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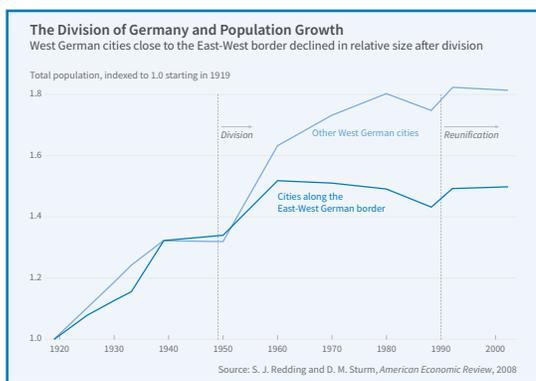
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Program Report

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The Program on Children

Janet Currie and Anna Aizer*

U.S. public programs that are targeted to children and youth have grown rapidly in recent decades. This trend has generated a substantial volume of research devoted to program evaluation. At the same time, researchers have developed an expanded conception of human capital and how it develops over the life course. This has drawn attention to children's physical and mental health, as well as to factors such as environmental exposures and maternal stress that influence the development of both non-cognitive and cognitive skills. Researchers in the Program on Children have been active contributors both to the evaluation of programs for children and to our developing understanding of the roots of human capital formation. This review provides a partial summary of this work. The number of research studies in the last eight years unfortunately makes it impossible to discuss all of the relevant contributions.

Long Run Consequences of Conditions in Early Life

The original "fetal origins" hypothesis held that poor nutrition during the fetal period could have persistent effects on metabolism that could lead to adult disease. Economists in the children's group have broadened the scope of inquiry beyond a narrow focus on fetal nutrition to examine factors beyond prenatal nutrition, shocks in early childhood as well as the fetal period, and a much broader array of outcomes. Douglas Almond, Bhashkar Mazumder, and Reyn Van Ewijk show, for example, that nutritional restriction due to Ramadan fasting is associated with lower child test scores at age seven.¹ Joseph Ferrie

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and Karen Rolf show that socioeconomic status in a household when children are ages 0 to five is historically associated with longevity and health in

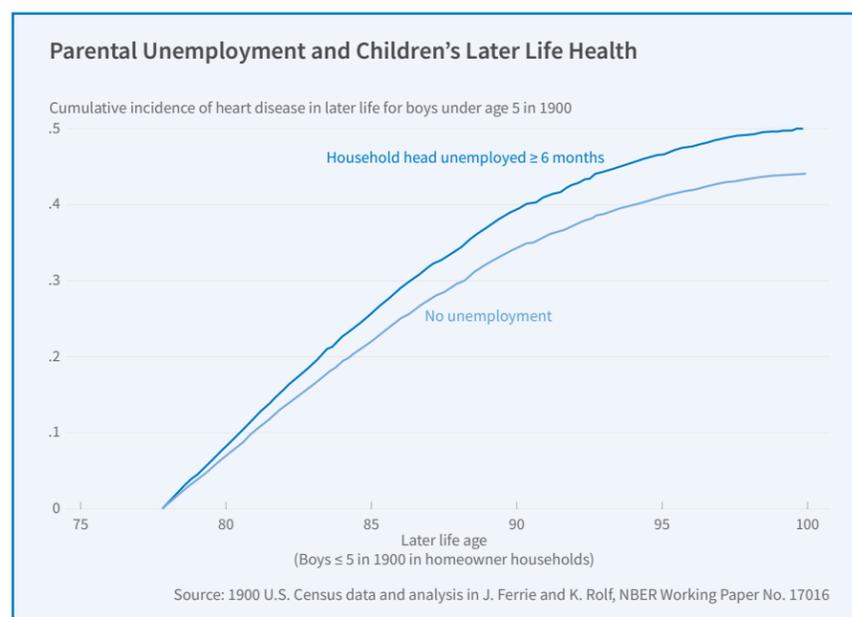


Figure 1

old age [Figure 1].² David Autor, David Figlio, Krzysztof Karbownik, Jeffrey Roth, and Melanie Wasserman link contemporary birth and schooling records in Florida to show that disadvantaged boys tend to have lower test scores, more disciplinary problems, and less likelihood of completing

The Program on Children

The Program on Children, which was launched in 1993 as the program on the Economic Well-Being of Children, has 134 affiliated researchers. It has produced about 600 NBER Working Papers since the last review in *The NBER Reporter*, which former program director Jonathan Gruber prepared in 2008.

Many of the first economic studies concerning the well-being of children focused either on family formation and parental behavior or on formal education, including both K–12 and college. Today, these topics remain important.

Roughly one quarter of the studies that are part of the Program on Children fall under the auspices of the NBER Education Program. Roughly as many studies concern children's well-being in developing countries, and fall within the purview of the Development Economics Program. This review does not summarize either of these active research areas.

high school.³ Anna Aizer, Shari Eli, Ferrie, and Adriana Lleras-Muney show that cash transfers to poor families at the early decades of the 20th century led to increases in the income and longevity of children in those households.⁴ Similarly Fredrik Andersson, John Haltiwanger, Mark Kutzbach, Giordano Palloni, Henry Pollakowski, and Daniel Weinberg show that, once the endogeneity of public housing use is accounted for, childhood residence in supported housing, which has a large cash value, has positive effects on young adult earnings and reduces the probability of incarceration.⁵ A possible caution: Gordon Dahl, Andreas Ravndal Kostoi, and Magne Mogstad show that family welfare participation can increase the probability that children grow up to participate themselves.⁶

Neighborhood conditions while young are another important determinant of longer-term outcomes. Jens Ludwig, Greg Duncan, Lisa Gennetian, Lawrence Katz, Ronald Kessler, Jeffrey Kling, and Lisa Sanbonmatsu summarize long-term effects of the Moving to Opportunity experiment, which enabled some poor families to move to less-poor neighborhoods, and find relatively little effect on children in those families.⁷ However, Raj Chetty, Nathaniel Hendren, and Katz find that the younger children in those families did benefit from moving in terms of higher future incomes [Figure 2].⁸ Chetty, Hendren, Patrick Kline, and Emmanuel Saez argue that features of neighborhoods that promote social mobility include low residential segregation, less income inequality, better schools, more social capital, and more family stability.⁹

Many Program on Children researchers document longer-term effects of specific policy initiatives. Hilary Hoynes, Diane Schanzenbach, and Douglas Almond find positive effects of childhood participation in the Food Stamp Program on future adult health, as measured by reductions in rates of high blood pressure, obesity, and diabetes.¹⁰ Gabriella Conti, James Heckman, and Rodrigo Pinto find improvements in the adult health of participants in two model preschool programs,¹¹ while Heckman, Pinto, and Peter Savelyev argue that much of this effect is operating through changes in personality traits.¹² On a cautionary note, Michael Baker, Jonathan Gruber, and Kevin Milligan find negative effects of a Quebec universal child care program on children's non-cognitive skills, underscoring the importance of program quality.¹³

Expansions of Medicaid and the Value of Medical Care

One of the most important policies that affected children born in the late 20th century was the expansion of public health insurance under the Medicaid program. State governments were first incentivized and then required to expand coverage to children in poor families, and many states expanded coverage to children with family incomes up to 200 percent of the federal poverty line. Because the expansions occurred at different times in different states and affected some age groups and not others, it is possible to identify the effect of insurance.

Currie, Sandra Decker, and Wanchuan Lin,¹⁴ Bruce Meyer and Laura Wherry,¹⁵ David Brown, Amanda Kowalski, and Ithai Lurie,¹⁶ and Wherry, Sarah Miller, Robert Kaestner, and Meyer¹⁷ all examine the long-term effect of these expansions on individuals who gained coverage as young children. They focus on different datasets and find positive effects on

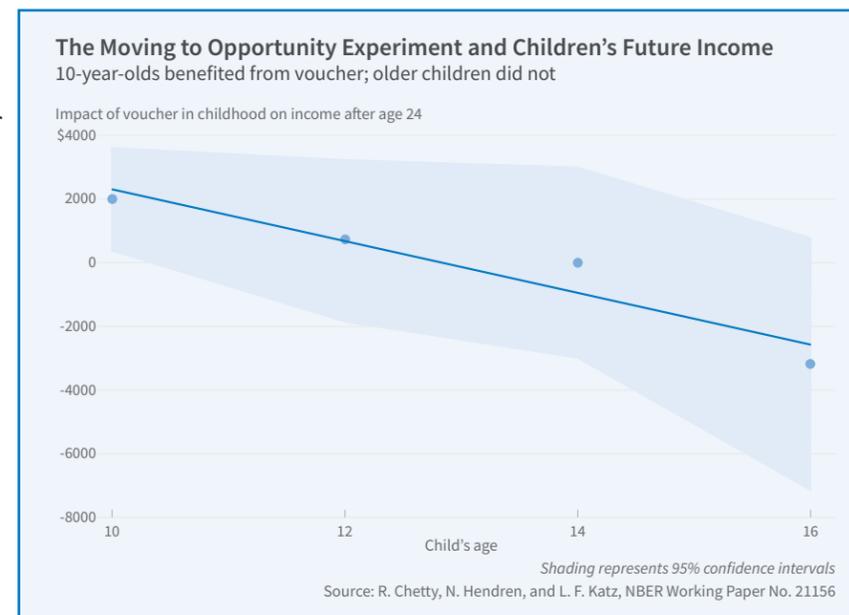


Figure 2

diverse young adult outcomes, including maternal reports of health, hospitalization for chronic conditions, and employment and earnings. Figure 3, from Wherry et al. (on the following page), shows the reduction in hospitalizations for chronic conditions among young adults who had Medicaid coverage from early childhood. Those born after September 1, 1983, were covered, whereas those born just before that date were never eligible. Currie and Hannes Schwandt argue that these expansions of access to care may explain some of the large reductions in mortality inequality among children over the past 20 years.¹⁸

These findings imply a large positive value for the medical care received at the margin, an inference borne out by Almond, Joseph Doyle, Kowalski, and Heidi Williams who

The Impact of Additional Childhood Medicaid Eligibility

Hospitalization data for 21- to 28-year-old blacks in 2009

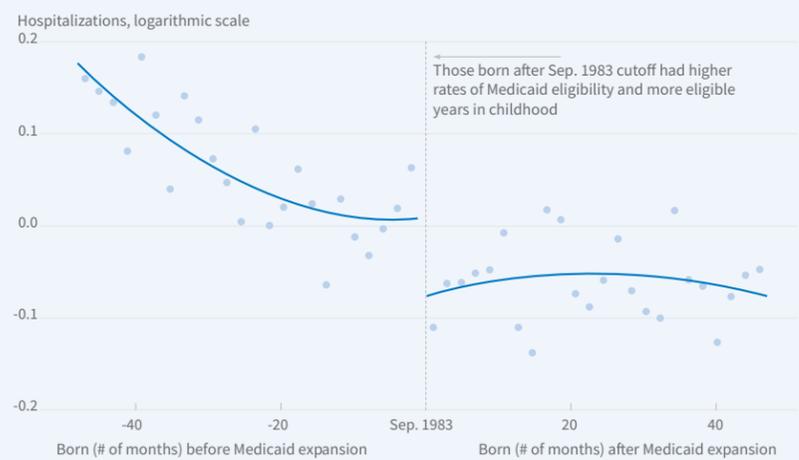


Figure 3

estimate that the statistical cost of saving a very low birth weight's life was about \$550,000 in 2006 dollars.¹⁹ At the same time, Currie and Bentley MacLeod²⁰ and Erin Johnson and Marit Rehaavi²¹ study the incidence of C-sections, and conclude that many are probably unnecessary.

Stress and Mental Health

Researchers in the Program on Children have moved from focusing only on cognitive skills, to thinking about non-cognitive skills (such as social skills) and physical health, to explicitly studying mental health and its role in promoting positive future outcomes.

Using a sibling fixed effects design, Jason Fletcher examines ADHD, one of the most prevalent childhood mental health conditions and finds large negative impacts on employment, welfare use, and earnings.²² While this finding would seem to argue that treatment of ADHD should have large positive effects, Currie, Mark Stabile, and Lauren Jones find that increases in drug treatment that accompanied an expansion of drug coverage in Quebec had little positive effect on educational outcomes or emotional functioning, suggesting that drug therapy alone may not be enough to improve outcomes.²³ Susan Busch, Ezra Golberstein, and Ellen Meara examine the use of antidepressants among adolescents and find that FDA “black box” warnings — the most stringent warnings used in prescription drug labeling — discouraged antidepressant use and led to increases in risky behaviors and small reductions in grade point averages.²⁴ Mark Anderson, Resul Cesur, and Erdal Tekin further argue that depression increases adolescent propensity to engage in property crime, though not violent crime or selling drugs.²⁵ Together these papers

suggest that many children suffer from poor mental health and that more research into how it can be treated appropriately is needed.

Acute stress, both among mothers and among children, may be one root cause of poor mental health. Aizer, Laura Stroud, and Stephen Buka exploit unique data on maternal cortisol levels during pregnancy and find, using sibling comparisons, that children exposed to high levels of this “stress hormone” suffer negative effects on their cognitive functioning and motor development.²⁶ Moreover, mothers of lower socioeconomic status have higher cortisol levels, suggesting one mechanism for the intergenerational transmission of poverty. This is consistent with work by William Evans and Craig Garthwaite showing that Earned Income Tax Credit (EITC) payments are associated with improved maternal mental health and reduction of certain biomarkers for

stress.²⁷

A source of stress that is more common among mothers of lower socioeconomic status is the death of a family member. Petra Persson and Maya Rossin-Slater compare children whose mothers experienced loss of a family member while the children were in utero to those who experienced such a loss in the first year after birth; they find that the former group were more likely to suffer from mental health problems including ADHD, anxiety, and depression in later life.²⁸ Sandra Black, Paul Devereux, and Kjell Salvanes also investigate the long-term effects of the mother experiencing a death in the family during pregnancy. They find negative effects on birth outcomes, but do not find negative effects on adult outcomes such as education, employment, and earnings.²⁹

Currie and Rossin-Slater examine the effect of maternal residence along the predicted path of a hurricane during pregnancy and find increases in abnormal conditions of the newborn.³⁰ Seth Gershenson and Tekin find that stress due to the “Beltway Sniper” impacted the test scores of children in schools near the locations of the shootings but that the effect dissipated after one year.³¹ Even more “every day” stress due to poor economic conditions and higher risk of

parental job loss is shown by Golberstein, Gilbert Gonzales, and Meara to have negative effects on children's mental health.³²

Environmental Policy

Pollution from toxic chemicals like lead can also have important long-term effects on children's health. The combination of large administrative datasets measuring both pollution levels and health outcomes, and environmental policies that have greatly reduced pollution exposures, have allowed us to better identify the harmful effects of exposures. Karen Clay, Joshua Lewis, and Edson Severnini show that emissions from coal-fired electricity generation plants were responsible for 3,500 infant deaths per year in the early 1960s.³³ Currie and Reed Walker find that the implementation of E-ZPass improved birth out-

Falling Pollution at Toll Plazas Reduced Premature Births in Nearby Areas

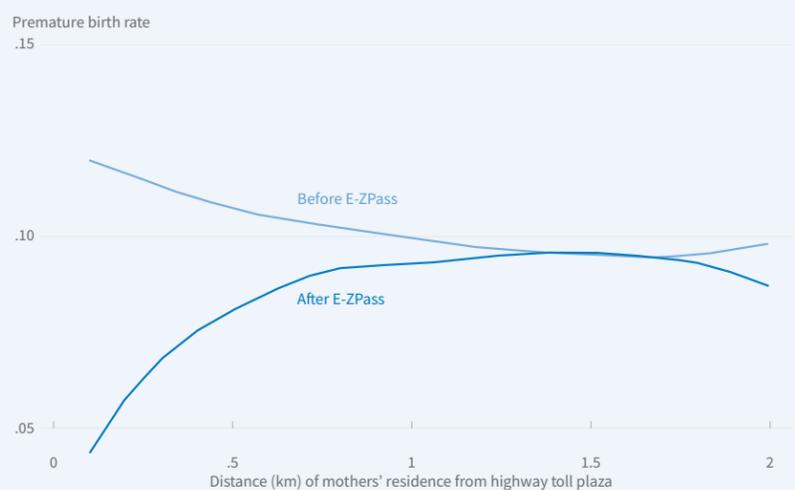


Figure 4

comes in the neighborhood of highway toll plazas by reducing pollution from automobiles [Figure 4].³⁴ Adam Isen, Rossin-Slater, and Walker follow children born in counties that were required to reduce air pollution because of the 1970 Clean Air Act. They find that lower pollution levels in the year of birth are associated with higher employment levels and higher earnings at age 30.³⁵ Aizer, Currie, Peter Simon, and Patrick Vivier document the tremendously positive effects of measures to reduce lead exposure by targeting old lead paint in Rhode Island. They show that in areas that implemented a “lead safe” certificate program, preschool blood lead levels declined rapidly and children's later test scores improved.³⁶ This study builds on previous work by Jessica Reyes showing that cohorts of young children who benefited from the elimination of lead in gasoline when they were young had lower levels of behavior problems, aggression, and delinquency as adolescents and less crime as young adults.³⁷ Currie, Lucas Davis, Michael Greenstone, and Walker find that manufacturing plants that emitted toxic pollutants reduced infant health within a one-mile radius.³⁸ Currie, Greenstone, and Enrico Moretti find that Superfund hazardous waste site cleanups

improved birth outcomes among infants born to mothers who lived nearby compared to mothers who lived a little further away.³⁹ Claudia Persico, Figlio, and Roth show that children prenatally exposed to Superfund sites are more likely to repeat a grade or be suspended from school and have lower test scores than their own younger siblings who benefited from later cleanups of these sites.⁴⁰

Additional Immediate or Short-Term Impacts of Policy on Children

In addition to tracking long-term effects, researchers in the Program on Children continue to study the immediate impacts of a wide variety of policies affecting children and their families. These include cash transfer programs, preschool enrichment, and nutrition programs. Hoynes, Douglas Miller, and David Simon show that expansions of the EITC reduced the incidence of low birth weight and that the impact was greatest for African-American mothers [Figure 5].⁴¹ In keeping with the finding of heterogeneous program effects, Marianne Bitler, Hoynes, and Thurston Domina estimate quantile treatment effect models of the Head Start preschool program for disadvantaged children and find the largest and most persistent effects on the most disadvantaged children.⁴² This is consistent with work by Kline and Chris Walters showing that the impact of Head Start is greatest for those children without access to any other preschool programming.⁴³

Sara Markowitz, Kathleen Adams, Patricia Dietz, Viji Kanna, and Van Tong study state increases in cigarette taxes and bans on indoor smoking and show that both policies reduced the rate of premature births.⁴⁴ Aizer and Stroud show that the initial Surgeon General's report about the dangers of smoking had a much greater

Expansion of EITC Reduced Probability of Low Birth Weight

Changes after 1993 tax reform, two-child vs. one-child EITC

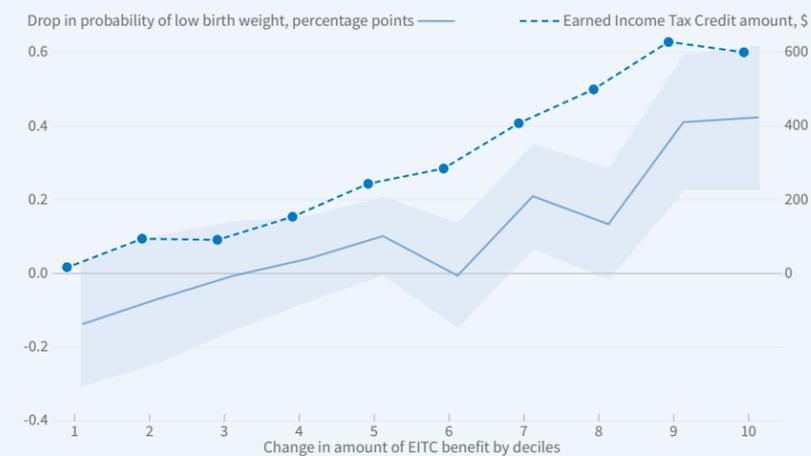


Figure 5

impact on smoking among more-educated women, so that initially the gap in smoking rates grew.⁴⁵

Schanzenbach and Mary Zaki focus on an expansion in the School Breakfast Program and find some evidence of improvements in health and behavior in some subgroups, though not overall.⁴⁶ Hoynes, Marianne Page, and Ann Huff Stevens focus on the initial roll out of the Supplemental Nutrition for Women, Infants and Children (WIC) Program across U.S. counties and show that it had positive effects on infant health and no evidence that these effects are driven by differences in fertility.⁴⁷ Currie and Ishita Rajani examine WIC in New York City and find that even comparing siblings born full term, WIC reduces low birth weight.⁴⁸ John Cawley, David Frisvold, and Chad Meyerhoefer examine state physical education mandates and find that they lower body mass index and reduce the probability of obesity among fifth graders, especially boys.⁴⁹ Conversely, Patricia Anderson, Kristin Butcher, and Schanzenbach find that schools cut back on physical education in response to “No Child Left Behind” and that this increased the fraction of children who were overweight.⁵⁰

Fertility and Parental Behaviors

Parental choices, beginning with the choice to have a child or not and under what circumstances, shape every aspect of a child’s life. One of the most important demographic changes of the late 20th and early 21st centuries has been the increase in the rate of non-marital childbearing. Not only has the overall rate increased, but Shelly Lundberg, Robert Pollak, and Jenna Stearns document a widening divide between parents with college education and those without in terms of whether they will marry and remain married.⁵¹ They argue that college educated parents marry in order to facilitate the increasingly intense investments that they will jointly make in their children. Matthias Doepke and Fabian Kindermann instead emphasize conflict between parents. They present cross-country evidence from 19 nations suggesting that fertility is lower in countries where women bear more of the child care burden.⁵² Lisa Dettling and Melissa Kearney show that increases in housing prices encourage child bearing among homeowners but discourage it among renters, highlighting the importance of economic factors in fertility decisions.⁵³

Martha Bailey provides a history of the impact of the introduction of federally funded family planning programs for 1964 to 1973 on fertility, linking them to both delays in childbearing and decreases in the number of children per woman.⁵⁴ Michael Lovenheim, Randall Reback, and Leigh Wedenoja focus on teens and show that school-based health centers can lower teen fertility, especially among younger teens and African Americans.⁵⁵ Kasey Buckles and Daniel Hungerman show that a condom distribution program is also effective, lowering teen fertility

by about 10 percent.⁵⁶ Jason Lindo and Analisa Packham show that a policy providing long-acting reversible contraceptives to teenagers reduced the teen birth rate by five percent.⁵⁷ While not a policy per se, the violence inflicted on abortion providers in many parts of the country has had the opposite effect, according to Mireille Jacobson and Heather Royer, increasing fertility by making it more difficult to terminate a pregnancy.⁵⁸ Two studies by Kearney and Phillip Levine indicate, however, that much of the decline in teen childbearing since 1981 appears due to “demand” factors: Both lower teen employment rates and TV shows depicting the realities of teen motherhood have had large effects on teen birth rates.⁵⁹

Fertility decisions can have a direct impact on the parental resources available for children, as Chinhui Juhn, Yona Rubinstein, and Andrew Zuppann emphasize in their re-examination of the so-called child quantity-quality tradeoff.⁶⁰ Black, Devereux, and Salvanes find evidence of complicated patterns of parental investment by birth order, showing for example, that mothers are more likely to be smokers when their first children are born but also are more likely to breast feed those children.⁶¹ Marianne Bertrand and Jessica Pan focus on father presence as an important input, showing that boys in “broken” families are more likely to have deficits in non-cognitive skills [Figure 6].⁶² On the other hand, Lindo, Jessamyn Schaller, and Benjamin Hansen show that higher male unemployment rates predict increases in child abuse and neglect at the county level,⁶³ while Page, Schaller, and Simon find that better maternal employment prospects are associated with worse child health.⁶⁴ Consistent with this latter finding, Chris Herbst and Tekin find that higher child care subsidies are associated with greater risk of childhood obesity, perhaps through encouraging the use of non-parental care. Parental behaviors may also be implicated in the higher infant mortality rates seen in the U.S. compared to European countries.⁶⁵ Alice Chen, Emily Oster, and Williams show that the while some of the higher death rate is attributable to poorer health at birth, much of the gap opens up after the first month of life, pointing to conditions in the home as a probable cause.⁶⁶

Several studies examine ways in which policy can impact parents’ investments in children. Alexander Gelber and Isen find that parents who were randomized to Head Start in the Head Start Impact Study invest more in their children subsequently, suggesting either that parents view their own inputs as complementary to preschool or that they learned something from Head Start about how to parent.⁶⁷ Aizer and Flavio Cunha examine the introduction of the Head Start preschool program, arguing that parents tend to reinforce differences between their children and showing that parents are more likely to invest in children in a way that reinforces differences between children in larger families.⁶⁸ Roland Fryer, Steven Levitt, and John List find

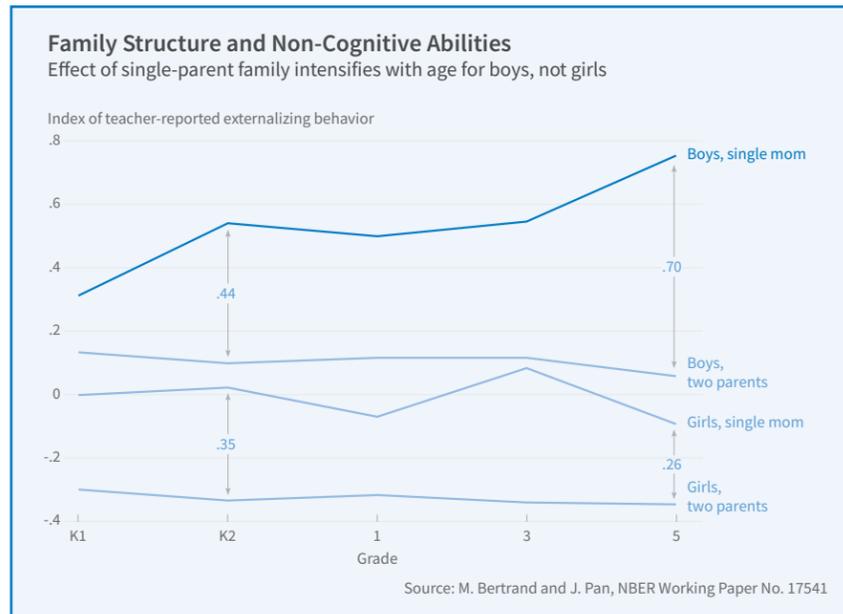


Figure 6

that providing mothers with incentives to engage their children in behaviors known to improve child development is very effective in increasing cognitive achievement in some families, but not others.⁶⁹ Rossin-Slater and Mariam Wust examine child support enforcement in Denmark and find that higher paternal obligations raise payments but that these gains are partially offset by various behavioral responses.⁷⁰ In an innovative study, Ariel Kalil, Philip Oreopoulos, and Sebastian Gallegos conduct a field experiment designed to increase the time parents spent reading to their children, using behavioral tools such as text reminders, goal setting, and social rewards; they find large positive effects relative to simply providing information about the importance of reading to children.⁷¹

Research Focusing on Adolescents

Much about adolescents is predictive of their incipient adult outcomes. It is during adolescence that many risky or antisocial behaviors emerge or increase in frequency and severity, often with long term consequences. Miguel Sarzosa and Sergio Urzua estimate significant long term costs associated with being bullied in one’s youth.⁷² Aizer and Doyle point out that 130,000 juveniles are detained each year. Using randomly assigned judges with different propensities to incarcerate, they find that incarceration

in adolescence greatly increases the probability of incarceration in adulthood.⁷³ The importance of mental health is highlighted by Anderson, Cesur, and Tekin who show using school and sibling fixed effects models that adolescent depression predicts future property crime.⁷⁴ Fletcher finds further that adolescent depression predicts lower employment probabilities later in life.⁷⁵

While much of the previous work examining the impact of programs or policies that aim to curb risky behaviors among adolescents has not found them to be particularly effective, more recent work suggests that innovative programs can be effective.⁷⁶ For example, among youths who are involved with the justice system but not incarcerated, Alison Cuellar and Dhaval Dave find that intensive mental health treatments can help to keep youth in school.⁷⁷ In contrast, adolescent behavior seems to be less responsive to prices and sanctions. Anderson, Hansen, and Daniel Rees examine the impact of medical marijuana laws and find little impact of these laws on teen smoking.⁷⁸ Likewise, Hansen, Joseph Sabia, and Rees argue that the impact of cigarette taxes on youth smoking has declined over time.⁷⁹

The close links between mental health, what economists often call non-cognitive skills, cognitive skills, and outcomes are emphasized by two studies reporting on randomized interventions of innovative programs among youth in Chicago. Philip Cook, Kenneth Dodge, George Farkas, Fryer, Jonathan Guryan, Ludwig, Mayer, Harold Pollack, and Laurence Steinbert discuss an intervention designed to improve school performance by combining coaching on social-cognitive skills with personalized academic remediation. While the sample was small and it is not known if the program is scalable, the program had dramatic effects at modest cost.⁸⁰ Sara Heller, Anuj Shah, Guryan, Ludwig, Sendhil Mullainathan, and Pollack discuss three randomized controlled trials aimed at reducing violence and arrests and improving school engagement. These interventions, which emphasized teaching youth to slow down before acting on first thoughts and automatic behaviors, suggest that it may be possible to intervene effectively with adolescents, as well as with pregnant women and young children, to improve child outcomes.⁸¹

¹ D. Almond, B. Mazumder, and R. van Ewijk, “Fasting During Pregnancy and Children’s Academic Performance,” NBER Working Paper No. 17713, December 2011.

² J. Ferrie and K. Rolf, “Socioeconomic Status in Childhood and Health After Age 70: A New Longitudinal Analysis for the U.S., 1895–2005,” NBER Working Paper No. 17016, May 2011, and *Explorations in Economic History*, 48(4), 2011, pp. 445–60.

³ D. Autor, D. Figlio, K. Karbownik, J. Roth, and M. Wasserman, “Family Disadvantage and the Gender Gap in Behavioral and Educational Outcomes,” NBER Working

Paper No. 22267, May 2016.

⁴ A. Aizer, S. Eli, J. Ferrie, and A. Lleras-Muney, "The Long Term Impact of Cash Transfers to Poor Families," NBER Working Paper No. 20103, May 2014, and *American Economic Review*, 106(4), 2016, pp. 935–71.

⁵ F. Anderson, J.C. Haltiwanger, M.J. Kutzbach, G.E. Palloni, H.O. Pollakowski, and D. Weinberg, "Childhood Housing and Adult Earnings: A Between-Siblings Analysis of Housing Vouchers and Public Housing," NBER Working Paper No. 22721, October 2016.

⁶ G.B. Dahl, A.R. Kostol and M. Mogstad, "Family Welfare Cultures," NBER Working Paper No. 19237, July 2013, and *The Quarterly Journal of Economics*, Oxford University Press, 129(4), 2014, pp. 1711–52.

⁷ J. Ludwig, G.J. Duncan, L.A. Gennetian, L.F. Katz, R.C. Kessler, J.R. Kling, and L. Sanbonmatsu, "Long-Term Neighborhood Effects on Low-Income Families: Evidence from Moving to Opportunity," NBER Working Paper No. 18772, February 2013, and *American Economic Review*, 103(3), 2013, pp. 226–31.

⁸ R. Chetty, N. Hendren, and L.F. Katz, "The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment," NBER Working Paper No. 21156, May 2015, and *American Economic Review*, 106(4), 2016, pp. 855–902.

⁹ R. Chetty, N. Hendren, P. Kline, and E. Saez, "Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States," NBER Working Paper No. 19843, January 2014, and *The Quarterly Journal of Economics*, 129(4), 2014, pp. 1553–623.

¹⁰ H. Hoynes, D.W. Schanzenbach, and D. Almond, "Long Run Impacts of Childhood Access to the Safety Net," NBER Working Paper No. 18535, November 2012, and *American Economic Review*, 106(4), 2016, pp. 903–34.

¹¹ G. Conti, J.J. Heckman, and R. Pinto, "The Effects of Two Influential Early Childhood Interventions on Health and Healthy Behaviors," NBER Working Paper No. 21454, August 2015.

¹² J.J. Heckman, R. Pinto, and P.A. Savelyev, "Understanding the Mechanisms through Which an Influential Early Childhood Program Boosted Adult Outcomes," NBER Working Paper No. 18581, November 2012, and *American Economic Review*, 103(6), 2013, pp. 2052–86.

¹³ M. Baker, J. Gruber, and K. Mulligan, "Non-Cognitive Deficits and Young Adult Outcomes: The Long-Run Impacts of a Universal Child Care Program," NBER Working Paper No. 21571, September 2015.

¹⁴ J. Currie, S. Decker, and W. Lin, "Has Public Health Insurance for Older Children Reduced Disparities in Access to Care and Health Outcomes?" NBER Working Paper No. 14173, July 2008, and *Journal of Health Economics*, 27(6), 2008, pp. 1567–81.

¹⁵ B.D. Meyer and L.R. Wherry, "Saving Teens: Using a Policy Discontinuity to Estimate the Effects of Medicaid Eligibility," NBER Working Paper No. 18309, August 2012.

¹⁶ D.W. Brown, A.E. Kowalski, and I.Z. Lurie, "Medicaid as an Investment in Children: What is the Long-Term Impact on Tax Receipts?" NBER Working Paper No. 20835, January 2015.

¹⁷ L.R. Wherry, S. Miller, R. Kaestner, and B.D. Meyer, "Childhood Medicaid Coverage and Later Life Health Care Utilization," NBER Working Paper No. 20929, February 2015.

¹⁸ J. Currie and H. Schwandt, "Mortality Inequality: The Good News from a County-Level Approach," NBER Working Paper No. 22199, April 2016, and *Journal of Economic Perspectives*, 30(2), 2016, pp. 29–52.

¹⁹ D. Almond, J.J. Doyle Jr., A.E. Kowalski, and H. Williams,

"Estimating Marginal Returns to Medical Care: Evidence from At-Risk Newborns," NBER Working Paper No. 14522, December 2008, and *Quarterly Journal of Economics*, 125(2), 2010, pp. 591–634.

²⁰ J. Currie and W.B. MacLeod, "Diagnosing Expertise: Human Capital, Decision Making and Performance Among Physicians," NBER Working Paper No. 18977, April 2013.

²¹ E.M. Johnson and M.M. Rehani, "Physicians Treating Physicians: Information and Incentives in Childbirth," NBER Working Paper No. 19242, July 2013, and *American Economic Journal: Economic Policy*, 8(1), 2016, pp. 115–41.

²² J. Fletcher, "The Effects of Childhood ADHD on Adult Labor Market Outcomes," NBER Working Paper No. 18689, January 2013, and *Health Economics*, 23(2), 2014, pp. 159–81.

²³ J. Currie, M. Stabile, and L.E. Jones, "Do Stimulant Medications Improve Educational and Behavioral Outcomes for Children with ADHD?" NBER Working Paper No. 19105, June 2013, and *Journal of Health Economics*, 37, 2014, pp. 58–69.

²⁴ S. Busch, E. Goldberstein, and E. Meara, "The FDA and ABCs: The Unintended Consequences of Antidepressant Warnings on Human Capital," NBER Working Paper No. 17426, September 2011, and *Journal of Human Resources*, 49(3), 2014, pp. 540–71.

²⁵ D.M. Anderson, R. Cesur, and E. Tekin, "Youth Depression and Future Criminal Behavior," NBER Working Paper No. 18656, December 2012, and *Economic Inquiry*, 53(1), 2015, pp. 294–317.

²⁶ A. Aizer, L. Stroud, and S. Buka, "Maternal Stress and Child Outcomes: Evidence from Siblings," NBER Working Paper No. 18422, September 2012.

²⁷ W.N. Evans and C.L. Garthwaite, "Giving Mom a Break: The Impact of Higher EITC Payments on Maternal

Health," NBER Working Paper No. 16296, August 2010, and *American Economic Journal*, 6(2), 2014, pp. 258–90.

²⁸ P. Persson and M. Rossin-Slater, "Family Ruptures, Stress, and the Mental Health of the Next Generation," NBER Working Paper No. 22229, May 2016.

²⁹ S. Black, P.J. Devereux, and K. Salvanes, "Does Grief Transfer across Generations? In-Utero Deaths and Child Outcomes," NBER Working Paper No. 19979, March 2014.

³⁰ J. Currie and M. Rossin-Slater, "Weathering the Storm: Hurricanes and Birth Outcomes," NBER Working Paper No. 18070, May 2012, and *Journal of Health Economics*, 32(2), 2013, pp. 487–503.

³¹ S. Gershenson and E. Tekin, "The Effect of Community Traumatic Events on Student Achievement: Evidence from the Beltway Sniper Attacks," NBER Working Paper No. 21055, March 2015.

³² E. Goldberstein, G. Gonzales, and E. Meara, "Economic Conditions and Children's Mental Health," NBER Working Paper No. 22459, July 2016.

³³ K. Clay, J. Lewis, and E. Severnini, "Canary in a Coal Mine: Infant Mortality, Property Values, and Tradeoffs Associated with Mid-20th Century Air Pollution," NBER Working Paper No. 22155, April 2016.

³⁴ J. Currie and W.R. Walker, "Traffic Congestion and Infant Health: Evidence from E-ZPass," NBER Working Paper No. 15413, October 2009, and *American Economic Journal: Applied Economics*, 3(1), 2011, pp. 65–90.

³⁵ A. Isen, M. Rossin-Slater, and W.R. Walker, "Every Breath You Take – Every Dollar You'll Make: The Long-Term Consequences of the Clean Air Act of 1970," NBER Working Paper No. 19858, January 2014.

³⁶ A. Aizer, J. Currie, P. Simon, and P. Vivier, "Do Low Levels of Blood Lead Reduce Children's Future Test Scores?" NBER Working Paper No. 22558, August 2016.

³⁷ J.W. Reyes, "Lead Exposure and Behavior: Effects on Antisocial and Risky Behavior among Children and Adolescents," NBER Working Paper No. 20366, August 2014, and *Economic Inquiry*, 53(3), 2015, pp. 1580–1605.

³⁸ J. Currie, L. Davis, M. Greenstone and W.R. Walker, "Do Housing Prices Reflect Environmental Health Risks? Evidence from More than 1600 Toxic Plant Openings and Closings," NBER Working Paper No. 18700, January 2013, and *American Economic Review*, 105(2), 2015, pp. 678–709.

³⁹ J. Currie, M. Greenstone, and E. Moretti, "Superfund Cleanups and Infant Health," NBER Working Paper No. 16844, March 2011, and *American Economic Review*, 101(3), 2011, pp. 435–41.

⁴⁰ C. Persico, D. Figlio, and J. Roth, "Inequality Before Birth: The Developmental Consequences of Environmental Toxicants," NBER Working Paper No. 22263, May 2016.

⁴¹ H. Hoynes, D.L. Miller, and D. Simon, "Income, the Earned Income Tax Credit, and Infant Health," NBER Working Paper No. 18206, July 2012, and *American Economic Journal: Economic Policy*, 7(1), 2015, pp. 172–211.

⁴² M.P. Bitler, H. Hoynes, and T. Domina, "Experimental Evidence on Distributional Effects of Head Start," NBER Working Paper No. 20434, August 2014.

⁴³ P. Kline and C. Walters, "Evaluating Public Programs with Close Substitutes: The Case of Head Start," NBER Working Paper No. 21658, October 2015.

⁴⁴ S. Markowitz, E.K. Adams, P.M. Dietz, V. Kannan, and V. Tong, "Smoking Policies and Birth Outcomes: Estimates From a New Era," NBER Working Paper No. 17160, June 2011.

⁴⁵ A. Aizer and L. Stroud, "Education, Knowledge and the Evolution of Disparities in Health," NBER Working Paper No. 15840, March 2010.

⁴⁶ D.W. Schanzenbach and M. Zaki, "Expanding the School Breakfast Program: Impacts on Children's Consumption, Nutrition and Health," NBER Working Paper No. 20308, July 2014.

⁴⁷ H. Hoynes, M. Page and A. Huff Stevens, "Is a WIC Start a Better Start? Evaluating WIC's Impact on Infant Health Using Program Introduction," NBER Working Paper No. 15589, December 2009, and *Journal of Public Economics*, 95, 2011, pp. 813–27.

⁴⁸ J. Currie and I. Rajani, "Within-Mother Estimates of the Effects of WIC on Birth Outcomes in New York City," NBER Working Paper No. 20400, August 2014, and *Economic Inquiry*, 53(4), 2015, pp. 1691–1701.

⁴⁹ J. Cawley, D. Frisvold, and C. Meyerhoefer, "The Impact of Physical Education on Obesity among Elementary School Children," NBER Working Paper No. 18341, August 2012, and *Journal of Health Economics*, 32(4), 2013, pp. 743–55.

⁵⁰ P.M. Anderson, K.F. Butcher, and D.W. Schanzenbach, "Adequate (or Adipose?) Yearly Progress: Assessing the Effect of 'No Child Left Behind' on Children's Obesity," NBER Working Paper No. 16873, March 2011.

⁵¹ S. Lundberg, R.A. Pollak, and J.E. Stearns, "Family Inequality: Diverging Patterns in Marriage, Cohabitation, and Childbearing," NBER Working Paper No. 22078, March 2016, and *Journal of Economic Perspectives*, 30(2), 2016, pp. 79–102.

⁵² M. Doepke and F. Kindermann, "Bargaining over Babies: Theory, Evidence, and Policy Implications," NBER Working Paper No. 22072, March 2016.

⁵³ L.J. Detting and M.S. Schettini Kearney, "House Prices and Birth Rates: The Impact of the Real Estate Market on the Decision to Have a Baby," NBER Working Paper No.

17485, October 2011, and *Journal of Public Economics*, 110, 2014, pp. 1–116.

⁵⁴ M. Bailey, “Reexamining the Impact of Family Planning Programs on U.S. Fertility: Evidence from the War on Poverty and the Early Years of Title X,” NBER Working Paper No. 17343, August 2011, and *American Economic Journal: Applied Economics*, 4(2), 2012, pp. 62–97; also M. Bailey, “Fifty Years of Family Planning: New Evidence on the Long-Run Effects of Increasing Access to Contraception,” NBER Working Paper No. 19493, October 2013, and *Brookings Papers on Economic Activity*, 46(1), 2013, pp. 341–409.

⁵⁵ M.F. Lovenheim, R. Reback, and L. Wedenoja, “How Does Access to Health Care Affect Teen Fertility and High School Dropout Rates? Evidence from School-based Health Centers,” NBER Working Paper No. 22030, February 2016.

⁵⁶ K.S. Buckles and D.M. Hungerman, “The Incidental Fertility Effects of School Condom Distribution Programs,” NBER Working Paper No. 22322, June 2016.

⁵⁷ J.M. Lindo and A. Packham, “How Much Can Expanding Access to Long-Acting Reversible Contraceptives Reduce Teen Birth Rates?” NBER Working Paper No. 21275, June 2015.

⁵⁸ M. Jacobson and H. Royer, “Aftershocks: The Impact of Clinic Violence on Abortion Services,” NBER Working Paper No. 16603, December 2010, and *American Economic Journal: Applied Economics*, 3(1), 2011, pp. 189–223.

⁵⁹ M.S. Kearney and P.B. Levine, “Explaining Recent Trends in the U.S. Teen Birth Rate,” NBER Working Paper No. 17964, March 2012; also M.S. Kearney and P.B. Levine, “Media Influences on Social Outcomes: The Impact of MTV’s 16 and Pregnant on Teen Childbearing,” NBER Working Paper No. 19795, January 2014, and *American*

Economic Review, 105(12), 2015, pp. 3597–632.

⁶⁰ C. Juhn, Y. Rubinstein, and A. Zuppann, “The Quantity-Quality Trade-off and the Formation of Cognitive and Non-cognitive Skills,” NBER Working Paper No. 21824, December 2015.

⁶¹ S. Black, P.J. Devereux, and K. Salvanes, “Healthy(?), Wealthy and Wise: Birth Order and Adult Health,” NBER Working Paper No. 21337, July 2015.

⁶² M. Bertrand and J. Pan, “The Trouble with Boys: Social Influences and the Gender Gap in Disruptive Behavior,” NBER Working Paper No. 17541, October 2011, and *American Economic Journal: Applied Economics*, 5(1), 2013, pp. 32–64.

⁶³ J.M. Lindo, J. Schaller, and B. Hansen, “Caution! Men Not at Work: Gender-Specific Labor Market Conditions and Child Maltreatment,” NBER Working Paper No. 18994, April 2013.

⁶⁴ M. Page, J. Schaller and D. Simon, “The Effects of Aggregate and Gender-Specific Labor Demand Shocks on Child Health,” NBER Working Paper No. 22394, July 2016.

⁶⁵ C. Herbst and E. Tekin, “Child Care Subsidies and Childhood Obesity,” NBER Working Paper No. 15007, May 2009, and *Review of Economics of the Household*, 9(3), 2011, pp. 349–78.

⁶⁶ A. Chen, E. Oster, and H. Williams, “Why is Infant Mortality Higher in the US than in Europe?” NBER Working Paper No. 20525, September 2014.

⁶⁷ A. Gelber and A. Isen, “Children’s Schooling and Parents’ Investment in Children: Evidence from the Head Start Impact Study,” NBER Working Paper No. 17704, December 2011, and *Journal of Public Economics*, 101, 2013, pp. 25–38.

⁶⁸ A. Aizer and F. Cunha, “The Production of Human Capital: Endowments, Investments and Fertility,” NBER Working Paper No. 18429, September 2012.

⁶⁹ R. Fryer, S. Levitt and J. List, “Parental Incentives and Early Childhood Achievement: A Field Experiment in Chicago Heights,” NBER Working Paper No. 21477, August 2015.

⁷⁰ M. Rossin-Slater and M. Wust, “Parental Responses to Child Support Obligations: Evidence from Administrative Data,” NBER Working Paper No. 22227, May 2016.

⁷¹ S. Mayer, A. Kalil, P. Oreopoulos, and S. Gallegos, “Using Behavioral Insights to Increase Parental Engagement: The Parents and Children Together (PACT) Intervention,” NBER Working Paper No. 21602, October 2015.

⁷² M. Sarzosa and S. Urzua, “Bullying among Adolescents: The Role of Cognitive and Non-Cognitive Skills,” NBER Working Paper No. 21631, October 2015.

⁷³ A. Aizer and J.J. Doyle Jr., “Juvenile Incarceration, Human Capital and Future Crime: Evidence from Randomly-Assigned Judges,” NBER Working Paper No. 19102, June 2013, and *The Quarterly Journal of Economics*, 130(2), 2015, pp. 759–803.

⁷⁴ D.M. Anderson, R. Cesur, and E. Tekin, “Youth Depression and Future Criminal Behavior,” NBER Working Paper No. 18565, December 2012, and *Economic Inquiry*, 53(1), 2015, pp. 294–317.

⁷⁵ J. Fletcher, “Adolescent Depression and Adult Labor Market Outcomes,” NBER Working Paper No. 18216, July 2012, and *Southern Economic Journal*, 80(1), 2013, pp. 26–49.

⁷⁶ J.J. Heckman and T. Kautz, “Fostering and Measuring Skills: Interventions that Improve Character and Cognition,” NBER Working Paper No. 19656, November 2013.

⁷⁷ A. Cuellar and D.M. Dave, “Causal Effects of Mental Health Treatment on Education Outcomes for Youth in the Justice System,” NBER Working Paper No. 21206, May 2015, and *Economics Education Review*, 2016.

⁷⁸ D.M. Anderson, B. Hansen, and

D. Rees, “Medical Marijuana Laws and Teen Marijuana Use,” NBER Working Paper No. 20332, July 2014, and *American Law and Economics Review*, 17(2), 2015, pp. 495–528.

⁷⁹ B. Hansen, J. Sabia, and D. Rees, “Cigarette Taxes and Youth Smoking: Updated Estimates Using YRBS Data,” NBER Working Paper No.

21311, June 2015.

⁸⁰ P. Cook, K. Dodge, G. Farkas, R. Fryer, Jr., J. Guryan, J. Ludwig, S. Meyer, H. Pollack, and L. Steinberg, “The (Surprising) Efficacy of Academic and Behavioral Intervention with Disadvantaged Youth: Results from a Randomized Experiment in Chicago,” NBER

Working Paper No. 19862, January 2014.

⁸¹ S. Heller, A. Shah, J. Guryan, J. Ludwig, S. Mullainathan, and H. Pollack, “Thinking, Fast and Slow? Some Field Experiments to Reduce Crime and Dropout in Chicago,” NBER Working Paper No. 21178, May 2015.



Quantifying Agglomeration and Dispersion Forces

Stephen J. Redding

Stephen Redding's research interests include international trade, economic geography, and productivity growth. Recent work has been concerned with heterogeneous firms and comparative advantage, multi-product firms, and the contribution of agglomeration forces to the spatial distribution of economic activity.

He is currently the Harold T. Shapiro '64 Professor in Economics in Princeton University's economics department and Woodrow Wilson School. He is director of the NBER's International Trade and Investment Program, an international research associate of the London School of Economics' Centre for Economic Performance, and a research fellow of the Centre for Economic Policy Research.

Prior to joining the Princeton faculty, Redding was a professor in economics at the London School of Economics and the Yale School of Management. He was awarded a Philip Leverhulme Prize Fellowship during 2001–04 for his research on international trade and economic growth and a Global Economic Affairs Prize from the Kiel Institute for the World Economy in 2008. He was a Peter Kenen Fellow in International Economics at Princeton University during 2005–06, a visiting associate professor at Harvard University during fall 2007, and the Wesley Clair Mitchell Visiting Professor at Columbia University from 2016–17.

Economic activity is highly unevenly distributed across space. In the United States, the 2,000 counties with the lowest employment densities account for over 75 percent of land area but less than 12 percent of employment. By contrast, the 100 counties with the highest employment densities make up around 40 percent of employment but less than 2 percent of land area. A fundamental research question in economic geography is the extent to which this uneven distribution of economic activity reflects differences in location fundamentals, such as natural resources, mountains and navigable water, or agglomeration forces, such as knowledge externalities.

Understanding the strength of agglomeration forces and of corresponding dispersion forces is central to a range of economic and policy questions. These forces influence economic efficiency, the size distribution of cities, and the organization of economic activity within cities. They have implications for the level and distribution of income and for local and aggregate productivity. They also determine the impact of public policy interventions, such as transport infrastructure investments, local taxation, and regional development programs.

Although the literature on economic geography and urban economics dates back at least to the work of Alfred Marshall in the late 19th century, separating agglomeration and dispersion forces from variation in location fundamentals remains challenging. While high land prices and levels of economic activity in a group

of neighboring locations are consistent with strong agglomeration forces, they are also consistent with shared amenities that make these locations desirable places to live or common natural advantages that make these locations attractive for production.

This challenge has both theoretical and empirical dimensions. From a theoretical perspective, to develop tractable models of location choice, much existing research makes simplifying assumptions such as a small number of symmetric locations, which ignores the important differences in location fundamentals that are observed in practice and limits the usefulness of these models for empirical work. From an empirical perspective, the challenge is to find exogenous sources of variation in the surrounding concentration of economic activity to help disentangle agglomeration and dispersion forces from variation in location fundamentals. Part of my research program has sought to overcome these challenges and quantify the magnitude of agglomeration and dispersion forces.

The Costs of Remoteness

In the presence of trade costs, the location of agents relative to one another in geographic space determines their access to one another's markets, which in turn affects consumption, production, and income. Anthony Venables and I used a theoretical model of economic geography to derive theoretically consistent measures of market access that can be structurally estimated using

observed bilateral trade data between locations.¹ As predicted by economic geography models, these measures of market access are strongly correlated with the observed cross-sectional distribution of economic activity.

To provide evidence for a causal role of market access, Daniel Sturm and I used the division of Germany after the Second World War and the reunification of East and West Germany in 1990 as a source of exogenous variation.² The key idea behind our empirical approach is that the division caused West German cities close to the former border between East and West Germany — “treatment cities” within 75 kilometers of the border — to experience a disproportionate loss of market access relative to other West German cities, our “control cities.” The reason is that West German cities close to the East-West border lost nearby trading partners with whom they could interact at low transport costs prior to division. In contrast, the effect on West German cities further from the East-West border was more muted, because they were more remote from the trading partners lost, and therefore already faced higher transport costs prior to division.

In line with the predictions of a standard new economic geography model, the imposition of the East-West border led to a sharp decline in population growth of West German cities close to the border relative to their further-from-the-border counterparts. Over the 40-year period of division, border cities experienced a relative decline in their annualized rate of population growth of 0.75 percentage points. This resulted in a relative shrinkage of these cities by about one-third over the four decade division, as shown in Figure 1. In the new eco-

omic geography model, the impact of division is determined by two parameter combinations: the strength of agglomeration and dispersion forces, and the elasticity of trade with respect to distance. We show that for plausible values of these parameter combinations, the model can account quantitatively for both the average estimated treatment effect of division and the larger estimated treatment effect for smaller cities that are more dependent on markets in other cities. We also provide evidence against a range of potential alternative explanations, such as differences in the degree of disruption during and in the aftermath of the Second World War, Western European integration, and fear of further armed conflict.

My more recent research has explored how factor mobility across locations influences the welfare gains from trade in goods.³ In an entire class of trade and geography models, I show

with itself and its share of mobile factors of production provide sufficient statistics for calculating the welfare effects of changes in trade costs.

The Economics of Density

Agglomeration and dispersion forces not only determine the distribution of economic activity across cities and regions but also play an important role in shaping the internal organization of economic activity within cities. To quantify this role, recent research I have undertaken with Gabriel Ahlfeldt, Daniel Sturm, and Nikolaus Wolf develops a structural model of internal city structure that incorporates both agglomeration and dispersion forces and an arbitrary number of heterogeneous locations, while remaining tractable and amenable to empirical analysis.⁴ Locations differ in terms of productivity, amenities, density of development (which determines the ratio of floor space to ground area), and access

to transport infrastructure. Productivity depends on production externalities, which are determined by the surrounding density of workers, and production fundamentals, such as topography and proximity to natural supplies of water. Amenities depend on residential externalities, which are determined by the surrounding density of residents, and residential fundamentals, such as access to forests and lakes. Congestion forces take the form of an inelastic supply of land and com-

muting costs that increase with travel time, where travel time in turn depends on the transport network.

We combine this quantitative urban model with the natural experiment of Berlin's division in the aftermath of the Second World War and its reunification following the fall of the Iron Curtain.



Figure 1

how observed data on bilateral trade between regions, population shares, and income shares can be used to undertake model-based counterfactuals for the welfare effects of transport infrastructure improvements and other public policy interventions. Within this class of models, changes in each region's share of trade

The division of Berlin severed all local economic interactions between East and West Berlin, which corresponds in the model to prohibitive trade and commuting costs and no production and residential externalities between these two parts of the city. Our analysis makes use of a remarkable and newly collected dataset for Berlin on around 15,000 city blocks, which includes data on land prices, employment by place of work, and employment by place of residence covering the pre-war, division, and reunification periods.

We first present reduced-form evidence in support of the model's qualitative predictions without imposing the full structure of the model. We show that division leads to a reorientation of the gradient in land prices and employment in West Berlin away from the main pre-war concentration of economic activity in East Berlin, the prewar central business district in Mitte, while reunification leads to a reemergence of this gradient as shown in Figure 2. In contrast, land prices and employment show little effect of division or reunification along other, more economically remote sections of the Berlin Wall.

We next use the exogenous variation from Berlin's division and reunification to structurally estimate the model's parameters determining the strength of agglomeration and dispersion forces. Our identifying assumption is that the systematic change in the pattern of economic activity in West Berlin following division and reunification is explained by the mechanisms of the model—the changes

in commuting access and production and residential externalities—rather than by systematic changes in production and residential fundamentals. We find substantial production and residential externalities, with estimated elasticities of productivity and amenities with respect to the surrounding density of economic activity of around 7 and 15 percent respectively. Both externalities are highly

concerned with quantifying the magnitude and implications of spatial interactions between locations. Past research with Sturm and Wolf has provided evidence of the role of such interactions in generating path dependence or multiple steady-states in location choices.⁵ Current research with Ferdinando Monte and Esteban Rossi-Hansberg demonstrates the importance of spatial interactions between locations, in particular through commut-

Broader Research Agenda

My broader research agenda remains concerned with quantifying the magni-

tude and implications of spatial interactions between locations. Past research with Sturm and Wolf has provided evidence of the role of such interactions in generating path dependence or multiple steady-states in location choices.⁵ Current research with Ferdinando Monte and Esteban Rossi-Hansberg demonstrates the importance of spatial interactions between locations, in particular through commut-

ing, for understanding the local economic impact of labor demand shocks.⁶ Ongoing work with Pablo Fajgelbaum quantifies the role of internal geography in shaping the effects of external integration, using the natural experiment of Argentina's integration into the world economy in the late-19th century.⁷

All of these papers are part of a broader, developing literature on quantitative spatial models, which are rich enough to incorporate first-order features of the data and also tractable enough to be amenable to counterfactual analysis. In a recent survey paper with Rossi-Hansberg, we review this rapidly-growing literature and the many exciting areas for further research.⁸

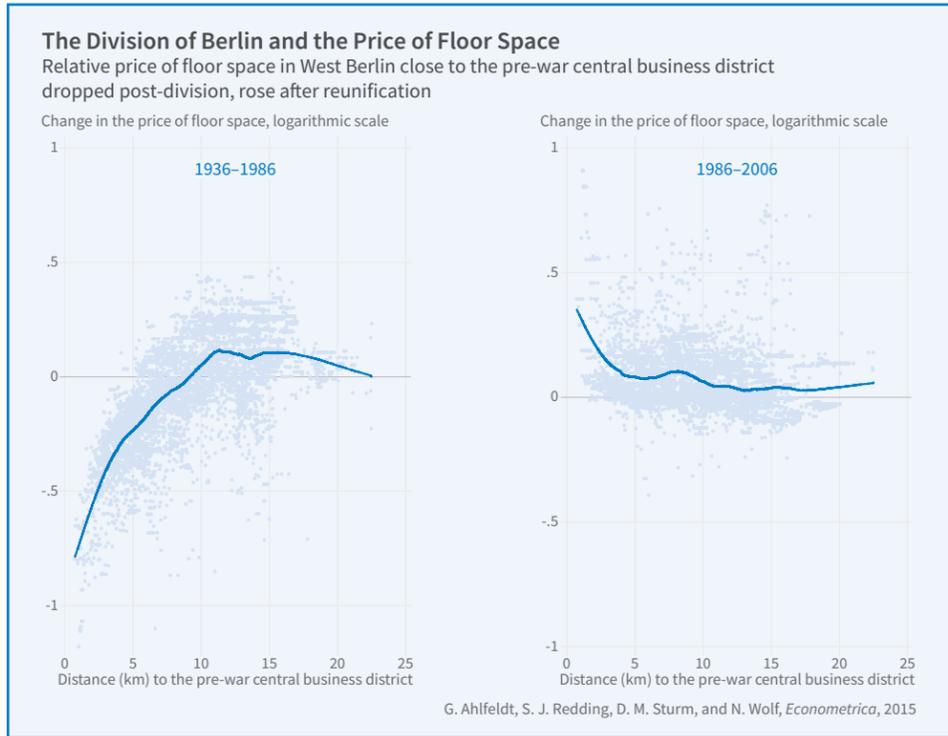


Figure 2

localized and are estimated to decline to around zero after nine minutes of travel time, about half a kilometer of distance for our estimated average travel speeds.

Undertaking counterfactuals for the impact of division and reunification, we show that the special case of the model without any production or residential externalities is unable to account quantitatively for the observed reallocations of economic activity within the city. In contrast, for the estimated values of production and residential externalities, the model is successful in matching the observed impacts of division and reunification, both qualitatively and quantitatively. Therefore, using the exogenous changes in the surrounding concentra-

¹ S.J. Redding and A.J. Venables, "Economic Geography and International Inequality," *Journal of International Economics*, 62(1), 2004, pp. 53–82.

² S.J. Redding and D.M. Sturm, "The Costs of Remoteness: Evidence from German Division and Reunification," *American Economic Review*, 98(5), 2008, pp. 1766–97.

³ S.J. Redding, "Goods Trade, Factor Mobility, and Welfare," NBER Working Paper No. 18008, April 2012, and *Journal of International*

Economics, 101(c), 2016, pp. 148–67.

⁴ G. Ahlfeldt, S.J. Redding, D.M. Sturm, and N. Wolf, "The Economics of Density: Evidence from the Berlin Wall," NBER Working Paper No. 20354, July 2014, and *Econometrica*, 83(6), 2015, pp. 2127–89.

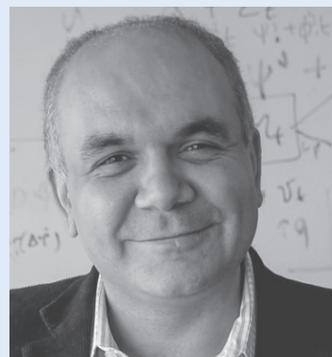
⁵ S.J. Redding, D.M. Sturm, and N. Wolf "History and Industrial Location: Evidence from German Airports," *Review of Economics and Statistics*, 93(3), 2011, pp. 814–31.

⁶ F. Monte, S.J. Redding, and E. Rossi-Hansberg, "Commuting,

Migration, and Local Employment Elasticities," NBER Working Paper No. 21706, November 2015.

⁷ P. Fajgelbaum and S.J. Redding, "External Integration, Structural Transformation, and Economic Development: Evidence from Argentina 1870–1914," NBER Working Paper No. 20217, June 2014.

⁸ S.J. Redding and E. Rossi-Hansberg "Quantitative Spatial Economics," NBER Working Paper No. 22655, September 2016, and forthcoming in *Annual Review of Economics*.



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Guvenen received his bachelor's degree in electrical and electronics engineering from Bilkent University in Ankara, Turkey, and his Ph.D. from Carnegie Mellon University. He has held visiting or full-time academic positions at various institutions, including the University of Rochester, New York University's Stern School of Business, Yale University, and the Federal Reserve Bank of Chicago.

Guvenen's research is at the intersection of macroeconomics and labor economics, broadly defined. His recent work focuses on the causes and consequences of inequality trends, the interactions between inequality and the macroeconomy, individual income risk, tax policy in the presence of inequality, and the linkages between the financial and real sides of the macroeconomy. His work has been supported by grants from the National Science Foundation, the Retirement Research Consortium, the Russell Sage Foundation, and other organizations.

He grew up in Belgium and Turkey, and currently lives in Minneapolis with his two sons.

Income Risk over the Life Cycle and the Business Cycle: New Insights from Large Datasets

Fatih Guvenen

Millions of young men and women enter the labor market annually. Over the next 40 years, each of them goes through a unique journey that involves surprises as well as disappointments: searching for the dream career, finding and losing jobs, getting promotions, salary raises, or demotions, and experiencing the recessions and booms of the macro economy.

In recent research, I try to understand the nature of the uncertainty that major labor market events generate for workers. There are three main dimensions of this research, which studies how individuals' income uncertainty and risk varies over the business cycle and over the life cycle, and how it has changed over the last four decades. The answers to these questions are of immediate relevance for both deepening our knowledge of labor market dynamics and for informing social insurance debates, such as those surrounding Social Security reform, unemployment insurance policy, the degree of job protection, and the progressivity of the tax system. Each of these policies seeks to moderate various types of individual risk.

In this summary, I discuss in detail my colleagues' and my findings on the variation of income risk over the business cycle. I also briefly describe our findings about life cycle risk and changes in risk over time.

Because of its central role for policy questions, the nature of individual income uncertainty has received significant attention from academics since the 1970s, when panel datasets on individual incomes started to become available. However, those datasets — as well as the majority of newer ones — were overwhelmingly based on surveys and therefore suffered from the usual problems of small sample sizes, sample attribution, and survey response error. The data problems forced researchers to focus on simple, parameterized statistical

models to examine these questions. Perhaps not surprisingly, the combination of data issues and restrictive methods and assumptions often yielded a wide range of answers to these questions, resulting in wide disagreements. My earlier research on these topics also relied on these survey-based datasets and methods; I became increasingly uncomfortable about their use and this motivated the current work.

My research on income uncertainty builds on two main elements. First, it makes extensive use of large administrative panel datasets on individuals from various countries, some of which have become more widely available in the last decade. Second, because these datasets do not suffer from the shortcomings of survey data such as small sample, attrition, and measurement error, my research relaxes many of the econometric assumptions made in prior literature. For example, my collaborators and I relax the strong focus in earlier work on just the variance — the second moment — as a measure of risk and uncertainty. We find that most of the interesting and substantively important variation happens in “higher-order moments,” in particular in the third- and fourth-order moments. The risk from these components, “higher-order risk,” matters a great deal for a range of substantive economic questions.

The Datasets

One dataset my coauthors and I have used in this research comes from the Master Earnings File (MEF) of the U.S. Social Security Administration (SSA). The MEF currently covers the entire U.S. population with a Social Security number from 1978 to 2013. It contains data on each individual's labor earnings (wage/salary income from W-2 forms and self-employment income from Schedule SE), as well as

some key demographic variables and employer identifiers. The substantial sample size, 600 million individual-year observations in a 10 percent subsample, allows us to employ fully nonparametric methods and take what amounts to high-resolution pictures of individual earnings histories. The relaxation of parametric assumptions is a key part of this research agenda.

In addition, we use data from Swedish, German, and French administrative records (Linda, IAB, and DADS, respectively) and complement them with various survey-based datasets (PSID for the U.S. and GSOEP for Germany) as well as firm-level datasets (Compustat Global, OSIRIS, and ORBIS).

Income Risk over the Business Cycle

Conventional wisdom among economists was that income shocks become much larger in recessions, and that this property was captured by a rise in the variance of such shocks. The most widely-cited papers on this question used survey-based data from the Panel Study of Income Dynamics (PSID), applied parsimonious parametric specifications for income dynamics, and concluded that the variance of persistent income shocks roughly tripled in recessions relative to expansions.¹

While the hypothesis of countercyclical variance of income shocks is consistent with the plausible idea that many individuals experience large negative shocks in recessions, it also implies, less plausibly, that with a larger variance many more individuals experience larger *positive* shocks in recessions than in expansions. In fact, typical estimates in the literature imply that about 40 percent of individuals receive larger positive shocks in recessions than they do in expansions.

The Cyclicity of Income Risk

Standard deviation and skewness of one-year individual income change



Figure 1

Serdar Ozkan, Jae Song, and I used Social Security Administration data on tens of millions of U.S. workers and documented two sets of results on the cyclicity of income risk.² First, the variance of income shocks is not countercyclical at all — in fact, it is *virtually flat* over the business cycle. This can be seen clearly in the left panel of Figure 1, which plots the cross-sectional standard deviation of one-year income changes from 1978 onward, a period that includes four recessions and three expansions.³ We also examined whether this overall lack of cyclicity might be hiding some countercyclical variance of shocks for certain groups defined by age, average past income, and others. We found no evidence to that effect, with an almost flat variance emerging within every group we examined.

So, do we conclude that the nature of income risk does not change over the business cycle? No. In fact, it changes quite significantly, but we have to move beyond the variance — to the third moment, skewness — to see these big changes. Skewness is a measure of asymmetry of a distribution. A negative skewness means that relative to the median outcome, the likelihood of large negative outcomes is higher than that of large positive outcomes, and vice versa for positive skewness. The right panel of Figure

2 plots the *skewness* of income shocks, which is strongly procyclical. During recessions, the upper end of the income change distribution collapses — large upward income changes such as raises, promotions, big career moves, and so on become less likely, and the bottom end expands as large drops in income from job losses and reductions in hours become more likely. Thus, while the dispersion of shocks does not increase, shocks become more left-skewed, and hence risky, during recessions.

A second question, one that has received little attention in earlier academic work, is whether the fortunes of a worker during a recession can be predicted in part by observable characteristics measured prior to the recession. If so, this would imply that business cycle risk has a predictable component — a “factor structure” whereby aggregate shocks can translate differently to workers with different characteristics — which is quite different than purely idiosyncratic shocks that receive almost all the attention in studies of individual income risk.

We found that one variable in particular — the average earnings of a worker over the five-year period that precedes a recession — strongly predicts how much the worker will suffer during that recession. In particular, lower pre-recession

earnings predict larger subsequent losses. For example, workers who were at the 10th percentile before the Great Recession suffered an average earning loss from 2007 to 2009 that was 18 percentage points larger than those who were at the 90th percentile. The 1980–83 double dip recession displayed just as strong a factor structure, with similarly large differences in the effects of the recession for workers who entered the recession at different points of the income distribution. The other two, smaller, recessions exhibited smaller gaps but the same factor structure. These patterns are seen clearly in the left panel of Figure 2, which plots the upward-sloping factor structure for all four recessions between the 10th and 90th percentiles of the five-year average income distribution.

Figure 2 also shows an interesting reversal within the top 5 percent and even more strongly inside the top 1 percent of the pre-recession income distribution. Workers who entered the Great Recession in the top 1 percent lost *on average* 30 percent of their 2007 income by 2009. Similarly, those in the top 0.1 percent lost 50 percent of their income between 2006 and 2011 (a much longer horizon). As surprising as this may sound, the Great Recession was not the most severe recession for very top earners: Earnings

losses for the top 1 percent and 0.1 percent were more severe during the 2000–01 recession and just as bad during the 1989–94 period. These changes are not likely to be the result of wage declines; our labor earnings measure includes bonuses, restricted stock units at time of vesting, and exercised stock options.

Is this upward-sloping factor structure specific to recessions or does it also emerge in expansions? The answer is a partial “no.” Expansions display a more complex pattern. This can be seen in the right panel of Figure 2, which plots the analogous graphs for the three expansions. In particular, workers who entered each expansion above the 70th percentile of the income distribution experienced an upward-sloping factor structure, which further stretched the income distribution at the top end. The opposite happens at the lower end, where those with lower pre-expansion income see larger increases in their income during the subsequent expansion and catch up to the rest of the workers. This catching up was very strong during the 1992–2000 expansion and weaker during the other two expansions, which is only partly due to the longer duration of the 1990s recession.

An important corollary to these findings on the factor structure is that a

large part of the well-documented rise in income inequality during recessions and its partial reversal during expansions is due to this predictable factor structure and not from larger shocks.

Social Insurance Policy

The analysis in the preceding paper raises three questions. First, are the business cycle patterns in income risk specific to the United States, or do they hold more broadly in other developed economies? Second, since these findings were documented for male earnings; do the results extend to household earnings, which might benefit from within-household insurance? And three, how are these patterns affected by government social insurance policies, in the form of unemployment benefits, welfare, and the tax policy?

To provide a broad perspective on these questions, my paper with Christopher Busch, David Domeij, and Rocio Madera studies panel data from Germany and Sweden, covering roughly the same time period as the project described above.⁴ We supplement these with U.S. data from the PSID. These datasets provide information not only on household income but also on income taxes and a broad range of government benefits.

The cyclical behavior of both individual and household income is remarkably similar across these countries in terms of flat variance and procyclical skewness, which is somewhat surprising given that the countries differ in many details of their labor markets. Furthermore, skewness is procyclical within almost every subgroup — education level, gender, type of employment, occupation, and so on — that we examined. Therefore, the fundamental forces driving skewness over the cycle seem to be a robust feature of developed economies.

Second, moving from

individual earnings to household earnings makes only a small difference to the cyclical risk, suggesting little within-household insurance against the business cycle component of individual income risk.

Third, government-provided insurance plays a more important role than within-household insurance in reducing downside risk in all three countries. The effect of government programs is weakest in the United States, and is much stronger (and comparable to each other) in Germany and Sweden.

How about Cyclical Risk of Employers?

About 93 percent of the individuals in our sample earn the majority of their labor income from wages and salaries, that is by working for a firm as opposed to by being self-employed. So it is natural to wonder if the cyclical behavior of the wage income of employees we found so far is also manifest in the distribution of employers’ performance. An active literature has studied the cyclical behavior of firm outcomes, such as sales and profit growth rates and shocks to firm-level total factor production. These studies used panel datasets and typically made parametric assumptions similar to those made in the income dynamics literature discussed above. They found that key variables, such as firm-level sales or profit growth, had countercyclical variances.⁵

Sergio Salgado, Nicholas Bloom, and I revisit this conclusion and also examine the cyclical behavior of skewness, again using nonparametric methods and expanding the analysis to firm-level data from 40 or so countries, including almost all developed economies.⁶ In particular, we use Compustat from 1962 to 2013 for U.S. publicly listed firms, and to study firms in other countries, we use Compustat Global, OSIRIS, and ORBIS, which contain very rich data on sales, employment, and profits, on a very large number of firms.⁷

A robust finding across the vast majority of countries and different firm-level variables is that the skewness of

growth rates is strongly procyclical — as was the case with individual income. In fact, this pattern of a lower tail of growth rates greatly expanding during recessions is also the main driver behind the countercyclical variance, which holds in some countries during some time periods, but is not as pervasive or robust as the procyclical skewness.

To summarize, the results of these three papers draw attention to fluctuations in skewness over the business cycle as a robust feature — much more so than fluctuations in variance, especially for earnings risk.

How Does Individual Income Risk Vary over the Life Cycle and across the Population?

There is surprisingly little consensus on how the nature of income risk changes over the life cycle and across income groups. This lack of consensus is again mostly due to data limitations and the required parametric assumptions discussed above.

Fatih Karahan, Ozkan, Song, and I study these issues using the SSA panel data.⁸ A main finding is that income shocks are far from following a normal distribution, and the extent of deviation from the normal bell-curve benchmark varies significantly with age and income level. In particular, income shocks become much more negatively skewed as workers age, up to about ages 45 to 50, and as their incomes increase, up to about \$100,000 per year.

Further, and more importantly, income shocks are much more concentrated for those with very low incomes and in the tails of the distribution — a feature called excess kurtosis. In other words, most individuals have small income changes in most years but experience very large up or down income moves — that also tend to be quite persistent — relative to a normal distribution, which predicts lots of middling shocks and few very large or very small shocks. The extent of this excess kurtosis also increases substantially with age and with income levels, again up to roughly the same age and income

threshold as for skewness.

Recent follow up work on these findings has important implications for a range of economic questions. For example, George M. Constantinides and Anisha Ghosh show that an incomplete markets asset-pricing model with countercyclical (negative) skewness shocks generates plausible asset-pricing implications.⁹ Lawrence Schmidt goes one step further and considers both negative skewness and thick tails (targeting the moments documented in my work with Ozkan and Song) and finds that the resulting model provides a plausible set of prediction for asset prices.¹⁰ With regard to fiscal policy, a recent paper by Mikhail Golosov, Maxim Troschkin, and Aleh Tsyvinski shows that using an income process with negative skewness and excess kurtosis implies a marginal tax rate on labor earnings for top earners that is substantially higher than under a traditional calibration with normally-distributed shocks with the same variance.¹¹ Finally, Greg Kaplan, Benjamin Moll, and Giovanni L. Violante show that introducing earnings shocks with excess kurtosis into a New Keynesian model with household heterogeneity has important implications for the monetary transmission mechanism.¹²

To sum up, studying the higher-order moments of individual income dynamics seems to be a key step for better understanding the nature of the idiosyncratic risk facing workers. Precise estimation of these higher-order moments and documentation of how they vary over the business cycle and life cycle, as well as across the population, require large and clean panel datasets, which are rapidly becoming more available. This move towards big data holds great promise for the future of empirical work in this area, and will hopefully allow researchers to correct old misconceptions, reveal new and interesting findings, and push economic research forward.

¹ K. Storesletten, C.I. Telmer, and A. Yaron, “Cyclical Dynamics in Idiosyncratic Labor Market Risk,” *Journal of Political Economy*, 112(3), pp. 695–717.

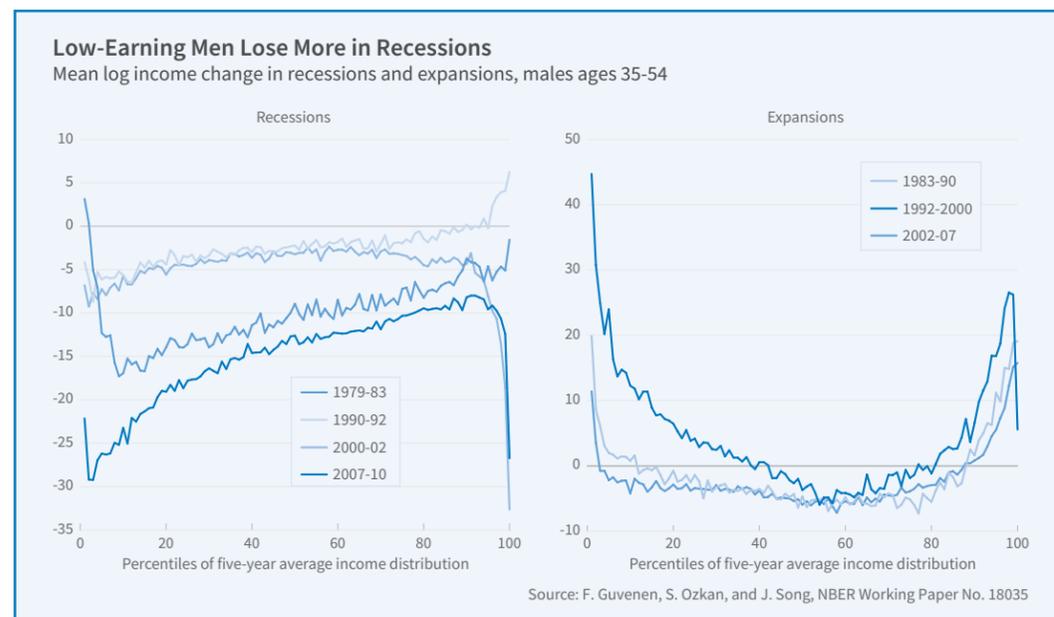


Figure 2

² F. Guvenen, S. Ozkan, and J. Song, “The Nature of Countercyclical Income Risk,” NBER Working Paper No. 18035, May 2012, and *Journal of Political Economy*, 2014, 122(3), pp. 621–60.

³ These income changes we plot are closely linked, but are not the same as the innovations or shocks to income. In the paper, we have also linked these income changes to underlying persistent shocks to show that the same procyclical skewness emerges in the shocks as well.

⁴ C. Busch, D. Domeij, F. Guvenen, and R. Madera, “Asymmetric Business Cycle Risk and Government Insurance,” Working Paper, University of Minnesota, 2016.

⁵ N. Bloom, “The Impact of Uncertainty Shocks,” NBER Working Paper No. 13385, September 2007, and *Econometrica*, 77(3), 2009, 623–85.

⁶ S. Salgado, F. Guvenen, and N. Bloom, “Skewed Business Cycles,” Working Paper, University of Minnesota 2015.

⁷ For many developed countries the data is quite comprehensive, going back to the 1980s, and including both public and private firms. For others, the time horizon is shorter and only public firms are included.

⁸ F. Guvenen, F. Karahan, S. Ozkan, and J. Song, “What Do Data on Millions of U.S. Workers Say About Labor Income Risk?” NBER Working

Paper No. 20913, January 2015.

⁹ G. Constantinides and A. Ghosh, “Asset Pricing with Countercyclical Household Consumption Risk,” NBER Working Paper No. 20110, and forthcoming in the *Journal of Finance*.

¹⁰ L. Schmidt, “Climbing and Falling Off the Ladder: Asset Pricing Implications of Labor Market Event Risk,” Working Paper, University of Chicago, 2016.

¹¹ M. Golosov, M. Troshkin, and A. Tsyvinski, “Redistribution and Social Insurance,” *American Economic Review*, 106(2), 2016, pp. 359–86.

¹² G. Kaplan, B. Moll, G.L. Violante, “Monetary Policy According to HANK,” NBER Working Paper No. 21897, January 2016.

What Can Housing Markets Teach Us about Economics?

Johannes Stroebel

Housing is a unique asset. Both an investment and a consumption good, it is traded in markets that are subject to significant search frictions and information asymmetries. In addition, housing accounts for a large share of wealth in the economy. As a result, changes in house prices can have large effects on aggregate economic activity. In combination with the availability of excellent microdata on housing transactions, this makes housing an ideal asset for the study of a range of questions of broader economic interest. In this piece, I summarize a number of findings that have emerged from my empirical research on housing markets.

Housing and Long-Run Discount Rates

Long-run discount rates play a central role in economics and public policy. For example, decisions about how much to invest in climate change abatement depend crucially on the trade-off between the immediate costs and the very long-term benefits of efforts to reduce global warming. Yet, despite their importance, there are few, if any, reliable estimates of the discount rates households attach to payoffs that accrue over horizons exceeding 30 years. This is, in large parts, due to the absence of finite, long-maturity assets necessary to estimate these discount rates.

In a set of papers with Stefano Giglio and Matteo Maggiori, I take advantage of a unique

feature of housing markets in the U.K. and Singapore to provide direct estimates of long-run discount rates for housing cash flows that materialize hundreds of years in the future.¹ In both countries, property ownership takes the form of either a leasehold or a freehold. Leaseholds are temporary, pre-paid, and tradable ownership contracts with initial maturities ranging from 99 to 999 years, while freeholds are perpetual ownership contracts. This contract structure allows us to infer households’ maturity-specific valuation of cash flows over horizons spanning hundreds of years. In particular, the price difference between leaseholds and freeholds for otherwise identical properties captures the present value of perpetual rental income starting at leasehold expiry, and is thus informative about households’ discount rates over extremely long and previously unexplored horizons.

We estimate the price difference between leaseholds and freeholds of different maturities with hedonic regressions, using data on the universe of housing transactions and associated property characteristics since 1994. Our findings show that, in both the U.K. and Singapore, 100-year leaseholds are valued at 10 to 15 percent less than otherwise identical freeholds; the price difference is smaller for leaseholds with higher maturities, and goes to zero for leaseholds with remaining maturities of 700 years or more. Figure 1 shows the term-structure of leasehold discounts for the United Kingdom.

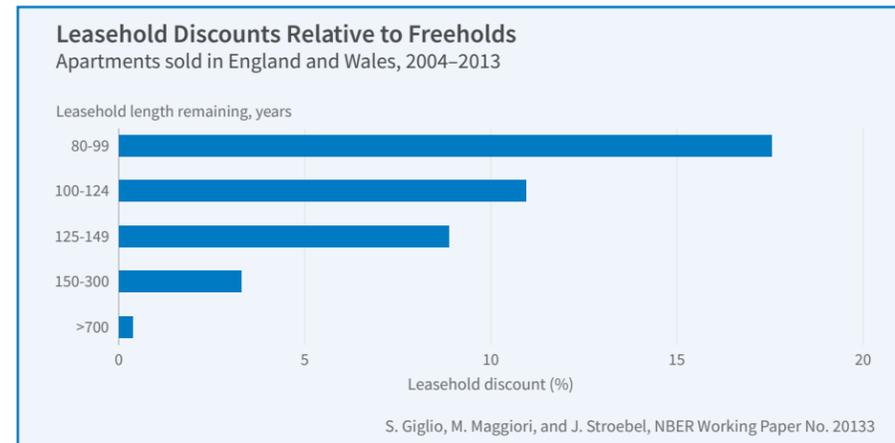
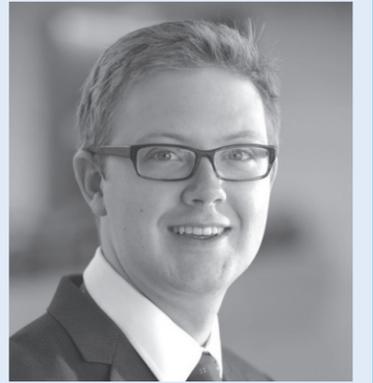


Figure 1



Johannes Stroebel is a faculty research fellow in the NBER’s Asset Pricing, Corporate Finance, and Economic Fluctuations and Growth programs, and an associate professor of finance at New York University’s Stern School of Business. He is also the director of the Household Finance program at NYU’s Salomon Center for the Study of Financial Institutions. Before joining NYU in 2013, he was the Neubauer Family Assistant Professor of Economics at Chicago Booth.

Stroebel conducts research across a number of topics in finance and macroeconomics, with a particular focus on understanding consumer and firm behavior in housing and credit markets. More generally, he enjoys analyzing large micro datasets.

In 2012, Stroebel earned a Ph.D. in economics from Stanford University, where he held the Bradley and Kohlhaugen Fellowships at the Stanford Institute for Economic Policy Research. Before that, he read philosophy, politics and economics at Merton College, Oxford, where he won the Hicks and Webb Medley Prize for the best performance in economics.

A native of Darmstadt, Germany, Stroebel lives in New York City with his wife and one-year-old son, Konrad.

We show that these price discounts of leaseholds are not driven by institutional features of the contracts. We also introduce a large dataset on rental listings to show that, conditional on observable control variables, leaseholds of different maturities and freeholds rent for similar amounts. This suggests that differences in unobservable property characteristics across leaseholds and freeholds do not confound our findings. A natural interpretation of our results is that households attach a relatively high value to housing cash flows arising far in the future. This implies that their corresponding discount rates have to be low — according to our calculations, below 2.6 percent for housing cash flows more than 100 years in the future.

In related work together with Andreas Weber, we explore the implications of these findings for the appropriate discount rates to value investments in climate change abatement.² We begin by providing new empirical evidence on the shape of the entire term structure of housing discount rates. In particular, we find the average return to real estate to be above 6 percent. In combination with the low long-run discount rates estimated above, this implies that the term structure of housing discount rates is steeply downward-sloping: the further out the cash-flow, the lower the annual discount rate attached to it. This suggests that average rates of return to assets, which generally average over discount rates at many different horizons, are likely to be uninformative about the appropriate discount rates for valuing very long-run costs or benefits. In addition, we emphasize that the appropriate discount rate for valuing an investment depends on its riskiness, this is, whether that investment is more likely to pay off in good or in bad states of the world. We also show that house prices are generally positively correlated with the state of the economy, which makes housing a risky asset. Similarly, to the extent that climate change abatement investments are designed to avoid climate disasters, those investments are hedge assets. This implies that the declining term structure of discount rates we find for housing

should be considered an upper bound on appropriate discount rates at each horizon for valuing the benefits of climate change abatement. Quantitatively, this suggests that the true present value of investments to reduce global warming is vastly greater than the one obtained by discounting their benefits at the average rate of return to the capital stock in the economy.

House Prices and Asset Bubbles

The recent boom-bust cycle in global house prices is regularly described as the result of a house price bubble. As a result, there has been a lively policy debate about whether and how institutions such as the Fed should intervene in markets in order to prevent the emergence of such asset bubbles. Yet, theoretical models used by policymakers and researchers differ substantially over what is considered a bubble. The workhorse model of bubbles in macroeconomics is based on a failure of the “transversality condition,” a condition that requires the present value of a payment occurring infinitely far in the future to be zero. Such a bubble is often called a classic rational bubble. Other, more-behavioral models of bubbles do not require this condition. These differences are not of merely theoretical interest; the positive and normative implications of models with bubbles depend crucially on precise definition of the type of bubble under consideration. Despite this, challenges to designing appropriate tests for bubbles have prevented an empirically driven narrowing of the set of bubbles under consideration.

In work with Giglio and Maggiori, I study the leasehold-freehold contract setting described above to provide a direct and model-free test of the presence of classic rational bubbles in the housing market.³ In the absence of rational bubbles, 700-year leaseholds and freeholds should have the same fundamental value, because cash flows arising more than 700 years from now have essentially zero present value, even at very low discount rates. Importantly, a rational bubble can only arise on infinite-maturity assets, and can therefore only affect the price

of freeholds, but not the price of leaseholds. Consequently, any price difference between freeholds and leaseholds would reveal the presence and magnitude of a rational bubble in the housing market.

In both Singapore and the U.K., we find no statistically or economically significant difference between the prices of leaseholds with more than 700 years of remaining tenure and the prices of freeholds. This is not only true on average, but also at each point in time over the last 20 years. A variety of cross-sectional tests reveals that 700-plus year leaseholds and freeholds trade at the same price even in geographic regions that have experienced strong growth in house prices and price to income ratios. Put differently, we find no evidence of a rational bubble in these housing markets, not even during periods of significant house price growth and despite the fact that most existing time-series tests for rational bubbles suggest the presence of such a bubble in these markets.

Taken together, our findings highlight that any study of the positive and normative implications of classic rational bubbles would benefit from showing the robustness of its conclusions to considering other, more empirically plausible models of bubbles. Indeed, I believe that designing and then testing such alternative models of asset price bubbles is an exciting research agenda.

Social Networks and Housing Markets

Understanding how house prices are determined is also a motivating question in some of my other work. In particular, in joint work with Michael Bailey, Rachel Cao, and Theresa Kuchler, I analyze the effects of social interactions on individuals’ housing market expectations and investments.⁴

Our data combine anonymized social network information from Facebook with housing transaction data and a survey. Variation in the geographic spread of social networks combined with time-varying regional house price changes induces heterogeneity in the house price experi-

ences of different individuals’ friends that is not systematically related to other factors that might also affect those individuals’ housing market investments. We find that individuals whose geographically distant friends experienced larger recent house price increases are more likely to transition from renting to owning. They also buy larger houses, and pay more for a given house. Similarly, when homeowners’ friends experience less positive house price changes, these homeowners are more likely to become renters, and more likely to sell their property at a lower price. These relationships appear to be driven by the effect of social interactions on individuals’ housing market expectations. Indeed, survey data show that individuals whose geographically distant friends experienced larger recent house price increases consider local property a more attractive investment, with larger effects for individuals who regularly discuss such investments with their friends.

Our findings suggest that differences in social networks can be a key driver of disagreement about the value of housing assets. They also show that social interactions can play an important role in propagating house price shocks across different regions: a fundamental demand shock in one part of the United States might make people in other regions more optimistic, and drive up house prices in those regions, purely as a result of increased speculative demand.

Much work remains to be done to better understand the role of social networks in economic and social decision making. Indeed, my research suggests the potential of using newly emerging data from online social networks to help overcome some of the pervasive measurement

challenges in this type of work. In ongoing research with various coauthors, I continue to use data from Facebook to analyze the effect of social interactions on a broad range of outcomes, from mortgage refinancing, to the adoption of new products, to patent citations and migration.

House Prices and Consumer Demand

In the United States, housing is the largest asset of most households. Consequently, variation in house prices

We use a large dataset of retail store scanner data to construct local retail price indices at the zip code and Metropolitan Statistical Area (MSA) levels. We then show that local retail prices respond to local house price movements. For example, Figure 2 shows larger increases in the retail price level between 2001 and 2011 in MSAs that were in the top versus the bottom quintile of house price growth over the period. Our regression analysis uncovers elasticities of retail prices to house prices of about 15 to 20 percent across housing booms and busts.

We argue for a causal response by exploiting the local housing supply elasticity to instrument for house price changes, and by showing that the response differs by the local homeownership rate: In areas with many homeowners, higher house prices lead to higher retail prices, while in areas with mainly renters we find, if anything, a negative response. We provide evidence that these retail price responses are driven by changes in markups rather than by changes

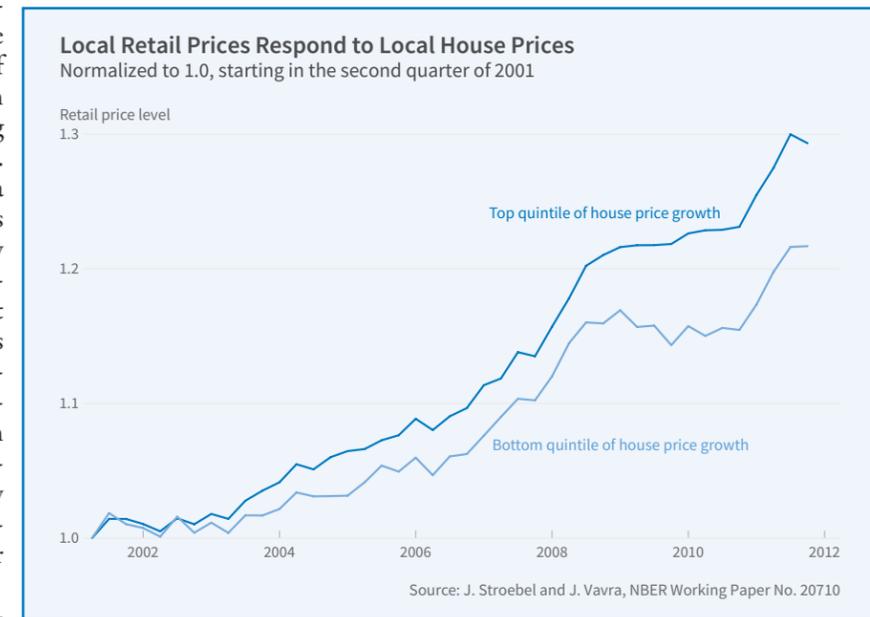


Figure 2

can create large shocks to households’ wealth, and, through home equity extraction, to households’ liquidity position.

An emerging literature has started to explore the effects of changes in house prices on household consumption behavior and real economic activity. In joint work with Joseph Vavra, I contribute to this research effort, and study cross-regional variation in house price movements to better understand how local retail prices and markups respond to local demand shocks.⁵ This response of markups to demand shocks provides a key amplification mechanism in many New Keynesian macro models, but evidence on the cyclicity of markups from aggregate time-series data has proved inconclusive.

in local costs. We then argue that markups rise with house prices, particularly in high homeownership locations, because greater housing wealth reduces homeowners’ demand elasticity, and firms raise markups in response. Data from Nielsen Homescan provides further evidence for this explanation. In particular, we find that house price increases cause homeowners to spend more, and to buy fewer goods on sale or with a coupon; we find the opposite effect for renters.

Taken together, our empirical results provide evidence of a novel and important link between changes in household wealth, shopping behavior, and firms’ price-setting. Positive shocks to wealth cause households to become less price-

sensitive and firms respond by raising markups and prices. We hope that follow-on research to include this mechanism in business cycle models will allow researchers to better match inflation patterns in the data.

Information and Search Frictions in Housing Markets

Asymmetric information is a pervasive feature of many asset and credit markets. However, testing the empirical implications of models with asymmetric information is often challenging because of the difficulties in observing the identities of different trading parties, as well as their relative information sets. In the U.S., details about housing transactions, including the identity of buyers, sellers, and lenders, is public information. I exploit the availability of these data in a number of research papers to better understand the role of asymmetric information in housing and mortgage markets.

In the first project, I empirically analyze credit market outcomes when competing mortgage lenders are differentially informed about the expected return on a loan.⁶ I study the residential mortgage market where property developers often cooperate with vertically-integrated mortgage lenders to offer financing to buyers of new homes. These integrated lenders might have more information about both the value of the mortgage collateral and borrower characteristics. By conditioning their interest rate offers on such superior information, integrated lenders can subject less-informed competitors to adverse selection.

To analyze the magnitude and implications of such asymmetric information, I construct a dataset of all housing transactions and associated mortgages in Arizona between 2000 and 2010. I find that houses financed by an integrated lender outperform *ex-ante* similar houses financed by non-integrated competitors by 40 basis points annually. They are also 40 percent less likely to enter into foreclosure. These differences are best explained by the integrated lender's superior information about collateral quality, not bor-

rower characteristics. For example, I show that those houses initially financed by an integrated lender continue to outperform during the ownership period of the second owner of the house, the identity of whom was unknown to all lenders at the time the original mortgage was made. This is most likely explained by differences in collateral quality, which remains constant across ownership spells. I also show that the better performance of the integrated lenders' collateral is particularly large for houses built on expansive soil, for which subsequent house prices are more sensitive to the initial construction quality. Non-integrated lenders respond to the adverse selection by charging higher interest rates for similar mortgages when they compete against a better-informed integrated lender. This raises the average financing cost of borrowers by about 10 basis points annually.

From a policy perspective, the identification of collateral values as a key source of asymmetric information in mortgage lending helps to develop and assess policy proposals to improve the functioning of this market. In particular, a stronger focus on providing independent and reliable property assessments to all market participants might play an important role in mitigating the impact of asymmetric information.

In a related project, Pablo Kurlat and I study equilibrium outcomes in housing markets with asymmetric information among both buyers and sellers.⁷ We document that hard-to-observe neighborhood characteristics are a key source of information heterogeneity in housing markets: Sellers are usually better informed about neighborhood values than buyers, but there are some sellers and some buyers who are better informed than their peers. To empirically test the effects of such information asymmetry, we combine data on all housing transactions in Los Angeles County since 1994, including the identities of home buyers and sellers, with information on all real estate licenses issued in Los Angeles County. We propose that real estate agents are better informed than other households about matters such as neighborhood-level demographic trends.

Consistent with theoretical predictions, we find that changes in the seller composition toward more informed sellers and sellers with a greater elasticity of sale predict subsequent house-price declines and demographic changes in a neighborhood. This effect is larger for houses whose value depends more on neighborhood characteristics, and smaller for houses bought by more informed buyers. Our findings suggest that homeowners have superior information about important neighborhood characteristics, and exploit this information to time local market movements.

A second major friction in housing markets derives from the heterogeneous nature of different houses, which means that prospective buyers do not know *ex ante* which houses will maximize their utility. As a result, buyers and sellers must search for high-quality matches. This search friction can have quantitatively important effects on equilibrium housing market outcomes.

Monika Piazzesi, Martin Schneider, and I empirically examine the consumer search process in the housing market, and its effect on house prices, inventories, and time on market.⁸ In particular, rather than considering one integrated housing market, where all home buyers potentially look at all vacant houses, we analyze housing search, trading and valuation in interconnected housing market segments with heterogeneous buyers.

We use a novel dataset on online housing search from the online real estate website Trulia to measure buyer search ranges for the San Francisco Bay Area. We use these data to split the Bay Area into 576 unique market segments along the dimensions suggested by the search queries, and represent each search query as the subset of the segments that a particular searcher is interested in. We identify over 10,000 unique search patterns within our data. We then analyze the cross-section of turnover, inventory, and search activity across our segments, and relate these measures of market activity to the observed housing search behavior. We find, for example, that search activity and inventory co-vary positively within cities and zip codes, but negatively across those units.

We propose a new search model with many segments and heterogeneous searchers to capture the importance of the interaction of broad and narrow searchers within and across segments. This model, while high-dimensional, can be estimated given our data; it shows how market activity at different levels of aggregation depends on the interaction of heterogeneous clienteles. For example, this model can explain the difference in slopes of Beveridge curves computed within cities over time, and across cities at a point in time. Within a city over time, there are "broad searchers" who are willing to buy in a given area should new inventory come on the market. This causes those segments within that city that have more inventory to attract more search activity. Across cities, however, there is variation in which cities are attractive on various dimensions. Those cities that are less attractive see less search activity and generally also have more inventory sitting on the market. The model is also informative about the transmission of shocks across

segments, which depends on the presence of households that search across two segments and therefore connect them. It also shows how search frictions induce significant liquidity discounts in house prices that vary widely across market segments.

Overall, these papers highlight the ability of housing market data to shed light on the effect that various market frictions, such as search frictions or asymmetric information, have on equilibrium market outcomes.

¹ S. Giglio, M. Maggiori, and J. Stroebe, "Very Long-Run Discount Rates," NBER Working Paper No. 20133, May 2014, and Quarterly Journal of Economics, 130(1), 2015, pp. 1–53.

² S. Giglio, M. Maggiori, J. Stroebe, and A. Weber, "Climate Change and Long-Run Discount Rates: Evidence from Real Estate," NBER Working Paper No. 21767, November 2015.

³ S. Giglio, M. Maggiori, and J. Stroebe, "No-Bubble Condition:

Model-free Tests in Housing Markets, NBER Working Paper No. 20154, May 2014, and Econometrica, 84(3), 2016, pp. 1–53.

⁴ M. Bailey, R. Cao, T. Kuchler, and J. Stroebe, "Social Networks and Housing Markets," NBER Working Paper No. 22258, May 2016.

⁵ J. Stroebe and J. Vavra, "House Prices, Local Demand, and Retail Prices," NBER Working Paper No. 20710, November 2014.

⁶ J. Stroebe, "Asymmetric Information about Collateral Values," Journal of Finance, 71(2), 2016, pp. 1071–111.

⁷ P. Kurlat and J. Stroebe, "Testing for Information Asymmetries in Real Estate Markets," NBER Working Paper No. 19875, January 2014, and Review of Financial Studies, 28(8), 2015, pp. 2429–61.

⁸ M. Piazzesi, M. Schneider, and J. Stroebe, "Segmented Housing Search," NBER Working Paper No. 20823, January 2015.



Brian A. Jacob is the Walter H. Annenberg Professor of Education Policy and professor of economics in the University of Michigan's Gerald R. Ford School of Public Policy. His primary fields of interest are labor economics, program evaluation, and the economics of education.

Jacob's research on education covers a wide variety of topics, from school choice to teacher labor markets to standards and accountability. His work has appeared in leading economics journals, including the *American Economic Review*, the *Quarterly Journal of Economics*, and the *Review of Economics and Statistics*. Earlier in his career, he served as a policy analyst in the Office of the Mayor of New York City and taught middle school in East Harlem.

Jacob is a research associate in the NBER's Program on Children and Program on Education, and a member of the editorial boards of the *American Economic Journal: Applied Economics*, *Education Finance and Policy*, and the *Review of Economics and Statistics*. He received his B.A. from Harvard College and his Ph.D. from the University of Chicago. In 2008 he was awarded the Association for Public Policy Analysis & Management's David N. Kershaw Prize for distinguished contributions to public policy and management by an individual under the age of 40.

Teachers, Schools, and Student Performance

Brian A. Jacob

Economists have long realized the importance of education for the well-being of individuals and the productivity of society. Over the past few decades, the economic returns to education have risen dramatically, increasing the importance of this issue. Yet researchers have made only limited progress in understanding how various policies can influence educational outcomes. My research in education economics has focused on three areas: standards and accountability, teacher policies, and measurement of individual ability.

Standards and Accountability

One approach to school reform involves holding schools accountable for student performance. In 2002, President Bush signed the No Child Left Behind Act (NCLB), which dramatically expanded federal influence over the nation's public schools. NCLB is arguably the most far-reaching education policy initiative

in the past four decades. The legislation compelled states to conduct annual student assessments, calculate and report the fraction of students deemed at least proficient in key subjects, and institute an increasingly severe set of sanctions for schools that did not show sufficient progress toward having all students proficient.

In a series of papers, Thomas Dee and I study how NCLB affects school practices and student outcomes. We identify the impact of NCLB by comparing changes across states that already had school accountability policies in place prior to NCLB and those that did not. To examine student achievement, we utilize a state-year panel of student achievement scores from the National Assessment of Educational Progress (NAEP), a common metric that was low-stakes for schools.¹ Our results indicate that NCLB generated substantial increases in the average math performance of elementary students [Figure 1]. Moreover, we find evidence of

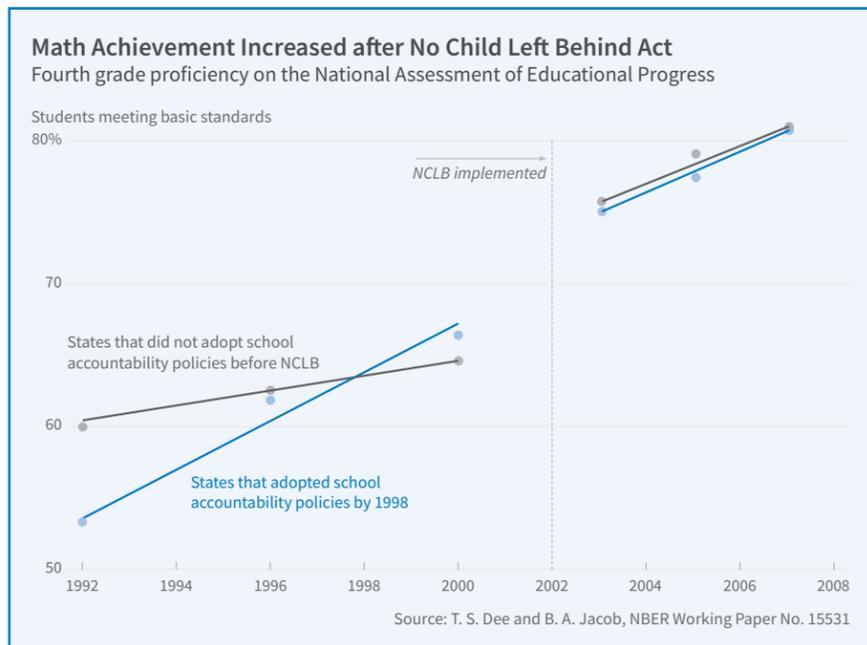


Figure 1

improvement at both the top and bottom of the performance distribution, suggesting that the benefits were not limited to students near the proficiency threshold. There is also evidence of improvements in eighth-grade math achievement, particularly among traditionally low-achieving groups and at the lower percentiles. In contrast, we find no evidence of any effects on reading performance.

We also use a similar design to examine the impact of NCLB on education policies and practices.² Our results indicate that NCLB increased per-pupil spending by nearly \$600, which was funded primarily through increased state and local revenue. We find that NCLB increased teacher compensation and the share of elementary school teachers with advanced degrees but had no effect on class size. We also find that NCLB did not influence overall instructional time in core academic subjects, but did lead schools to reallocate time away from science and social studies and toward the tested subject of reading.

As states have implemented school accountability systems, they have also raised standards. Since the 1970s, states have slowly increased high school graduation requirements. Recently, some have begun requiring students to pass rigorous college preparatory classes. Michigan was among the first states to do so when it began requiring students in the high school class of 2011 to pass geometry, algebra 2, biology, and chemistry/physics.

My colleagues and I use several non-experimental strategies to study the impact of this policy.³ Our analyses suggest that the higher expectations embodied in the Michigan Merit Curriculum have had little impact on student outcomes. Looking at student performance on the ACT, the only clear evidence of a change in academic performance is in science. While our estimates for high school completion are sensitive to the sample and methodology, the weight of the evi-

dence suggests that the policy had a small negative impact on high school graduation for students who entered high school with the weakest academic preparation.

The Teacher Labor Market

A second area of my research focuses on teachers. A growing body of evidence finds that there is substantial variance in teacher effectiveness, but that very little of it can be explained by easily observable teacher characteristics such as certification or advanced degrees.⁴

This naturally raises the question of whether school principals or district officials can distinguish between more and less effective teachers. Lars Lefgren and I surveyed elementary school prin-

cipals (CPS) and Chicago Teachers Union (CTU) signed a new collective bargaining agreement in 2004 that gave principals the flexibility to dismiss probationary teachers for any reason and without the documentation and hearing process that is typically required for such dismissals. With the cooperation of the school system, I matched information on all teachers who were eligible for dismissal with records indicating which teachers were dismissed. With these data, I estimated the relative weight that school administrators place on a variety of teacher characteristics. I found evidence that principals do consider teacher absences and value-added measures, along with several demographic characteristics, in determining which teachers to dismiss [Figure 2].

Given the large variance in teacher effectiveness and the high financial and political costs of dismissing ineffective teachers, many observers have noted that teacher selection may be a cost-effective means of improving educational quality. However, to date there has been little research that links information gathered during the hiring process to subsequent teacher performance.

In a recent project, several colleagues and I partnered with the District of Columbia Public Schools (DCPS) to study teacher hiring.⁷ We examined detailed teacher candidate data collected during a multi-stage application process, including written assessments, a personal interview, and sample lessons. We identified a number of background characteristics, such as undergraduate GPA, as well as screening measures, such as applicant performance on a mock teaching lesson, that strongly predicted teacher effectiveness. Interestingly, we found that these measures are only weakly associated with the likelihood of being hired, suggesting considerable scope for improving teacher quality through the hiring process.

In response to this finding, DCPS changed the way it presented informa-

Differences in Probability of Teacher Dismissal by Performance Ranking

	Difference in probability of dismissal
"Satisfactory" relative to "superior"	+22.1 percentage points
"Excellent" relative to "superior"	+4.3 percentage points

Rankings: superior > excellent > satisfactory
Baseline average dismissal rate: 11 percent
Source: B. A. Jacob, NBER Working Paper No. 15715

Figure 2

cipals and asked them to evaluate all of their teachers along a variety of dimensions.⁵ We then calculated value-added measures of teacher effectiveness, using standardized test scores as the outcome. When we compare these subjective and objective measures of teacher performance, we find that principals' assessments of teachers predict future student achievement significantly better than the traditional measures used for teacher compensation, such as educational credentials or prior experience. We find that principals are quite good at identifying those teachers who produce the largest and smallest test score gains in their schools, but have far less ability to distinguish among teachers in the middle.

In subsequent work, I take advantage of a policy change in Chicago to examine a similar question.⁶ The Chicago Public

tion on applicant quality to principals. Specifically, the district assigned each applicant a letter “grade” that corresponded to our measures of predicted effectiveness. We are currently in the process of studying how this change affected teacher hiring and student performance.

Measurement of Student Ability

Most recently I have written about how individual ability is measured in modern assessment systems. Economists use test scores to measure human capital in explaining wages and other employment outcomes and, increasingly, as outcome measures in evaluations of programs or policies aimed at improving human capital formation. Applied researchers typically take cognitive test scores from pre-existing surveys or datasets without exploring how they are constructed. These test scores often reflect non-trivial decisions about how to measure and scale student achievement.

Jesse Rothstein and I discuss several important issues relating to the measurement and scaling of individual ability measures, highlighting the implications for secondary analyses.⁸ We point out that the test score measures reported in many surveys are rarely simple summaries of student performance like the fraction of items answered correctly, but rather are estimates generated by complex statistical models. The resulting scores are generally not unbiased

measures of student ability. For example, scores computed for students who take the NAEP test depend not only on the examinees’ responses to test items, but also on their background characteristics, including race and gender. As a consequence, if a black student and a white student respond identically to questions on the NAEP assessment, the reported ability for the black student will be lower than for the white student — reflecting the lower average performance of black students.

Even when reported scores are unbiased measures of student ability, they often are transformed to scale scores. This undermines many of the purposes for which researchers use test scores, such as measuring the magnitude of a treatment effect or quantifying the difference in ability between two demographic groups. Rothstein and I currently are working on a project to characterize the magnitude of biases that arise in common applications.

¹ T.S. Dee and B.A. Jacob, “The Impact of No Child Left Behind on Student Achievement,” NBER Working Paper No. 15531, 2009, and *Journal of Policy Analysis and Management*, 30(3), 2011, pp. 418–46.

² T.S. Dee, B.A. Jacob, and N.L. Schwartz, “The Effects of NCLB on School Resources and Practices,” *Educational Evaluation and Policy Analysis*, 35(2), 2013, pp. 252–79.

³ B.A. Jacob, S. Dynarski, K. Frank,

and B. Schneider, “Are Expectations Alone Enough? Estimating the Effect of a Mandatory College-Prep Curriculum in Michigan,” NBER Working Paper No. 22013, February 2016.

⁴ R. Chetty, J.N. Friedman, and J.E. Rockoff, “Measuring the Impacts of Teachers I: Evaluating Bias in Teacher Value-Added Estimates,” *American Economic Review*, 104(9), 2014, pp. 2593–632.

⁵ B.A. Jacob and L. Lefgren, “Principals as Agents: Subjective Performance Measurement in Education,” NBER Working Paper No. 11463, July 2005, and *Journal of Labor Economics*, 26(1), 2008, pp. 101–36.

⁶ B.A. Jacob, “Do Principals Fire the Worst Teachers?” NBER Working Paper No. 15715, February 2010, and *Educational Evaluation and Policy Analysis*, 33(4), February 2011, pp. 403–34.

⁷ B.A. Jacob, J. Rockoff, E. Taylor, B. Lindy, and R. Rosen, “Teacher Applicant Hiring and Teacher Performance: Evidence from D.C. Public Schools,” NBER Working Paper No. 22054, March 2016.

⁸ B.A. Jacob and J. Rothstein, “The Measurement of Student Ability in Modern Assessment Systems,” NBER Working Paper No. 22434, July 2016, and *forthcoming in Journal of Economic Perspectives*.

NBER News

Oliver Hart, Bengt Holmström Win Nobel Prize in Economic Sciences for Research on Contract Theory

Oliver Hart of Harvard and Bengt Holmström of MIT, who both have been NBER research associates for more than two decades, were awarded the 2016 Nobel Prize in Economic Sciences for their contributions to analyzing incentives, institutions, and organizations in the field of economics known as “contract theory.”

“Contract theory provides us with a general means of understanding contract design. One of the theory’s goals is to explain why contracts have various forms and designs. Another goal is to help us work out how to draw up better contracts, thereby shaping better institutions in society,” the Royal Swedish Academy of Sciences said in a statement announcing the award. “The contributions of this year’s laureates are invaluable in helping us understand real-life contracts and institutions, as well as the potential pitfalls when designing new contracts.”

The Academy cited a range of contexts in which contract theory provides key insights for understanding economic behavior and the associated institutions. These include the tradeoff between providing insurance against adverse outcomes and maintaining incentives to take care, designing executive pay contracts that depend in part on corporate performance, deciding how to allocate property rights, and choosing between public and private provision of basic services.

Hart is the Andrew E. Furer Professor of Economics at Harvard, and a research asso-

ciate in two NBER programs—Corporate Finance and Law and Economics. He has been an NBER affiliate since 1990.

Holmström is the Paul A. Samuelson Professor of Economics at MIT, and a research associate in the NBER Corporate Finance program, which he joined in 1996. Between 1984 and 1986, he was also a research associate in the Labor Studies Program. Both have been active in the NBER Working Group on Organizational Economics.

Hart and Holmström join a group of twenty-four current or past NBER research affiliates who have received the Nobel Prize: Angus Deaton, 2015; Lars Hansen and Robert Shiller, 2013; Alvin Roth, 2012; Thomas Sargent and Christopher Sims, 2011; Peter Diamond, 2010; Paul Krugman, 2008; Edward C. Prescott and Finn Kydland, 2004; Robert F. Engle, 2003; Joseph E. Stiglitz, 2001; James J. Heckman and Daniel L. McFadden, 2000; Robert C. Merton and Myron S. Scholes, 1997; Robert E. Lucas, Jr., 1995; the late Dale Mortenson, 2010; Robert W. Fogel, 1993; Gary S. Becker, 1992; George J. Stigler, 1982; Theodore W. Schultz, 1979; Milton Friedman, 1976; and Simon Kuznets, 1971. In addition, six current or past members of the NBER Board of Directors have received the Nobel Prize: George Akerlof, 2001; Robert Solow, 1987; the late William Vickrey, 1996; Douglass North, 1993; James Tobin, 1981; and Paul Samuelson, 1970.



Oliver Hart



Bengt Holmström

Conferences

Entrepreneurship and Economic Growth

An NBER Conference, “Entrepreneurship and Economic Growth,” supported by the Ewing Marion Kauffman Foundation, took place in Durham, North Carolina, on October 14–15. Manuel Adelino and Research Associate David T. Robinson, both of Duke University, organized the meeting. These researchers’ papers were presented and discussed:

- **Chuck Eesley** and **Yong Suk Lee**, Stanford University, “The Effects of University Entrepreneurship Initiatives on Entrepreneurship and Innovation”
- **Sabrina T. Howell**, New York University, “Learning in Entrepreneurship”
- **Titan M. Alon**, Northwestern University; **David W. Berger**, Northwestern University and NBER; and **Robert C. Dent** and **Benjamin Pugsley**, Federal Reserve Bank of New York, “Older and Slower: The Startup Deficit’s Lasting Effects on Productivity Growth”
- **Jorge Guzman**, MIT, and **Scott Stern**, MIT and NBER, “The State of American Entrepreneurship: Evidence from 15 States” (NBER Working Paper No. 22095)
- **Mark Curtis**, Wake Forest University, and **Ryan Decker**, Federal Reserve Board, “Entrepreneurship and State Policy”
- **Konrad B. Burchardi**, Stockholm University; **Thomas Chaney**, Sciences Po (Paris); and **Tarek A. Hassan**, University of Chicago and NBER, “Migrants, Ancestors, and Investments” (NBER Working Paper No. 21847)
- **Jean-Noel Barrot**, MIT, and **Ramana Nanda**, Harvard University and NBER, “Can Paying Firms Quicker Affect Aggregate Employment?” (NBER Working Paper No. 22420)

Summaries of these papers are at: <http://www.nber.org/confer/2016/EEGf16/summary.html>

Public Policies in Canada and the United States

“Public Policies in Canada and the United States,” an NBER conference supported by the Alfred P. Sloan Foundation and Employment and Social Development Canada, took place in Gatineau, Quebec, on October 27–28. Research Associates Philip Oreopoulos of the University of Toronto and David Card of the University of California, Berkeley, organized the meeting. These researchers’ papers were presented and discussed:

- **Hilary Hoynes**, University of California, Berkeley, and NBER, and **Mark Stabile**, INSEAD (Fontainebleau) and NBER, “Small Differences that Matter: Differences in the Social Safety Net and the Implications for Women and Children”
- **Kevin S. Milligan**, University of British Columbia and NBER, and **Tammy Schirle**, Wilfrid Laurier University (Ontario), “Push and Pull: Disability Insurance, Regional Labor Markets, and Benefit Generosity in Canada and the United States”

- **Michael Baker**, University of Toronto and NBER; **Janet Currie**, Princeton University and NBER; and **Hannes Schwandt**, University of Zurich, “Inequality in Mortality over the Life Course: A Comparison of the U.S. and Canada”
- **Marc Frenette**, Statistics Canada; **Judith Scott-Clayton**, Columbia University and NBER; **Philip Oreopoulos**; and **Carolyn Tsao**, Harvard University, “Why are Community College Completion Rates So Different between Canada and the United States and Does It Lead to Differences in Earnings?”
- **Michael Kottelenberg**, Huron University College (Ontario), and **Steven F. Lehrer**, Queen’s University (Ontario) and NBER, “New Evidence on How Skills Influence Human Capital Acquisition and Early Labour Market Return to Human Capital between Canada and the United States”
- **Kory Kroft**, University of Toronto and NBER; **Fabian Lange**, McGill University (Montreal); **Matthew J. Notowidigdo**, Northwestern University and NBER; and **Matthew Tudball**, University of Toronto, “Long Time Out: Unemployment and Joblessness in Canada and the United States”
- **Stephen Jones**, McMaster University (Ontario), and **Craig Riddell**, University of British Columbia, “Unemployment, Marginal Attachment, and Labour Force Participation in Canada and the United States”
- **David Albouy**, University of Illinois at Urbana-Champaign and NBER; **Chandler Lutz**, Copenhagen Business School; and **Casey Warman**, Dalhousie University (Nova Scotia) and NBER, “Local Labor Markets in Canada and the United States”
- **Ana Damas De Matos** and **Daniel Parent**, HEC Montréal, “Canada and High Skill Immigration in the U.S.: Way Station or Farm System?”
- **Andrew J. Clarke**, University of Melbourne, and **Ana Ferrer** and **Mikal Skuterud**, University of Waterloo, “A Comparative Analysis of the Labour Market Performance of University-Educated Immigrants in Australia, Canada, and the United States: Does Policy Matter?”
- **David A. Green**, University of British Columbia; **Rene Morissette**, Statistics Canada; and **Benjamin M. Sand**, York University (Toronto), “Geographic Spillovers of Booms: The Effects of Canada’s Resource Boom on Canada-U.S. Differences in Wages”
- **Audra Bowlus** and **Chris Robinson**, University of Western Ontario, and **Haoming Liu**, National University of Singapore, “Different Paths? Human Capital Prices, Wages, and Inequality in Canada and the U.S.”
- **Marie Connolly** and **Catherine Haeck**, Université du Québec à Montréal, and **Miles Corak**, University of Ottawa, “Intergenerational Income Mobility in Canada and the United States”

Summaries of these papers are at: <http://www.nber.org/confer/2016/PPCf16/summary.html>

Youth Labor Market

An NBER conference, “Youth Labor Market,” supported by the Smith Richardson Foundation, took place in Cambridge on November 12. Research Associate David Card of the University of California, Berkeley, organized the meeting. These researchers’ papers were presented and discussed:

- **Jesse Rothstein**, University of California, Berkeley, and NBER, “Inequality of Educational Opportunity? Schools as Mediators of the Intergenerational Transmission of Income”
- **Joseph Altonji**, Yale University and NBER, and **Richard Mansfield**, Cornell University, “Quantifying Family, School and Location Effects in the Presence of Complementarities and Sorting”
- **Steven Raphael**, University of California, Berkeley, and NBER, and **Sandra Rozo**, University of Southern California, “Racial Disparities in the Acquisition of Juvenile Arrest Records”
- **Janna Johnson**, University of Minnesota, and **Samuel Schulhofer-Wohl**, Federal Reserve Bank of Minneapolis, “The Declining Geographic Mobility of U.S. Youth: Explanations and Implications”
- **Till von Wachter**, University of California, Los Angeles, and NBER, and **Hannes Schwandt**, University of Zurich, “The Effects of Graduating High School in Recessions and Booms on Early Career Outcomes and Long Term Earnings”

Summaries of these papers are at: <http://www.nber.org/confer/2016/YLMf16//summary.html>

Program and Working Group Meetings

Economic Fluctuations and Growth

The NBER’s Program on Economic Fluctuations and Growth met in Chicago on October 21. Research Associates Steven J. Davis of the University of Chicago and Guido Menzio of the University of Pennsylvania organized the meeting. These researchers’ papers were presented and discussed:

- **Xavier Gabaix**, Harvard University and NBER, “A Behavioral New Keynesian Model”
- **Alessandro Gavazza**, London School of Economics; **Simon Mongey**, New York University; and **Giovanni Violante**, New York University and NBER, “Aggregate Recruiting Intensity” (NBER Working Paper No. 22677)
- **François Geerolf**, University of California, Los Angeles, “A Theory of Pareto Distributions”
- **Neil Mehrotra**, Brown University, and **Dmitriy Sergeyev**, Bocconi University (Milan), “Financial Shocks and Job Flows”
- **Pablo Kurlat**, Stanford University and NBER, “The Social Value of Financial Expertise” (NBER Working Paper No. 22047)
- **Tobias Adrian**, **Nina Boyarchenko**, and **Domenico Giannone**, Federal Reserve Bank of New York, “Vulnerable Growth”

Summaries of these papers are at: <http://www.nber.org/confer/2016/EFGf16/summary.html>

Monetary Economics

The NBER’s Program on Monetary Economics met in Cambridge on October 28. Research Associate Ricardo J. Caballero of MIT and Faculty Research Fellow Eric R. Sims of the University of Notre Dame organized the meeting. These researchers’ papers were presented and discussed:

- **Joshua Hausman** and **Paul Rhode**, University of Michigan and NBER, and **Johannes Wieland**, University of California, San Diego, and NBER, “Recovery from the Great Depression: The Farm Channel in Spring 1933”
- **Florian Heider** and **Glenn Schepens**, European Central Bank, and **Farzad Saidi**, Stockholm School of Economics, “Life below Zero: Bank Lending under Negative Policy Rates”
- **Adrien Auclert**, Stanford University and NBER, and **Matthew Rognlie**, Princeton University, “Inequality and Aggregate Demand”
- **Xavier Gabaix**, Harvard University and NBER, “A Behavioral New Keynesian Model”
- **Òscar Jordà**, Federal Reserve Bank of San Francisco; **Moritz Schularick**, University of Bonn; and **Alan M. Taylor**, University of California, Davis, and NBER, “Large and State-Dependent Effects of Quasi-Random Monetary Experiments”

- **Vladimir Asriyan, Luca Fornaro, and Alberto Martin**, CREI (Barcelona); and **Jaume Ventura**, CREI and NBER, “Monetary Policy for a Bubbly World” (NBER Working Paper No. 22639)

Summaries of these papers are at: <http://www.nber.org/confer/2016/MEf16/summary.html>

International Finance and Macroeconomics

The NBER’s Program on International Finance and Macroeconomics met in Cambridge on October 28. Research Associates Ariel Burstein of the University of California, Los Angeles, and Charles Engel of the University of Wisconsin-Madison organized the meeting. These researchers’ papers were presented and discussed:

- **Luca Fornaro**, CREI (Barcelona), and **Federica Romei**, Stockholm School of Economics, “Aggregate Demand Externalities in a Global Liquidity Trap”
- **Martin Eichenbaum** and **Sergio Rebelo**, Northwestern University and NBER, and **Benjamin Johansson**, Federal Reserve Board, “On the Empirical Determinants of Nominal Exchange Rates”
- **Manuel Amador**, University of Minnesota and NBER; **Javier Bianchi**, Federal Reserve Bank of Minneapolis and NBER; **Luigi Bocola**, Northwestern University and NBER; and **Fabrizio Perri**, Federal Reserve Bank of Minneapolis, “Exchange Rate Policies at the Zero Lower Bound”
- **Vahid Gholampour**, Bucknell University, and **Eric van Wincoop**, University of Virginia and NBER, “What Can We Learn from Euro-Dollar Tweets?”
- **Pierre-Olivier Gourinchas**, University of California, Berkeley, and NBER; **Thomas Philippon**, New York University and NBER; and **Dimitri Vayanos**, London School of Economics and NBER, “The Analytics of the Greek Crisis” (NBER Working Paper No. 22370)
- **Ricardo J. Caballero** and **Alp Simsek**, MIT and NBER, “A Model of Fickle Capital Flows and Retrenchment: Global Liquidity Creation and Reach for Safety and Yield” (NBER Working Paper No. 22751)

Summaries of these papers are at: <http://www.nber.org/confer/2016/IFMf16/summary.html>

Asset Pricing

The NBER’s Program on Asset Pricing met in Palo Alto on October 28. Faculty Research Fellow Valentin Haddad of University of California, Los Angeles, and Research Associate Motohiro Yogo of Princeton University organized the meeting. These researchers’ papers were presented and discussed:

- **Tarek A. Hassan**, University of Chicago and NBER; **Thomas Mertens**, Federal Reserve Bank of San Francisco; and **Tony Zhang**, University of Chicago, “Currency Manipulation”
- **Hanno Lustig**, Stanford University and NBER, and **Adrien Verdelhan**, MIT and NBER, “Does Incomplete Spanning in International Financial Markets Help to Explain Exchange Rates?” (NBER Working Paper No. 22023)

- **Harrison Hong**, Columbia University and NBER; **Frank Weikai Li**, Hong Kong University of Science and Technology; and **Jiangmin Xu**, Peking University (Beijing), “Climate Risks and Market Efficiency”

- **Stephan Jank** and **Christoph Roling**, Deutsche Bundesbank, and **Esad Smajlbegovic**, Erasmus University Rotterdam, “Flying under the Radar: The Effects of Short-Sale Disclosure Rules on Investor Behavior and Stock Prices”

- **Terrence Hendershott** and **Dmitry Livdan**, University of California, Berkeley; **Dan Li**, Federal Reserve Board; and **Norman Schürhoff**, University of Lausanne, “Relationship Trading in OTC Markets”

- **Viral V. Acharya**, New York University and NBER; **Tim Eisert**, Erasmus University Rotterdam; **Christian Eufinger**, IESE Business School (Barcelona); and **Christian Hirsch**, Goethe University Frankfurt, “Whatever It Takes: The Real Effects of Unconventional Monetary Policy”

Summaries of these papers are at: <http://www.nber.org/confer/2016/APf16/summary.html>

Market Design

The NBER’s Working Group on Market Design met in Cambridge on October 28–29. Codirectors Michael Ostrovsky of Stanford University and Parag A. Pathak of MIT organized the meeting. These researchers’ papers were presented and discussed:

- **Darrell Duffie**, Stanford University and NBER, and **Haoxiang Zhu**, MIT and NBER, “Size Discovery” (NBER Working Paper No. 21696)
- **Ahmad Peivandi**, Georgia State University, “Participation and Unbiased Pricing in CDS Settlement Mechanisms”
- **Laura Doval**, Yale University, “A Theory of Stability in Dynamic Matching Markets”
- **Hugo Hopenhayn**, University of California, Los Angeles, and NBER, and **Maryam Saeedi**, Carnegie Mellon University, “Bidding Dynamics in Auctions” (NBER Working Paper No. 22716)
- **Oleg Baranov**, University of Colorado Boulder; **Christina Aperjis**, Power Auctions LLC; **Lawrence Ausubel**, University of Maryland; and **Thayer Morrill**, North Carolina State University, “Efficient Procurement Auctions with Increasing Returns”
- **Tibor Heumann**, Princeton University, “Ascending Auction with Multidimensional Signals”
- **John Hatfield**, University of Texas at Austin, and **Scott Duke Kominers**, Harvard University, “Hidden Substitutes”
- **Paul Milgrom**, Stanford University, “Deferred Acceptance Auctions without Substitutes”
- **Gabriel Carroll** and **Ilya Segal**, Stanford University, “Robustly Optimal Auctions with Unknown Resale Opportunities”
- **Songzi Du**, Simon Fraser University, “Robust Mechanisms under Common Valuation”
- **Shengwu Li**, Stanford University, “Obviously Strategy-Proof Mechanisms”
- **Marek Pycia**, University of California, Los Angeles, and **Peter Troyan**, University of Virginia, “Obvious Dominance and Random Priority”

- **Benjamin Roth**, MIT, and **Ran Shorrer**, Pennsylvania State University, “Making It Safe to Use Centralized Markets: Epsilon-Dominant Individual Rationality and Applications to Market Design”
- **Michal Feldman**, Tel Aviv University; **Nicole Immorlica**, **Brendan Lucier**, and **Vasilis Syrgkanis**, Microsoft Research; and **Tim Roughgarden**, Stanford University, “Efficiency Guarantees in Large Markets”
- **David Delacrétaz**, University of Melbourne; **Scott Duke Kominers**; and **Alexander Teytelboym**, University of Oxford, “Refugee Resettlement”
- **Tommy Andersson**, Lund University, and **Lars Ehlers**, Université de Montréal, “Assigning Refugees to Landlords in Sweden: Stable Maximum Matchings”

Summaries of these papers are at: <http://www.nber.org/confer/2016/MDf16/summary.html>

Political Economy

The NBER’s Program on Political Economy met in Cambridge on November 4. Director Alberto F. Alesina of Harvard University organized the meeting. These researchers’ papers were presented and discussed:

- **Jonathan Schulz**, Yale University, “The Church’s Ban on Consanguineous Marriages, Extended Kin-Groups, and Democracy”
- **David N. Figlio**, Northwestern University and NBER; **Paola Giuliano**, University of California, Los Angeles, and NBER; **Umut Özek**, American Institutes for Research; and **Paola Sapienza**, Northwestern University and NBER, “Long-Term Orientation and Educational Performance” (NBER Working Paper No. 22541)
- **Claudia Olivetti**, Boston College and NBER; **M. Daniele Paserman**, Boston University and NBER; and **Laura Salisbury**, York University and NBER, “Three-Generation Mobility in the United States, 1850–1940: The Role of Maternal and Paternal Grandparents” (NBER Working Paper No. 22094)
- **Edward L. Glaeser** and **Andrei Shleifer**, Harvard University and NBER, and **Giacomo A.M. Ponzetto**, CREI (Barcelona), “Securing Property Rights” (NBER Working Paper No. 22701)
- **Murat Iyigun**, University of Colorado Boulder; **Nathan Nunn**, Harvard University and NBER; and **Nancy Qian**, Yale University and NBER, “Winter Is Coming: The Long-Run Effects of Climate Change on Conflict”
- **Julia Cagé**, Sciences Po (Paris), and **Nicolas Hervé** and **Marie-Luce Viaud**, Institut National de l’Audiovisuel (Bry-sur-Marne, France), “The Production of Information in an Online World: Is Copy Right?”

Summaries of these papers are at: <http://www.nber.org/confer/2016/POLf16/summary.html>

Public Economics

The NBER’s Program on Public Economics met in Cambridge on November 3–4. Codirectors Amy Finkelstein of MIT and Raj Chetty of Stanford University and Research Associate Jonathan Gruber of MIT organized the meeting. These researchers’ papers were presented and discussed:

- **Florian Scheuer**, Stanford University and NBER, and **Iván Werning**, MIT and NBER, “Mirrlees Meets Diamond-Mirrlees” (NBER Working Paper No. 22076)
- **Emmanuel Saez**, University of California, Berkeley, and NBER, and **Stefanie Stantcheva**, Harvard University and NBER, “A Simpler Theory of Optimal Capital Taxation”
- **Raj Chetty**, **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 in the U.S.” (subsequently posted as NBER Working Paper No. 22910)
- **Dmitry Taubinsky**, Dartmouth College and NBER, and **Alex Rees-Jones**, University of Pennsylvania, “Attention Variation and Welfare: Theory and Evidence from a Tax Salience Experiment” (NBER Working Paper No. 22545)
- **John Beshears**, **David Laibson**, and **Brigitte C. Madrian**, Harvard University and NBER; **James J. Choi**, Yale University and NBER; **Christopher D. Clayton**, Harvard University; and **Christopher Harris**, University of Cambridge, “Optimal Illiquidity”
- **Matthew C. Weinzierl**, Harvard University and NBER, “Popular Acceptance of Inequality Due to Brute Luck and Support for Classical Benefit-Based Taxation” (NBER Working Paper No. 22462)
- **Brian G. Knight**, Brown University and NBER, and **Nathan M. Schiff**, Shanghai University of Finance and Economics, “The Out of State Tuition Distortion”

Summaries of these papers are at: <http://www.nber.org/confer/2016/PEf16/summary.html>

Health Care

The NBER’s Program on Health Care met in Cambridge on November 4. Director Jonathan Gruber of MIT and Research Associates Amy Finkelstein of MIT and Raj Chetty of Stanford University organized the meeting. These researchers’ papers were presented and discussed:

- **Vilsa Curto**, Stanford University; **Liran Einav**, **Jonathan D. Levin**, and **Jay Bhattacharya**, Stanford University and NBER; and **Amy Finkelstein**, “Health Care Spending and Utilization in Public and Private Medicare”
- **Michael D. Frakes**, Duke University and NBER, and **Jonathan Gruber**, “Defensive Medicine: Evidence from Military Immunity”
- **Nathaniel Hendren**, Harvard University and NBER, “Measuring Ex-Ante Welfare in Insurance Markets”
- **Jason Abaluck**, Yale University and NBER; **Leila Agha**, Dartmouth College and NBER; and **David C. Chan, Jr.**, Stanford University and NBER, “Discretion and Guidelines: Evidence from Warfarin Administration”

- **Sonia P. Jaffe**, University of Chicago, and **Mark Shepard**, Harvard University and NBER, “Price-Linked Subsidies and Health Insurance Markups”
- **Emily Oster**, Brown University and NBER, “Does Disease Cause Vaccination? Disease Outbreaks and Vaccination Response” (NBER Working Paper No. 22464)

Summaries of these papers are at: <http://www.nber.org/confer/2016/HCF16/summary.html>

Corporate Finance

The NBER’s Program on Corporate Finance met in Cambridge on November 4. Research Associate Malcolm Baker and Faculty Research Fellow Samuel Hanson, both of Harvard University, organized the meeting. These researchers’ papers were presented and discussed:

- **Jason R. Donaldson** and **Giorgia Piacentino**, Washington University in St Louis, and **Denis Gromb**, HEC Paris, “The Paradox of Pledgeability”
- **Marco Di Maggio**, Harvard University and NBER; **Amir Kermani**, University of California, Berkeley, and NBER; and **Christopher Palmer**, University of California, Berkeley, “How Quantitative Easing Works: Evidence on the Refinancing Channel” (NBER Working Paper No. 22638)
- **Sumit Agarwal**, Georgetown University; **Souphala Chomsisengphet**, Office of the Comptroller of the Currency; **Neale Mahoney**, University of Chicago and NBER; and **Johannes Stroebel**, New York University and NBER, “Do Banks Pass through Credit Expansions to Consumers Who Want to Borrow? Evidence from Credit Cards” (NBER Working Paper No. 21567)
- **Hong Ru**, Nanyang Technological University, and **Antoinette Schoar**, MIT and NBER, “Do Credit Card Companies Screen for Behavioral Biases?” (NBER Working Paper No. 22360)
- **Olivier Dessaint**, University of Toronto; **Thierry Foucault**, HEC Paris; **Laurent Frésard**, University of Maryland; and **Adrien Matray**, Princeton University, “Ripple Effects of Noise on Corporate Investment”
- **Jean-Noel Barrot**, MIT, and **Ramana Nanda**, Harvard University and NBER, “Can Paying Firms Quicker Affect Aggregate Employment?” (NBER Working Paper No. 22420)
- **Aleksander Andonov**, Erasmus University Rotterdam; **Yael Hochberg**, Rice University and NBER; and **Joshua Rauh**, Stanford University and NBER, “Political Representation and Governance: Evidence from the Investment Decisions of Public Pension Funds”
- **Alan M. Benson**, University of Minnesota; **Danielle Li**, Harvard University; and **Kelly Shue**, University of Chicago and NBER, “Can Promotion Tournaments Produce Bad Managers? Evidence of the ‘Peter Principle’ ”

Summaries of these papers are at: <http://www.nber.org/confer/2016/CFf16/summary.html>

Behavioral Finance

The NBER’s Working Group on Behavioral Finance met in Cambridge on November 5. Director Nicholas C. Barberis of Yale University organized the meeting. These researchers’ papers were presented and discussed:

- **Ulrike Malmendier**, University of California, Berkeley, and NBER; **Demian Pouzo**, University of California, Berkeley; and **Victoria Vanasco**, Stanford University, “A Theory of Experience Effects”
- **Chen Lian**, MIT, and **Yueran Ma** and **Carmen Y. Wang**, Harvard University, “Low Interest Rates and Risk Taking: Evidence from Individual Investment Decisions”
- **Anthony A. DeFusco** and **Charles G. Nathanson**, Northwestern University, and **Eric Zwick**, University of Chicago and NBER, “Speculative Dynamics of Prices and Volume”
- **Antonio Gargano**, University of Melbourne, and **Alberto G. Rossi**, University of Maryland, “Does it Pay to Pay Attention?”
- **Santosh Anagol**, University of Pennsylvania; **Vimal Balasubramaniam**, University of Oxford; and **Tarun Ramadorai**, Imperial College London, “Endowment Effects in the Field: Evidence from India’s IPO Lotteries”
- **Michael Bailey**, Facebook; **Ruiqing Cao**, Harvard University; **Theresa Kuchler**, New York University; and **Johannes Stroebel**, New York University and NBER, “Social Networks and Housing Markets” (NBER Working Paper No. 22258)

Summaries of these papers are at: <http://www.nber.org/confer/2016/BFf16/summary.html>

Economics of Education

The NBER’s Program on the Economics of Education met in Palo Alto on November 10–11. Director Caroline M. Hoxby of Stanford University organized the meeting. These researchers’ papers were presented and discussed:

- **Judith Scott-Clayton**, Columbia University and NBER, and **Basit Zafar**, Federal Reserve Bank of New York, “Financial Aid, Debt Management, and Socioeconomic Outcomes: Post-College Effects of Merit-Based Aid” (NBER Working Paper No. 22574)
- **Hugh Macartney**, Duke University and NBER; **Robert McMillan**, University of Toronto and NBER; and **Uros Petronijevic**, York University, “A Unifying Framework for Education Policy Analysis”
- **Juan Saavedra**, University of Southern California and NBER; **Darío Maldonado**, Universidad de los Andes (Bogotá); **Lucrecia Santibañez**, Claremont Graduate University; and **Luis Omar Herrera Prada**, Inter-American Development Bank, “Premium or Penalty? Labor Market Returns to Novice Public Sector Teachers”
- **Michael D. Bates**, University of California, Riverside, and **Quentin O. Brummet**, Bureau of the Census, “Parental Valuation of School Choice: Evidence from Geographic Boundaries”
- **Lauren L. Schmitz**, University of Michigan, and **Dalton Conley**, Princeton University and NBER, “The Effect of Vietnam-Era Conscript and Genetic Potential for Educational Attainment on Schooling Outcomes” (NBER Working Paper No. 22393)

- **Thomas Ahn**, University of Kentucky; **Peter Arcidiacono**, Duke University and NBER; and **Amy Hopson** and **James R. Thomas**, Duke University, “Equilibrium Grade Inflation with Implications for Female Interest in STEM Majors”
- **Graham Beattie**, University of Pittsburgh; **Jean-William P. Laliberté**, University of Toronto; and **Philip Oreopoulos**, University of Toronto and NBER, “Thrivers and Divers: Using Non-Academic Measures to Predict College Success and Failure” (NBER Working Paper No. 22629)
- **Rob Garlick**, Duke University, “The Effects of Nationwide Tuition Fee Elimination on Education Outcomes”
- **Caroline Hoxby**, “It’s Not the Major, It’s the Selectivity: Returns to College Majors”
- **Ben M. Marx**, University of Illinois at Urbana–Champaign, and **Lesley J. Turner**, University of Maryland and NBER, “Student Loan Nudges: Experimental Evidence on Borrowing and Educational Attainment”
- **Katherine Micheltore**, Syracuse University, and **Susan Dynarski**, University of Michigan and NBER, “The Gap within the Gap: Using Longitudinal Data to Understand Income Differences in Student Achievement” (NBER Working Paper No. 22474)

Summaries of these papers are at: <http://www.nber.org/confer/2016/EDf16/summary.html>

Labor Studies

The NBER’s Program on Labor Studies met in Cambridge on November 11. Director David Card of the University of California, Berkeley, organized the meeting. These researchers’ papers were presented and discussed:

- **Dylan Glover**, Sciences Po (Paris); **Amanda Pallais**, Harvard University and NBER; and **William Pariente**, Université catholique de Louvain, “Discrimination as a Self-Fulfilling Prophecy: Evidence from French Grocery Stores” (NBER Working Paper No. 22786)
- **Peter Bergman**, Columbia University, and **Isaac McFarlin, Jr.**, University of Florida, “An Experimental Analysis of Cream Skimming in Charter Schools”
- **Suzanne Barth** and **Kyung Park**, Wellesley College, and **Nikolas Mittag**, CERGE-EI (Prague), “Voter Discrimination in Democratic Elections”
- **Stefano DellaVigna**, University of California, Berkeley, and NBER, and **David Card**, “What Do Editors Maximize? Evidence from Four Economics Journals”
- **Zhuan Pei**, Cornell University; **Jörn-Steffen Pischke**, London School of Economics and NBER; and **Hannes Schwandt**, University of Zurich, “Poorly Measured Confounders Are More Useful on the Left Than on the Right”
- **Melvin Stephens, Jr.**, University of Michigan and NBER, and **Desmond J. Toohey**, University of Delaware, “The Impact of Health on Labor Market Outcomes: Experimental Evidence from MRFIT”
- **Robert E. Hall**, Stanford University and NBER, and **Andreas I. Mueller**, Columbia University and NBER, “Wage Dispersion and Search Behavior” (NBER Working Paper No. 21764)

Summaries of these papers are at: <http://www.nber.org/confer/2016/LSf16/summary.html>

Organizational Economics

The NBER’s Working Group on Organizational Economics met in Cambridge on November 18–19. Director Robert S. Gibbons of MIT organized the meeting. These researchers’ papers were presented and discussed:

- **Marina Halac**, Columbia University, and **Pierre Yared**, Columbia University and NBER, “Commitment vs. Flexibility with Costly Verification”
- **Joshua Gans** and **Avi Goldfarb**, University of Toronto and NBER, and **Mara Lederman**, University of Toronto, “Exit, Tweets, and Loyalty”
- **Wouter Dessein**, Columbia University, and **Richard Holden**, University of New South Wales (Sydney), “Organizations with Power-Hungry Agents”
- **Nicholas Bloom**, Stanford University and NBER; **Erik Brynjolfsson**, MIT and NBER; **Lucia Foster** and **Ron S. Jarmin**, Bureau of the Census; **Megha Patnaik**, Stanford University; **Itay Saporta-Eksten**, Tel Aviv University; and **John Van Reenen**, MIT and NBER, “What Drives Differences in Management?”
- **Miguel Anton** and **Mireia Gine**, University of Navarra; **Florian Ederer**, Yale University; and **Martin C. Schmalz**, University of Michigan, “Common Ownership, Competition, and Top Management Incentives”
- **Heikki Rantakari**, University of Rochester, “Relational Influence”
- **Rocco Macchiavello**, London School of Economics, and **Josepa Miquel-Florensa**, Toulouse School of Economics, “Vertical Integration and Relational Contracts in the Costa Rica Coffee Chain”
- **Christopher Hansman** and **Matthieu Teachout**, Columbia University; **Jonas Hjort**, Columbia University and NBER; and **Gianmarco León**, Pompeu Fabra University (Barcelona), “Vertical Integration, Supplier Behavior, and Quality Upgrading among Exporters”
- **Enghin Atalay**, University of Wisconsin–Madison; **Mary Jialin Li**, University of Chicago; and **Ali Hortaçsu** and **Chad Syverson**, University of Chicago and NBER, “How Wide Is the Firm Border?”
- **Alan M. Benson**, University of Minnesota; **Danielle Li**, Harvard University; and **Kelly Shue**, University of Chicago and NBER, “Can Promotion Tournaments Produce Bad Managers? Evidence of the ‘Peter Principle’ ”

Summaries of these papers are at: <http://www.nber.org/confer/2016/OEf16/summary.html>

Chinese Economy

The NBER's Working Group on the Chinese Economy met in Cambridge on November 18–19. Director Shang-Jin Wei of Columbia University and Research Associate Hanming Fang of the University of Pennsylvania organized the meeting. These researchers' papers were presented and discussed:

- **Yongheng Deng**, National University of Singapore; **Shang-Jin Wei**; and **Jing Wu**, Tsinghua University, "Estimating the Unofficial Income of Officials: The Case of China"
- **Yu-Hsiang Lei**, Yale-NUS College (Singapore), "Can Governments Harvest Connections with Firms? Evidence from China"
- **Ruixue Jia**, University of California, San Diego, and **Hongbin Li**, Tsinghua University, "Access to Elite Education, Wage Premium, and Social Mobility: The Truth and Illusion of China's College Entrance Exam"
- **Lily Fang**, INSEAD (Singapore); **Josh Lerner**, Harvard University and NBER; and **Chaopeng Wu**, Xiamen University, "Intellectual Property Rights Protection, Ownership, and Innovation: Evidence from China" (NBER Working Paper No. 22685)
- **Jing Fang**, Huazhong University of Science and Technology (Wuhan), and **Hui He** and **Nan Li**, International Monetary Fund, "China's Rising IQ (Innovation Quotient) and Growth: Firm-Level Evidence"
- **Panle Jia Barwick**, Cornell University and NBER; **Shengmao Cao**, Stanford University; and **Shanjun Li**, Cornell University, "Local Protectionism, Market Structure, and Social Welfare: China's Automobile Market"
- **Sebastian Heise**, Federal Reserve Bank of New York; **Justin Pierce**, Federal Reserve Board; **Georg Schaur**, University of Tennessee; and **Peter Schott**, Yale University and NBER, "Trade Policy and the Structure of Supply Chains"
- **Russell Cooper**, Pennsylvania State University and NBER, and **Guozhong Zhu**, University of Alberta, "Household Finance in China"
- **Markus Brunnermeier** and **Wei Xiong**, Princeton University and NBER, and **Michael Sockin**, University of Texas at Austin, "China's Model of Managing the Financial System"
- **Viral Acharya**, New York University and NBER; **Jun Qian**, Shanghai Advanced Institute of Finance; and **Zhishu Yang**, Tsinghua University (Beijing), "In the Shadow of Banks: Wealth Management Products and Issuing Banks' Risk in China"
- **Hao Wang** and **Hao Zhou**, Tsinghua University (Beijing); **Honglin Wang**, Hong Kong Institute for Monetary Research; and **Lisheng Wang**, Chinese University of Hong Kong, "Shadow Banking: China's Dual-Track Interest Rate Liberalization"

Summaries of these papers are at: <http://www.nber.org/confer/2016/CEf16/summary.html>

Market Microstructure

The NBER's Working Group on Market Microstructure met in Cambridge on December 2. Tarun Chordia of Emory University; Amit Goyal of the University of Lausanne; Joel Hasbrouck of New York University; Research Associate Bruce Lehmann of University of California, San Diego; Gideon Saar of Cornell University; and Avaniidhar Subrahmanyam of University of California, Los Angeles, organized the meeting. These researchers' papers were presented and discussed:

- **Lin William Cong** and **Douglas Xun Xu**, University of Chicago, "Rise of Factor Investing: Asset Prices, Informational Efficiency, and Security Design"
- **Paolo Pasquariello**, University of Michigan, "Agency Costs and Strategic Speculation in the U.S. Stock Market"
- **Jennifer Conrad**, University of North Carolina at Chapel Hill, and **Sunil Wahal**, Arizona State University, "The Term Structure of Liquidity Provision"
- **Andriy Shkilko** and **Konstantin Sokolov**, Wilfrid Laurier University (Ontario), "Every Cloud Has a Silver Lining: Fast Trading, Microwave Connectivity, and Trading Costs"
- **Haoming Chen** and **Thomas Ruf**, University of New South Wales (Sydney); **Sean Foley**, University of Sydney; and **Michael Goldstein**, Babson College, "The Value of a Millisecond: Harnessing Information in Fast, Fragmented Markets"
- **Katya Malinova** and **Andreas Park**, University of Toronto, "Market Design with Blockchain Technology"

Summaries of these papers are at: <http://www.nber.org/confer/2016/MMf16/summary.html>

International Trade and Investment

The NBER's Program on International Trade and Investment met in Palo Alto on December 2–3. Director Stephen Redding of Princeton University organized the meeting. These researchers' papers were presented and discussed:

- **Robert Feenstra**, University of California, Davis, and NBER; **Mingzhi Xu**, University of California, Davis; and **Alexis Antoniades**, Georgetown University, "What is the Price of Tea in China? Towards the Relative Cost of Living in Chinese and U.S. Cities"
- **Treb Allen**, Dartmouth College and NBER; **Costas Arkolakis**, Yale University and NBER; and **Xiangliang Li**, Yale University, "On the Existence and Uniqueness of Trade Equilibria"
- **Sharon Traiberman**, Cowles Foundation, "Occupations and Import Competition: Evidence from Danish Matched Employee-Employer Data"
- **Farid Farrokhi**, Purdue University, "Global Sourcing in Oil Markets"
- **Anna Gumpert**, University of Munich; **Andreas Moxnes**, University of Oslo and NBER; **Natalia Ramondo**, University of California, San Diego, and NBER; and **Felix Tintelnot**, University of Chicago and NBER, "Exporters' and Multinational Firms' Life-Cycle Dynamics"
- **Andrew Bernard**, Dartmouth College and NBER, and **Swati Dhingra**, London School of Economics, "Importers, Exporters, and the Division of the Gains from Trade"

- **Mary Amity**, Federal Reserve Bank of New York; **Mi Dai**, Beijing Normal University; **Robert Feenstra**, University of California, Davis, and NBER; and **John Romalis**, University of Sydney and NBER, “How Did China’s WTO Entry Benefit U.S. Consumers?”
- **Justin Pierce**, Federal Reserve Board, and **Peter Schott**, Yale University and NBER, “Trade Liberalization and Mortality: Evidence from U.S. Counties” (NBER Working Paper No. 22849)

Summaries of these papers are at: <http://www.nber.org/confer/2016/ITIf16/summary.html>

Entrepreneurship

The NBER’s Working Group on Entrepreneurship, supported by the Ewing Marion Kauffman Foundation, met in Cambridge on December 9. Director Antoinette Schoar of MIT and Research Associate Josh Lerner of Harvard University organized the meeting. These researchers’ papers were presented and discussed:

- **Zhao Chen**, Fudan University (Shanghai); **Zhikuo Liu**, Shanghai University of Finance and Economics; and **Juan Carlos Suárez Serrato** and **Daniel Xu**, Duke University and NBER, “Notching R&D Investment with Corporate Income Tax Cuts in China”
- **Juanita Gonzalez-Urbe** and **Daniel Paravisini**, London School of Economics, “How Sensitive Is Investment to the Cost of Outside Equity? Evidence from a U.K. Tax Relief”
- **Morten Bennedsen**, INSEAD (Fontainebleau); **Margarita Tsoutsoura**, University of Chicago; and **Daniel Wolfenzon**, Columbia University and NBER, “Drivers of Effort: Evidence from Employee Absenteeism”
- **Sabrina T. Howell**, New York University, “Learning and Success in Entrepreneurship”
- **William Mullins**, University of Maryland, and **Patricio Toro**, Central Bank of Chile, “Credit Guarantees and Credit Constraints”
- **Daniel Cavagnaro** and **Yingdi Wang**, California State University, Fullerton; **Berk Sensoy**, Ohio State University; and **Michael Weisbach**, Ohio State University and NBER, “Measuring Institutional Investors’ Skill from Their Investments in Private Equity” (NBER Working Paper No. 22547)
- **Aleksander Andonov**, Erasmus University Rotterdam; **Yael Hochberg**, Rice University and NBER; and **Joshua Rauh**, Stanford University and NBER, “Political Representation and Governance: Evidence from the Investment Decisions of Public Pension Funds”

Summaries of these papers are at: <http://www.nber.org/confer/2016/ENTf16/summary.html>

Development

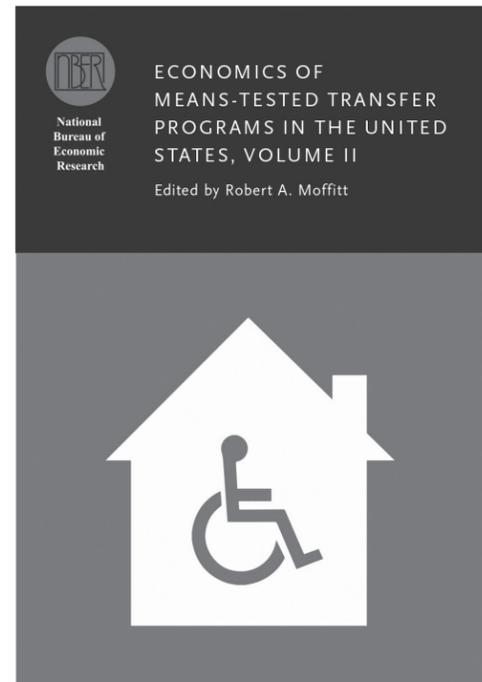
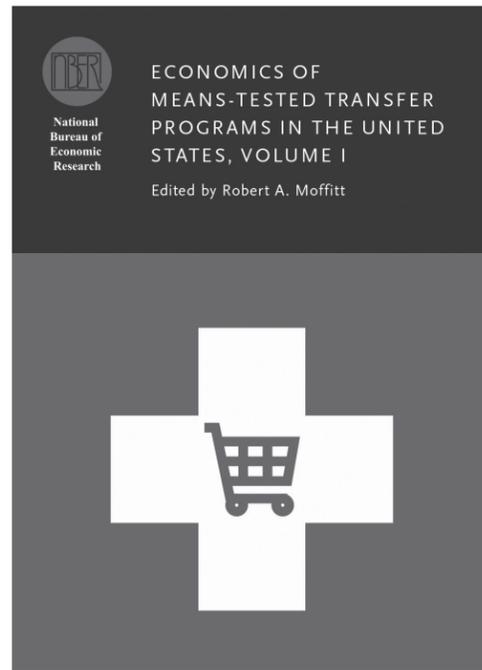
The NBER’s Program on Development Economics met in Cambridge on December 9–10. Research Associates Esther Dufo of MIT, Richard Hornbeck of the University of Chicago, Rohini Pande of Harvard University, Duncan Thomas of Duke University, and Eric Verhoogen of Columbia University organized the meeting. These researchers’ papers were presented and discussed:

- **Adnan Khan**, London School of Economics; **Asim Ijaz Khwaja**, Harvard University and NBER; and **Benjamin A. Olken**, MIT and NBER, “Making Moves Matter: Experimental Evidence on Incentivizing Bureaucrats through Performance-Based Transfers”
- **Michael C. Best**, Stanford University; **Jonas Hjort**, Columbia University and NBER; and **David Szakonyi**, George Washington University, “Individuals and Organizations as Sources of State Effectiveness, and Consequences for Policy Design”
- **Tommaso Porzio**, University of California, San Diego, “Cross-Country Differences in the Optimal Allocation of Talent and Technology”
- **Emily Breza**, Harvard University and NBER, and **Cynthia Kinnan**, Northwestern University and NBER, “Measuring the Equilibrium Impacts of Credit: Evidence from the Indian Microfinance Crisis”
- **Seema Jayachandran**, Northwestern University and NBER; **Joost de Laat**, Porticus; **Eric Lambin**, Stanford University; and **Charlotte Stanton**, Carnegie Institution for Science, “Cash for Carbon: A Randomized Controlled Trial of Payments for Ecosystem Services to Reduce Deforestation” (NBER Working Paper No. 22378)
- **Zhao Chen**, Fudan University (Shanghai); **Zhikuo Liu**, Shanghai University of Finance and Economics; and **Juan Carlos Suárez Serrato** and **Daniel Xu**, Duke University and NBER, “Notching R&D Investment with Corporate Income Tax Cuts in China”
- **Lorenzo Casaburi**, University of Zurich, and **Tristan Reed**, McKinsey and Company, “Competition and Interlinkages in Agricultural Markets: An Experimental Approach”

Summaries of these papers are at: <http://www.nber.org/confer/2016/DEVf16/summary.html>

Economics of Means-Tested Transfer Programs in the United States, Volume I and Volume II

Robert A. Moffitt, editor
The University of Chicago Press, 2016
\$110.00 each (cloth)



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Competition in the Promised Land: Black Migrants in Northern Cities and Labor Market

Leah Platt Boustan
Princeton University Press, 2016
\$29.95 (cloth)

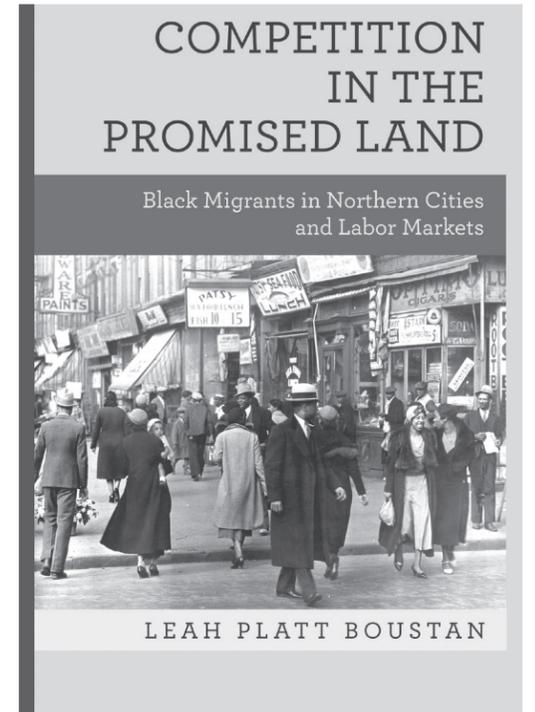
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