))
- **Titan Alon**, University of California, San Diego; **Matthias Doepke**, Northwestern University and NBER; **Jane Olmstead-Rumsey**, Northwestern University; and **Michèle Tertilt**, University of Mannheim, "This Time It's Different: The Role of Women's Employment in a Pandemic Recession" (NBER Working Paper [27660](#))
- **Raj Chetty** and **Nathaniel Hendren**, Harvard University and NBER; **John N. Friedman**, Brown University and NBER; and **Michael Stepner**, Harvard University, "Real-Time Economics: A New Public Platform to Analyze the Impacts of COVID-19 and Macroeconomic Policies Using Private Sector Data"
- **Michael Woodford**, Columbia University and NBER, "Effective Demand Failures and the Limits of Monetary Stabilization Policy" (NBER Working Paper [27768](#))
- **Daniel Greenwald**, MIT; **Martin Lettau**, University of California, Berkeley and NBER; and **Sydney C. Ludvigson**, New York University and NBER, "How the Wealth Was Won: Factor Shares as Market Fundamentals"

Summaries of these papers are at www.nber.org/conferences/efg-research-meeting-fall-2020

Public Economics

Members of the NBER Public Economics Program met October 29-30 online. Program Director Raj Chetty of Harvard University and Faculty Research Fellow Damon Jones of University of Chicago organized the meeting. These researchers' papers were presented and discussed:

- **Lucie Gadenne**, Warwick University; **Sam Norris**, University of Chicago; **Sandip Sukhtankar**, University of Virginia; and **Monica Singhal**, University of California, Davis and NBER, "In-Kind Transfers as Insurance"
- **David Coyne**, Department of the Treasury; **Itzik Fadlon**, University of California, San Diego and NBER; and **Tommaso Porzio**, Columbia University, "Who Needs Liquidity, When, and Where? Evidence from Penalized Withdrawals"
- **Francis Wong**, NBER, "Mad as Hell: Property Taxes and Financial Distress"
- **Sylvain Catherine**, **Max Miller**, and **Natasha Sarin**, University of Pennsylvania, "Social Security and Trends in Inequality"
- **Pascal Michaillat**, Brown University and NBER, and **Emmanuel Saez**, University of California, Berkeley and NBER, "Beveridgean Unemployment Gap"
- **Jarkko Harju**, VATT Institute for Economic Research; **Simon Jäger**, MIT and NBER; and **Benjamin Schoefer**, University of California, Berkeley, "Worker Voice and Shared Governance: Evidence from a Reform in Finland"
- **Michael Dinerstein**, University of Chicago and NBER; **Christopher Neilson**, Princeton University and NBER; and **Sebastian Otero**, Stanford University, "The Equilibrium Effects of Public Provision in Education Markets: Evidence from a Public School Expansion Policy"
- **Brad C. Nathan** and **Alejandro Zentner**, University of Texas at Dallas; and **Ricardo Perez-Truglia**, University of California, Berkeley and NBER, "My Taxes Are Too Darn High: Tax Protests as Revealed Preferences for Redistribution" (NBER Working Paper [27816](#))

- **Max Risch**, Carnegie Mellon University, “Does Taxing Business Owners Affect Employees? Evidence from a Change in the Top Marginal Tax Rate”
- **Manasi Deshpande**, University of Chicago and NBER, and **Lee Lockwood**, University of Virginia and NBER, “Beyond Health: Non-Health Risk and the Value of Disability Insurance”
- **Benjamin R. Handel** and **Jonathan T. Kolstad**, University of California, Berkeley and NBER, and **Thomas Minten** and **Johannes Spinnewijn**, London School of Economics, “The Social Determinants of Choice Quality: Evidence from Health Insurance in the Netherlands” (NBER Working Paper [27785](#))
- **Anne Brockmeyer**, World Bank; **Juan Carlos Suárez Serrato**, Duke University and NBER; and **Alejandro Estefan**, University of Notre Dame, “Taxing Property in Developing Countries: Theory and Evidence from Mexico”

Summaries of some of these papers are at www.nber.org/conferences/public-economics-program-meeting-fall-2020

International Finance and Macroeconomics

Members of the NBER International Finance and Macroeconomics Program met October 30 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:

- **Felipe Saffie**, University of Virginia; **Liliana Varela**, London School of Economics; and **Kei-Mu Yi**, University of Houston and NBER, “The Micro and Macro Dynamics of Capital Flows” (NBER Working Paper [27371](#))
- **Bryan Gutierrez**, SBS Peru; **Victoria Ivashina**, Harvard University and NBER; and **Juliana Salomao**, University of Minnesota, “Why Is Dollar Debt Cheaper? Evidence from Peru”
- **Stéphane Auray**, CREST-ENSAI and Université du Littoral Côte d’Opale; **Michael B. Devereux**, University of British Columbia and NBER; and **Aurélien Eyquem**, Université de Lyon, “Trade Wars, Currency Wars”
- **Karen K. Lewis**, University of Pennsylvania and NBER, and **Edith Liu**, Federal Reserve Board, “The Real Costs of International Financial Dis-Integration”
- **Rafael Guntin**, New York University; **Pablo Ottonello**, University of Michigan and NBER; and **Diego Perez**, New York University and NBER, “The Micro Anatomy of Macro Consumption Adjustments” (NBER Working Paper [27917](#))

Summaries of these papers are at nber.org/conferences/ifm-program-meeting-fall-2020

Political Economy

Members of the NBER Political Economy Program met October 30-31 online. Research Associates Gerard Padró i Miquel of Yale University and Jesse M. Shapiro of Brown University organized the meeting. These researchers’ papers were presented and discussed:

- **Filipe R. Campante**, Johns Hopkins University and NBER; **Emilio Depetris-Chauvin**, Pontificia Universidad Católica de Chile; and **Ruben Durante**, Universitat Pompeu Fabra, “The Virus of Fear: The Political Impact of Ebola in the US” (NBER Working Paper [26897](#))
- **Belinda Archibong**, Columbia University, and **Nonso Obikili**, Economic Research Southern Africa (ERSA), “Prison Labor: The Price of Prisons and the Lasting Effects of Incarceration”
- **Pauline Grosjean**, **Federico Masera**, and **Hasin Yousaf**, University of New South Wales, “Whistle the Racist Dogs: Political Campaigns and Police Stops”
- **Yiming Cao**, Boston University, “The Social Costs of Patronage Ties: Lessons from a Devastating Earthquake”
- **Ahmet Arda Gitmez**, MIT, and **Konstantin Sonin** and **Austin L. Wright**, University of Chicago, “Political Economy of Crisis Response”

- **Mattia Nardotto**, KU Leuven, and **Sandra Sequeira**, London School of Economics, “Identity, Media and Consumer Behavior”
- **Elliott Ash**, ETH Zürich; **Daniel Chen**, Toulouse School of Economics; and **Suresh Naidu**, Columbia University and NBER, “Ideas Have Consequences: The Impact of Law and Economics on American Justice”
- **Renee Bowen**, University of California, San Diego and NBER, and **Danil Dmitriev** and **Simone Galperti**, University of California, San Diego, “Learning from Shared News: When Abundant Information Leads to Belief Polarization”

Summaries of these papers are at www.nber.org/conferences/political-economy-program-meeting-fall-2020

Behavioral Finance

Members of the NBER Behavioral Finance Working Group met October 30 online. Research Associate Nicholas C. Barberis of Yale University, the director of the group, organized the meeting, which was supported by Bracebridge Capital and Fuller & Thaler Asset Management. These researchers’ papers were presented and discussed:

- **Allen Hu** and **Song Ma**, Yale University, “Persuading Investors: A Video-Based Study”
- **Xavier Gabaix**, Harvard University and NBER, and **Ralph S. J. Koijen**, University of Chicago and NBER, “In Search of the Origins of Financial Fluctuations: The Inelastic Markets Hypothesis”
- **Nikolai Roussanov**, University of Pennsylvania and NBER; **Hongxun Ruan**, University of Pennsylvania; and **Yanhao Wei**, University of Southern California, “Mutual Fund Flows and Performance in (Imperfectly) Rational Markets?”
- **Tobias J. Moskowitz**, Yale University and NBER, and **Kaushik Vasudevan**, Yale University, “What Can Betting Markets Tell Us About Investor Preferences and Beliefs? Implications for Low Risk Anomalies”
- **Pooya Molavi** and **Alireza Tahbaz-Salehi**, Northwestern University, and **Andrea Vedolin**, Boston University and NBER, “Asset Pricing with Misspecified Models”
- **Alexander M. Chinco**, University of Illinois at Urbana-Champaign; **Samuel M. Hartzmark**, University of Chicago and NBER; and **Abigail Sussman**, University of Chicago, “Necessary Evidence for a Risk Factor’s Relevance” (NBER Working Paper [27227](#))

Summaries of these papers are at www.nber.org/conferences/behavioral-finance-meeting-fall-2020

Asset Pricing

Members of the NBER Asset Pricing Program met November 6 online. Research Associates Dimitri Vayanos of the London School of Economics and Jessica Wachter of the University of Pennsylvania organized the meeting. These researchers’ papers were presented and discussed:

- **Huaizhi Chen**, University of Notre Dame; **Lauren Cohen**, Harvard University and NBER; and **Umit Gurun**, University of Texas at Dallas, “Don’t Take Their Word for It: The Misclassification of Bond Mutual Funds” (NBER Working Paper [26423](#))
- **Carolyn Pflueger**, University of Chicago and NBER, and **Gianluca Rinaldi**, Harvard University, “Why Does the Fed Move Markets So Much? A Model of Monetary Policy and Time-Varying Risk Aversion” (NBER Working Paper [27856](#))
- **Niels Joachim Gormsen**, University of Chicago, and **Eben Lazarus**, MIT, “Duration-Driven Returns”
- **Jonathan A. Parker** and **Antoinette Schoar**, MIT and NBER, and **Yang Sun**, Brandeis University, “Retail Financial Innovation and Stock Market Dynamics: The Case of Target Date Funds” (NBER Working Paper [28028](#))

- **Yixin Chen**, University of Rochester, and **Randolph B. Cohen** and **Zixuan Wang**, Harvard University, “Famous Firms, Earnings Clusters, and the Stock Market”
- **Arvind Krishnamurthy**, Stanford University and NBER, and **Wenhao Li**, University of Southern California, “Dissecting Mechanisms of Financial Crises: Intermediation and Sentiment” (NBER Working Paper 27088)

Summaries of these papers are at www.nber.org/conferences/asset-pricing-program-meeting-fall-2020

Corporate Finance

Members of the NBER Corporate Finance Program met November 6 online. Research Associates Robin Greenwood of Harvard University and David Thesmar of MIT organized the meeting. These researchers’ papers were presented and discussed:

- **Daniel Greenwald**, MIT, and **John Krainer** and **Pascal Paul**, Federal Reserve Bank of San Francisco, “The Credit Line Channel”
- **João Granja**, University of Chicago; **Christos Makridis**, MIT; and **Constantine Yannelis** and **Eric Zwick**, University of Chicago and NBER, “Did the Paycheck Protection Program Hit the Target?” (NBER Working Paper 27095)
- **Bryan Gutierrez**, SBS Peru; **Victoria Ivashina**, Harvard University and NBER; and **Juliana Salomao**, University of Minnesota, “Why Is Dollar Debt Cheaper? Evidence from Peru”
- **Tania Babina**, Columbia University; **Anastassia Fedyk**, University of California, Berkeley; **Alex X. He**, University of Maryland; and **James Hodson**, Jozef Stefan International Postgraduate School, “Artificial Intelligence, Firm Growth, and Industry Concentration”
- **Paul Gertler** and **Catherine Wolfram**, University of California, Berkeley and NBER, and **Brett Green**, Washington University in St. Louis, “Unlocking Access to Credit with Lockout Technology”
- **Jason R. Donaldson**, Washington University in St. Louis; **Edward Morrison**, Columbia University; **Giorgia Piacentino**, Columbia University and NBER; and **Xiaobo Yu**, Columbia Business School, “Restructuring vs Bankruptcy”
- **Eleonora Broccardo**, University of Trento; **Oliver D. Hart**, Harvard University and NBER; and **Luigi Zingales**, University of Chicago and NBER, “Exit vs. Voice” (NBER Working Paper 27710)

Summaries of these papers are at www.nber.org/conferences/corporate-finance-program-meeting-fall-2020

Monetary Economics

Members of the NBER Monetary Economics Program met November 13 online. Research Associates Francesco Bianchi of Duke University and James Cloyne of the University of California, Davis organized the meeting. These researchers’ papers were presented and discussed:

- **Hassan Afrouzi**, Columbia University, and **Choongryul Yang**, Federal Reserve Board, “Dynamic Rational Inattention and the Phillips Curve”
- **Lydia Cox**, Harvard University; **Gernot Müller**, University of Tübingen; **Ernesto Pastén**, Central Bank of Chile; **Raphael Schoenle**, Brandeis University; and **Michael Weber**, University of Chicago and NBER, “Big G” (NBER Working Paper 27034)
- **George-Marios Angeletos**, MIT and NBER, and **Chen Lian**, University of California, Berkeley, “Confidence and the Propagation of Demand Shocks” (NBER Working Paper 27702)
- **Qian Chen**, Beijing Technology and Business University; **Christoffer Koch**, Federal Reserve Bank of Dallas; **Padma Sharma**, Federal Reserve Bank of Kansas City; and **Gary Richardson**, University of California, Irvine and NBER, “Payments Crises and Consequences” (NBER Working Paper 27733)

- **Simon Gilchrist**, New York University and NBER; **Bin Wei**, Federal Reserve Bank of Atlanta; **Vivian Yue**, Emory University and NBER; and **Egon Zakrajšek**, Federal Reserve Board, “The Fed Takes on Corporate Credit Risk: An Analysis of the Efficacy of the SMCFF” (NBER Working Paper [27809](#))
- **Olivier Coibion**, University of Texas at Austin and NBER; **Yuriy Gorodnichenko**, University of California, Berkeley and NBER; **Edward Knotek**, Federal Reserve Bank of Cleveland; and **Raphael Schoenle**, Brandeis University, “Average Inflation Targeting and Household Expectations” (NBER Working Paper [27836](#))

Summaries of these papers are at www.nber.org/conferences/nber-monetary-economics-program-meeting-fall-2020

Labor Studies

Members of the NBER Labor Studies Program met November 13 online. Program Directors David Autor of MIT and Alexandre Mas of Princeton University organized the meeting. These researchers’ papers were presented and discussed:

- **Joseph Price**, Brigham Young University and NBER; **Valerie R. Michelman**, University of Chicago; and **Seth D. Zimmerman**, Yale University and NBER, “The Distribution of and Returns to Social Success at Elite Universities”
- **Adriana D. Kugler**, Georgetown University and NBER, and **Ammar Farooq** and **Umberto Muratori**, Georgetown University, “Do Unemployment Insurance Benefits Improve Match Quality? Evidence from Recent US Recessions” (NBER Working Paper [27836](#))
- **Jarkko Harju**, VATT Institute for Economic Research; **Simon Jäger**, MIT and NBER; and **Benjamin Schoefer**, University of California, Berkeley, “Worker Voice and Shared Governance: Evidence from Finland”
- **Peter Ganong** and **Damon Jones**, University of Chicago and NBER; **Pascal J. Noel**, University of Chicago; **Diana Farrell**, **Fiona E. Greig**, and **Chris Wheat**, JPMorganChase Institute, “Wealth, Race, and Consumption Smoothing of Typical Income Shocks” (NBER Working Paper [27574](#))
- **Sandra E. Black**, Columbia University and NBER; **Jeffrey T. Denning**, Brigham Young University and NBER; **Lisa J. Dettling** and **Sarena Goodman**, Federal Reserve Board; and **Lesley J. Turner**, Vanderbilt University and NBER, “Taking It to the Limit: Effects of Increased Student Loan Availability on Attainment, Earnings, and Financial Well-Being” (NBER Working Paper [27658](#))
- **Barbara Biasi**, Yale University and NBER, and **Heather Sarsons**, Harvard University and NBER, “Flexible Wage, Bargaining, and the Gender Gap” (NBER Working Paper [27894](#))
- **Yana Gallen**, University of Chicago, and **Melanie Wasserman**, University of California, Los Angeles, “Informed Choices: Gender Gaps in Career Advice”

Summaries of these papers are at www.nber.org/conferences/labor-studies-program-meeting-fall-2020

Development Economics

Members of the NBER Development Economics Program met November 19–20 online. Program Director Benjamin A. Olken of MIT and Research Associates Katherine Casey of Stanford University, Thomas Fujiwara of Princeton University, Karthik Muralidharan of the University of California, San Diego, Christopher R. Udry of Northwestern University, Eric Verhoogen of Columbia University, and Maisy Wong of the University of Pennsylvania and organized the meeting. These researchers’ papers were presented and discussed:

- **Jonah M. Rexer**, University of Pennsylvania, “The Local Advantage: Corruption, Organized Crime, and Indigenization in the Nigerian Oil Sector”
- **Emily Aiken** and **Joshua Blumenstock**, University of California, Berkeley; **Suzanne Bellue**, University of Mannheim; **Dean Karlan**, Northwestern University and NBER; and **Christopher R. Udry**, “Targeting COVID-19 Aid with Mobile Phone Data and Machine Learning”

- **Jie Bai**, Harvard University and NBER; **Daniel Xu**, Duke University and NBER; **Jin Liu**, New York University; and **Maggie Chen**, George Washington University, “Search and Information Frictions on Global E-Commerce Platforms: Evidence from AliExpress” (NBER Working Paper [28100](#))
- **Cyril Chalendar**, International Trade Centre (UN-WTO agency); **Ana M. Fernandes** and **Bob Rijkers**, The World Bank; and **Gael Raballand**, “Technology (Ab)use and Corruption in Customs”
- **Jing Cai**, University of Maryland and NBER, and **Shing-Yi Wang**, University of Pennsylvania and NBER, “Improving Management through Worker Evaluations: Evidence from Auto Manufacturing” (NBER Working Paper [27680](#))
- **Daniel J. Agness**, University of California, Berkeley; **Travis Baseler**, University of Rochester; **Sylvain Chassang**, Princeton University and NBER; **Pascaline Dupas**, Stanford University and NBER; and **Erik Snowberg**, California Institute of Technology and NBER, “Valuing the Time of the Self-Employed”
- **Wyatt Brooks**, Arizona State University; **Kevin Donovan**, Yale University; **Terence R. Johnson**, University of Notre Dame; and **Jackline Oluoch-Aridi**, Strathmore University and University of Notre Dame, “Cash Transfers as a Response to COVID-19: A Randomized Experiment in Kenya”
- **Dietmar Fehr**, University of Heidelberg; **Günther Fink**, Swiss Tropical and Public Health Institute; and **Kelsey Jack**, University of California, Santa Barbara and NBER, “Poor and Rational: Decision-making under Scarcity”
- **Francis Annan**, Georgia State University, and **Aly Sanoh**, The World Bank, “Misconduct and Reputation under Imperfect Information”
- **Karthik Muralidharan**; **Paul Niehaus**, University of California, San Diego and NBER; and **Sandip Sukhtankar**, University of Virginia, “Identity Verification Standards in Welfare Programs: Experimental Evidence from India” (NBER Working Paper [26744](#))
- **Manaswini Rao**, University of California, San Diego, “Judicial Capacity Increases Firm Growth Through Credit Access: Evidence from Clogged Courts of India”
- **Augustin Bergeron** and **Pablo Balan**, Harvard University; **Gabriel Z. Tourek**, MIT and J-PAL; **Jonathan L. Weigel**, London School of Economics, “Local Elites as State Capacity: How City Chiefs Use Local Information to Increase Tax Compliance in the D.R. Congo”
- **Susanna B. Berkouwer**, University of Pennsylvania, and **Josh T. Dean**, University of Chicago, “Credit and Attention in the Adoption of Profitable Energy Efficient Technologies in Kenya”
- **Abhijit Banerjee**, **Esther Duflo**, and **Frank Schilbach**, MIT and NBER; **Madeline McKelway**, Stanford University; **Garima Sharma** and **Erin Grela**, MIT; and **Girija Vaidyanathan**, Government of Tamil Nadu, “Did Pensions Protect the Elderly from the Impacts of COVID?”
- **Megan MacGarvie**, Boston University and NBER, and **Caroline Fry**, University of Hawai’i at Manoa, “Drinking from the Firehose: Preprints, Chinese Scientists, and the Diffusion of Research on COVID-19”
- **Julieta Caunedo**, Cornell University, and **Namrata Kala**, MIT and NBER, “Mechanizing Agriculture: Impacts on Labor and Productivity”
- **Noam Angrist**, University of Oxford; **Peter Bergman**, Columbia University and NBER; and **Moitshepi Matsheng**, Young Iove, “School’s Out: Experimental Evidence on Limiting Learning Loss Using ‘Low-Tech’ in a Pandemic”
- **Eduardo Montero**, University of Michigan, and **Dean Yang**, University of Michigan and NBER, “Religious Festivals and Economic Development: Evidence from Catholic Saint-Day Festivals in Mexico”
- **Steve Cicala**, Tufts University and NBER, “Early Economic Impacts of COVID-19: A View from the Grid”
- **Lelys Ilean Dinarte**, The World Bank; **Sofia Amaral**, Ludwig Maximilian University of Munich; **Santiago M. Perez**, Inter-American Development Bank (IDB); and **Patricio Domínguez Rivera**, University of California, Berkeley, “Helping Families Help Themselves: Effects of a SMS Parental and Stress Management Intervention”

- **Shyamal Chowdhury**, University of Sydney; **Hannah Schildberg-Hörisch**, Heinrich-Heine-University Düsseldorf; **Sebastian O. Schneider** and **Matthias Sutter**, Max Planck Institute for Research on Collective Goods, “Nudging or Paying? Evaluating the Effectiveness of Measures to Contain COVID-19 in Rural Bangladesh in a Randomized Controlled Trial”
- **Joan Hamory Hicks**, University of Oklahoma; **Edward Miguel**, University of California, Berkeley and NBER; **Michael W. Walker**, University of California, Berkeley; **Michael Kremer**, University of Chicago and NBER; and **Sarah J. Baird**, George Washington University, “Twenty Year Economic Impacts of Deworming” (NBER Working Paper 27611)

Summaries of some of these papers are at www.nber.org/conferences/development-economics-program-meeting-fall-2020

Organizational Economics

Members of the NBER's Organizational Economics Working Group met November 20–21 online. Research Associate Robert S. Gibbons of MIT, the director of the working group, organized the meeting. These researchers' papers were presented and discussed:

- **Katarzyna A. Bilicka**, Utah State University, and **Daniela Scur**, Cornell University, “Organizational Capacity and Profit Shifting”
- **Diana Moreira**, University of California, Davis, and **Santiago Pérez**, University of California, Davis and NBER, “Civil Service Reform and Organizational Practices: Evidence from the 1883 Pendleton Act”
- **Heski Bar-Isaac**, University of Toronto, and **Ian Jewitt** and **Clare Leaver**, University of Oxford, “Training, Recruitment, and Outplacement as Endogenous Adverse Selection”
- **Namrata Kala**, MIT and NBER, “The Impacts of Managerial Autonomy on Firm Outcomes” (NBER Working Paper 26304)
- **Marco Casari**, University of Bologna, and **Maurizio Lisciandra**, University of Messina, “Institutional Change in Property Rights: Model and Evidence of a Centuries-Long Dynamic”
- **Arjada Bardhi**, Duke University, and **Yingni Guo** and **Bruno Strulovici**, Northwestern University, “Early-Career Discrimination: Spiraling or Self-Correcting?”
- **Andrea Weber**, Central European University; **Ingrid Huitfeldt**, University of Oslo; **Jan Sebastian Nimczik**, European School of Management and Technology Berlin; and **Andreas R. Kostol**, Arizona State University, “Internal Labor Markets: A Worker Flow Approach”
- **Joyee Deb**, Yale University; **Aditya Kuvalekar**, Universidad Carlos III de Madrid; and **Elliot Lipnowski**, Columbia University, “Fostering Collaboration”
- **Gani S. Aldashev**, Université Libre de Bruxelles, and **Giorgio Zanarone**, Washington University in St. Louis, “Governance in the Wild: A Theory of State vs. Private Firms under Weak Institutions”
- **Weijia Li**, Monash University, “Meritocracy and Dual Leadership: Historical Evidence and an Interpretation”
- **Florian Englmaier**, University of Munich; **Jose Galdon-Sanchez**, Universidad Pública de Navarra; **Ricard Gil**, Queen's University; and **Michael Kaiser**, Ludwig Maximilian University of Munich, “Management Practices and Firm Performance during the Great Recession: Evidence from Spanish Survey Data”
- **Erik Madsen** and **Basil Williams**, New York University, and **Andrzej Skrzypacz**, Stanford University, “Designing Career Concerns”

Summaries of these papers are at www.nber.org/conferences/organizational-economics-fall-2020

Health Care

Members of the NBER Health Care Program met December 3–4 online. Program co-directors Amy Finkelstein of MIT and Heidi L. Williams of Stanford University and Research Associates Michael Geruso of the University of Texas at Austin and Kate Ho of Princeton University organized the meeting. These researchers' papers were presented and discussed:

- **D. Mark Anderson**, Montana State University and NBER; **Kerwin Kofi Charles**, Yale University and NBER; and **Daniel I. Rees**, University of Colorado at Denver and NBER, “The Federal Effort to Desegregate Southern Hospitals and the Black-White Infant Mortality Gap” (NBER Working Paper [27970](#))
- **Barbara Biasi**, Yale University and NBER; **Petra Moser**, New York University and NBER; and **Michael S. Dahl**, Aalborg University Business School, “Career Effects of Mental Health”
- **Nikhil Agarwal**, MIT and NBER; **Paulo J. Somaini**, Stanford University and NBER; and **Charles B. Hodgson**, Yale University, “Choices and Outcomes in Assignment Mechanisms: The Allocation of Deceased Donor Kidneys” (NBER Working Paper [28064](#))
- **Paul J. Eliason**, Brigham Young University; **Riley J. League** and **Ryan C. McDevitt**, Duke University; **Benjamin Heebsh**, Federal Trade Commission; and **James W. Roberts**, Duke University and NBER, “The Effect of Bundled Payments on Provider Behavior and Patient Outcomes”
- **David C. Chan Jr.**, Stanford University and NBER; **David Card**, University of California, Berkeley and NBER; and **Lowell Taylor**, Carnegie Mellon University and NBER, “Is There a VA Advantage? Evidence from Dually Eligible Veterans”
- **Ashvin Gandhi**, University of California, Los Angeles, “Picking Your Patients: Selective Admissions in the Nursing Home Industry”
- **Mark Duggan**, Stanford University and NBER; **Craig Garthwaite**, Northwestern University and NBER; and **Yanyue Wang**, NBER, “Heterogeneity in the Impact of Privatizing Social Health Insurance”

Summaries of these papers are at www.nber.org/conferences/health-care-program-meeting-fall-2020

Economics of Education

Members of the NBER Economics of Education Program met December 3–4 online. Program Director Caroline M. Hoxby of Stanford University organized the meeting. These researchers' papers were presented and discussed:

- **Nolan G. Pope** and **George W. Zuo**, University of Maryland, “Suspending Suspensions: The Education Production Consequences of School Suspension Policies”
- **Christina L. Brown**, University of California, Berkeley, and **Tahir Andrabi**, Pomona College, “Inducing Positive Sorting through Performance Pay: Experimental Evidence from Pakistani Schools”
- **Rajashri Chakrabarti**, Federal Reserve Bank of New York; **Nicole Gorton**, University of California, Los Angeles; and **Michael F. Lovenheim**, Cornell University and NBER, “State Investment in Higher Education: Effects on Human Capital Formation, Student Debt, and Long-term Financial Outcomes of Students” (NBER Working Paper [27885](#))
- **Eric Brunner**, University of Connecticut; **Ben Hoen**, Lawrence Berkeley National Laboratory; and **Joshua M. Hyman**, Amherst College, “School District Revenue Shocks, Resource Allocations, and Student Achievement: Evidence from the Universe of US Wind Energy Installations”
- **Michael Gilraine**, New York University, and **Nolan G. Pope**, “Making Teaching Last: Long- and Short-Run Value-Added”
- **Christopher Neilson**, Princeton University and NBER; **Matteo Bobba** and **Tim Ederer**, University of Toulouse; **Gianmarco León**, Universitat Pompeu Fabra; and **Marco G. Nieddu**, University of Cagliari, “Teacher Compensation and Structural Inequality: Evidence from Centralized Teacher School Choice in Peru”

- **David N. Figlio**, Northwestern University and NBER; **Paola Giuliano**, University of California, Los Angeles and NBER; **Riccardo Marchingiglio**, Northwestern University; **Paola Sapienza**, Northwestern University and NBER; and **Umut Özek**, American Institutes for Research, “Diversity in Schools: Immigrants and the Educational Performance of US-Born Students”
- **Michael Dinerstein**, University of Chicago and NBER; **Christopher Neilson**, Princeton University and NBER; and **Sebastian Otero**, Stanford University, “The Equilibrium Effects of Public Provision in Education Markets: Evidence from a Public School Expansion Policy”
- **Jesse M. Bruhn**, Brown University; **Scott A. Imberman**, Michigan State University and NBER; and **Marcus A. Winters**, Boston University, “Regulatory Arbitrage in Teacher Hiring and Retention: Evidence from Massachusetts Charter Schools” (NBER Working Paper 27607)
- **Andrew Bacher-Hicks**, Boston University; **Joshua Goodman**, Boston University and NBER; and **Christine Mulhern**, RAND Corporation, “Inequality in Household Adaptation to Schooling Shocks: Covid-Induced Online Learning Engagement in Real Time” (NBER Working Paper 27555)

Summaries of these papers are at www.nber.org/conferences/education-program-meeting-fall-2020

International Trade and Investment

Members of the NBER International Trade and Investment Program met December 4–5 online. Program Director Stephen J. Redding of Princeton University organized the meeting. These researchers’ papers were presented and discussed:

- **Jonathan I. Dingel** and **Felix Tintelnot**, University of Chicago and NBER, “Spatial Economics for Granular Settings” (NBER Working Paper 27287)
- **Matilde Bombardini** and **Francesco Trebbi**, University of California, Berkeley and NBER, and **Bingjing Li**, National University of Singapore, “Did US Politicians Expect the China Shock?” (NBER Working Paper 28073)
- **Rafael Dix-Carneiro**, Duke University and NBER; **João Paulo Pessoa**, LSE; **Ricardo M. Reyes-Heroles**, Federal Reserve Board; and **Sharon Traiberman**, New York University, “Globalization, Trade Imbalances and Labor Market Adjustment”
- **Rodrigo Adão**, University of Chicago and NBER; **Costas Arkolakis**, Yale University and NBER; and **Sharat Ganapati**, Georgetown University, “Aggregate Implications of Firm Heterogeneity: A Nonparametric Analysis of Monopolistic Competition Trade Models” (NBER Working Paper 28081)
- **Christoph Boehm** and **Nitya Pandalai-Nayar**, University of Texas at Austin and NBER, and **Andrei A. Levchenko**, University of Michigan and NBER, “The Long and Short (Run) of Trade Elasticities” (NBER Working Paper 27064)
- **David Autor**, MIT and NBER; **David Dorn**, University of Zurich; and **Gordon H. Hanson**, Harvard University and NBER, “On the Persistence of the China Shock”
- **Lorenzo Caliendo**, Yale University and NBER; **Robert C. Feenstra** and **Alan M. Taylor**, University of California, Davis and NBER, and **John Romalis**, The University of Sydney, “A Second-Best Argument for Low Optimal Tariffs”
- **Gene M. Grossman**, Princeton University and NBER, and **Elhanan Helpman**, Harvard University and NBER, “When Tariffs Disturb Global Supply Chains” (NBER Working Paper 27722)
- **Diego A. Comin**, Dartmouth College and NBER, and **Robert C. Johnson**, University of Notre Dame and NBER, “Offshoring and Inflation” (NBER Working Paper 27957)
- **James E. Anderson**, Boston College and NBER, and **Yoto V. Yotov**, Drexel University, “Quantifying the Extensive Margin of Trade”

Summaries of these papers are at www.nber.org/conferences/international-trade-and-investment-program-meeting-fall-2020

Entrepreneurship

Members of the NBER Entrepreneurship Working Group met December 4 online. Research Associate Josh Lerner of Harvard University and Working Group Director David T. Robinson of Duke University organized the meeting. These researchers' papers were presented and discussed:

- **Vojislav Maksimovic** and **Liu Yang**, University of Maryland, “Reshaping the Local Marketplace: Brands, Local Stores, and COVID”
- **Robert W. Fairlie**, University of California, Santa Cruz and NBER, and **Frank Fossen**, University of Nevada, Reno, “Did the \$660 Billion Paycheck Protection Program and \$220 Billion Economic Injury Disaster Loan Program Get Disbursed to Minority Communities in the Early Stages of COVID-19?”
- **Lucy Xiaolu Wang**, Max Planck Institute for Innovation and Competition, “Global Drug Diffusion and Innovation with the Medicines Patent Pool”
- **Daniel Fehder**, University of Southern California; **Naomi Hausman**, Hebrew University; and **Yael Hochberg**, Rice University and NBER, “The Virtuous Cycle of Innovation and Capital Flows”
- **Shai Bernstein**, Harvard University and NBER; **Richard R. Townsend**, University of California, San Diego and NBER; and **Ting Xu**, University of Virginia, “Flight to Safety: How Economic Downturns Affect Talent Flows to Startups” (NBER Working Paper 27907)
- **Robert P. Bartlett III**, University of California, Berkeley, and **Adair Morse**, University of California, Berkeley and NBER, “Small Business Survival Capabilities: Evidence from Oakland” (NBER Working Paper 27629)

Summaries of these papers are at www.nber.org/conferences/entrepreneurship-working-group-fall-2020

Health Economics

Members of the NBER Health Economics Program met December 10–11 online. Program Director Christopher Carpenter of Vanderbilt University and Research Associate Heather Royer of the University of California, Santa Barbara organized the meeting. These researchers' papers were presented and discussed:

- **Patrick Flynn** and **Michelle M. Marcus**, Vanderbilt University, “A Watershed Moment: The Clean Water Act and Infant Health”
- **Scott Cunningham**, **Jonathan Seward** and **Vivian S. Vigliotti**, Baylor University, “Mental Health Courts and Their Effects on Repeat Offending and Suicidality: Evidence from Randomized Therapists”
- **Edward N. Okeke**, RAND Corporation, and **Isa S. Abubakar**, Bayero University, Kano, “When a Doctor Falls from the Sky: The Impact of Easing Physician Supply Constraints on Mortality”
- **Onur Altindag**, Bentley University; **Bilge Erten**, Northeastern University; and **Pinar Keskin**, Wellesley College, “Mental Health Costs of Lockdowns: Evidence from Age-Specific Curfews in Turkey”
- **Anne Ardila Brenøe**, University of Zurich, and **Jenna E. Stearns**, University of California, Davis, “Explaining the Effect of Breastfeeding Promotion on Infant Weight Gain: The Role of Nutrition”
- **Martin Andersen**, University of North Carolina Greensboro; **Johanna Catherine Maclean**, Temple University and NBER; **Michael F. Pesko**, Georgia State University; and **Kosali I. Simon**, Indiana University and NBER, “Effect of a Federal Paid Sick Leave Mandate on Staying at Home during the COVID-19 Pandemic: Evidence from Cellular Device Data” (NBER Working Paper 27138)

- **Christopher J. Cronin**, University of Notre Dame, and **William N. Evans**, University of Notre Dame and NBER, “Nursing Home Quality, COVID-19 Deaths, and Excess Mortality”
- **Yiqun Chen**, University of Illinois at Chicago, “Team-Specific Human Capital and Team Performance: Evidence from Doctors”

Summaries of these papers are at www.nber.org/conferences/health-economics-program-meeting-fall-2020

Chinese Economy

Members of the NBER’s Chinese Economy Working Group met December 17–19 online. Working Group Director Shang-Jin Wei of Columbia University and Research Associates Hanming Fang of the University of Pennsylvania, Zhiguo He of the University of Chicago, and Wei Xiong of Princeton University organized the meeting. These researchers’ papers were presented and discussed:

- **Hanming Fang**, and **Xincheng Qiu**, University of Pennsylvania, “‘Golden Ages’: A Tale of Two Labor Markets”
- **Lin William Cong**, Cornell University; **Ke Tang** and **Danxia Xie**, Tsinghua University; and **Qi Miao**, Nielsen Company, “Asymmetric Cross-Side Network Effects on Financial Platforms: Theory and Evidence from Marketplace Lending”
- **Zhiguo He**, **Maggie Rong Hu**, Chinese University of Hong Kong; **Zhenping Wang**, University of Chicago; and **Vincent Yao**, Georgia State University, “Political Uncertainty and Asset Valuation: Housing Prices in Hong Kong”
- **Gautam Gowrisankaran**, University of Arizona and NBER; **Michael Greenstone** and **Ali Hortaçsu**, University of Chicago and NBER; **Mengdi Liu**, University of International Business and Economics; **Caixia Shen**, Zhejiang University of Finance and Economics; and **Bing Zhang**, Nanjing University, “Discharge Fees, Pollution Mitigation and Productivity: Evidence from Chinese Power Plants”
- **Ming Li**, Chinese University of Hong Kong, Shenzhen, “Information and Corruption: Evidence from China’s Land Auctions”
- **Lili Dai**, University of New South Wales, Sydney; **Jianlei Han**, Macquarie University; **Jing Shi**, Royal Melbourne Institute of Technology; and **Bohui Zhang**, Chinese University of Hong Kong, Shenzhen, “Digital Footprints as Collateral for Debt Collection”
- **Franklin Allen**, Imperial College London; **Junhui Cai**, University of Pennsylvania; **Xian Gu**, Durham University; **Jun Qian**, Fudan University; and **Linda Zhao** and **Wu Zhu**, University of Pennsylvania, “Ownership Networks and Firm Growth: What Do Forty Million Companies Tell Us About the Chinese Economy?”
- **Chong-En Bai**, Tsinghua University; **Ruixue Jia**, University of California, San Diego and NBER; **Hongbin Li**, Stanford University; and **Xin Wang**, Chinese University of Hong Kong, “Entrepreneurial Reluctance: Talent and Firm Creation in China”
- **Jie Bai**, Harvard University and NBER; **Maggie Chen**, George Washington University; **Jin Liu**, New York University; and **Daniel Xu**, Duke University and NBER, “Search and Information Frictions on Global e-Commerce Platforms: Evidence from AliExpress” (NBER Working Paper 28100)

Summaries of these papers are at www.nber.org/conferences/chinese-economy-working-group-meeting-fall-2020

Environmental and Energy Policy and the Economy, volume 2

Matthew J. Kotchen, James H. Stock, and Catherine D. Wolfram, editors

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This volume presents six new papers on environmental and energy economics and related policy issues.

Robert Pindyck provides a systematic overview of what is known—and what remains unknown—about climate change, along with the implications of uncertainty for climate policy. Shaikh Eskander, Sam Fankhauser, and Joana Setzer offer insights from a comprehensive dataset on climate change legislation and litigation across all countries of the world over the past 30 years.

Adele Morris, Noah Kaufman, and Siddhi Doshi shine a light on how expected trends in the coal industry will

create significant challenges for the local public finance of coal-reliant communities. Joseph Aldy and his collaborators analyze the treatment of co-benefits in benefit-cost analyses of federal clean air regulations. Tatyana Deryugina and her co-authors report on the geographic and socioeconomic heterogeneity in the benefits of reducing particulate matter air pollution.

Finally, Oliver Browne, Ludovica Gazze, and Michael Greenstone use detailed data on residential water consumption to evaluate the relative impacts of conservation policies based on prices, restrictions, and public persuasion.



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