

The Reporter

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Program Report: Economics of Education

Caroline Hoxby

The NBER Economics of Education Program covers topics related to education in a manner that is deeply informed by economic logic and empirical methods. The program draws upon theory from several fields including public, labor, development, and urban economics, as well as industrial organization. The program has 179 members and meets three times a year in Cambridge, Chicago, Stanford, and Washington. The average meeting attracts about 100 submissions for a program of about 10 papers. The program has a culture that combines rigor, constructive advice, and noteworthy collegiality.

Top North American universities are very well represented, but the Economics of Education draws participants from many states, countries, universities, and organizations. While the papers often analyze high-income countries' policies, most of the issues are fairly universal. Thus, it should come as no surprise that about two-fifths of the papers focus on policies in low- and middle-income countries. For instance, recent conferences have featured studies of Gambia,¹ Ghana,² Colombia,³ and Brazil.⁴

Economics of Education participants eagerly take up new topics and methods. Researchers very often employ administrative data that are

comprehensive, massive, and accurate. An example would be student financial aid data that are linked to academic and labor market performance. Such data let us apply the latest econometric methods as soon as they become available. Cutting-edge methods make for exciting meetings and, crucially, allow us to differentiate between correlation and causation.

Program participants nearly always have close connections with policymakers as well as researchers in

non-profit and for-profit institutions. These connections ensure substantial attention to questions on the "policy table."

Since my last report, the Economics of Education Program has issued more than 850 working papers and hosted additional scores of conference papers.⁵ Therefore, I cannot possibly describe them all. When last I reported, I focused on productivity in education, teacher value-added, and student loans. Though I will not

Teachers' Value-Added on 4th-Grade Average Test Scores

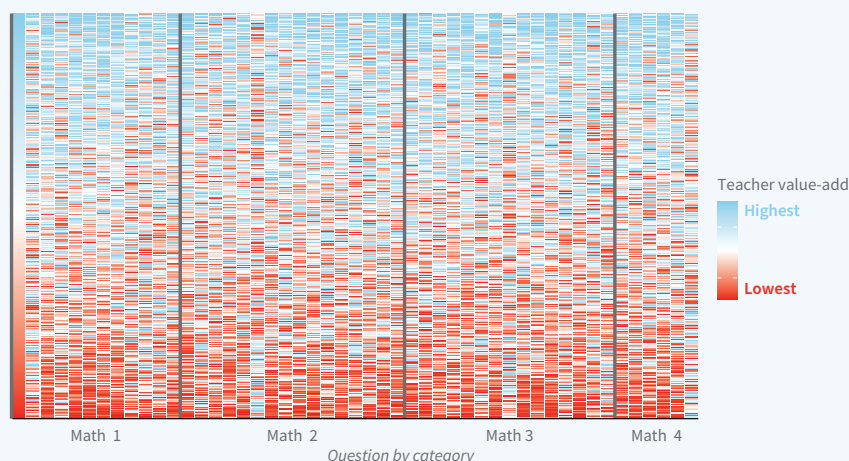


Figure 1

"Do Test Scores Misrepresent Test Results? An Item-by-Item Analysis," Bruhn J, Gilraine M, Ludwig J, Mullainathan S. NBER Working Paper 34484, issued November 2025, revised November 2025.

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discuss these topics in this report, they continue to attract substantial research interest. My last report also forecast that technology and university majors would be increasingly important topics. This turned out to be the case, and I discuss both of those topics in this report. I am often asked how artificial intelligence (AI) is changing education, and it is early days for an answer. Nevertheless, I will speculate, based on what the latest research shows, toward the end of this report.

How Data Science Is Changing the Study of the Economics of Education

Machine learning, natural language processing, deep learning, and other data science tools are rapidly changing how we conduct research in the economics of education. These tools can provide us with techniques and measurements that allow us to answer time-honored, fundamental questions that were intractable previously. In the process, new questions inevitably arise.

For instance, Bruhn, Gilraine, Ludwig, and Mullainathan show that there is vastly more information in test scores than is typically used.⁶ This is because individual questions are usually aggregated into a single score that educators, parents, and researchers see. Ex ante, it is not obvious that the aggregate score destroys much information, but, in fact, it does. The authors use Texas data on 5 million students and 1.31 billion student-item responses to show that much valuable data is effectively thrown away. By valuable they mean data that is highly relevant for student outcomes and educational decisions.

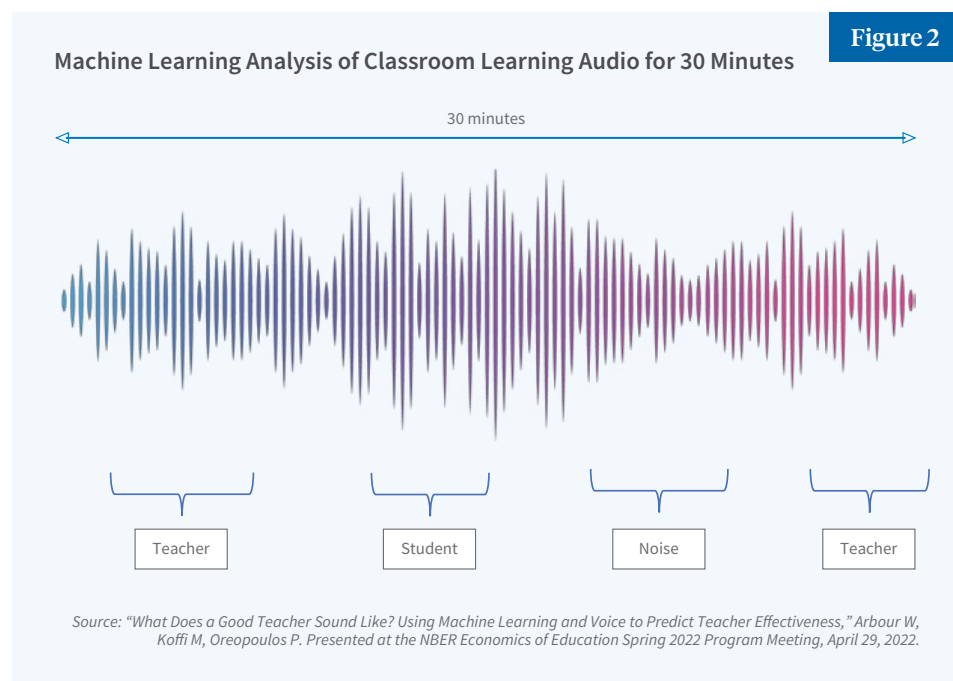
The evidence for findings along these lines is strong. Nielsen shows that individual test items have different implications for outcomes such as school completion and labor market earnings.⁷ For instance, individual test items can fully explain Black/White earnings differences, whereas aggregate scores do not come close to doing so.

Similarly, using administrative

data from Maryland, Conrad, Pope, and Zuo demonstrate that subscores reveal substantial heterogeneity in skill and earnings premiums that aggregate scores mask.⁸ Additional supporting evidence is offered by Moreno-Medina, Nielsen, and Rodriguez.⁹ They digitize content for 3,500 individual test items and 1 billion student-item records linked to Texas administrative data. They show wide variation in individual items' predictive power for earnings and other later outcomes. To interpret these differences, the authors use machine learning and AI to analyze why individual items have the explanatory power that they do.

Arbour, Koffi, and Oreopoulos use machine learning to analyze the audio in thousands of 30-minute classroom videos.¹⁰ They identify the sounds coming from the teacher, the students, and noise. Figure 2 illustrates how they do this. The audio not only reveals how much of the time is occupied by the teacher's speech but the teacher's vocal pitch, brightness, smoothness, and 27 other vocal measures. Remarkably, the authors show that machine learning can predict a teacher's value-added, using audio alone (without word recognition), as well as or better than highly trained classroom observers. This result matters because predicting teachers' value-added is important to get right in education, but employing highly trained observers is prohibitively expensive.

Shaikh uses rich data on 3,700 undergraduates in an online programming course, precisely tracking their study time.¹¹ His field experiment induces period-by-period exogenous variation in students' study effort. He shows that weighting the course grade toward *early* assignments, rather than equal weights or later assignments, encourages more effective effort. Specifically, early weights mitigate procrastination by boosting effort when foundational skills are being acquired. These foundational skills then allow the students to benefit more from later assignments. Shaikh's research may cause dramatic changes in how instructors structure their



courses. His presentation drew rapt attention from the many professors in the room.

Aucejo, Perry, and Zafar use detailed work and study effort data from a partnership between Arizona State University and Uber to analyze how labor supply and study effort respond to changes in labor market conditions and college tasks.¹² They find that a 10 percent increase in study effort reduces weekly time spent on the Uber platform by only 1 percent, indicating that the opportunity cost of studying can be very low with a flexible work schedule. The authors also show that study time is fairly insensitive to labor market conditions: a 10 percent increase in weekly pay rates reduces study hours by only 2 percent.

Biasi and Ma apply natural language processing to the text of 1.7 million university course syllabi and 20 million academic articles to construct the "education-innovation gap," a measure of a syllabus's distance from frontier knowledge.¹³ They show that students at more selective universities learn more frontier knowledge and that, even within a university, research-active instructors teach more frontier knowledge. The authors use a credibly causal empirical strategy that relies on instructor turnover to demonstrate that students who experience more frontier knowledge complete

more doctoral degrees, produce more patents, and earn more.

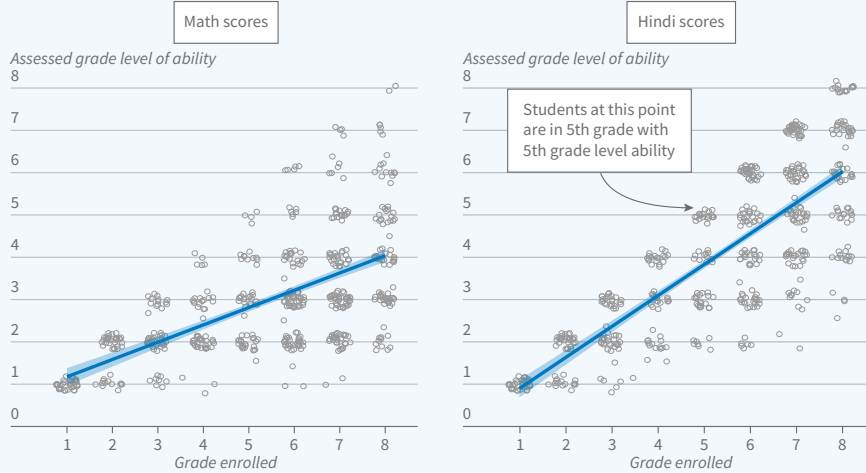
Technology Use in Education

So far, I have discussed how technology is changing how researchers analyze the economics of education. Obvious follow-up questions are how technology is changing what students learn, how they learn, and how productive schools are. Increasingly, the evidence suggests that there are different answers to this question depending on the nature of the technology and how it is used. This is where economics is so helpful. If we look at the economic logic behind different technologies, we may be able to predict which technologies are going to improve education and which are not. It is this economic reasoning that makes technology so exciting.

Personalized adaptive learning (PAL) and computer-assisted learning (CAL), while not exactly the same, share the same "endogenous learning" logic. The logic is that students who do not learn basic material benefit much less when presented with advanced material. For instance, students who are still confused about addition may benefit very little from lessons about fractions. Students who struggle with basic reading comprehension may benefit very little from lessons on essay writing. Moreover,

Figure 3

Student Achievement Relative to Grade Enrolled, India



Source: "Adapting for Scale: Experimental Evidence on Technology-Aided Instruction in India," Muralidharan K, Singh A. NBER Working Paper 34205, issued September 2025, revised November 2025.

as students age, they increasingly diverge in terms of what they have already learned. While first grade material is appropriate for most first graders, a classroom of seventh graders may contain a few students who need first grade material, some who need third grade material, and others who need seventh grade material. Figure 3, from Muralidharan and Singh, shows this fact.¹⁴ While the figure is based on India, the finding is fairly universal.

What PAL and CAL attempt to do is diagnose each child's current skills and customize the curriculum with which the child engages. The goal is to ensure that students demonstrate proficiency with a topic before moving on. Can PAL or CAL software achieve this goal? This would require that students work with computers, rather than attend class-wide lectures.

Muralidharan and Singh conduct a randomized controlled trial with 250,000 students in an Indian state that integrated PAL software into normal public school schedules with existing teachers and modest computer labs that had to be shared among all classes. While the software they test was successful in small-scale trials, such trials often impose conditions that preclude rolling out the software everywhere. A small trial may rely on students who can stay after school or specially trained (and, therefore, expensive) teachers. Muralidharan and Singh's fully scaled-up experiment

shows that students who used PAL scored about 0.2 standard deviations higher in math and language arts. This represents an impressive 50 to 66 percent productivity increase.

Oreopoulos, Gibbs, Jensen, and Price study two field experiments (in Nashville, Tennessee, and Arlington, Texas) in which primary and middle school math teachers are coached to integrate CAL into normal school days.¹⁵ The authors show that the coaching improves math performance by 0.12 to 0.22 standard deviations. This is despite the coaching inducing only limited integration. For instance, most students master fewer than half of the prescribed CAL activities before moving on to the next topic.

Bhatt, Guryan, Khan, LaForest-Tucker, and Mishra also analyze CAL, but as a substitute for high-dosage tutoring rather than as part of normal lessons.¹⁶ While credible research has shown that high-dosage tutoring can improve achievement, such tutoring is often impossible to scale owing to its high costs and dependence on volunteers, such as tutors drawn from local universities. The authors' randomized controlled trial doubles the number of students who receive help by rotating students between CAL and in-person tutoring. In Chicago and New York City high schools, the authors show that CAL substitution, rotated in this manner, reduces costs by 30 percent, gets more students into tutoring, and

generates the same improvements as high-dosage tutoring.

"One Laptop per Child" (OLPC) programs are some of the most ambitious attempts to integrate technology into education. Rolled out in 40 low- and middle-income countries, OLPC programs provide a laptop to each student, most of whom would otherwise have no access to any device such as a laptop, tablet, or smartphone. OLPC programs also provide technical support and train teachers to integrate laptops into their lessons. These programs are costly. Moreover, the economic logic behind them is not terribly clear. A student can do many things with a laptop—not just instructional activities, but play games, stream video, and use social media. Just as the rollout of television had an ex ante ambiguous predicted effect on learning, so might laptops.

Cueto, Beuermann, Cristia, Malamud, and Pardo conduct a randomized controlled trial of Peru's OLPC program over 10 years.¹⁷ They show that students do use the laptops and develop familiarity with the technology. However, the authors find no significant effects on academic performance, school completion, or university enrollment. Its long-term nature, accurate data, and rigorous empirical strategy make this study stand out among others on laptop provision.

At present, there is worldwide debate about smartphones. On the one hand, they can be used for instruction, and they are cheap and easy to network. However, policymakers are worried that smartphones distract students, encourage bullying, or hamper social development by suppressing in-person interactions. These worries explain why several countries and numerous North American school districts have enacted smartphone restrictions. The restrictions have usually been triggered by anecdotes. Little actual evidence is available about which restrictions have their intended effects. Fortunately, there are several recent and credible studies on the question.

Allcott, Baron, Dee, Duckworth, Gentzkow, and Jacob evaluate US schools that have restricted smartphone use during the school day by

insisting that they be placed in lockable pouches.¹⁸ They use GPS pings to verify changes in actual use. Because the schools that adopt pouches are self-selected, the authors use a stacked difference-in-differences design to address biases. The authors find that in the first year after adoption, disciplinary incidents increase. However, the disciplinary effect fades later. For academic achievement, school attendance, self-reported class attention, and online bullying, the authors report effects that are close to zero or statistically insignificant.

Figlio and Özek study Florida's 2023 smartphone ban in schools.¹⁹ Because the ban was statewide, there are no true control schools. Therefore, the authors compare schools where there was a larger pre-ban difference in cellphone use between regular school days and teacher in-service days (high-effect schools) and those with a smaller pre-ban difference in cellphone use (low-effect schools). The results show that the cellphone ban increased disciplinary incidents, but that these effects began to dissipate after the first year. The authors find statistically significant improvements in test scores in the second year of the ban. The effects come exclusively from middle and high schools, though the ban applied to primary schools, too.

Atsoy, Lusher, and Carrell evaluate an app designed to keep university students off their smartphones while in class.²⁰ They conduct an experiment at Texas A&M University where randomly selected students are encouraged to use Pocket Points, which rewards students with points if they lock their phones when in class (verified by GPS). The points can be used at participating businesses. The authors show that use of this app does reduce smartphone use and that the reduction caused students to self-report increased classroom focus, attendance, and academic satisfaction. However, the effects on transcript grades are statistically insignificant.

College Majors

With good reason, students have long wanted to know how their choice of a college major would affect their earnings and other life outcomes. De-

spite assertions commonly splashed in the media, major-specific returns are largely unknown and currently *unknowable* for the US. This is because self-selection into majors is severe and incredibly difficult to address with empirical strategies that could produce plausibly causal results.

In contrast, it is possible to obtain plausibly causal evidence on the effect of program field selection for the many countries where a student must be admitted into a specific field based on a sharply enforced test score cutoff. However, evidence from such cutoff-based studies is not relevant for Americans who choose majors only after being admitted to a university, frequently switch majors, rarely face cutoffs for declaring a major, and face different labor market institutions.

Should rigorous economists therefore give up on learning about US majors? The answer is “no,” as shown by several recent papers.

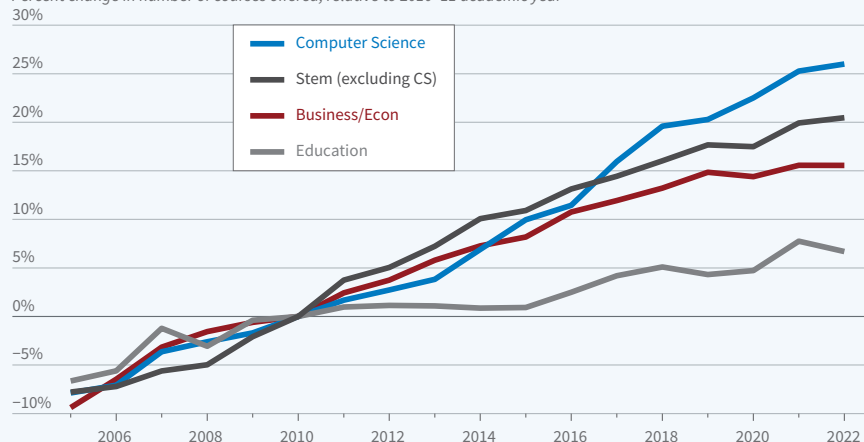
Conlon and Patel show that American students exhibit dramatic biases about how majors connect to careers.²¹ Using administrative and survey data, they find that students grossly overestimate their likelihood of ending up in their major's “stereotypical” career. For instance, 63 percent of biology majors expect to be doctors (versus 23 percent in reality), 65 percent of art majors expect to be artists (versus 17 percent), and 42 percent of

journalism majors expect to be journalists (versus 4 percent). Students grossly *underestimate* how likely they are to end up in a career that is generic, meaning that it is not strongly associated with any major. Using a field experiment, the authors show that giving students accurate information causes them to rely less on stereotypes when choosing their majors.

When the labor market demands more computer scientists, say, and fewer social workers, do universities respond by changing their supply of the relevant courses? Conzelmann, Hemelt, Hershbein, Martin, Simon, and Stange show that they do, although not all majors and universities are equally responsive.²² The authors identify supply responses using exogenous demand shocks to regional labor markets (a “shift-share” strategy). Light, using a similar empirical strategy but different data, finds broadly consistent results.²³ Light's methods are distinctive because he uses natural language processing to analyze hundreds of thousands of course descriptions. Taken together, the results suggest that universities respond to demand by offering more courses, more sections, and more instruction on skills that employers want. However, universities respond asymmetrically: They add supply more in growing fields than they contract supply in shrinking fields. See Figure 4.

College Course Offerings, 2005–2022

Percent change in number of courses offered, relative to 2010–11 academic year



Source: “Student Demand and the Supply of College Courses,” Light JD. NBER Conference Paper 216708, presented at the NBER Economics of Education Spring 2025 Program Meeting, May 2, 2025.

Figure 4

Students may choose majors not just because of what is the best match for them but also because it is easier to signal ability in some majors than in others. Economic theory predicts that students who expect to face discrimination may be induced to choose certain majors in order to signal that they do not fit the stereotype. For instance, Black students may worry about discrimination caused by employers believing that selective universities lowered admission standards for them. Female students may have similar concerns about how to signal their math ability. In such cases, Black or female students who are able in math may be induced to major in, say, statistics—not because they are well matched but because it allows them to signal their abilities fairly precisely through the major and grades. Batis-tich, Bond, Linde, Mumford test this hypothesis using administrative data from several large universities.²⁴ They show that able Black students are disproportionately likely to choose a major that offers precise signaling. Lepage, Li, and Zafar show that female students who are able in math are disproportionately likely to choose STEM majors and to reveal their grades to employers.²⁵

How Artificial Intelligence Affects Education

When university materials such as lecture notes and study guides, went online, many professors observed that the change made the distribution of achievement more bimodal. Highly motivated, compliant, able students performed even better because they still attended class, concentrated during class, studied, and came to office hours. Their effort was more productive, though, because they had access to comprehensive materials 24 hours a day, 7 days a week. On the other hand, students who struggled with motivation, compliance, and understanding performed worse because the ready availability of online materials tempted them to neglect class, procrastinate, and hope that the materials would substitute for in-person help. I remember going through the transition while teaching advanced

undergraduate econometrics over several years at Harvard. The increasing bimodality in the distribution of achievement was measurable.

Generative AI may affect learning in a similar way, with some students using the tools to make their effort more productive and other students using the tools to substitute for effort. It is very early days yet for evidence on how AI affects student learning, but one recent paper by Reyes and Contractor provides intriguing evidence.²⁶ The authors run a lab-based experiment in which university students are assigned to learn about a novel topic (such as CRISPR gene editing), take before-and-after tests, and write a short essay. The students are randomly assigned to computer labs with and without access to generative AI tools. The authors find that the AI tools improve test performance and essays by about 0.25 standard deviations at the end of the learning session. These gains hold up when students take a follow-up test and write an essay using no AI tools one week later. The researchers find that the gains on the follow-up test are found primarily among students with high pre-experiment grade point averages. This may indicate that these students use AI tools differently from their classmates, thereby capturing greater benefits.

September 2023, revised February 2025.

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⁴ “The Effects of Widespread Online Education on Market Structure and Enrollment,” Barahona N, Dobbin C, Otero S. NBER Working Paper 34522, November 2025.

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⁵ “Program Report: Economics of Education, 2019,” Hoxby CM. *NBER Reporter*, April 2019.

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⁶ “Do Test Scores Misrepresent Test Results? An Item-by-Item Analysis,” Bruhn J, Gilraine M, Ludwig J, Mullainathan S. NBER Working Paper 34484, issued November 2025, revised November 2025.

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⁷ “Test Items, Outcomes, and Achievement Gaps,” Nielsen E. Presented at the NBER Economics of Education Fall 2018 Program Meeting, November 2, 2018.

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⁸ “Skills That Pay: Subject-Specific Test Scores and Long-Run Outcomes,” Conrad CL, Pope NG, Zuo GW. Paper to be presented at the NBER Economics of Education Summer Institute 2026 Meeting, July 29, 2026.

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⁹ “The Anatomy of a High-Return Question: Text, Skills, and the Economics of Achievement Measurement,” Moreno-Medina J, Nielsen E, Rodriguez V. Paper to be presented at the NBER Economics of Education 2026 Summer Institute Meeting, July 29, 2026.

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¹⁰ “What Does a Good Teacher Sound Like? Using Machine Learning and Voice to Predict Teacher Effectiveness,” Arbour W, Koffi M, Oreopoulos P. Presented at the NBER Economics of Education Spring 2022 Program Meeting, April 29, 2022.

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² “How to Build a Reader: Evidence from a Scalable Literacy Intervention in Ghana,” Andersen ETJ, Graffy S, Kerwin JT, Lambon-Quayefio M. Presented at the NBER Economics of Education Spring 2026 Program Meeting, April 23, 2026.

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³ “Financial Aid and Upward Mobility: Evidence from Colombia’s Ser Pilo Paga,” Londoño-Vélez J, Rodriguez C, Sanchez F, Álvarez-Arango LE. NBER Working Paper 31737, issued

2025.

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¹² “Assessing the Costs of Balancing College and Work Activities: The Gig Economy Meets Online Education,” Aucejo EM, Perry AS, Zafar B. NBER Working Paper 32357, April 2024.

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¹³ “The Education-Innovation Gap,” Biasi B, Ma S. NBER Working Paper 29853, issued March 2022, revised May 2023.

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¹⁴ “Adapting for Scale: Experimental Evidence on Technology-Aided Instruction in India,” Muralidharan K, Singh A. NBER Working Paper 34205, issued September 2025, revised November 2025.

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¹⁵ “Teaching Teachers to Use Computer Assisted Learning Effectively: Experimental and Quasi-Experimental Evidence,” Oreopoulos P, Gibbs C, Jensen M, Price J. NBER Working Paper 32388, April 2024.

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¹⁶ “Can Technology Facilitate Scale? Evidence from a Randomized Evaluation of High Dosage Tutoring,” Bhatt MP, Guryan J, Khan SA, LaForest-Tucker M, Mishra B. NBER Working Paper 32510, May 2024.

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¹⁷ “Laptops in the Long Run: Evidence from the One Laptop per Child Program in Rural Peru,” Cueto S, Beuermann DW, Cristia J, Malamud O, Pardo F. NBER Working Paper 34495, November 2025, and *Journal of Public Economics* 252, December 2025, Article 105538.

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¹⁸ “The Effects of School Phone Bans: National Evidence from Lockable Pouches,” Allcott H, Baron EJ, Dee T, Duckworth AL, Gentzkow M, Jacob B. NBER Working Paper 35132, April 2026.

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¹⁹ “The Impact of Cellphone Bans in Schools on Student Outcomes: Evidence from Florida,” Figlio DN, Özek U. NBER Working Paper 34388, October 2025.

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²⁰ “From Distraction to Dedication: Commitment and Incentives Against Phone Use in the Classroom,” Aksoy B, Lusher LR, Carrell SE. NBER Working Paper 33703, April 2025, and *Journal of Economic Behavior & Organization* 236, August 2025, Article 107082.

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²¹ “What Jobs Come to Mind? Stereotypes About Fields of Study,” Conlon JJ, Patel DA. Presented at the NBER Economics of Education Fall 2024

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²² “Skills, Majors, and Jobs: Does Higher Education Respond?” Conzelmann JG, Hemelt SW, Hershbein B, Martin SM, Simon A, Stange KM. NBER Working Paper 31572, August 2023.

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²³ “Student Demand and the Supply of College Courses,” Light JD. Presented at the NBER Economics of Education Spring 2025 Program Meeting, May 2, 2025.

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²⁴ “Statistical Discrimination and Optimal Mismatch in College Major Selection,” Batistich MK, Bond TN, Linde S, Mumford KJ. Presented at the NBER Economics of Education 2025 Summer Institute Meeting, July 23, 2025.

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²⁵ “Anticipated Gender Discrimination and Grade Disclosure,” Lepage LP, Li X, Zafar B. NBER Working Paper 30765, December 2022.

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²⁶ “Experimental Evidence on the Learning Impact of Generative AI,” Reyes GJ, Contractor Z. Presented at the NBER Economics of Education Spring 2026 Program Meeting, April 24, 2026.

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Innovative Investments in Local Jails

Marcella Alsan, Peter Hull, and Crystal Yang

In research conducted in collaboration with Arkey Barnett at the University of Michigan and Meghan Beal at the National Sheriffs' Association, we investigate the effects of innovative investments in local jails that aim to improve health and rehabilitation outcomes for incarcerated individuals and their communities. The US has one of the highest incarceration rates in the world, with nearly 2 million people detained in correctional facilities every year. While most people are held in state or federal prisons, local jails house 546,000 individuals across 3,116 facilities, the majority of whom are not convicted. Local jails serve as the front door to the criminal justice system, with more than 7.6 million admissions per year and a significant share of those released being re-booked within the same year, revealing a persistent cycle of incarceration in local jails.

At the same time, incarceration coincides with ongoing public health crises. Individuals in jail have disproportionately high rates of disease, including substance use disorder, hypertension, diabetes, and serious mental health illness. Mortality in local jails has increased over the last two decades, with suicide and substance-use-related causes accounting for a large share of in-custody deaths.

High recidivism and rising mortality in local jails reflect a common challenge: Although often viewed as short-term detention facilities, local jails profoundly shape both short- and long-run outcomes for the millions of people cycling through them and the communities to which they return. This creates a critical intervention point where rehabilitative investments can influence outcomes both within and beyond jail walls and generate outside returns in community safety and health.

Since the 1970s, a dominant view in US criminal justice was that “nothing works,” meaning that interventions that invest in incarcerated populations had little private or social

return.¹ This perspective emphasizes harsh conditions as a means of deterring future criminal behavior. In contrast, an investment approach emphasizes rehabilitation through improvements in mental and physical health, education, and overall well-being.

Through collaboration with practitioners and leaders in the correctional system, our recent research revisits this idea and examines two distinct but complementary investments inside local jails. One study examines a top-down approach that improves healthcare services in jails through external accreditation, and another study examines a bottom-up approach centered on education-based, holistic rehabilitation programs tailored to individuals. Together, these approaches highlight two distinct channels for improving jail outcomes: reshaping institutional environments and empowering individual transformation.

Our joint work indicates that both pathways impact behavioral and health outcomes during and after incarceration and suggests innovative ways local law enforcement and communities can invest in jails to disrupt recidivism cycles and reduce mortality rates among incarcerated populations.

Voluntary Accreditation and Healthcare Quality in US Jails

As wards of the county or state during confinement, incarcerated individuals rely entirely on correctional institutions for medical care, and since the Supreme Court's landmark decision in *Estelle v. Gamble* (1976), correctional institutions have been constitutionally obligated to provide it. Yet, most jails operate with limited medical oversight, and there is no dedicated funding for inmate healthcare due to the Medicaid Inmate Exclusion Policy. Healthcare delivery in jails is largely overseen by sheriffs with limited medical expertise and delivered through contracts with for-profit vendors under capitated payment structures. These

conditions create incentives to reduce costs by cutting quality along dimensions that are noncontractible or difficult to monitor.

This combination of weak external monitoring and non-expert principals is particularly concerning in jail settings. Accreditation could provide standardized expertise and independent compliance assessments to help public officials monitor quality and constrain private service providers' incentives to reduce noncontractible dimensions of quality. However, the effects of accreditation have only been studied in the US civilian health system and evidence remains mixed and non-causal.

In Alsan and Yang (2025), we conduct the first randomized controlled trial of healthcare accreditation and, to the best of our knowledge, the first randomized controlled trial in US jails, and evaluate its impact on process-based measures of quality and mortality.² Over several years, we randomized the offer of accreditation to 46 midsized jails (average daily population between 100 and 3,000) across the United States. Facilities were randomly assigned to receive a subsidy to pursue accreditation from the National Commission on Correctional Health Care (NCCHC) either immediately or at the end of the study period. NCCHC standards of care are often regarded as a “gold standard” and, in some cases, as evidence of constitutionally adequate care, although critics argue that accreditation may be ineffective and even counterproductive.

NCCHC standards span seven core categories ranging from governance and administration to patient care and treatment. We measured compliance and organizational practice using five primary instruments. We administered a detailed survey to jail leadership, conducted independent audits of medical records and death logs, and fielded anonymous surveys of medical and custody staff. At the end line, we conducted qualitative

interviews with jail leadership and incarcerated individuals. We also conducted an incentivized survey of 145 experts across several domains—including jail administrators, healthcare providers, policy experts, and the formerly incarcerated—to elicit beliefs about the importance of different standards as well as predictions about the effects of compliance with standards. We prespecified three methods for constructing a meta-index using the individual indices of compliance with the NCCHC quality standards to address multiple hypothesis-testing concerns: a simple average across the seven NCCHC quality standard indices, a principal component analysis, and an expert-weighted average of the seven indices.

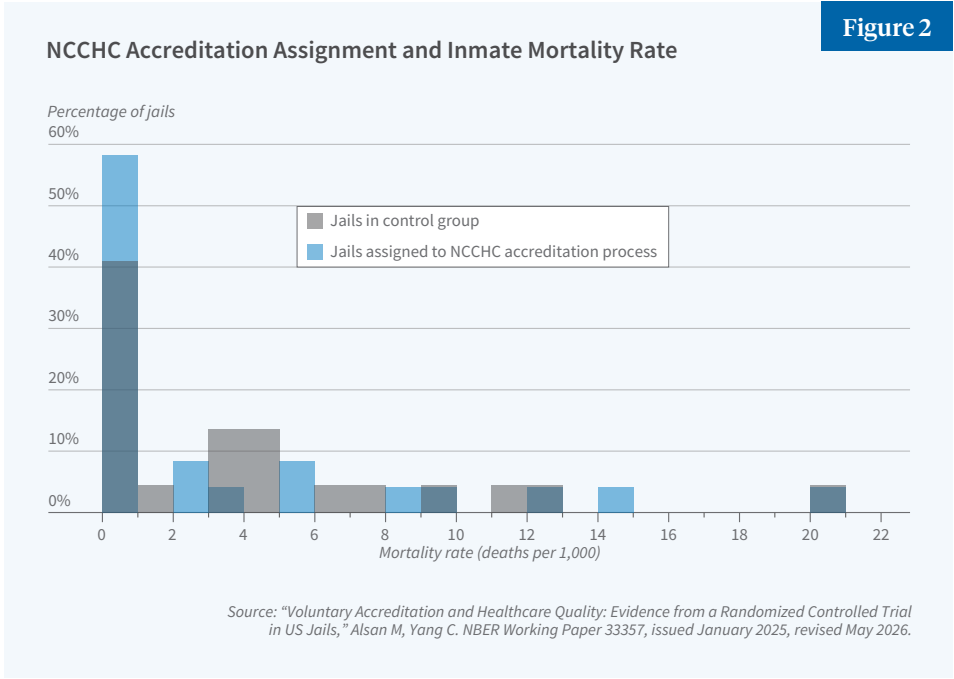
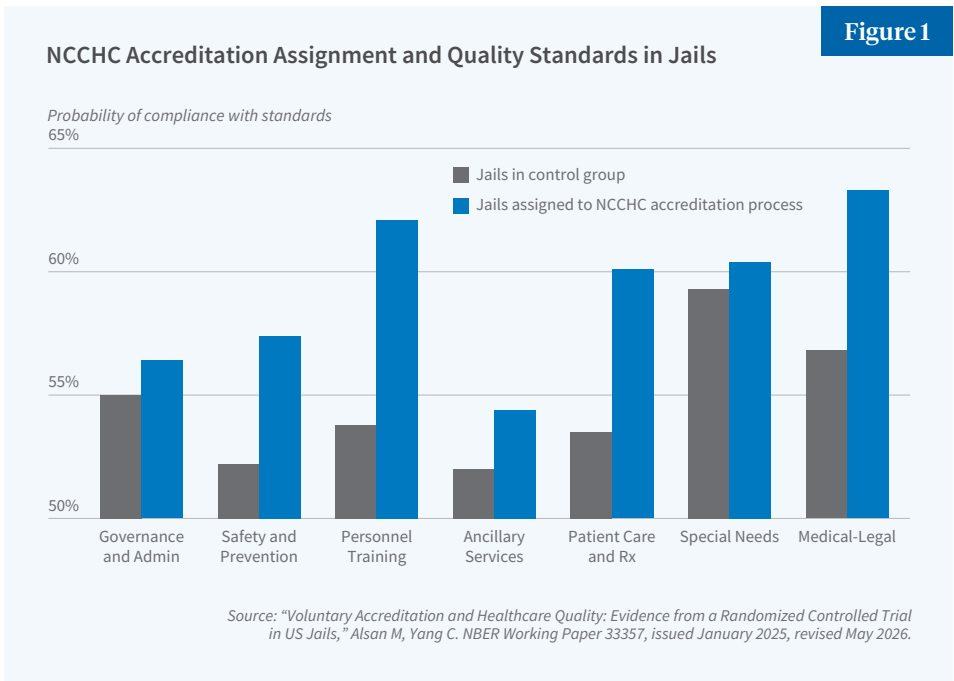
Effects on Quality Standards and Mortality

We find that assignment to the NCCHC accreditation process leads to statistically significant improvements in compliance with quality standards, particularly in training and patient care. We also find that treatment assignment yields statistically significant and medically meaningful increases across all three prespecified meta-indices.³ [See Figure 1]

Assignment to the accreditation process also reduces the 12-month mortality rate (deaths per 1,000) in jails by approximately 60 percent, with the largest reductions concentrated in preventable causes and in jails that experienced the greatest quality improvements. Figure 2 presents the mortality rate distribution for treatment and control groups using administrative death logs and shows a leftward shift in the jails assigned to accreditation. This result is robust to different functional forms and holds across both the administrative death logs and our independently collected mortality data from media reports, mitigating concerns that our findings are driven by reporting bias.

Staff Coordination and Timely Screening

We find evidence that suggests effects operate through improving



coordination between staff, timely screening, and increased information for oversight. Notably, these improvements are achieved without structural changes in inputs, such as increases in staffing or capital investments, reflecting the standards' focus on organizational practices and procedures rather than new resources.

Staff surveys reveal that treatment assignment generates statistically significant improvements in horizontal coordination. In addition to more staff reporting coordination and communication between custody and medical

staff, we also find positive improvements in staff feeling valued at work and sufficiently equipped with tools and resources. Interviews with facility leadership corroborate these patterns, with leadership highlighting the importance of knowing the correct protocols and securing buy-in from custody staff.

Consistent with our finding that treatment substantially reduces mortality associated with preventable causes, our independent medical audits find increased early screening for several acute and mental-health-related conditions, including withdrawal

symptoms, chronic disease indicators, and suicide risk. Screening also substantially increased for three high-risk conditions: suicidal ideation, opioid use disorder, and hypertension. Correspondingly, accreditation assignment yields improvements in documentation and screening for mental health history and prior psychiatric or addiction treatment. In interviews with facility leadership at the jails, we found that the biggest changes reported by almost all treatment facilities were with respect to screening and initial health assessments, with some especially emphasizing mental health screening and processes of care.

While treatment assignment leads to changes in documentation and screening, it does not generate changes in staffing levels, healthcare vendors, or referral patterns for off-site care. However, treatment facilities do increase services for incarcerated individuals, (e.g., laboratory and pharmacy services), consistent with findings on improved screenings for medical conditions.

Overall, these findings reveal that the impact of accreditation operates through improved staff coordination, improved documentation and adherence to protocols, and increased early screening. The evidence also demonstrates that meaningful improvements in quality of care and mortality reductions are achievable without resource expansion or additional capital, and instead, through improvements in organizational practices.

Education-Focused Rehabilitation in Jail

The Inmate Growth Naturally and Intentionally Through Education (IGNITE) program represents a more bottom-up approach to reform, focusing on direct engagement with incarcerated individuals through education and cultural change. In September 2020, Sheriff Christopher Swanson of Genesee County, Michigan, launched the education-centered initiative. The initiative was designed to reverse the cycle of generational incarceration through education by restoring value, hope, and purpose to the incarcerated

population. IGNITE is a voluntary, meritocracy-based approach to rehabilitation that relies on the community for support.

To estimate the effect of exposure to IGNITE, we and Barnett leveraged jail administrative data and a novel instrumental variable approach that exploits quasi-random variation in the length of jail stays caused by court scheduling delays.⁴ These court delays are caused by changes in the schedule of the judge or prosecutor assigned to the case, fiscal crises, or holidays and are uncorrelated with defendant characteristics or predicted recidivism risk. In our data, such delays extend jail stays by approximately two weeks on average, both before and after IGNITE's launch. We used these delays as an instrument for program exposure and combined this approach with a difference-in-differences framework comparing outcomes before and after program implementation. This approach allowed us to isolate the causal effect of additional exposure to IGNITE.

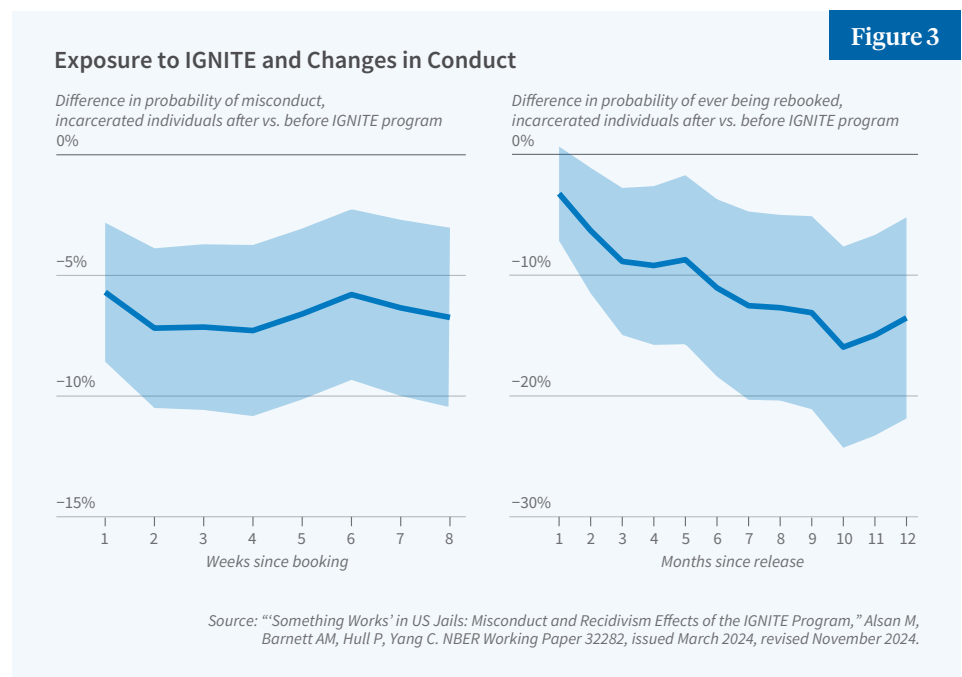
Effects on Behavior and Recidivism

We find that exposure to IGNITE substantially reduces the likelihood of in-jail misconduct and recidivism.⁵ One additional month of exposure to the program reduces incidences of

weekly major misconduct within the jail by 25 percent. The improvements in behavior extended beyond the facility walls. Each additional month of exposure reduces three-month recidivism by 24 percent (9 percentage points). We find similar misconduct and recidivism effects across different demographic groups, prior-offense status, and predicted exposure to the Flint water crisis. Reductions in rebooking persist for up to one year after release, the longest follow-up horizon available in the data. As shown in Figure 3, recidivism effects also grow over time, reaching a 14 percentage point reduction at one year, with the largest impacts among individuals with high predicted recidivism risk.⁶

Academic Achievement and Cultural Change

We further study the mechanisms underlying these results.⁷ First, we find that the individualized structure of IGNITE produces substantial gains in academic achievement. Participants advance roughly one grade-level equivalent in literacy and math assessment scores during their period of exposure. Second, evidence suggests that the program shifts attitudes and expectations for both incarcerated people and jail staff. Sentiment analysis of administrative text-mes-



sage data exchanged between incarcerated individuals and jail staff shows that incarcerated individuals exposed to IGNITE are more likely to use language classified as positive and trust-related compared to those incarcerated before the program's implementation. Our custody staff survey, which shows balanced exposure to IGNITE participants among respondents, reveals that officers with more frequent interaction with IGNITE participants are approximately twice as likely to view educational programming in jails as worthwhile as officers with limited interaction with IGNITE participants.

Consistent with the in-jail evidence, observed positive spillovers in the community suggest cultural change extending beyond the jail. Using our anonymized Flint community survey, which was conducted with no IGNITE association in our distribution channels or questionnaire, we assess respondents' trust in local law enforcement. Community members who were formerly incarcerated or had a family member or close friend incarcerated in Genesee County Jail after September 2020 (indicating IGNITE exposure) are 23 percentage points more likely to express positive views of law enforcement than respondents without either experience.

These behavioral and attitudinal changes generate substantial social returns. We estimate that one additional month of IGNITE exposure reduces the three-month social cost of crime and incarceration by at least \$2,954 per individual. Over a one-year horizon, the reduction in social costs amounts to at least \$7,285 per

person-month. Even under conservative assumptions, the implied social savings exceed \$6,000 per participant, a strikingly large benefit relative to the modest cost of administering the program.

Following IGNITE's demonstrated impact and positive rehabilitative benefits in Genesee County, Michigan, the National Sheriffs' Association adopted the initiative and has replicated IGNITE in dozens of jails nationwide, customizing each site through local partnerships. Ongoing research examines IGNITE as it expands across the country.

Conclusion

Our collaborative research examines two distinct institutional investments in jails: a top-down strategy through external healthcare accreditation aimed at improving organizational practices and procedures, and a bottom-up strategy focused on education-based rehabilitation that promotes holistic individual growth and skill development among the incarcerated. Despite targeting different domains, both investments demonstrate that rehabilitative investments impact behavior and institutional culture in ways that can improve safety and behavioral outcomes. Both investments also highlight the interconnectedness between educational achievement and engagement and underlying health and wellbeing, as the capacity for incarcerated individuals to participate in programming is intertwined with whether their basic medical and mental health needs are being met.

Taken together, these findings demonstrate that institutional reforms within local jails can yield outside benefits across multiple dimensions: improved facility safety, reduced recidivism, reduced mortality, and improved community perception of law enforcement. These benefits, both during and after the period of incarceration, demonstrate the value of rehabilitative approaches within the criminal justice system.

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Marcella Alsan

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Her research has been published in leading economics journals and law reviews and has been featured in outlets such as the *New York Times*, *Washington Post*, *Wall Street Journal*, and *The Economist*, and has been cited by the US Supreme Court. She is a recipient of the American Law Institute's Early Career Scholars Medal and Harvard Law School's Sacks-Freund Award for Teaching Excellence.

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The Long Shadow of Early Life: Life Cycle Exposures and Old-Age Mortality

Jason Fletcher

Period life expectancy in the United States rose from roughly 47 years in 1900 to 77 years in 2020—a gain of 30 years across 12 decades.¹ Economists have worked to understand what drives these aggregate improvements and, more specifically, what explains variation in longevity across individuals and groups. Cutler, Deaton, and Lleras-Muney’s foundational survey identified education, income, and public health infrastructure as central determinants, with medical care playing a more limited and targeted role.² Much of what drives old-age mortality—the question of why people who survive to 65 live to 75 rather than 85—remains poorly understood and often correlational. This lack of knowledge matters because the gains in life expectancy over the twentieth century were concentrated not at the end of life but near the beginning of it. The dramatic rise from 47 to 77 years reflects largely the near-elimination of infant and child mortality; age-specific mortality rates at 65 and older have improved far more modestly, and the slowdown in those gains has become a recurring concern in the demography and economics literatures. Recent cohort-mortality forecasts and related evidence document deceleration in longevity gains.³ While most efforts at examining determinants of longevity have focused on conditions in older ages, especially medical innovations and individual resources, there is growing evidence that early-life conditions may be a significant factor.

This summary describes a substantial body of work that I have carried out with Hamid Noghanibehambari of Austin Peay State University. We explore the extent to which the early-life conditions and interventions that shape childhood development and adult health and human capital play a role in who survives into old age.

Credibility linking early-life circumstances to old-age outcomes faces major constraints: Among the

most important is the length of the human lifespan itself. A researcher implementing an ideal experiment that begins *in utero* must wait over 80 years to answer this question directly. Instead, many researchers have focused on analyzing recent old-age mortality determinants by “looking backward” in historical time (still often 80+ years) and face many data constraints, since gold-standard measures of circumstances are not available. Here, creativity is important to overcome substantial hurdles, and much inference is indirect. The other key issues are effect sizes and the need for “big data.” For context, cohort life expectancy between 1900 and 1930 increased about 15 years. However (like period life expectancy) the gains are overwhelmingly attributable to improvements at young ages: The conditional (at age 65) cohort life expectancy gains across these 30 birth cohorts were just over 2 years for men and barely 1 year for women (see Figure 1).^{4,5} Thus, early-life effect estimates on old-age mortality can be both consequential and likely measured in months. It is possible that most US survey infrastructure (e.g.,

the Health and Retirement Study) is not powered to detect these effect sizes.

Building the Evidence Base on Early-Life Effects

My studies with Noghanibehambari and other colleagues represent a systematic effort to fill in the empirical (and conceptual) map. Figure 2 arrays estimated months of longevity gained or lost in old age as a result of a large share of causes studied in our joint program—environmental toxins and disease, racialized violence, economic conditions, public health, human capital (including intergenerational education), and selected external benchmarks. These estimates use the same research designs used throughout this article: Social Security Administration death records linked to the full-count 1940 census through the CenSoc project, usually combined with spatial and temporal variation in exposure. In many cases we extend prior research that established short- or medium-run effects and trace implications for mortality decades later.⁶

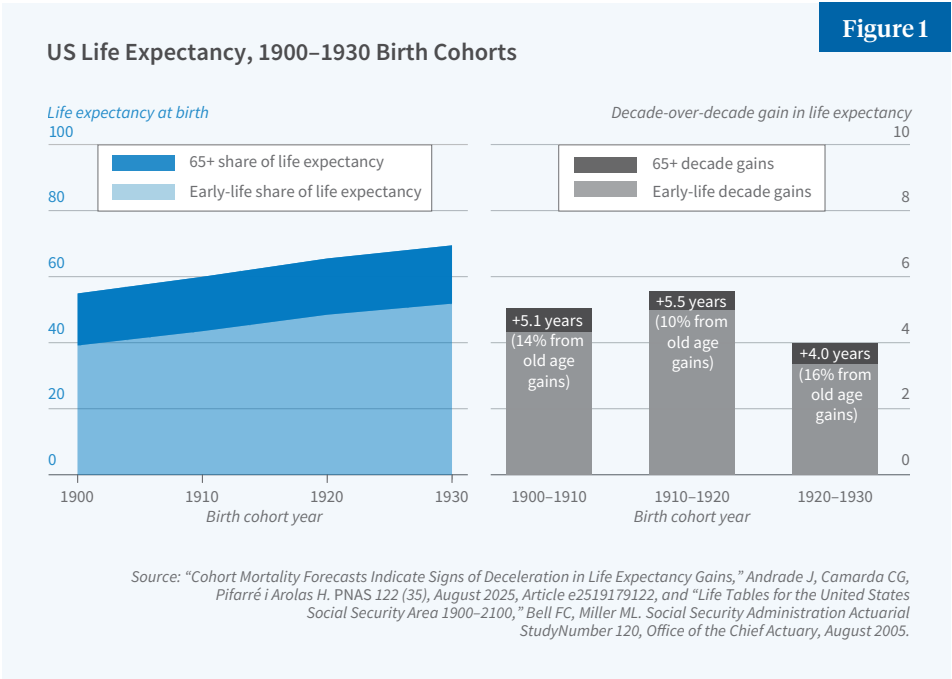


Figure 2

Life-Course Exposures and Old-Age Longevity

○ = ITT/DID/FE □ = TOT/IV

Change in months of old-age longevity gained



Source: Legend numbers match references in the footnote of this article.

Environmental Toxins and Disease

Lead-contaminated drinking water in cities that installed lead-pipe systems in the late nineteenth and early twentieth centuries has been linked to fertility, infant mortality, and birth outcomes.⁷ Our instrumental-variable estimates, exploiting proximity to lead refineries, imply roughly 9.6 months lower longevity at older ages.⁸ Pesticide exposure tied to periodical cicada emergencies—which plausibly raised agricultural insecticide use—reduced longevity by about 2 months in intent-to-treat (ITT) estimates for highly agricultural counties, with ITT estimates for sons in highly-exposed farm families on the order of 10 months.⁹ The Dust Bowl combined environmental and income shocks and caused persistent local income and migration responses to erosion.¹⁰ Our estimates imply roughly 2.5 months lower longevity among sons in highly-exposed farm families.¹¹ Figure 2 also lists related program papers on disease environment, climate, and the 1918 influenza pandemic.^{12,13,14}

Public Health Interventions

Bleakley's analysis of the Rockefeller hookworm eradication campaign in the American South anchors the short-run human-capital literature.¹⁵ We estimate the eradication campaign led to roughly 1.3 months higher longevity overall, with larger effects for nonwhite children and complementarities with Rosenwald school construction.¹⁶ In utero and early-childhood exposure to alcohol prohibition is associated with higher longevity in ITT estimates (and larger treatment-on-treated effects for heavily exposed cohorts).¹⁷ Municipal water filtration spread unevenly across cities and affected racial gaps in infant mortality.¹⁸ Our difference-in-differences estimates imply roughly 3.2 months higher longevity at older ages from filtration exposure.¹⁹ The figure adds county health departments, polio vaccination, malaria eradication, midwifery licensing, birth registration, and other interventions on the public health interventions panel.^{20,21,22,23,24}

Economic Conditions and Policies

A large literature has linked economic resources to health. Our program adds to this literature with several examples: county bank deposits during the Great Depression, NAFTA-era trade shocks, the boll weevil infestation, and Social Security retirement income.^{25,26,27,28} College access—new four-year colleges near age 17—adds on the order of 1 to 1.6 years of longevity in treatment-on-treated estimates.²⁹

Racial and Social Environment

Ang shows that screenings of the film *The Birth of a Nation* were followed by elevated racial violence; we estimate 6.5 months lower male longevity in highly exposed counties.^{30,31} Historical work on the geography of lynching motivates our measure of in utero exposure to a lynching in the county of birth; we estimate 3.5 months lower longevity for Black males, explaining a substantial fraction of the Black-White longevity

gap in 1980.³² Figure 2 also includes birth order, fertility, “passing as white,” intergenerational college, and paternal education.^{33,34,35,36,37}

Across all of these papers, a pattern recurs that echoes the finding in Adriana Lleras-Muney and Flavien Moreau’s unified model of cohort mortality: Effects are largely invisible in middle age and emerge only after age 55 or 60.³⁸ This latency is not a quirk of our data; it likely reflects the biology of how early-life conditions interact with aging processes, accumulating until the body’s reserves are depleted enough that the earlier insults become mortality determining.

Fully charting this terrain means facing real constraints. On the census side, records are released after a 72-year restriction, meaning the 1950 census became available only in 2022 and the 1960 census will not be public until 2032—leaving large blocks of birth cohorts and their associated exposures still out of reach for linked mortality analysis. On the death record side, individual-level mortality data before the mid-1970s are largely absent, a gap that is striking for a country of such administrative capacity; coverage from the 1970s through the early 2000s is relatively complete for older ages (through Social Security application links) but sparse for younger ones. A further break came around 2005, when a policy change led many states to stop sharing mortality data with federal systems, producing a significant drop in coverage in the publicly available linked files. The combined effect is to circumscribe our analytical window to birth cohorts of roughly the 1910s through 1930s, whose deaths fall in the well-covered 1975–2005 window—which in turn determines which historical exposures and policies can be studied. Ongoing work in our group is extending this forward using the newly available 1950 census, accepting less-complete death record coverage to examine exposures from the 1940s and 1950s whose effects may manifest through midlife rather than just old age.

Even within the available window, a second set of constraints shapes what

can be measured. Going back in time to characterize early-childhood exposures requires relying on indirect and ecological proxies rather than direct biological measurement. Our cicada paper illustrates the approach: Cicada emergence serves as an indirect measure of pesticide application of pesticide application in agricultural counties, which in turn proxies for infant exposure—a chain of inference that is plausible and well supported but very different from a blood lead level or a daily pollution reading. As a result, nearly all estimates in this literature are ITT, applying to everyone in an exposed geographic area regardless of actual dose. This mode of inference is standard in economic history and has genuine strengths—ecological exposure is often less subject to selection than individual behavioral choices and is often directly policy relevant—but it sacrifices the mechanistic specificity that contemporary data with ICD-coded diagnoses, biomarkers, and daily exposure measurements would provide.

What Have We Learned, and What Comes Next?

The accumulated evidence suggests a striking pattern: Early-life conditions routinely shift old-age longevity by one to four months, in both directions, depending on whether the exposure was a toxin or a beneficial intervention. These are not small effects. A one-to-four-month shift in average longevity, applied to the cohorts born between 1900 and 1940, represents millions of life-years—and the effects compound across exposures, since few people experienced only one. To put the magnitudes in perspective roughly, the full set of early-life exposures we have studied, taken together, could plausibly account for a meaningful share of the overall improvement in old-age longevity observed across the twentieth century. Much more work remains before we can be precise about that accounting, but the direction is clear. What happens in the first years of life does not disappear at 65.

Data Infrastructure

The ability to pursue this research program rests on a data breakthrough: the creation of large-scale linked datasets connecting historical census records to decades-long mortality outcomes. Three data products deserve mention.

The CenSoc project, developed at Berkeley and now in its third version, links the full-count 1940 US census to Social Security Administration death records—producing a CenSoc-DMF file covering 5.3 million male deaths from 1975 to 2020 and a CenSoc-Nu-mident file covering 7.0 million records of all genders from 1988 to 2005.³⁹ Nearly every paper in the research program described here uses one of these datasets. Their scale—millions of observations—makes it feasible to detect the modest-but-real effects of early-life exposures that would be invisible in smaller survey-based studies, and to implement fine-grained geographic and cohort comparisons that identification requires.

The IPUMS Multigenerational Longitudinal Panel (MLP) links individuals across US censuses from 1850 to 1950, tracking more than 175 million people across 645 million census links.⁴⁰ The MLP opens the possibility of studying *intergenerational* pathways—how conditions experienced by parents and grandparents transmit to children’s long-run health, a question that CenSoc, anchored to 1940, cannot fully address—but one we have begun to examine empirically, finding that parental college access and fathers’ educational attainment have significant positive effects on children’s old-age longevity, with treatment-on-treated estimates ranging from 4 to 6 months for a college-educated father.^{41,42} The LIFE-M project provides complementary infrastructure, linking 1880–1940 census records to birth, marriage, and death certificates for Ohio and North Carolina, enabling cause-of-death analysis and intergenerational tracing in those states.⁴³

Despite these advances, two additional data sources remain largely off the table—underutilized not from

lack of interest but from structural barriers. Medicare administrative records contain detailed information on medical care utilization, diagnoses, and (through additional links) cause of death for virtually all Americans over 65; together with links to place of birth, they would allow researchers to trace the mechanisms by which early-life conditions translate into specific diseases and medical trajectories in old age. But access is expensive and administratively slow, effectively limiting use to well-resourced teams with institutional relationships with the Centers for Medicare and Medicaid Services. Large-scale electronic health record data present a complementary barrier: The records exist and contain richer clinical detail than any administrative source, but interoperability and data-sharing agreements remain immature at the scale needed for population-level causal inference. As my coauthors and I document elsewhere, these two data sources hold the keys to filling in the next round of details—the causes of death, the disease mechanisms, and the clinical pathways that connect early-life exposures to mortality statistics decades later.⁴⁴

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The Dynamics of Cities

Stephan Heblich

Cities, like portfolios, reflect a balance between concentration and diversification. Some places build their fortunes on a narrow set of industries and reap large gains when those sectors expand. Others spread activity more broadly and grow more steadily. At first glance, the trade-off seems familiar: Higher returns come with higher risk. But unlike financial portfolios, cities cannot be easily rebalanced. Their economic structure is embedded in physical capital, skills, and local networks, which adjust only slowly over time. This creates a distinct dynamic: Places that grow rapidly around a single industry often struggle long after that industry has faded. The puzzle is not why they decline, since shrinking demand for their core activity is explanation enough, but why they fail to adapt.

The answer lies in how growth happens. The same forces that generate rapid expansion can narrow the local economic structure in ways that are difficult to reverse. Transport infrastructure plays a central role in this story, not because it determines city trajectories on its own, but because it shapes how economic activity is organized across space. By enabling larger markets, it supports rapid growth and specialization while also contributing to economic structures that are difficult to adjust over time.

This pattern reflects two related tensions in how cities grow. Proximity between firms and workers raises productivity through better matching, knowledge spillovers, and shared access to inputs and markets, but density also generates costs through congestion, high land prices, and, at early stages of development, poor sanitation and disease. Cities expand if the benefits of agglomeration outweigh these costs. Over longer horizons, a second tension emerges: The economic structure that develops in this process can support growth in the short run but may limit adaptability as technologies and markets change. These tensions become particularly

visible during industrialization, when cities expand rapidly and reorganize around new forms of production.¹

Transport and the Making of Industrial Cities

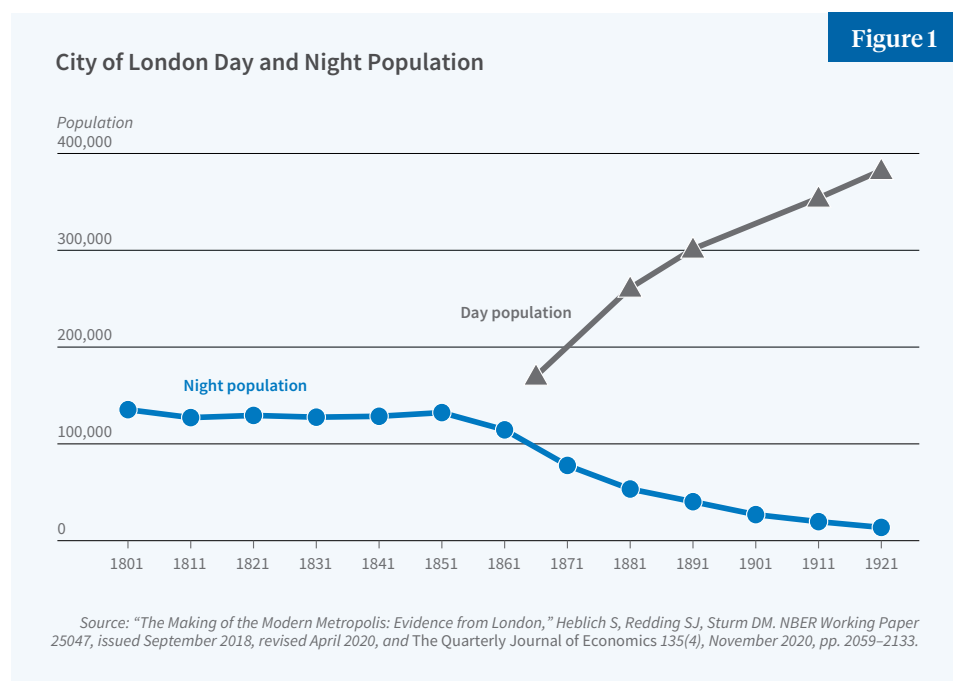
Before the nineteenth century, cities operated under tight spatial constraints. Production and residence had to remain close, and both the scale of cities and the organization of economic activity were limited by transport costs. Most workers lived near their workplace. Pre-industrial cities were “walking cities,” where a roughly 30-minute walk defined the effective radius of daily activity. Market integration was similarly limited, with transport at scale largely confined to waterways.

The transport revolution fundamentally changed these constraints. The introduction of canals and, more importantly, the expansion of railways in the nineteenth century reduced the cost of moving goods across regions and sharply lowered commuting times within cities. This allowed firms to serve larger markets and made it profitable to concentrate production in a smaller number of locations. Industrial production shifted toward large-

scale factories, typically located in central areas with access to transport networks. Economic activity became increasingly specialized across regions, reflecting differences in access to markets and inputs.

This structural change created a new organizational challenge: how to accommodate a growing workforce in cities where production was increasingly concentrated. Urban transport provided a solution. As commuting over longer distances became feasible, workers were no longer required to live close to their workplaces. Central locations increasingly specialized as places of production, while populations spread outward into less dense areas. In London, for example, the expansion of railways enabled workers to live farther from the center and travel to jobs in the city, moving households away from the most congested and polluted areas.²

This reorganization was not marginal and is clearly visible in Figure 1, which shows the night and day population in the City of London around the turn of the nineteenth century. While the residential (night) population of the central city declined sharply, workplace (day) employment increased,



reflecting a shift toward a commuting-based urban structure. Lower commuting costs allowed locations to specialize: High-productivity areas became centers of employment, while areas with better living conditions became residential.

Transport therefore did not simply support urban growth. It changed the internal structure of cities. By decoupling production from residence, it allowed cities to expand spatially while maintaining high levels of economic concentration. This increased the scale at which agglomeration forces could operate, since firms could cluster in highly productive locations without being constrained by the need for workers to live nearby. The persistence of these patterns differs across scales: While connections between cities can be partially substituted over time, the layout of transport within cities is much harder to change once density has increased. This durability reflects the fact that urban structures are embedded in physical capital, skills, and local networks, which are costly to reorganize.

Specialization and Its Consequences

Once commuting constraints were relaxed, agglomeration forces operated at a much larger scale. Cities could sustain dense concentrations of employment while drawing workers from a wider hinterland. This led to cumulative growth, with larger cities becoming more productive and attracting more activity. But it also generated increasing specialization as production concentrated in particular locations and cities became dominated by a narrow set of industries. As a result, cities that were initially similar began to diverge, depending on the industries in which they specialized.

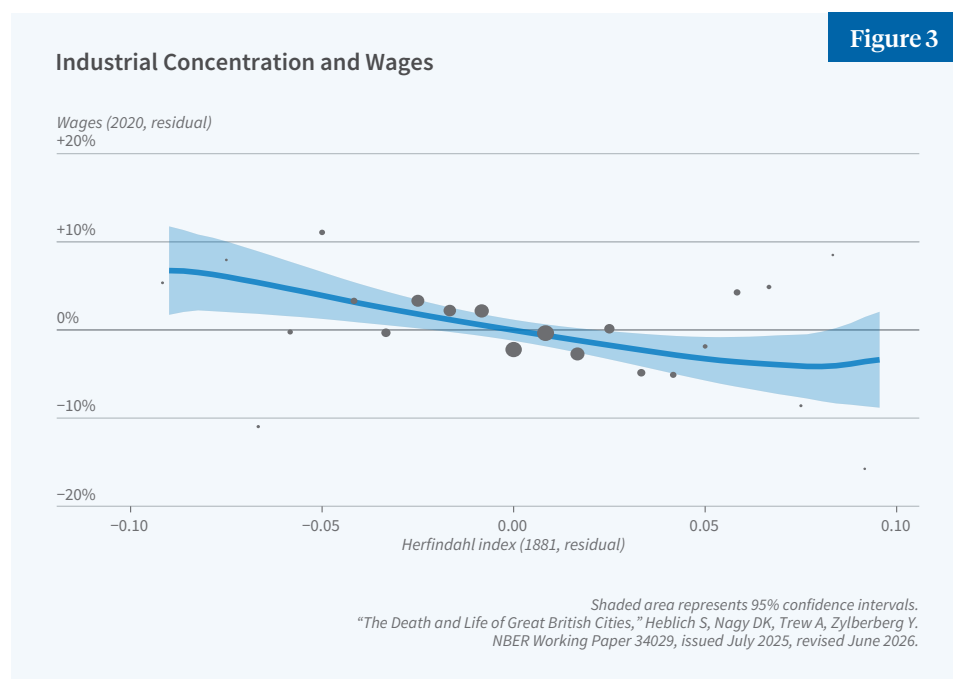
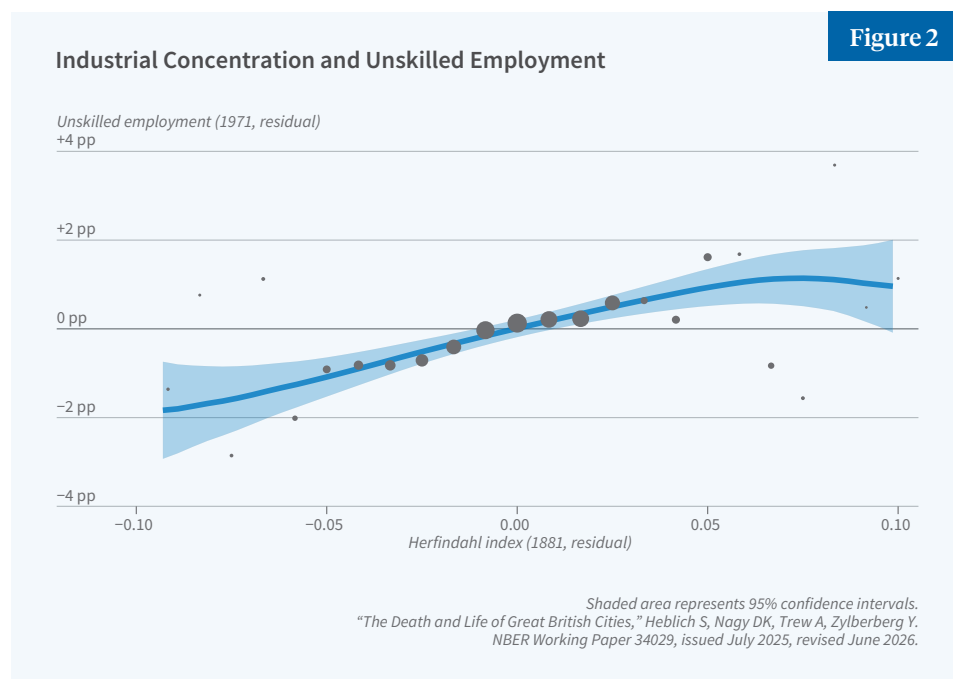
The neighboring cities of Bradford and Leeds in the United Kingdom illustrate this divergence clearly. Similar in size and structure around 1800, they followed markedly different paths. Bradford specialized in worsted wool and initially prospered, becoming known as “Worstedopolis,” while Leeds developed a more diversified

industrial base. Bradford's specialization supported rapid expansion, but in the long run Leeds emerged as the more productive and adaptable city. Specialization within cities can improve efficiency by allowing places to exploit comparative advantage, but excessive concentration within cities may limit adaptability.

This contrast highlights a central feature of urban dynamics. Specialization can generate strong short-run gains by allowing cities to exploit comparative advantage and deepen sector-specific knowledge. But it also

narrows the local economic structure, reducing the scope for new combinations across activities when technologies or markets shift. Diversified cities, while potentially less efficient in the short run, often prove more adaptable over longer horizons, a pattern consistent with early evidence linking urban diversity to subsequent growth.^{3,4,5}

This pattern is visible more broadly across English cities. Figures 2 and 3 link initial industrial concentration to subsequent outcomes.⁶ Figure 2 shows that cities that were more



specialized in the late nineteenth century were less attractive to skilled workers by 1971, even before the substantial decline in Britain's manufacturing employment. Figure 3 shows the longer-run effect using recent wage data. The estimated gradients imply that cities with lower initial specialization, with a Herfindahl index around 0.05, had about 1.5 percentage points fewer unskilled workers in 1971 and about 4 percent higher wages than more specialized cities with an index of 0.15.

This pattern is not unique to England. Cross-country evidence shows that cities more specialized in manufacturing at their peak experienced larger subsequent declines in employment, with substantial heterogeneity in recovery across places.⁷ Evidence from large industrial investments provides further insight into the underlying mechanism. China offers a particularly useful example, having undergone similar dynamics in a compressed time frame. In the 1950s, large-scale industrial plants were established as part of a coordinated industrialization program. During the subsequent decades, these locations experienced rapid growth, and by the early 1980s they exhibited substantially higher productivity than comparable regions, reflecting the concentration of activity around large, technologically advanced plants.⁸

Following the transition to a market economy, however, these advantages eroded. This reversal is visible in the evolution of industrial activity, with treated locations experiencing an initial rise followed by a relative decline over time. The pattern reflects the same mechanism. By 2010, the initially favored locations had fallen behind. While the flagship plants themselves remained productive, surrounding firms exhibited low productivity, limited innovation, and high markups. Production became increasingly concentrated along the supply chains of dominant industries, with little scope for new activities to emerge. The local economic structure narrowed, reducing spillovers across sectors and weakening entrepreneurial activity. This evidence highlights how specialization shapes long-run outcomes.

The Asymmetry: Rapid Rise and Slow Decline

If transport infrastructure shapes specialization and long-run city trajectories, a natural question is what happens when infrastructure is removed. Does disinvestment simply unwind the earlier transformation, or does it have distinct and lasting effects? The evidence suggests the latter. A rare opportunity to observe this comes from large-scale rail disinvestment in the United Kingdom.⁹ In the 1950s and 1960s, the so-called Beeching cuts led to the closure of around one-third of the railway network and more than half of all stations. Many of the affected lines served places that were already in relative decline, so the cuts largely followed broader structural change. In that sense, they can be interpreted as a negative shock to market access, similar to settings studied in the economic geography literature.^{10,11} If infrastructure effects were fully reversible, removing these connections should mainly have reflected that ongoing adjustment.

Instead, areas that lost rail access experienced long-lasting declines in population, employment, and the share of skilled workers, even after accounting for broader structural change and the reallocation of activity across space. These were not short-run adjustments. The losses persisted for decades, indicating that reduced access was associated with weaker local performance relative to comparable places, rather than simply reflecting ongoing trends.

This persistence reflects the role of agglomeration economies in shaping adjustment in a setting without strong local interactions; decline in access would simply lead firms and workers to relocate, and activity would reallocate quickly across space. But when productivity depends on proximity to other firms and workers, this adjustment is slower. Firms remain tied to local supply chains, workers to location-specific skills and networks, and housing to existing patterns of use. As a result, economic activity does not immediately move to more productive locations. Instead, it declines in place.

Micro-level evidence shows that durable housing, local amenities, and social networks make places slow to adjust.^{12,13} In this sense, transport infrastructure can support rapid growth by improving access, but the spatial structures it creates adjust only slowly when that access is reduced.

Persistence and the Limits of Policy

These dynamics have direct implications for how to think about urban policy. Place-based interventions such as infrastructure investment, industrial policy, or regional development programs can generate large and durable effects, but these effects are not easily redirected once they have taken hold. Cities that became highly specialized through infrastructure-driven growth often experienced strong initial gains but faced challenges as technologies and markets changed. Bradford is one example; the formerly dominant industrial cities of the American Midwest are another. In each case, the forces that generated early success—agglomeration, specialization, and deep sector-specific investment—also made subsequent adaptation more difficult. Diversification was constrained not by a lack of effort, but by the inherited structure of local economies built around dominant activities. These effects arise because agglomeration economies create externalities that individual firms and workers do not internalize, generating complementarities across firms and workers that make adjustment inherently slow.

This points to an intertemporal tension in urban development. Policies that reinforce comparative advantage and promote specialization can generate substantial short-run gains, but they may reduce adaptability by narrowing the range of activities within a city. More diversified structures, while potentially less efficient in the short run, tend to support stronger long-run performance by facilitating innovation and adjustment.

From a policy perspective, the asymmetry between rapid rise and

slow decline cuts both ways. Slow decline can soften the immediate impact of negative shocks, but it also means that misallocation can persist for long periods. Agglomeration economies both support growth and slow adjustment: Places do not quickly reset when conditions change but remain tied to past structures, delaying adjustment and prolonging divergence across regions.

If infrastructure investment shapes economic geography in ways that persist long after the investment itself has become obsolete, then the stock of past decisions weighs heavily on the present. Today's spatial distribution of economic activity reflects not only current fundamentals but also the accumulated legacy of earlier choices about transport and industrial organization.

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Stephan Heblich

Stephan Heblich is a professor in the Department of Economics at the University of Toronto and a Research Associate in the NBER Development of the American Economy Program. His research lies at the intersection of urban economics and economic history. He studies how the spatial distribution of consumption and productive amenities shapes the location choices of households and firms, helping to explain differences in housing prices, the concentration of high-skilled labor, environmental conditions, innovation, political outcomes, and economic development. Drawing on both contemporary and historical settings, he investigates how these spatial patterns emerge, persist, and change over time. Heblich completed his PhD at the University of Passau, Germany, and has held positions at the University of Stirling and the University of Bristol (UK) before joining the University of Toronto. He serves as an editor at the *Journal of Urban Economics*.



Multinational Corporate Finance: From Integration to Decoupling

Isil Erel and Michael S. Weisbach

In late twentieth and early twenty-first centuries, the dominant narrative in corporate finance was one of vanishing borders. Multinational companies stood at the center of this transformation, through cross-border mergers and other types of investment, acting as bridges between global markets. In this era of integration, firms did not cross borders just to find new customers; they did so to optimize their financial structures, lower their cost of capital, and bypass local market inefficiencies.

Once two firms from different countries are merged, international transactions can be consummated inside of firms, rather than negotiated between different firms. As Coase famously observed, transacting inside a firm can be more efficient than arms-length contracting.¹ Much of our work, both jointly and with other coauthors, examines the factors that lead to the formation of multinational companies and the way in which they internalize international factors inside the firms.²

However, the tide has turned. The rise of economic nationalism and protectionism—ranging from political interference in mergers to aggressive tariff regimes—has introduced new frictions. Our more recent research tracks this change, examining how multinationals that thrived during the push for globalization are now being forced to adapt to a world of “decoupling.”

It is not clear what the consequences of de-globalization will be for the structure of firms. Will there be fewer cross-border deals, and possibly breakups of international conglomerates? How can we understand economic nationalism and how likely is it to change in a deglobalized political environment? More generally, are multinationals likely to continue to be an important engine of international commerce? The

insights from our work about global integration potentially have insights about the future of multinationals in a deglobalized economy.

Why Cross Borders?

A fundamental question in international finance is why firms choose to

acquire assets in foreign jurisdictions rather than their own. In Erel, Liao, and Weisbach, we analyze a comprehensive sample of nearly 57,000 cross-border deals between 1990 and 2007.³ In Tables 1 and 2 we present an abridged version of summary statistics using updated data through 2020.⁴

Table 1

Number of Mergers and Acquisitions, 1990–2020

Target country	Acquirer country								Total
	AU	CA	CN	FI	FR	DE	IN	IT	
AU	10,524	239	71	23	95	93	52	23	11,120
CA	152	13,270	47	26	184	94	39	32	13,844
CN	48	69	9,364	15	98	71	14	21	9,700
FI	8	32	5	2,748	46	80	7	9	2,935
FR	36	161	62	56	11,972	555	33	251	13,126
DE	64	150	117	154	656	11,596	75	204	13,016
IN	28	27	7	10	104	78	3,082	23	3,359
IT	20	37	47	31	333	308	40	4,136	4,952
JP	5	10	52	4	23	34	9	6	143
NL	30	72	32	51	225	364	20	53	847
ES	27	49	26	22	460	217	23	159	983
SE	20	61	15	343	126	178	15	29	787
CH	15	48	11	28	211	534	16	71	934
GB	266	447	56	95	674	608	158	169	2,473
US	610	4,444	227	195	959	1,024	456	262	8,177
Total	11,853	19,116	10,139	3,801	16,166	15,834	4,039	5,448	86,396

Source: “Cross-Border Mergers and Acquisitions,” Erel I, Jang Y, Weisbach MS. NBER Working Paper 30597, October 2022.

Table 2

Number of Mergers and Acquisitions, 1990–2020, Continued

Target country	Acquirer country							Total
	JP	NL	ES	SE	CH	GB	US	
AU	110	67	17	51	73	518	1,158	1,994
CA	59	77	23	57	80	350	4,247	4,893
CN	132	36	18	20	27	91	487	811
FI	14	51	15	457	40	74	177	828
FR	88	275	194	187	213	736	1,303	2,996
DE	158	542	96	279	628	807	2,002	4,512
IN	77	42	10	17	28	128	515	817
IT	60	119	101	85	110	273	631	1,379
JP	15,505	17	4	8	13	38	243	15,828
NL	59	3,482	43	139	121	497	771	5,112
ES	47	181	5,041	75	66	307	437	6,154
SE	28	109	9	4,639	58	272	454	5,569
CH	42	72	15	78	2,233	150	436	3,026
GB	198	400	87	355	187	25,451	4,737	31,415
US	836	509	173	478	531	3,394	115,965	121,886
Total	17,413	5,979	5,846	6,925	4,408	33,086	133,563	207,220

Source: “Cross-Border Mergers and Acquisitions,” Erel I, Jang Y, Weisbach MS. NBER Working Paper 30597, October 2022.

There are several patterns evident in this table. While diagonal elements, representing domestic deals, are by far the largest category, the volume of cross-border flows is substantial and highly concentrated. Among the cross-border deals, geography appears to be an important factor: Companies are more likely to acquire companies in nearby and trading-partner countries.

While traditional factors like geography and bilateral trade are significant, financial “valuation” motives are also a primary driver of these flows. Capital tends to flow from strong markets to weaker ones: Firms in countries with appreciating currencies and high stock market valuations (specifically high market-to-book ratios) are significantly more likely to be acquirers. Conversely, firms in countries experiencing economic underperformance are often targets. This pattern suggests that cross-border mergers and acquisitions (M&As) serve as a mechanism for capital to seek out undervalued assets globally, effectively acting as an arbitrage of national market conditions.^{5,6}

Beyond valuation, the “quality” of a country’s institutions is an important determinant of acquisition patterns. Several studies find that firms from countries with high-quality accounting standards, strong disclosure requirements, and robust shareholder protections tend to be the dominant buyers.⁷ In many ways, a cross-border acquisition is an *export* of governance. By bringing a subsidiary under the umbrella of a high-standard parent, the firm essentially lowers the information asymmetry and agency costs that constrain local markets.

Once a firm becomes part of a multinational network, its financial condition and its ability to finance investments can change fundamentally. A common management claim is that acquisitions create value by providing the target with access to capital. In Erel, Jang, and Weisbach, we put this claim to the test using a sample of over 5,000 European acquisitions.⁸

Our results imply that target firms are indeed financially constrained

prior to being acquired. Once under the ownership of a larger multinational, these constraints vanish. The evidence is visible in several key metrics. First, target firms drastically reduce their cash-to-assets ratios after being acquired. In an independent state, these firms must “hoard” cash for precautionary reasons; as part of an multinational enterprise, they can rely on the parent’s liquidity pool, allowing that capital to be deployed more productively. Second, the sensitivity of a firm’s investment and cash holdings to its own internal cash flow—a classic measure of financial constraints—drops significantly.

In this way, a multinational firm can reallocate capital across borders more efficiently than local financial institutions might allow. This internal reallocation is particularly valuable in segmented markets where external finance is expensive or unavailable.

The Real Economy Channel: When Interconnectedness Becomes a Liability

However, this deep integration has a “dark side.” While internal capital markets provide efficiency, they also serve as a conduit for economic shocks. Bena, Dinc, and Erel document the way in which multinationals can spread distress across borders even without goods being traded.⁹

When a multinational’s subsidiary in one country faces an economic crisis, the parent does not have to let that subsidiary suffer in isolation. Instead, the parent can reallocate resources away from healthy subsidiaries in other countries to help struggling ones or to protect the parent’s own liquidity. Bena, Dinc, and Erel find that subsidiaries of parents in crisis-hit countries reduced their own investment and employment growth, even if their local economy was doing well. This finding implies that a shock to a parent or a subsidiary in one corner of the globe can have employment consequences in an entirely different hemisphere through the internal reallocation decisions of multinationals.

The Rise of Economic Nationalism

As we move into the current era of protectionism, the almost *frictionless* model of multinational corporations has come under attack. Before the current wave of tariffs, there was nonetheless substantial political interference in the market for corporate control. Dinc and Erel study the way in which governments in Europe intervene in acquisition bids, treating domestic acquirers differently from foreign acquirers.¹⁰

Dinc and Erel find that when a foreign firm tries to acquire a firm, especially a firm that is a “national champion,” governments are likely to interfere—either through direct blocking or by subsidizing a “white-knight” domestic bidder. This nationalism is most potent when and where nationalistic sentiments are stronger—e.g., when only the far-right political parties are strong or when the government is politically fragile. These interventions appear to have a deterrent effect: When a country blocks one foreign deal, foreign investment in that country drops for several years afterward.

Protectionism can scare away global capital. Firms stop looking at firms in protectionist countries as potential targets, not because the business case is weak, but because potential political frictions are likely to make deals harder to close. Presumably, even if a cross-border acquisition is allowed to occur, the new multinational will face additional barriers relative to domestic competitors. The paper’s message is even more relevant today than when this paper was written, given the increased nationalism in the world since then.

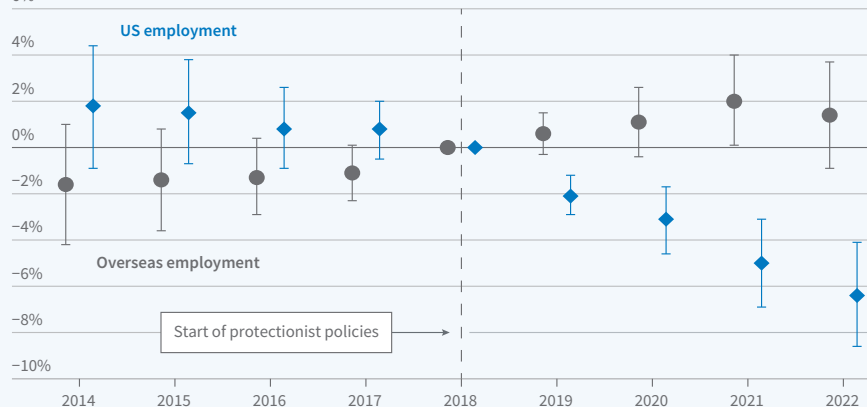
When Protectionism Kills Talent

The most recent stage of this decoupling is perhaps the most damaging: the impact on human capital and innovation. Canayaz, Erel, Gurun, and Wu examine the protectionist measures in the semiconductor industry after 2018.¹¹ Focusing on the US chip manufacturing sector, the study finds

Figure 1

Employment by US Semiconductor Companies

Percentage change in science and engineering employment by US firms, relative to 2018



Thin bars represent 95% confidence intervals.
Source: "When Protectionism Kills Talent," Canayaz MI, Erel I, Gurun UG, Wu Y. NBER Working Paper 32466, issued May 2024, revised January 2025.

that protectionist policies intended to *protect* an important domestic industry have weakened its core strength: its people. As tariffs and immigration restrictions increased, science and engineering employment in the sector declined. Firms responded to US restrictions by shifting their recruitment overseas. Instead of bringing jobs home, the policies gave firms incentives to move jobs and skills to other jurisdictions. Furthermore, fewer domestic students chose to pursue chip-related degrees. Far from revitalizing domestic manufacturing, these measures reduced the US share of global expertise in the very technologies that the policies were meant to secure. The result of the protectionist policies appears to have been substantial reductions in patented innovation.

Private Equity: A New Approach to Multinational Acquisition

Together with the shifting political environment, there has been a change in the predominate form of multinational acquisition. Coincident with the worldwide decline in the number of public firms has been an increase in the importance of private markets. A large fraction of all acquisitions, both domestic and cross-border, are now buyouts consummated through private funds. Jenkinson, Kim,

and Weisbach provide much detail on the structure of these transactions as well as statistics on their increasing importance.¹²

Buyouts, especially large ones, often have an international flavor to them. Funds are raised from investors around the world who often invest in companies in other countries. As such, they can reflect and magnify political sentiments. For example, during the globalizing period of the early 2000s, China was one of the most active sources of buyout targets; with the cooling of relations between China and the West, we have seen a corresponding decrease in buyouts of Chinese companies by Western funds.

One area where funds have created a new form of multinational organization is infrastructure. Giant funds, some of which have close to \$50 billion in assets, have been acquiring infrastructure assets globally. Howell, Jang, Kim, and Weisbach examine the real effects of a sample of private equity acquisitions of airports and find efficiency gains and improvements in airport quality.¹³ In addition to financial improvements, airports add capacity, increase the number of airlines and routes serviced by the airport, and become more likely to win awards based on passenger feedback.

Conclusion: Navigating a Fragmented World

The body of research we have conducted over the past two decades suggests that multinational firms have moved capital, governance, and technology across borders to overcome local market failures. In many cases, multinational corporations provided stability and liquidity when local markets failed. Yet, the "global decoupling" currently underway presents a challenge of a different magnitude. While multinational corporations can navigate financial and maybe cultural barriers, the frictions of political nationalism and talent barriers are harder to bypass. As we look toward the future, the question for the coming years is no longer how firms will integrate into a global market, but how they will survive the fragmentation of it.

¹ "The Nature of the Firm," Coase RH. *Economica* 4(16), November 1937, pp. 386–405.

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² "The Corporate Finance of Multinational Firms," Erel I, Jang Y, Weisbach M. NBER Working Paper 26762, February 2020, and in *Global Goliaths: Multinational Corporations in the 21st Century Economy*, Foley CF, Hines J, Wessel D, editors, pp. 183–226. Washington: Brookings Institution, 2021.

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³ "World Markets for Mergers and Acquisitions," Erel I, Liao RC, Weisbach MS. NBER Working Paper 15132, July 2009. Published as "Determinants of Cross-Border Mergers and Acquisitions" in *The Journal of Finance* 67(3), June 2012, pp. 1045–1082.

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⁴ "Cross-Border Mergers and Acquisitions," Erel I, Jang Y, Weisbach MS. NBER Working Paper 30597, October 2022, and in *Handbook of Corporate Finance*, Denis D, editor, pp. 345–376. Cheltenham, UK, and Northampton, MA: Edward Elgar Publishing, 2024.

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⁵ "World Markets for Mergers and Acquisitions," Erel I, Liao RC, Weisbach

MS. NBER Working Paper 15132, July 2009. Published as “Determinants of Cross-Border Mergers and Acquisitions” in *The Journal of Finance* 67(3), June 2012, pp. 1045–1082.

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⁶ “Corporate Liquidity, Acquisitions, and Macroeconomic Conditions,” Erel I, Jang Y, Minton BA, Weisbach MS. NBER Working Paper 23493, June 2017, and *Journal of Financial and Quantitative Analysis* 56(2), March 2021, pp. 443–474.

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⁷ “Cross-Border Mergers and Acquisitions,” Erel I, Jang Y, Weisbach MS. NBER Working Paper 30597, October 2022, and in *Handbook of Corporate Finance*, Denis D, editor, pp. 345–376. Cheltenham, UK, and Northampton, MA: Edward Elgar Publishing, 2024.

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⁸ “Do Acquisitions Relieve Target Firms’ Financial Constraints?” Erel I, Jang Y, Weisbach MS. NBER Working Paper 18840, February 2013, and *The Journal of Finance*, 70(1), February 2015, pp. 289–328.

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⁹ “The International Propagation of Economic Downturns Through Multi-national Companies: The Real Economy Channel,” Bena J, Dinc S, Erel I. NBER Working Paper 27873, September 2020, and *Journal of Financial Economics* 146(1), October 2022, pp. 277–304.

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¹⁰ “Economic Nationalism in Mergers and Acquisitions,” Dinc IS, Erel I. *The Journal of Finance* 68(6), December 2013, pp. 2471–2514.

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¹¹ “When Protectionism Kills Talent,” Canayaz MI, Erel I, Gurun UG, Wu Y. NBER Working Paper 32466, issued May 2024, revised January 2025.

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¹² “Buyouts: A Primer,” Jenkinson T, Kim H, Weisbach MS. NBER Working Paper 29502, November 2021, and *Handbook of the Economics of Corporate Finance* 1(1), 2023, pp. 161–238.

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¹³ “All Clear for Takeoff: Evidence from Airports on the Effects of Infrastructure Privatization,” NBER Working Paper 30544, issued October 2022, revised March 2023, and forthcoming in the *Review of Financial Studies*.

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Isil Erel

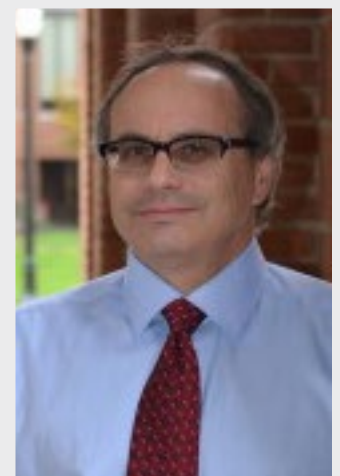
Isil Erel is the David A. Rismiller Chair in Finance at the Fisher College of Business at The Ohio State University. She holds a PhD in financial economics from MIT Sloan School of Management, and her research spans corporate finance with particular emphasis on mergers and acquisitions, corporate governance, and financial institutions, including private debt. Her work has appeared in leading journals such as the *Journal of Finance*, the *Journal of Financial Economics*, and the *Review of Financial Studies*.

Erel is a Research Associate in the NBER’s Corporate Finance Program and a research member at the European Corporate Governance Institute. She serves as executive editor of the *Review of Corporate Finance Studies* and associate editor of the *Journal of Financial Intermediation*. She has held board positions with the European Finance Association, the Financial Intermediation Research Society, and the Foundation for Advancement of Research in Financial Economics. Among her honors are the Fisher College of Business Distinguished Faculty Award, the *Review of Financial Studies* Distinguished Referee Award, and multiple best paper prizes for her research.

Michael S. Weisbach

Michael S. Weisbach is the Ralph W. Kurtz Chair in Finance at The Ohio State University, as well as a Research Associate in the NBER’s Corporate Finance Program. He has previously taught at the University of Illinois, the University of Chicago, the University of Rochester, and the University of Arizona. Weisbach is a former editor of the *Review of Financial Studies*, one of the leading academic journals in finance, and has been an associate editor of five other academic journals.

He is the author of *The Economist’s Craft: An Introduction to Research, Publishing, and Professional Development*. Weisbach has broad-ranging research and teaching interests in finance and economics, with specialties in corporate finance, corporate governance, and private equity. He has 70 publications on these and related topics. These papers have won a number of major awards, including the Brattle Group Prize (twice), the Jensen Prize, the Fama/DFA Prize, the Wharton/WRDS award, and the Jack Treynor Prize.



Ludwig Straub Wins John Bates Clark Medal



The American Economic Association has awarded Ludwig Straub of Harvard University, a research associate in the Economic Fluctuations and Growth and Monetary Economics programs, the 2026 John Bates Clark Medal. The honor recognizes an American economist under the age of 40 who has made a significant contribution to economic thought and knowledge.

Straub's research has ranged over many issues in macroeconomics, including the impact of income inequality and household heterogeneity on the aggregate effects of economic shocks and the macroeconomic consequences of changes in monetary policy. He has also developed new tools for the estimation and solution of heterogeneous agent models.

The [prize citation](#) explains that Straub has made "profound and far-reaching contributions to modern macroeconomics."

American Economic Association Names Distinguished Fellows for 2026



(L to R) Marjorie B. McElroy, N. Gregory Mankiw, and Robert A. Margo

The American Economic Association (AEA) has named four new Distinguished Fellows, three of whom, [Marjorie McElroy](#), [N. Gregory Mankiw](#), and [Robert A. Margo](#), have long-standing ties to the NBER.

Marjorie McElroy of Duke University has done path-breaking research in labor economics with a focus on the application of bargaining theory to understand within-household decision-making. She served on the NBER Board of Directors for 32 years and is currently a director emerita.

N. Gregory Mankiw of Harvard University has contributed foundational improvements to our understanding of price stickiness, consumer behavior, economic fluctuations, and economic growth. He is a research associate in the Monetary Economics and Economic Fluctuations and Growth programs.

Robert A. Margo of Boston University, a pioneer in applying modern econometrics to the study of economic history, has made key progress in our understanding of US economic development in the nineteenth and early twentieth centuries. He is a research associate in the Development of the American Economy and Labor Studies programs.

The other new Distinguished Fellow is econometrician Donald Andrews of Yale University.

The AEA issued a [press release](#) covering these and other award announcements.

NBER Appoints 65 New Affiliates

Following a call for nominations in January, the NBER has appointed 65 new affiliates: 16 Research Associates and 49 Faculty Research Fellows. In addition, two Faculty Research Fellows have been promoted to Research Associates.

The directors of the NBER's 19 research programs recommend appointments after consulting with steering committees made up of leading scholars. Research Associate appointments must be approved by the NBER Board of Directors, while Faculty Research Fellows are appointed by the NBER president. All new affiliates must

hold primary academic appointments in North America; Research Associates must have tenure.

The newly appointed researchers serve on the faculties of 38 different colleges and universities. They received their graduate training at 30 different institutions. The new appointments bring the total number of Research Associates to 1,590 and the number of Faculty Research Fellows to 318.

The names and university affiliations of the newly appointed NBER affiliates are listed below.

Research Associates

Name	University Affiliation	Program
Abi Adams	Northwestern University	Labor Studies, Children and Families
Sule Alan	Cornell University	Children and Families, Development Economics
Saki Bigio*	UC Los Angeles	Economic Fluctuations and Growth, International Finance and Macroeconomics
Thomas Chaney	University of Southern California	International Trade and Investment
Cesi Cruz	University of Michigan	Political Economy
Rajeev Darolia	University of Kentucky	Economics of Education
Farid Farrokhi	Boston College	Environment and Energy Economics
Julia Fonseca	University of Illinois at Urbana-Champaign	Corporate Finance
Domenico Giannone	John Hopkins University	Monetary Economics
Paul Grieco	Pennsylvania State University	Industrial Organization
Arpit Gupta	New York University	Corporate Finance
Navin Kartik	Yale University	Political Economy
Jason Kerwin	University of Washington	Economics of Education
Erik Loualiche	University of Minnesota	Asset Pricing
Sam Norris	University of British Columbia	Labor Studies
Javaeria A. Qureshi	University of Illinois at Chicago	Economics of Education
Thomas Wollmann*	Boston University	Economics of Health, Industrial Organization
Rachel Werner	University of Pennsylvania	Economics of Aging

*Promotion from Faculty Research Fellow.

Faculty Research Fellows

Name	University Affiliation	Program
Lukas Althoff	Stanford University	Development of the American Economy
Charles Angelucci	MIT	Political Economy
Carlos Avenancio-Leon	UC San Diego	Law and Economics
Victoria Barone	University of Notre Dame	Economics of Health
Panka Bencsik	Vanderbilt University	Economics of Health
Agostina Brinatti*	University of Chicago	International Trade and Investment
Kevin Bryan	University of Toronto	Productivity, Innovation, and Entrepreneurship
Sophie Calder-Wang	University of Pennsylvania	Industrial Organization
Alex Chan	Harvard University	Economics of Health
Antonio Coppola*	Stanford University	International Finance and Macroeconomics
Jamein Cunningham	UT Austin	Law and Economics
Matthew Denes	Carnegie Mellon University	Productivity, Innovation, and Entrepreneurship
Cauê Dobbin	Georgetown University	Economics of Education
Arkadev Ghosh	Duke University	Development Economics
Benjamin Goldman	Cornell University	Children and Families, Public Economics
Joao Guerreiro	UC Los Angeles	Economic Fluctuations and Growth
Juan Herreno	UC San Diego	Monetary Economics
Sean Higgins	Northwestern University	Corporate Finance
Ryan Hill	Northwestern University	Productivity, Innovation, and Entrepreneurship
Erica Xuewei Jiang	UC Los Angeles	Corporate Finance
Eben Lazarus	UC Berkeley	Asset Pricing
Anran Li	University of Minnesota	Economics of Health
Paolo Martellini	New York University	Economic Fluctuations and Growth
Virginia Minni	University of Chicago	Labor Studies
Yuhei Miyauchi	Boston University	International Trade and Investment
Leon Musolff	University of Pennsylvania	Industrial Organization
Ishan Nath	Harvard University	Environment and Energy Economics
Ryungha Oh*	University of Chicago	Economic Fluctuations and Growth
Andrew Olenski	Lehigh University	Economics of Aging
Cristobal Otero	Columbia University	Economics of Health
Simon Quach	University of Southern California	Labor Studies

Faculty Research Fellows (continued)

Name	University Affiliation	Program
Eric Richert	University of Chicago	Industrial Organization
Marius Ring	UT Austin	Public Economics
Max Risch	Carnegie Mellon University	Public Economics
Roman Rivera	Georgetown University	Law and Economics
Fernanda Rojas Ampuero	University of Wisconsin–Madison	Children and Families
Kunal Sangani	Northwestern University	Monetary Economics
Lawrence D.W. Schmidt	MIT	Asset Pricing
Garima Sharma	Northwestern University	Development Economics, Labor Studies
Manasvini Singh	Carnegie Mellon University	Economics of Health
Cory Smith	University of Maryland	Development of the American Economy
Ben Sprung-Keyser	University of Pennsylvania	Public Economics
Carolyn Stein	UC Berkeley	Productivity, Innovation, and Entrepreneurship
Daniela Vidart	University of Connecticut	Development of the American Economy
Nicholas Vreugdenhil	Arizona State University	Environment and Energy Economics
Conor Walsh	Columbia University	Economic Fluctuations and Growth
Jeff Weaver	University of Southern California	Development Economics
Jhacova Williams	American University	Political Economy, Development of the American Economy
Nahim Zahur	Queen's University	Environment and Energy Economics

*Appointment effective July 1, 2026.

Conferences and Meetings

Detailed programs for NBER conferences are available at nber.org/conferences

Title of Conference/Meeting	Organizers	Dates
Labor Studies Program Meeting	David Autor and Alexandre Mas	April 3
Organizational Economics Working Group Meeting	Raffaella Sadun and Andrea Prat	April 9–10
International Trade and Investment Program Meeting	Stephen J. Redding	April 10–11
41st Annual Conference on Macroeconomics	John V. Leahy, Valerie A. Ramey, and Giovanni L. Violante	April 16–17
Public Economics Program Meeting	Damián Vergara and Danny Yagan	April 16–17
Asset Pricing Program Meeting	Ip Simsek and Jessica Wachter	April 17
Corporate Finance Program Meeting	Paige Ouimet and Lucian A. Taylor	April 17
New Developments in Long-Term Asset Management	Luis M. Viceira and Annette Vissing-Jorgensen	April 18
Behavioral Finance Working Group Meeting	Nicholas C. Barberis	April 18
Corporate Associates Research Symposium	James M. Poterba	April 21
Data for Long-Term Care Research	Brian McGarry and Corina Mommaerts	April 22
Investments in Early Career Scientists	Donna K. Ginther, Joshua L. Rosenbloom, and Bruce A. Weinberg	April 23
Climate and Nature Finance	Janis Berzins, Caroline Flammer, Stefano Giglio, Salvatore Miglietta, Bogdan Stacescu, Johannes Stroebel, Stephen Szaura, and Adam Winegar	April 23–24
Economics of Education Program Meeting	Caroline M. Hoxby	April 23–24
Economic Analysis of Regulation	Craig Garthwaite and Steve Cicala	April 23–24
Productivity, Innovation, and Entrepreneurship Program Meeting	Nicholas Bloom, Serguey Braguinsky, Sabrina T. Howell, and Josh Lerner	April 24
Economics of Chronic Disease	Christopher S. Carpenter and Maria Polyakova	April 24
Children and Families Program Meeting	Anna Aizer and Janet Currie	April 30–May 1
Environment and Energy Economics Program Meeting	Tamma Carleton, Michael Greenstone, Nicolai V. Kuminoff, and Ishan B. Nath	April 30–May 1
Political Economy Program Meeting	Ruixue Jia and Matias Iaryczower	May 1
Economics of Culture and Institutions	Paola Giuliano and Alberto Bisin	May 2
NBER Entrepreneurship and Innovation Policy and the Economy Conference	Benjamin Jones and Josh Lerner	May 5
AI and Economic Measurement	Erik Brynjolfsson and Karen Dynan	May 7
Fiscal and Monetary Policy Research Boot Camp	Luigi Bocola	May 7–8
Applications of Artificial Intelligence in Healthcare	Nikhil Agarwal and Kevin Schulman	May 7–8
Insurance Working Group Meeting	Benjamin R. Handel and Motohiro Yogo	May 8

Title of Conference/Meeting	Organizers	Dates
TRIO Conference	Shin-ichi Fukuda, Joshua K. Hausman, and Kenichi Ueda	May 9–10
Behavioral Macroeconomics Boot Camp	Yuriy Gorodnichenko	May 14–15
Economics of Transportation in the 21st Century	Edward L. Glaeser, James M. Poterba, and Stephen J. Redding	May 15
Health and Healthcare Variations across the Population	Hannes Schwandt and Jevay Grooms	May 15
8th Annual Environmental and Energy Policy and the Economy Conference	Tatyana Deryugina, Matthew Kotchen, and Catherine Wolfram	May 21
Graduate and Early Career Fellowships on the Fiscal and Economic Effects of Productivity Policies	Timothy F. Bresnahan, Michael A. Clemens, and Heidi L. Williams	June 4
East Asian Seminar on Economics	Benjamin Faber, Takeo Hoshi, Chong-En Bai, and Binzhen Wu	June 7–8
Geography and Health: Exploring Rural-Urban Disparities	Alee Lockman and Sarah Miller	June 8
Trans-Atlantic Public Economics Symposium	Hilary W. Hoynes and Andreas Peichl	June 8–10
NBER-SAIF Conference on AI and Financial Markets	James M. Poterba and Yongxiang Wang	June 15–16
NBER Coordinating Center on the Economics of AD/ADRD Prevention, Treatment, and Care	Rhoda Au, Julie Bynum, and Kathleen M. McGarry	June 18
International Seminar on Macroeconomics	Jeffrey A. Frankel and Hélène Rey	June 24–25
Production Network Boot Camp	David Baqaee, Ernest Liu, and Alireza Tahbaz-Salehi	June 25–26

Books



NBER Macroeconomics Annual 2025, volume 40

John V. Leahy and **Valerie A. Ramey**, editors.

This fortieth volume of the *NBER Macroeconomics Annual* includes four new papers on contemporary macroeconomic challenges and methodologies. **Christopher Clayton**, **Matteo Maggiori**, and **Jesse Schreger** examine how hegemonic powers use economic policies as tools of influence on target countries and show how the effectiveness of these policies depends on the target's available alternatives and whether it can take advantage of those alternatives.

José Luis Montiel Olea, **Mikkel Plagborg-Møller**, **Eric Qian**, and **Christian Wolf** provide essential guidance for practitioners choosing between vector autoregressions and local projections for estimating impulse response functions.

Kristin Forbes, **Jongrim Ha**, and **M. Ayhan Kose** analyze inflation-output tradeoffs across rate cycles from the 1970s to the post-pandemic period using a new cross-country database that reveals how delayed but aggressive monetary responses can generate low-cost disinflation.

Satyajit Chatterjee, **Dean Corbae**, **Kyle Dempsey**, and **José-Victor Ríos-Rull** explore the bidirectional relationship between credit scores and inequality over the life cycle, demonstrating through a dynamic general equilibrium model how full information credit scoring systems can improve welfare outcomes.

In a keynote address commemorating the conference anniversary, **Olivier Blanchard** assesses the evolution of macroeconomic research over four decades and finds substantial methodological convergence.



Tax Policy and the Economy, Volume 40

Damon Jones and **Robert Moffitt**, editors.

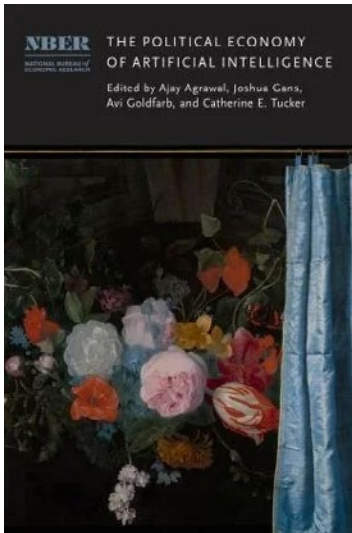
This volume presents new research on taxation, transfer programs, and related issues. **Karen Dynan** and **Douglas Elmendorf** examine the potential impact of automatic fiscal stabilizers on fiscal policy and economic activity. They find that a stabilizer providing direct payments could have produced faster unemployment decline after the Great Recession without raising inflation, and much lower inflation after COVID at the cost of a slower unemployment reduction.

Alan J. Auerbach and **William Gale** review federal budget history and project the US debt-to-GDP ratio over the next 30 years, arguing that high projected debt could constrain future policy actions. They also explore possible fiscal consolidation policies. **Beatrice Ferrario** and **Stefanie Stantcheva** survey Americans' views of health care and insurance, finding broad agreement regarding costs, access, and efficiency, but partisan gaps in policy preferences stemming from fundamentally different views of government scope rather than contrasting efficiency or fairness beliefs.

Jonathan Hartley, **Kevin Hassett**, and **Joshua Rauh** analyze the corporate investment response to the Tax Cut and Jobs Act of 2017, finding a larger response than a number of earlier studies of investment sensitivity would have suggested.

Joel Slemrod reviews historical taxation based on racial, religious, and gender identity and examines how tax policies that are not conditioned on any of these attributes can nevertheless differentially impact families due to systemic differences in their economic circumstances.

Finally, **Marianne Bitler**, **Jason Cook**, **Chloe East**, **Sonya R. Porter**, and **Laura Tiehen** analyze geographic proximity effects on Supplemental Nutrition Assistance Program (SNAP) participation, finding that when a SNAP office opens, participation increases by about 20 percent. When an office closes, they find that participation drops by about 8 percent in the next two years.



The Political Economy of Artificial Intelligence

Ajay Agrawal, Joshua Gans, Avi Goldfarb, and Catherine Tucker, editors.

As the effects of artificial intelligence are felt across economies and societies, many of its ramifications are still emerging. This **volume** brings together economists and political scientists to examine how AI intersects with regulation, military power, and political identity—offering analytical frameworks and identifying key open questions for future research.

The contributions address topics such as the allocation of property rights for AI inputs, trade-offs among alternative regulatory regimes, and the role of interest groups in shaping the technology's trajectory. They explore how AI-related capabilities influence military effectiveness, resource allocation, and bargaining power among nations, and consider AI's effects on political preferences, from the influence of AI-curated information on polarization to the implications of targeted political advertising and personalized education for national identity formation.

The **volume** highlights key trade-offs that arise in AI's political economy, and points toward empirical strategies and theoretical models that can advance understanding in this emerging field. Drawing on diverse disciplinary perspectives, the collection provides a foundation for rigorous inquiry into how AI both shapes and is shaped by political and economic forces.

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