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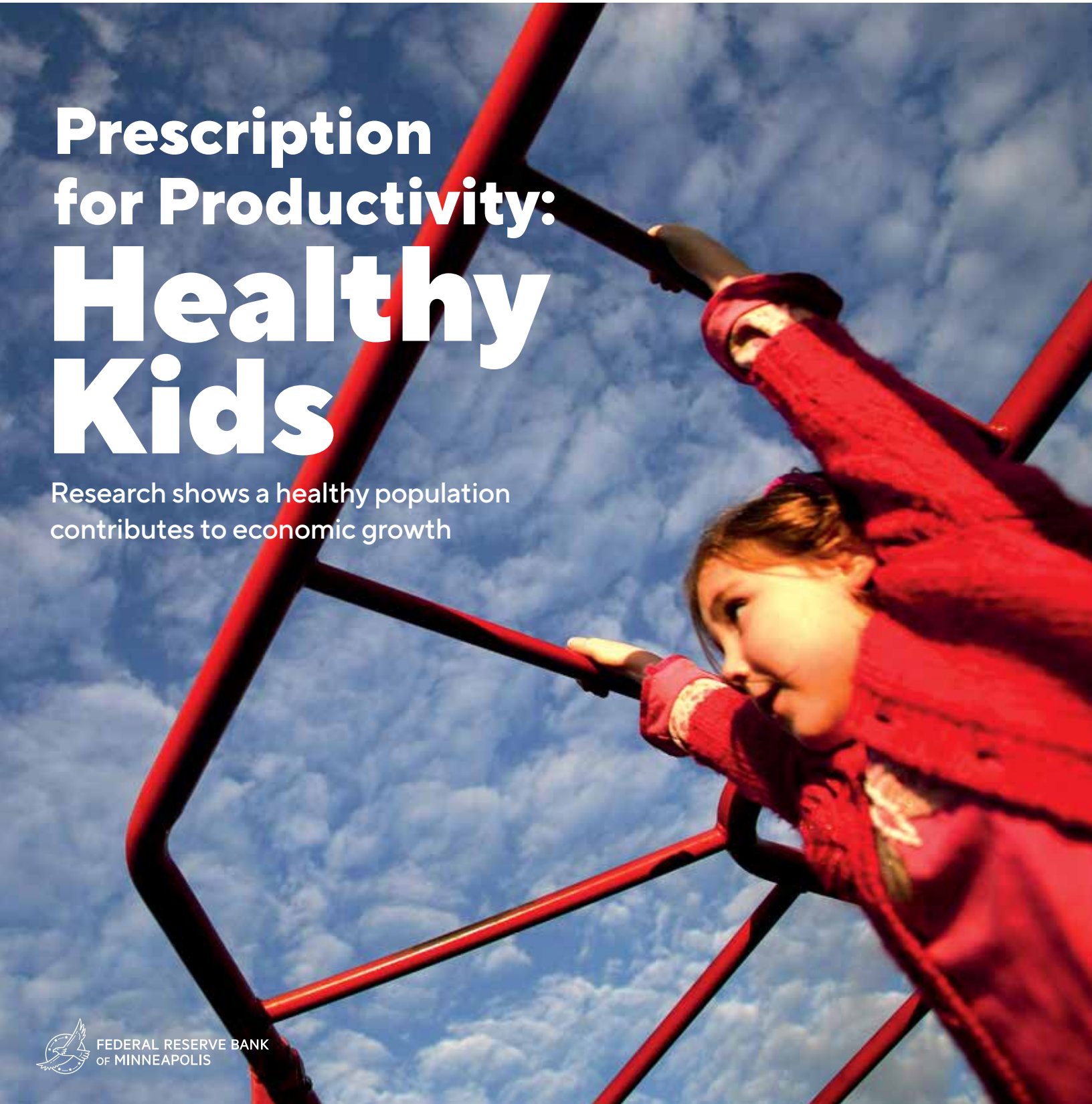
FALL 2026

DATA DIVE: How Medicaid spending varies across children

INTERVIEW: Marianne Wanamaker on tech-driven growth and public leadership

RESEARCH: How declining job mobility contributes to stagnant wage growth

THE MAGAZINE OF THE OPPORTUNITY & INCLUSIVE GROWTH INSTITUTE



Prescription for Productivity: Healthy Kids

Research shows a healthy population contributes to economic growth

FEDERAL RESERVE BANK OF MINNEAPOLIS

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Visit **minneapolisfed.org/institute/conferences** for the full event video, presentation slides, and paper PDFs from our annual research conference held on October 8.

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FROM THE DIRECTOR

BY ABIGAIL WOZNIAK



Accountability in the age of AI

I recently had a conversation with a leader in the architecture field. As I do with almost everyone at this point, I asked how they were using AI and whether they thought it was shaping work in their area. His answer was clear and striking. He said architects do two things: They design buildings, and they take accountability for the safety of those designs. AI is rapidly contributing to the first part of the job, but he saw accountability as something that meant humans would remain key to the process.

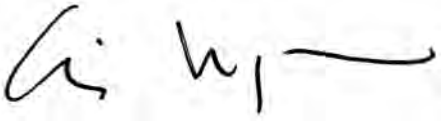
This has obvious connections to the research we support and produce at the Institute. AI is quickly becoming an essential part of research, helping economists and other experts analyze data, solve equations, and communicate findings much more rapidly. But at the end of the day, who is responsible for ensuring that the research is *credible*?

Ultimately, that accountability sits with researchers and the organizations that support them. In studying a complex set of human interactions, like the U.S. economy, researchers have to make choices—about what data are best when all are limited, which assumptions to accept when simplifying the economy, and whether past studies apply to new situations.

Researchers are ultimately accountable for those choices.

In *For All*, we are accountable for the information we share with you. How do we ensure that we are providing research you can feel confident about using? Two ways. First, we feature research that has a strong connection to the Institute. It comes from scholars who have spent time here, Federal Reserve colleagues, and our own staff researchers. Second, we put all our *For All* publications through a human fact-checking process, working to ensure we've correctly summarized research and that new facts can be reproduced.

We are quickly heading to a future where words and figures on a page could easily be created by anyone. With Opportunity & Inclusive Growth Institute research, we have humans in the loop who stand behind their work. We're glad you're taking time to dive into that work. If you know someone who's looking for a resource to trust, I hope you'll share this issue with them. ★



The research community at the Institute includes visiting scholars, consultants, economists, research analysts, and research assistants. These scholars bring varied backgrounds, interests, and expertise to research that deepens our understanding of economic opportunity and inclusion as well as policies that work to improve both.

MOISES YI

Senior Economist, Center for Economic Studies, U.S. Census Bureau

SIMILAR PEOPLE, DISSIMILAR OUTCOMES

The question that prompted Moises Yi's journey into economics is the same one at the heart of the academic papers he writes today: What shapes the outcomes of workers?

"Looking at people that I knew in the labor market, I was struck by how people who seemed so similar could end up with very different outcomes," Yi said.

In graduate school, Yi studied why outcomes varied among manufacturing workers in Germany following large declines in employment in their industry. The research drove home two lessons.

First is the value of rich administrative data that provide enough contextual information to tease out what determines how opportunities and outcomes vary across workers. This appreciation led Yi to his job at the U.S. Census Bureau, where he helps improve data infrastructure for the Longitudinal Employer-Household Dynamics (LEHD) program, which links workers to their employers over time.



The second lesson: the importance of place. In the case of displaced German manufacturing workers, Yi and his co-authors found that where workers lived mattered. Workers who lived in places with nonmanufacturing jobs that made use of their specific skills were better able to adjust after manufacturing jobs disappeared.

"I try to understand outcomes for workers by looking at particular features of their economic environment. And a lot of times, that's about place—city, neighborhood, or other geographic context," Yi said.

> "I try to understand outcomes for workers by looking at particular features of their economic environment. And a lot of times, that's about place."
>
> MOISES YI

The role of place is nuanced in Yi's research. In one recent paper, Yi and co-authors David Card and Jesse Rothstein use LEHD data to examine whether proximity to jobs—and in particular to "good" jobs that pay above-average wages—is different for Black and White workers who live in the same city. If so, this could help explain the racial earnings gap. But they find that Black workers' homes are, if anything, *closer* to potential workplaces than White workers' homes are. Where workers live relative to potential employers in a city does not appear to be driving the earnings gap.

However, the economists' subsequent analysis finds that the neighborhood where children grow up matters quite a lot. Take two children whose parents have similar incomes. The one who grows up with richer neighbors is likely to earn more as an adult, the economists find. "Neighborhoods shape the environments and networks children are exposed to," Yi said. "For example, growing up around neighbors employed at high-paying firms is associated with a greater likelihood of working at those kinds of firms later in life."

—Lisa Camner McKay

ANDREW GLOVER

Research and Policy Advisor, Federal Reserve Bank of Kansas City

PLAIN LANGUAGE, POLICY IMPACT

Like many who read sociologist Matthew Desmond's 2016 book, *Evicted*, Andrew Glover was moved. As an economist, Glover was moved to construct a mathematical model.

Glover, the Institute's System affiliate at the Kansas City Fed, wanted to understand the cycle of evictions that can afflict low-income renters like those profiled in the book. He partnered with Dean Corbae and Michael Nattinger of the University of Wisconsin–Madison on a paper now coming to fruition. Glover said the economists wanted a "theory of eviction" to help assess policies like the eviction moratoriums common during the pandemic.



Their model features a "two-sided lack of commitment": The landlord is inclined to evict when a tenant hits a rough patch; the tenant is inclined to depart once back on their feet (leaving back-rent unpaid). The optimal result in their setting, the economists show, would be for both parties to ride it out. However, they find that eviction bans or waiting periods lead to excessive screening of tenants and a drop in housing supply. A better approach, they determine, would be a partial subsidy to the landlord. A public subsidy as low as 25 percent of missed rent "can overcome those commitment issues at a relatively affordable cost," Glover said.

Glover discovered his passion for advanced mathematics later than many economists; math at his rural Indiana high school stopped at Algebra 2. An early college philosophy course instilled a commitment to convey complex ideas in plain language, a value he brings to his role as research coordinator for the Kansas City Fed's annual Jackson Hole Economic Symposium. "We can't lose parts of the audience" with the presentations, Glover said, when "the goal is to have a wide-ranging discussion amongst policymakers."

> At Jackson Hole, "we can't lose parts of the audience" with overly technical talks. "The goal is to have a wide-ranging discussion amongst policymakers."
>
> ANDREW GLOVER

In early 2026 Glover and colleague Johnson Oliyide debuted their own contribution to Fed policy: a new monthly estimate of the natural rate of interest ("r-star"). Other estimates are quarterly and based on projected rates of GDP growth. The Kansas City Fed measure instead uses the unemployment rate, which is more frequent and "what our dual mandate tells us we should be looking at," Glover said.

Growth and employment often move together, but not always. Their new model could be an important, alternate signal for policymakers in the age of artificial intelligence. "If we start to see divergence between underlying growth and labor markets," Glover said, different r-star models could suggest "a divergence in what the appropriate policy rate should be."

—Jeff Horwich

RICHARD LIU

Ph.D. Student in Economics, University of Michigan

FINDING HIS PATH, LEAVING HIS MARK



As he begins a Ph.D. at the University of Michigan, Richard Liu has been asked a lot: What kind of economics do you want to do?

"I get excited when I say, 'I don't know,'" said Liu, who just finished almost three years as a research associate with the Institute. "There are so many important questions."

A conversation with Liu spans the opioid crisis in his Indiana hometown, iron deficiency among schoolchildren in rural China, and whether political polarization affects household consumption. And that's before we get to the many projects where he became integral at the Institute.

Most of those projects relate to Income Distributions and Dynamics in America (IDDA), a joint Institute effort with the Census Bureau to publish U.S. earnings data at unprecedented detail. Liu's IDDA work included teaming with the Minneapolis Fed's Center for Indian Country Development to advance knowledge of incomes on Native land areas. He spent much of his final months in a vault-like computer lab, poring over unreleased earnings data and debating the meaning with colleagues. "We'd go through four or five different charts and spend, I kid you not, a half hour talking about each one, trying to think, What is the story we're learning from this?"

In 2025, Liu collaborated with counterparts in other cities to organize the first academic conference by and for Fed research assistants. Around 100 attended the virtual event, which they held again in 2026.

Although he majored in economics, Liu's interest in research was inspired by a sociology professor. As he joined the Institute, he still wasn't sure an econ Ph.D. was the path for him. "The strongest signal for me that I wanted to apply to grad school was that I liked going to seminars," Liu said. "I wanted to understand more." He also saw how the economists, while deeply devoted to economic theory in the Minneapolis Fed tradition, remained committed to real world influence. "They care a lot about policy, which is why I got into this."

Liu said he found his purpose and potential at the Institute thanks to the mentorship of Natalie Gubbay, a research associate who died in a car crash in 2024. "When I first came here, I felt totally out of my depth," Liu said. "Natalie was so brilliant. But also from a character standpoint, one of the most formative parts of my time here was getting to work with her."

—Jeff Horwich

> Institute economists "care a lot about policy, which is why I got into this."
>
> RICHARD LIU

A tour of this issue's insights and highlights



FEATURE ARTICLE

Prescription for productivity p. 6

The rise of public health insurance under Medicaid saw a corresponding decline in the share of uninsured American children. Empirical research shows this spending had lasting effects on health, employment, and U.S. economic growth.



INTERVIEW

The work of public leadership p. 14

Marianne Wanamaker's career as an economic historian started with questions about demographic transition. As dean of Tennessee's first school of public policy, she finds young people uniquely positioned to meet America's current shift toward technology-driven growth.



The economic upside of admitting more students to selective public colleges p. 19

↗ Limited capacity prevents qualified students from attending selective colleges.
↗ Expanding enrollment is predicted to increase average earnings eight times more than cost of expansion.
→ Features research by System affiliate Oksana Leukhina (St. Louis Fed).



What explains the broken rungs on the U.S. job ladder? p. 22

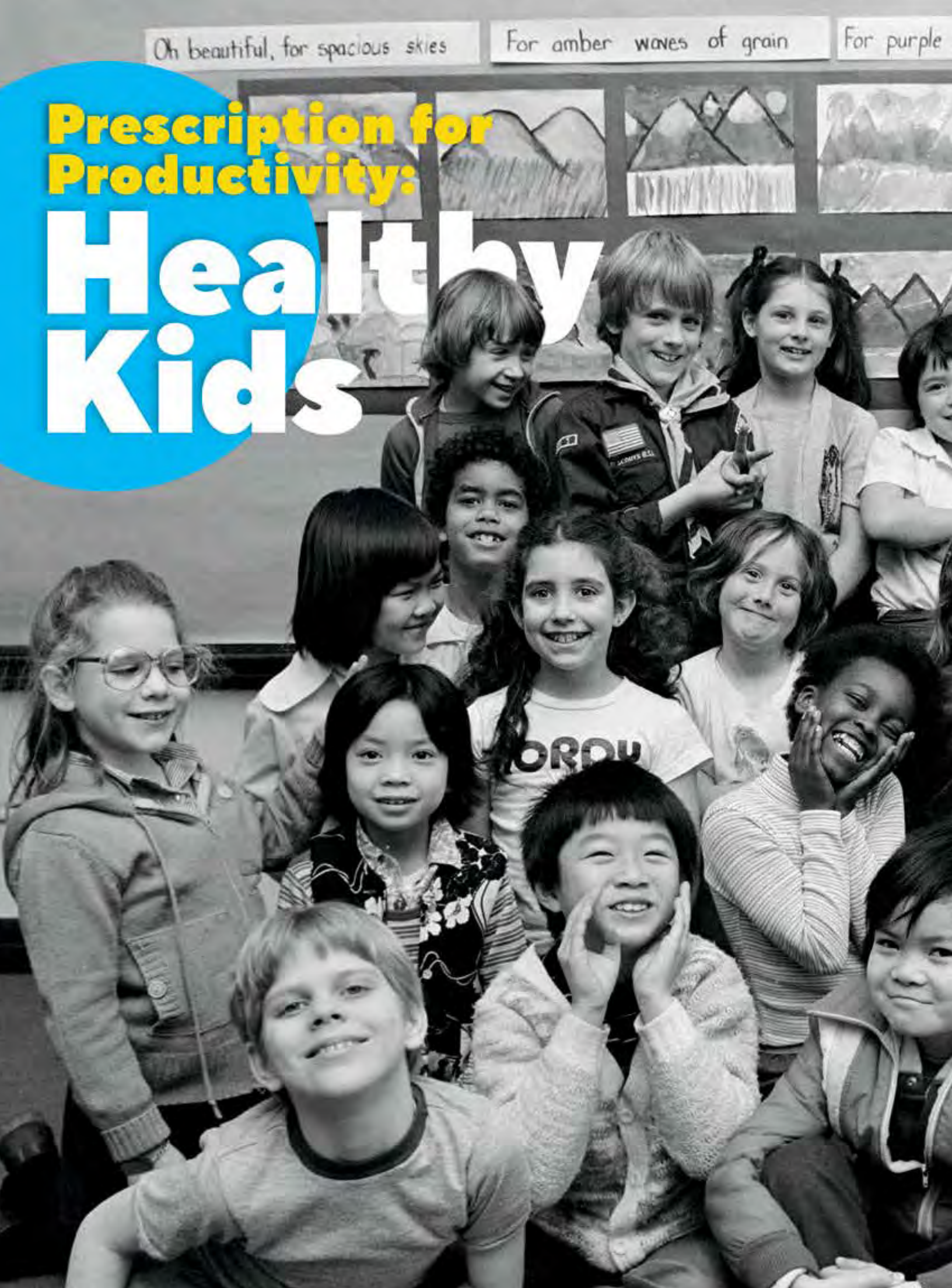
↗ Employed workers today are half as likely to receive better-paying outside offers as workers in 1980s.
↗ Employer concentration and non-compete agreements have made it harder for workers to find better-paying jobs.
→ Features research by former Institute visiting scholar Niklas Engbom (New York University).



To identify true sources of employment and income risk, ask workers p. 25

↗ Modeling with survey data shows productivity shocks matter less than economists thought.
↗ Worker outcomes depend more on inherent skills and how well workers fit with their jobs.
→ Features research by Institute consultant Mariacristina De Nardi (University of Minnesota).

Prescription for Productivity: Healthy Kids



Research shows a healthy population contributes to economic growth

ANDREW GOODMAN-BACON
AND SARAH MILLER



Elementary students in Seattle in the mid-1980s. At the time, 14 percent of children received health care through Medicaid. Now the share is 47 percent.

H. ARMSTRONG ROBERTS/ CLASSICSTOCK/GETTY IMAGES

The intestinal worm *Necator americanus* (commonly known as hookworm) arrived in the warm, humid climate of the South with the slave trade and remained endemic there until the 1950s. Hookworm spread through people's bare feet around unsanitary privies, and in the early 20th century 40 percent of children in 12 states from North Carolina to Texas were infected. Worms consumed their victims' blood, causing listlessness, lack of focus, and stunting, especially in children, who often missed school or couldn't pay attention.

Hookworm took an enormous toll on health—so much so that it held back the Southern economy. The parasites "so lower the vitality of those who are affected as to retard their physical and mental development … [and] make labor less efficient," wrote a group of physicians and civic leaders in 1909, and the disease was "seriously affecting economic development." Stock prices of cotton mills in highly infected areas ran noticeably lower than in areas with lighter infection because "it takes, by actual count, about 25% more laborers to secure the same results in the counties where the infection is heavy."

The story of hookworm illustrates a fundamental, but often overlooked, input into economic growth: health. Classical economic models view output in terms of machines and materials, work hours, workers' skills, and the technologies that combine them. When people are unhealthy, the middle of this equation falls out. Sluggish students cannot learn. Sick workers cannot produce. Economic growth benefits from population health.

Health remains a key issue in discussions about the U.S. economy today. In fact, 8.6 percent of U.S. gross domestic product goes toward public programs that are meant to support health. Most of this spending is for the public health insurance programs Medicare and Medicaid. But does this spending actually maintain health, and if so, does that deliver economic benefits? In this article we review evidence on the link between one specific type of health spending, Medicaid's coverage of children, and how those children influence the economy when they grow up.



President Lyndon B. Johnson's 1964 "poverty tours" helped bring attention to the role that poor health plays in economic outcomes.

CSU ARCHIVES / EVERETT COLLECTION / ALAMY

Medicaid's coverage of children

Today Medicaid provides health insurance to over 35 million children 18 and under and about 1.5 million pregnant women, representing about 47 percent of American kids and 41 percent of births. Children typically qualify for Medicaid based on income, and once they are on the program, they usually pay nothing for medical care. Health care providers who treat them are reimbursed by the state Medicaid agency or a private insurance plan funded by Medicaid. No other income-tested program reaches as many children and, to the extent that Medicaid affects their health, no other program has such scope to shape their economic trajectories.

When Medicaid was born in 1965, the link between health and productivity was fresh in policymakers' minds. A 1964 Department of Defense report found that a full *one-third* of 18-year-old men would fail to meet peacetime standards for military service, with about half of these disqualifications related to preventable health issues. About one-third of children—but almost all poor children—lacked health insurance, and less than half of the children with incomes in the bottom 10 percent even visited a doctor each year (Goodman-Bacon 2021).

In response to these concerns about health outcomes for America's youth, President Lyndon B. Johnson proposed a public insurance program: Medicaid. On Medicaid, low-income Americans could receive medical care from existing providers, who would then be paid with public funds. The federal government pays most of Medicaid's costs, but states mostly run it. Programs began operating in 1966, and by 1975, they covered 10 million children, a dramatic increase from the mid-1960s (Figure 1). At the same time, the number of children with *no* insurance fell by almost the same amount, and the poorest children in the country began to see doctors at the same rates as everyone else, with approximately 70 percent visiting a doctor in a year (Goodman-Bacon 2021).

Originally, Medicaid served children whose families received cash welfare, but over time, federal mandates have made Medicaid eligibility more generous. In the 1980s, policymakers sought to expand coverage by moving children's Medicaid eligibility to a simpler standard: family income itself. Over the next decade and a half, the number of children enrolled in Medicaid increased from about 9.3 million in 1980 to 17.1 million in 1995 (Figure 1). Today, states must cover all children in households with income less than 133 percent of the federal poverty line (which comes to about $44,000 for a family of four), but all states go beyond that, extending coverage to children in families earning as much as 400 percent of the poverty line.

In 2023, Medicaid spent about $4,000 per child, not much different from the average cost of care for children not on



SOUTHERN UNIVERSITY AND A&M COLLEGE / GETTY IMAGES

One of Medicaid's benefits is its Early and Periodic Screening, Diagnostic, and Treatment program. This includes the type of hearing, speech, and language assessment pictured here in 1980.

Medicaid. This spending is skewed toward children with the kind of health needs that can shape health and productivity years later. For example, half of preterm births in the U.S. are covered by Medicaid (Meltzer and Markus 2020), and the acute care that helps these infants regulate their body temperature, absorb oxygen, and finish their physical development has been shown to raise academic achievement in elementary, middle, and high school (Bharadwaj et al. 2013).

But high spending on critical needs is not the only way that Medicaid might have longer-run effects. The program also funds a large amount of low-cost prevention. In fact, at least 80 percent of children on Medicaid use very little costly care, but nevertheless receive important screenings, checkups, and preventive services (Kuo and Houtrow 2016). (See "How Medicaid spending varies across children," page 13.)

A large research base tries to understand how and how much Medicaid coverage affects children's health in the short run. This evidence consistently shows that Medicaid boosts health care use and improves health, especially for the lowest-income children. By the end of the 1970s, for instance, Medicaid had saved about 35,000 children's lives by supporting better delivery care for infants and protecting younger children against infectious diseases (Goodman-Bacon 2018). As it expanded to other low-income families in the 1980s, Medicaid generated similarly large health improvements (Currie and Gruber 1996a, 1996b). Expansions to higher-income children, however, did not have such profound effects (Currie et al. 2008), perhaps because many of these families already had access to insurance (Lo Sasso and Buchmueller 2004).

A longer-term view raises further questions about childhood Medicaid coverage—the same kinds of questions that arose alongside hookworm infections decades earlier. Do Medicaid's short-run health effects last into adulthood? Do they open up the pathways through which children gain skills and grow into healthy, productive workers? Does Medicaid ultimately feed back into the economy?

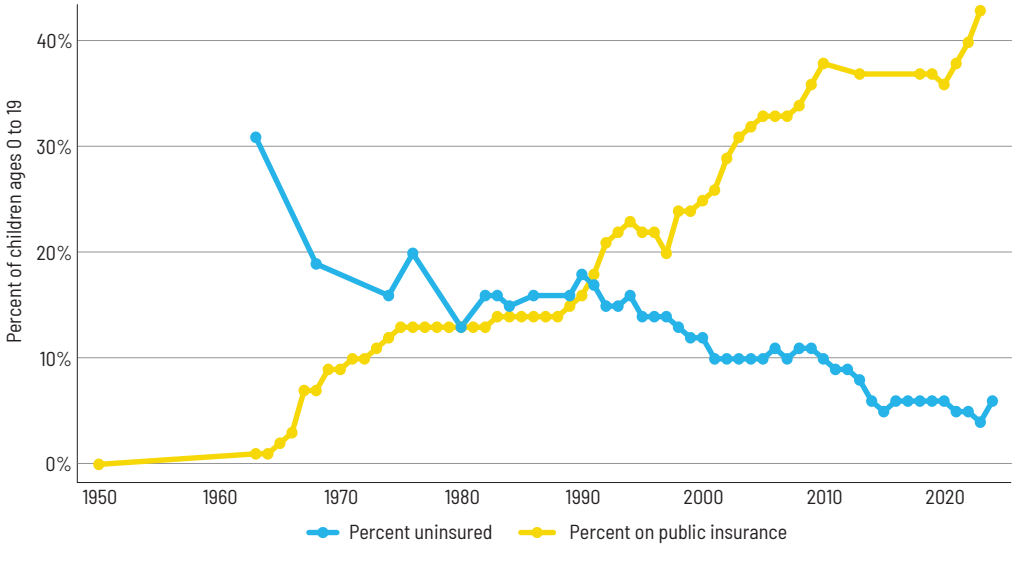
Medicaid's lasting effects on the labor force

The millions of children originally covered by Medicaid provide the first good opportunity to learn whether and how the program shapes economic outcomes down the line. Medicaid's original connection to cash welfare programs meant there was meaningful variation across states in the share of children who received any coverage and the number of years they were covered.

For example, about 1 percent of White children in Virginia gained access to Medicaid when it began, compared with 3 percent in Tennessee. And these differences added up across childhood. The average child born around the mid-1960s in the top half of states ranked by this welfare-based Medicaid eligibility measure accumulated about 1.5 years of Medicaid eligibility before age 11; kids from the bottom half of states gained one year. Practically, this meant that kids in

1 / FROM UNINSURED TO COVERED

As the share of children covered by Medicaid increased, the share of American children who lacked insurance declined.



Sources: The figure uses administrative data from the U.S. Department of Health, Education, and Welfare and the Centers for Medicare & Medicaid Services to measure the number of children ages 0 to 19 on Medicaid and related programs, and population denominators taken from the U.S. Census Bureau. The share of children ages 0 to 19 without health insurance is calculated using a dataset from IPUMS NHIS, University of Minnesota.

Medicaid led children to perform better in school, repeat grades less often, graduate high school at higher rates, and attend and finish college more.

higher-welfare states grew up with more opportunities than similar kids from lower-welfare states to see doctors, get prescriptions, receive screenings, and undergo surgical procedures as a result of Medicaid. If this spending prevented or treated illnesses, made it easier to attend and focus on school, and ultimately made for healthier adults, we should see better economic outcomes for people who grew up in states with higher Medicaid eligibility.

This is exactly what census data from the 2000s show. Figure 2 plots differences in adult employment rates (in yellow) between kids born in higher- versus lower-welfare states by birth cohort. There is little difference in employment rates in the two groups of states for adults born long before Medicaid was available (the yellow line is close to zero). But among people who were in elementary school or younger when Medicaid began, adult employment rates are higher by about one-half of a percentage point for those who grew up in higher-Medicaid areas. Adjusting for differences in cumulative childhood eligibility across states suggests that raising average childhood Medicaid eligibility by one year raises employment by about 4 percentage points (Goodman-Bacon 2021). This is a substantial effect when compared with the national employment-to-population ratio, which rose by about 10 percentage points from its trough in the 1950s to its peak in 2000.

Measuring earnings instead of just employment, which incorporates both who enters the workforce because of Medicaid and any effects on education or productivity of workers, shows that groups with one additional year of average childhood eligibility experienced a 2.7 percent increase in earnings, concentrated among lower-income workers most likely to have used the program. To put this in context, each year of early life Medicaid exposure raises earnings by almost as much as a year of adult labor market experience.

These labor market effects appear to stem from just the kind of health improvements that Medicaid's architects had in mind. Figure 2 also shows that adult disability rates are systematically lower for the cohorts and states where Medicaid raised employment. Unlike in cases of specific pathogens, such as hookworm, Medicaid provided broad-based care against childhood ailments. Occupational therapy to manage physical limitations, prevention or early treatment of acute infectious diseases that have longer-term consequences, and early diagnosis of chronic and potentially deadly or disabling conditions could all underlie the program's long-run health effects. Other research confirms this finding. Early Medicaid coverage in the 1960s and 1970s is associated with lower adult mortality, disability, and chronic disease burden (Boudreaux et al. 2016; Sohn 2017; Goodman-Bacon 2021), explaining why an investment in children's health ultimately paid off in the labor market.[1]

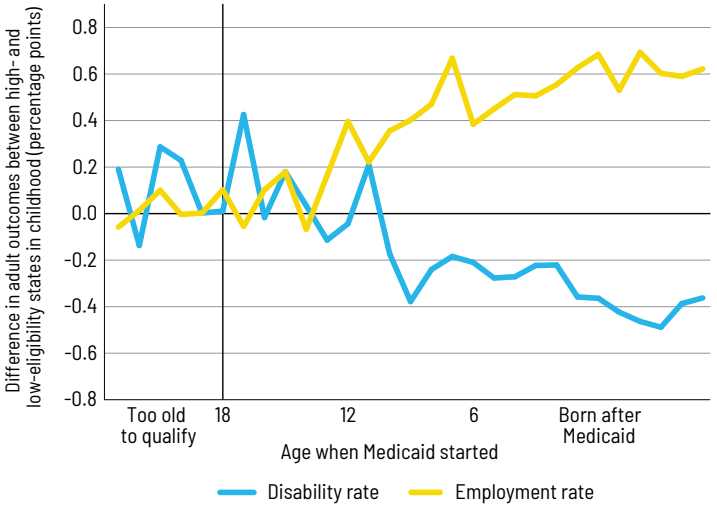
A second chance to learn about Medicaid's effects on labor market outcomes came in the 1980s, when eligibility was expanded beyond its original link with cash welfare. Some states already covered most poor children, so new federal mandates that set income-based eligibility rules resulted in very little new Medicaid coverage. In other states, however, thousands of children gained coverage for the first time.

A series of different research teams took advantage of this variation across states to study the long-term impacts of these 1980s-era expansions, and all pointed toward the same conclusions as the 1960s-era research. Medicaid led children to perform better in school, repeat grades less often, graduate high school at higher rates, and attend and finish college more (Thompson 2017; Cohodes et al. 2016). Newly covered children were diagnosed with and hospitalized for fewer chronic conditions than other children, and their mortality rates as teenagers and young adults were lower (Thompson 2017; Wherry et al. 2018; Miller and Wherry 2018; Brown et al. 2020). The effects continue to echo: Girls who gained Medicaid coverage as children in the 1980s went on to give birth to healthier babies in the 2000s (East et al. 2023).

As in the 1960s, improvements in health and education went hand-in-hand with better labor market outcomes. For example, one study compared kids whose birthday happened

2 MEDICAID IN CHILDHOOD, OPPORTUNITY IN ADULTHOOD

Growing up in states with more Medicaid access raised adult employment rates and lowered adult disability rates.



Notes: The figure plots differences in the share of adults who report an "ambulatory difficulty" or having worked in the previous year, both measured out of 100. We compare adults born in states with above- versus below-median welfare rates in the year that Medicaid began (1966–1970) and birth cohorts measured relative to the year that Medicaid began. Outcomes are adjusted for race-by-region trends, then averaged by cohort and welfare groups, then normalized to zero relative to cohorts born 19 years before Medicaid. Source: Adult disability and employment rates are calculated from the 2000 U.S. Census and 2000–2015 American Community Surveys; IPUMS USA, University of Minnesota.

to fall on either side of a strict eligibility cutoff in a 1991 Medicaid reform. It found that Medicaid eligibility reduced later-life incarceration (Arenberg et al. 2024), a finding echoed in more recent work looking at children who lose access to mental health therapy and medications when they become too old to get Medicaid (Jácome 2024). More broadly, the largest study, based on tax data, found that each year of Medicaid eligibility in childhood raised annual earnings by about 0.8 percent (Brown et al. 2020).



Students participate in English class at a Houston, Texas, high school in 1993. Research shows part of Medicaid's economic benefits come from helping children complete more schooling.

PAUL HOWELL / HULTON ARCHIVE / GETTY IMAGES

Medicaid in childhood and long-run effects on the economy

Together, this evidence on Medicaid's long-run effects is broadly consistent across studies, research teams, datasets, and policy regimes. But are these benefits large enough to affect the economy? Traditional economic models provide one way to connect the findings about childhood Medicaid and adult earnings to conclusions about aggregate economic output (Weil 2007). If earnings reflect the value of what workers produce, then the earnings gains from Medicaid are also its contribution to national output.

To measure this, we first calculate the effect of Medicaid on adult earnings for each birth cohort based on their amount of childhood exposure. People born in 1965, for example, accumulated almost one year of eligibility during the earliest era of Medicaid policy, raising their earnings by almost 2.7 percent. Cohorts born in the 1980s accumulated about four years of Medicaid exposure because they were children during the period when eligibility expanded. Combining this with the findings on Medicaid's labor market effects suggests that their childhood eligibility raised these cohorts' average earnings by as much as 6 percent.

Next we calculate the share of total earnings in a given year that come from each cohort, a measure of their contribution to aggregate output. The 1965 cohort, for example, is relatively large. In 2005 at age 40, they were near the peak of their earnings profile, meaning their contribution to aggregate output was large. By 2024, however, the 1965 cohort was smaller in number and had lower mean earnings because some left the labor force. Their 6 percent earnings gain because of Medicaid thus translates to less of an effect on the overall economy. Similarly, the contribution of the 1980s cohorts to aggregate output started out small in the 2000s, when early career earnings were low, but grew over time as these cohorts reached the peak of their earning capacity around 2024.

Applying Medicaid's estimated earnings effects to these cohort-specific contributions in 2005, 2015, and 2024 gives us a guess about how much Medicaid coverage of children raised total output later on. The results suggest that the history of child Medicaid spending raised the level of U.S. GDP by 1.8 percent in 2005, 3 percent in 2015, and 4.2 percent in 2024. That translates to $1.2 trillion in 2024 (at 2024 prices)—more than the cost of the entire Medicaid program (which includes care for older people and people with disabilities).[2] While Medicaid's impact is a one-time benefit, its size is on par with annual GDP growth in these years, which averaged 3.1 percent.

Medicaid's long-run effects may also matter for economic output by easing federal budgets. Medicaid's long-run health and labor market effects led adults to receive less from safety-net programs, especially those aimed at people in poor health, and to pay more in income taxes (Goodman-Bacon 2021; Brown et al. 2020). These savings to the government are now greater than the original cost of covering children through Medicaid during the program's first three decades. To the extent that these savings ease pressure on governments to raise revenue in ways that may depress economic growth, or to shift spending toward other productive uses, Medicaid may be raising output by even more.

Medicaid funding and health care sector economics

Today's debates about Medicaid do relate to economic growth, but they often have more to do with the nearly $1 trillion program's role in the health care industry than with its enrollees. In 2022, nearly 15 million people were employed in the health care sector, representing about 9 percent of all jobs in the U.S. economy. Medicaid financially supports the hospitals and clinics where these workers are employed, especially in rural areas where nearly 1 in 4 people have Medicaid coverage. With rural hospital closures surging, the role of Medicaid in keeping the labor market stable and health care in good supply in these areas is a key concern.

But despite bringing in revenue for hospitals, Medicaid is an imperfect source of support for health care providers.

The program reimburses providers at a lower rate than commercial insurance plans and is far more likely to deny medical care claims. As a result, a typical Medicaid visit generates about $87 in revenue for a physician, while a visit from a commercially insured patient generates $178 (Dunn et al. 2024). These low reimbursement rates likely dampen any beneficial effect of the program on the health care sector's employment and output.

Yet boosting reimbursements is no easy fix. Medicaid is already costly to both federal and state governments, representing nearly 20 percent of state general funds in 2024. Medicaid's price tag creates pressure to raise revenue or forego other spending priorities, both of which may dampen economic growth. Therefore, while research clearly shows that Medicaid can deliver long-run economic benefits, a program of its size can also generate large short-run costs.

From childhood health to a lifetime of learning and earning

Not long after the economic costs of hookworm became clear, John D. Rockefeller Jr., motivated both as a philanthropist and an industrialist with a stake in Southern productivity, pledged to fight the parasite. The newly formed Rockefeller Sanitary Commission provided thousands of 50-cent doses of thyme oil to treat infection and scores of new latrines to prevent its spread. The costs were modest, but the returns were huge. School attendance, performance, and even literacy rates jumped in the South, and years later, children who avoided hookworm grew up to earn 40 percent more than they otherwise would have, meaningfully shrinking the income gap between the North and the South (Bleakley 2007). A simple investment in children's health became a massive investment in the region's economic future.

Medicaid has the same goal. In a message to Congress recommending a 12-point program for America's children, President Johnson argued that "our whole society pays a toll for the unhealthy and crippled children who go without medical care: a total of incalculable human suffering, unemployment, rising rates of disabling disease, and expenditures for special education and institutions for the handicapped." Now, 60 years later, we are in a position to evaluate whether Medicaid addressed Johnson's observation. It did. Maintaining child health shapes a lifetime of learning and work. Evidence now shows that this force, multiplied across millions of children, can also shape the growth of an economy. ★

Sarah Miller is a professor at the Ross School of Business at the University of Michigan.

1 Medicaid also boosted the labor market by maintaining the population itself. Perhaps 2 percent of people exposed to Medicaid as young children survived to 2015 because of it, and a large share of them likely worked.

2 This finding also lines up broadly with a recent analysis by the Congressional Budget Office, which (based on the same body of research) used an annual earnings effect of 0.5 percent per year of childhood eligibility. Applying this number to average childhood Medicaid eligibility, which was 5.8 years in 2024 (adjusted to account for different cohorts' earnings), gives a similarly large output effect of 2.9 percent.

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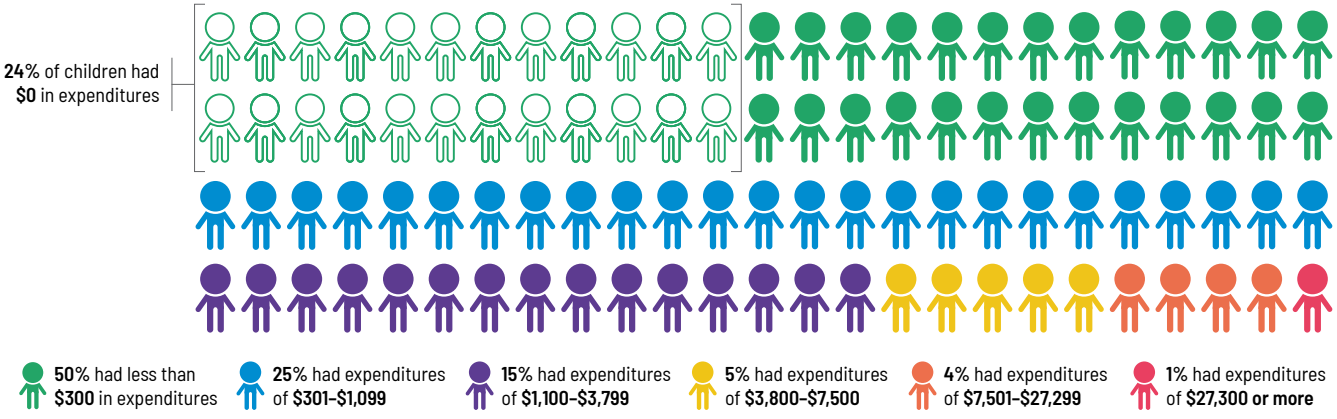
How Medicaid spending varies across children

In 2023, Medicaid paid around $119.5 billion in medical expenses for the 35.5 million children ages 0 to 18 who were enrolled in the program. That's an average of $3,366 per child. But that average doesn't say much about how Medicaid spending is actually distributed across the population of enrolled children.

To gain a clearer picture of how Medicaid spending varies across children, researchers can turn to the Medical Expenditure Panel Survey (MEPS), which provides detailed, nationally representative data on health care expenditures by payment source. The survey data show that Medicaid spends $300 or less on half of enrollees ages 0 to 18.

1 BREAKING DOWN MEDICAID COSTS PER CHILD

Average annual Medicaid expenditure among enrollees ages 0 to 18 in the survey sample

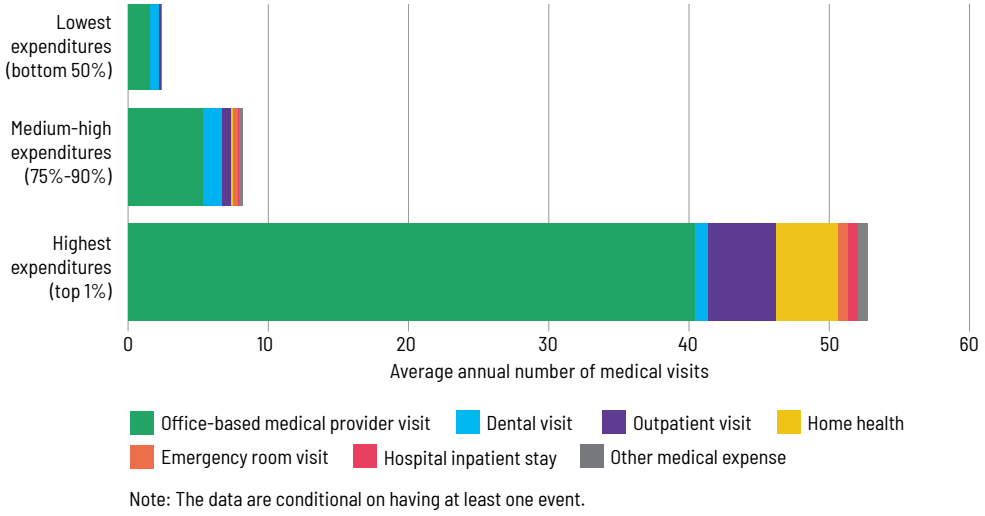


Note: Data cover 2019 to 2023. Of the approximately 15,500 children ages 0 to 18 included in the sample, 53 percent were covered by Medicaid, compared with 47 percent of the total U.S. population of children. Dollar amounts are rounded to nearest hundred.

2 MORE VISITS, MORE EXPENSIVE VISITS

Type and number of medical events for children with different average annual Medicaid expenditures

MEPS data also capture the number and average dollar amounts associated with different types of medical visits. Not surprisingly, children with higher expenditures experienced more medical events in a year. On average, children in the bottom 50 percent of Medicaid expenditures had 1.5 office-based visits that cost Medicaid $45 each. Children in the top 1 percent had an average of 40.4 visits that cost Medicaid $285 each.



Note: The data are conditional on having at least one event.

Source: IPUMS MEPS, University of Minnesota.

LISA CAMNER MCKAY AND NINA LEO, WITH RESEARCH ASSISTANCE FROM AIDAN BRYANT AND ELLA TRACY



The Work of Public Leadership

Policy school dean Marianne Wanamaker discusses tech-driven growth, demographic decline, and why young adults may be uniquely equipped to meet the moment.

BY LISA CAMNER MCKAY

AMY SMOTHERMAN BURGESS



When Marianne Wanamaker stepped in to instruct a class on public leadership at the University of Tennessee's Baker School, she had two goals: Teach the next generation of public servants the history of recent leadership crises and emphasize the trade-offs that leaders faced in real time.

"The idea here was, hey, these kids are 22 years old. They're going to go out and be ready to work at a public employer, and there are a whole series of stories that their bosses know that they don't know, at least not in the same way that their bosses know them," Wanamaker said. "If you try to look at all of what is happening right now without that context, how would you ever make sense of it?"

To study each of those stories—Hurricane Katrina, 9/11, COVID, the financial crisis—the class took the perspective of the people making the choices. "We framed it as, What are the trade-offs that someone in that position is facing?" Wanamaker said. "And therefore, why might someone think this was the right answer, even if in retrospect, we understand that it wasn't? It's about understanding that every time you make a decision in public life, you're choosing one value over another one."

The class reflected themes that have animated Wanamaker's career: a love of history, a commitment to public service, and a belief that listening to others is essential for citizens and leaders alike. Wanamaker

was drawn to economics because of her fascination with people's stories. "I want to know where you started, what caused you to take the education path that you took, how did you end up where you are?"

Wanamaker's own journey started in Tennessee, where she grew up hearing stories from great-aunts and great-uncles who had, like millions of other Americans, followed the railways to points north and west before returning home. She later published several papers on the Great Migration. After earning tenure as a professor of economics at the University of Tennessee and serving on the White House Council of Economic Advisers, she became executive director of the Howard H. Baker Jr. Center for Public Policy, leading its transformation into Tennessee's first school of public policy that graduates students with master's and bachelor's degrees. The Baker School of Public Policy and Public Affairs is now in its fourth year of operations.

"This place had zero students three years ago, and we're going to have 600 in the fall," Wanamaker said. "The way you get to changing the nature of the public service workforce is you just graduate students, and in 10 years you will be able to see your impact."

This interview has been edited for length and clarity.

What were the big questions that inspired you to specialize as an economic historian?

I started my career being really interested in choices people made about how many children to have. I studied all of that in a historical context. One of the big mysteries of economic history is the demographic transition. Why was it that we went from having basically as many babies as we could to a very, very small subset of that number? Why did it happen in different places at different times for different demographic groups in the U.S.?

I think what's interesting about it is it's only partially economic. It's also cultural—it's about what are the elites doing and how do people model that or follow that. And so that kind of transmission of ideas alongside the economic causes—that's what Joel Mokyr won the Nobel prize for, was trying to understand the dissemination of ideas and how that intersects with the dissemination of economic change itself. Fertility is no different.

The saying goes that those who do not know history are condemned to repeat it. Do you look around you and feel like we are making some of the same mistakes?

Yesterday, I was thinking about how when you study demographic history, you start with Malthus and the idea that the amount of life-sustaining material in the environment is the thing that determines the birth rate.

And so in years where there's more food, there are more babies. I mean, it's true for deer and it's true for humans. And this is the thing you're trying to refute in economic theories about demography, that it's not just about how much food there is. But if you think about what is happening right now, why are people not having babies? One of the reasons people aren't having babies is it's super expensive to get a house. It's super expensive to get day care. All the pieces are really expensive, and food is back on the menu of things that are in scarcity.

So I've been thinking the last 24 hours, Malthus is back. And if you want a different demographic outcome, you can't have *everything* be expensive and you really can't have housing be expensive. People just aren't going to have babies in that environment.

So anyway, that's my hot take on an old idea.

What are some of the important economic consequences of the decline in fertility that you see as deserving more of our attention?

The one that is really interesting to me is the public finance implications. So here's an example. In Southern states, our fertility rates are pretty low. Our death rates are pretty high.

But what we do have in the South are some higher education institutions that we're super attached to. This is not just in the South, but thinking about the state that I'm in and the states that border us, there are a lot of flagship universities. Mississippi has two, Alabama has two, South Carolina has two. And you start thinking about a decline in population and how do you support those schools? And then you think about the regional state schools. The regional schools are really important from an economic development perspective, yet there's no way that all of those higher ed institutions can maintain the scale that they have been at. And so it's going to require some sort of interesting public finance outcome, which almost certainly means we have less money for other stuff.

Another place we may see a consequence of the demographic transition is the trajectory of U.S. economic growth. What do you see as the drivers of growth in the American economy right now?

Well, I've certainly changed my perspective on this as the country has sort of changed its strategy. Not meaning that we actually have been cognizant of our changing strategy, but quietly behind the scenes, we have changed our strategy as a country from "We are going to lead on labor force" to "We're going to lead on technology."

I think it would be healthy for all of us to take a step back and acknowledge this quiet choice that we've made. If I were in charge, task number one is write down the equation: Economic growth equals the sum of the growth in workforce plus the growth

> "Winning is not the calling. The compromise is the calling."

in labor productivity. That's it. And then you can say, because we have decided to really restrict immigration and workforce, that means that in order for this economy to keep growing, the technology that drives labor productivity has to shine.

We didn't have to make this choice, but it's a choice that we made. I think most Americans don't realize that there was a fork in the road and we took one path—the low immigration path—and not the other. And I think the whole conversation is healthier once you can do that.

In 2024, 84 percent of population growth in this country was due to immigration. That tends to get people's attention. They're like, wait, what?

If you don't have more people, the only other way to grow is through innovation. And I think you see that playing out right now with the intense focus on technology—which the government didn't lead. This is really a private sector process.

People don't trust technology all the time, they don't trust data centers, they don't trust AI. And yet in the absence of population growth, these things are the key to economic growth. There's no way around it. And so I think the policy world is trying to figure out how to manage that. We put all of our eggs in the technology and innovation basket, and the American people are really skeptical about the technology and innovation basket. And so what do we do next?

Let me put that question back to you: What *do* we do next? How should leaders be communicating about technology in order to build trust and foster economic growth?

On the technology side, I think a sort of silver lining in all of this is that no one trusts technology. People on the left, people on the right, people in the middle. So it's actually a very nonpolarizing topic, and it's hard to name a lot of nonpolarizing topics right now. Now, it's polarizing in the sense that you have pro-technology and anti-technology people, but they don't cleanly line up with political parties.

I'll also say that when it comes to data centers in particular, their location, the side effects, the environment, the tax, the effects on the energy system, these are hyper-local questions. And it's good for us as Americans to have hyper-local questions that get sorted out in our city councils and our county commissions and don't get resolved in Washington. Immigration isn't a thing that you could sort out in the city council in Knoxville, but data centers are.

As the drivers of economic growth shift, how do you see the opportunity for economic mobility for the younger generation?

I think there are lots of reasons to be optimistic. We're in a period of very disruptive change. Disruption can reset what otherwise would be a default to higher levels of inequality and less mobility.

It doesn't have to turn out that way, but it could. The optimistic side of me sees a leveling of the playing field in the sense that there are things that AI can do where previously, it would've taken a particular path to develop that skill and that particular path might have been more accessible to higher socioeconomic status individuals. I do think this technology has a chance to democratize a lot of things.

One thing I think that's concerning when you look at the early data on AI is that men are way more likely to adopt AI in their daily life than women. And they're also more likely to build the skillset. So I think that's something we have to watch. Will that change over time or is that destined to be a gender gap that we're going to live with forever? I would view that to be a very negative thing if that's the way that that played out.

On the flip side, what do you see as some of the obstacles to inclusion in the economy today?

What I see is we still have a lot of attention in this country on higher education. I work in higher education and it's great to have attention on your industry, but from my perspective, our attention on higher education is way out of line with our attention on what happens before kids get to school.

In my own state, we spend a ton of resources and a ton of time thinking about what happens as soon as a kid turns 18 and graduates from high school. What community college are they going to? What training program are they in? What's their workforce pathway?

How much time do we spend thinking about what happened to the kid the year before they show up in the kindergarten room? Zero. And yet I think you could argue that what happens to them when they're 4 is just as important as what happens to them when they're 19, or certainly it's not zero and 100 percent. It's way harder to catch up than to never allow the gap to emerge.

I'll also say that I find it a little bit puzzling that when we talk about pre-K, we talk about it as though it's just solving

this human capital problem. But pre-K also solves day care, which is on people's top-five list of affordability problems in this country.

There have been a lot of headlines about the tough economic environment that new college graduates are facing. What is your message to the undergraduates at the Baker School in light of these anxieties?

I think it's actually a two-part issue. One is the headlines about the labor market that they're walking into. Two is how many times this generation has been told that they are in deficit as a generation.

So what I tell them is, Look, I can't do anything about housing prices. I can't change that. I can tell you that, Are unemployment rates for college-age kids coming out of college higher than they have been? Yes. Are they high? No. You still have a 95 percent chance of employment. So first of all, let's make sure we understand what the numbers actually say.

And then the other thing that I spend a lot of time talking to them about is this deficit framing of their generation, that there's something wrong with them. And I remind them that we have a country that is desperate for an ability to talk across difference, to find inclusion, to solve problems together. And those are all the characteristics that this generation *does* have.

They're really good problem solvers. They're very interested in inclusion. I think it's because of COVID. The group that I am with every single day, they love a good gathering where Republicans and Democrats are in the same room. They love that.

Then on the economic side of the equation, they are in a position to take advantage of the technological change in a way that those of us who are 20 years their senior cannot. Can I rewrite an email with AI? Sure. Can it be part of what I offer the labor market? Absolutely not. Can it be that for them? Yes. And there's increasing evidence that employers are looking for that.

This isn't the first time a younger generation has been told by their elders that they don't have what it takes. Do you think there's something different about the message that young folks today are hearing?

I mean, I don't think it's different from what they were told, but I think the context is wildly different. At the moment people don't believe in the capacity of the country to do the things that we have to do to succeed. And so it's not that I think the country is telling this generation that it's their fault, but they certainly aren't recognizing that they're the answer.

Fundamentally what we're not able to do as a country anymore is communicate. And what is the younger generation good at? They do know how to communicate. They may not communicate the way we do, but I enjoy watching high schoolers, college-aged kids on Instagram or on LinkedIn. When someone posts something that they've done, they will get 400 messages of how proud their classmates are of them. That would not have happened when I was that age even if Instagram was available. Just the level of support and collaboration in life is different for this group in a way that I think is super helpful.

How does the Baker School prepare students to be effective public problem solvers and meet the challenges at the moment?

Well, we start with their first class when they come to the Baker School, which is an introduction to citizenship. The idea is to get them prepared to think about their role as citizens as well as the role of government. What is it supposed to be doing? What is our role in it? And then they take an introduction to public policy, which is how do we get stuff done? What are we trying to accomplish? And an important part of how you get stuff done and how you become a public problem solver is that you listen to other perspectives.

I think the beauty of what we've built at UT at the Baker School is that we have very intentionally recruited students from all over the political spectrum. So you're in class from the beginning with people who by definition you're not going to agree with about everything. And then our faculty are in the business of helping people see, okay, you don't agree with this person about this, but you still have to solve the problem. How might you get to a solution that everyone can live with? That used to be called compromise. It's a dirty word these days, so we don't use it. But public problem-solving is just as good a phrase.

But it starts with recognizing the strengths of this generation. That tension of, "Hey, we both want to solve this problem, but we don't see eye to eye on it"—they enjoy living in that tension.

Tennessee recently passed a law to improve civic education at the K-12 level. What are the essential components of civics learning and how does civic knowledge strengthen our communities and our country?

I think the core of civic knowledge is understanding that the system was built for disagreement. If you understand that, then everything else is possible. If you don't understand that, then it's not possible. And the way you understand that is to study the founding. Understanding the diversity of views that were in the room, the way that the actual outcome, the U.S. Constitution, is itself a compromise and it reflects the disagreement of those founders. If those great humans can disagree and still find common ground, that is the calling for all of us.

Winning is not the calling. The compromise is the calling. ★

World-class research can be lengthy and complex. Here, we present key findings from several studies by Opportunity & Inclusive Growth Institute scholars. These examples represent a fraction of the Institute's growing body of research. For our full library, visit minneapolisfed.org/institute/publications/working-papers.

Opening the doors wider

The economic upside of admitting more students to selective public colleges

BY LISA CAMNER MCKAY AND ELLA TRACY

ILLUSTRATIONS BY TOMI UM



Over the past half-century, one education trend towers above the rest: Americans are going to college in greater numbers. In 1970, about 1 in 10 adults held a college degree. Today, 1 in 3 do. This surge in demand makes economic sense—college offers a sizable payoff in the labor market. Median earnings of workers with a bachelor's degree are about 70 percent higher than median earnings of workers with a high school diploma alone.

There is an additional incentive for students to attend more selective and higher-resourced schools. Research finds that students who attend selective four-year colleges earn 20 to 30 percent more per year than their peers who attend more inclusive four-year colleges.

Yet as demand for college has climbed, acceptance rates at the most selective schools have moved in the opposite direction. The limited classroom seats mean that many qualified students are shut out.

What if selective public colleges enrolled more students? And not just a few more, but 20 percent more? This question is at the heart of a new working paper by St. Louis Fed System affiliate Oksana Leukhina and co-authors Lutz Hendricks and Tatyana Koreshkova.

A model of college admissions and college choice

To predict college expansion's effect on the economy, the economists model individual decisions to attend college and how college education translates to employment income.

At first blush, estimating the effect on earnings of college expansion might seem like a simple calculation: College-educated workers earn X on average, noncollege-educated workers earn Y, so if we move folks from one category to the other, aggregate earnings increase by Z.

But that assumes everyone would benefit from a selective college in the same way.

"We need a model because people differ in terms of unobservable characteristics," said Leukhina. Not everyone who could succeed in college has the opportunity to attend, for instance, and not everyone who enrolls in college graduates. In addition, "some students just may do better in certain types of colleges," Leukhina said. Higher-ability students may thrive in selective colleges while lower-ability students may do better at other colleges.

> "A lot of the kids who are constrained by admissions and therefore benefit from expanded capacity at selective colleges tend to come from lower-income families."
> OKSANA LEUKHINA

In addition, the model includes features that resonate with the choices and constraints we face in real life. Students differ in their learning ability, test scores, and parents' income. They don't know with certainty which school is best for their learning ability, or how attending one school versus another will impact their future earnings. They also have idiosyncratic preferences for certain schools unrelated to their ability or finances—often schools close to home or those attended by parents or friends. "Those preferences are important in explaining why certain people go to certain schools," Leukhina said.

The real higher education landscape encompasses some 3,500 degree-granting institutions, so to simplify, Leukhina and her co-authors consider four categories of colleges that differ in student test scores, cost, and graduation requirements, summarized in the table. (Expenditures, tuition, and net costs are reported in 2000 dollars.)

The economists use data from the National Longitudinal Survey of Youth to capture real-world values of the variables they include in their model. This survey follows a representative sample of Americans who were born between 1980 and 1984. For each high school graduate, the economists observe their test scores, college attended, net cost of college, student loans, earnings while in college, parental income, parental money transfers, degrees earned, and a time series of earnings after graduation. These detailed data help the economists understand how students are sorting across colleges now, which they use to predict how a change to admissions policies would ripple through college enrollment and then the economy.

The big payoff to more seats at selective colleges

So what happens when top-tier colleges admit 20 percent more students (equivalent to 2 percent of graduating high school students each year)? Unsurprisingly, more students go to top-tier colleges. But because of the complementarity between student and school, it matters *which* students go.

According to the data, around 70 percent of students in the top quartile of student test scores already enroll in four-year colleges. The main effect of the expansion, the economists predict, would be for students in the second-highest quartile of student test scores. About a third

STUDY AUTHORS

LUTZ HENDRICKS, University of North Carolina; TATYANA KORESHKOVA, Concordia University; OKSANA LEUKHINA, Federal Reserve Bank of St. Louis

of students in this group do not enroll in college at all, the data show. When admissions expand, the model predicts that a significant share of this group will enroll at Tier 1 colleges. Because these students are similar in ability to previous Tier 1 college students, they perform similarly at college, graduating at rates near 80 percent. The lifetime earnings for a top-tier college graduate are close to 50 percent higher than the lifetime earnings of a noncollege graduate, the economists find. As a result, the expansion of seats at top-tier colleges will increase total earnings in the economy by 0.8 percent. (While some students might "shift up" from a Tier 3 or Tier 2 to a Tier 1 college, this is not a meaningful element to the macro-level outcome.)

"The wage gain is equivalent to increasing consumption every day for the rest of your life by 0.8 percent," Leukhina explained.

The earnings gains are also considerably higher than the cost of adding the college seats. For their hypothetical scenario, Leukhina and co-authors assume that spending per student stays the same so that the college experience doesn't degrade. The cost of the 20 percent expansion is about one-eighth of the estimated aggregate earnings gain and could therefore be financed with taxes.

TAKEAWAYS ↗↗

- Limited capacity prevents qualified students from attending selective colleges
- Expanding enrollment is predicted to increase average earnings eight times more than cost of expansion
- New seats disproportionately go to lower-income students, increasing intergenerational mobility

How expansion affects readiness, wages, and the workforce

Giving more students the opportunity to attend top-tier college sounds like a good thing. But critics of collegiate expansions point out several concerns. One, they question whether the students who enroll at selective colleges under the expansion will be appropriately prepared for their college experience. Leukhina and her co-authors expect the average learning ability of students admitted to the most selective schools would decline if enrollment were expanded, but only slightly. The new admittees are still high-ability students who were previously excluded due to capacity constraints. As a result, their graduation rates remain high, and any negative effects on the learning of the highest-ability students would be small.

The second concern: Expanding the supply of college graduates could shrink the wage premium that college graduates earn. The principles of supply and demand mean an increase in the supply of college graduates will reduce their wages. The economists calculate that the college wage premium would fall about 4 percent as a result of the expansion. Recent estimates put that college wage premium at 74 percent—so it remains large even after a 4 percent decline. On the flip side, the decrease in the noncollege-educated workforce should lead to a small *increase* in their wages.

Furthermore, "a lot of the kids who are constrained by admissions and therefore benefit from expanded capacity at selective colleges tend to come from lower-income families," Leukhina said. Giving more students from less-well-off backgrounds access to top-tier colleges means their future earnings are less tied to their parents' earnings, increasing intergenerational mobility. ★

FOUR TIERS OF COLLEGES

The differences among the four tiers matter for how a change to admissions policies might affect students and the economy.

	Tier 4	Tier 3	Tier 2	Tier 1
Average percentile score on Armed Forces Qualification Test	50	61	73	83
Graduation rate within 6 years	N/A	53%	74%	85%
Expenditure per student	$4,304	$8,153	$10,166	$16,659
Average tuition	$2,060	$6,001	$7,349	$12,991
Average net college cost	$795	$1,153	$2,692	$5,590
Example schools	Bunker Hill Community College Normandale Community College	San Diego State University Missouri Valley College	Washington State University University of Central Florida	University of North Carolina University of California, Santa Barbara

Note: Graduation rates refer only to four-year degrees, and by construction, Tier 4 schools do not offer four-year degrees. Tiers 1–3 include all four-year colleges, with each tier accounting for about one-third of total freshmen enrollment. Expenditure per student is calculated from 2000 data, when the NLSY 1997 cohort was entering college. Armed Forces Qualification Test is administered as part of the NLSY survey. Source: Hendricks, Koreshkova, and Leukhina, "Expanding Access to Selective Colleges," June 2026, using data from the National Longitudinal Survey of Youth 1997 cohort (U.S. Bureau of Labor Statistics) and Integrated Postsecondary Education Data System (Institute of Education Sciences).



What explains the broken rungs on the U.S. job ladder?

Wage growth for American workers has stalled as moving between jobs has gotten harder

BY LISA CAMNER MCKAY

It's hard to find a consensus of opinions, but this might come close: Workers want their wages to go up over time, ideally over and above inflation. These raises are what allow them to not just keep pace with the cost of groceries and rent but afford more—nicer neighborhoods, better computers, more berries. At an economy-wide level, this real wage growth (wage growth after adjusting for inflation) means that as society becomes richer and more productive, living standards improve in the population as a whole. It's what allows children to grow up to be better off than their parents.

Between the late 1940s and late 1970s, Americans enjoyed strong economic performance. Real GDP per capita, a measure of total economic output per person, doubled between 1947 and 1977. So did worker productivity, measured as output per hour. Real wages rose in tandem with these other indicators of economic growth, more than doubling over the same span.

Starting around 1980, the picture changed. The economy continued to grow, but real wages no longer kept pace. Between 1980 and 2020, real GDP per capita and worker productivity both doubled (a 100 percent increase). But real wages grew only 25 percent, former Institute visiting scholar Niklas Engbom and his co-authors explain in a recent Institute working paper. And once demographic changes are taken into account—the workforce

has grown older and more educated—real wage growth is close to zero.

The trajectory of productivity growth tells us that the economy is producing more. The flat real wage growth tells us that many workers are not benefiting from that progress. Why? Economists have studied a number of possibilities. The introduction of new technologies, trade exposure, the decline of unions, and the falling real value of the federal minimum wage have all negatively affected wages for American workers over the last four decades.

Engbom and his co-authors examine a complementary explanation: Something about the way workers previously made wage gains over their career has changed.

How the job ladder helps workers reach higher wages

Economists like to use the metaphor of a job ladder to describe how workers progress in pay over their career. A worker gets an entry-level job, acquires skills, then takes a new, better-paying position at a different company.

Nursing is a booming occupation where some can still climb the job ladder that many American workers were once able to count on. This upward trajectory has characterized the nursing career of Lauren Kemp. (Kemp is related to the author.) After earning her Bachelor of Science and becoming a registered nurse, Kemp's first job was at a nursing home in northeast Ohio, where she assisted residents with activities of daily living and medication. The pay was quite low, Kemp said, lower than many hospital RN positions. After nine months, she found a nursing job in a hospital in Texas where the pay was higher (and cost of living lower). A couple of years later, she started as a traveling bedside nurse—a challenging job but traditionally one that offers the highest wages for nurses. Her path illustrates how job-to-job transitions can lead to higher earnings during a career.

Though the job ladder metaphor has always been idealized, research has found again and again that workers who make more moves from one employer to another experience greater wage gains over their lifetime.

Evidence of a weakening job ladder

How can we know how prevalent Kemp's experience of upward mobility is among workers generally? In the data, Engbom and his co-authors look for evidence of upward job mobility by comparing the wage distribution of employed workers with the distribution of offered wages to nonemployed workers. Economists expect these distributions to look different for at least three reasons. One, employed workers tend to have more bargaining power to negotiate higher wages when they receive an offer. Two, employed workers tend to be more selective about which jobs to apply to and accept. And three, nonemployed individuals may experience skill loss when not employed.

So, when the distribution of offered wages is lower than the wage distribution of employed workers, that suggests employed workers are receiving higher-paying offers and are climbing that proverbial job ladder. This is "upward job mobility." In contrast, when the two distributions are very similar, it suggests that employed workers aren't making much wage gains once employed.

Using data from the Current Population Survey, Engbom and his co-authors find that there was a meaningful gap between the employed wage distribution and the wage offer distribution in the 1980s. However, the gap has narrowed in each of the subsequent three decades. By the 2010s, the two distributions were very similar. In other words, a person who takes a job from nonemployment can expect less wage gain over their years of employment.

This lower wage growth is true across the board: for men and women, for college-educated and noncollege-educated workers, for White workers and non-White workers. The group that has seen the most pronounced decline in upward job mobility is younger workers. "The new entrants into the U.S. labor market, they've seen a complete collapse of the job ladder over time," Engbom said. The economists estimate that employed workers today are about half as likely to receive a better-paying outside offer as they were in the 1980s.

To get a deeper understanding of what's happening to the job ladder, Engbom and his co-authors use the National Longitudinal Survey of Youth (NLSY), which tracks labor market activities and other significant life events for thousands of Americans over several

TAKEAWAYS ↗↗

- Despite growing worker productivity, average real wage growth has been close to zero
- Employed workers today are half as likely to receive better-paying outside offers as workers in 1980s
- Employer concentration and non-compete agreements have made it harder for workers to find better-paying jobs

The trajectory of productivity growth tells us the economy is producing more. The flat real wage growth tells us many workers are not benefiting from that progress.

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"The new entrants into the U.S. labor market [have] seen a complete collapse of the job ladder over time." NIKLAS ENGBOM

decades. In theory, wage gains after joining the workforce from nonemployment could come from sizeable raises at the same employer or from job-to-job transitions (a term economists use to refer to changing companies).

The NLSY data show that in practice, "job movers" are the ones who experience wage gains while "job stayers" gain very little. And in each decade since the 1980s, the share of job movers has declined while the share of job stayers has gone up. The result: less upward job mobility for workers.

What is causing job mobility to decline?

The data show workers are making fewer moves up the ladder to higher-paying jobs. The next step is to diagnose what has caused this decline in upward job mobility. And the list of possible reasons runs long. These reasons may relate to economy-wide changes, changes to worker preferences, or changes to firm behavior.

Less demand for labor?

One possibility concerns demand for labor in the economy. If demand for labor falls, the rate at which people find jobs will fall too—for all workers. This isn't what the data show, however. "What we see instead is not much of a decline in the job-finding rate of the unemployed, but a sharp decline in the job-finding rate of the employed," Engbom said, "which leads us to think about the types of factors that have particularly affected the job-finding prospects of employees."

Changing worker preferences?

Other potential explanations stem from the preferences of workers. For instance, maybe workers are moving to jobs that pay less but have better perks and benefits. Or maybe people aren't changing employers because it is hard for them to *move*, period, due to rising interest rates or dual-career households. Engbom and his co-authors investigate each of these potential explanations, but they don't find evidence in the data for either one.

Changing firm behavior?

Employer behavior could also be making it more difficult for workers to move to higher-paying jobs. Two recent trends deserve scrutiny. First, employment opportunities in local labor markets are often concentrated among a small number of employers. This makes it harder to shop around for jobs because there just aren't that many employers. Second, firms have increasingly required employees to sign non-compete agreements, a tool explicitly designed to limit job mobility for workers. When the economists dig into these trends, they find they matter a lot.

Nowhere to go: The prevalence of employer concentration

Economists typically measure employer concentration by looking at the number of firms in a local labor market and the share of local employment those firms have. Using the variation in employer concentration across states and across time, Engbom and co-authors find that states with larger *increases* in concentration also experienced larger *declines* in upward job mobility. Specifically, workers in states where employer concentration increased more received fewer better-paying job offers from new employers.

"If you think about a town back in the days with maybe 10 employers that you could shop for jobs at, you could move across this set of employers," Engbom said. "If that has shrunk to four today, that just mechanically restricts your ability to find a job. If you're unemployed, it might not make that much of a difference. You can still find a job. It's just that once you're at one of these employers, there's not that much room for shopping for alternative employment."

Stay where you are: The prevalence of non-compete agreements

In the early 2010s, new employees of a national sandwich chain were required to sign a document agreeing not to take jobs with the chain's competitors or work within two miles of one of the company's stores for two years after leaving employment. These non-compete agreements weren't just going out to top corporate officers—the hourly workers making the sandwiches had to sign them, too.

"It was hard to see a business need to sign these," Engbom said. "It was, I think, an intent by the employer to restrict competition for labor."

And that's just what happened. There is no reliable data on how the prevalence of non-compete agreements (NCAs) has changed over time, so the economists use NCA prevalence in the last decade as an estimate for their change over time. This prevalence varies across states, allowing the economists to determine that states with higher NCA prevalence experienced larger declines in upward job mobility.

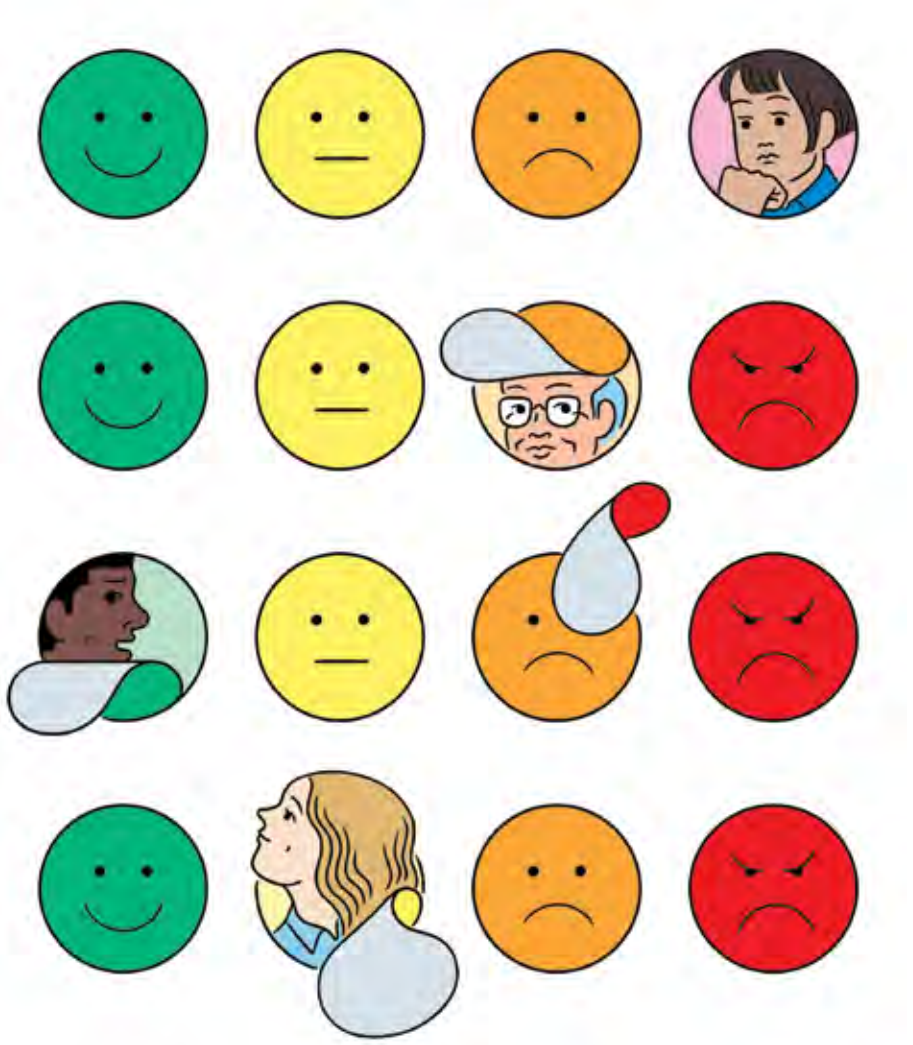
Economic research focused specifically on the wage effects of NCAs has found meaningful implications. In a 2021 paper, economists Evan Starr and Michael Lipsitz study the effect of a 2008

law in Oregon banning NCAs for hourly and low-wage workers. They find that the monthly rate of job-to-job transitions among hourly workers increased 12 to 18 percent after the ban, and they estimate the wage increase for workers previously bound by an NCA was 14 to 21 percent. And earlier this year, a Federal Reserve Bank of Chicago working paper found that workers with less than a four-year college degree who signed an NCA experienced slower wage growth over the next four years than counterparts without an NCA.

How the broken job ladder slows wage growth

Ultimately, the story Engbom and his co-authors are telling leads back to the puzzle they started with: Why did real wage growth stagnate to such a degree after 1980? Both employer concentration and NCAs make it harder for employed workers to seek new, higher-paying jobs. Recognizing that workers are less likely to leave, employers are offering lower wages. A recent report from The Burning Glass Institute and New York University's School of Professional Studies describes "a quiet mobility crisis" in the American workforce. "Large numbers of professionals remain steadily employed but experience prolonged stagnation in wages, responsibility, and advancement," the report states.

Real wages have come under pressure from many sides over the last four decades. "We want to emphasize that ours is not a competing explanation but rather a complementary explanation that there's something about the structure of the U.S. labor market that has changed over and above those changes in technology or trade," Engbom said. Research identifying the causes may help point to policy solutions to unstick wages and return the economy to a situation in which economic growth, productivity, and wages all move together. ★



To identify true sources of employment and income risk, ask workers

Novel use of survey data reveals variation in outcomes is driven by job match and inherent differences in skills **BY JEFF HORWICH**

How much risk do people face in the labor market? What causes this variation in earnings and employment? Few questions are more fundamental to economic policy, including the Fed's mandate to pursue maximum employment.

Yet efforts to answer these questions through economic models of earnings and employment face a problem: Most labor market data come with important limitations. "When you look at the outcomes for people, you only ever observe [their earnings] if they are working, and only in

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a certain job," said Institute consultant and University of Minnesota economist Mariacristina De Nardi. "You only see the options they were offered and that they decided to take."

This observed outcome could be only a partial representation of a worker's actual skills and potential, which would be more valuable data to economists. "Just looking at the realizations of income, it is very hard to disentangle all of the possible forces and mechanisms" behind those outcomes, said Yale economist Orazio Attanasio, a 2024 Institute visiting scholar. "You have to make a very strong set of statistical assumptions to be able to extract from those data the objects you are interested in," such as unemployment risk and the extent to which earnings growth is sustained over time.

In a recent Institute working paper, Attanasio, De Nardi, and co-authors illustrate one solution: Try a different type of data. Sufficiently detailed household surveys can elicit not just current labor market status but each respondent's expectations and preferences about job offers and earnings. This allows the researchers to observe beliefs about opportunities that do not depend on whether those opportunities are ultimately accepted.

In "Subjective Earnings and Employment Dynamics," the economists leverage the New York Fed's panel-style Survey of Consumer Expectations (SCE) to reveal a new and arguably more accurate portrait of the risk and heterogeneity that shape outcomes for American workers. Compared with prior findings based on observational data, their survey-based findings point to a much smaller role for "productivity shocks" in shaping workers' outcomes. Productivity shocks are bolts-from-the-blue that can knock a worker off course or provide an unexpected boost. Examples might be new technologies, health events, or the birth of a child, said De Nardi, "everything that makes you less or more productive at work with the same employer, and is not a permanent change." Given the challenge of identifying other factors from observational data, prior research lumped much labor market risk under this broad heading. Even in studies that allow for changing employers, the results indicate that such generic productivity shocks play a big role.

In the SCE data, however, survey respondents express a relatively low expectation that their status quo will be upended by such events. "These productivity shocks, this catch-all, are much less persistent than in a big chunk of the literature," Attanasio said. De-emphasizing the role of these exogenous events, he said, "makes a big difference for the way you represent reality" in economic models.

Worker, know thyself

Instead of productivity shocks, the SCE data identify more significant roles for two other factors in generating variation in worker outcomes.

The first is simply the extent to which people differ in skill and ability. In the SCE, people report their own earning potential (see sidebar). This might differ a lot from their pay at the job they happen to hold at any moment. Through this lens, said Attanasio, "diversity across people is substantially larger than what's been estimated before."

Should we trust people's own perceptions of their earnings and job offer prospects? Yes, said De Nardi—in fact, the lack of this "latent" expression of labor market outcomes is precisely the problem with observational data. "What people think is how they act," said De Nardi. "Your consumption choices, your savings choices, your job search choices are based on beliefs." In simulations, the economists find that these beliefs lead to

Estimating labor market models using the Survey of Consumer Expectations

The labor market module of the New York Fed's SCE captures workers' own assessments of risks and opportunities, including the probabilities of various outcomes and how they would respond to hypothetical decisions they might face. Each respondent typically answers the labor market questions two or three times during their year-long participation in the panel. Some examples of SCE questions researchers can use to assess risk are:

Expectation of productivity shocks: "If you were to remain at your current job, what do you expect your annual earnings to be at your current job in 10 years?"

Perceived unemployment risk: "What do you think is the percent chance that four months from now you will be unemployed?"

Latent earnings potential: "Think about the job offers that you may receive within the coming four months. Roughly speaking, what do you think the annual salary for the best offer will be for the first year?"

choices that align with subsequent labor market outcomes.

The second factor, which is a major source of risk for workers, will resonate with anyone who has struggled with a poor fit during their career: the quality of the job match. "I might be very good at working with a certain firm," said Attanasio, "but not that good at working with another one or producing something a little bit different." The economists find that other than entering unemployment, job changes are the biggest driver of individual earnings variability. Carefully worded survey questions in the SCE illuminate workers' expectations for the impact of changing employers. This can mean a boost in productivity and earnings if the job match is a great one. But a switch can also take workers sideways or backward.

Why would job changes arise as a more important component of individual risk in this study compared with previous research? Unlike realized labor market data, said Attanasio, surveys elicit responses to hypothetical scenarios. For example, all respondents, employed or not, are asked whether they would accept a hypothetical offer and change their labor market status or current employer. "When working with realized data, one only observes outcomes of job changers, with no information on offers that have been rejected," he said. "This poses difficult selection issues in the econometric study of these models."

Different risks suggest different directions for policy

If better data shift our understanding of labor market risks and worker diversity, this has implications for policies intended to support employment and life cycle stability. Whereas prior research reinforced the value of buffering workers against surprise productivity shocks, these new findings highlight instead the heterogeneity across individuals and the importance of a well-matched job.

How might public policy address the heavy role the economists find for individual differences? The wide variation in earnings and income volatility "does not mean we can do nothing about it," De Nardi said. On the contrary, "it depends on education, it depends on how we develop social-emotional skills. It depends on the family background one grows up with." The findings complement the enormous body of research showing the long-term value of childhood interventions that build skills and economic resilience.

The substantial risk that the economists identify from better or worse job matches suggests a policy focus on "the fluidity of the labor market," said De Nardi. "The more labor market frictions you have, the harder it is for people to find the right match." For example, if workers are tied down by the fear of losing benefits, intimidated by high job-search costs, or otherwise wary of the downside of seeking a better role, that can raise the level of risk in the labor market overall.

"If you can improve that dimension—making people potentially more mobile, making it easier to find better matches for their skills—that could be useful," said Attanasio.

Running some modern "heterogeneous agent" economic models can require heavy computing resources. In contrast, the economists highlight the relatively simple, linear nature of their model, where the rich survey data obviates the need for complex mathematical methods. "Questions that consider counterfactual, hypothetical scenarios simplify things considerably," said Attanasio. As the research evolves, the economists contemplate future steps to make their subjective data even more useful, including gathering respondents' expectations at multiple time horizons and pairing survey responses with detailed, lifelong work history.

TAKEAWAYS ↗↗

- Surveys elicit workers' expectations and earnings potential, an advantage when measuring employment risk
- Modeling with survey data shows productivity shocks matter less than economists thought
- Worker outcomes depend more on inherent skills and how well workers fit with their jobs

> "What people think is how they act. Your consumption choices, your savings choices, your job search choices are based on beliefs."
>
> MARIACRISTINA DE NARDI

Their research into employment risk will also evolve alongside a potentially generational shock to the labor market. Whatever the ultimate scale of change, artificial intelligence promises to disrupt productivity, tasks, job search, compensation, unemployment, and just about any aspect of the labor market one might think to model. "There is no question that AI is a structural change," said De Nardi.

No matter how AI ultimately figures into economists' labor market models, the findings of Attanasio, De Nardi, and their co-authors illustrate how the direct perspectives of workers can be essential data to measure the risks those workers face. ★

Expanding the reach of research

At the Opportunity & Inclusive Growth Institute, connecting economic research to those who use it has always been core to our mission. Institute economists often take that commitment on the road. Over the past year, they have shared their work not only with academic peers, but with business leaders, physicians, legal scholars, students, and others who rely on evidence to guide choices that shape people's lives.

Director Abigail Wozniak delivered the keynote address at the Metropolitan Economic Development Association, a community development financial institution (CDFI) in the Twin Cities that supports entrepreneurs. Wozniak discussed last issue's *For All* feature article on nonwage income and its role in the economic well-being of households.

Wozniak also gave the Dannelly Distinguished Visitor Lecture at the University of Notre Dame. In remarks to an audience of students, professors, and community members, she focused on the relationship between economics and policymaking—how research is used, what constrains its usefulness, and what this means for the trajectory of the field.

Institute economist Andrew Goodman-Bacon spoke to the American Academy of Pediatrics about the long-run effects of childhood Medicaid eligibility on adults' health and economic outcomes, the topic of this issue's feature article (see page 6). His talk gave clinicians a deeper view of how investments in children's health reverberate beyond childhood, affecting earnings and well-being decades later.

Economist Alex Albright has likewise been expanding the reach of her research in interdisciplinary settings. This spring, she presented to the Work and Organizations Department at the University of Minnesota's Carlson School of Management, sharing findings from her work on the effects of algorithmic recommendation systems, research featured in the spring 2025 issue of *For All*.



Director Abigail Wozniak delivered the Dannelly Distinguished Visitor Lecture at the University of Notre Dame in 2026.

Albright has also engaged with legal audiences. She spoke at UC Berkeley School of Law about evidence on bail reform, highlighting the decisions courts face when balancing public safety, fairness, and cost. And in June, she presented on algorithmic recommendations at a law and economics workshop jointly hosted by the Max Planck Institute for Research on Collective Goods and the University of Bonn.

These efforts, across topics and audiences, reflect the Institute's role as a bridge making it easier to reach rigorous economic research. ★

—Lisa Camner McKay

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The Federal Reserve Bank of Minneapolis is home to the Opportunity & Inclusive Growth Institute and *For All* magazine. The Minneapolis Fed has a long history of research designed to inform policymakers. Some of the hallmark policy initiatives driven by pioneering research are studies around banks that are too big to fail and the powerful return on public investment in early childhood education. One of 12 Federal Reserve Banks, the Minneapolis Fed monitors the Federal Reserve's Ninth District economy to help determine the nation's monetary policy and strives to promote economic well-being.

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FINAL THOUGHT

"Distributional analysis matters for the budget, it matters for the economy, and therefore I would say it matters for the Fed and for monetary policy. . . .

Deficits, debt, interest payments, and economic growth all depend on distributional analysis."

Congressional Budget Office Director **Phillip Swagel**, speaking at the 2026 Institute Research Conference in Minneapolis about why the Congressional Budget Office analyzes how policies would affect households across the income distribution.



CAROLINE YANG

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