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Article

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Macroeconomic Policy in a Liquidity Trap

Gauti B. Eggertsson

Gauti B. Eggertsson is a macroeconomist and a professor of economics at Brown University. He received his Ph.D. in economics from Princeton University in 2004, after having completed his B.S. in economics at the University of Iceland.

He has worked at research departments of the International Monetary Fund and the Federal Reserve Bank of New York. He has also been a visiting faculty member at Princeton, Yale University, and Columbia University, where he taught international finance and macroeconomics at graduate and undergraduate levels.

Eggertsson has published in a variety of professional journals, including the *American Economic Review* and the *Quarterly Journal of Economics*. The main focus of his work is the analysis of monetary and fiscal policy over the business cycle, both from a modern and a historical perspective.

The main focus of my research for nearly two decades has been macroeconomic policy during periods when the central bank has cut the short-term nominal interest rate to zero, periods that are often referred to as exhibiting a liquidity trap. In this summary, I describe my key conclusions.

The work can be divided quite neatly into four parts, roughly following the time line in which it was written. I highlight each phase of my research agenda and three generations of models which evolved along the way. While I focus primarily on my own research, I must acknowledge at the outset that many others have contributed to this research agenda.

First-Generation Models

My interest in the liquidity trap was triggered by events in Japan in the late 1990s. At that time, Japan suffered from subpar growth and deflation, and the short-term interest rate had collapsed to zero. If it could happen in Japan, it could happen here as well, and it seemed to me a first-order priority for those concerned with macroeconomic policy to understand those events.

My first published work on this topic was written with my adviser, Michael Woodford.[1] Central to it was the idea that once a central bank is constrained by the zero lower bound (ZLB), it can still have an impact on the economy by giving markets guidance about the evolution of future interest rates, rates that would prevail once the ZLB is no longer binding. For example, it could set explicit thresholds, saying that the interest rate will stay at zero until the price level or unemployment rate reaches a particular level, an idea we formalized in the paper. These results have received quite a bit of attention over the years, perhaps due to the fact that during the Great Recession the Federal Reserve used the analysis, and closely related work by other authors, as part of the rationale for its "forward guidance" policy once the ZLB became a concern.[2] Several other central banks — including the Bank of Canada, the European Central Bank, the Bank of Japan, and the Bank of England — utilized this research for similar policy purposes.

Another important result was an "irrelevance" proposition, the idea that increasing the money supply at a zero interest rate has no effect on output or prices if it does not change expectations about future interest rates. Woodford and I further showed that it was irrelevant how this was done, that is, which assets the central bank bought in order to increase the money supply. This was a quite controversial proposition when reported, but one that has stood the test of time, with several central banks more than doubling the monetary base during the most recent crisis, using various purchasing schemes, with little or no apparent effect on prices.[3] This was consistent with the empirical prediction of that paper. It was a direct violation, however, of the quantity theory of money, which was a reigning paradigm in the '90s.

A second major theme of my early work was how policies aimed at manipulating expectations, such as forward guidance, could be made credible. Specifically, I wanted to know what could be done by the government to back up an announcement of future intervention by the appropriate use of fiscal policy, exchange rate policy, or various forms of quantitative easing. This was the main focus of the paper, "The Deflation Bias and Committing to Being Irresponsible," the title of which played on Paul Krugman's proposal that the Bank of Japan needed to "commit to being irresponsible."[4] It was a theme I would return to repeatedly in work on the Great Depression in order to interpret various government policy actions in the 1930s, an agenda I took up after leaving graduate school at the urging of one of my advisers, Ben Bernanke, and many others.

The Great Depression and the Liquidity Trap

My work on the Great Depression yielded three major conclusions. First, it gave a somewhat novel interpretation of the U.S. recovery that started in 1933, when Franklin Delano Roosevelt took office. It heavily emphasized the role of expectations about future policy and the price level, something that was largely missing from the existing literature, which focused more on static movements in the money supply or government spending as explanatory variables.[5] One of the main goals of my work on the regime change in 1933 was to model it in the context of an infinitely repeated game; then, one could interpret many of the actions of the government as having directly affected expectations, something I spent considerable time arguing did indeed happen. A second and somewhat more provocative conclusion was that some of the most controversial elements of the New Deal, such as the National Industrial Recovery Act, were expansionary, rather than contractionary, as the conventional wisdom held at the time, but the act included temporary but highly controversial policies like allowing firms to cartelize to prop up prices, in violation of reigning antitrust laws.[6] This was due to the positive effect these policies had on inflation expectations, as higher inflation expectations are expansionary at the ZLB since they reduce the real rate of interest, thereby stimulating demand. These policies were, in other words, part of FDR's commitment to "reflate" the economy. Third, this research provided a novel interpretation of the 1937 recession, which I termed "The Mistake of 1937." I argued that the mistake was due to the administration's abandonment of the commitment to inflate the price level back to pre-Depression levels.[7]

"The Mistake of 1937" is one of my favorite papers. I was invited to give the paper as a part of the Bank of Japan's Annual Conference in 2006. This meeting was attended by a large part of the governing board at the bank, and in a youthful fit of over-confidence, I felt that perhaps warning that they were about to repeat the mistake of 1937 would make a difference. The talk, of course, had no apparent effect at the time. The bank raised the short-term nominal rate a few weeks later — precisely what I warned could lead to a recession. The phrase "The Mistake of 1937" caught on, and is used routinely by policy makers and pundits talking about this period. This was probably driven by the fact that Krugman devoted a *New York Times* column to the paper and used the title for his column when warning the Fed about raising rates prematurely.

The 2008 Crisis: Second-Generation ZLB Models

The work described above was done prior to the economic crisis of 2008, which led me to abandon further work on economic history. The 2008 crisis looked a lot like the type of economic crises that I already had analyzed in previous work and I decided to pursue two main lines of research in response. The first was tightly linked to my earlier theoretical dissertation work, while the second aimed at building a second generation of New Keynesian models to understand what happened, going deeper into the origin of the 2008 crisis and the Great Depression.

Within the first line, I examined how fiscal policy tools could be used instead of, or in addition to, monetary policy in responding to the crisis. Perhaps the most important result was that the "multiplier of government spending" — the increase in output as a consequence of an increase in government spending — was theoretically much greater at the ZLB than under normal circumstances.[8] I proved that it had to be above unity in a standard New Keynesian model. This implied that existing empirical estimates of government spending multipliers were not useful. Those estimations depended upon data generated under regular circumstances when the short-term nominal interest rate was positive. This had strong policy implications, as the Obama administration was designing the largest fiscal stimulus program seen since the end of World War II. While this result was anticipated in some of my earlier work, I now showed it explicitly with a series of analytical propositions. Since then a considerable literature has emerged on this question and I have continued to work on it.[9]

I wrote two other papers studying the policy response to the Great Recession, built to some extent on the theoretical framework I had developed prior to the crisis. The first provides theoretical foundations for some aspect of the Federal Reserve's policy during the crisis, namely the quantitative easing (QE) program in which the Fed bought long-term government bonds [Figure 1].[10] One motivation for that paper was that Bernanke has famously quipped "QE works in practice but not in theory." In other words, there was and remains a perception that QE had an important economic

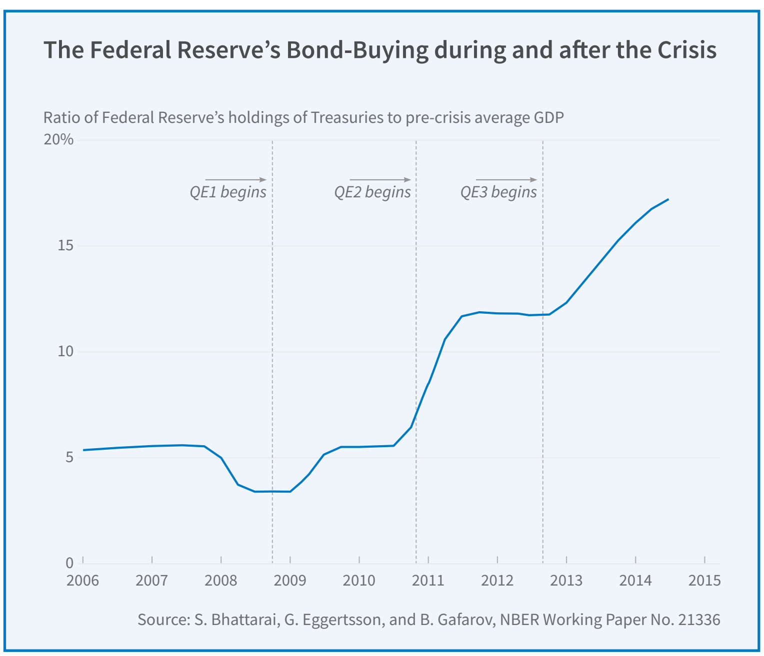

Figure 1

effect, yet proper theoretical explanations have been elusive, in part due to the "irrelevance result" I proposed with Woodford in 2003. This paper suggests a particular way in which QE affected expectations about future interest rate policy.

The second paper in this vein, written with Andrea Ferrero and Andrea Raffo, was motivated by the deep recession in the southern periphery of Europe following the 2008 crisis.[11] The periphery countries were unable to fight the slump by devaluing their own currency on account of the euro, and they could not engage in an aggressive fiscal expansion due to high levels of public debt. As a result, many policy makers turned to "structural reforms" as a panacea. The paper showed that while structural reforms, defined as policies that increase the potential output of the economy, are expansionary in the long run, they are contractionary in the short run due to their deflationary effects if the central bank is constrained by the ZLB. The key insight, as in the case of the article on the New Deal, was built on what I had earlier termed as the "paradox of toil," according to which the usual rules of macroeconomics can be stood on their head at the ZLB. [12]

The second line of research I pursued in response to the crisis sought deeper theoretical foundations for the source of ZLB episodes. The first generation of models I had written assumed that the shocks that triggered the crisis were a reduced form of "preference shock." Krugman and I modeled the origin of the crisis in a more fundamental way based on the idea of a "Minsky moment."[13] This refers to the work of Hyman Minsky, and suggests that the 2008 crisis came about due to debtors realizing in the "Minsky moment" that they had overextended themselves by taking on too much debt, after which there was a rapid contraction of spending ("deleveraging") by borrowers. To make up for this drop in spending, some other economic agents had to step in and start spending more. The way this happened in our theory was via reduction in short-term real interest rates that induced savers to spend. The key point was that the required reduction in the real interest rate resulting from a "Minsky moment" might easily bring the economy to the ZLB, which would then lead to the type of macroeconomic challenges that had been such a strong focus of my earlier work.

This debt deleveraging theory of the crisis had readily testable implications, including the idea that regions in the U.S. in which consumers had taken on larger amounts of debt should have suffered more during the crisis than other areas. A considerable literature has emerged that supports predictions of this kind using micro-data, the best-known of which are a series of papers by Atif Mian and Amir Sufi summarized in their book, *House of Debt*.[14] I continued this line of research in a recent paper with Pierpaolo Benigno and Federica Romei.[15] We take the debt deleveraging idea and incorporate it into what has become known as the standard New Keynesian model, a consensus model formed prior to the crisis. We show how the standard model can be nested in a more general setting, which includes the forces associated with debt deleveraging and banking crisis, and argue that this new framework should become the post-crisis benchmark model in the New Keynesian literature. We also illustrate several important policy implications of the proposed new benchmark model and how the policy conclusion changes relative to the earlier benchmark model.

This second line of research also includes a joint paper with Marco Del Negro, Ferrero, and Nobuhiro Kiyotaki.[16] While much of the focus of the paper is on the effect of various Fed policies during the crisis, at its heart is once again an attempt to model in more detail the origin of the economic crisis of 2008. This turns out to be necessary to rationalize various types of policy interventions the Federal Reserve implemented in the early part of the crisis involving emergency loans. The paper proposes that an important element of the crisis is the reduction in liquidity that occurred because several asset classes became harder to sell. It argues that the emergency assistance of the Federal Reserve via various liquidity facilities may have prevented the second coming of the Great Depression.

Post Crisis: Third-Generation Models of Secular Stagnation

My most recent work has grappled with the fact that existing models have a difficult time explaining the long duration of the Great Recession and the fact that the U.S. nominal interest rate is still close to zero almost a decade after the shocks that led to the recession occurred. The second-generation models predicted a temporary debt deleveraging cycle which should have led to a recession that was more short-lived. Similarly, the first-generation models plainly assumed that the shocks giving rise to the crisis were temporary. Moreover, those models "blow up" in the presence of very long-lasting shocks: They do not permit well-defined, bounded solutions in such cases. I have referred to these conditions as "deflationary black holes" in some of my work.

With interest rates still close to zero around the world, and inflation low but not approaching any explosive negative numbers, many started suggesting that we need to consider models in which a low interest rate can persist for an arbitrarily long time. The proposition that we could be in for a very long slump — without any natural pushback to normalcy — is the secular stagnation hypothesis. It was posited by Alvin Hansen in 1938 in his presidential address to the American Economic Association, shortly after "the Mistake of 1937," when the future of the American economy looked grim indeed.[17] This hypothesis was recently resurrected by Lawrence Summers in a speech at the International Monetary Fund.[18]

Neil Mehrotra and I formalize the secular stagnation hypothesis in a theo-

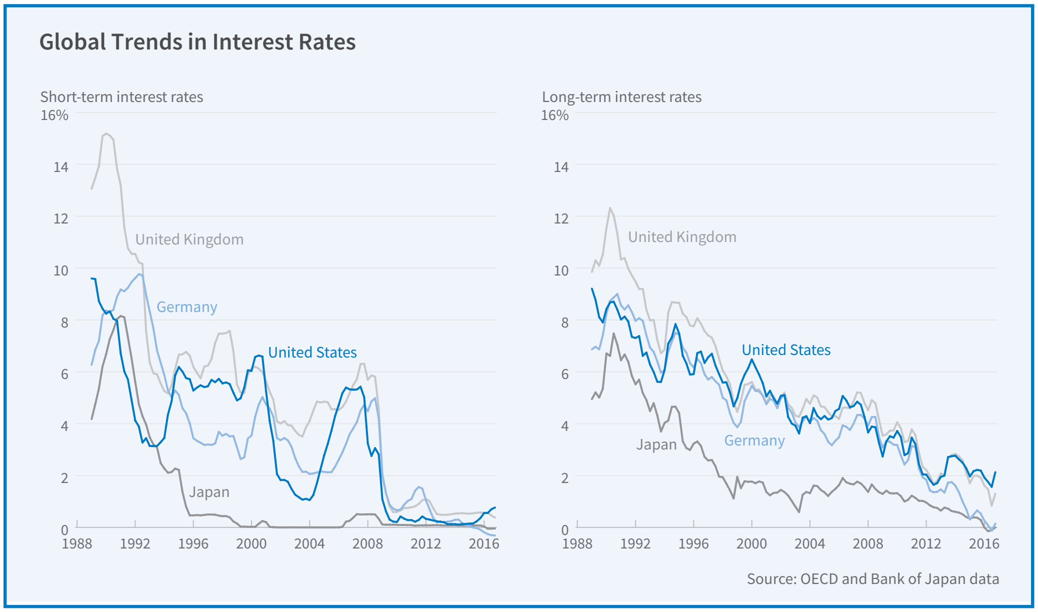

Figure 2

retical model which I consider to be a key contribution to "third generation" modeling of the ZLB.[19] Our model provides a much stronger rationale for aggressive fiscal policy relative to monetary policy in the optimal policy mix. At the heart of this work is the idea that something more than financial collapse may have been behind the crisis of 2008. The drop in real interest rates we have seen in recent years appears to be the result of a broader worldwide trend that dates back well before the recent financial turbulence [Figure 2].[20]Accordingly, in this model, we focus not only on financial shocks — which still remain very important — but also on slower moving trends such as increasing inequality, population dynamics, and a fall in the relative price of investment over time as well as the observed slowdown in productivity. All these forces can put downward pressures on the real interest rate and, unlike financial shocks, they are unlikely to return to where they were quickly, if at all. Moreover, this new generation of models has some fundamentally new implications for policy relative to the first two generations. In particular, monetary policy becomes much more challenging as a solution to insufficient demand.

Following up on the first paper with Mehrotra, he and I started joint work with Summers on secular stagnation, some of which is coauthored by Sanjay Singh.[21] One of the key insights of this work is that while under regular circumstances a current account deficit transmits lower interest rates from the surplus country to the deficit country, which is expansionary, when the ZLB is binding, the trade deficit will instead transmit a recession. This provides a theoretical foundation for the prospect of trade and currency war in low-interest environments. Overall, this highlights an increased value of cross-country policy coordination in these circumstances.

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6 *G. Eggertsson, "Was the New Deal Contractionary?"* American Economic Review, *102 (1), 2012, pp. 524–55.*
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7 *G. Eggertsson and B. Pugsley, "The Mistake of 1937: A General Equilibrium Analysis,"* Bank of Japan's Monetary and Economic Studies, *24 (S-1), 2006, pp. 151–90.*
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[14] *A. Mian and A. Sufi,* House of Debt: How They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again, *Chicago, Illinois: University of Chicago Press, 2015.*
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[18] *For futher discussion see L. Summers, "U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound,"* Business Economics, *49 (2), 2014, pp. 65–73.*
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NBER News

Awards 2016

John Abowd received the Julius Shiskin Memorial Award for Economic Statistics. The award, presented by the Washington Statistical Society, the National Association for Business Economics, and the American Statistical Association, recognizes original and important contributions to the development of economic statistics.

Kenneth Ahern won second place in the Jensen Prize competition for the Best Paper in the *Journal of Financial Economics*. He was honored for his paper "Lost in Translation? The Effect of Cultural Values on Mergers Around the World," with Daniele Daminelli and Cesare Fracassi.

Susan Athey was elected a Corresponding Fellow of the British Academy and received the Jean-Jacques Laffont Prize.

Orazio Attanasio received the Carlos Diaz-Alejandro Prize from the Latin American and Caribbean Economic Association (LACEA) and the Klaus J. Jacobs Research Prize.

Javier Bianchi received the Excellence Award in Global Economic Affairs from the Kiel Institute for the World Economy.

Olivier Blanchard received an honorary doctorate from London Business School, was named an Officier de la Légion d'Honneur in France, and was elected President of the American Economic Association.

Francine D. Blau received the 2017 Judge William B. Groat Alumni Award, presented each year by the Industrial and Labor Relations School at Cornell University to a graduate in recognition of outstanding professional accomplishments and commitment to the school.

Eric Budish, Heidi Williams, and Benjamin N. Roin received the 24th Arrow Award for the best paper in health economics for the paper, "Do Firms Underinvest in Long-Term Research? Evidence from Cancer Clinical Trials."

Leonardo Bursztyn received an Alfred P. Sloan Research Fellowship in Economics.

John Y. Campbell delivered the Richard T. Ely Lecture at the American Economic Association meetings in January 2016.

John Cawley became the U.S. Department of State's Fulbright Specialist in Economics to Ireland.

Stephen G. Cecchetti was awarded an honorary doctorate from the faculty of business and economics at the University of Basel.

Janet Currie received an honorary doctorate from l'Université Jean Moulin Lyon III and the Carolyn Shaw Bell Award for furthering the role of women in economics from the Committee on the Status of Women in the Economics Profession.

Angus Deaton was named Knight Bachelor in the Queen's Birthday Honours List, Doctor of Humane Letters from Brown University, Honorary Fellow and Royal Medal Recipient from the Royal Society of Edinburgh, Honorary Fellow of the University of Bristol, and recipient of the Franklin Founder Award.

Peter DeMarzo became President-Elect of the American Finance Association, and received the Charles River Associates Award for Best Paper on Corporate Finance for "The Leverage Ratchet Effect," with Anat Admati, Martin Hellwig, and Paul Pfleiderer, and the Best Paper Prize at the Utah Winter Finance Conference for "Relative Pay for Non-Relative Performance: Keeping Up with the Joneses with Optimal Contracts," with Ron Kaniel.

Marco Di Maggio received the NASDAQ Prize at the Financial Management Association conference for his paper "The Value of Trading Relations in Turbulent Times," coauthored with Amir Kermani and Zhaogang Song.

Martin Gaynor received the Best Paper Award from the *American Economic Journal: Economic Policy* for "Death by Market Power: Reform, Competition, and Patient Outcomes in the National Health Service," with Rodrigo Moreno-Serra and Carol Propper, and was elected to the Academy of Medicine of the National Academies of Sciences, Engineering, and Medicine.

Matthew Gentzkow received the 2016 Calvó-Armengol International Prize in Economics.

Claudia Goldin received the 2016 IZA Prize in Labor Economics for her career-long work on the economic history of women in education and the labor market.

Robert J. Gordon's book *The Rise and Fall of American Growth* won the PROSE Award of the Association of American Publishers for the best book of the year in U.S. history, and was included in the *Wall Street Journal*'s list of the ten best nonfiction books of 2016.

Gautam Gowrisankaran received the 2016 Best Paper Award for the Workshop on Health IT and Economics (WHITE) for "Does Hospital EMR Adoption Lead to Upcoding or More Accurate Coding?" coauthored with Keith Joiner and Jianjing Lin. He, **Aviv Nevo**, and **Robert Town** were awarded the 2016 Antitrust Writing Award for the best academic paper on mergers for their paper "Mergers When Prices are Negotiated: Evidence from the Hospital Industry."

John Graham, **Michael R. Roberts**, and **Mark Leary** were awarded the Jensen Prize for the best corporate finance paper published in the *Journal of Financial Economics* for "A Century of Capital Structure: The Leveraging of Corporate America." Graham also received the AAA Notable Contribution to Accounting Literature Award for his *Journal of Accounting and Economics* paper "Earnings Quality: Evidence from the Field," with Ilia Dichev, **Campbell R. Harvey**, and Shiva Rajgopal.

Shane Greenstein's book, *How the Internet Became Commercial: Innovation, Privatization, and the Birth of a New Network*, won the Schumpeter Prize for recent scholarly contributions that are related to Schumpeter's work.

Gene M. Grossman was awarded an honorary doctorate by the University of Minho in Braga, Portugal and delivered The World Economy Annual Lecture at the University of Nottingham.

Daniel S. Hamermesh was named Network Director of the IZA and Editor-in-Chief of the IZA *World of Labor*.

Oliver Hart and **Bengt Holmstrom** shared the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. Holmstrom was also named the 2016 Distinguished Fellow at CESifo in Munich.

Yael V. Hochberg was awarded the Ewing Marion Kauffman Prize Medal for Distinguished Research in Entrepreneurship.

Sebnem Kalemli-Ozcan was selected as the Council on Foreign Relations' first International Affairs Fellow in International Economics.

Steven N. Kaplan received the Harry M. Markowitz Award for the best paper published in the *Journal of Investment Management* for his paper with Robert Harris and Tim Jenkinson on "How Do Private Equity Investments Perform Compared to Public Equity?"

Loukas Karabarbounis received an Alfred P. Sloan Research Fellowship in Economics.

Samuel Kortum was elected a Fellow of the American Academy of Arts and Sciences.

Amanda E. Kowalski, **Martin B. Hackmann**, and **Jonathan T. Kolstad** received the National Institute for Health Care Management (NIHCM) Research Award for their paper on "Adverse Selection and an Individual Mandate: When Theory Meets Practice."

Ronald Lee received the 2016 Laureate Award from the International Union for Scientific Study of Population for outstanding contributions to demography.

Christian Leuz was awarded the 2016 Distinguished Contribution to the Accounting Literature Award for his paper "Mandatory IFRS Reporting Around the World: Early Evidence on the Economic Consequences," with Holger Daske, Luzi Hail, and Rodrigo Verdi. He also received the 2016 Best Paper Award from the Financial Accounting and Reporting Section of the American Accounting Association for "Adopting a Label: Heterogeneity in the Economic Consequences around IAS/IFRS Adoptions," with the same three co-authors, and the 2016 Best Dissertation Supervision Award from the same organization.

Brigitte Madrian received the 2016 Brigham Young University Distinguished Alumni Achievement Award.

Thomas McGuire received the article of the year award at the *International Journal of the Economics of Business* for his paper on "Do Reverse Payment Settlements Constitute an Anticompetitive Pay-for-Delay?" coauthored with Keith Drake and Martha Starr.

Alan C. Monheit received the New Jersey Health Foundation's Excellence in Research Award.

Enrico Moretti was elected a Fellow of the Econometric Society.

Stewart C. Myers received the Morgan Stanley American Finance Association Award for Excellence in Finance, recognizing "outstanding thought leadership in the field of financial economics."

Ariel Pakes gave the inaugural Griliches Lecture of the Econometric Society on "Moment Inequalities and Their Use in Industrial Organization."

Alessandro Rebucci received the E-House Best Paper Award at the Global Chinese Real Estate Congress for "Does Easing Monetary Policy Increase Financial Stability?" jointly with Ambrogio Cesa-Bianchi.

Dani Rodrik was awarded an honorary doctorate by the University of Southern Denmark.

Judith Scott-Clayton received the 2016 American Educational Research Association Division L (Education Policy and Politics) Early Career Award, as well as the National Association of Student Financial Aid Administrators (NASFAA) Robert P. Huff Golden Quill Award for her research on student financial aid.

Kent Smetters and Felix Reichling received the 2016 TIAA Paul A. Samuelson Award for their paper "Optimal Annuitization with Stochastic Mortality and Correlated Medical Costs."

Robert N. Stavins was awarded the Edmund G. "Pat" Brown Award for advancing environmental policy in California.

Erdal Tekin was appointed Honorary Professor at Deakin University, Australia.

Daniel Trefler received the Killam Prize in the Social Sciences and the Bank of Canada Fellowship Award for academic excellence.

Stijn Van Nieuwerburgh was awarded the Germán Bernácer Prize for the best European economist under 40 working in macroeconomics or finance.

John Van Reenen was named an OBE (Officer of the Order of the British Empire) "for services to economics and public policy making."

Conferences

18th Annual Neemrana Conference

The NBER, India's National Council for Applied Economic Research (NCAER), and the Indian Council for Research on International Economic Relations (ICRIER) sponsored a meeting in Neemrana, India, on December 16–18, 2016, that included NBER researchers and economists from Indian universities, research institutions, and government departments.

NBER participants were **David Atkin**, **Abhijit Banerjee**, **Esther Duflo**, and **James Poterba**, all of MIT; **Emily Breza**, **Shawn Cole**, and **Gita Gopinath**, of Harvard University; **Meredith Fowlie** and **Pierre-Olivier Gourinchas**, from the University of California, Berkeley; **Douglas Irwin of** Dartmouth College; **Peter Klenow** from Stanford University; **Anne O. Krueger** of Johns Hopkins University; **Rajnish Mehra** of Arizona State University; **Karthik Muralidharan** of the University of California, San Diego; and **Romain Wacziarg** of the University of California, Los Angeles. A wide range of topics was discussed, including the prospects for India and the global economy after Brexit and the U.S. presidential election; new perspectives on skill development, education, economic growth and productivity; currency reform in India and its consequences; business investment, financial markets, and trade in India and the U.S.; and the economics of pollution abatement and climate change.

Economics of Digitization

"Economics of Digitization," an NBER conference supported by the Alfred P. Sloan Foundation, took place at Stanford on March 3. Research Associates Shane Greenstein and Josh Lerner of Harvard University and Scott Stern of MIT organized the meeting. These researchers' papers were presented and discussed:

- **Barbara Biasi**, Stanford University, and **Petra Moser**, New York University and NBER, "Effects of Copyrights on Science: Evidence from the WWII Book Republication Program"
- **Joan Calzada**, University of Barcelona, and **Ricard Gil**, Johns Hopkins University, "What Do News Aggregators Do? Evidence from Google News in Spain and Germany"
- **Thomas Blake**, eBay Research Labs; **Sarah Moshary**, University of Pennsylvania; **Kane Sweeney**, Uber; and **Steven Tadelis**, University of California, Berkeley, and NBER, "Price Salience and Product Choice"
- **Erik Brynjolfsson**, MIT and NBER; **Felix Eggers**, University of Groningen (Netherlands); and **Avinash Gannamaneni**, MIT, "Using Massive Online Choice Experiments to Measure Changes in Well-Being"
- **Ben Shiller**, Brandeis University; **Joel Waldfogel**, University of Minnesota and NBER; and **Johnny Ryan**, PageFair Limited, "Will Ad Blocking Break the Internet?" (NBER Working Paper No. 23058)
- **Shawn Cole**, Harvard University and NBER, and **A. Nilesh Fernando**, University of Notre Dame, " 'Mobile'izing Agricultural Advice: Technology Adoption, Diffusion, and Sustainability"
- **Susan F. Lu**, Purdue University, and **Huaxia Rui** and **Abraham Seidmann**, University of Rochester, "Does Technology Substitute for Nurses? Staffing Decisions in Nursing Homes"

Summaries of these papers are at: http://www.nber.org/confer/2017/EoDs17/summary.html

Economics of National Security

"Economics of National Security," an NBER conference organized by NBER President-emeritus Martin Feldstein of Harvard University and Research Associate Eli Berman of the University of California, San Diego, took place in Cambridge on March 5–6. These researchers' papers were presented and discussed:

- **Giorgio Chiovelli** and **Elias Papaioannou**, London Business School, and **Stelios Michalopoulos**, Brown University and NBER, "Land Mines and Spatial Development"

- **Esteban Klor**, Hebrew University of Jerusalem; **Sebastian M. Saiegh**, University of California, San Diego; and **Shanker Satyanath**, New York University, "The Logic of Cronyism in State Violence: Evidence from Labor Repression During Argentina's Last Dictatorship"

- **Suleiman Abu Bader**, Ben-Gurion University of the Negev (Israel), and **Elena I. Ianchovichina**, World Bank, "Polarization, Foreign Military Interventions, and Civil Conflicts"

- **Kerwin Kofi Charles**, University of Chicago and NBER; **Konstantin Kunze**, University of California, Davis; **Hani Mansour** and **Daniel I. Rees**, University of Colorado Denver; and **Bryson Rintala**, U.S. Air Force Academy, "Taste-Based Discrimination and the Labor Market Outcomes of Arab and Muslim Men in the United States"

- **Benjamin Crost**, University of Illinois at Urbana-Champaign, and **Joseph Felter**, Stanford University, "Export Crops and Civil Conflict"

- **Samuel A. Bazzi** and **Matthew Gudgeon**, Boston University; **Robert Blair**, Brown University; **Christopher Blattman** and **Oeindrila Dube**, University of Chicago and NBER; and **Richard Peck**, Northwestern University, "What Can Prediction Teach Us About Violence? Machine Learning Applications in Indonesia and Colombia"

- **Madeline Zimmerman**, Harvard University, "The Effect of U.S. Drone Strikes on Terrorism in Pakistan and Yemen"

- **Luke N. Condra**, University of Pittsburgh; **James D. Long**, University of Washington; **Andrew C. Shaver**, Princeton University; and **Austin L. Wright**, University of Chicago, "The Logic of Insurgent Electoral Violence"

Summaries of these papers are at: http://www.nber.org/confer/2017/ENSs17/summary.html

Program and Working Group Meetings

Industrial Organization

The NBER's Program on Industrial Organization met at Stanford on January 27–28. Research Associate Matthew Gentzkow of Stanford University and Faculty Research Fellow Robin S. Lee of Harvard University organized the meeting. These researchers' papers were presented and discussed:

- **Ali Hortaçsu**, University of Chicago and NBER; **Fernando Luco** and **Dongni Zhu**, Texas A&M University; and **Steven L. Puller**, Texas A&M University and NBER, "Does Strategic Ability Affect Efficiency? Evidence from Electricity Markets"

- **Avi Goldfarb**, University of Toronto and NBER, and **Mo Xiao**, University of Arizona, "Transitory Shocks, Limited Attention, and a Firm's Decision to Exit"

- **David Atkin**, MIT and NBER, and **Dave Donaldson**, Stanford University and NBER, "Who's Getting Globalized? The Size and Implications of Intra-National Trade Costs" (NBER Working Paper No. 21439)

- **Bruce Blonigen**, University of Oregon and NBER, and **Justin R. Pierce**, Federal Reserve Board, "Evidence for the Effects of Mergers on Market Power and Efficiency" (NBER Working Paper No. 22750)

- **Takuo Sugaya**, Stanford University, and **Alexander Wolitzky**, MIT, "Maintaining Privacy in Cartels"

- **Adam Kapor**, Columbia University; **Christopher Neilson**, Princeton University and NBER; and **Seth Zimmerman**, University of Chicago and NBER, "Heterogeneous Beliefs and School Choice Mechanisms"

- **Pietro Tebaldi**, University of Chicago, "Estimating Equilibrium in Health Insurance Exchanges: Price Competition and Subsidy Design under the ACA"

Summaries of these papers are at: http://www.nber.org/confer/2017/IOs17/summary.html

Economic Fluctuations and Growth

The NBER's Program on Economic Fluctuations and Growth met in New York City on February 24. Research Associates Laura Veldkamp of New York University and Jon Steinsson of Columbia University organized the meeting. These researchers' papers were presented and discussed:

- **Matthias Kehrig**, Duke University, and **Nicolas Vincent**, HEC Montréal, "Do Firms Mitigate or Magnify Capital Misallocation? Evidence from Plant-Level Data"

- **Daniel Garcia-Macia**, International Monetary Fund; **Chang-Tai Hsieh**, University of Chicago and NBER; and **Peter Klenow**, Stanford University and NBER, "How Destructive is Innovation?" (NBER Working Paper No. 22953)

- **George-Marios Angeletos**, MIT and NBER, and **Chen Lian**, MIT, "Forward Guidance without Common Knowledge" (NBER Working Paper No. 22785)

- **Barney Hartman-Glaser**, University of California, Los Angeles; **Hanno Lustig**, Stanford University and NBER; and **Mindy Zhang**, University of Texas at Austin, "Capital Share Dynamics When Firms Insure Managers" (NBER Working Paper No. 22651)

- **Sang Yoon Lee**, Toulouse School of Economics, and **Yongseok Shin**, Washington University in St. Louis and NBER, "Horizontal and Vertical Polarization: Task-Specific Technological Change in a Multi-Sector Economy"

- **Michael Gelman**, University of Michigan; **Yuriy Gorodnichenko** and **Steven Tadelis**, University of California, Berkeley, and NBER; **Shachar Kariv** and **Dmitri Koustas**, University of California, Berkeley; **Matthew Shapiro**, University of Michigan and NBER; and **Dan Silverman**, Arizona State University and NBER, "The Response of Consumer Spending to Changes in Gasoline Prices" (NBER Working Paper No. 22969)

Summaries of these papers are at: http://www.nber.org/confer/2017/EFGw17/summary.html

Labor Studies

The NBER's Program on Labor Studies met in San Francisco on February 24. Program Director David Card of the University of California, Berkeley, organized the meeting. These researchers' papers were presented and discussed:

- **Raj Chetty**, Stanford University and NBER; **David Grusky** and **Maximilian Hell**, Stanford University; **Nathaniel Hendren**, Harvard University and NBER; **Robert Manduca**, Harvard University; and **Jimmy Narang**, University of California, Berkeley, "The Fading American Dream: Trends in Absolute Income Mobility Since 1940" (NBER Working Paper No. 22910)

- **Seth D. Zimmerman**, University of Chicago and NBER, "Making the One Percent: The Role of Elite Universities and Elite Peers" (NBER Working Paper No. 22900)

- **Lars Lefgren**, **David Sims**, and **Olga B. Stoddard**, Brigham Young University, "The Other 1%: Class Leavening, Contamination and Voting for Redistribution"

- **David Neumark**, University of California, Irvine, and NBER; **Ian Burn**, University of California, Irvine; and **Patrick Button**, Tulane University, "Is It Harder for Older Workers to Find Jobs? New and Improved Evidence from a Field Experiment" (NBER Working Paper No. 21669)

- **George Bulman**, University of California, Santa Cruz; **Robert W. Fairlie**, University of California, Santa Cruz, and NBER; **Sarena Goodman**, Federal Reserve Board; and **Adam Isen**, Department of the Treasury, "Parental Resources and College Attendance: Evidence from Lottery Wins" (NBER Working Paper No. 22679)

- **Rachel B. Baker**, University of California, Irvine; **Eric Bettinger**, Stanford University and NBER; **Brian Jacob**, University of Michigan and NBER; and **Ioana Marinescu**, University of Chicago and NBER, "The Effect of Labor Market Information on Community College Students' Major Choice"

Summaries of these papers are at: http://www.nber.org/confer/2017/LSs17/summary.html

Law and Economics

The NBER's Program on Law and Economics met in Cambridge on March 3. Program Director Christine Jolls of Yale University organized the meeting. These researchers' papers were presented and discussed:

- **David Arnold**, Princeton University; **Will S. Dobbie**, Princeton University and NBER; and **Crystal Yang**, Harvard University, "Racial Bias in Bail Decisions"
- **Mitchell Polinsky**, Stanford University and NBER, and **Paul N. Riskind**, Stanford University, "Deterrence and the Optimal Use of Prison, Parole, and Probation"
- **Saurabh Bhargava** and **George Loewenstein**, Carnegie Mellon University, and **Justin R. Sydnor**, University of Wisconsin-Madison and NBER, "Evaluating Health Insurance Decisions: Health Plan Choices from a Menu with Dominated Options"
- **Tal Gross**, Columbia University and NBER; **Matthew J. Notowidigdo**, Northwestern University and NBER; and **Jialan Wang**, University of Illinois at Urbana-Champaign, "The Marginal Propensity to Consume over the Business Cycle" (NBER Working Paper No. 22518)
- **Andrew Daughety** and **Jennifer Reinganum**, Vanderbilt University, "Information Suppression by Teams and Violations of the Brady Rule"
- **Albert Choi**, University of Virginia, and **Eric Talley**, Columbia University, "Appraising the 'Merger Price' Appraisal Rule"
- **Edward L. Glaeser** and **Andrei Shleifer**, Harvard University and NBER, and **Giacomo A.M. Ponzetto**, Pompeu Fabra University (Barcelona), "Securing Property Rights" (NBER Working Paper No. 22701)
- **Justin Marion**, University of California, Santa Cruz, "Affirmative Action Exemptions and Capacity Constrained Firms"

Summaries of these papers are at: http://www.nber.org/confer/2017/LEs17/summary.html

Monetary Economics

The NBER's Program on Monetary Economics met in Chicago on March 3. Research Associate Yuriy Gorodnichenko of the University of California, Berkeley, and Faculty Research Fellow Kinda Cheryl Hachem of the University of Chicago organized the meeting. These researchers' papers were presented and discussed:

- **Ernesto Pasten**, Central Bank of Chile; **Raphael Schoenle**, Brandeis University; and **Michael Weber**, University of Chicago and NBER, "Nominal Rigidities and the Granular Origins of Aggregate Fluctuations"
- **Andres Drenik**, Columbia University, and **Diego Perez**, New York University, "Price Setting under Uncertainty about Inflation"
- **Camila Casas**, Banco de la República (Colombia); **Federico Díez**, Federal Reserve Bank of Boston; **Gita Gopinath**, Harvard University and NBER; and **Pierre-Olivier Gourinchas**, University of California, Berkeley, and NBER, "Dominant Currency Paradigm" (NBER Working Paper No. 22943)

- **Juan Antolín-Díaz**, Fulcrum Asset Management, and **Juan Rubio Ramírez**, Emory University, "Narrative Sign Restrictions for SVARs"

- **Jeffrey W. Huther**, **Jane Ihrig**, and **Elizabeth Klee**, Federal Reserve Board, "The Federal Reserve's Portfolio and its Effect on Interest Rates"

Summaries of these papers are at: http://www.nber.org/confer/2017/MEs17/summary.html

Environment and Energy Economics

The NBER's Program on Environment and Energy Economics met in Cambridge on March 3–4. Research Associates Christopher R. Knittel of MIT and Paulina Oliva of the University of California, Irvine, organized the meeting. These researchers' papers were presented and discussed:

- **Sharat Ganapati**, Yale University; **Joseph S. Shapiro**, Yale University and NBER; and **Reed Walker**, University of California, Berkeley, and NBER, "The Incidence of Carbon Taxes in U.S. Manufacturing: Lessons from Energy Cost Pass-Through" (NBER Working Paper No. 22281)

- **Joshua A. Lewis**, Université de Montréal, and **Edson R. Severnini**, Carnegie Mellon University, "Short- and Long-Run Impacts of Rural Electrification: Evidence from the Historical Rollout of the U.S. Power Grid"

- **T. Robert Fetter** and **Andrew L. Steck**, Duke University; **Christopher Timmins**, Duke University and NBER; and **Douglas Wrenn**, Pennsylvania State University, "Learning by Viewing? Social Learning, Regulatory Disclosure, and Firm Productivity in Shale Gas"

- **Frank A. Wolak**, Stanford University and NBER, "Assessing the Impact of the Diffusion of Shale Oil and Gas Technology on the Global Coal Market"

- **Nicholas Ryan**, Yale University and NBER, "Is There an Energy-Efficiency Gap? Experimental Evidence from Indian Manufacturing Plants"

- **James E. Archsmith** and **David Rapson**, University of California, Davis; **Kenneth Gillingham**, Yale University and NBER; and **Christopher R. Knittel**, "Household Diversification: The Vehicle Portfolio Effect"

- **Maximilian Auffhammer**, University of California, Berkeley, and NBER, "Climate Adaptive Response Estimation: Short and Long Run Impacts of Climate Change on Residential Electricity and Natural Gas Consumption Using Big Data"

- **Solomon M. Hsiang**, University of California, Berkeley, and NBER, "Estimating Economic Damage from Climate Change in the United States"

- **Achyuta Adhvaryu**, University of Michigan and NBER; **Prashant Bharadwaj**, University of California, San Diego, and NBER; **James E. Fenske**, University of Warwick (England); **Anant Nyshadham**, Boston College; and **Richard Stanley**, UNICEF, "Dust and Death: Evidence from the West African Harmattan"

- **Kelsey Jack**, Tufts University and NBER; **Seema Jayachandran**, Northwestern University and NBER; and **Sarojini V. Rao**, University of Chicago, "Environmental Externalities and Intrahousehold Inefficiencies"

- **Gustavo Bobonis** and **Leonardo Tovar**, University of Toronto, and **Mark Stabile**, INSEAD (Fontainebleau), "Bombs and Babies: U.S. Navy Bombing Activity and Infant Health in Vieques, Puerto Rico" (NBER Working Paper No. 22909)

Summaries of these papers are at: http://www.nber.org/confer/2017/EEEs17/summary.html

NBER Books

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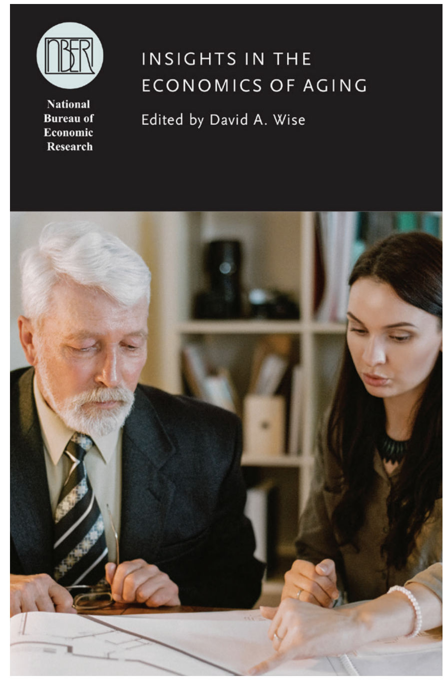
Innovation Policy and the Economy, Volume 17

Edited by Shane Greenstein, Josh Lerner, and Scott Stern
The University of Chicago Press, 2017
$60 (cloth)

The 17th volume of *Innovation Policy and the Economy* provides an accessible forum for bringing the work of leading academic researchers to an audience of policy makers and those interested in the interaction between public policy and innovation. In the first chapter, Joel Waldfogel discusses how reduced costs of production have resulted in a "Golden Age of Television," arguing that this development has gone underappreciated. The second chapter, by Marc Rysman and Scott Schuh, discusses the prospects for innovation in payment systems, including mobile payments, faster payment systems, and digital currencies. In the third chapter, Catherine Tucker and Amalia Miller analyze the consequences of patient data becoming virtually costless to store, share, and individualize, showing how data management and privacy issues have become important considerations in health policy. The fourth chapter, by Michael Luca, examines how online marketplaces have proliferated over the past decade, evolving far beyond pioneers such as eBay and Amazon. In the fifth chapter, Timothy Bresnahan and Pai-Ling Yin characterize information and communication technologies in the workplace, which have transformed production and shifted relative labor demand toward smart managers and professionals, and workers who are skilled at contributing to and interacting with other members of organizations.

Insights in the Economics of Aging

Edited by David A. Wise
The University of Chicago Press, 2017
$110.00 (cloth)



In many developed countries, the fraction of the population over age 65 is projected to rise in coming decades, in some cases sharply. This has generated growing interest in research on the health and economic circumstances of individuals as they age. Many individuals are retiring from paid work, and they are living longer than ever. Their well-being is shaped by past decisions, such as their saving behavior, as well as by current and future economic conditions, health status, medical innovations, and a rapidly evolving landscape of policy incentives and supports.

The contributors to *Insights in the Economics of Aging* uncover how financial, physical, and emotional well-being are integrally related. The authors consider the interactions between financial circumstances in later life, such as household savings and home ownership, physical circumstances such as health and disability, and emotional well-being, including happiness and mental health.

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