Program Report

Productivity, Innovation, and Entrepreneurship

Nicholas Bloom, Josh Lerner, and Heidi Williams*

The Productivity, Innovation, and Entrepreneurship (PIE) Program was founded as the Productivity Program, with Zvi Griliches as the inaugural program director, in 1978. The program benefited tremendously from Griliches' inspirational leadership, which was continued by Ernst Berndt. In recent years, the program has expanded to incorporate the vibrant and growing body of research in the affiliated fields of innovation and entrepreneurship.

With the generous support of the Ewing Marion Kauffman and Alfred P. Sloan Foundations, the program has generated a large and diverse volume of research activity. Currently, 128 researchers are affiliated with the PIE Program. Since the last program report, in September 2013, affiliates have distributed more than 1,050 working papers and edited or contributed to several research volumes, including the annual *Innovation Policy and the Economy* series.

The activities of the program are organized into four large project areas: economic research on the measurement and drivers of productivity growth; innovation, which examines R&D, patenting, and creative activities; entrepreneurship, which focuses on the measurement, causes, and effects of new business creation; and digitization, which focuses on the creation, use, and impact of digital information. This review summarizes the research in the first three of these areas.[1] In the interest of space, we will not detail the PIE group's many activities, including boot camps for

* Nicholas Bloom and Josh Lerner have codirected the Productivity, Innovation, and Entrepreneurship Program since 2011. Heidi Williams is a codirector of the Innovation Working Group and a frequent co-organizer of PIE events. Bloom is the William D. Eberle Professor of Economics at Stanford University; Lerner is the Jacob H. Schiff Professor of Investment Banking at Harvard Business School. Williams is the Charles R. Schwab Professor of Economics at Stanford.

graduate students and an annual conference in Washington that communicates research findings to the policy community.

Productivity

Recent years have seen growing concerns that US gross domestic product (GDP) growth is slowing. A factor that accounts for about half of this slowdown is the decline of labor productivity growth [Figure 1], which fell by roughly half, from 3 percent to 1.5 percent, between 1950 and 2019. The other half of slowing growth is due to declining growth of labor hours, due roughly equally to declining population growth and declining labor force participation.[2] National productivity is defined as the amount of GDP that can be obtained with a given set of inputs. In this sense, productivity growth is "growth by inspiration" in that it yields more from less, in contrast to growth from increasing the use of inputs, which has been labeled "growth by perspiration." As such, productivity growth is critical to driving long-run increases in the standard of living.

One immediate question is whether the productivity growth slowdown is real. An alternative view is that the observed slowdown in productivity growth could be an artifact of some measurement issue such as the increasing importance of online activity, much of which may not be recorded in conventional GDP statistics. Several recent studies argue against this view: they conclude that the decline in productivity growth is real, rather than due to measurement issues in inputs and outputs, transfer pricing, or cyclical issues related to the end of the 1990s information technology boom.[3]

This then leads to another question: what is driving the fall in productivity? Robert Gordon argues that a combination of headwinds accounts for this slowdown.[4] One is the slowing growth of educational attainment, which began around 1980 with the annual growth rate of the percentage of the population completing high school falling from 3.3 percent per year until 1980 to only 0.2 percent after 1980, with similar slowdowns in college enrollment growth.

The second headwind Gordon highlights is the slowdown of productivity growth after the end of the Great Inventions Era. He argues that inventions such as sanitation, antibiotics, steam and electric power, radio, telephone, and air conditioning drove rapid national growth
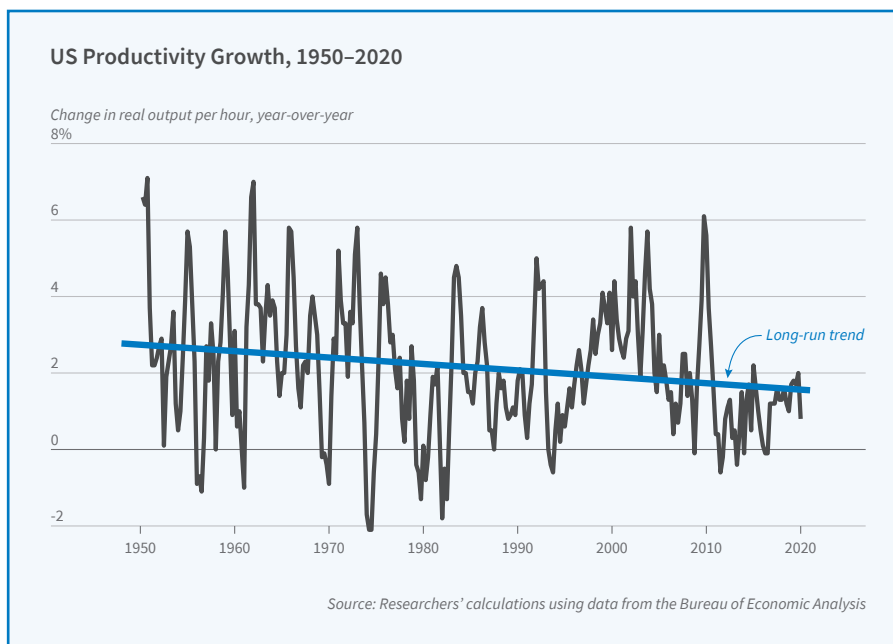
US Productivity Growth, 1950–2020

Change in real output per hour, year-over-year

Source: Researchers' calculations using data from the Bureau of Economic Analysis

Figure 1

during the first part of the 20th century, and that comparably high-impact inventions have not been produced as frequently in recent years. Nicholas Bloom, Charles Jones, John Van Reenen, and Michael Webb build on this idea, arguing empirically that new ideas like these great inventions are becoming increasingly hard to find.[5] They document that innovation output per R&D dollar or per scientist is falling, perhaps because the lower-hanging fruits on the knowledge tree are getting plucked over time.

A final, more positive headwind may be that the huge productivity benefits derived from modern information communication technologies (ICT) like computers, the internet, and smartphones take time to show up in national productivity. Erik Brynjolfsson, Daniel Rock, and Chad Syverson argue that since it took almost 50 years in the first half of the 20th century to incorporate electricity fully into modern factories and offices, we should be more patient in looking for the productivity impact of ICT.[6] This is the ICT productivity J-curve — an initially slow productivity impact as society has to reorganize to use these new technologies efficiently, but a longer-run acceleration once they are effectively exploited.

Following this narrative, a reasonable outlook is that these modern great inventions will eventually raise productivity growth, overcoming some of the first two headwinds. But it may take another 10 or 20 years for society to reorganize itself to exploit them. Of course, one step toward that has potentially been the massive shift to working from home during the pandemic, for which ICT has been invaluable.[7] Indeed, one could argue this almost certainly improved productivity versus any pre-computer version of working from home, so in that sense the enormous productivity impact of modern ICT has already begun.

Innovation

A second focus of academics and policymakers in recent years has been trying to understand the causes and consequences of rising inequality in the United States and other developed countries.[8] From an innovation policy perspective, several questions are of interest. Have innovation policies — such as government-awarded market power through patents and antitrust policy decisions — contributed to the observed rise in inequality? How does inequality at a societal level impact who becomes an inventor and what they invent? Tremendous progress is being made in developing new conceptual frameworks,

datasets, and empirical approaches to tackle these questions at both the macro and micro levels.

At the macro level, two recent studies consider how innovation affects inequality in Schumpeterian growth models.[9] One of these studies also leverages variation in the composition of the US Senate Committee on Appropriations to empirically test for a causal link between innovation and inequality, and argues that a 1 percent increase in patents increases the top 1 percent's income share by 0.2 percent.[10]

At the micro level, research in fields such as health economics and labor economics has provided evidence on how innovation affects inequality. David Cutler, Ellen Meara, and Seth Richards-Shubik point out that when the most common causes of death vary across demographic groups, a policy of equalizing the expected marginal benefit of research across diseases can increase cross-group disparities in mortality outcomes.[11] Taking this idea to the data, they suggest that National Institutes of Health-funded research increased the Black-White infant mortality gap between 1950 and 2007.

Two recent studies have explored the link between innovation and earnings inequality. Patrick Kline, Neviana Petkova, Heidi Williams, and Owen Zidar develop a novel firm-level linkage between patent applications and US Treasury firm/worker tax filings, and document that patent allowances raise average earnings at the firm level but also exacerbate within-firm inequality on a number of margins — with earnings of top-earning employees, firm officers, and male employees responding more strongly to patent grants.[12] Related research using a novel firm-level linkage between patents and US Social Security Administration earnings records suggests that rising inequality in innovation activity across firms in the 1990s, as measured by patenting, can account for a significant share of the recent rise in income inequality.[13]

Of course, inequality at the societal level might also affect who becomes an inventor, and what they invent. Several recent studies have constructed linked

data enabling new analyses of how demographic factors are associated with the probability of inventing, as measured by patenting.[14] Figure 2 documents that children from high-income (top 1 percent) families are 10 times as likely to become inventors as those from below-median-income families. While the results from these papers suggest that public policies could influence who becomes an inventor, it is difficult to derive quantitative conclusions from these descriptive analyses. An important step in closing this gap is provided by the work of Chang-Tai Hsieh, Erik Hurst, Chad Jones, and Peter Klenow, who estimate that between 20 and 40 percent of the increase in US output per person between 1960 and 2010 can be explained by an improved allocation of talent, notably the convergence in occupations across gender and race.[15]

Entrepreneurship

Given the concerns about stagnant productivity and rising inequality, it is natural to wonder whether either or both concerns are being — or have the potential to be — addressed by the burgeoning number of new high-potential ventures. Much attention in recent years has focused on the role of venture capital (VC) in fomenting innovation. The level of VC financing has rapidly increased over the last decade, in contrast with federal R&D which has been stagnant in the US. A number of economic models suggest that VC funds should be uniquely positioned to promote innovative growth in risky and uncertain environments, given their combination of careful screening, intense monitoring, and staged financing.[16]

The empirical literature, however,

suggests a more nuanced picture. VC funding is increasingly concentrated in a relatively small number of startup firms that raise far more capital than in the past and stay private much longer.[17] Much of

Parents' Income and Child's Probability of Being Awarded a Patent

Inventors per thousand

Percentile of parents' household income

Source: Bell A, Chetty R, Jaravel X, Petkova N, and Van Reenen, J, NBER Working Paper 24062

Figure 2

the funding comes not from the venture investors themselves, but from investors who traditionally focused on public firms, such as mutual and hedge funds, as well as pension funds and other large institutional investors.

This concentration of capital may or may not be socially desirable; after all, the list of long-gestating firms that garnered extensive financing while private would include Alibaba, Facebook, and Uber, each of which undoubtedly has had profound economic impacts. But Josh Lerner and Ramana Nanda argue that while venture funding is very efficacious in stimulating a certain kind of innovative business, the scope is increasingly limited. For instance, using data on the patents filed at the US Patent and Trademark Office, they found that the top 10 patent classes using the US Cooperative Patent Classification (CPC) system represented 48 percent of all US VC patents filed over the 2008–17 period, compared to 24 percent for the top 10 patent classes for patents not filed by comparable VC-backed firms.[18]

This concentration has increased substantially over time.

This suggestion is underscored by computations by Sand Hill Econometrics. Susan Woodward and Robert Hall describe this firm's indices, which suggest that an investment in all software deals between December 1991 and September 2019 would have yielded an annualized gross return of 24 percent, far greater than investments in hardware (17 percent), healthcare (13 percent), or clean tech (2 percent).[19] These data further illustrate that the divergence in the performance of these categories has been particularly stark in the last decade. Thus, the shift of venture investment to software is not surprising.

A related concern is the increasing concentration of venture funds in the hands of a number of small groups. Not only are these funds concentrated geographically in a few urban areas, but the makeup of the most influential US firms is very different from that of the country as a whole. At VC firms and among the founders of VC-backed startups, women represent less than 10 percent of the entrepreneurial and VC labor pool, Hispanics about 2 percent, and African Americans less than 1 percent.[20] This concentration appears despite the fact that women, Hispanics, and African Americans have much higher corresponding levels of representation in education programs that traditionally lead to careers in these sectors, as well as higher rates of representation in other highly compensated professions.

The disparities are also manifested in financing raised. For instance, using data from the Kauffman Firm Survey, Robert Fairlie, Alicia Robb, and David Robinson show that the typical White-
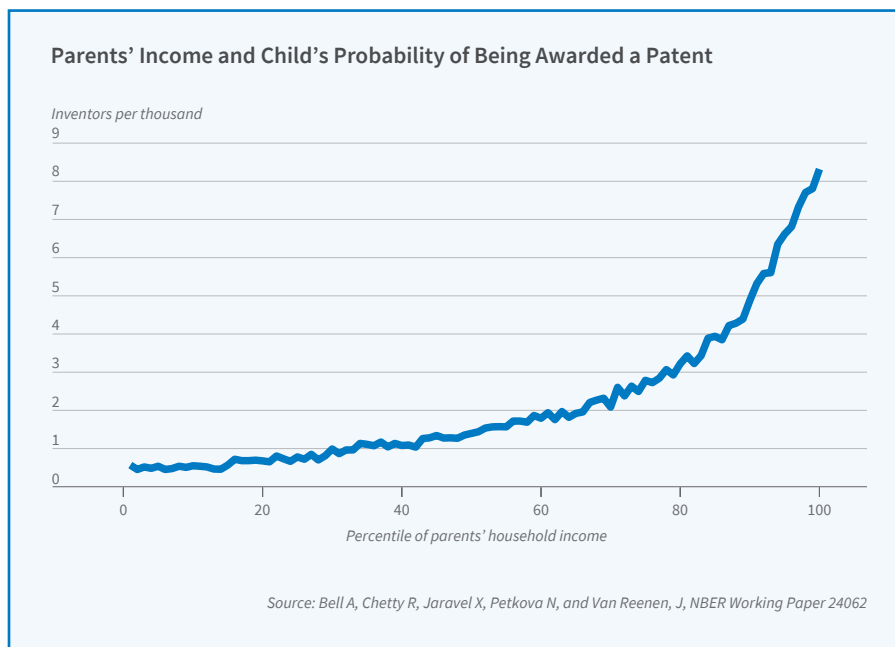
owned firm had 35 times the amount of outside equity financing as the analogous Black-owned firm at the time of the initial survey, a difference that persists over time.[21]

These findings suggest that while VC is a powerful tool for boosting innovation, it is far from a panacea for addressing rising inequality or stagnant productivity across the economy.

[1] For an overview of the digitization effort, see "The Economics of Digitization," Greenstein S. *The Reporter*, 2020-2.
Return to Text

[2] Robert Gordon offers a longer discussion: "Why Has Economic Growth Slowed When Innovation Appears to Be Accelerating?" Gordon R. NBER Working Paper 24554, April 2018.
Return to Text

[3] "Productivity and Potential Output Before, During, and After the Great Recession," Fernald J. NBER Working Paper 20248, June 2014; "Challenges to Mismeasurement Explanations for the US Productivity Slowdown," Syverson C. NBER Working Paper 21974, February 2016; "Offshore Profit Shifting and Domestic Productivity Measurement," Guvenen F, Mataloni R, Rassier D, Ruhl K. NBER Working Paper 23324, October 2019; "Productivity Measurement: Racing to Keep Up," Sichel D. NBER Working Paper 25558, February 2019.
Return to Text

[4] Gordon, ibid note 2.
Return to Text

[5] "Are Ideas Getting Harder to Find?" Bloom N, Jones C, Van Reenen J, Webb M. NBER Working Paper 23782, September 2017.
Return to Text

[6] "The Productivity J-Curve: How Intangibles Complement General Purpose Technologies," Brynjolfsson E, Rock D, Syverson C. NBER Working Paper 25148, January 2020.
Return to Text

[7] Research that bears on work from home includes "What Jobs Are Being Done at Home during the COVID-19 Crisis? Evidence from Firm-Level Surveys," Bartik A, Cullen Z, Glaeser E, Luca M, Stanton C. NBER Working Paper 27422, June 2020; "COVID-19 and Remote Work: An Early Look at US Data," Brynjolfsson E, Horton J, Ozimek A, Rock D, Sharma G, TuYe H-Y. NBER Working Paper 27344, June 2020; "Why Working from Home Will Stick," Barrero J, Bloom N, Davis S. NBER Working Paper 28731, April 2021.
Return to Text

[8] The rise in inequality is documented, for example, by Piketty and Saez: "Income Inequality in the United States, 1913–1998," Piketty T, Saez E. NBER Working Paper 8467, September 2001; "The Evolution of Top Incomes: A Historical and International Perspective," Piketty T, Saez E. NBER Working Paper 11955, January 2006.
Return to Text

[9] "Innovation and Top Income Inequality," Aghion P, Akcigit U, Bergeaud A, Blundell R, Hémous D. NBER Working Paper 21247, June 2015; "A Schumpeterian Model of Top Income Inequality," Jones C, Kim J. NBER Working Paper 20637, July 2015.
Return to Text

[10] Aghion et al., Ibid.
Return to Text

[11] "Induced Innovation and Social Inequality: Evidence from Infant Medical Care," Cutler D, Meara E, Richards-Shubik S. NBER Working Paper 15316, September 2009.
Return to Text

[12] "Who Profits from Patents? Rent-Sharing at Innovative Firms," Kline P, Petkova N, Williams H, Zidar O. NBER Working Paper 25245, March 2019.
Return to Text

[13] "Technological Innovation and Labor Income Risk," Kogan L, Papanikolaou D, Schmid L, Song J. NBER Working Paper 26964, April 2020.
Return to Text

[14] "Who Becomes an Inventor in America? The Importance of Exposure to Innovation," Bell A, Chetty R, Jaravel X, Petkova N, Van Reenen J. NBER Working Paper 24062, January 2019; "The Rise of American Ingenuity: Innovation and Inventors of the Golden Age," Akcigit U, Grigsby J, Nicholas T. NBER Working Paper 23047, January 2017; "The Social Origins of Inventors," Aghion P, Akcigit U, Hyytinen A, Toivanen O. NBER Working Paper 24110, December 2017.
Return to Text

[15] "The Allocation of Talent and US Economic Growth," Hsieh C-T, Hurst E, Jones C, Klenow P. NBER Working Paper 18693, January 2013.
Return to Text

[16] Two recent examples are "Synergizing Ventures," Akcigit U, Dinlersoz E, Greenwood J, Penciakova V. NBER Working Paper 26196, August 2019; "Private Equity and Growth," Jovanovic B, Ma S, Rousseau P. NBER Working Paper 28030, October 2020.
Return to Text

[17] "The Deregulation of the Private Equity Markets and the Decline in IPOs," Ewens M, Farre-Mensa J. NBER Working Paper 26317, December 2019.
Return to Text

[18] "Venture Capital's Role in Financing Innovation: What We Know and How Much We Still Need to Learn," Lerner J, Nanda R. NBER Working Paper 27492, July 2020.
Return to Text

[19] "Benchmarking the Returns to Venture," Woodward S, Hall R. NBER Working Paper 10202, January 2004.
Return to Text

[20] "Diversity in Innovation," Gompers P, Wang S. NBER Working Paper 23082, January 2017.
Return to Text

[21] "Black and White: Access to Capital among Minority-Owned Startups," Fairlie R, Robb A, Robinson D. NBER Working Paper 28154, November 2020.
Return to Text

Research Summaries

Long-Run Trends and the Natural Rate of Unemployment

Ayşegül Şahin

Ayşegül Şahin is the Richard J. Gonzalez Regents Chair in Economics at the University of Texas at Austin and an NBER research associate in the Economic Fluctuations and Growth and Monetary Economics programs. She has been serving as a coeditor of the *American Economic Journal: Macroeconomics* since January 2020.

Şahin is a member of the panel of economic advisers of the Congressional Budget Office, the Bureau of Labor Statistics' technical advisory committee, the American Economic Association Committee on Economic Statistics and the advisory boards of the Federal Reserve Bank of San Francisco and the Carnegie-Rochester-NYU Conference on Public Policy. She also is a consultant to the Federal Reserve Banks of Cleveland, Dallas, and Minneapolis.

Prior to joining UT Austin's economics department, Şahin was a research economist at the Federal Reserve Bank of New York for 14 years, concentrating primarily on analysis of the US labor market. Her research focuses on analysis of macro-labor issues such as unemployment and labor force participation dynamics, labor market mismatch, the natural rate of unemployment, gender disparities in labor market outcomes, and entrepreneurship.

Şahin grew up in Turkey, where she studied electrical engineering at Bilkent University in Ankara before earning her PhD in economics from the University of Rochester. She lives in Austin and enjoys hiking and doing jigsaw puzzles with her daughter.

Starting with Milton Friedman and Edmund Phelps, academics and policymakers have endeavored to measure a sustainable level of unemployment and the implications that deviations from this level have for inflation of prices and wages. This natural rate of unemployment, u^*, is broadly defined as the unemployment rate at which, controlling for supply shocks, inflation remains stable.

Long-run trends in the labor market and changes in inflation expectations make it hard to pin down this natural rate of unemployment. Specifically, the dramatic trend decline in unemployment and the concurrent anchoring of inflation expectations since the 1980s have triggered extensive discussions in policy and academic circles. My recent work focuses on using detailed data on labor market flows and inflation expectations to estimate the natural rate of unemployment.

In this report, I first focus on the drivers of the trend decline in unemployment and review my work that connected this decline to two prominent long-run trends in the economy: the grand gender convergence and the dual aging of workers and firms. Then I summarize my work and discuss a unified framework that I have developed with Richard Crump, Stefano Eusepi, and Marc Giannoni for estimating the natural rate of unemployment. While I mostly focus on the period before the COVID-19 pandemic, I end with a discussion of the effect of the pandemic on the natural rate of unemployment.

Inflows to and Outflows from Unemployment, 1960–2018

*The inflow rate is the percentage of employed workers leaving employment and becoming unemployed each month. The outflow rate is the percentage of unemployed workers becoming employed each month.
Source: Crump R, Eusepi S, Giannoni M, and Şahin A, NBER Working Paper 25930 and published as "A Unified Approach to Measuring u*," Brookings Papers on Economic Activity, 50(1), Spring 2019, pp 43–214*
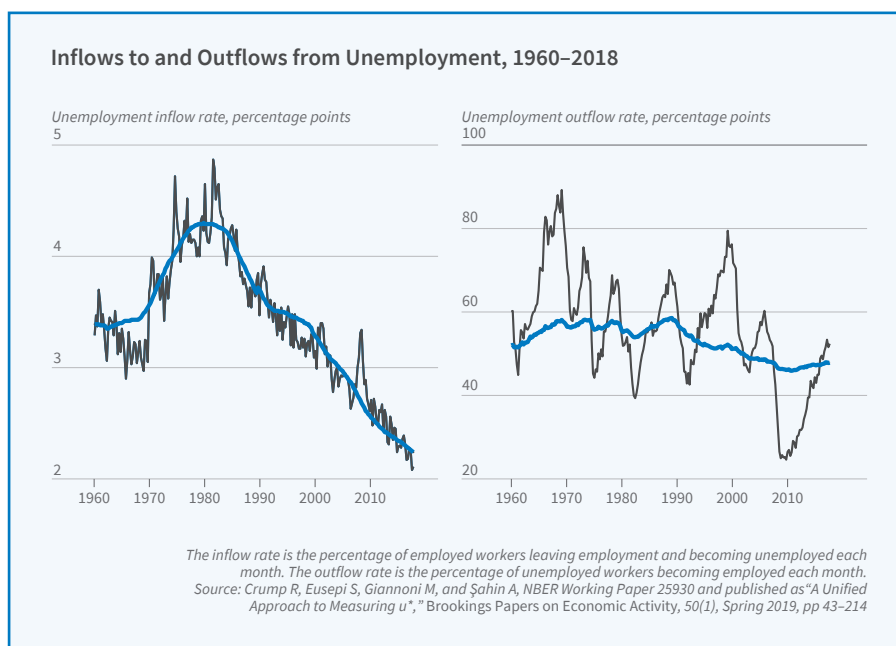
Figure 1

Trend Decline in the Unemployment Rate

A useful insight from my research with Michael Elsby and Bart Hobijn is that the flow origins of unemployment rate movements provide useful information about the underlying drivers of unemployment fluctuations and trends.[1] The idea is simple: the unemployment rate increases either because more workers become unemployed (inflows increase) or it becomes harder for the unemployed to leave unemployment (outflows decrease). Visual examination of inflow and outflow rates in Figure 1 shows that the inflow rate is characterized by sharp, short-lived spikes during recessions, while the outflow rate from unemployment is strongly procyclical with persistent downswings during recessions. The figure also shows the secular trends in these flow rates, estimated using flow data by detailed demographics with a state-space method that I developed with Crump, Eusepi, and Giannoni.[2] The two flows that shape the evolution of the unemployment rate over time exhibit differential long-run trends. The inflow rate has a striking downward trend declining gradually to 0.02, with half of its level preceding the twin recessions of the early 1980s. In contrast, there is no evident trending behavior in the outflow rate.

This stark decline in the rate at which workers become unemployed caused about a 1 percentage point decline from the 1980s to the 1990s and another 1.5 percentage point decline from the 1990s to 2020 in the long-term trend rate of unemployment. Interestingly, this downward trend continued even after the dramatic job losses of the Great Recession, underscoring the importance of secular trends in the labor market. My research has focused on explaining this declining incidence of unemployment.

Grand Gender Convergence

The United States experienced grand gender convergence in the 20th century, with female labor force participation, the fraction of all women who

Unemployment Inflows by Gender, 1976–2018

Inflow rate, percentage points

Women

Men

Figure 2

are in the labor force, increasing from around 47 percent in 1976 to approximately 60 percent in 2000.[3] The main driver of the rise in the female labor force participation rate was the increase in participation of married women with children. Women started to work longer into their pregnancies and to work sooner after childbirth than their counterparts in the 1960s, likely due to changes in social norms, more widespread availability of maternity leave, which facilitated return to women's previous jobs, and advances in maternal health and child care. As labor market interruptions declined, women's labor force attachment gradually increased. Having stretches of uninterrupted employment allowed women to

build more stable employment relationships. Stefania Albanesi and I found that this reduced frictional unemployment through a decline in the incidence of job loss and the incidence of unemployment during reentry into the labor force.[4] Figure 2 shows the unemployment inflow rate by gender.

During the 1980s and 1990s, the unemployment inflow rate for women, which had been higher than that for men, converged to men's rate, driving down the secular trend of unemployment. The importance of gender convergence was relatively minor after 2000. This is when another prominent trend — dual aging — took over.

Dual Aging

The US economy has been experiencing a striking shift toward older workers and older firms since the mid-1990s. While the change in worker demographics is directly attributable to the drastic increase in births following World War II, the emphasis on aging of firms is relatively new, as data have only recently become available. Benjamin Pugsley and I show that declining births of firms almost fully account for the shift of employment toward older firms.[5] Moreover, in joint work with Fatih Karahan, Pugsley and I find that the origin of the decline in firm entry is the decline in labor supply growth arising from the aging of the baby boom cohort and the flattening out of the female labor force participation rate.[6] We establish a clear link from worker to firm demographics.

The aging pattern is stark. Around 18 percent of the labor force consisted of workers between 16 and 24 years old (*young workers* in Figure 3) in 1987. By
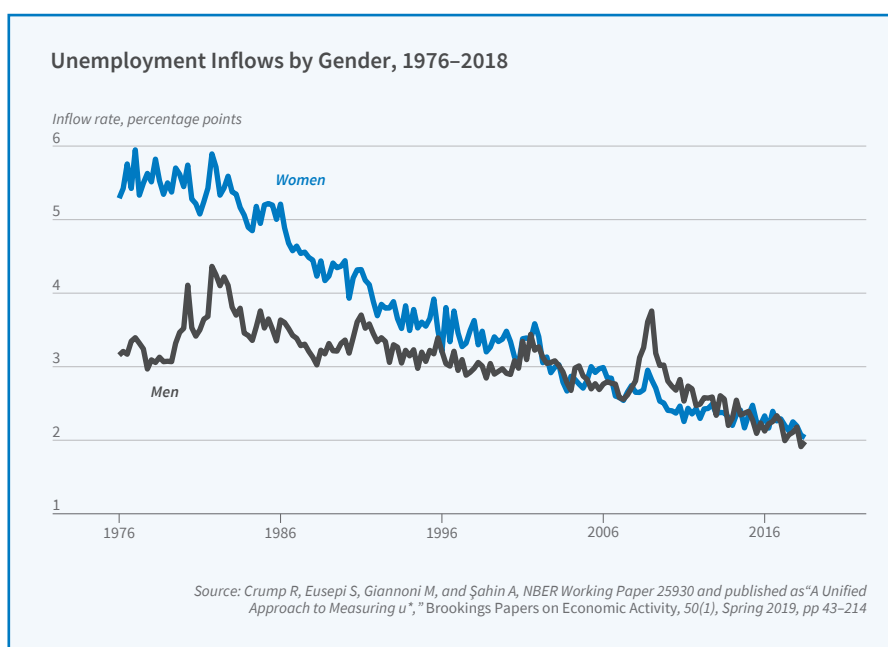
2017, the number had declined to 10 percent. The employment share of firms less than five years old also followed a similar pattern, with their share declining from around 20 percent to 10 percent. On the flip side, in 1987, firms 11 or more years old —mature firms— employed about two-thirds of the workers in the economy. By 2017, the number of workers in mature firms had increased to 80 percent. [Figure 3]

Younger workers are four times more likely to become unemployed than prime-age workers. Similarly, firms aged between one and five years old are twice as likely to eliminate jobs as their older counterparts. These patterns suggest that declines in unemployment and job destruction are direct consequences of dual aging. While the shift in worker and firm age composition falls short of accounting for the decline in the inflow rate, aging also affects the economy by affecting age-specific outcomes. Put differently, in economies with older workers and firms, unemployment and job destruction are lower for all workers. Using state-level variation and an instrumental variables approach, Crump, Eusepi, Giannoni and I showed that a 1 percentage point increase in mature firms' share lowers the job destruction rate by 0.60 percentage points for younger firms.[7]

While grand gender convergence was important in accounting for the secular decline in the unemployment rate

Aging of Workers and Firms, 1987–2016

Share of firms and workers
22%

Young firms (<5 years)

Young workers (16-24 years)

Share of workers 25%

Share of firms 90%

Mature firms (>5 years)

Mature workers (55+ years)

Source: Crump R, Eusepi S, Giannoni M, and Şahin A, NBER Working Paper 25930 and published as "A Unified Approach to Measuring u*," Brookings Papers on Economic Activity, 50(1), Spring 2019, pp 43–214
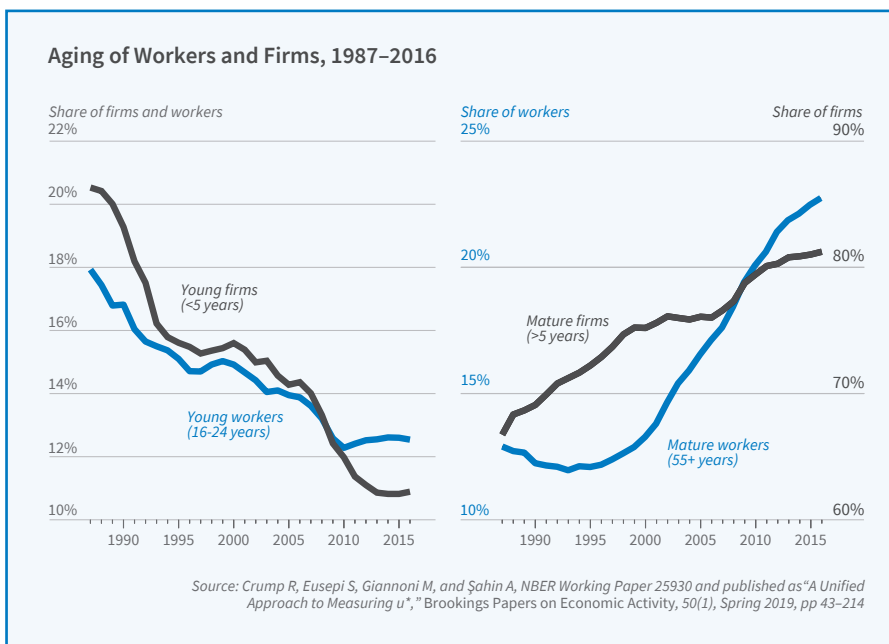
Figure 3

until 2000, dual aging stands out as an important driver of the decline since then.

Natural Rate of Unemployment

Grand gender convergence and dual aging together have reduced the overall incidence of unemployment, and consequently the secular trend of unemployment. Concurrently, inflation expectations became better anchored following

the Volcker disinflation.[8] Estimating the natural rate of unemployment requires recognizing these prominent changes in the macroeconomy.

Crump, Eusepi, Giannoni and I calculate this in our recent paper.[9] We employ a forward-looking Phillips curve linking inflation to expected inflation and the unemployment gap (the difference between the actual and natural rates of unemployment). We utilize survey-based expectations of inflation at different horizons to provide noisy signals of true inflation expectations and impose that the secular trend of unemployment we derive from the flow dynamics acts as an anchor for the natural rate, while accommodating the possibility of persistent deviations.

Figure 4 shows the evolution of u^* since 1960. In the first decade of the sample, the natural rate hovers slightly below 6 percent and starts rising in the early 1970s, easily exceeding 7 percent by the late 1970s before falling to about 7 percent in 1983. The natural rate then declines throughout the 1980s falling consistently below the median of the secular trend of the unemployment rate (black solid line). The period from the 1990s to the Great Recession is characterized by a fairly stable natural rate of unemployment,

The Natural Rate of Unemployment, 1960–2018

Estimate of natural unemployment rate
Actual unemployment rate
Long-run trend of unemployment rate

Light-blue shading represents 95% confidence interval.
Source: Crump R, Eusepi S, Giannoni M, and Şahin A, NBER Working Paper 25930 and published as "A Unified Approach to Measuring u*," Brookings Papers on Economic Activity, 50(1), Spring 2019, pp 43–214

Figure 4

which remains range-bound between 4.5 and 5.5 percent. Finally, during the prerecession years 2005–06, the natural rate of unemployment begins increasing toward its long-run trend. In the aftermath of the Great Recession, the natural rate of unemployment gradually declines roughly in line with its secular trend. The natural rate toward the end of 2018 was 3.8 percent, with a confidence interval between 3.4 and 4.5 percent, consistent with the unemployment gap being around zero before the pandemic.

While some recent work argues for a change in the unemployment-inflation trade-off, our work emphasizes the role of inflation expectations. This is illustrated in Table 1, which compares the early 1980s with the late 2000s. In the early 1980s, we estimate an unemployment gap (the difference between the actual and the natural rate of unemployment) of 3.5 percentage points. During this time period, average core CPI inflation fell from 9.1 percent in 1978–79 to 4.6 percent in 1982–83. Following the Great Recession, which displays the largest une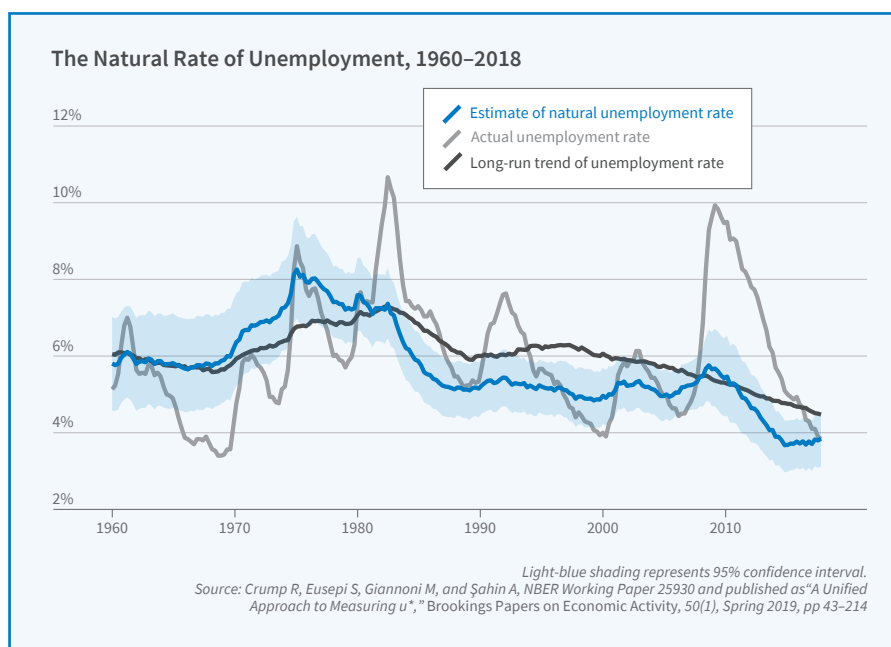mployment gap in the sample, at around 4 percentage points, price inflation declined only modestly, from 2.5 percent in 2006–07 to 1.2 percent in 2009–10. The key determinant is the behavior of inflation expectations, which dropped much more sharply in the early 1980s than in the aftermath of the Great Recession. The comparison of the early 1980s with the Great Recession period demonstrates the importance of accounting for inflation

expectations in explaining the behavior of inflation and the unemployment gap.

The longest labor market expansion in postwar US history came to an abrupt end with the emergence of the COVID-19 pandemic in March 2020. The unemployment rate jumped from its historically low level of 3.5 percent in February to 14.8 percent in April. This sharp increase was followed by a

Evolution of Unemployment Gap, Core CPI, and Inflation expectations

	Early 1980s	Late 2000s
Unemployment gap	≈ 3.5 percentage points	≈ 4 percentage points
Core CPI	9.1% in 1978–79	2.5% in 2006–7
Core CPI	4.6% in 1982–83	1.2% in 2009–10
Decline in Core CPI	4.5 percentage points	1.3 percentage points
Inflation expectations	Dramatic drop	Mild drop

Source: Crump R, Eusepi S, Giannoni M, and Şahin A, NBER Working Paper 25930 and published as "A Unified Approach to Measuring u*," Brookings Papers on Economic Activity, 50(1), Spring 2019, pp 43–214

Table 1

steep decline; the unemployment rate retreated to 6.9 percent by October. Murat Tasci, Jin Yan, and I show that this was due to the unprecedented rise in unemployment inflows, which was mostly driven by workers on temporary layoffs.[10] Applying the methodology I developed with Crump, Eusepi, and Giannoni, we find that during the pandemic recession, increased from 3.8 percent to a range of 4.0 to 4.5 percent, suggesting that the unemployment gap as of May 2021 stood between 1.3 and 1.8 percentage points.

1 "Unemployment Dynamics in the OECD," Elsby M, Hobijn B, Şahin A. NBER Working Paper 14617, December 2008, and Review of Economics and Statistics 95(2), 2013, pp. 530–548.
Return to Text

2 "A Unified Approach to Measuring u*," Crump R, Eusepi S, Giannoni M, Şahin A. NBER Working Paper 25930, June 2019, and published in Brookings Papers on Economic Activity 50(1), Spring 2019, pp. 43–214.
Return to Text

3 "The Quiet Revolution That Transformed Women's Employment, Education, and Family," Goldin C. NBER Working Paper 11953, January 2006.
Return to Text

4 "The Gender Unemployment Gap," Albanesi S, Şahin A. NBER Working Paper 23743, August 2017, and Review of Economic Dynamics 30, 2018, pp. 47–67.
Return to Text

5 "Grown-up Business Cycles," Pugsley B, Şahin A. Review of Financial Studies 32(3), 2018, pp. 1102–1147.
Return to Text

6 "Demographic Origins of the Startup Deficit," Karahan F, Pugsley B, Şahin A. NBER Working Paper 25874, May 2019.
Return to Text

7 Ibid note 2.
Return to Text

8 "Anchored Inflation Expectations," Carvalho C, Eusepi S, Moench E, Preston B. 2017, SSRN.
Return to Text

9 Ibid note 2.
Return to Text

10 "Unemployment in the Time of COVID-19: A Flow-Based Approach to Real-Time Unemployment Projections," Şahin A, Tasci M, Yan J. NBER Working Paper 28445, February 2021.
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Dynamic Corporate Finance under Costly Equity Issuance

Patrick Bolton and Neng Wang

Two fundamental concepts in corporate finance are the net present value (NPV) rule and the Modigliani-Miller (MM) irrelevance proposition. When financial markets operate without frictions, when investors can trade securities that correspond to all relevant risks, when investors and managers share the same information, when incentives are aligned, and when there are no tax distortions, then corporate finance boils down to a valuation exercise and a simple investment decision rule: undertake all investments with a positive NPV. How companies and investments are financed is irrelevant.

This characterization of financial markets is frequently taken as approximately valid; a plausible and convenient simplification even if it poorly reflects reality. Corporate income taxation, the interest tax shield for debt, and bankruptcy costs are often the only deviations from this view that are considered when explaining corporate financing choices.

Although tax distortions and bankruptcy costs are obviously relevant, they cannot alone account for most observed corporate financial decisions. They cannot explain why companies hold so much cash, their leverage dynamics, nor their payout, equity issuance, and investment policies. We show in our research that the cost of issuing equity is a key and practically relevant distortion. Because of asymmetric information or incentive misalignment, firms must incur costs when raising external funds[1] and these costs are higher for equity than for debt financing.[2]

When firms face external financing costs, they seek to avoid such financing. This is a key reason that firms retain earnings and accumulate cash (corporate savings). With Hui Chen, we analyze a dynamic model with three main building blocks: (1) an investment rule based on the marginal value of incremental capital investment relative to its cost, (2) cash, equity, and a credit line as funding sources (together with hedging), and (3) equity issuance costs and cash carry costs.[3] A first, key result of our analysis is that investment is no longer determined by equating the marginal cost of investing with the marginal addition to the firm's valuation from such capital, as in the neoclassical theory of investment. Instead, investment is determined by the ratio of the marginal increase in the firm's value to the marginal value of cash. The marginal cost of investing equals the marginal product of capital, also known as marginal q, divided by the marginal value of cash.

When firms are flush with cash, the marginal value of cash is about one, so that this equation is approximately the same as the equation under MM irrelevance. But when firms are close to running out of internal funds, or close to the limit of their credit line, the marginal value of cash is much larger than one, so that marginal product may need to yield a much higher return, and optimal investment may be far lower, than the level pre-

Patrick Bolton is the Barbara and David Zalaznick Professor of Business at Columbia University and a visiting professor at Imperial College London. An NBER research associate in the Corporate Finance Program, he is a past president of the American Finance Association, a fellow of the Econometric Society and the American Academy of Arts and Sciences, and a corresponding fellow of the British Academy. He has coauthored *Contract Theory* (2005) with Mathias Dewatripont and *The Green Swan: Central Banking and Financial Stability in the Age of Climate Change* (2020) with Morgan Despres, Luiz Pereira Da Silva, Frédéric Samama, and Romain Svartzman.

Neng Wang is the Chong Khoon Lin Professor of Real Estate and Finance at Columbia Business School. He is also a research associate in the NBER's Asset Pricing Program and a senior research fellow at the Asian Bureau of Finance and Economic Research.

Wang is an associate editor of *The Journal of Finance* and was an editor in finance at *Management Science*. His research interests include corporate finance, asset pricing, and macroeconomics.

Wang was born and raised in China. He received his BS in chemistry from Nanjing University, an MS in chemistry from the California Institute of Technology, an MA in international relations from the University of California, San Diego, and his PhD in finance from Stanford University in 2002. He lives in Scarsdale, NY, with his wife and three children.

dicted under MM neutrality.

Figure 1 illustrates the sizable value destruction that a financial crisis can cause, as firms are shut out of capital markets and can only rely on internal funds to continue their operations.[4] Panels A and B show that firm value is increasing and concave in cash holdings, that the marginal value of cash always exceeds one, and that it is very large when the firm runs out of cash. Panel C shows that firms substantially cut investment and engage in very costly fire sales when liquidity is low. The firm values a dollar in hand at about $30 and sells about 60 percent of its productive capital at a significant value discount when it is close to being inefficiently liquidated, in sharp contrast to the predictions of the neoclassical theory of investment. Finally, Panel D reveals how nonlinear and non-monotonic investment-cash sensitivity can be, indicating that investment-cash sensitivity is a poor measure of how financially constrained a firm is.[5]

A second key result concerns the firm's optimal cash-inventory policy. That involves continuous management of cash reserves through adjustments in investment, asset sales, and corporate hedging between two barriers: a lower bound at which the firm must tap external financing after exhausting all its cash reserves, and an upper bound at which the firm has accumulated enough cash that it is safe to pay out any additional earnings. Our model provides insights into how these bounds depend on factors such as the growth rate and volatility of earnings, external financing costs, and capital adjustment costs. It can thus provide part of an explanation for why the aver-

age cash-to-assets ratio for US public corporations more than doubled from 1980 to 2006, and remained elevated after the 2008 financial crisis.[6]

Market Timing and Financial Crises

Our model predicts that cash holdings increase when earnings volatility rises, but this is not an adequate explanation for the rise in corporate savings. A

Corporate Cash Balances, Investment, and Valuation

A. Firm value/capital ratio

B. Marginal value of cash

C. Investment-capital ratio

D. Investment-cash sensitivity

Source: Bolton P, Chen H, and Wang N. NBER Working Paper 14845, and published as "A Unified Theory of Tobin's q, Corporate Investment, Financing, and Risk Management" Journal of Finance, 66(5), October 2011, pp 1545–78

Figure 1

more plausible explanation is the risk of a financial crisis, which causes a jump in the cost of external financing and possibly even a financial market shutdown.

With Chen, we further explore how firms' financial policies are affected by anticipation of random financial crises.[7] We show that during such a crisis, firms delay payout, cut investment, and engage in fire sales of assets even when their productivity remains unaffected, all to avoid incurring prohibitive equity issuance costs. This is especially true when a firm enters the crisis with low cash reserves. We also find that in normal

or boom times, when external financing costs are affordable (cheap), firms optimally time their equity offerings and issue equity even when there is no immediate need for external funds. Along with the timing of equity issuance by firms with low cash holdings in good market conditions, there is also optimal timing of stock repurchases by firms with large cash holdings. Just as firms with low cash holdings seek to take advantage of low costs of external financing to raise more funds, firms with high holdings will be inclined to disburse their cash through stock repurchases when financing conditions improve. This result is consistent with the finding that aggregate equity issuances and stock repurchases are positively correlated.[8] When the perceived probability of a crisis rises, firms invest more conservatively, issue equity sooner, and delay payouts to shareholders, all to increase cash hoards that will help them through the impending crisis. Finally, we demonstrate that firms' risk premia have two components: productivity and financing. Both risk premia change substantially with firms' cash holdings, especially in a crisis when external financing conditions are poor.

Real Options and Financial Flexibility

Real-options theory, which applies when investments are lumpy and irreversible, is an important subfield of corporate finance that generally assumes that firms operate in an MM environment. With Jinqiang Yang, we show that the presence of external financing costs fundamentally alters the value and exercising decisions

associated with real options.[9] To avoid incurring external financing costs, firms delay investment until they have sufficient funds, and mostly finance their investments with internally generated funds, consistent with the empirical evidence.

In our model, investment, financing, payout, and abandonment policies all depend on both earnings fundamentals and the firm's cash holdings. We show that when cash holdings are depleted — following a crisis, for example — low investment persists even when earnings fundamentals fully recover. After a crisis, firms are in repair mode, seeking to rebuild their internal funds. Also, firms favor investments with front-loaded earnings, and payout policy is different depending on whether the firm is in a growth or a mature phase. In a mature phase a more profitable firm pays out more, while in a growth phase it pays out less.

Managing Keyman Risk

In addition to the cost of raising external funds, moral hazard is an important source of financial constraints. With Yang, we explore a dynamic model where the source of moral hazard is inalienability of human capital[10] — what is commonly referred to as "keyman risk" in the tech industry to describe the risk that key employees could leave the firm.[11] It is often noted that tech companies stand out in terms of their cash holdings. We explain these tech company cash policies in terms of mitigation of keyman risk.

How do tech companies retain their most valuable engineers? Essentially by offering enough deferred state-contingent compensation. We show that the larger the company's cash holdings and borrowing capacity, the greater its ability to retain talent by making credible compensation promises. We also describe the company's optimal risk management policy, showing how the company's idiosyncratic and aggregate risk exposures can be set to reduce both the cost of retaining talent and the cost of financing. In our model, physical capital is illiquid and depreciates randomly. The firm faces risk with respect both to its future financial performance and to the outside options of key employees. To retain risk-averse employees, the company optimally compensates them by smoothing their consumption and limiting their risk exposure.

We show that the objective of corporate risk management is not achieving an optimal risk-return profile for investors; they can do that on their own. Rather, risk management is designed to offer optimal risk-return profiles to risk-averse, under-diversified, key employees. The company is, in effect, both the employer and the asset manager for its key employees. Indeed, corporations invest 40 percent of their liquid savings in risky financial assets, and less-constrained firms invest more in the market portfolio.[12]

We further show that when companies are severely financially constrained they cut compensation, reduce investment, engage in asset fire sales, and reduce hedging positions, with the primary objective of surviving by honoring liabilities and retaining key employees.[13]

Leverage Dynamics under Costly Equity Issuance

An important lesson from dynamic models of corporate finance is that "capital structure is not static, but rather evolves over time as an aggregation of sequential decisions."[14] With Yang, we build on the work of Christopher Hennessy and Toni Whited and show how leverage dynamics can be naturally explained by companies' efforts to avoid incurring equity issuance costs.[15] We consider a company that can issue equity and short-term debt, facing both cash-flow diffusion and jump shocks. As in the MM trade-off theory widely taught in MBA classes, when the company faces no equity issuance costs it always stays at its target leverage, defined as the point at which the benefits from debt financing are equal to expected bankruptcy costs. In our model, debt has a net funding advantage over equity because shareholders are impatient. When making a profit, the company uses it to pay down debt to the extent that it stays at its target leverage, and when making a loss it raises just enough new equity to return to its target leverage. These predictions are clearly counterfactual.

However, when we incorporate equity issuance costs, the model yields plausible average leverage outcomes and leverage dynamics. First, and somewhat paradoxically, it is optimal for companies to target lower leverage when they face higher equity issuance costs. Indeed, when it is costly to issue equity, it is best to avoid incurring such costs too often, which is achieved by keeping leverage low to be able to cover a future loss by borrowing, which is cheaper. Second, the company's leverage increases following a loss and decreases following a profit realization. Leverage can then only increase in response to earnings losses. When the company attains its low leverage target any additional profit is paid out, and when leverage reaches the company's debt capacity any additional loss either triggers a costly recapitalization via equity issuance or — when the jump loss is very large — a default. When leverage is close to the recapitalization target, the expected change in leverage is negative, so that leverage tends to revert to the recapitalization target. But when leverage passes a certain threshold, the expected change in leverage is positive, so that the company enters a leverage death spiral.

These leverage dynamics are consistent with the empirical evidence pointing to the heterogeneity of corporate leverage of firms with similar characteristics.[16] Companies, in effect, behave like households with credit card debt, except that they also have an option to issue external equity to deleverage. As credit card revolvers, firms pay down their debt when they receive a positive earnings shock, and they increase their debt when they have no option to do otherwise, consistent with empirically observed leverage dynamics.[17]

Dynamic Trade-off Theory under Costly Equity Issuance

With Chen, we add equity issuance costs to the standard dynamic trade-off theory model of capital structure.[18] An important additional cost of debt financ-

ing in this expanded model is debt service: debt payments drain the firm's cash holdings, which increases the risk of incurring equity issuance costs. Also, realized earnings are separated in time from payouts to shareholders, so that savings have both a corporate tax, when savings are inside the firm, and a personal tax component, when savings are outside the firm. In this setting, standard measures of the net tax benefits of debt are no longer valid.

This framework can be extended beyond the traditional corporate setting. With Ye Li and Yang, we show that costly equity issuance also plays a critical role in understanding the dynamics of a bank's balance sheet, bank valuation, and the effects of equity capital and leverage regulation.[19] We develop a dynamic theory of banking in which the role of deposits is akin to that of productive capital in the neoclassical theory of investment for nonfinancial firms. We show that deposits create value for well-capitalized banks. However, the marginal value of deposits can turn negative for undercapitalized banks, as further inflows of deposits may require the bank to raise more costly equity capital to comply with leverage regulations. Our predictions on bank valuation and dynamic asset-liability management are broadly consistent with the evidence, and our model offers new insights into the dynamics of banking in a low interest rate environment.

In sum, our research shows that avoiding future costly equity issuance is a key motive driving various aspects of dynamic corporate financial behavior.

[1] "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have," Myers SC, Majluf NS. *Journal of Financial Economics* 13(2), 1984, pp. 187–221.
Return to Text
[2] "The Capital Structure Puzzle," Myers SC. *The Journal of Finance* 39(3), 1984, pp. 574–592.
Return to Text
[3] "A Unified Theory of Tobin's q, Corporate Investment, Financing, and Risk Management," Bolton P, Chen H, Wang N. NBER Working Paper 14845, April 2009, and *The Journal of Finance* 66(5), 2011, pp. 1545–1578.
Return to Text
[4] Ibid. Figure 2.
Return to Text
[5] "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?" Kaplan SN, Zingales L. *The Quarterly Journal of Economics* 112(1), 1997, pp. 169–215. "The Corporate Propensity to Save," Riddick LA, Whited TM. *The Journal of Finance* 64(4), 2009, pp. 1729–1766.
Return to Text
[6] "Why Do US Firms Hold So Much More Cash Than They Used To?" Bates TW, Kahle KM, Stulz RM. *The Journal of Finance* 64(5), 2009, pp. 1985–2021, and "Is There a US High Cash Holdings Puzzle after the Financial Crisis?" Pinkowitz LF, Stulz RM, Williamson RG. The Ohio State University Fisher College of Business Working Paper No. 2013-03-07.
Return to Text
[7] "Market Timing, Investment, and Risk Management," Bolton P, Chen H, Wang N. NBER Working Paper 16808, February 2011, and *Journal of Financial Economics* 109(1), 2013, pp. 40–62.
Return to Text
[8] "The Timing of Financing Decisions: An Examination of the Correlation in Financing Waves," Dittmar AK, Dittmar RF. *Journal of Financial Economics* 90(1), 2008, pp. 59–83.
Return to Text
[9] "Investment under Uncertainty with Financial Constraints," Bolton P, Wang N, Yang J. NBER Working Paper 20610, July 2019, and *Journal of Economic Theory* 184, November 2019, 10.1016.
Return to Text
[10] "A Theory of Debt Based on the Inalienability of Human Capital," Hart O, Moore J. *The Quarterly Journal of Economics* 109(4), 1994, pp. 841–879.
Return to Text
[11] "Optimal Contracting, Corporate Finance, and Valuation with Inalienable Human Capital," Bolton P, Wang N, Yang J. NBER Working Paper 20979, March 2019, and *The Journal of Finance* 74(3), 2019, pp. 1363–1429.
Return to Text
[12] "Precautionary Savings with Risky Assets: When Cash Is Not Cash," Duchin R, Gilbert T, Harford J, Hrdlicka C. *The Journal of Finance* 72(2), 2017, pp. 793–852.
Return to Text
[13] "Boarding a Sinking Ship? An Investigation of Job Applications to Distressed Firms," Brown J, Matsa DA. *The Journal of Finance* 71(2), 2016, pp. 507–550.
Return to Text
[14] "Presidential Address: Collateral and Commitment," DeMarzo P. *The Journal of Finance* 74(4), 2019, pp. 1587–1619.
Return to Text
[15] "Leverage Dynamics and Financial Flexibility," Bolton P, Wang N, Yang J. NBER Working Paper 26802, February 2020. This research builds on "How Costly is External Financing? Evidence from a Structural Estimation," Hennessy CA, Whited TM. *The Journal of Finance* 62(4), 2007, pp. 1705–1745.
Return to Text
[16] "Do Firms Rebalance Their Capital Structures?" Leary MT, Roberts MR. *The Journal of Finance* 60(6), 2005, pp. 2575–2619, and "Back to the Beginning: Persistence and the Cross-Section of Corporate Capital Structure," Lemmon ML, Roberts MR, Zender JF. *The Journal of Finance* 63(4), 2008, pp. 1575–1608.
Return to Text
[17] "Corporate Deleveraging and Financial Flexibility," DeAngelo H, Gonçalves AS, Stulz RM. *The Review of Financial Studies* 31(8), 2018, pp. 3122–3174.
Return to Text
[18] "Debt, Taxes, and Liquidity," Bolton P, Chen H, Wang N. NBER Working Paper 20009, March 2014.
Return to Text
[19] "Dynamic Banking and the Value of Deposits," Bolton P, Li Y, Wang N, Yang J. NBER Working Paper 28298, December 2020.
Return to Text

Wealth Inequality in the United States

Edward N. Wolff

Edward N. Wolff received his PhD from Yale University in 1974 and is currently professor of economics at New York University, where he has taught since 1974. He is a research associate at the NBER, where he is affiliated with the Productivity, Innovation, and Entrepreneurship Program, and is a member of the editorial boards of the *Journal of Economic Inequality* and the *Review of Income and Wealth*.

Wolff was managing editor of the *Review of Income and Wealth,* 1987–2004; senior scholar at the Levy Economics Institute of Bard College, 1999–2011; visiting scholar at the Russell Sage Foundation, 2003–04; president of the Eastern Economics Association, 2002–2003; and a council member of the International Association for Research in Income and Wealth, 1987–2012, and the International Input-Output Association, 1995–2003.

His principal research areas are income and wealth inequality. Recent books include: *Does Education Really Help? Skill, Work, and Inequality* (2006); *The Transformation of the American Pension System: Was It Beneficial for Workers?* (2011); *Inheriting Wealth in America: Future Boom or Bust?* (2015); and *A Century of Wealth in America* (2017). He has also published articles in a wide range of journals including the *American Economic Review, Journal of Political Economy, Review of Economics and Statistics, Review of Income and Wealth,* and the *Journal of Economic Inequality*.

Much attention has focused in the last few years on the issue of inequality. With recent proposals for a direct wealth tax, particular attention has been given to wealth inequality. My work also focuses on this issue. Here, I summarize studies of four different aspects.

First, what are the general trends in wealth and wealth inequality over the last 60 years or so in the United States? I pay particular attention to the role of leverage and asset price movements in explaining these trends. Second, how has the racial wealth gap evolved over time, and what are the factors that account for its movement? Third, how does one account for the fact that certain assets like 401(k)s are tax-deferred? How does this affect the valuation of these assets and how does this impact measured inequality and wealth movements over time? Fourth, how might a direct tax on household wealth impact wealth inequality?

The Role of Leverage

In the first study, I examine wealth trends from 1962 to 2019.[1] My empirical work in this and the next three papers is based mainly on data from the Federal Reserve Board's Survey of Consumer Finances. In terms of median wealth, the year 2007 stands out as a true high-water mark. Median net worth in constant dollars showed robust growth over 1962–2001, gaining 1.55 percent per year, and rose even faster over 2001–07, at 2.90 percent per year. Then the Great Recession hit like a tsunami and wiped out 40 years of gains. Over 2007–10, house prices fell 24.5 percent in real terms, stock prices declined 26.6 percent, and median wealth was reduced by a staggering 43.9 percent. By 2010, median wealth was at about the same level as in 1969.

However, between 2010 and 2019 asset prices recovered, and median wealth advanced by a robust 41.9 percent. Still, it was 20.4 percent below its 2007 peak. Mean wealth more than fully recovered by 2016 and by 2019 it was up 9.2 percent from its 2007 level.

Wealth grew more vigorously at the top of the wealth distribution than in the middle. Indeed, according to the Gini coefficient and top wealth shares, wealth inequality rose sharply from 1983 to 1989 (the Gini coefficient was up 0.029), remained relatively stable from 1989 to 2007, then showed a steep increase over 2007–10 (the Gini was up 0.032), and a more modest rise from 2010 to 2016. By 2016, the Gini coefficient and the share of the top percentile were at their highest levels of the 57 years of the study period, at 0.877 and 39.6 percent, respectively. However, from 2016 to 2019 there was actually a small decline in inequality, with the top percentile share down by 1.4 percentage points, the Gini coefficient down by 0.008, and the mean wealth of the top 1 percent down by 1.9 percent.

Another notable trend is the sharp increase in relative debt after 1983, with the debt-income and the debt-net worth ratios peaking in 2010 and then receding. The overall homeownership rate rose from 63.4 percent in 1983 to a peak of 69.1 percent in 2004, then fell off to 64.9 percent in 2019. The overall stock ownership rate — either directly or indirectly through mutual funds, trust funds, or pension plans — after rising briskly from 31.7 percent to a peak of 51.9 percent over 1989–2001, fell off to 46.1 percent in 2013. It rebounded to 49.6 percent in 2019, though it was still down from its peak.

The key to understanding the plight of middle-class Americans in the years following the Great Recession is

their high degree of leverage, the high concentration of assets in their homes, and the precipitous fall in home prices. This translated into a very high negative rate of return on their wealth (−10.4 percent per year), which largely explains the steep decline in median wealth over 2007–10. High leverage, moreover, helps explain why median wealth fell more than house prices over these years. The high negative rate of return accounted for 61 percent of the collapse in median net worth, with the other 39 percent due to dissaving.

What about the recovery in median wealth after 2010? In 2010–16, the rate of return should have led to a $42,600 increase in median wealth, while the actual increase was $12,200. Dissaving reduced the gain by $30,400. For 2016–19, both the rate of return and saving made positive contributions, explaining 85.6 and 14.4 percent of the gain, respectively.

The large spread in returns between the middle three wealth quintiles and the top percentile — over 4 percentage points — also helps explain why wealth inequality climbed steeply from 2007 to 2010. It is first of note that, as shown in Figure 1, the return on net worth for the middle group exceeded that for the top percentile over the whole 1983–2019 period and for all subperiods except 1983–89 and 2007–10. A lot of theoretical work on wealth inequality assumes just the opposite relationship. In a decomposition analysis of the change in the ratio of the wealth of the top percentile to median wealth, the differential in returns between the two groups accounted for 28.7 percent of the increase in the inequality ratio

over the Great Recession, with differences in saving accounting for the rest. The middle class took a bigger relative hit to its wealth from the home price plunge than the top 1 percent did from the stock market decline. There was a modest rise in the inequality ratio from 2010 to 2016. The same decomposition shows that the differential in returns between the two groups — now in favor of the middle group — should have led to a decline in the inequality ratio, while there actually was an

increase. The inequality ratio fell a bit from 2016 to 2019. In this case, the rate of return difference — again in favor of the middle group — accounted for 18.2 percent of the decline and the residual accounted for 81.8 percent.

The Decline in Black and Hispanic Wealth

The year 2007 was also a watershed year for both the racial and ethnic wealth gaps.[2] The ratios of mean net worth between Blacks and Whites and between Hispanics and non-Hispanic Whites reached their maximum values, 0.19 and 0.26, respectively. The Great Recession hit Black households much harder than White because Blacks were more highly

leveraged and had a greater share of their assets in their homes; the racial ratio plunged to 0.14 in 2010, reflecting a 33 percent decline of Black wealth in real terms. The wealth gap remained unchanged from 2010 to 2019.

Hispanic households made sizable gains on White households from 1983 to 2007, with the mean net worth ratio growing from 0.16 to 0.26. However, like Blacks, Hispanics got hammered by the Great Recession, with their mean net worth plunging in half over 2007–10 and the wealth ratio falling from 0.26 to 0.15. The relative and absolute losses suffered by Hispanic households over these three years were also mainly due to their much higher leverage and greater concentration of assets in homes. Over 2010–16, the mean wealth ratio rebounded to 0.19, where it remained in 2019.

Differential leverage and resulting differences in rates of return on net worth play critical roles in accounting for movements in the wealth of minorities relative to Whites. Blacks and Hispanics had much higher indebtedness and a higher concentration of housing wealth than Whites. In 2007, the debt-net worth ratio among Black households was an astounding 0.553 and that for Hispanics was 0.511, compared to 0.154 among Whites. Housing as a share of gross assets was 54 percent for Blacks and 52.5 percent for Hispanics, compared to 30.8 percent for Whites. The rate of return on net worth for the Black and Hispanic middle groups surpassed that for Whites for the whole period 1983–2019 and for all subperiods except 1983–89 and 2007–10, as shown in Figure 2, on the next page.

Using a decomposition analy-

Real Rate of Return by Net Worth, 1983–2019

Average annual rate of return

	Top 1% net worth	Middle 3 quintiles net worth
1983–1989	3.7%	3.6%
1989–2001	4.0%	5.0%
2001–2007	3.9%	5.6%
2007–2010	-5.9%	-10.4%
2010–2016	5.9%	7.8%
2016–2019	4.4%	5.6%
Average over the period 1983–2019	3.5%	4.1%

Source: Wolff E, NBER Working Paper 28383, and published in part as "The declining wealth of the middle class, 1983–2016," Contemporary Economic Policy, February 2021, published online

Figure 1

sis, I find that capital revaluation explains about three-quarters of the advance of mean wealth among Black households over 2001–07 and 78 percent of the ensuing collapse over 2007–10. Among Hispanics, the corresponding figures are 59 and 57 percent. Differentials in returns account for 43 percent of the gain in the Black-White wealth ratio over 2001–07 and 39 percent of the decline over 2007–10. Over 2010–19, the higher rate of return for Black households should have helped close the racial wealth gap, but this was offset by greater dissaving.

Likewise, disparities in returns account for 33 percent of the gain in the Hispanic-White wealth ratio in 2001–07 and 28 percent of the ensuing drop over 2007–10. Over 2010–16, the higher returns for Hispanic households explain 41.4 percent of their relative gains, but over 2016–19 this effect is neutralized by greater dissaving.

The racial gap in augmented wealth, defined as the sum of net worth, defined-benefit pension wealth, and Social Security wealth, is considerably smaller than that in net worth. The former is defined as the present value of expected future pension benefits and the latter as the present value of expected Social Security benefits. In 2016, while the Black-White ratio in mean net worth was 0.14 and that in median net worth a mere 0.02, the ratio in mean augmented wealth was 0.27 and that in median augmented wealth also 0.27. The ratios in mean defined-benefit pension and Social Security wealth were notably higher, at 0.50 and 0.60, respectively. Whereas the racial gap in net worth widened from 1983 to 2016, the gap in augmented wealth remained largely unchanged.

Real Rate of Return by Race/Ethnicity, 1983–2019

Average annual real rate of return

Source: Source: Wolff E, NBER Working Paper 25198, and forthcoming in the Review of Income and Wealth
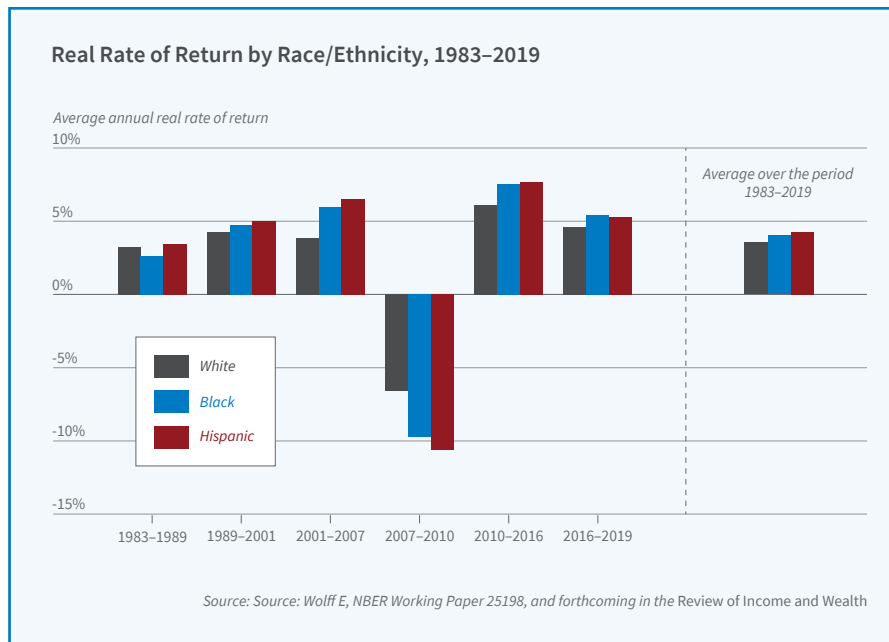
Figure 2

Taxes and the Revaluation of Household Wealth

The face value of 401(k)s, IRAs, and other tax-deferred assets cannot be directly valued with other components of wealth like houses, stocks, and securities because tax-deferred assets carry a substantial tax liability on withdrawal.[3] For example, an IRA valued at $1,000 can yield considerably less than $1,000 when the asset is "cashed out." Whether the net rate of return is higher with tax-deferred assets or directly investing in stocks depends on the income level of the investor, the time horizon, and the tax treatment of dividends.

I compare trends in wealth levels and wealth inequality with and without netting out this implicit tax liability.[4] I also consider how netting out income taxes due on accrued capital gains impacts wealth trends for both conventional net worth and augmented wealth over the period 1983–2016.

Netting out implicit taxes on tax-deferred assets and accrued capital gains reduces the growth in net worth and augmented wealth by between 17 and 20 percent [see Figure 3] but has little impact on their inequality. However, it does lower pension wealth and Social

Change in Pre- and Post-tax Net Worth and Augmented Wealth, 1983–2016

Percentage change, ages 47+

Post-tax net worth subtracts implicit future taxes on retirement assets and unrealized capital gains from pre-tax values.
Augmented wealth is the sum of net worth, defined-benefit pension wealth, and Social Security wealth
Source: Wolff E, NBER Working Paper 27328, and forthcoming in the Journal of Pension Economics and Finance

Figure 3

Security wealth inequality. The implication is that the use of pre-tax values has led to a considerable overstatement of household wealth growth.

The impact of implicit taxes varies by demographic group. Netting out taxes is generally an equalizing factor with regard to i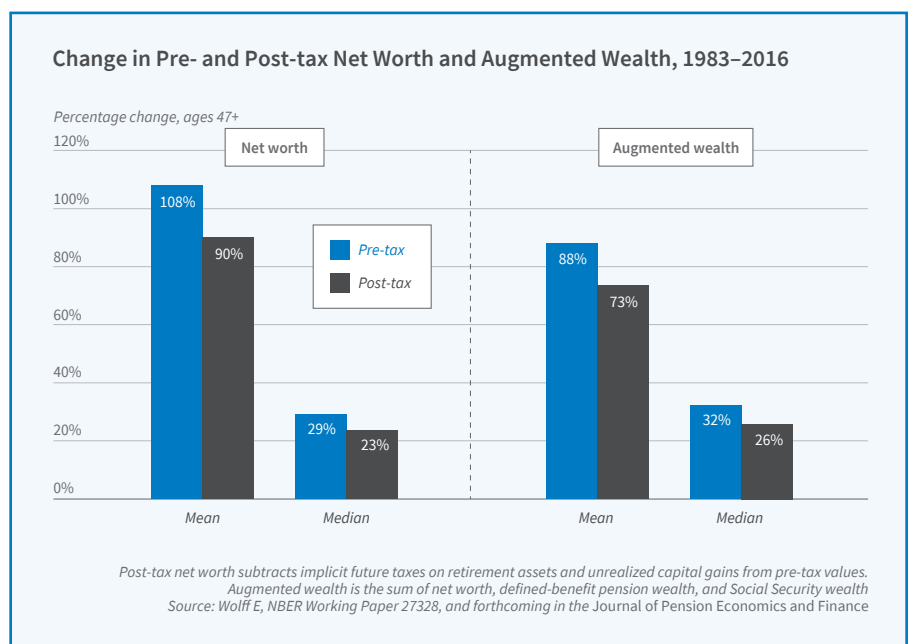ntergroup differences in pension and Social Security wealth, though less so for net worth or augmented wealth. It has a minimal effect on the Black-White ratio in net worth or augmented wealth.

Distributional Effects of Wealth Taxation

I also analyze the fiscal effects of a Swiss-type direct tax on household wealth, with a $120,000 exemption and marginal tax rates running from 0.05 to 0.3 percent on $2,400,000 or more of wealth.[5] I also analyze the wealth tax proposed by Senator Elizabeth Warren with a $50 million exemption, a 2 percent tax on wealth above that, and a 1 percent surcharge on wealth above $1 billion. Based on the 2016 Survey of Consumer Finances augmented with wealth data from the Forbes 400, the Swiss tax would yield $189.3 billion and the Warren tax

$303.4 billion per year by my estimates. Only 0.07 percent of households would pay the Warren tax, compared to 44.3 percent for the Swiss tax. However, the effect on wealth inequality of implementing either the Swiss tax or the Warren tax is small. If the policies were in place for a single year, they would reduce the Gini coefficient by at most 0.0005. The effect of both policies on wealth inequality would grow if they remained in place for a long period of time.

The incidence of the Swiss tax differs by demographic group, falling proportionately more on older than younger families, more on married couples than on singles, and more on Whites than on others.

A potential problem stemming from a wealth tax is capital flight. However, by my estimates, the Swiss tax would reduce the average yield on household assets by only 6.2 percent. It would reduce the yield in the top bracket by 9.7 percent. These figures suggest that disincentive effects on personal savings would be very modest. In contrast, the Warren wealth tax could reduce the after-tax rate of return on investments for the top group by almost 100 percent.

[1] "Household Wealth Trends in the United States, 1962 to 2019: Median Wealth Rebounds … But Not Enough," Wolff E. NBER Working Paper 28383, January 2021. Published in part as "The Declining Wealth of the Middle Class, 1983–2016," *Contemporary Economic Policy* 39(3), July 2021, pp. 461–478. Return to Text

[2] "The Decline of African-American and Hispanic Wealth since the Great Recession," Wolff E. NBER Working Paper 25198, October 2018, and *Review of Income and Wealth*, forthcoming. Return to Text

[3] "Valuing Assets in Retirement Savings Accounts," Poterba J. NBER Working Paper 10395, March 2004. Published in *National Tax Journal* 57(2, Part 2), 2004, pp. 489–512. Return to Text

[4] "Taxes and the Revaluation of Household Wealth," Wolff E. NBER Working Paper 27328, June 2020, and *Journal of Pension Economics and Finance*, forthcoming. Return to Text

[5] "Wealth Taxation in the United States," Wolff E. NBER Working Paper 26544, December 2019, and *Public Sector Economics* 44(2), June 2020, pp. 153–178. Return to Text

New Approaches to Understanding Choice of Major

Matthew J. Wiswall and Basit Zafar

College major choice and its relationship to labor market outcomes has long been a topic of study for social scientists. Stretching back at least to the 1970s, researchers have recognized that the particular field, and not just the level of education, deserves attention. A number of studies have demonstrated that the choice of post-secondary field is a key correlate of future earnings, and that choice of college major may be an important factor in explaining earnings differences, in particular by gender. Beyond individual welfare, major choice affects the skill composition of the workforce, making an understanding of how these choices are affected by changes in skill demand and wages important to research on the dynamics in the overall economy.

Our recent work on college major choice is focused on identifying the importance of earnings to major choice, relative to any other nonpecuniary considerations. Across our work, we bring new approaches to this classic issue, including the collection of new survey data on college students' expectations about the consequences of majors on their own future earnings and other outcomes, including future labor supply, marriage, and fertility. We show how information interventions, lab experiments, and hypothetical/stated choice designs can supplement subjective expectations data to provide further evidence on the factors that affect choice of major. Although this work has used a sample of high-ability college students from a selective university, we demonstrate that the richness of our data collection brings important new insights into the choice of a major and serves as a model for subsequent work.

Earnings Beliefs

The standard economic literature on decisions made under uncertainty, such as occupational and educational choices, generally assumes that individuals, after comparing the expected outcomes from various choices, choose the option that maximizes

Matthew J. Wiswall is the Juli Plant Grainger Professor of Economics at the University of Wisconsin-Madison and a research associate affiliated with the NBER's Program on Children.

Wiswall is an applied microeconomist who conducts research on child development, education, and applied econometric methodologies. His work has been funded by the National Science Foundation, the US Department of Education, the William T. Grant Foundation, and the Smith Richardson Foundation. It has been published in leading periodicals including the *Journal of Political Economy*, *The Review of Economic Studies*, and *The Quarterly Journal of Economics*.

Wiswall is an associate editor for *Econometrica* and *Quantitative Economics,* and an affiliate of UW-Madison's Institute for Research on Poverty, Center for Demography and Ecology, and Center for Financial Security. He received his PhD in economics from the University of California, Los Angeles, in 2005, and previously has held faculty positions at New York University and Arizona State University.

Basit Zafar is a professor of economics at the University of Michigan and a research associate in the NBER's Labor Studies Program. He is an applied microeconomist whose research is focused on labor economics, economics of education, and household finance. Specifically, his work seeks to understand how individuals make decisions under conditions of uncertainty.

Zafar's research employs a disparate set of empirical methods and techniques, including the use of survey-based subjective expectations data and experimental data. He has published in several leading economics and finance journals. He is an associate editor at the *Journal of the European Economic Association* and serves on the advisory board of the NBER's Gender in the Economy Study Group. Zafar received his PhD from Northwestern University in 2008, and his B.Sc from the California Institute of Technology. Before joining the faculty at Michigan, he held positions at Arizona State University and the Federal Reserve Bank of New York.

their expected utility. In the absence of expectations data, assumptions have to be made on expectations to infer the decision rule, including assumptions about expectations for counterfactual choices — the majors not chosen by the student. Although previous studies allow varying degrees of individual heterogeneity in beliefs about future earnings, they typically assume that expectations are either myopic or rational and use realized choices and realized earnings to identify the choice model. This approach is problematic because observed choices and realized earnings can be consistent with several combinations of expectations and preferences.

We designed a survey of major-specific earnings expectations and fielded it to undergraduates at New York University. We distinguish between two kinds of beliefs: what we term *self*-beliefs concern how much each respondent expects to earn in the future if they were to complete their degree in each major category, while *population* beliefs concern the realized distribution — for example, beliefs about average earnings for past graduates in each major. Whether correct or not, self-beliefs are the bases of choices, and collecting this information allows us to robustly estimate the importance of earnings to college major choices, free from the bias of incorrectly assuming the wrong model of expectations. Population beliefs, on the other hand, may not be directly relevant at all to self-beliefs or choices,

Students' Beliefs About Expected Earnings by Age, Gender, and Major

Source: Wiswall MJ and Zafar B, NBER Working Paper 22543 and published as "Human Capital Investments and Expectations about Career and Family," Journal of Political Economy, 129(5), 2021, pp 1361–424

Figure 1

but they provide some indications of how well-informed college students are about the labor market and whether some information intervention would be effective.

To understand how students believe their earnings would evolve through their life cycle, we asked questions about expected earnings at three future ages: just after college graduation (age 22–23), age 30, and age 45. We also included questions to elicit perceptions about uncertainty in future earn-

ings. Figure 1 summarizes average expected earnings for our sample. Our survey respondents believe that their earnings would grow rapidly as they aged, that their earnings would be higher if they majored in science or business rather than humanities or arts, that completing a college degree even in lower-paying fields would provide higher earnings than no degree at all, and that the earnings premium associated with higher earning majors would increase as they age. We also see that students anticipate a gender gap: average earnings beliefs of male students are higher than the average beliefs of female students, with the gap largest at older ages. When we compare these self-beliefs about own future earnings with population beliefs about current average earnings for graduates aged 30, respondents report that they believe their own earnings will exceed the current population average, even adjusting for inflation, which is unsurprising given the high-ability sample.

One of the important advantages of these data is that we can use them to construct the full distribution of individual perceptions of the earnings return to major choices. These ex ante returns are the subjective treatment effects of major choice anticipated by the students while they are in college. Figure 2 presents the sample distribution of the log of the anticipated age 30 earnings return to a science or business degree relative to a humanities or arts degree. The

Expected Earnings for Science/Business vs Humanities Degree

Source: Wiswall MJ and Zafar B, NBER Working Paper 22543 and published as "Human Capital Investments and Expectations about Career and Family," Journal of Political Economy, 129(5), 2021, pp 1361–424

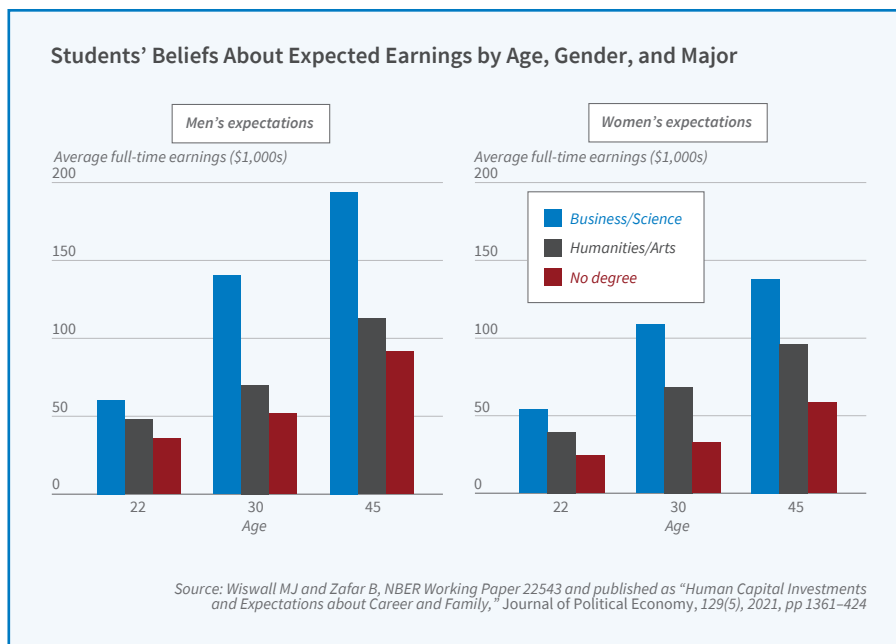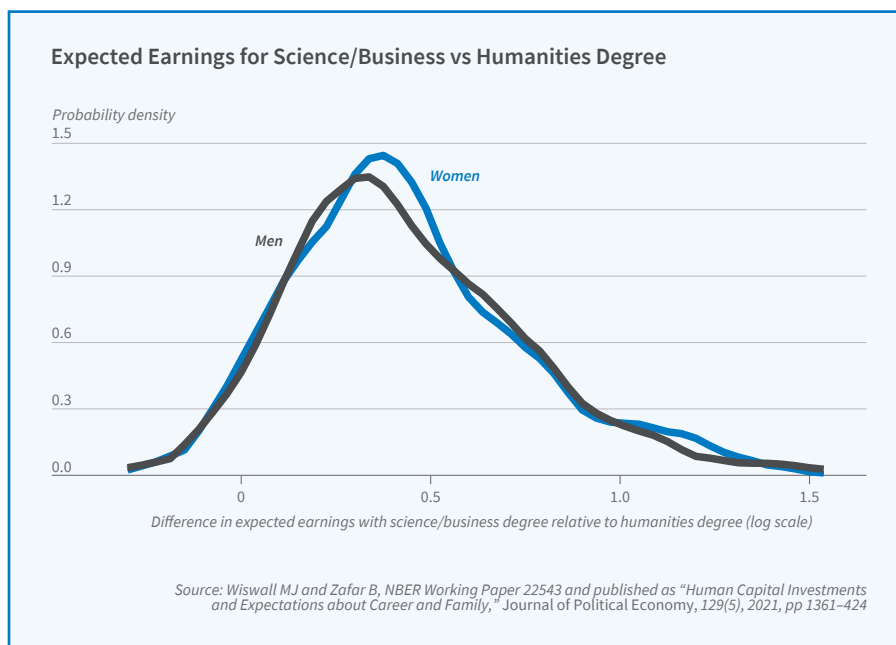**Figure 2**

average expected return (the average ex ante treatment effect) is approximately 43 percent for female and 52 percent for male students. The figure makes clear that there is also a wide distribution in anticipated earnings return, with some individuals expecting a very high return (more than a 100 percent difference in earnings), others a small return, and for a small minority even a negative return.[1]

Using Beliefs to Estimate Preferences

We use our collection of beliefs data in otherwise standard models of expected utility from major choice, substituting the beliefs data for a particular model of how expectations are assumed to be formed. For earnings, a standard approach would be to use realized earnings from a prior cohort and variables such as college admissions test scores and grades, in addition to demographics, to predict each student's future earnings from completing each major. This approach essentially assumes that students make the same prediction of earnings as the researcher. Our expectations data, providing earnings beliefs for each respondent for each major, enables us to relax these assumptions, allowing for heterogeneity in earnings beliefs beyond that captured by observable variables. We can then estimate preferences for majors, and the relative utility students place on earnings and other aspects of majors, robust to mis-specifying the expectations of students.

The disadvantage of our approach is the possibility of measurement error in the beliefs data we collect. While the overall patterns we document are reasonable, some responses are nonsensical. In part this may occur because, unlike in many studies of beliefs in the context of games played in a lab setting, we cannot incentivize students for "correct" answers to belief questions about future events and for various counterfactual outcomes that will never be realized. In addition to using various estimating strategies to account for measurement errors, we also conducted follow-up surveys when our

respondents were in their mid- to late 20s. The follow-up data indicate a strong positive correlation of beliefs elicited earlier and actual realized outcomes, giving us confidence that our data are representative of students' true beliefs.

Information Interventions

Information provision has been used in many contexts as a low-cost way to influence decision-making. We designed an information intervention in the context of our research on major choice for two purposes: the traditional one of assessing whether our intervention can improve decision-making and welfare, and, in addition, as a method to identify preferences. Motivated by prior studies which found that individuals have biased beliefs about the population distribution of earnings, we focused on providing earnings information to college students.

In one of our studies, we find that students logically revised their beliefs in response to the information. Students who underestimated average population earnings tended to revise upward their beliefs about their own earnings after the information treatment, and vice versa.[2] By comparing changes in subjective probabilities of majoring in each field with the changes in subjective expectations about earnings and other characteristics of the major, we can measure the relative importance of each of these characteristics in the choice of major, free of bias stemming from the correlation of unobserved preferences with observed beliefs about majors. We find that earnings considerations are a significant factor in major choice, but a smaller factor than would be indicated using only baseline, cross-sectional data.

Non-Earnings Considerations

Early seminal work on human capital investments focused on "career concerns" motivations for human capital

investment, where the motivation is solely the gain in one's own future labor income. While earnings are of course an important consideration, human capital could affect life in many ways, and there could be a number of other motivations for human capital investments. For example, several recent studies have analyzed marriage market "returns" to human capital investment in which human capital affects an individual's marriage prospects and the "quality" of potential spouses. Do young people actually consider these kinds of issues when making key human capital decisions?

In a very recent study, we used our study of NYU students to look beyond earnings considerations and asked students their beliefs about marriage, spousal earnings, fertility, and labor supply.[3] These data allow us to analyze how young people perceive the trade-offs in career and family as they contemplate different human capital choices. Female college students, in particular, believe completing a science or business major, rather than a humanities or arts degree, would tend to lower marriage rates and lead to a delay in having children. Men, in contrast, perceive major choice to have no effect on these aspects of their later personal lives. We also elicit students' beliefs regarding the earnings of potential spouses if they themselves were to complete different degrees, and find that male and female students alike perceive a large "spousal return" to completing higher-earning degrees, indicating that they believe this choice will yield not only higher earnings for themselves but marriages to higher-earning spouses as well.

Understanding Beliefs and Tastes

Two of the most important conclusions that emerge from our work concern gender. First, there are systemic gender-specific differences in beliefs, and these matter for choice of a major. Second, while earnings are a motivating factor in major choice, nonpecu-

niary factors — what economists typically refer to as "tastes" — play a major role, in particular in the higher likelihood of women completing humanities and arts degrees.

So why do men and women have systematically different beliefs? To answer this question, in our 2017 paper with Ernesto Reuben, we combined a laboratory experiment to measure behavioral traits — risk preferences, overconfidence, and competitiveness — with our NYU survey of labor market expectations and education choices.[4] We find that the competitiveness and overconfidence measures, but not the risk aversion measure, are significantly related to the student's expectations about future major-specific earnings, with earnings expectations increasing with the level of competitiveness and overconfidence. Importantly, the experimental measures explain as much of the gender gap in earnings expectations as a rich set of control variables, including students' SAT scores, race, and family background. In addition, the experimental measures are not significantly related to the control variables, and thus have additional explanatory power.

The second main takeaway of our work — that tastes are a dominant driver of major choice — points to a natural question: what do these tastes capture? To unpack this, we use a hypothetical job choice methodology to recover student-level preferences for workplace amenities such as future earnings growth potential, dismissal probability, and work hours flexibility.[5] We find substantial willingness to pay for nonpecuniary aspects of jobs, and considerable heterogeneity in preferences for these attributes. We find that women have a much higher average preference for workplace hours flexibility and more-secure jobs, while men have a higher average willingness to pay for jobs with higher earnings growth potential. Finally, we show that the job preferences young adults held in college relate to their major choices, and through a later follow-up survey four years after the initial survey, to the types of jobs they actually hold after graduation.

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1   Figures 1 and 2 are taken from "Human Capital Investments and Expectations about Career and Family," Wiswall M, Zafar B. *Journal of Political Economy* 129(5), 2021, pp. 1361–1424.
Return to Text
2   "Determinants of College Major Choice: Identification Using an Information Experiment," *Review of Economic Studies* 82(2), 2015, pp. 791–824. See also "How Do College Students Respond to Public Information about Earnings?" Wiswall M, Zafar B. *Journal of Human Capital* 9(2), 2015, pp. 117–169.
Return to Text
3   "Human Capital Investments and Expectations about Career and Family," Wiswall M, Zafar B. *Journal of Political Economy* 129(5), 2021, pp. 1361–1424.
Return to Text
4   "Preferences and Biases in Educational Choices and Labor Market Expectations: Shrinking the Black Box of Gender," Reuben E, Wiswall M, Zafar B. *Economic Journal* 127(604), 2017, pp. 2153–2186. See also our recent paper with Arpita Patnaik and Joanna Venator: "The Role of Heterogeneous Risk Preferences, Discount Rates, and Earnings Expectations in College Major Choice," Patnaik A, Venator J, Wiswall M, Zafar B. forthcoming, *Journal of Econometrics.*
Return to Text
5   "Preference for the Workplace, Investment in Human Capital, and Gender," Wiswall M, Zafar B. *The Quarterly Journal of Economics* 133(1), 2018, pp. 457–507.
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Trebbi and Washington to Codirect Political Economy Program

Francesco Trebbi of the University of California, Berkeley and Ebonya L. Washington of Yale University are the new codirectors of the NBER's Political Economy Program, succeeding the late Alberto Alesina of Harvard University, who launched the program in 2006.

The new codirectors have studied a wide range of issues that span the field of political economy.

Trebbi is the Bernard T. Rocca Jr. Professor of Business and Public Policy at Berkeley's Haas School of Business. His research focuses on the determinants of polarization, lobbying and its effects, the design of political institutions, and the political economy of financial regulation. He has been an NBER affiliate since 2007.

Washington, an NBER affiliate since 2004, is the Samuel C. Park Jr. Professor of Economics at Yale. Her research examines the links between economic circumstances and political preferences, how candidate attributes

Francesco Trebbi   **Ebonya Washington**

affect voter turnout, the determinants of legislators' voting behavior, and the impact of the US Voting Rights Act of 1965. She currently chairs the American Economic Association's Committee on the Status of Minority Groups in the Economics Profession.

Crystal Yang Named Codirector of Economics of Crime Working Group

Crystal Yang

Crystal Yang, a professor of law at Harvard Law School and a research associate in the NBER Law and Economics Program, is a new codirector of the Economics of Crime Working Group. In this role she joins Philip J. Cook of Duke University and Jens Ludwig of the University of Chicago, who along with Justin McCrary of Columbia University launched the working group in 2007.

Yang, who became an NBER affiliate in 2017, has studied a range of issues related to the criminal justice system, including bail, inter-judge sentencing disparities, racial bias, and deportation. Her research has been cited in US Supreme Court and federal district court cases.

Yang received four degrees — an AB and PhD in economics, an MA in statistics, and a JD — from Harvard University. She took leave from her teaching post in 2014–15 to serve as Special Assistant US Attorney in the US Attorney's Office for Massachusetts.

New Research Associates, Faculty Research Fellows Named

The NBER Board of Directors appointed 15 research associates (RAs) at its April 2021 meeting. Two of them were previously faculty research fellows (FRFs).

RA appointments are reserved for tenured faculty members. They are recommended to the Board by directors of the NBER's 20 research programs after consultation with steering committees composed of leading scholars in each field. The new RAs are affiliated with 13 different colleges and universities; they received graduate training at 14 different institutions.

In addition, the NBER president appointed 57 new FRFs, typically junior scholars, also on the advice of program directors and their steering committees. The fellows, who hold PhDs from 26 different universities, are currently affiliated with 32 different institutions.

To be appointed an NBER research affiliate, a researcher must hold a primary faculty appointment at a North American college or university. New appointments are made each spring following a call for nominations. Candidates are evaluated based on their research records and their capacity to contribute to NBER activities. This year, 357 researchers were nominated for new NBER affiliations, and 70 were appointed. Including the new appointments, as of May 1, 2021, there were 1,297 RAs and 353 FRFs.

The names, current university affiliations, and primary NBER program affiliations of the newly appointed and promoted (in *italics*) researchers are listed below.

Research Associates

Marina Agranov	California Institute of Technology
Political Economy	
David Berger	Duke University
Economic Fluctuations and Growth	
Jishnu Das	Georgetown University
Development Economics	
Hulya Eraslan	Rice University
Political Economy	
Jane Cooley Fruehwirth	University of North Carolina
Economics of Education	
Darrell Gaskin	Johns Hopkins University
Health Economics	
Cecile Gaubert	University of California, Berkeley
International Trade and Investment	
Galina Hale	University of California, Santa Cruz
International Finance and Macroeconomics	
Matias Iaryczower	Princeton University
Political Economy	
Yaw Nyarko	New York University
Development Economics	
Stephen Ross	University of Connecticut
Economics of Education	
Heather Tookes	Yale University
Asset Pricing	
Leonard Wantchekon	Princeton University
Political Economy	
Rohan Williamson	Georgetown University
Corporate Finance	
Nicolas R. Ziebarth	Cornell University
Health Economics	

Faculty Research Fellows

Diane Alexander	University of Pennsylvania
Health Care	
Vellore Arthi	University of California, Irvine
Development of the American Economy	
Clare Balboni	Massachusetts Institute of Technology
Environment and Energy Economics	
Jason Baron	University of Michigan
Children	
John Barrios	Washington University in St. Louis
Productivity, Innovation, and Entrepreneurship	
Adrien Bilal	Harvard University
Economic Fluctuations and Growth	

Faculty Research Fellows

Katarzyna Bilicka	Utah State University
Public Economics	
Zach Brown	University of Michigan
Health Care	
Tamma Carleton	University of California, Santa Barbara
Environment and Energy Economics	
Mariana Carrera	Montana State University
Health Economics	
Christopher Conlon	New York University
Industrial Organization	
Zoe Cullen	Harvard University
Labor Studies	
Adam Dearing	Ohio State University
Industrial Organization	
Anthony DeFusco	Northwestern University
Corporate Finance	
Ellora Derenoncourt	University of California, Berkeley
Labor Studies	
Niklas Engbom	New York University
Economic Fluctuations and Growth	
Vasiliki Fouka	Stanford University
Political Economy	
Sharat Ganapati	Georgetown University
International Trade and Investment	
Michael Gilraine	New York University
Economics of Education	
Daniel Haanwinckel	University of California, Los Angeles
Labor Studies	
Kareem Haggag	Carnegie Mellon University
Political Economy	
Kyle Herkenhoff	University of Minnesota
Economic Fluctuations and Growth	
Bernard Herskovic	University of California, Los Angeles
Asset Pricing	
Alex Hollingsworth	Indiana University
Health Economics	
Kilian Huber	University of Chicago
Monetary Economics	
John Eric Humphries	Yale University
Economics of Education	
Reshmaan Hussam	Harvard University
Development Economics	

Alex Imas	University of Chicago
Asset Pricing	
Rohan Kekre	University of Chicago
International Finance and Macroeconomics	
Elisabeth Kempf	University of Chicago
Corporate Finance	
Marlène Koffi	University of Toronto
Productivity, Innovation, and Entrepreneurship	
Chen Lian	University of California, Berkeley
Monetary Economics	
Song Ma	Yale University
Corporate Finance	
Yueran Ma	University of Chicago
Monetary Economics	
Michelle Marcus	Vanderbilt University
Children	
Victoria Marone	University of Texas at Austin
Health Care	
Eduardo Montero	University of Michigan
Development Economics	
Alan Moreira	University of Rochester
Asset Pricing	
Ameet Morjaria	Northwestern University
Development Economics	
Ismael Mourifié	University of Toronto
Labor Studies	
Pascal Noel	University of Chicago
Public Economics	
Ziad Obermeyer	University of California, Berkeley
Economics of Aging	
Claudia Persico	American University
Children	
Tommaso Porzio	Columbia University
Development Economics	
Elena Prager	Northwestern University
Health Care	
Maria Rosales-Rueda	Rutgers University
Children	
Elisa Rubbo	University of Chicago
Economic Fluctuations and Growth	
Juliana Salomao	University of Minnesota
International Finance and Macroeconomics	

Benjamin Schoefer   University of California, Berkeley
Economic Fluctuations and Growth

Edson Severnini   Carnegie Mellon University
Environment and Energy Economics

Emil Siriwardane   Harvard University
Asset Pricing

Stephen Terry   Boston University
Productivity, Innovation, and Entrepreneurship

Shoshana Vasserman   Stanford University
Industrial Organization

Daniel Waldinger   New York University
Industrial Organization

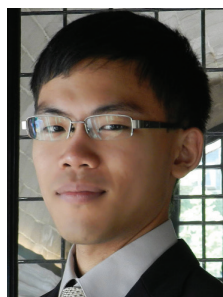Jialan Wang   University of Illinois at Urbana-Champaign
Public Economics

Zach Ward   Baylor University
Development of the American Economy

Christian Wolf   Massachusetts Institute of Technology
Economic Fluctuations and Growth

Ten Researchers Receive Post-Doctoral Fellowships

Alston

Chen

Di Gregorio

Fournier

Gorback

Ten post-doctoral scholars will be supported by NBER fellowships for the 2021–22 academic year. These fellows are selected by review panels following widely disseminated calls for applications.

Mackenzie Alston, an assistant professor at Florida State University, is the inaugural NBER post-doctoral fellow to promote diversity in the economics profession. She is using both experimental and survey methods to study perceptions of, and behavior in response to, stereotypes and discrimination in the labor market and other settings. Alston received her PhD from Texas A&M University.

Kuan-Ming Chen, who is studying how the long-term care needs of aged parents affect the retirement decisions of their children, and Max Kellogg, who is analyzing how the social value of disability insurance depends on the other ways potential beneficiaries can access health insurance, are the 2021–22 Retirement and Disability Policy Research Fellows.

They are supported by the Social Security Administration through the NBER's Retirement and Disability Research Center. Both received PhDs in 2021 from the University of Chicago.

Juliette Fournier, who received her PhD from MIT, is the post-doctoral fellow on the NBER Project on Tax Competition and Business Taxation, which is supported by Arnold Ventures. Her research examines the effect of enterprise zones in France on the location of business activity.

Holmes

Kellogg

Marone

McKiernan

Wong

Caitlin Gorback, who completed her PhD at the University of Pennsylvania's Wharton School in 2020, is a post-doctoral researcher on the NBER's Transportation Economics in the 21st Century Initiative, a project supported by the US Department of Transportation. She is studying how transportation innovations such as ridesharing affect the distribution of economic activities in urban areas.

Jonathan Holmes, a PhD graduate of the University of California, Berkeley, is the Postdoctoral Fellow on the Economics of an Aging Workforce, a position funded by the Alfred P. Sloan Foundation. Holmes is studying the link between health insurance premi-ums and employment among individuals with high-cost medical conditions.

Victoria Marone, whose research focuses on the design of health insurance markets and policies, and Francis Wong, who is analyzing how medical debt affects mental and physical health and healthcare utilization, are supported by the NBER's National Institute on Aging Fellowship Program in Aging and Health Research. Marone and Wong received their PhDs from Northwestern University and the University of California, Berkeley, respectively.

Kathleen McKiernan, who is analyzing social security reform, and Enrico Di Gregorio, who studies the role of tax compliance initiatives in raising revenue, are the 2021-22 fellows on long-term fiscal policy. They will be supported by the Peter G. Peterson Foundation. McKiernan, an assistant professor of economics at Vanderbilt University, received her PhD from the University of Minnesota. DeGregorio received his PhD from Harvard University.

Calls for fellowship applications are posted each fall at https://www.nber.org/career-resources/calls-fellowship-applications

Application closing dates are usually in early December. Anyone interested in receiving fellowship announcements can register at that webpage.

19 Graduate Students Win Support for Dissertation Research

The NBER annually supports a number of graduate students who are conducting dissertation research. Nineteen students will receive support for the 2021–22 academic year.

The Alfred P. Sloan Foundation provides support for five graduate students studying energy economics and three studying behavioral macroeconomics. The energy economics fellows are Sarah Armitage of Harvard University, who is studying technology transitions and the timing of environmental policy; Lauren Beatty of the University of Maryland, who is analyzing public policies that affect methane emissions from oil and gas production; Elise Breshears of Michigan State University, who is studying how redlining in mortgage markets affects the energy efficiency of the housing stock; Nafisa Lohawala of the University of Michigan, who is studying the effects of electric vehicle subsidies on vehicle demand; and Aspen Fryberger Underwood of Clemson University, who is analyzing the factors that affect the adoption and usage of electric vehicles.

The graduate fellows in behavioral macroeconomics are Miguel Acosta of Columbia University, whose dissertation examines the aggregate demand effects of monetary policy; Luisa Cefala of the University of California, Berkeley, who is studying the role of memory in the formation of beliefs and expectations; and Spencer Yongwook Kwon of Harvard, who is studying the macroeconomic implications of learning and information processing by behavioral agents.

The National Institute on Aging supports a Pre-Doctoral Program in Aging and Health Research that mentors fellows based at the NBER's Cambridge office. The participants for the 2021–22 academic year are Kevin Connolly, Travis Donahoe, Pragya Kakani, Chika Okafor, and Anthony Yu of Harvard, Aileen Devlin and Anna Russo of MIT, and Sarah Robinson of the University of California, Santa Barbara. The Social Security Administration funds a graduate fellowship program in retirement and disability policy. The three fellows for the 2021–22 academic year are Jonathan Cohen and Martina Uccioli of MIT and Ari Ne'eman of Harvard.

Calls for fellowship applications are posted each fall at: https://www.nber.org/career-resources/calls-fellowship-applications

Application closing dates are usually in early December. Anyone interested in receiving fellowship announcements can register at that webpage.

Isaiah Andrews Wins John Bates Clark Medal

NBER Research Associate Isaiah Andrews of Harvard University is this year's recipient of the John Bates Clark Medal, which is awarded by the American Economic Association to the American economist under the age of 40 who has made the most substantial contribution to economic thought and knowledge.

Andrews has made pathbreaking contributions in econometric theory and in the application of empirical methods in applied economics. He has provided new tools for assessing the sensitivity of parameter estimates to data inputs, explored the role of publication bias and potential corrections for it when evaluating published research, and advanced the analysis of weak identification in econometric models. The prize citation notes that he is "playing a key role in the recent turn of econometrics back toward the study of the most important problems faced in empirical research." The full citation for his award may be found here.

Andrews is affiliated with the NBER Labor Studies Program. He received his BA from Yale University and his PhD from MIT.

Isaiah Andrews

Chatterji and Wachter Take Leave for Posts at Commerce and SEC

Aaron Chatterji

Two NBER research associates have been tapped for economic leadership positions in major federal agencies. Aaron "Ronnie" Chatterji, an affiliate of the Productivity, Innovation, and Entrepreneurship Program, is the new chief economist of the US Department of Commerce. Jessica Wachter, an affiliate of the Asset Pricing Program, is serving as chief economist and director of the Division of Economic and Risk Analysis at the US Securities and Exchange Commission.

Chatterji is the Mark Burgess and Lisa Benson-Burgess Distinguished Professor of Business and Public Policy at Duke University's Fuqua School of Business. Wachter holds the Bruce I. Jacobs Chair in Quantitative Finance at the University of Pennsylvania's Wharton School.

Both researchers will be on leave from the NBER for the duration of their government service.

Jessica Wachter

Conferences

Immigrants and the US Economy

An NBER conference on Immigrants and the US Economy took place online March 11–12. Research Associates Aimee Chin of the University of Houston and Kalena Cortes of Texas A&M University organized the meeting. These researchers' papers were presented and discussed:

- **David N. Figlio** and **Paola Sapienza**, Northwestern University and NBER; **Paola Giuliano**, University of California, Los Angeles and NBER; **Riccardo Marchingiglio**, Northwestern University; and **Umut Özek**, American Institutes for Research, "Diversity in Schools: Immigrants and the Educational Performance of US Born Students"

- **Annie Laurie Hines**, University of California, Davis, and **Chloe N. East**, **Philip A. Luck**, **Hani Mansour**, and **Andrea P. Velásquez**, University of Colorado Denver, "The Labor Market Effects of Immigration Enforcement"

- **Joaquin A. Rubalcaba**, University of North Carolina at Chapel Hill; **José R. Bucheli**, New Mexico State University; and **Camila N. Morales**, University of Texas at Dallas, "Immigration Enforcement and Labor Supply: Hispanic Youth in Mixed-Status Families"

- **Parag Mahajan**, University of Delaware, "Immigration and Local Business Dynamics: Evidence from US Firms"

- **Elizabeth U. Cascio** and **Ethan G. Lewis**, Dartmouth College and NBER, "Opening the Door: Migration and Self-Selection in a Restrictive Legal Immigration Regime" (NBER Working Paper 27874)

- **Toman Barsbai**, University of Bristol; **Victoria Licuanan**, Asian Institute of Management; **Andreas Steinmayr**, University of Innsbruck; **Erwin Tiongson**, Georgetown University; and **Dean Yang**, University of Michigan and NBER, "Information and the Acquisition of Social Network Connections" (NBER Working Paper 27346)

- **Catalina Amuedo-Dorantes**, University of California, Merced; **Esther Arenas Arroyo**, WU Vienna University of Economics and Business; and **Bernhard Schmidpeter**, Johannes Kepler University Linz, "Immigration Policy and Firms' Labor Demand"

- **Blake H. Heller** and **Kirsten E. Slungaard Mumma**, Harvard University, "Immigrant Integration in the United States: The Role of Adult English Language Training"

Summaries of these papers are at: www.nber.org/conferences/immigrants-and-us-economy-spring-2021

Investments in Early Career Scientists: Data and Research Gaps

An NBER conference on Investments in Early Career Scientists: Data and Research Gaps took place online March 19. Research Associate Donna K. Ginther of University of Kansas organized the meeting, which was supported by the Alfred P. Sloan Foundation. These researchers' papers were presented and discussed:

- **Xuan Jiang**, The Ohio State University, and **Joseph Staudt**, US Census Bureau, "Publish and Train or Perish? Valuing the Early Career Outcomes of STEM PhD Recipients"

- **Misty L. Heggeness**, US Census Bureau, "The Impact of NIH Postdoctoral Fellowships on a Future Independent Career in Federally Funded Biomedical Research"

- **Tania Babina**, Columbia University; **Alex Xi He**, University of Maryland; **Sabrina T. Howell**, New York University and NBER; and **Elisabeth Ruth Perlman** and **Joseph Staudt**, US Census Bureau, "The Color of Money: Federal vs. Industry Funding of University Research" (NBER Working Paper 28160)

Summaries of these papers are at: www.nber.org/conferences/investments-early-career-scientists-data-and-research-gaps-spring-2021

Economics of Digitization

An NBER conference on the Economics of Digitization took place online March 19. Faculty Research Fellow Chiara Farronato of Harvard University and Research Associate Catherine Tucker of the Massachusetts Institute of Technology organized the meeting, which was supported by the Alfred P. Sloan Foundation. These researchers' papers were presented and discussed:

- **Rebecca Janssen**, the ZEW Mannheim; **Reinhold Kesler**, University of Zurich; **Michael Kummer**, University of East Anglia; and **Joel Waldfogel**, University of Minnesota and NBER, "GDPR and the Lost Generation of Innovative Apps"

- **Sarah Moshary**, University of Chicago, "Advertising Effects in Equilibrium"

- **Diego Aparicio**, IESE Business School; **Zachary Metzman**, MIT; and **Roberto Rigobon**, MIT and NBER, "The Pricing Strategies of Online Grocery Retailers"

- **Francis Annan**, Georgia State University, "Misconduct and Reputation under Imperfect Information"

- **Filippo Mezzanotti** and **Nicolas Crouzet**, Northwestern University, and **Apoorv Gupta**, Dartmouth College, "Shocks and Technology Adoption: Evidence from Electronic Payment Systems"

- **Gordon Burtch**, University of Minnesota; **Miguel Godinho de Matos**, Católica Lisbon School of Business & Economics; and **Francisco Lima**, Universidade de Lisboa, "Personal Social Networks, Technology Skills, and Workers' Digital Resilience"

Summaries of these papers are at www.nber.org/conferences/economics-digitization-spring-2021

Inequality, Discrimination, and the Financial System

An NBER conference on Inequality, Discrimination, and the Financial System took place April 1–2 online. Research Associates Gregor Matvos of Northwestern University and Manju Puri of Duke University, and Tarun Ramadorai of Imperial College London organized the meeting. The conference was held in collaboration with *The Review of Financial Studies.* These researchers' papers were presented and discussed:

- **Nirupama Kulkarni**, CAFRAL, and **Ulrike Malmendier**, University of California, Berkeley and NBER, "Mortgage Policies and Their Effects on Racial Segregation and Upward Mobility"

- **Marco Giacoletti**, University of Southern California; **Rawley Z. Heimer**, Boston College; and **Edison G. Yu**, Federal Reserve Bank of Philadelphia, "Using High-Frequency Evaluations to Estimate Discrimination: Evidence from Mortgage Loan Officers"

- **Lily Fang** and **Alexandra Roulet**, Institut Européen d'Administration des Affaires (INSEAD), and **Jim Goldman**, University of Toronto, "Private Equity and Pay Gaps Inside the Firm"

- **Raimundo Undurraga**, Universidad de Chile, "Bad Taste: Gender Discrimination in Consumer Credit Markets"

- **Jonathan A. Lanning**, Federal Reserve Bank of Chicago, "Testing Models of Economic Discrimination Using the Discretionary Markup of Indirect Auto Loans"

- **Francis Annan**, Georgia State University, "Gender and Financial Misconduct: A Field Experiment on Mobile Money"

- **Marina Gertsberg**, Monash University; **Johanna Mollerstrom**, George Mason University; and **Michaela Pagel**, Columbia University and NBER, "Gender Quotas and Support for Women in Board Elections" (NBER Working Paper 28463)

Summaries of these papers are at www.nber.org/conferences/inequality-discrimination-and-financial-system-spring-2021

36th Annual Conference on Macroeconomics

The 36th Annual Conference on Macroeconomics took place April 8–9 online. Research Associates Martin S. Eichenbaum of Northwestern University and Erik Hurst of the University of Chicago organized the meeting. These researchers' papers were presented and discussed:

- **Robert E. Hall**, Stanford University and NBER, and **Marianna Kudlyak**, Federal Reserve Bank of San Francisco and CEPR, "The Consistent Recovery of the US Economy from Every Previous Recession in the Past 70 Years"

- **Michael Kremer**, University of Chicago and NBER; **Jack Willis**, Columbia University and NBER; and **Yang You**, Harvard University, "Converging to Convergence"

- **Richard Rogerson**, Princeton University and NBER, and **Johanna Wallenius**, Stockholm School of Economics, "Changing Employment Trends for Older Workers in the OECD"

- Michael Barnett, Arizona State University; William Brock, University of Wisconsin; and Lars P. Hansen, University of Chicago and NBER, "Climate Change Uncertainty Spillover in the Macroeconomy"

- **Titan Alon**, University of California, San Diego; **Matthias Doepke**, Northwestern University and NBER; and **Sena Coskun**, **David Koll**, and **Michèle Tertilt**, University of Mannheim, "From Mancession to Shecession: Women's Employment in Regular and Pandemic Recessions" (NBER Working Paper 28632)

Summaries of these papers are at www.nber.org/conferences/36th-annual-conference-macroeconomics-2021

The Future of Globalization

An NBER conference on The Future of Globalization took place April 9–10 online. Research Associates Stephen J. Redding of Princeton University and Robert W. Staiger of Dartmouth College organized the meeting, which was supported by the Smith Richardson Foundation. These researchers' papers were presented and discussed:

- **Pol Antràs**, Harvard University and NBER, and **Stephen J. Redding** and **Esteban Rossi-Hansberg**, Princeton University and NBER, "Globalization and Pandemics"

- **Katherine A. Stapleton**, University of Oxford, and **Michael Webb**, Stanford University, "Automation, Trade and Multinational Activity: Micro Evidence from Spain"

- **Ufuk Akcigit**, University of Chicago and NBER; **Sina T. Ates**, Federal Reserve Board; **Josh Lerner**, Harvard University and NBER; **Richard R. Townsend**, University of California, San Diego and NBER; and **Yulia Zhestkova**, University of Chicago, "Fencing Off Silicon Valley: Cross-Border Venture Capital and Technology Spillovers" (NBER Working Paper 27828)

- **Adrien Bilal**, University of Chicago, and **Hugo Lhuillier**, Princeton University, "Outsourcing, Inequality and Aggregate Output"

- **Swati Dhingra** and **Silvana Tenreyro**, London School of Economics, "The Rise of Agribusinesses and Its Distributional Consequences"

- **Farid Farrokhi**, Purdue University, and **Ahmad Lashkaripour**, Indiana University, "Trade, Firm-Delocation, and Optimal Climate Policy"

- **Natalie Bau**, University of California, Los Angeles and NBER, and **Adrien Matray**, Princeton University, "Misallocation and Capital Market Integration: Evidence from India"

- **Giovanni Maggi**, Yale University and NBER, and **Robert W. Staiger**, "International Climate Agreements and the Scream of Greta"

- **Bruno Conte**, Universitat Autònoma de Barcelona; **Klaus Desmet**, Southern Methodist University and NBER; **Dávid Krisztián Nagy**, CREI, Universitat Pompeu Fabra; and **Esteban Rossi-Hansberg**, Princeton University and NBER, "Local Sectoral Specialization in a Warming World" (NBER Working Paper 28163)

- **Barthélémy Bonadio**, University of Michigan; **Zhen Huo**, Yale University; **Andrei A. Levchenko**, University of Michigan and NBER; and **Nitya Pandalai-Nayar**, University of Texas at Austin and NBER, "Global Supply Chains in the Pandemic"

- **Antoine Berthou** and **Sebastian Stumpner**, Banque de France, "Trade under Lockdown"

- **David Baqaee**, University of California, Los Angeles and NBER, and **Emmanuel Farhi**, "The Darwinian Returns to Scale"

Summaries of these papers are at www.nber.org/conferences/future-globalization-conference-spring-2021

Entrepreneurship and Innovation Policy and the Economy

The inaugural NBER Entrepreneurship and Innovation Policy and the Economy conference met April 27 online. Research Associates Josh Lerner of Harvard University and Scott Stern of the Massachusetts Institute of Technology organized the meeting. The meeting was supported by the Ewing Marion Kauffman Foundation. These researchers' papers were presented and discussed:

- **John C. Haltiwanger**, University of Maryland and NBER, "Entrepreneurship in the COVID-19 Pandemic: Evidence from the Business Formation Statistics"

- **Bhaven N. Sampat**, Columbia University and NBER, and **Daniel P. Gross**, Duke University and NBER, "Crisis Innovation Policy from World War II to COVID-19"

- **Mercedes Delgado**, Copenhagen Business School, and **Fiona Murray**, MIT and NBER, "Mapping the Regions, Organizations & Individuals that drive Inclusion in the Innovation Economy"

- **Lisa D. Cook**, Michigan State University and NBER, "Gender and Racial Disparity in the Innovation Process"

- **Michael Kremer**, University of Chicago and NBER, "Vaccines and the Pandemic"

- **Chiara Franzoni**, Politecnico di Milano; **Paula Stephan**, Georgia State University and NBER; and **Reinhilde Veugelers**, Katholieke Universiteit Leuven, "Funding Risky Research"

Summaries of some of these papers are at www.nber.org/conferences/entrepreneurship-and-innovation-policy-and-economy-2021

Economics of Culture and Institutions

An NBER conference on the Economics of Culture and Institutions took place April 30 online. Research Associates Alberto Bisin of New York University and Paola Giuliano of the University of California, Los Angeles organized the meeting. These researchers' papers were presented and discussed:

- **Samuel Bazzi**, University of California, San Diego and NBER; **Masyhur Hilmy**, Boston University; and **Benjamin Marx**, Sciences Po, "Islam and the State: Religious Education in the Age of Mass Schooling"

- **Daron Acemoglu**, Massachusetts Institute of Technology and NBER, and **James A. Robinson**, University of Chicago and NBER, "Culture, Institutions, and Social Equilibria: A Framework"

- **Leonardo Bursztyn**, University of Chicago and NBER; **Thomas Chaney**, Sciences Po; **Tarek Alexander Hassan**, Boston University and NBER; and **Aakaash Rao**, Harvard University, "The Immigrant Next Door: Exposure, Prejudice, and Altruism" (NBER Working Paper 28448)

- **Diego Ramos-Toro**, Dartmouth College, "Self-Emancipation and Progressive Politics: The Legacy of Civil War Refugee Camps"

- **Etienne Le Rossignol**, CES; **Sara Lowes**, University of California, San Diego and NBER; and **Nathan Nunn**, Harvard University and NBER, "Traditional Supernatural Beliefs and Prosocial Behavior"

- **Sebastian Hohmann**, Stockholm School of Economics SITE; **Stelios Michalopoulos**, Brown University and NBER; and **Elias Papaioannou**, London Business School, "Religion and Educational Mobility in Africa"

- **Marciano Siniscalchi**, Northwestern University, and **Pietro Veronesi**, University of Chicago and NBER, "Self-image Bias and Lost Talent"

Summaries of these papers are at www.nber.org/conferences/economics-culture-and-institutions-spring-2021

Environmental and Energy Policy and the Economy

The annual NBER conference on Environmental and Energy Policy and the Economy took place May 20 online. Research Associates Tatyana Deryugina of the University of Illinois at Urbana-Champaign, Matthew Kotchen of Yale University, and James H. Stock of Harvard University organized the meeting, which was supported by the Alfred P. Sloan Foundation. These researchers' papers were presented and discussed:

- **Kenneth Gillingham**, Yale University and NBER, "Designing Fuel Economy Standards in Light of Greater Electric Vehicle Offerings"

- **Severin Borenstein**, University of California, Berkeley and NBER, and **James B. Bushnell**, University of California, Davis and NBER, "Implications of Residential Energy Pricing for Energy Substitution and Welfare"

- **James Archsmith**, University of Maryland; **Erich Muehlegger**, University of California, Davis and NBER; and **David S. Rapson**, University of California, Davis, "Future Paths of Electric Vehicle Adoption in the United States: Predictable Determinants, Obstacles and Opportunities"

- **Rebecca J. Davis**, Stephen F. Austin State University, and **J. Scott Holladay** and **Charles Sims**, University of Tennessee, "Coal Fired Power Plant Retirements in the US"

- **Barbara Annicchiarico**, University of Rome Tor Vergata; **Stefano Carattini**, Georgia State University; **Carolyn Fischer**, Resources for the Future; and **Garth Heutel**, Georgia State University and NBER, "Business Cycles and Environmental Policy"

- **Frank A. Wolak**, Stanford University and NBER, "Long-Term Resource Adequacy in High Intermittent Renewables Wholesale Electricity Markets: Lessons from California"

Summaries of these papers are at www.nber.org/conferences/environmental-and-energy-policy-and-economy-conference-spring-2021

Wage Dynamics in the 21st Century

An NBER conference on Wage Dynamics in the 21st Century took place May 20–21 online. Research Associates Erik Hurst of the University of Chicago and Lisa B. Kahn of the University of Rochester organized the meeting, which was supported by the Smith Richardson Foundation. These researchers' papers were presented and discussed:

- **John R. Grigsby**, Northwestern University, "Skill Heterogeneity and Aggregate Labor Market Dynamics"

- **Gregor Schubert** and **Anna Stansbury**, Harvard University, and **Bledi Taska**, Burning Glass Technologies, "Employer Concentration and Outside Options"

- **Sadhika Bagga**, University of Texas at Austin, "Firm Market Power, Worker Mobility, and Wages in the US Labor Market"

- **John C. Haltiwanger**, University of Maryland and NBER, and **Henry R. Hyatt** and **James Spletzer**, US Census Bureau, "Industries, Mega Firms, and Increasing Inequality"

- **Jaime Arellano-Bover**, Yale University, and **Fernando Saltiel**, McGill University, "Differences in On-the-Job Learning across Firms"

- **Andrea L. Eisfeldt**, University of California, Los Angeles and NBER; **Antonio Falato**, Federal Reserve Board; and **Mindy Z. Xiaolan**, University of Texas at Austin, "Human Capitalists" (NBER Working Paper 28815)

- **Ellora Derenoncourt**, University of California, Berkeley and NBER, and **Clemens Noelke** and **David Weil**, Brandeis University, "Spillover Effects from Voluntary Employer Minimum Wages"

Summaries of these papers are at www.nber.org/conferences/wage-dynamics-21st-century-conference-spring-2021

Risks in Agricultural Supply Chains

An NBER conference on Risks in Agricultural Supply Chains took place May 20–21 online. Research Associate Pol Antràs of Harvard University and David Zilberman of the University of California, Berkeley organized the meeting, which was supported by the Economic Research Service of the US Department of Agriculture. These researchers' papers were presented and discussed:

- **Meilin Ma** and **Jayson L. Lusk**, Purdue University, "Concentration and Resiliency in the US Meat Supply Chains"

- **Farid Farrokhi**, Purdue University, and **Heitor S. Pellegrina**, New York University Abu Dhabi, "Trade, Technology, and Agricultural Productivity"

- **Austin F. Ramsey**, Virginia Tech; **Barry Goodwin**, North Carolina State University; and **Mildred Haley**, US Department of Agriculture, "Labor Dynamics and Supply Chain Disruption in Food Manufacturing"

- **Jason Grant**, Virginia Tech, and **Shawn Arita**, **Sharon S. Sydow**, and **Jayson Beckman**, US Department of Agriculture, "Has Global Agricultural Trade Been Resilient under Coronavirus (COVID-19)? Findings from an Econometric Assessment"

- **Michael Delgado**, **Meilin Ma**, and **H. Holly Wang**, Purdue University, "Risk, Arbitrage, and Spatial Price Relationships: Insights from China's Hog Market under the African Swine Fever"

- **Obie Porteous**, Middlebury College, "Reverse Dutch Disease with Trade Costs: Prospects for Agriculture in Africa's Oil-Rich Economies"

- **Joshua Deutschmann**, University of Wisconsin-Madison; **Tanguy Bernard**, University of Bordeaux (GREThA) and International Food Policy Research; and **Ouambi Yameogo**, IITA, "Contracting and Quality Upgrading: Evidence from an Experiment in Senegal"

- **Liang Lu** and **Jason Winfree**, University of Idaho, "Demand Shocks and Supply Chain Flexibility"

- **Charles A Taylor**, Columbia University, and **Geoffrey Heal**, Columbia University and NBER, "Algal Blooms and the Social Cost of Fertilizer "

- **Sunghun Lim**, Texas Tech University, and **Marc F. Bellemare**, University of Minnesota, "Global Agricultural Value Chains and Structural Transformation"

- **Sandro Steinbach**, University of Connecticut, "Exchange Rate Volatility and Global Food Supply Chains"

- **Ishan B. Nath**, University of Chicago, "The Food Problem and the Aggregate Productivity Consequences of Climate Change"

- **Lucas Zavala**, Yale University, "Unfair Trade? Market Power in Agricultural Value Chains"

- **Bruno Conte**, Universitat Autònoma de Barcelona; **Klaus Desmet**, Southern Methodist University and NBER; **Dávid Krisztián Nagy**, CREI, Universitat Pompeu Fabra; and **Esteban Rossi-Hansberg**, Princeton University and NBER, "Local Sectoral Specialization in a Warming World"

Summaries of these papers are at www.nber.org/conferences/risks-agricultural-supply-chains-spring-2021

NBER-SAIF Research Conference on Real Estate Markets and Housing Finance in China

The NBER and the Shanghai Advanced Institute of Finance (SAIF) at Shanghai Jiao Tong University co-hosted a research conference on Real Estate Markets and Housing Finance in China on May 20–21 online. Research Associate James M. Poterba of the Massachusetts Institute of Technology and Hong Yan of SAIF organized the meeting. These researchers' papers were presented and discussed:

- **Mark Rosenzweig**, Yale University and NBER, and **Junsen Zhang**, Chinese University of Hong Kong, "Housing Prices, Intergenerational Co-Residence, and 'Excess' Savings by the Young: Evidence using Chinese Data" (NBER Working Paper 26209)

- **Joseph Gyourko**, University of Pennsylvania and NBER, and **Xiaodan Wang**, **Jing Wu**, and **Rongjie Zhang**, Tsinghua University, "Hukou and Homeownership Premiums: A Study of Chinese Price-to-Rent Ratios"

- **Yinglu Deng** and **Li Liao**, Tsinghua University; **Jiaheng Yu**, MIT Sloan School of Management; and **Yu Zhang**, Peking University, "Capital Leakage, House Prices, and Consumer Spending: Quasi-Experimental Evidence from House Purchase Restriction Spillovers"

- **Yongheng Deng**, University of Wisconsin-Madison; **Yang Tang**, Nanyang Technological University, Singapore; **Ping Wang**, Washington University in St. Louis and NBER; and **Jing Wu**, "Spatial Misallocation in Housing and Land Markets: Evidence from China" (NBER Working Paper 27230)

- **Shenzhe Jiang**, Beijing University; **Jianjun Miao**, Boston University; and **Yuzhe Zhang**, Texas A&M University, "China's Housing Bubble, Infrastructure Investment, and Economic Growth"

- **Hanming Fang**, University of Pennsylvania and NBER; **Jing Wu**, and **Vincent Yao**, Georgia State University, "Property Right Uncertainty, Prices, and Speculation: Evidence from China's Housing Market"

- **Kaiji Chen**, Emory University; **Qing Wang** and **Tong Xu**, Southwestern University of Finance and Economics; and **Tao Zha**, Emory University and NBER, "Aggregate and Distributional Impacts of LTV Policy: Evidence from China" (NBER Working Paper 28092)

- **Sheridan Titman**, University of Texas at Austin and NBER, and **Guozhong Zhu**, University of Alberta, "City Characteristics, Land Prices and Volatility"

- **Wenlan Qian**, National University of Singapore; **Jing Wu**; and **Hong Tu** and **Weibiao Xu**, Nankai University, "Unintended Consequences of Demand-Side Housing Policies: Evidence from Household Reallocation of Capital"

Summaries of these papers are at
www.nber.org/conferences/nber-saif-research-conference-real-estate-markets-and-housing-finance-china-spring-2021

Program and Working Group Meetings

Monetary Economics

Members of the NBER's Monetary Economics Program met March 5 online. Research Associate Joshua K. Hausman of the University of Michigan, Faculty Research Fellow Arlene Wong of Princeton University, and Program Directors Emi Nakamura and Jón Steinsson, both of the University of California, Berkeley, organized the meeting. These researchers' papers were presented and discussed:

- **Carola Binder**, Haverford College, and **Gillian Brunet**, Wesleyan University, "Inflation Expectations and Consumption: Evidence from 1951"

- **Marcus Biermann**, Université Catholique de Louvain, and **Kilian Huber**, University of Chicago, "Tracing the International Transmission of a Crisis through Multinational Firms"

- **Jennifer La'O**, Columbia University and NBER, and **Alireza Tahbaz-Salehi**, Northwestern University, "Optimal Monetary Policy in Production Networks" (NBER Working Paper 27464)

- **Ricardo Reis**, London School of Economics, "The People versus the Markets: A Parsimonious Model of Inflation Expectations"

- **Martin Beraja**, MIT and NBER, and **Christian Wolf**, University of Chicago, "Demand Composition and the Strength of Recoveries"

Summaries of these papers are at www.nber.org/conferences/monetary-economics-program-meeting-spring-2021

Aging

Members of the NBER's Program on Aging met March 5 online. Research Associate Kathleen M. McGarry of the University of California, Los Angeles and Program Director Jonathan S. Skinner of Dartmouth College organized the meeting. These researchers' papers were presented and discussed:

- **Tal Gross**, Boston University and NBER; **Timothy Layton**, Harvard University and NBER; and **Daniel Prinz**, Harvard University, "The Liquidity Sensitivity of Healthcare Consumption: Evidence from Social Security Payments" (NBER Working Paper 27977)

- **Jevay Grooms**, Howard University, and **Alberto Ortega**, Indiana University, "Substance Use Disorders among Older Populations: What Role Does Race and Ethnicity Play in Treatment and Completion?"

- **Ran D. Balicer**, Ben Gurion University of the Negev; **Liran Einav**, Stanford University and NBER; **Joseph Rashba**, Clalit Research Institute; and **Dan Zeltzer**, Tel Aviv University, "The Impact of Increased Access to Telemedicine"

- **Mingli Zhong**, NBER, "Optimal Default Retirement Saving Policies: Theory and Evidence from OregonSaves"

- **Mika Akesaka**, Institute of Social and Economic Research, Osaka University; **Peter Eibich**, Max Planck Institute for Demographic Research; **Chie Hanaoka**, Toyo University; and **Hitoshi Shigeoka**, Simon Fraser University and NBER, "Temporal Instability of Risk Preference among the Poor: Evidence from Payday Cycles"

- **Lucas Goodman**, US Treasury Department; **Anita Mukherjee**, University of Wisconsin-Madison; and **Shanthi Ramnath**, Federal Reserve Bank of Chicago, "Abandoned Retirement Savings"

Summaries of some of these papers are at www.nber.org/conferences/aging-program-meeting-spring-2021

Children

Members of the NBER's Program on Children met March 11–12 online. Program Directors Anna Aizer of Brown University and Janet Currie of Princeton University organized the meeting. These researchers' papers were presented and discussed:

- **Nishith Prakash** and **Nathan Fiala**, University of Connecticut; K**ritika Narula**, Yale University; and **Ana Garcia-Hernandez**, University of Rosario and Innovations for Poverty Action, "Wheels of Change: Transforming Girl's Lives with Bicycles"

- **Patrick Agte**, Princeton University; **Arielle Bernhardt**, Harvard University; **Erica M. Field**, Duke University and NBER; **Rohini Pande**, Yale University and NBER; and **Natalia Rigol**, Harvard University and NBER, "Investing in the Next Generation: The Long-Run Educational Impacts of a Liquidity Shock"

- **Lisa Gennetian**, Duke University; **Katherine Magnuson**, University of Wisconsin-Madison; **Kimberly Noble**, Columbia University; **Greg Duncan**, University of California, Irvine; **Nathan Fox**, University of Maryland; **Sarah Halpern-Meekin**, University of Wisconsin-Madison; and **Hirokazu Yoshikawa**, New York University, "Impacts on Economic Well-Being of an Unconditional Cash Transfer during a Child's First Year: Findings from the Baby's First Years Study"

- **Roland G. Fryer Jr**, Harvard University; **Steven D. Levitt**, University of Chicago and NBER; **John A. List**, University of Chicago and NBER; and **Anya Samek**, University of California, San Diego and NBER, "Reducing the Academic Achievement Gap through a Summer Pre-Kindergarten Program"

- **Petra Persson** and **Maya Rossin-Slater**, Stanford University and NBER, and **Xinyao Qiu**, Stanford University, "Family Spillover Effects of Marginal Diagnoses: The Case of ADHD" (NBER Working Paper 28334)

- **Belinda Archibong**, Columbia University, and **Francis Annan**, Georgia State University, "'We Are Not Guinea Pigs': The Effects of Negative News on Vaccine Compliance"

- **Deborah A. Cobb-Clark** and **Tiffany Ho**, University of Sydney, and **Nicolás Salamanca**, University of Melbourne, "Parental Responses to Children's Achievement Test Results"

- **Claire Duquennois**, University of Pittsburgh, "Fictional Money, Real Costs: Impacts of Financial Salience on Disadvantaged Students"

Summaries of these papers are at www.nber.org/conferences/children-program-meeting-spring-2021

International Finance and Macroeconomics

Members of the NBER's International Finance and Macroeconomics Program met March 19 online. Cristina Arellano of the Federal Reserve Bank of Minneapolis and Research Associate Oleg Itskhoki of the University of California, Los Angeles and NBER organized the meeting. These researchers' papers were presented and discussed:

- **Zhengyang Jiang**, Northwestern University; **Hanno Lustig**, Stanford University and NBER; **Stijn Van Nieuwerburgh**, Columbia University and NBER; and **Mindy Z. Xiaolan**, University of Texas at Austin, "Manufacturing Risk-Free Government Debt" (NBER Working Paper 27786)

- **Xing Guo**, Bank of Canada; **Pablo Ottonello**, University of Michigan and NBER; and **Diego Perez**, New York University and NBER, "Monetary Policy and Redistribution in Open Economies" (NBER Working Paper 28213)

- **Meredith Crowley** and **Minkyu Son**, University of Cambridge, and **Lu Han**, University of Liverpool, "Dominant Currency Dynamics: Evidence on Dollar Invoicing from UK Exporters"

- **Harold L. Cole** and **Guillermo Ordoñez**, University of Pennsylvania and NBER, and **Daniel Neuhann**, University of Texas at Austin, "Asymmetric Information and Sovereign Debt: Theory Meets Mexican Data" (NBER Working Paper 28459)

- **Javier Bianchi**, Federal Reserve Bank of Minneapolis; **Saki Bigio**, University of California, Los Angeles and NBER; and **Charles Engel**, University of Wisconsin-Madison and NBER, "Scrambling for Dollars: International Liquidity, Banks and Exchange Rates"

- **João Ayres**, Inter-American Development Bank; **Constantino Hevia**, Universidad Torcuato di Tella; and **Juan Pablo Nicolini**, Federal Reserve Bank of Minneapolis, "Real Exchange Rates and Primary Commodity Prices: Mussa Meets Backus-Smith"

Summaries of these papers are at
https://www.nber.org/conferences/international-finance-and-macroeconomics-program-meeting-spring-2021

Development of the American Economy

Members of the NBER's Development of the American Economy Program met March 19–20 online. Program Directors Leah Platt Boustan of Princeton University and William J. Collins of Vanderbilt University organized the meeting. These researchers' papers were presented and discussed:

- **Carl Kitchens**, Florida State University and NBER, and **Luke P. Rodgers**, Florida State University, "The Impact of the WWI Agricultural Boom and Bust on Female Opportunity Cost and Fertility" (NBER Working Paper 27530)

- **Lisa D. Cook**, Michigan State University and NBER; **Maggie E.C. Jones**, University of Victoria; **Trevon Logan**, The Ohio State University and NBER; and **David Rosé**, Wilfrid Laurier University, "Competition and Discrimination in Public Accommodations: Evidence from the Green Books"

- **Price V. Fishback**, University of Arizona and NBER; **Jessica LaVoice**, Bowdoin College; and **Allison Shertzer** and **Randall Walsh**, University of Pittsburgh and NBER, "Race, Risk, and the Emergence of Federal Redlining" (NBER Working Paper 28146)

- **Leander Heldring**, Northwestern University; **James A. Robinson**, University of Chicago and NBER; and **Sebastian Vollmer**, University of Göttingen, "The Economic Effects of the English Parliamentary Enclosures"

- **Gary D. Libecap**, University of California, Santa Barbara and NBER; **Martin Fiszbein**, Boston University and NBER; and **Eric C. Edwards**, North Carolina State University, "Colonial Origins, Property Rights, and the Organization of Agricultural Production: The US Midwest and Argentine Pampas Compared" (NBER Working Paper 27750)

- **Wilfried Kisling**, University of Oxford; **Christopher M. Meissner**, University of California, Davis and NBER; and **Chenzi Xu**, Stanford University, "International Banks: Re-Agents of Globalization?"

Summaries of these papers are at www.nber.org/conferences/development-american-economy-program-meeting-spring-2021

Productivity, Innovation, and Entrepreneurship

Members of the NBER's Productivity, Innovation, and Entrepreneurship Program met March 26 online. Program Directors Nicholas Bloom of Stanford University and Josh Lerner of Harvard University, Research Associate Serguey Braguinsky of the University of Maryland, and Faculty Research Fellow Sabrina T. Howell of New York University organized the meeting. These researchers' papers were presented and discussed:

- **Scott Kim**, University of Pennsylvania, and **Petra Moser**, New York University and NBER, "Women in Science. Lessons from the Baby Boom"

- **David T. Robinson**, Duke University and NBER, and **Angelino Viceisza**, Spelman College and NBER, "Can the Media Spur Startup Activity? Evidence from the Television Show 'Shark Tank'"

- **Maria Kurakina**, University of Utah, "The Dark Side of Patents: Effects of Strategic Patenting on Firms and Their Peers"

- **Tania Babina**, Columbia University; **Alex X. He**, University of Maryland; **Sabrina T. Howell**; and **Elisabeth Ruth Perlman** and **Joseph Staudt**, US Census Bureau, "The Color of Money: Federal vs. Industry Funding of University Research"

- **Danielle Li**, MIT and NBER; **Lindsey R. Raymond**, MIT; and **Peter Bergman**, Columbia University and NBER, "Hiring as Exploration" (NBER Working Paper 27736)

- **Katarzyna A. Bilicka**, Utah State University, and **Daniela Scur**, Cornell University, "Organizational Capacity and Firm Profitability: Evidence from Multinationals"

Summaries of these papers are at
www.nber.org/conferences/productivity-innovation-and-entrepreneurship-program-meeting-spring-2021

Labor Studies

Members of the NBER's Labor Studies Program met March 26 online. Program Directors David Autor of the Massachusetts Institute of Technology and Alexandre Mas of Princeton University organized the meeting. These researchers' papers were presented and discussed:

- **Marco Stenborg Petterson**, Brown University; **David G. Seim**, Stockholm University; and **Jesse M. Shapiro**, Brown University and NBER, "Bounds on a Slope from Size Restrictions on Economic Shocks" (NBER Working Paper 27556)

- **Eliza Forsythe**, University of Illinois at Urbana-Champaign; **Lisa B. Kahn**, University of Rochester and NBER; **Fabian Lange**, McGill University and NBER; and **David G. Wiczer**, Stony Brook University, "Searching, Recalls, and Tightness: An Interim Report on the COVID Labor Market" (NBER Working Paper 28083)

- **Zoe B. Cullen**, Harvard University; **Will S. Dobbie**, Harvard University and NBER; and **Mitchell Hoffman**, University of Toronto and NBER, "Measuring Labor Demand for Workers with a Criminal Conviction"

- **Ioana Marinescu**, University of Pennsylvania and NBER; **Daphne Skandalis**, University of Copenhagen; and **Daniel Zhao**, Glassdoor, Inc., "The Impact of the Federal Pandemic Unemployment Compensation on Job Search and Vacancy Creation" (NBER Working Paper 28567)

- **John J. Horton**, New York University and NBER, and **Shoshana Vasserman**, Stanford University, "Job-Seekers Send Too Many Applications: Experimental Evidence and a Partial Solution"

- **Peter Ganong** and **Joseph S. Vavra**, University of Chicago and NBER; **Pascal J. Noel**, University of Chicago; **Fiona E. Greig**, **Daniel M. Sullivan**, and **Maxwell W. Liebeskind**, JPMorgan Chase Institute, "Spending and Job Search Impacts of Expanded Unemployment Benefits: Evidence from Administrative Micro Data"

- **Chao Fu**, and **Alan T. Sorensen**, University of Wisconsin-Madison and NBER, and **Junjie Guo** and **Adam Smith**, University of Wisconsin-Madison, "Students' Heterogeneous Preferences and the Uneven Spatial Distribution of Colleges"

Summaries of these papers are at www.nber.org/conferences/labor-studies-program-meeting-spring-2021

Chinese Economy

The NBER's Chinese Economy Working Group met April 1-3 online. Working Group Director Shang-Jin Wei of Columbia University and Research Associates Nancy Qian of Northwestern University and Daniel Xu of Duke University organized the meeting. These researchers' papers were presented and discussed:

- **Meng Miao**, Renmin University; **Jacopo Ponticelli**, Northwestern University and NBER; and **Yi Shao**, Peking University, "Eclipses and the Memory of Revolutions: Evidence from China"

- **Panle Jia Barwick** and **Shanjun Li**, Cornell University and NBER; **Luming Chen**, Cornell University; and **Xiaobo Zhang**, Peking University, "Entry Deregulation, Market Turnover, and Efficiency: China's Business Registration Reform"

- **Jing Cai**, University of Maryland and NBER, and **Shing-Yi Wang**, University of Pennsylvania and NBER, "Improving Management through Worker Evaluations: Evidence from Auto Manufacturing" (NBER Working Paper 27680)

- **Wei Chen**, Chinese University of Hong Kong; **Ernest Liu**, Princeton University; and **Zheng Michael Song**, Chinese University of Hong Kong, "Decentralized Industrial Policy"

- **Wolfgang Keller** and **Carol H. Shiue**, University of Colorado Boulder and NBER, "The Economic Consequences of the Opium War"

- **Ting Chen**, Hong Kong Baptist University, and **James K. Kung**, University of Hong Kong, "The Rise of Communism in China"

- **Laura Alfaro**, Harvard University and NBER; **Ge Bao**, University of International Business and Economics; **Maggie Chen**, George Washington University; **Junjie Hong**, UIBE; and **Claudia Steinwender**, MIT and NBER, "Omnia Juncta in Uno: Foreign Powers and Trademark Protection in Shanghai's Concession Era"

- **Clair Yang**, University of Washington, Seattle, and **Yasheng Huang**, MIT, "The Great Political Divergence"

- **Mary Amiti**, Federal Reserve Bank of New York; **Sang Hoon Kong**, Columbia University; and **David Weinstein**, Columbia University and NBER, "Trade Protection, Stock-Market Returns, and Welfare"

- **Qiaoyi Chen**, **Zhao Chen**, and **Zhikuo Liu**, Fudan University, and **Juan Carlos Suárez Serrato** and **Daniel Xu**, Duke University and NBER, "Regulating Conglomerates: Evidence from an Energy Conservation Program in China"

- **Zhiguo He**, University of Chicago and NBER; **Guanmin Liao**, Renmin University of China; and **Baolian Wang**, University of Florida, "Incentives and Firm Investment: Evidence from China's Reform"

Summaries of these papers are at www.nber.org/conferences/chinese-economy-working-group-meeting-spring-2021

Public Economics

Members of the NBER's Public Economics Program met April 1–2 online. Research Associate Julie Berry Cullen of the University of California, San Diego and Faculty Research Fellows Manasi Deshpande of the University of Chicago and Jacob Goldin of Stanford University organized the meeting. These researchers' papers were presented and discussed:

- **Juan Carlos Suárez Serrato** and **Daniel Xu**, Duke University and NBER, and **Zhao Chen**, **Zhikuo Liu** and **Qiaoyi Chen**, Fudan University, "Regulating Conglomerates: Evidence from an Energy Conservation Program in China"

- **Raj Chetty**, Harvard University and NBER; **John N. Friedman**, Brown University and NBER; and **Michael Stepner**, Harvard University, "Building an Infrastructure for Real-Time Policy Analysis Using Administrative Data: A Case Study of the Impacts of Stimulus Checks in the COVID-19 Crisis"

- **Abhijit Banerjee** and **Benjamin A. Olken**, MIT and NBER; **Rema Hanna**, Harvard University and NBER; **Elan Satriawan**, Universitas Gadjah Mada; and **Sudarno Sumarto**, National Team for the Acceleration of Poverty Reduction, Jakarta, "Food vs. Food Stamps: Evidence from an At-Scale Experiment in Indonesia" (NBER Working Paper 28641)

- **Joseph S. Shapiro** and **Reed Walker**, University of California, Berkeley and NBER, "Is Air Pollution Regulation Too Stringent?" (NBER Working Paper 28199)

- **John Guyton** and **Patrick Langetieg**, Internal Revenue Service; **Daniel Reck**, London School of Economics; **Max Risch**, Carnegie Mellon University; and **Gabriel Zucman**, University of California, Berkeley and NBER, "Tax Evasion at the Top of the Income Distribution: Theory and Evidence" (NBER Working Paper 28542)

- **Elena C. Derby**, Joint Committee on Taxation, "Does Growing Up in Tax-Subsidized Housing Lead to Higher Earnings and Educational Attainment?"

- **Lee Lockwood**, University of Virginia and NBER, "Anti Insurance: Health Insurance Worsens Risk Exposure"

- **Christine L. Dobridge**, Federal Reserve Board; **Rebecca Lester**, Stanford University; and **Andrew Whitten**, US Treasury Department, "IPOs and Corporate Tax Planning"

- **Neil Thakral**, Brown University, and **Linh T. Tô**, Boston University, "Anticipation and Consumption"

- **Adam M. Lavecchia**, McMaster University, and **Alisa Tazhitdinova**, University of California, Santa Barbara and NBER, "Permanent and Transitory Responses to Capital Gains Taxes: Evidence from a Lifetime Exemption in Canada" (NBER Working Paper 28514)

- **Joshua D. Gottlieb**, University of Chicago and NBER; **Maria Polyakova**, Stanford University and NBER; **Kevin Rinz** and **Victoria Udalova**, US Census Bureau; and **Hugh Shiplett**, University of British Columbia, "Who Values Human Capitalists' Human Capital? Physician Earnings and Labor Supply"

- **Thiago Scot**, UC Berkeley Haas School of Business; **Felipe Lobel**, University of California, Berkeley; and **Pedro Zúniga**, Servicio de Administración de Rentas, "Corporate Taxation and Evasion Responses: Evidence from a Minimum Tax in Honduras"

Summaries of these papers are at www.nber.org/conferences/public-economics-program-meeting-spring-2021

Corporate Finance

Members of the NBER's Corporate Finance Program met April 2 online. Research Associates Viral V. Acharya of New York University and Kelly Shue of Yale University organized the meeting. These researchers' papers were presented and discussed:

- **Ivan Alfaro**, BI Norwegian Business School; **Nicholas Bloom**, Stanford University and NBER; and **Xiaoji Lin**, University of Minnesota, "The Finance Uncertainty Multiplier" (NBER Working Paper 24571)

- **Matteo Crosignani**, Federal Reserve Bank of New York and **Marco Macchiavelli** and **Andre Silva**, Board of Governors of the Federal Reserve System, "Pirates without Borders: The Propagation of Cyberattacks through Firms' Supply Chains"

- **Mara Faccio**, Purdue University and NBER, and **John J. McConnell**, Purdue University, "Impediments to the Schumpeterian Process in the Replacement of Large Firms" (NBER Working Paper 27871)

- **Michael Faulkender**, University of Maryland; **Stephen Miran**; and **Robert Jackman**, US Treasury Department, "The Job-Preservation Effects of Paycheck Protection Program Loans"

- **Karsten Müller**, Princeton University, and **Emil Verner**, MIT, "Credit Allocation and Macroeconomic Fluctuations"

- **Jialan Wang** and **Jeyul Yang**, University of Illinois at Urbana-Champaign; **Benjamin Iverson**, Brigham Young University; and **Renhao Jiang**, University of California, Santa Cruz, "Bankruptcy and the COVID-19 Crisis"

- **Ashwini Agrawal**, London School of Economics, and **Daniel Kim**, BI Norwegian Business School, "Municipal Bond Insurance and the US Drinking Water Crisis"

- **Ivan T. Ivanov**, Federal Reserve Board; **Luke Pettit**, United States Senate; and **Toni Whited**, University of Michigan and NBER, "Taxes Depress Corporate Borrowing: Evidence from Private Firms"

Summaries of these papers are at www.nber.org/conferences/corporate-finance-program-meeting-spring-2021

Environment and Energy Economics

Members of the NBER's Environment and Energy Economics Program met April 8–9 online. Research Associates Catherine Hausman of the University of Michigan and Wolfram Schlenker of Columbia University organized the meeting. These researchers' papers were presented and discussed:

- **Charles A. Taylor**, Columbia University, and **Hannah Druckenmiller**, University of California, Berkeley, "Draining the Swamp: Wetlands, Flooding, and the Clean Water Act"

- **Esther Rolf**, **Vaishaal Shankar**, **Miyabi Ishihara**, and **Benjamin Recht**, University of California, Berkeley; **Jonathan Proctor**, Harvard University; **Tamma A. Carleton**, University of California, Santa Barbara; **Ian W. Bolliger**, Rhodium Group; and **Solomon M. Hsiang**, University of California, Berkeley and NBER, "A Generalizable and Accessible Approach to Machine Learning with Global Satellite Imagery" (NBER Working Paper 28045)

- **Peter Christensen**, **Paul Francisco**, and **Erica Myers**, University of Illinois at Urbana-Champaign; and **Mateuz Souza**, Charles III University of Madrid, "Decomposing the Wedge between Projected and Realized Returns in Energy Efficiency Programs"

- **Patrick Baylis**, University of British Columbia, and **Judson Boomhower**, University of California, San Diego and NBER, "Building Codes and Community Resilience to Natural Disasters"

- **Rafael Araujo**, Getúlio Vargas Foundation; **Francisco Costa**, University of Delaware and Escola Brasileira de Economia e Finanças; and **Marcelo Sant'Anna**, Escola Brasileira de Economia e Finanças, "Efficient Forestation in the Brazilian Amazon: Evidence from a Dynamic Model"

- **John A. List**, University of Chicago and NBER; **Robert D. Metcalfe**, Boston University and NBER; **V. Kerry Smith**, Arizona State University and NBER; and **Ariel Goldszmidt**, **Ian Muir** and **Jenny Wang**, Lyft, "The Value of Time in the United States: Estimates from Nationwide Natural Field Experiments" (NBER Working Paper 28208)

- **Meera Mahadevan**, University of California, Irvine, "The Price of Power: Costs of Political Corruption in Indian Electricity"

- **Ryan M. Abman**, San Diego State University; **Teevrat Garg**, University of California, San Diego; **Yao Pan**, Aalto University; and **Saurabh Singhal**, Lancaster University, "Agriculture and Deforestation"

- **Christopher Costello**, University of California, Santa Barbara and NBER, and **Matthew Kotchen**, Yale University and NBER, "Policy Instrument Choice with Coasean Provision of Public Goods" (NBER Working Paper 28130)

Summaries of these papers are at
www.nber.org/conferences/environment-and-energy-economics-program-meeting-spring-2021

Asset Pricing

Members of the NBER's Asset Pricing Program met April 9 online. Research Associates Hanno Lustig of Stanford University and Annette Vissing-Jorgensen of the University of California, Berkeley organized the meeting. These researchers' papers were presented and discussed:

- **Svetlana Bryzgalova**, **Christian Julliard**, and **Jiantao Huang**, London School of Economics, "Bayesian Solutions for the Factor Zoo: We Just Ran Two Quadrillion Models"

- **Leonid Kogan**, MIT and NBER; **Winston Wei Dou**, University of Pennsylvania; and **Wei Wu**, Texas A&M University, "Common Fund Flows: Flow Hedging and Factor Pricing"

- **Jennie Bai**, Georgetown University and NBER, and **Massimo Massa**, Institut Européen d'Administration des Affaires (INSEAD), "Is Hard and Soft Information Substitutable? Evidence from the Lockdowns"

- **Robert Jay Kahn**, Office of Financial Research, and **Daniel Barth**, Federal Reserve Board of Governors, "Hedge Funds and the Treasury Cash-Futures Disconnect"

- **Xavier Gabaix**, Harvard University and NBER, and **Ralph S. J. Koijen**, University of Chicago and NBER, "In Search of the Origins of Financial Fluctuations: The Inelastic Markets Hypothesis"

- **Mikhail Chernov**, University of California, Los Angeles and NBER; **Magnus Dahlquist**, Stockholm School of Economics; and **Lars A. Lochstoer**, University of California, Los Angeles, "Pricing Currency Risks" (NBER Working Paper 28260)

Summaries of these papers are at ww.nber.org/conferences/asset-pricing-program-meeting-spring-2021

Race and Stratification

The NBER's Working Group on Race and Stratification met April 9 online. Working Group Diretor Trevon Logan of The Ohio State University and Research Associates Isaiah Andrews of Harvard University, Rodney Andrews of the University of Texas at Dallas, Renee Bowen of the University of California, San Diego, and Ebonya L. Washington of Yale University organized the meeting. These researchers' papers were presented and discussed:

- **David Arnold**, University of California, San Diego; **Will S. Dobbie**, Harvard University and NBER; and **Peter Hull**, University of Chicago and NBER, "Towards a Non-Discriminatory Algorithm in Selected Data"

- **Lena Song**, New York University, "Discrimination and Media Diversity: Historical Evidence from US Radio Stations"

- **Dan McGee**, Princeton University, "Emergence of Stereotypes under Group Competition"

- **Ellora Derenoncourt**, University of California, Berkeley; **Chi Hyun Kim**, German Institute for Economic Research (DIW Berlin); and **Moritz Kuhn** and **Moritz Schularick**, University of Bonn, "The Racial Wealth Gap, 1860–2020"

- **Francisca Antman**, University of Colorado, and **Kalena Cortes**, Texas A&M University and NBER, "The Long-Run Impacts of Mexican-American School Desegregation"

Summaries of these papers are at www.nber.org/conferences/working-group-race-and-stratification-spring-2021

Organizational Economics

The NBER's Organizational Economics Working Group met April 15–17 online. Working Group Director Robert S. Gibbons of the Massachusetts Institute of Technology organized the meeting. These researchers' papers were presented and discussed:

- **Steven Callander**, **Dana Foarta**, and **Takuo Sugaya**, Stanford University, "Market Competition and Political Influence: An Integrated Approach"

- **Susan Helper**, Case Western Reserve University and NBER, and **Abdul Munasib**, Bureau of Economic Analysis, "Economies of Scope and Relational Contracts"

- **Serguey Braguinsky**, University of Maryland and NBER; **Atsushi Ohyama**, Hitotsubashi University; **Tetsuji Okazaki**, University of Tokyo; and **Chad Syverson**, University of Chicago and NBER, "Product Innovation, Product Diversification, and Firm Growth: Evidence from Japan's Early Industrialization" (NBER Working Paper 26665)

- **Laurence Prusak**, Columbia University, "The Practice of Knowledge Management in Organizations"

- **German Gieczewski**, Princeton University, and **Svetlana Kosterina**, University of Pittsburgh, "Endogenous Experimentation in Organizations"

- **Devesh Rustagi**, University of Nottingham, "The Interdependence of Formal Rules and Civic Capital in Commons Management"

- **Felix Zhiyu Feng** and **Mark Westerfield**, University of Washington, and **Curtis Taylor** and **Feifan Zhang**, Duke University, "Setbacks, Shutdowns, and Overruns"

- **Manaswini Rao**, University of California, San Diego, and **Ashish Shenoy**, University of California, Davis, "Got (Clean) Milk? Governance, Incentives, and Collective Action in Indian Dairy Cooperatives"

- **Renee Bowen**, University of California, San Diego and NBER; **Ilwoo Hwang**, University of Miami; and **Stefan Krasa**, University of Illinois, "Agenda-Setter Power Dynamics: Learning in Multi-Issue Bargaining" (NBER Working Paper 27981)

- **Rocco Macchiavello**, London School of Economics, and **Ameet Morjaria**, Northwestern University, "Acquisitions, Management and Efficiency: Evidence from Rwanda's Coffee Industry"

- **Stephen Michael Impink**, New York University; **Andrea Prat**, Columbia University; and **Raffaella Sadun**, Harvard University and NBER, "Communication within Firms: Evidence from CEO Turnovers"

- **Miguel Espinosa**, Universitat Pompeu Fabra and Barcelona GSE, and **Christopher T. Stanton**, Harvard University and NBER, "Worker Skills and Organizational Spillovers: Evidence from Linked Training and Communications Data"

- **Erika Deserranno**, Northwestern University; **Gianmarco León**, Universitat Pompeu Fabra and Barcelona Graduate School of Economics; and **Philipp M. Kastrau**, Universitat Pompeu Fabra, "Promotions and Productivity: The Role of Meritocracy and Pay Progression in the Public Sector"

- **Chong-En Bai**, Tsinghua University; **Ruixue Jia**, University of California, San Diego and NBER; **Hongbin Li**, Stanford University; and **Xin Wang**, Chinese University of Hong Kong, "Entrepreneurial Reluctance: Talent and Firm Creation in China"

- **Jordi Brandts**, Institut d'Anàlisi Econòmica, and **David J. Cooper**, Florida State University, "Managerial Leadership, Truth-Telling and Efficient Coordination"

Summaries of some of these papers are at www.nber.org/conferences/organizational-economics-meeting-spring-2021

Behavioral Finance

The NBER's Behavioral Finance Working Group met April 16 online. Working Group Director Nicholas C. Barberis of Yale University organized the meeting, which was supported by Bracebridge Capital and Fuller and Thaler Asset Management. These researchers' papers were presented and discussed:

- **Stefano Cassella**, Tilburg University; **Benjamin Golez** and **Peter Kelly**, University of Notre Dame; and **Huseyin Gulen**, Purdue University, "Horizon Bias in Expectations Formation"

- **Spencer Yongwook Kwon** and **Johnny Tang**, Harvard University, "Reactions to News and Reasoning by Exemplars"

- **Theis I. Jensen** and **Lasse H. Pedersen**, Copenhagen Business School, and **Bryan T. Kelly**, Yale University and NBER, "Is There a Replication Crisis in Finance?" (NBER Working Paper 28432)

- **Francesca Bastianello** and **Paul Fontanier**, Harvard University, "Partial Equilibrium Thinking in General Equilibrium"

- **Ricardo De la O**, University of Southern California, and **Sean Myers**, University of Pennsylvania Wharton School, "Real Cash Flow Expectations and Asset Prices"

- **Anna Pavlova** and **Taisiya Sikorskaya**, London Business School, "Benchmarking Intensity"

Summaries of these papers are at www.nber.org/conferences/behavioral-finance-working-group-meeting-spring-2021

Political Economy

Members of the NBER's Political Economy Program met April 22–23 online. Program directors Francesco Trebbi of the University of California, Berkeley and Ebonya L. Washington of Yale University organized the meeting. These researchers' papers were presented and discussed:

- **Alexander Wolitzky**, MIT, and **Anton Kolotilin**, University of New South Wales, "The Economics of Partisan Gerrymandering"

- **Andrei Markevich**, New Economics School, Moscow; **Natalya Naumenko**, George Mason University; and **Nancy Qian**, Northwestern University and NBER, "The Political Economic Causes of the Soviet Great Famine, 1932–33"

- **Ceren Baysan**, University of Essex, "Persistent Polarizing Effects of Persuasion: Experimental Evidence from Turkey"

- **Abhay Aneja**, University of California, Berkeley, and **Guo Xu**, University of California, Berkeley and NBER, "The Costs of Employment Segregation: Evidence from the Federal Government under Woodrow Wilson" (NBER Working Paper 27798)

- **Thomas Fujiwara**, Princeton University and NBER; **Karsten Müller**, Princeton University; and **Carlo Schwarz**, Bocconi University, "The Effect of Social Media on Elections: Evidence from the United States"

- **Alessandra Casella**, Columbia University and NBER, and **Jeffrey Guo** and **Michelle Jiang**, Columbia University, "Minority Turnout and Representation under Cumulative Voting. An Experiment." (NBER Working Paper 28674)

- **Bei Qin**, Hong Kong Baptist University; **David Stromberg**, Stockholm University; and **Yanhui Wu**, University of Hong Kong, "Social Media and Protests in China"

- **Pellumb Reshidi**, Princeton University, and **Alessandro Lizzeri** and **Leeat Yariv**, Princeton University and NBER, "Individual and Collective Information Acquisition: An Experimental Study"

Summaries of these papers are at www.nber.org/conferences/political-economy-program-meeting-spring-2021

Economics of Education

Members of the NBER's Economics of Education Program met April 29–30 online. Program Director Caroline M. Hoxby of Stanford University organized the meeting. These researchers' papers were presented and discussed:

- **Nathan Jones**, Boston University; **Matthew A. Kraft** and **John Papay**, Brown University; and **Leigh R. Wedenoja**, Rockefeller Institute of Government, "The Benefits of Early and Unconstrained Hiring: Evidence from Teacher Labor Markets"

- **Christina Brown**, University of California, Berkeley; **Supreet Kaur**, University of California, Berkeley and NBER; **Geeta Kingdon**, University College London Institute of Education; and **Heather Schofield**, University of Pennsylvania, "Attention As Human Capital"

- **Daniel Herbst**, University of Arizona; **Miguel Palacios**, University of Calgary; and **Constantine Yannelis**, University of Chicago and NBER, "Equity and Incentives in Human Capital Investment"

- **Michela M. Tincani** and **Enrico Miglino**, University College London, and **Fabian Kosse**, Ludwig Maximilian University Munich, "Subjective Beliefs and Inclusion Policies: Evidence from College Admissions"

- **Barbara Biasi** and **Song Ma**, Yale University and NBER, "The Education-Innovation Gap"

- **Joseph G. Altonji**, Yale University and NBER, and **Zhengren Zhu**, Yale University, "Returns to Specific Graduate Degrees: Estimates Using Texas Administrative Records"

- **Felipe H. Arteaga Ossa**, University of California, Berkeley; **Adam Kapor** and **Christopher Neilson**, Princeton University and NBER; and **Seth D. Zimmerman**, Yale University and NBER, "Smart Matching Platforms and Heterogeneous Beliefs in Centralized School Choice"

- **Anjali Adukia**, University of Chicago and NBER; **Alex Eble**, Columbia University; and **Emileigh Harrison**, **Hakizumwami B. Runesha**, and **Teodora B. Szasz**, University of Chicago, "What We Teach About Race and Gender: Representation in Images and Text of Children's Books"

- **Esteban M. Aucejo**, Arizona State University and NBER; **Jacob F. French**, Arizona State University; and **Basit Zafar**, University of Michigan and NBER, "Estimating Students' Valuation for College Experiences" (NBER Working Paper 28511)

- **Xiaoxiao Li**, Villanova University; **Sebastian Linde**, Medical College of Wisconsin; and **Hajime Shimao**, Santa Fe Institute, "Major Complexity Index and College Skill Production"

- **Dylan Conger**, George Washington University; **Mark Long**, University of Washington; and **Raymond McGhee Jr.**, Robert Wood Johnson Foundation, "Advanced Placement and Initial College Enrollment: Evidence from an Experiment"

- **Jake Anders**, **Alex Bryson**, and **Hedvig Horvath**, University College London, and **Bilal Nasim**, Institute of Education, "The Effects of Pay Decentralisation on Teachers' Pay and Teacher Retention"

Summaries of these papers are at www.nber.org/conferences/economics-education-program-meeting-spring-2021

Health Economics

Members of the NBER's Health Economics Program met May 6–7 online. Program Director Christopher Carpenter of Vanderbilt University and Research Associate Sara Markowitz of Emory University organized the meeting. These researchers' papers were presented and discussed:

- **Marcus Dillender**, University of Illinois at Chicago and NBER, "The Health Impacts of Public Health Funding: Evidence and Lessons from the Fight against HIV/AIDS"

- **Gabriella Conti**, University College London, and **Paul Rodríguez-Lesmes**, Universidad del Rosario, "Early Childhood Health Inequalities and In Utero Health Interventions: Evidence from the Treatment of Gestational Diabetes"

- **Nicolás Badaracco**, University of Wisconsin-Madison; **Marguerite Burns**, University of Wisconsin School of Medicine and Public Health; and **Laura Dague**, Texas A&M University and NBER, "In-Kind Welfare Benefits and Recidivism Risk: Evidence from Medicaid"

- **Alice Chen**, University of Southern California; **Elizabeth L. Munnich**, University of Louisville; **Stephen Parente**, University of Minnesota; and **Michael R. Richards**, Baylor University, "Provider Turf Wars and Medicare Payment Rules"

- **Timothy J. Moore**, Purdue University and NBER; **Benjamin Hansen**, University of Oregon and NBER; and **William W. Olney**, Williams College, "Importing the Opioid Crisis? Trade, Smuggling, and Fentanyl Overdoses"

- **Joshua C. Tibbitts**, Washington State University, and **Benjamin W. Cowan**, Washington State University and NBER, "The Opioid Safety Initiative and Veteran Suicides"

Summaries of these papers are at www.nber.org/conferences/health-economics-program-meeting-spring-2021

NBER Books

NBER Macroeconomics Annual 2020, volume 35

Martin Eichenbaum and Erik Hurst, editors

https://www.journals.uchicago.edu/toc/ma/2021/35

The *NBER Macroeconomics Annual 2020* presents research by leading scholars on central issues in contemporary macroeconomics. George-Marios Angeletos, Zhen Huo, and Karthik Sastry analyze expectation formation and find that, in response to business cycle shocks, expectations underreact initially but eventually overshoot. This pattern supports models with dispersed, noisy information and overextrapolation of expectations.

Esteban Rossi-Hansberg, Pierre-Daniel Sarte, and Nicholas Trachter contrast the patterns of rising aggregate firm market concentration with falling market concentration over time at the local level. Some associate rising concentration with less competition and more market power, but since most product markets are local, studying changes in local competition, as opposed to trends in aggregate competition, provides important insights.

Adam Guren, Alisdair McKay, Emi Nakamura, and Jón Steinsson develop a novel econometric procedure to recover structural parameters using cross-region variation. They apply this procedure to estimate the effect of housing wealth changes on household consumption.

Peter Klenow and Huiyu Li quantify the contribution of innovation to economic growth. They find that young firms generate roughly half of all productivity growth, that most of the changes in productivity during the mid-1990s were accounted for by developments at older firms, and that most growth results from quality improvements on existing products, rather than the introduction of new products.

Fatih Guvenen, Greg Kaplan, and Jae Song use panel data from the Social Security Administration to assess changes over time in the share of women in the top 1 percent and top 0.1 percent of the earnings distribution.

Joachim Hubmer, Per Krusell, and Anthony Smith Jr. explore the sources of growing wealth inequality. They argue that the significant drop in tax progressivity in the United States starting in the late 1970s was the most important contributor to increasing wealth inequality. Neither the increase in earnings inequality nor the falling labor share can account for a large share of the increase.

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Macroeconomics Annual 2020

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Tax Policy and the Economy, volume 35

Robert Moffitt, editor

This volume presents six new studies on current topics in taxation and government spending.

Benjamin B. Lockwood, Afras Sial, and Matthew Weinzierl investigate the design of income tax schedules when there is uncertainty about the way taxation affects household behavior. Youssef Benzarti studies the costs of income tax filing, which have risen over time because of the numerous tax forms families have to fill out when filing their taxes and because of increased costs of itemizing deductions, and explores ways to simplify filing and reduce those costs.

Diane Whitmore Schanzenbach and Michael R. Strain provide new and comprehensive estimates of the impact of the US Earned Income Tax Credit on the employment of low-income men and women, finding that the great majority of the various expansions of that credit over the last 40 years have increased employment of single mothers. Zhao Chen, Yuxuan He, Zhikuo Liu, Juan Carlos Suárez Serrato, and Daniel Yi Xu review the structure of business taxation in China, and describe a number of tax distortions and potential inefficiencies in the system.

Mark Duggan, Gopi Shah Goda, and Gina Li consider how the Affordable Care Act has affected the health insurance and labor market choices of individuals who are between the ages of 60 and 64, and finds increases in insurance coverage and reductions in employment for some groups. Jeffrey Clemens, Joshua D. Gottlieb, and Jeffrey Hicks consider how reimbursement rates for health care providers under various government insurance programs affect providers' willingness to take on new patients and expand patient capacity.

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NATIONAL BUREAU OF ECONOMIC RESEARCH

1050 Massachusetts Avenue
Cambridge, Massachusetts 02138-5398
(617) 868-3900

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