

The Reporter

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In This Issue

[Experiences, Expectations,
and Asset Prices](#)

[From Access to Pathways: Community
Colleges and Educational Opportunity](#)

[Towards Better Quantification of
Macro and International Models](#)

[Intergenerational Mobility
in United States History](#)

[NBER News](#)

[Conferences and Meetings](#)

[Books](#)

Social Security Reform in an Era of Fiscal Deficits

18th Annual Feldstein Lecture, July 29, 2026

Mark Duggan, Stanford University and NBER



I am deeply honored to be here with you today to deliver the 2026 Martin Feldstein lecture. I first met Marty more than 30 years ago in the Fall of 1995 as a graduate student in his Public Economics course. I learned so much from him during that course about Social Security and many other topics including individual and corporate income taxation, unemployment insurance, and public goods. I also was fortunate during the next three years of my graduate studies to serve as a Teaching Fellow in both his Principles of Economics and American Economic Policy courses and to have him as one of my advisors on my PhD research. He was a phenomenal teacher and advisor who cared deeply about all of his students. This dedication extended to the entire academic economics profession as evidenced by his inspiring leadership for many years of the NBER.

Marty was a prolific scholar who authored nearly 400 publications on a broad set of topics from his time as a graduate student at Oxford beginning in the early 1960s. In many of these publications, Social Security was the primary focus, including his distinguished lecture at the American Economic Association meetings in January 1996 titled “The Missing Piece in Policy Analysis: Social Security Reform.” In this lecture, Marty made a convincing case that Social Security’s steadily deteriorating financial condition would force major reforms in the future: “whether these reforms are good or bad ... will depend in part on whether we, as economists, provide the appropriate analytical framework for analyzing reform alternatives.” And Marty did his best to contribute to this cause by writing (with various coauthors) another 29 papers on Social Security during the next 10 years, including many that highlighted the economic case for reform.

This message resonated far outside of the ivory tower and with policymakers on both sides of the political aisle. Consistent with this, both President Bill Clinton and President George W. Bush highlighted the need to strengthen Social Security’s finances in their (1998 and 2005, respectively) State of the Union addresses.

As both presidents and Marty pointed out, delaying reform would make the ultimate and inevitable changes to Social Security much more painful than they otherwise might be. And federal finances at this time were much stronger than today; the ratio of federal debt held by the public to GDP declining from 47 percent in 1996 to 36 percent in 2005. But despite efforts by both administrations and by other policymakers in Washington, D.C. in the late 1990s and early 2000s, federal policy changes to improve Social Security’s finances remained elusive and no significant changes were made.

In the two decades since, Social Security has largely been absent from substantive policy discussions in Washington, D.C., despite the fact that the projected date of the program’s insolvency has come steadily closer. This is no doubt in part because any reform that improves the system’s finances would include some combination of tax increases and benefit reductions (as the last major program changes in 1983 did). But the most recent projections from the Social Security Administration indicate that Social Security’s revenues and trust fund assets will be insufficient to finance retirement and survivors benefits for 70 million beneficiaries of OASI (Old-Age

Professor Mark Duggan is the Director of the University of Toronto’s Munk School of Global Affairs and Public Policy, with a cross-appointment in the Department of Economics. He is an Research Associate affiliated with four NBER programs: the Economics of Aging, Education, and Health, and Public Economics.

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and Survivors Insurance) in just six years. Absent any policy change before then, their benefits would be automatically lowered by an estimated 22 percent. This date of insolvency could be extended by about two years until 2034 if the program's OASI and DI (Disability Insurance) trust funds were merged, when benefits would be lowered by about 20 percent for the projected 81 million OASDI recipients.

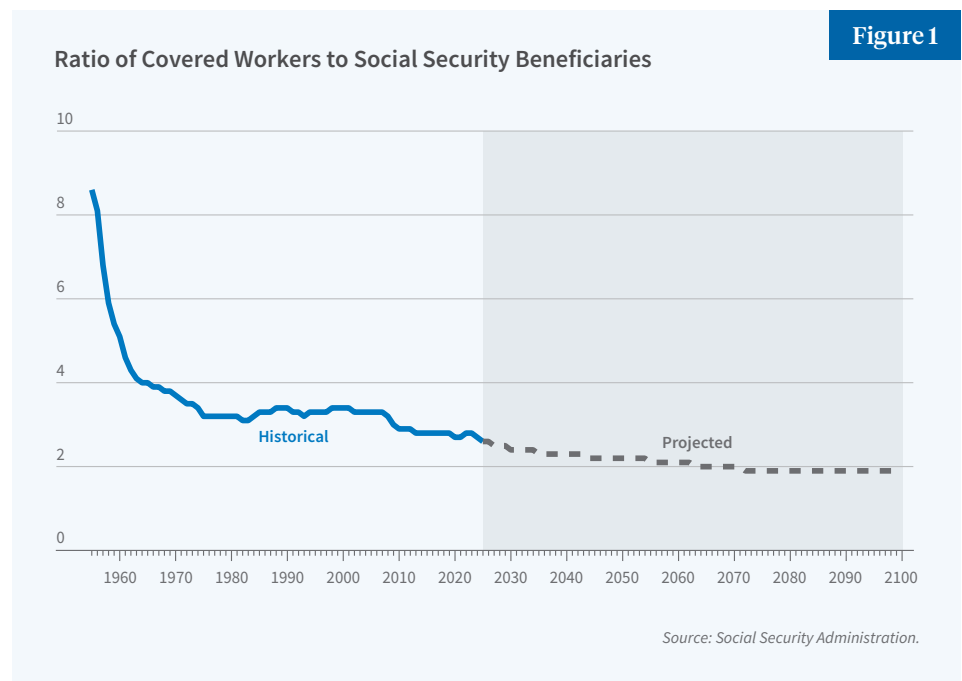
Given these projections and the financial hardship these changes would impose on many Social Security recipients, it is natural to expect policymakers to begin work in earnest soon on legislation that could address the program's structural deficit. But as Marty recognized in his AEA lecture more than 30 years ago, Social Security reform is much less appealing to policymakers now than it would have been then since the magnitude of the required tax increases and/or benefit reductions are substantially greater today and because a much larger fraction of the population is receiving Social Security or will be soon. Further amplifying this challenge, the overall federal budget is in much worse financial shape today than it was then, with debt held by the public at approximately 100 percent of GDP and the recent deficit at about 6 percent of GDP.

Before proceeding to a discussion of reform options, I will briefly summarize the legislative history of the OASDI program. In August of 1935, the Social Security Act was passed. The program paid benefits to retired workers aged 65 and up and was financed with a 2 percent payroll tax on the first \$3,000 in annual earnings. Ten years later, there were 1.1 million Social Security recipients and 46 million covered workers. In the subsequent years, a series of reforms expanded the set of individuals who were covered by the program, added disability insurance to the program, increased the tax rate and the taxable wage base, introduced the option of claiming early retirement benefits at age 62, and changed the calculation and indexing of benefits.

By 1980, the number of OASDI recipients had increased thirtyfold (to 35 million), and the ratio of covered workers to recipients had fallen from about 40:1 to just 3.2:1. Social Security was running modest annual deficits at that time and its trust fund was gradually drifting toward zero, though the financing gap was much smaller than it is today. Furthermore, the overall federal financial outlook was much healthier with the debt-to-GDP ratio at just 28 percent of GDP.

Policymakers responded to several consecutive years of annual deficits in Social Security by passing legislation in 1983 that increased the full retirement age, accelerated planned payroll tax increases, and introduced the taxation of benefits for high-income recipients. The most important of these changes for the program's long-term financial outlook was the gradual increase in the program's full retirement age from 65 to 67. One key rationale for this change was the several-year increase in life expectancy since the program was created, which reduced the number of workers per recipient. The political opposition to this benefit cut was somewhat limited because benefits for individuals born in 1937 or earlier (aged 46 or older in 1983) were unaffected by the policy change while those between the ages of 29 and 45 were only partially affected (with a retirement age increase of one year or less). The full two-year retirement age increase applied only to individuals aged 23 or younger at the time. Because of this gradual change, individuals who were affected had many years to prepare and adjust their savings and/or retirement plans accordingly.

Since the passage of the 1983 Social Security amendments, there have been no changes to the program that have significantly altered its revenues or expenditures. As a result, the declining ratio of covered workers to Social Security beneficiaries summarized in Figure 1 has resulted in growing financial pressure for the program. As the figure shows, this ratio actually rose somewhat after 1983 due to the labor market entry of the baby boom cohort but has been declining



for the past 25 years and is projected to fall still further in the coming years as a result of declining fertility, rising life expectancy, and reduced rates of immigration relative to previous years.

An additional source of pressure for Social Security's finances in recent decades is that average benefits have become increasingly generous over time. For example, and as shown in Figure 2, the average, inflation-adjusted Social Security benefit for retired workers increased by more than 150 percent from 1960 to 2025. This

increase has been financed both by an increase over time in the OASDI payroll tax rate and in the program's taxable wage base. More specifically, the tax rate stood at 6.0 percent in 1960 versus 12.4 percent today. Similarly, the ratio of OASDI taxable earnings to workers' average annual earnings in the economy was just 1.2 in 1960 versus about 2.4 today. Both of these policy levers have been essentially unchanged for decades, however, with the 12.4 percent tax rate unchanged since 1990 and the ratio of 2.4 in effect since the mid-1980s.

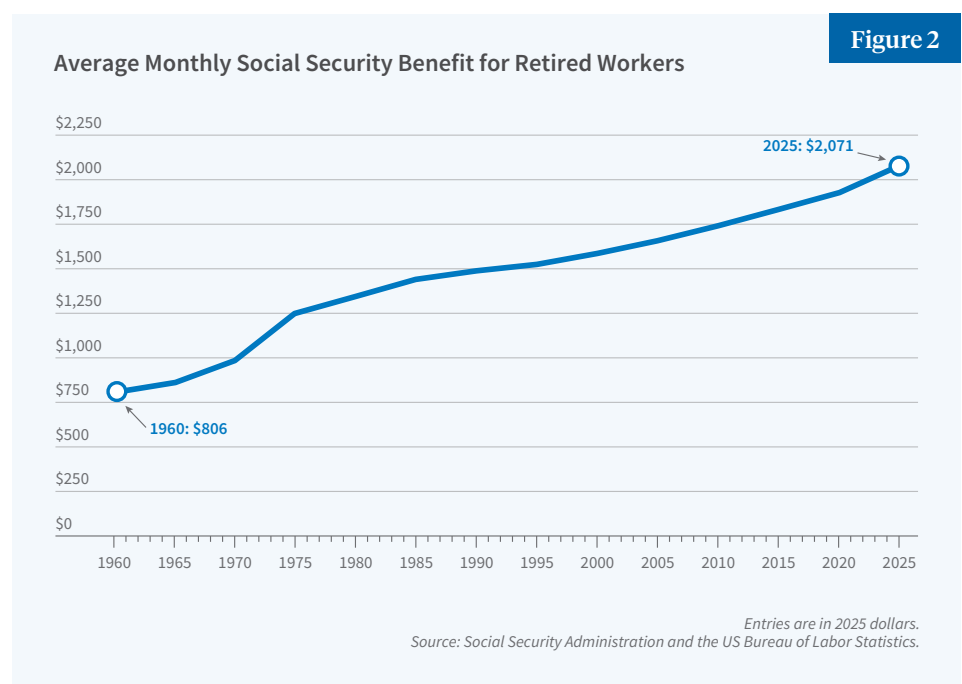
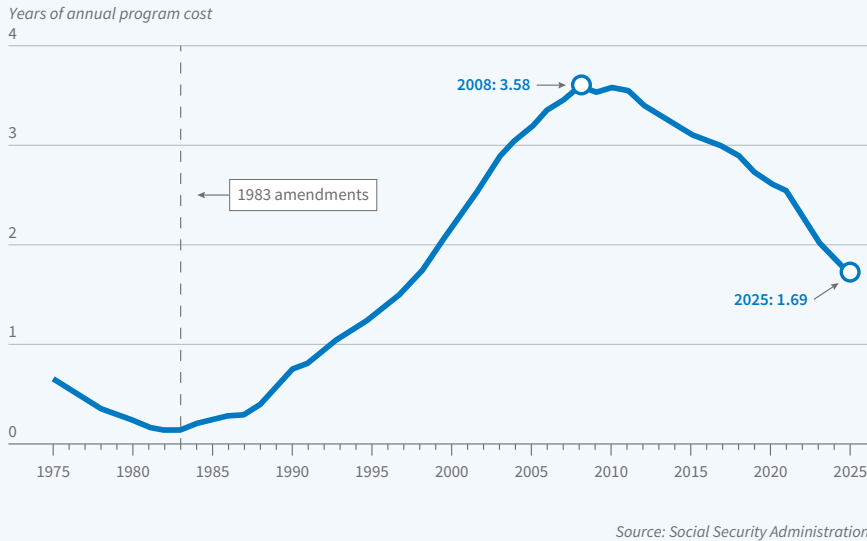


Figure 3

OASDI Trust Fund Reserves Relative to Annual Program Cost



The 1983 Social Security amendments substantially improved Social Security finances and, as shown in Figure 3, coincided with a significant increase in the ratio of OASDI trust fund assets to program expenditures. This ratio increased from a low of just 0.2 in 1983 to a high of 3.6 by 2008. This measure of financial health has declined steadily in the years since and is projected by SSA to reach 0 by 2032 (for OASI only) or 2034 (for OASI and DI combined). At the time of the 1983 amendments, Social Security was projected to remain solvent for another 75 years (through 2058). For multiple reasons, including rising earnings inequality and slower-than-expected growth in average earnings during the past 40 years, the program is on track to become insolvent 25 years earlier than was expected back in 1983.

The magnitude of the gap between program revenues and program expenditures will be substantially greater in the next several years than it was leading up to the 1983 amendments. Additionally, this gap is projected to increase substantially over the next few decades, as shown in Figure 4, which assumes that benefit payments are unaffected even after trust fund expiration. The Social Security deficit as a share of GDP is projected to double from 2025 (0.74 percent of GDP) to 2055 (1.48 percent of GDP) and to

triple by 2075 (2.22 percent of GDP). While there is, of course, considerable uncertainty about the magnitude of this gap multiple decades into the future, the combination of declining fertility, rising life expectancy, and declining immigration is the key driver of these projections.

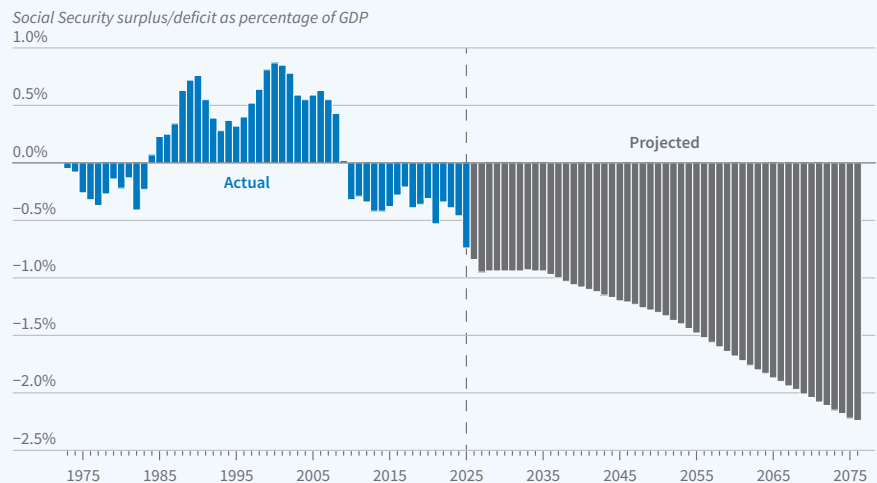
While Figure 4 assumes that benefit payments are unaffected by trust fund expiration, this is not accurate. More specifically, if policymakers do not act before the trust fund reaches zero, there will be an instantaneous benefit cut required by law of 22 percent for

those receiving retirement and survivors' benefits. The magnitude of this benefit cut grows steadily over time, reaching 37 percent by 2080, which underscores the severity of the financing challenge. But this challenge has been known for many years—indeed Marty warned about this in his AEA lecture more than 30 years ago.

To make this financing challenge even more difficult, the federal debt is now much larger relative to the size of the economy than it was in 1983. There were large federal budget deficits in the early 1980s too, but the debt-to-GDP ratio was less than 30 percent then versus approximately 100 percent today, as shown in Figure 5. This figure, which utilizes data from the Congressional Budget Office (CBO), includes historical data from 1940 to the present and projections through 2055. The current debt-to-GDP ratio is similar to the level near the end of World War II at 100 percent and is projected to increase to 175 percent of GDP over the next 30 years (Figure 5). And according to CBO, more than half of this projected increase is attributable to Social Security, since these projections also assume that benefits will be paid even if no policy changes are made and the trust fund reaches zero. It is also worth noting that these projections do not incorporate the effects of possible future recessions or other unexpected

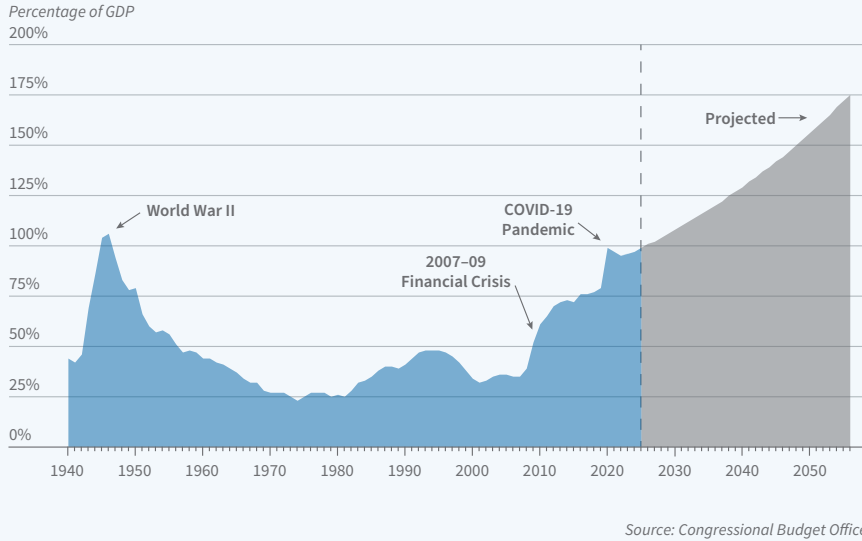
Figure 4

Annual Deficits for Social Security, 1973–2076



Federal Debt Held by the Public

Figure 5



events such as we recently experienced with the pandemic.

Before proceeding to a discussion of Social Security reform options, it is useful to summarize the key policy levers that influence revenues and expenditures for the program. Revenues for the program last year (2025) were \$1.45 trillion, with 91 percent of this coming from the 12.4 percent payroll tax imposed on each worker's taxable earnings, up to a maximum of \$184,500. This tax is paid half by the employer and half by the employee, with the entire 12.4 percent paid by self-employed workers. The taxation of Social Security benefits for high-income recipients provides an additional 4 percent of OASDI revenue, with interest on the accumulated trust fund accounting for the remaining 5 percent. Social Security expenditures were 11 percent higher than revenues at \$1.61 trillion in 2025, with retired workers and their dependents receiving 84 percent of program expenditures. The remaining 16 percent is divided approximately equally between benefits to disabled workers and their dependents (9 percent) and those paid to surviving children and spouses (7 percent).

A key determinant of the benefits that a retired worker or a disabled worker (or their dependents, including survivors) receives is the program's

90-32-15 benefit formula, which is used to calculate what is called the "primary insurance amount." The primary insurance amount (PIA) is the monthly benefit amount that a person receives if they claim retirement benefits at their full retirement age or that a disabled worker receives if awarded benefits. A worker's average indexed monthly earnings (AIME) over their highest 35 (indexed) earnings years are used to calculate the PIA. As shown in Figure 6, the formula replaces 90 percent of the first \$1,286 of a worker's AIME, 32 percent of the next

\$6,463 (if applicable), and 15 percent of any remaining AIME above \$7,749. The two "bend points" in this benefit formula are indexed to average wage growth each year. While the formula appears to be quite progressive, with low-income workers replacing a much higher share of their earnings than their high-income counterparts, previous research has shown that differences in life expectancy undo much of that progressivity.

The Social Security benefits that a person receives after claiming are then increased each year (to adjust for cost-of-living increases) with the Consumer Price Index that is calculated each month by the US Bureau of Labor Statistics. There is an actuarial adjustment for Social Security's retired worker benefits as well that rewards those who delay claiming with a higher monthly benefit. Seventy percent of the PIA is paid to those claiming benefits at age 62, and this steadily increases to reach 124 percent of the PIA at age 70. Workers with lower incomes and shorter life expectancy tend to claim their retirement benefits earlier than do those with higher incomes and longer life expectancy.

In June of 2026 there were 71 million Americans receiving Social Security benefits for an average benefit of approximately \$1,900. Retired workers are receiving an average

Primary Insurance Amount vs. Average Indexed Monthly Earnings, 2026

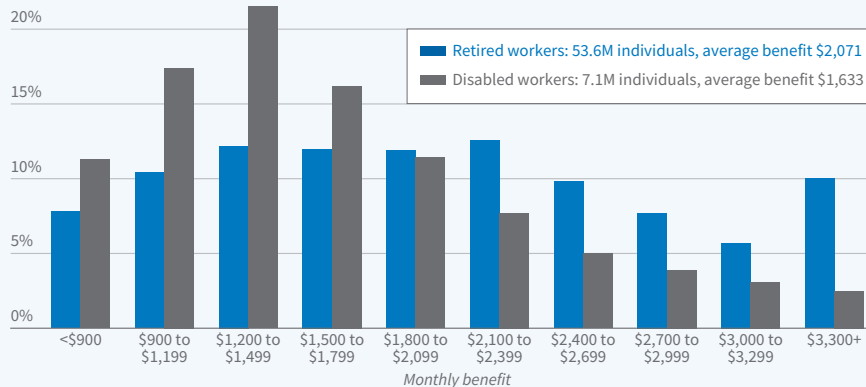
Figure 6



Source: Social Security Administration.

Figure 7

Monthly Social Security Benefits, December 2025

Distribution of workers by monthly benefit
25%

Source: Social Security Administration.

of \$2,100 per month versus \$1,600 per month for the average disabled worker. The lower benefits for disabled workers largely reflect the fact that they had lower average earnings during their work years than did retired workers. Widows and widowers are between those two extremes, receiving \$1,900 a month, while spouses and children of retired and disabled workers are paid about \$1,000 per month. More than one in five Americans receive Social Security benefits and the fraction of the population receiving OASDI benefits is steadily increasing given the changing demographics in the country.

One little-noticed feature of this benefit formula is that Social Security taxes are a “pure tax” for a worker in any year outside of the 35 best earnings years. For example, and as Marty often pointed out when explaining this benefit formula, it is plausible that many workers would have their highest earnings from age 25 to age 59. In this case, the program would impose the highest effective tax rate on workers in their early twenties or in their sixties and seventies. This coincides with the ages at which labor supply elasticities are highest, thus amplifying the distortionary effects of this revenue source.

As I mentioned previously, there has been a substantial increase over

time in the taxable wage cap for Social Security, which is now about 2.4 times average earnings versus just 1.2 times average earnings in 1960. This change has led to a larger increase in the Social Security benefits that retired or disabled high-income workers receive relative to low and middle-income workers. Furthermore, the actuarial adjustment of retirement benefits encourages those with longer life expectancy to delay claiming. The 1983 amendments increased the adjustment beyond the full retirement age from 3 percent to 8 percent per year, and high-income workers have differentially benefited. As a result, a high-income worker who claims retirement benefits at age 70 this year will receive more than \$5,000 per month from Social Security. The two policy changes—the increase in the taxable wage base and in the actuarial adjustment beyond the full retirement age—mean that average retirement benefits for high-income workers have increased much more rapidly than for other workers.

Figure 7 summarizes the distribution of monthly Social Security benefits in 2025 among the 54 million retired workers. As the figure shows, approximately 8 percent of them have a monthly benefit that is less than \$900 a month, whereas about 10 percent of them have a benefit over \$3,300 a month. In dollar terms, a 22

percent across-the-board benefit cut (which would result if the trust fund is allowed to reach zero in 2032 and no other policy changes occur) would be larger for the high-income group captured on the right on this figure than for the low-income group summarized on the left. Put another way, a Social Security recipient with a \$900 monthly benefit would experience a \$198 benefit cut that would almost surely put considerable pressure on their spending for housing, food, and medical care.

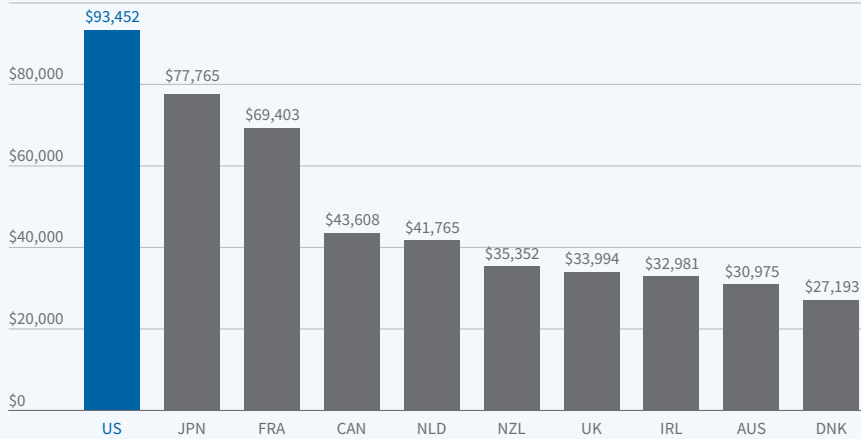
The fact that high-income workers in the US receive large benefits from Social Security was nicely summarized recently by the Committee for a Responsible Federal Budget. The data in Figure 8 lists the maximum public pension amount for a couple in 2024 in 10 industrialized countries. More specifically, if a person earned above the taxable maximum throughout their working years, and they claimed at the full retirement age, and their spouse claimed at the full retirement age, what would their combined Social Security benefit be? Here in the US, it's \$94,000 a year. If you take that 24 percent actuarial adjustment for delaying until age 70, it's about \$117,000 per year. Even though the US, relative to other industrialized countries, has a smaller ratio of people 65 and older to the overall population, the fact that our Social Security benefits are so much more generous makes the financing challenge for our Social Security program just as challenging as in France, Germany, and Italy.

Social Security is arguably the most important source of income for elderly Americans, certainly lower-income elderly Americans. More than half of elderly people get more than half of their income from Social Security. A quarter of elderly people get more than 90 percent. And the average shares vary considerably by age. For example, those aged 80 and up rely on Social Security to a much greater extent than those aged 65 to 69. Not surprisingly, these shares also vary with education, income quintile, race, and gender, with the variation by income quintile especially large.

Figure 8

Maximum Public Pension Benefit Amount for Couples, 2024

USD, adjusted for purchasing power
\$100,000



Source: Committee for a Responsible Federal Budget.

Social Security looms very large for America's elderly and especially for those with lower incomes throughout their working years. And this is even more true when considering disabled workers.

I would now like to shift gears to discuss reform proposals along with a few criterion for evaluating each proposal relative to the "do-nothing" alternative. The first criterion that I use is, what does any proposal do for the long-run solvency of the program? That seems like an important criterion for policymakers, academics, and others to consider when evaluating reforms.

An additional criterion is the distributional effect of any reform and the effect on benefit adequacy for workers with very low earnings. The effect of a reform on the incentive to work and to save must also be considered, along with any effects on the rest of the federal budget. For example, to the extent that an increase in the Social Security taxable wage base reduces earnings and employment, this could reduce income tax revenues as well.

A final criterion that I will mention is resilience to changes in the economy. There are some quite significant changes going on currently because of the diffusion of artificial intelligence and the declining share of GDP going to labor income. A reform that makes

the program more resilient to these and other potential changes in the future would be more desirable than one that does the opposite. The declining labor share displayed in Figure 9 is likely already putting a strain on Social Security finances, and this is likely to become increasingly the case over time. As the figure shows, the labor income share of GDP is down to just 53.7 percent, which is its lowest level since this series began about 80 years ago. Given that Social Security is so dependent on taxable earnings to finance its benefits, these changes

put the program's solvency at even greater risk.

In general, Social Security is a complicated program that many workers may not fully understand. It is incumbent on economists and others who research Social Security and on policymakers to explain the program and the effects of potential reforms so that the program is less confusing for the typical worker and their dependents. All else equal, a simpler, more transparent reform is preferable to one that's complicated and opaque.

There are many decisions facing policymakers in the very near future. The first is whether any changes should be made. In the absence of any policy change, tens of millions of Social Security recipients will see their benefits substantially lowered in just six years. This would surely impose significant hardship on a large fraction of these recipients, including especially those with low incomes, for whom Social Security is the primary and often the only source of income. On the other hand, the debt-to-GDP ratio would be much lower than projected and GDP would be higher as well (since individuals would likely increase their labor supply in response to the reduction in current or future benefits).

One alternative to this "no reform" scenario could involve no change to Social Security itself but instead

Figure 9

Labor's Share of Nonfarm Business Output

Quarterly share of output accruing to workers as compensation



Source: US Bureau of Labor Statistics.

legislation that would allow Social Security to use general revenues to finance its large and increasing deficits after the trust fund expires. One potential concern with this is that it would amplify pressure on other categories of federal spending. Social Security spending already represents nearly 5 percent and it is projected to increase to more than 6 percent on its current path. This represents a very large and growing share of projected federal spending, which would likely exert pressure on other categories of spending such as Medicare, Medicaid, and national defense. Proponents of this approach would argue that plausible increases in income tax rates would likely place less of an economic burden on lower-income individuals than would an increase in Social Security's payroll tax rate. Given the increase in earnings and life expectancy inequality since the last major changes to Social Security were made 43 years ago, one could argue that high-income individuals should bear relatively more of the burden from financing Social Security in the future.

Should the reform retain a pay-as-you-go structure rather than move to a system based partially or entirely on individual accounts? If so, it would likely involve some reduction in benefits from what has been promised. The 1983 amendments only gradually reduced benefits by increasing the full retirement age in two-month increments from 65 to 67 and delaying its implementation for almost 20 years. This change applied to both high- and low-income workers, though a future reform could instead limit benefit reductions to those with high incomes, insulating low- and middle-income recipients. Whether through an across-the-board change such as a retirement age increase or a targeted change such as a reduction in indexing for high-income recipients, gradual benefit reductions will not be sufficient in the current situation given the magnitude of the Social Security financing gap.

An alternative or complementary set of policies could increase revenues for the program through an expansion of the OASDI earnings tax

base beyond the current \$184,500 or through the inclusion of other sources of income, including interest, dividends, and capital gains. The Social Security tax rate of 12.4 percent has not increased in 36 years despite a substantial increase in life expectancy during that time. Increasing either the taxable wage base or the tax rate would retain the current structure.

There are outside-the-box options that have been proposed in recent years too. For example, Senators Bill Cassidy and Tim Kaine recently proposed a plan called the Big Idea Plan, under which Social Security would borrow \$300 billion a year for five years and invest those funds in equity markets. Any returns on those investments in excess of the cost of servicing the debt would be used to finance Social Security deficits.

As economists, policymakers, and others deliberate in the months and years ahead about the best path forward, it is worth considering what has changed since the last major reform in 1983. Debt held by the public is now about three times higher. There has also been a significant increase in earnings, income, and wealth inequality, and a lower share of earnings today is subject to OASDI taxes than back then. The share of all earnings subject to OASDI taxes was about 83 percent last year versus 90 percent in 1983. The labor income share has declined quite significantly, reaching a low recently of just 53.7 percent. This further reduces the available revenues for Social Security.

It is also instructive to reflect on how little political pushback there has been on the gradual increase in the full retirement age, which was equivalent basically to a 12.5 percent benefit cut for those born in 1960 or later relative to what they would have received in the absence of a policy change. As for increasing the taxable wage base, there is precedent, as federal legislation substantially increased the Medicare tax base (by 160 percent) in 1991 and removed the cap on earnings subject to Medicare taxation in 1994. While there has been little evidence of a decline in labor supply

resulting from this tax increase, a corresponding increase for Social Security would involve a tax increase more than four times as large (12.4 percent versus 2.9 percent).

It is also true that since 1983, there has been a much larger increase in OASDI benefits for high-income workers than for the average worker. The two reasons for this are that the taxable wage base has grown substantially and the reward for delaying claiming beyond the full retirement age has also increased. As a result, the maximum retired worker benefit has grown by more than twice as much (in percentage terms) as the average benefit since 1990. This, along with the much lower increase in life expectancy among low-income workers, further strengthens the case for any policy-induced reduction in benefits to be larger for high-income recipients.

In addition to the tax rate, the taxable wage base, and the full retirement age, there are other plausible levers to improve the financing of Social Security. For example, the program's 90-32-15 benefit formula has two bend points that are indexed to average wage growth. If policymakers chose to slow the growth in the 32-15 bend point and leave unchanged the 90-32 bend point, this would reduce benefits for high-income recipients while leaving benefits for low- and middle-income recipients unchanged. And the impact of this change would be gradual, allowing affected recipients to adjust their planned date of retirement, savings, and so forth to cushion any adverse effects.

Many subtle changes in Social Security benefits, in taxes, or in the taxation of benefits are also possible, such as increasing the number of years of earnings used in calculating benefits or altering the indexing or actuarial adjustment of benefits. Reforms like the ones discussed above could also be bundled with changes that provide a minimum benefit for retired and disabled workers. The incremental cost of such a change is of course dependent on the size of this minimum benefit, but the change could help

cushion low-income workers against the effects of a potentially more turbulent labor market in the future.

An adjustment as gradual as the one policymakers that policymakers made in 1983 would not be nearly enough to address the magnitude of Social Security's financial shortfall today. According to SSA actuaries, a nearly 5-percentage-point increase (from 12.4 to 17.3 percent) in the tax rate would be necessary to keep the program solvent through 2100. And that increase would not be sufficient to achieve sustainable solvency, since the trust fund would be projected to reach zero again around that time.

Perhaps the most widely discussed policy change has been eliminating the cap on earnings subject to Social Security taxes, as was done with Medicare in 1994. While this would eliminate a substantial fraction of the financing gap (assuming that it was a "pure tax" that did not increase Social Security benefits), it would push marginal tax rates well beyond 60 percent for many high-income individuals in

states with relatively high state tax rates, such as California and New York. This increase would potentially reduce labor supply and thus other revenue such as from individual income taxation.

All of the policy levers that I have discussed above would involve substantial sacrifices for a large segment of the population. The current structure of Social Security is not designed to weather the economic effects of significant changes such as declining fertility, rising life expectancy, declining immigration, rising earnings inequality, and a declining labor income share. All of these forces are conspiring to create a perfect storm for Social Security financing.

One possibility that may be more palatable to policymakers would involve a partial reform that financed a growing fraction of the financing gap with Social Security benefit reductions and/or tax increases and the remainder with funds from general revenues. General revenues could, for example, contribute a fixed percentage of the

program's revenues, as is done for Medicare Part B. These revenues could help to cover Social Security's deficit at the time of trust fund expiration. At the same time, gradual reductions in benefits and/or increases in taxes could be implemented to finance an increasing share of the current financing gap going forward. Such a gradual change to Social Security benefits and/or taxes would make it easier for current and future beneficiaries to plan for the future.

There is of course considerable uncertainty about how many of the factors that influence Social Security financing will evolve in the future, such as productivity, immigration, life expectancy, and much more. Adding to this is the uncertain impact of artificial intelligence and adjacent technologies on workers' earnings and the labor market. In light of this, it seems that any changes to Social Security that make the program more resilient to unanticipated changes will have substantial economic benefits now and in the future.

Experiences, Expectations, and Asset Prices

Stefan Nagel

Asset prices are inherently forward-looking. Stock prices reflect investors' expectations of dividends many years into the future. Prices of long-term bonds reflect investors' expectations of future short-term interest rates and inflation over the life of the bond. To understand why asset prices fluctuate, one must understand the forces that shape investor expectations. This is a fundamental question in asset pricing and macrofinance.

Models with full-information rational expectations (FIRE) sidestep the expectations-formation question by presuming that investors not only process information rationally but also know the correct structure and parameters of the data-generating process, which then pins down the expectations. Investors would need to know, for example, the long-run mean of dividend growth or the long-run mean of interest rates, even though such quantities are difficult to estimate precisely despite many decades of data. If the objective process is hard for econometricians to infer *ex post*, it is implausible that all investors know it in real time.

Economists must therefore ask how investors form beliefs, what information they use, and how they weight it. For asset pricing, the most important forces are those that systematically push the expectations of many investors in a common direction and thereby influence aggregate asset demand. The expectations of any individual investor, whether retail or professional, may be shaped by a wide range of idiosyncratic influences. Many of these influences offset one another when demand is aggregated across investors and therefore leave no trace in equilibrium prices. The key question is which common forces survive aggregation and leave a measurable imprint on asset prices.

The research that I describe in this summary shows that lifetime experiences are one such systematic force, exerting a broad and persistent influence on expectations and asset prices. When investors form beliefs about the future, they place substantial weight

on the macroeconomic conditions and asset returns they have experienced over their lifetimes. As new observations accumulate and generations turn over, beliefs gradually adjust and asset prices move with them. This process generates persistent, low-frequency variation in asset prices.

Experience-Based Expectations

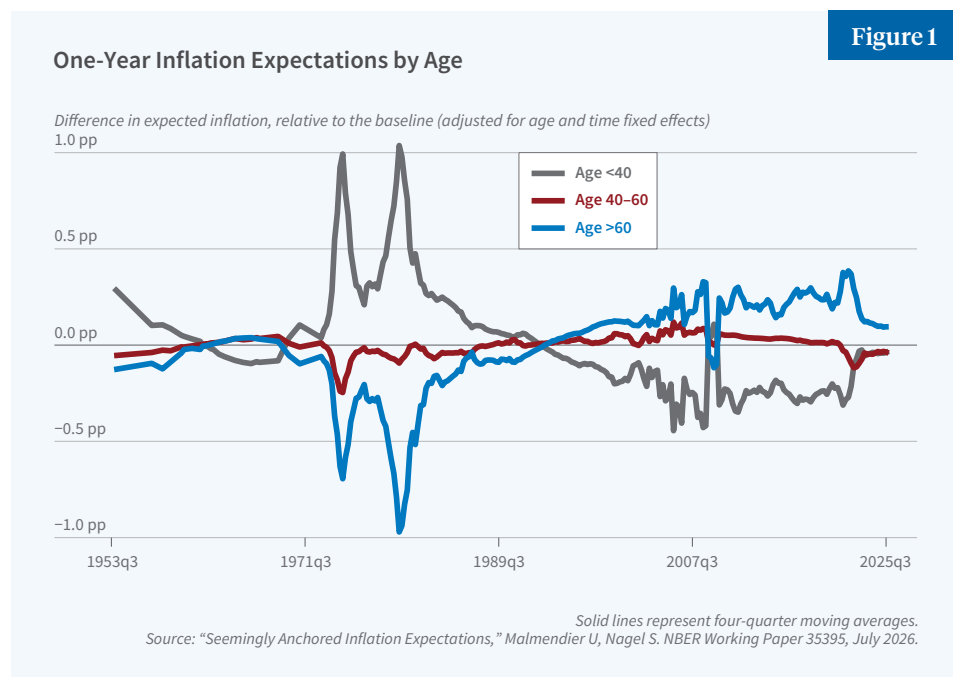
In a series of papers, Ulrike Malmendier and I show that lifetime experiences have a pervasive influence on financial decisions and expectations. To identify these effects cleanly and distinguish them from other determinants of beliefs, we exploit variation across age cohorts. Because individuals of different ages have lived through different histories, they have accumulated systematically different experiences. If people draw on those experiences when forming expectations, these differences should translate into predictable differences in beliefs across cohorts.

Using data from the Survey of Consumer Finances and its predecessor surveys extending back to the 1950s, we find that individuals who have experienced higher real stock-market returns over their lifetimes allocate a larger share of their financial wealth to

equities.¹ In a shorter sample containing individual investors' return expectations, we also find that those with more favorable return experiences are more optimistic about future stock-market returns. Our estimates indicate that the influence of an experienced return observation on beliefs and decisions wanes over time, consistent with fading memory of past experiences.

In subsequent work, we focus more directly on experience effects in subjective expectations by studying inflation forecasts from the Michigan Surveys of Consumers (MSC), which are available from the 1950s onward.² We find that cohort-level expectations are well described by a model in which individuals learn about the long-run mean and the short-run persistence of inflation from the inflation outcomes they have experienced over their lifetimes. Strikingly, the estimated pattern of memory decay closely resembles that found in our earlier work on stock returns and investment decisions. For a 50-year-old individual, for example, an inflation realization observed in the most recent quarter receives about twice as much weight as one experienced 15 years earlier.

Figure 1 illustrates the key patterns in one-year inflation expectations



using updated data through 2025 (the sample ended in 2009 in our original study). The dots show MSC expectations averaged within three age groups. During the 1970s, the gap between younger and older respondents widened steadily. By the early 1980s, individuals under 40 expected inflation to be more than 2 percentage points higher than did those over age 60, consistent with the fact that younger cohorts' lifetime experiences were dominated by the high inflation of the 1970s. The gap then took roughly a decade to disappear. In the two decades preceding the COVID-19 pandemic, the pattern reversed: Older individuals expected higher inflation than younger individuals did, consistent with older cohorts retaining memories of the inflationary 1970s. The lines show the predictions of an experience-based learning model in which individuals infer the properties of the inflation process from the inflation outcomes observed over their lifetimes, placing greater weight on recent experiences within their lifetimes than on more distant ones earlier in life. The model accounts for much of the evolving dispersion in expectations across age groups.

These experience effects are not confined to consumers. In joint work with Zhen Yan, we show that the same experience-based model of inflation expectations, with the same weighting of past inflation outcomes as estimated for consumers, also helps explain disagreement about the inflation outlook among individual monetary policymakers.³ In this analysis, we use the inflation forecasts reported by members of the Federal Open Market Committee in the Federal Reserve's semiannual Monetary Policy Report to the Congress. Although experience effects are smaller among policymakers than among consumers, they are economically relevant even for experts supported by professional staff and quantitative economic analyses.

Fading Memory in the Aggregate

Time-varying differences in beliefs across age groups provide a clean source of identification for experience effects, but for asset pricing the rele-

vant object is, roughly speaking, the belief of the average investor.⁴ The key feature of experience-based learning in this respect is fading memory. For the average investor, memory fades partly because individuals place greater weight on recent observations than on experiences from earlier in life, and partly because generational turnover brings younger investors into asset markets with experience sets concentrated on more recent data.

When each cohort learns from its own experience, the dynamics of the average belief are well approximated by a constant-gain learning rule. Under constant-gain learning, new observations always receive a constant positive weight, so older observations gradually fade from memory and learning is perpetual. Even with this focus on average beliefs, the cross-cohort evidence from expectations surveys is still valuable because it identifies the rate at which memory decays. Specifically, the experience-based learning model estimated on MSC survey data on inflation expectations implies a weight of 1.8 percent on a new quarterly observation in a constant-gain updating scheme that approximates the dynamics of average beliefs. Rather than choosing a fading-memory mechanism to fit asset prices directly, I discipline an asset pricing exercise using this memory-decay rate implied by the estimates from the cohort-level survey data. In other words, I ask whether the belief-formation mechanism that explains the expectations in survey data well can, with the same parameters, also help explain properties of asset prices.

Growth Experiences and Stock Market Valuation Cycles

A standard present-value identity says that a high price-dividend ratio for a stock market index must reflect some combination of high expected future dividend growth and low expected future returns. Under FIRE, the usual empirical interpretation is that variation in valuation ratios mostly reflects time-varying risk premia, because dividend growth is difficult to forecast while stock index excess returns relative to risk-free interest rates are

forecastable with the price-dividend ratio. However, this evidence is based on ex post predictive regressions and is unlikely to reflect the expectations investors held when making their portfolio decisions. Indeed, subjective excess-return expectations elicited from retail investors, professional forecasters, and corporate executives do not covary with the price-dividend ratio in the manner implied by these ex post regressions.⁵

Experience-based learning offers a different interpretation. In this framework, investors perceive long-run dividend growth as uncertain and learn about it from realized dividend growth observations, with the influence of past observations fading over time. Now suppose a sequence of strong realized dividend growth raises their estimate of long-run growth. Because they expect higher future dividends, they bid up stock prices relative to current dividends. The resulting high price-dividend ratio of the stock market index therefore reflects subjective optimism about cash flows rather than a willingness to accept lower expected returns. When optimism eventually turns into disappointment, elevated valuations are followed by low realized returns. Thus, the same episode can appear to investors as a boom justified by dividend expectations and as return predictability to an econometrician studying the data ex post.

Zhengyang Xu and I show that this mechanism helps reconcile several key facts about asset prices and survey expectations.⁶ We build an asset pricing model in which the representative investor learns about the long-run growth rate of dividends with a constant-gain learning rule. In constructing these experience-based growth beliefs, we fix the weight on a new quarterly dividend observation in this updating rule at the value of 1.8 percent implied by the microdata estimates on inflation expectations in the MSC. Given this relatively low weight on newly arriving data, beliefs adjust only slowly, which generates persistent valuation cycles, consistent with the high persistence of the price-dividend ratio and other valuation measures in empirical data. It also predicts that

elevated experience-based growth beliefs should forecast lower subsequent excess returns in ex post analyses; empirically, this relationship is strong in US data from 1927 to 2019. At the same time, the mechanism explains why valuation ratios need not be negatively related to subjective expected excess returns: Valuation cycles arise from fluctuations in subjective cash-flow expectations rather than from time-varying risk premia. Accordingly, valuations should instead be positively related to subjective dividend expectations, a prediction supported by evidence from equity analysts' earnings forecasts.

Figure 2 illustrates the relationship between experience-based growth beliefs and stock market index returns in excess of Treasury bill yields over the next five years. In this plot, the experience-based growth beliefs are translated into predicted five-year excess returns. These predicted excess returns are inversely related to experience-based growth beliefs: when investors have experienced high growth in stock payouts, including dividends and repurchases, such as in the late 1990s, predicted excess returns are low; when they have experienced low growth in payouts, such as during the depths of the Great Depression in the 1930s or coming out of the global financial crisis in 2009, predicted excess returns are high. The figure also shows

that actual realized five-year excess returns are strongly positively related to these predicted excess returns. This pattern is consistent with the view that high experienced payout growth generates optimistic beliefs and elevated valuations, which result in future disappointment, on average.

Inflation Experiences and the Secular Dynamics of Real Interest Rates

Real interest rates in advanced economies have moved in large, persistent waves. In the US, the five-year ex ante real Treasury yield rose from about 1 percent in the 1960s to around 8 percent in the early 1980s, then declined for decades and turned negative after the global financial crisis. Standard explanations emphasize movements in the natural rate of interest caused by productivity, preferences, demographics, and other fundamentals. Those forces likely matter, but common estimates of the natural rate leave much of the secular variation in real interest rates unexplained. Much of the remaining variation is explained by experience-based formation of inflation expectations and by monetary policymakers' leaning against deviations of these expectations from inflation targets.⁷

When the long-run inflation expectations of consumers and corporate

decision-makers are shaped primarily by accumulated historical experience, central bank communication about inflation targets may have only limited influence on those expectations. Consequently, if a period of high realized inflation has pushed long-run expectations above the central bank's explicit or implicit target, policymakers sustain high real interest rates for an extended period. Doing so generates a sequence of low inflation realizations that gradually alter experience-based beliefs and eventually bring long-run expectations back into line with the target.

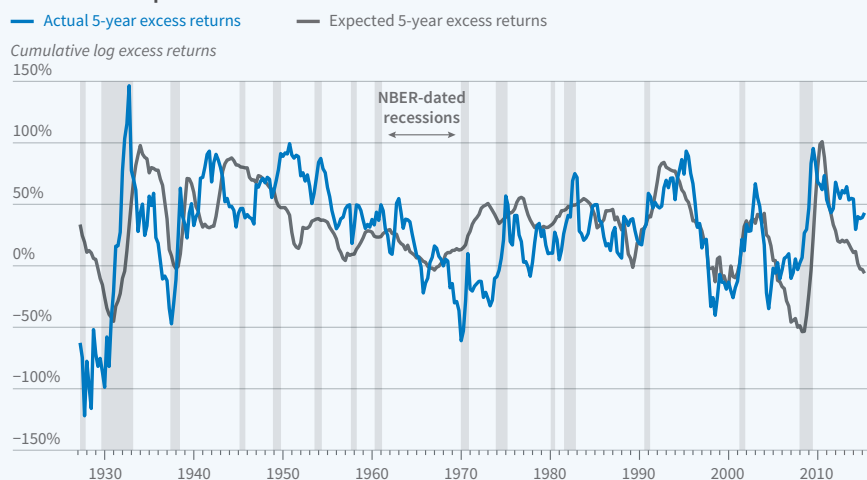
Moreover, expectations of long-run inflation based on experience are effectively the economic agents' subjective perception of the central bank's inflation target. Given that current long-run inflation expectations are already equal to this perceived target, they therefore expect both inflation and the short-term interest rate in the future to remain, on average, at their current levels. High experience-based expectations of long-run inflation are thus accompanied by high expected future nominal and real interest rates, resulting in elevated yields across the entire term structure of nominal and real interest rates.

Empirically, this prediction is strongly supported by the data. Experience-based long-run inflation expectations, constructed using a constant-gain updating scheme that assigns a weight of 1.8 percent to each new quarterly inflation observation, are positively related to real interest rates across the maturity spectrum in the US, the UK, Germany, and Japan, using data extending back to the 1960s in the US and back to the 1970s in the other countries.

Figure 3 illustrates this relationship for the US. It plots the five-year ex ante real interest rate, measured as the five-year Treasury yield less the MSC five-to-ten-year inflation expectation. The figure also shows an estimate of the natural rate of interest, r^* , which is typically central to explanations of secular movements in real rates.⁸ Yet variation in r^* leaves much of the low-frequency movement in real interest rates unexplained. Adding the component

Figure 2

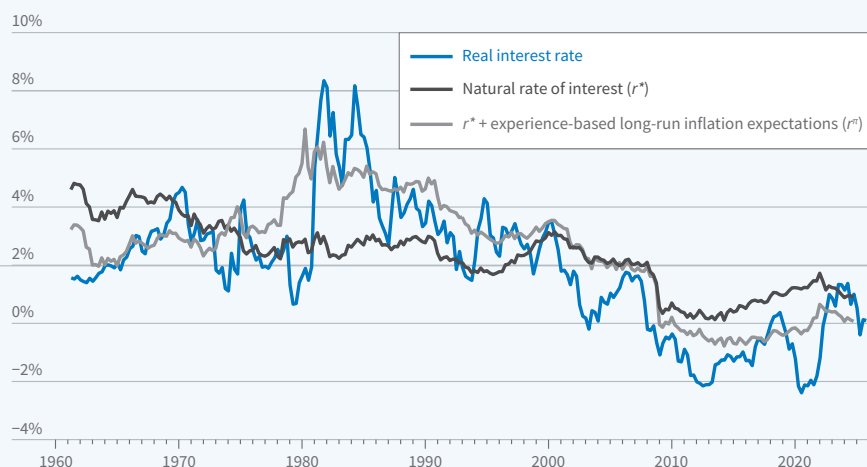
Actual and Expected 5-Year Excess Stock Returns



Return measurement period begins on year in the horizontal axis.
Source: "Asset Pricing with Fading Memory," Nagel S, Xu Z. NBER Working Paper 26255, September 2019, and The Review of Financial Studies 35(5), May 2022, pp. 2190–2245.

Figure 3

US Real Interest Rates



The real interest rate is measured as the five-year treasury yield less the MSC five-to-ten year inflation expectation.
Source: "Leaning Against Inflation Experiences," Nagel S. NBER Working Paper 35379, June 2026.

associated with experience-based long-run inflation expectations, r^π , substantially improves explanatory power. For example, r^π helps account for the prolonged period of elevated real interest rates during the 1980s. Thus, the combination of experience-based inflation expectations and monetary policy that leans against the effects of inflation experiences generates substantial secular variation in real interest rates beyond variation in the natural rate of interest.

Malmendier and I further show that experience-based formation of long-run inflation expectations also explains well the reduction in the level and the stabilization of US long-run inflation expectations from the early 1980s to the years prior to the COVID pandemic, purely based on learning from realized inflation data, without invoking any direct expectations-stabilizing effects of communication about the inflation target

by the Federal Reserve.⁹ This finding implies that the Federal Reserve may still need to respond forcefully to future inflationary shocks in order to keep inflation aligned with its target. Unlike in models in which central bank communication of an inflation target anchors long-run expectations, the experience-based mechanism requires a persistent real interest rate response, similar to those observed in the past, if the US economy is hit by a sustained sequence of inflationary shocks.

¹ "Depression Babies: Do Macroeconomic Experiences Affect Risk-Taking?" Malmendier U, Nagel S. NBER Working Paper 14813, March 2009, and *The Quarterly Journal of Economics* 126(1), February 2011, pp. 373–416.

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² "Learning from Inflation Experiences," Malmendier U, Nagel S. *The Quarterly*

Journal of Economics 131(1), February 2016, pp. 53–87.

[Return to text](#)

³ "The Making of Hawks and Doves: Inflation Experiences on the FOMC," Malmendier U, Nagel S, Yan Z. NBER Working Paper 23228, March 2017, and *Journal of Monetary Economics* 117, January 2021, pp. 19–42.

[Return to text](#)

⁴ "Experiences, Expectations, and Asset Prices," Nagel S. NBER Working Paper 34675, January 2026, and *Journal of Business Economics* 96(1), January 2026, pp. 1–24.

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⁵ "Dynamics of Subjective Risk Premia," Nagel S, Xu Z. NBER Working Paper 29803, February 2022, and *Journal of Financial Economics*, 150(2), November 2023, article 103713.

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⁶ "Asset Pricing with Fading Memory," Nagel S, Xu Z. NBER Working Paper 26255, September 2019, and *The Review of Financial Studies*, 35(5), May 2022, pp. 2190–2245.

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⁷ "Leaning Against Inflation Experiences," Nagel S. NBER Working Paper 35379, June 2026.

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⁸ "Measuring the Natural Rate of Interest," Federal Reserve Bank of New York, <https://www.newyorkfed.org/research/policy/rstar/overview>. The r^* series is the Laubach-Williams natural interest rate estimate series provided by the Federal Reserve Bank of New York.

[Return to text](#)

⁹ "Seemingly Anchored Inflation Expectations," Malmendier U, Nagel S. NBER Working Paper 35395, July 2026.

[Return to text](#)



Stefan Nagel

Stefan Nagel is the Fama Family Distinguished Service Professor of Finance at the University of Chicago Booth School of Business. His research focuses on asset pricing, investor behavior, and the formation of investor expectations. His most recent work explores the role of personal experiences in shaping expectations about the macroeconomy and asset returns, the application of machine learning techniques in empirical asset pricing, and the risk-taking of financial institutions. He has served as executive editor of *The Journal of Finance*, coeditor of *The Review of Financial Studies*, and as president of the Western Finance Association. He is a Research Associate affiliated with the NBER's Asset Pricing program, and a Research Fellow at CEPR and CESifo. He received his PhD from the London Business School in 2003.

From Access to Pathways: Community Colleges and Educational Opportunity

Kalena Cortes

For decades, economists have sought to understand why some students complete college while others do not. Much of this work has focused on the demand side factors that determine whether students attend college, such as tuition costs, financial aid, academic preparation, and the information students possess when making enrollment decisions. Yet gaining access to higher education is only the beginning of a much longer journey. Students must decide where to enroll, whether to transfer, which credentials to pursue, and ultimately how those credentials translate into labor market success. Understanding those educational pathways and their effects on educational attainment, labor market success, and economic mobility, has become the central focus of my recent research.

This summary describes four recent studies that trace those pathways from initial enrollment decisions to long-run labor market outcomes. Together, they ask a common question: How does the set of institutions realistically accessible to students shape their educational and economic opportunities?

The studies begin by showing that geographic access to colleges—particularly community colleges—plays a central role in determining students' postsecondary opportunities. They then follow students beyond their initial enrollment decisions to examine how those geographic constraints influence degree completion. Building on those findings, I turn to the rapid expansion of community college bachelor's degree programs as one institutional response to geographic barriers. Finally, I examine whether employers value bachelor's degrees awarded by community colleges and the implications of these findings for the economic returns to different postsecondary pathways.

Taken together, these studies suggest that educational opportunities

depend not only on whether students gain access to higher education, but also on the pathways available to them after they enroll. Geography influences those pathways, institutions may expand or constrain them, and labor markets ultimately determine how they are rewarded.

Geographic Access and Educational Opportunity

When economists think about access to higher education, we often focus on tangible costs like tuition and fees. However, colleges themselves are unevenly distributed across space, creating large differences in the travel or moving costs students face to attend them. Some students grow up surrounded by multiple postsecondary institutions, while others live many miles from the nearest community college or university.¹

In one study, my coauthors and I broadened the traditional focus on demand-side determinants of college enrollment by examining an often-overlooked supply-side constraint: the geographic distribution of colleges themselves.² Previous research has shown that students are more likely to attend nearby institutions, but much less was known about whether geographic access contributes to racial, ethnic, and socioeconomic disparities in college enrollment. To address this question, we examined how living in a higher education desert—an area where students face unusually long travel distances to reach postsecondary institutions—shapes students' postsecondary choice sets.

We find that distance plays an important role in shaping where students enroll, but its effects differ sharply across groups. Living more than 30 miles from the nearest community college substantially reduces community college enrollment. White and higher-income students often respond by substituting toward four-year institutions, largely offset-

ting the lack of nearby community college access. In contrast, Black, Hispanic, and economically disadvantaged students are much less likely to make this substitution, making them up to 12 percentage points less likely to enroll in college when they live in a community college desert. In other words, the same geographic constraint changes students' postsecondary choice sets in different ways. These findings suggest that geography does not simply influence where students enroll, it changes the educational opportunities available to different students, widening existing racial, ethnic, and socioeconomic disparities in college enrollment.

These findings suggest that geography functions as an implicit cost of college attendance. Unlike tuition or fees, geographic barriers receive comparatively little attention in discussions of higher education access. Yet commuting time, transportation costs, and the challenges associated with relocating can substantially influence educational choices. For students with work obligations, caregiving responsibilities, or limited financial resources, these geographic constraints may be especially consequential.

While documenting enrollment effects is important, a natural question follows: Do these geographic barriers ultimately affect degree attainment?

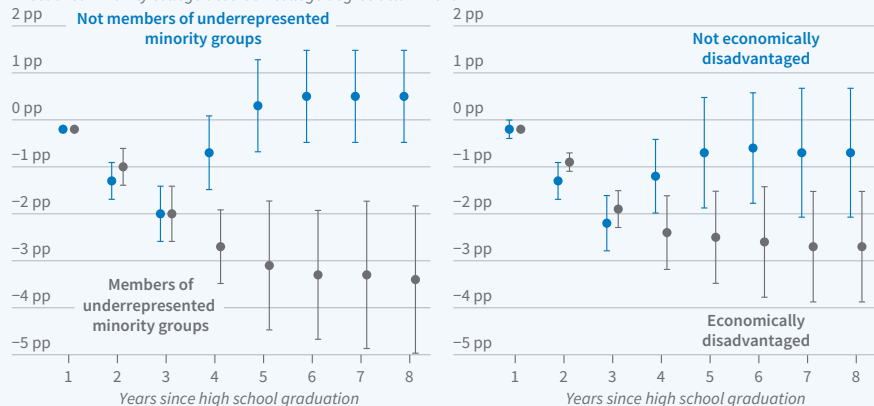
Geographic Access and Educational Attainment

In subsequent work, my coauthors and I asked whether the enrollment differences documented in our earlier study persist over time or eventually disappear.^{3,4} Following students for up to eight years after high school graduation, we find that those living in areas with limited postsecondary access do not catch up to their peers. Geographic barriers have lasting consequences, shaping not only where students initially enroll but also

Figure 1

College Degree Attainment and Community College Proximity

Effect of community college desert on college degree attainment



Students live in community college deserts if there is no public two-year college within a 30-minute drive of their high school.
 Source: "Distance to Degrees: How College Proximity Shapes Students' Enrollment Choices and Attainment across Race-Ethnicity and Socioeconomic Status," Acton RK, Cortes K, Miller L, Morales C. NBER Working Paper 33337, January 2025, and Economics of Education Review, September 2025, Article 102724.

whether they accumulate credits, transfer to four-year institutions, and ultimately complete college degrees.

The most pronounced effects arise from access to community colleges. Students who live in community college deserts are 2.7 percentage points (31 percent) less likely to earn an associate's degree within six years of high school graduation. They also accumulate fewer college credits and are less likely to transfer successfully to four-year institutions or earn bachelor's degrees. Rather than fading over time, the gaps observed shortly after high school graduation persist, and in some cases become more pronounced, throughout students' postsecondary careers.

The persistence of these effects reflects important, underlying differences in how students respond to the same geographic constraint. White and higher-income students often compensate for limited community college access by enrolling directly in four-year institutions. As a result, distance primarily changes the type of degree they earn—reducing associate's degree completion while increasing bachelor's degree completion. In contrast, Black, Hispanic, and economically disadvantaged students are far less likely to make this substitution. Instead, living in a community college desert reduces the likelihood that they enroll in college at all,

leading to lower rates of associate's degree completion, fewer successful transfers, and ultimately fewer bachelor's degrees. For example, living in a community college desert reduces overall degree completion by 3.3 percentage points (16.9 percent) for underrepresented minority students and by 2.6 percentage points (15.7 percent) for economically disadvantaged students.

It can be important to distinguish between outcomes that affect the extensive margin—whether students complete any college degree—and the intensive margin—which type of degree they ultimately earn. Our findings reveal that geographic access operates through both channels. For Black, Hispanic, and economically disadvantaged students, nearby community colleges increase educational attainment at the extensive margin by making college attendance and degree completion more attainable. For White and higher-income students, community college access primarily affects the intensive margin by shifting students between associate's and bachelor's degree pathways. These differences suggest that educational disparities arise not only because students have unequal geographic access to colleges, but also because they differ in how they respond to geographic constraints.

Community College Bachelor's Degrees as New Pathways

Our earlier findings naturally led to another question. If community college access plays such an important role in shaping bachelor's degree attainment, could bringing bachelor's degree programs directly to community colleges expand educational opportunity? Over the last two decades, a growing number of states have authorized community colleges to offer bachelor's degrees, and today 24 states allow at least some community colleges to confer these degrees.

The rationale is straightforward. Community colleges tend to be more geographically accessible than four-year universities. They often charge lower tuition, maintain flexible schedules for working adults, and disproportionately serve students from historically underserved populations. If community colleges can successfully offer bachelor's degrees, they may create new pathways to degree attainment for students who otherwise would not complete a four-year degree. Yet despite the rapid growth of these programs, remarkably little evidence exists regarding their labor market value. Do graduates benefit economically from earning a bachelor's degree at a community college? How do their outcomes compare with those of associate's degree holders and graduates from traditional four-year institutions?

To answer these questions, my coauthors and I conducted the first national analysis of community college bachelor's degree outcomes using administrative data from the Post-Secondary Employment Outcomes project.^{5,6}

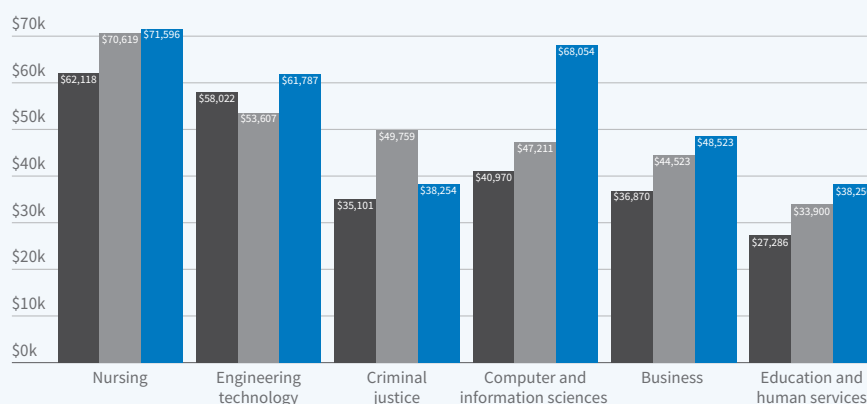
Our findings indicate that community college bachelor's degrees occupy an intermediate position in the higher education landscape. Relative to associate's degree holders, graduates with community college bachelor's degrees earn substantially more. One year after graduation, annual earnings are roughly \$4,000 to \$9,000 higher than those of comparable associate's degree recipients. These gains are economically

Figure 2

Earnings Effects of College Degrees

■ Community college associate's ■ Community college bachelor's ■ Traditional bachelor's

Average earnings of median-earner graduates, one-year post-graduation
\$80k



Source: "Community College Bachelor's Degrees: How CCB Graduates' Earnings Compare to AAs and BAs," Acton RK, Morales C, Cortes K, Turner JA, Miller L. NBER Working Paper 34684, January 2026.

meaningful and suggest that the additional education associated with the bachelor's credential generates substantial value.

At the same time, average earnings remain somewhat below those of graduates of traditional four-year institutions. On average, community college bachelor's graduates earn roughly \$2,000 less than comparable graduates with bachelor's degrees from traditional colleges and universities one year after graduating. However, these averages conceal substantial variation across fields of study.

In nursing, criminal justice, and several health-related fields, earnings differences between community college and traditional bachelor's degree graduates are minimal or nonexistent. In contrast, larger gaps emerge in fields such as computer science and information technology. These findings suggest that the labor market value of institutional type depends importantly on the field of study rather than reflecting a uniform premium or penalty.

The study also reveals another important feature of community college bachelor's programs: They are closely tied to local labor markets. Graduates are highly likely to be employed in the same state where they earned their degrees, and many work

in occupations closely aligned with their field of study. These patterns are consistent with the workforce-oriented mission that has characterized many community college bachelor's programs since their inception.

Perhaps most importantly, the results demonstrate that community college bachelor's degrees generate substantial economic returns relative to stopping at the associate's degree level. Yet average earnings remain modestly below those of graduates from traditional four-year institutions. Why do these earnings differences persist? Are employers discounting community college bachelor's degrees, or are other mechanisms at work?

Observational earnings data cannot distinguish between these explanations. Employers may value community college bachelor's degrees differently, but graduates may also sort into different occupations, industries, or geographic labor markets. Differences in earnings could therefore reflect employer preferences, worker choices, or both. To distinguish among these possibilities, we need to move beyond observed labor market outcomes and study employer behavior directly.

Rather than asking how much graduates earn after entering the workforce, my coauthors and I asked

a more fundamental question: When employers encounter a community college bachelor's degree on a resume, how do they respond?

Do Employers Value Community College Bachelor's Degrees?

Much of the debate surrounding community college bachelor's degrees ultimately revolves around employer perceptions. Critics have sometimes questioned whether employers will treat bachelor's degrees awarded by community colleges as equivalent to those awarded by traditional four-year institutions. If employers discount these credentials, then expanding access alone may not translate into improved labor market opportunities.

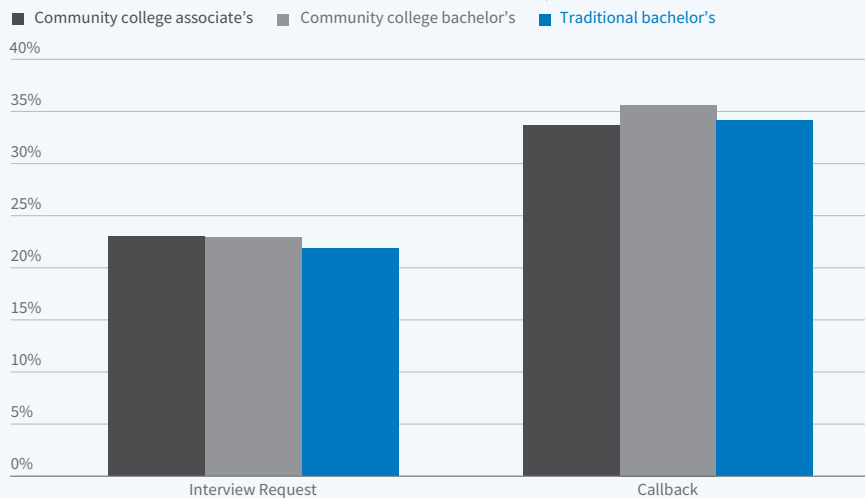
Observational data provide only limited insight into this question. Graduates of community college bachelor's programs may differ from graduates of traditional institutions in ways that are difficult to observe. Consequently, earnings differences alone cannot tell us whether employers value the credential itself differently.

To address this question directly, my coauthors and I conducted the first resume audit study of community college bachelor's degrees.⁷ We submitted nearly 4,700 fictitious applications to more than 1,500 real job vacancies in the early childhood education labor market, experimentally varying applicants' educational credentials while holding all other characteristics constant.

The experimental evidence provides little support for the view that employers systematically discount community college bachelor's degrees, at least within the early childhood education industry. Applicants holding community college bachelor's degrees had callback rates that were statistically indistinguishable from those of applicants holding traditional bachelor's degrees. They also performed similarly to applicants with associate's degrees. Across a variety of specifications and outcome measures, we find little evidence that

Figure 3

Interview & Callback Rates of Resume Submissions, Childhood Education



Source: "The Labor Market Value of Community College Bachelor's Degrees: Initial Evidence from a Resume Audit Study in Early Childhood Education," Acton RK, Morales C, Turner JA, Miller L, Cortes K. NBER Working Paper 35404, July 2026.

employers systematically penalize applicants because their bachelor's degree was awarded by a community college.

These findings are especially notable because early childhood education has become one of the fastest-growing fields for community college bachelor's programs. The sector has experienced increasing professionalization, rising educational requirements, and persistent labor shortages. If employers systematically discounted community college bachelor's degrees, one might expect those concerns to appear in hiring decisions. Instead, we observe remarkably similar employer responses across credential types.

Our study also moves beyond traditional callback measures. We collected and analyzed the text of employer responses to examine whether employers communicate differently with applicants holding different credentials. Once again, we found little evidence of systematic differences. Employers were generally no less warm, enthusiastic, or personalized in their communications with community college bachelor's graduates than with traditional bachelor's graduates.

In addition, we surveyed employers and hiring managers after the audit study concluded. Their responses help illuminate the mechanisms

underlying the experimental findings. Employers consistently emphasized work experience, reliability, interpersonal skills, and organizational fit as the primary determinants of hiring decisions. The institution awarding the degree ranked far below these factors.

Taken together, these findings suggest that employer skepticism may not be the primary obstacle facing community college bachelor's graduates—at least in this labor market. This conclusion also helps reconcile the findings from our earlier labor market outcomes study.^{8,9} The modest earnings differences between community college bachelor's graduates and traditional bachelor's graduates do not appear to arise because employers systematically discount the credential. Instead, they are more likely to reflect differences in the characteristics and work experiences of individuals with various degree types, or other factors that influence earnings independently of employer acceptance.

The Economics of Community College Pathways

These studies suggest that educational opportunity is shaped by more than students' academic preparation or financial resources alone. Geographic access influences the

postsecondary options available to students. Those initial choices have lasting consequences for educational attainment, and community colleges can expand bachelor's degree pathways for students who might otherwise face limited opportunities. At the same time, our findings suggest that understanding these pathways requires looking beyond educational attainment itself to the labor market value of the credentials students ultimately earn.

Evaluating these pathways requires considering both benefits and costs. Our work has shown that community college bachelor's degrees generate meaningful earnings gains relative to associate's degrees, but understanding their economic value also requires examining the costs students incur to obtain them. In ongoing work, we complement our analysis of labor market returns with evidence on both published tuition ("sticker price") and the prices students actually pay after grants and financial aid ("net price").^{10,11} This broader perspective aligns with growing interest in evaluating postsecondary programs according to both their costs and their labor market returns, including recent discussions surrounding gainful employment.

Our résumé audit study in early childhood education provides an important first step toward understanding how employers value community college bachelor's degrees. Yet it also highlights how much remains to be learned. We are currently conducting a large-scale follow-up audit study that extends this work to additional fields of study and labor markets, allowing us to examine whether employer responses to community college bachelor's degrees differ across occupations, industries, and geographic settings. These analyses will provide the first comprehensive evidence on how employers value these degrees across a broad range of hiring contexts.

These studies—including our ongoing large-scale audit study—point toward a broader research agenda centered on understanding the economics of community college

pathways. Community college bachelor's degrees represent one such pathway, but they exist alongside transfer and articulation agreements, reverse transfer policies, career and technical education, work-based learning, student support interventions, and other institutional innovations that shape students' progression through higher education. Understanding how access to higher education and the pathways students follow through it interact—and which generate the greatest improvements in educational attainment and labor market success—remains an important frontier in the economics of higher education.

¹ “Using Geographic Variation in College Proximity to Estimate the Return to Schooling,” Card D. NBER Working Paper 4483, October 1993, and in *Aspects of Labour Market Behavior: Essays in Honour of John Vanderkamp*, Christofides L, Grant EK, Swidinsky R. editors. University of Toronto Press, 1995.
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² “Distance to Opportunity: Higher Education Deserts and College Enrollment Choices,” Acton RK, Cortes K, Morales C. NBER Working Paper 33085, October 2024, and in *Financing Institutions of Higher*

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[Return to text](#)



Kalena Cortes

Kalena Cortes is the Verlin and Howard Kruse '52 Founders Professor in the Department of Public Service and Administration at the Bush School of Government and Public Service at Texas A&M University, where she is also the inaugural Director of the Program in Education Policy. She is a Research Associate affiliated with the NBER's Children and Families and Economics of Education programs and a Research Fellow at the Institute of Labor Economics at the Luxembourg Institute of Socio-Economic Research.

Cortes' research examines how educational policies and institutions expand opportunity across the educational life course. One stream of her work focuses on improving academic outcomes from preschool through high school through innovative parent engagement programs and evaluations of education policies. A second stream examines postsecondary education, where she studies how college admissions policies, geographic access, community colleges, and transfer pathways shape educational attainment, labor market outcomes, and economic mobility. Her research has appeared in leading economics and policy journals, including *The Review of Economics and Statistics*, *The Journal of Human Resources*, *Economics of Education Review*, *Education Finance and Policy*, and *Science*.

A Southern California native, Cortes received her BA in economics from the University of California, San Diego, and her PhD in economics from the University of California, Berkeley.

Towards Better Quantification of Macro and International Models

Christoph E. Boehm, Andrei A. Levchenko, and Nitya Pandalai-Nayar

Some of the most important questions in macro and international economics are quantitative in nature. How much do countries benefit from trading with others? To what extent do shocks transmit through production networks and to other countries? How much does inflation respond to changes in aggregate demand? Answering these questions requires both models and their parameterization.

Model predictions in macro and international economics often hinge on a small number of crucial parameters. For instance, such parameters include those governing how easy it is for firms to substitute between imported and domestic inputs in production, how much trade flows respond to changes in tariffs, or how much prices rise when industries ramp up production. Without these parameters, most macro and international models have limited use. Only with parameterization can the models answer the types of questions raised above.

Several problems complicate the estimation of these parameters. The first is endogeneity: Prices and quantities, for instance, are jointly determined, making it difficult to identify supply and demand curves separately. In addition, it is often challenging to isolate the effect of a single force, such as higher tariffs, from confounding forces that could also influence the outcome of interest, such as other policy changes. The second is that economic effects are often horizon specific. The response of trade or production one year after a shock differs from the response after a decade when firms have had more time to adjust to the new conditions. Common estimation approaches often conflate horizons: For instance, the most popular approach to estimating how much trade responds to tariff changes effectively compares different products and countries to one another, but disregards how long tariffs have been in place. As a result,

the estimates typically pick up a mix of responses at different horizons. A model calibrated with a parameter estimated at one horizon and used to answer questions about another is likely to produce misleading answers.

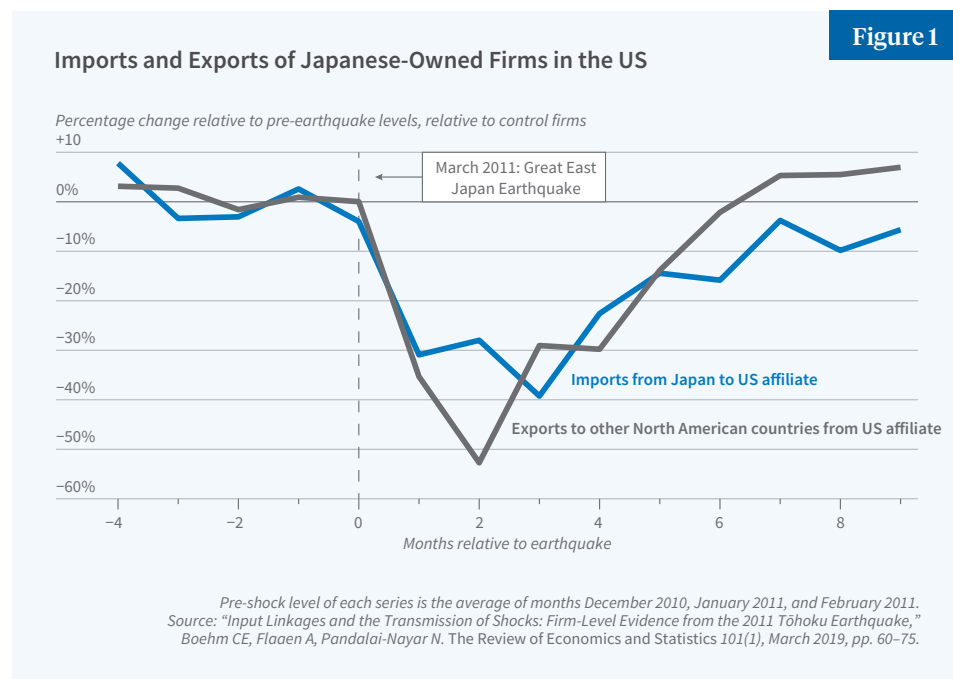
Our research addresses both problems. We use quasi-experimental variation—a natural disaster, changes in most-favored-nation (MFN) tariffs, and certain changes in demand—to address the endogeneity issues related to estimating key parameters. We also use estimation methods that are explicit about time horizons and use economic theory to specify statistical models. This summary describes four studies, proceeding from firm-level evidence on short-run input substitutability to how much trade responds to trade cost changes. It also discusses one example in which the new parameter estimate produces a very different answer to a long-standing question than earlier estimates: How large are the welfare gains from trade?

Input Substitutability in the Short Run

To what extent shocks transmit

through production networks and across countries critically hinges on how substitutable different intermediate inputs are in production. High substitutability implies that firms can switch to alternative inputs when the price of one input rises or it becomes unavailable. By contrast, low substitutability implies that firms' costs rise and their production contracts. In work with Aaron Flaaen, two of us estimated this elasticity using the Great East Japan Earthquake of March 2011 as a natural experiment.¹

The earthquake and the subsequent tsunami were large and sudden. In addition to the tragic loss of life, the production of manufacturing goods in Japan fell by approximately 15 percent during the first few months following this shock. The analysis uses detailed US Census Bureau microdata to trace the effects of this natural disaster on production in the US. The main finding is that production of US manufacturing plants—primarily Japanese-owned—fell approximately one-for-one with their imports of intermediates from Japan (see Figure 1). With insufficient inputs, these plants were unable to produce. Substitution



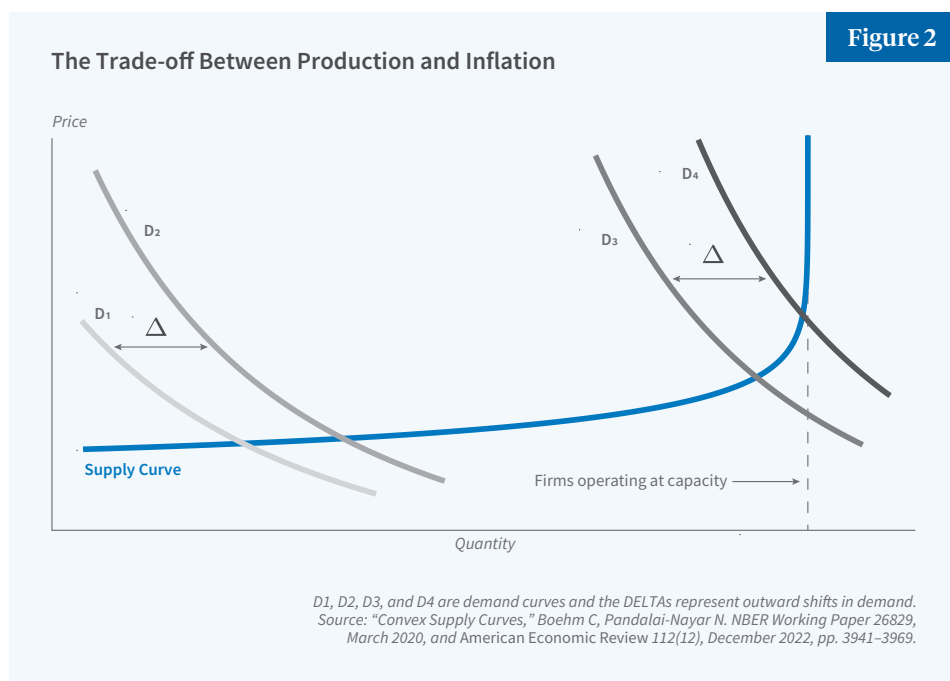
towards other inputs was not feasible to a meaningful extent immediately after the shock.

A surprising finding of the analysis is that measured prices did not change systematically after the shock, neither those charged between related parties nor those of arm's-length transactions. This finding is relevant because it implies that common estimation approaches of this critical parameter—the elasticity of substitution—are invalid in the context of this natural disaster. We therefore develop an alternative estimation procedure. It delivers very small elasticities of substitution, in line with Figure 1. The estimate is substantially below the values previously used to calibrate network and international business cycle models and therefore alters their predictions. We highlight that this natural experiment identifies a short-run object: It is uninformative about substitutability at longer horizons, at which substitution possibilities are greater.

Convex Supply Curves

Economic policymakers routinely face a trade-off: Expansionary monetary and fiscal policy can boost output and employment, but at the risk of higher inflation. How much output, employment, and inflation rise for a given stimulus depends on the slope of the supply curve. This slope, moreover, is thought to change over the business cycle rather than stay fixed. In downturns, firms may be able to expand production without pushing prices up much; in booms, when firms are already operating near capacity, the same expansion can drive prices up sharply (Figure 2). This logic suggests that stabilization policy may be very effective at raising output while not generating much inflation during downturns.

Several difficulties arise when trying to estimate the supply curve and changes in its slope over the business cycle. As mentioned above, one is endogeneity: A researcher only observes quantities and prices, but these are jointly determined by supply and demand forces, thereby



making it difficult to isolate the shape of the supply curve. A second is that the concept of capacity has been difficult to operationalize in practice. What is the correct concept and how should it be measured? A third is that there is insufficient data to answer these questions using aggregate data alone. To address these challenges, two of us have developed a theoretical framework that can be used for estimation.²

The model implies that an industry's capacity utilization rate, defined as the ratio of actual to full-capacity production, is a sufficient statistic for the slope of the supply curve. That is, the only variable that affects the slope of the supply curve is this utilization rate. It turns out that such rates are measured for plants in US Census Bureau surveys, and series of capacity utilization for different manufacturing industries are published by the Federal Reserve Board. The use of industry-level data has the added advantage of providing more variation than aggregate time series. To address endogeneity, the analysis isolates variation from three demand-shift instruments: demand changes from trading partners, demand shifts from certain large downstream industries, and demand changes that arise when industries' effective exchange rates change.

Intuitively, these instruments allow researchers to trace out the supply curve (as illustrated in Figure 1).

At low utilization rates, the hypothesis that supply curves are horizontal cannot be rejected. Stimulating demand at low initial utilization rates therefore has minimal effects on prices while raising output substantially. At higher utilization rates, the supply curve becomes steeper. When industries' capacity utilization is very high, further increases in demand produce sizable price increases. Specifically, a 1 percent increase in production raises prices by about half a percent.

We also derive aggregate implications: How much output rises when the government increases spending depends on the state of the business cycle. During downturns, the effect of fiscal stimulus is larger. The Phillips curve, which captures the trade-off between output and inflation, inherits the curvature of supply curves; this curvature raises the welfare costs of business cycles.³

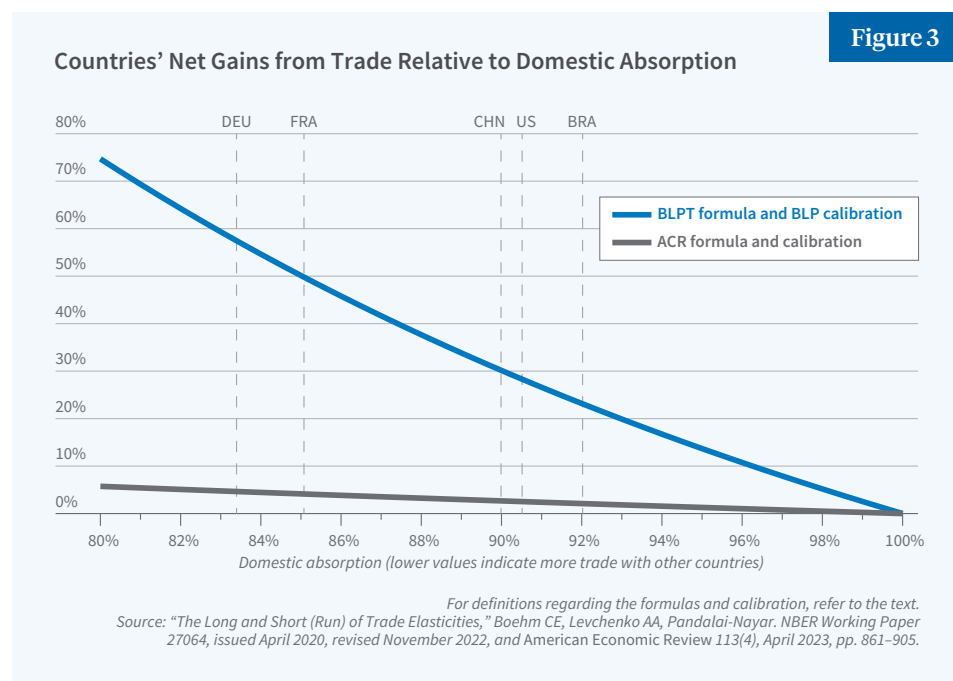
Again, the estimates should be considered as horizon specific in that they apply when industry capacity is approximately constant—the short run. A long-run response where industry capacity adjusts would result in a flatter supply curve.

The Trade Elasticity at Short and Long Horizons

The trade elasticity—the response of trade flows to changes in trade costs—is a critical object in international economics. In international trade, it has been shown that the long-run trade elasticity determines the welfare gains from trade in a large class of environments.⁴ International macro models rely on this parameter to discipline shock transmission across countries at business cycle frequencies. These models require a short-run estimate. Despite the importance of these elasticities, estimating them has proved challenging, as many trade costs are difficult to measure, and tariffs—the only well-measured trade cost—may be set in response to actual or anticipated trade flows. In addition, their effects can be confounded by other policy measures. As a result of these difficulties and because different methods recover responses at different horizons, published estimates of trade elasticities differ widely.

We develop a method to estimate trade elasticities at different time horizons while simultaneously addressing the endogeneity concerns affecting many existing estimates.⁵ To tackle endogeneity, we propose a new instrument. When a country changes its MFN tariff, all partners that export to it on MFN terms experience a tariff change that is plausibly exogenous from the perspective of small trading partners. Partners with preferential access, whose applied tariffs do not change because they do not trade on MFN terms, serve as the untreated control group.

The elasticity of trade flows is estimated to be -0.76 in the year following the tariff change, implying that a 1 percent increase in the tariff rate lowers trade by approximately three-quarters of a percent. The magnitude of this response grows with the horizon following the tariff change, leveling off after roughly seven to ten years. This long-run value is around -2 , so that trade decreases by about 2 percent for every 1 percent increase in the tariff rate. In comparison to



earlier estimates—often in the range of -3 to -10 —the long-run value of -2 is substantially smaller in magnitude.

In joint work with Hiroshi Toma, we explore the quantitative relevance of these new elasticity estimates for the welfare gains from trade. Building on prior work, we show that in a broad class of models, a simple and intuitive formula approximates how much countries benefit from trading with others. The critical input into the formula is the long-run trade elasticity. The smaller its magnitude, the greater the welfare gains from trade.

Figure 3 visualizes these gains. It shows how much an economy's consumption grows when opening up to trade with other countries for two different classes of models and parameterizations.^{6,7} The first case, (ACR formula and calibration) combines an elasticity of -5 , a value frequently used before our new estimates became available, with the formula derived by Costas Arkolakis, Arnaud Costinot, and Andrés Rodríguez-Clare. The welfare gains are relatively small. The US economy, for example, has 2.5 percent higher consumption with international trade than without. With our new elasticity estimate of -2 and the formula from our work (the BLPT formula and BLP calibration in Figure 3), the welfare gains are substantially larger. In the

case of the US, the welfare gains rise to 28.3 percent, more than 10 times larger.

The Research Agenda

Our research aims to improve the predictions of economic models by estimating important parameters. Since macroeconomics is a field with almost no controlled experiments, doing so often requires using natural experiments or exploiting certain institutional features such as the MFN tariff. In some cases, our estimates dramatically change models' predictions. While models of international trade long predicted that the welfare gains from trade are small, we demonstrate that they can be much larger. Since the world is currently moving away from free trade, our research underscores just how much may be lost in the process.

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[Return to text](#)



Christoph Boehm

Christoph Boehm is an associate professor of economics at the University of Texas at Austin and a Research Associate affiliated with the NBER’s Monetary Economics program. His research focuses on topics in closed and open economy macroeconomics, particularly business cycles, monetary and fiscal policy, and the cross-country transmission of shocks, and has been published in journals such as the *American Economic Review* and *The Review of Economic Studies*. He earned his PhD in economics from the University of Michigan, was a postdoc at Princeton University, and was a Fulbright Scholar at Tufts University, where he earned an MA in economics.

Andrei Levchenko

Andrei Levchenko is a professor of international economics at the University of Michigan, coeditor of the *American Economic Review*, and a Research Associate affiliated with the NBER’s International Finance and Macroeconomics and International Trade and Investment programs. His research focuses on the propagation of macroeconomic shocks within and across borders and the interactions between globalization, economic development, and macroeconomics, and has appeared in journals including the *American Economic Review*, *Econometrica*, the *Journal of Political Economy*, *The Quarterly Journal of Economics*, *The Review of Economic Studies*, and *PNAS*. He earned his BA in economics, mathematics, and Italian from Indiana University and his PhD in economics from MIT.



Nitya Pandalai-Nayar

Nitya Pandalai-Nayar is an associate professor of economics at the University of Texas at Austin and a Research Associate affiliated with the NBER’s International Finance and Macroeconomics and International Trade and Investment programs. Her research focuses on international trade and macroeconomics, including the formation of global supply chains and their role in global synchronization, the transmission of shocks across countries, the adaptation of economies to climate risk, and the employment impacts of trade, with work published in journals such as the *American Economic Review*, the *Journal of Political Economy*, and *The Review of Economic Studies*. She serves on the editorial board of the *Journal of Economic Literature* and is an associate editor of the *Journal of International Economics* and the *IMF Economic Review*. She earned her BA in economics and mathematics from Wellesley College, an MSc in economics from the London School of Economics, and her PhD in economics from the University of Michigan.

Intergenerational Mobility in United States History

Kasey Buckles, Joseph Price, and Zachary Ward

While social scientists have been studying the extent to which socioeconomic status is transmitted from one generation to the next for well over a century, the last decade has brought a surge of research on the topic within economics. This includes attempts to measure the strength of this transmission in the United States both in the present day and throughout the nation's history. We believe there are at least two reasons for this.

First, there is a strong narrative among many Americans that the country is a “land of opportunity,” in which each person—through hard work—can build a better life than those who came before them. Especially in an era when inequality is increasing along many dimensions, it is critical to understand whether and for whom that opportunity exists, and what policies and institutions in our past have made the US a more or less mobile society.

Second, on a practical level, challenges with data and measurement have long made it difficult for researchers to produce convincing answers to even basic questions:¹ Is mobility decreasing over time? Is the transmission of socioeconomic status stronger for sons than for daughters? Is status transmitted across multiple generations? However, recent innovations in record linking have opened new possibilities for rigorous analysis.

In this summary, we describe our own efforts (with collaborators) to enrich our understanding of socioeconomic mobility throughout US history. We begin with work to improve estimates of mobility for men by addressing measurement error and sample selection bias, made possible by new record links across historical US censuses. This includes the Census Tree—a set of over 700 million census-to-census links that we created by combining state-of-the-art linking methods with information from an online genealogy platform, FamilySearch. The Census Tree links have also facilitated our work to

produce mobility estimates for women, alongside new measures of assortative mating. Finally, we describe our recent findings regarding the multigenerational transmission of status, the persistence of extreme wealth, and the transmission of health.

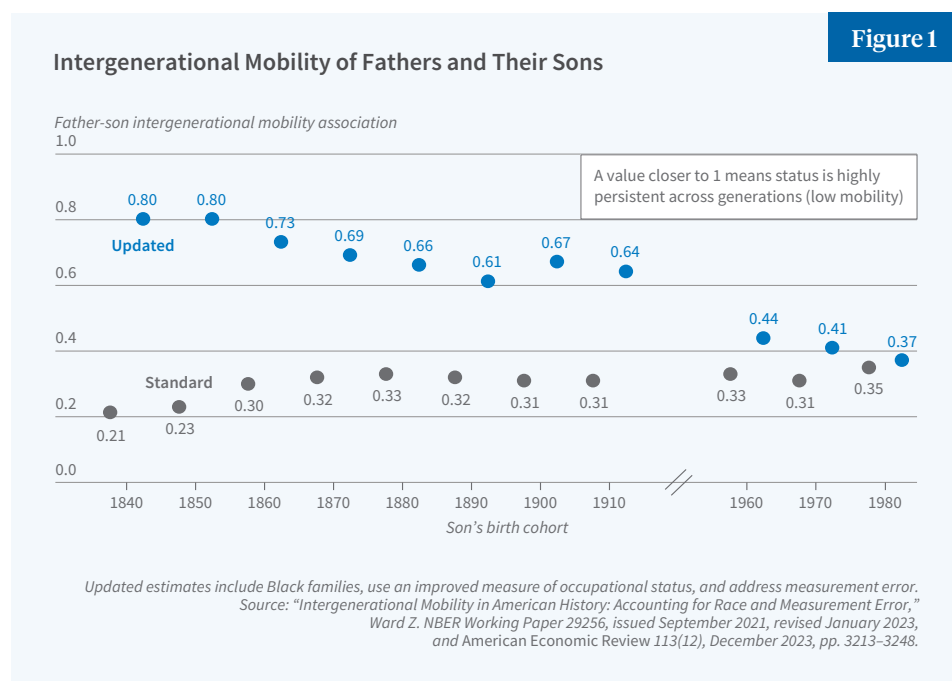
Correcting the Record for Men

For a long time, estimates of intergenerational transmission in the US were available only for White men, a group that made up roughly 45 percent of the population between 1850 and 1940. Women were excluded because the change of women's surnames at marriage made it difficult to link them to their fathers. Even among men, linkage was difficult for Black men, many of whom were not recorded by name in the censuses before emancipation and who have been harder to link across the 1870–1940 censuses because enslavement left them with fewer unique surnames. Furthermore, most estimates relied on a single observation of the father's status, which is a noisy measure of his long-run standing. That noise leads to attenuation bias, weakening the apparent link between father and son and making mobility appear

greater than it was.

Fortunately, recent advances in methods for linking historical US censuses have yielded new datasets of sufficient size and quality to address these problems. The Census Linking Project was the first large-scale effort to link men across the 1850–1940 historical censuses by matching on stable characteristics like name, birth year, and birthplace.² Buckles and Price, along with Jacob Van Leeuwen, Isaac Riley, Adrian Haws, and Haley Wilbert, built on this effort by incorporating links that FamilySearch users created and by using these links to train a machine learning algorithm.^{3,4} The resulting data resource, which we call the Census Tree, has 391 million links for men and is highly representative of the US population.

We use these links to create new estimates of the intergenerational transmission of socioeconomic status for men.⁵ First, we include Black men, rather than studying White men alone. Second, because multiple observations can now be obtained for the father, we can better pinpoint his long-run standing by averaging across observations or by using an instrumental variables (IV) strategy.



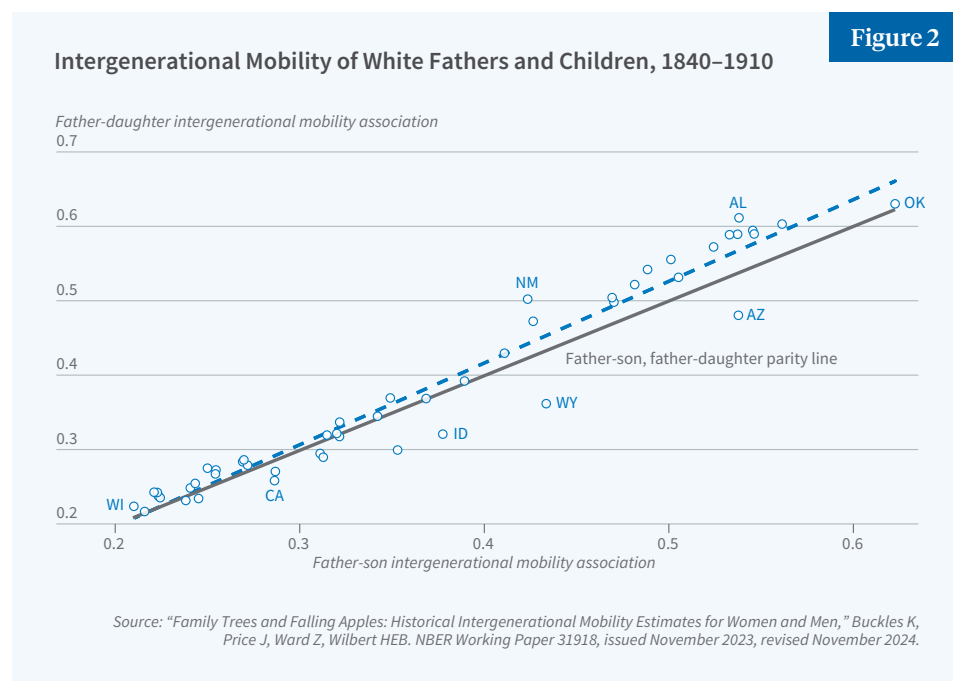
Third, we refine how occupational status is measured, allowing men in the same occupation to differ in their status by race and region rather than treating them as identical. This matters because a given occupation carried very different economic status depending on where one lived and, under Jim Crow, on one's race. In Figure 1, we show that these three changes make a big difference. Fathers and sons are far more tightly linked than previously thought, meaning that mobility in the past was substantially lower—overturning a long-held view that mobility was greater in the past.

New Mobility Estimates for Women

Important as these corrections are, they still measure the mobility of only half the population. In addition to providing the largest-ever set of links for men, the Census Tree was the first large-scale census-linking effort to include women. This breakthrough was possible because FamilySearch users often have private information, including maiden names, which help link married women to their fathers. As a result, the full Census Tree includes 314 million links for women.

With Wilbert, we use these links to create novel estimates of transmission from fathers to daughters as well as to sons.⁶ Another challenge when estimating historical socioeconomic mobility for women is that many do not report occupations. To address this, we create a new measure of socioeconomic status based on the average of the occupational status of one's neighbors, which we call neighborhood-SES (n-SES). In addition to giving us a measure of status that does not rely on selection into either marriage or labor force participation, n-SES is a household measure that combines the resources of all family members.

With these innovations, we show that socioeconomic mobility for daughters was remarkably similar to that of sons in the late nineteenth and early twentieth centuries. For both groups, mobility was low but



increasing across the 1835–1915 birth cohorts. The similarity in the transmission coefficients for men and women persists when using different measures of status and for both OLS and IV estimates. It also holds within states, as Figure 2 shows. The correlation between the state-specific estimates for daughters and sons is very high at 0.974. This is true even though the state-specific estimates themselves range widely, suggesting that mobility estimates from a single state may not present a clear picture of mobility at the national level.

This similarity in estimates for sons and daughters was not a clear theoretical prediction and suggests strong assortative mating. Because the Census Tree also allows us to compare the occupational status of fathers and fathers-in-law, we can provide new national-level estimates of assortative mating that correct for measurement error. We find that assortative mating was much higher than many prior estimates suggest, ranging from a correlation coefficient for the fathers' status of 0.75 for the 1840 birth cohort to 0.63 for the 1910 cohort.

Other Dimensions of Mobility

Strong transmission to both sons and daughters raises a further question: Did these advantages compound

across multiple generations, so that great-grandparents remained more tightly linked to their descendants than the simple chain of parent-child links would predict? If so, mobility over the long run was even more limited than two-generation estimates suggest. This could happen either because of direct impacts from grandparents and great-grandparents, or because families carry advantages that are hard to observe in messy historical census data and pass them down beyond what any single parent-child link captures. Measuring multigenerational mobility has been difficult due to the lack of both intergenerational links and the repeated observations needed to correct the attenuation bias that affects two-generation estimates.

We address both problems, linking millions of great-grandchildren to their great-grandfathers in the Census Tree and again using multiple observations of each ancestor to correct for measurement error.⁷ We confirm that mobility was low both vertically and horizontally. Low vertical mobility means that there is a strong association between great-grandparents' status and that of their great-grandchildren. We find evidence of low mobility horizontally in a strong correlation in education across second cousins—relatives who share only a great-grandparent

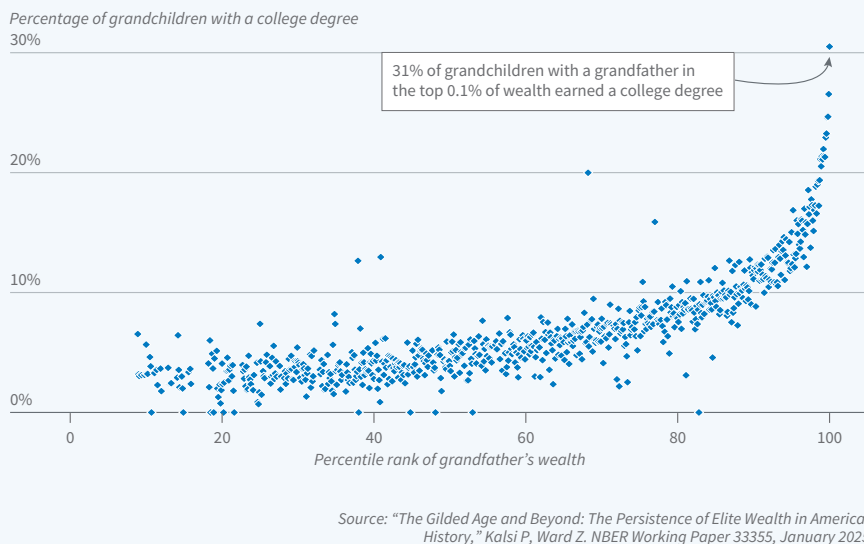
and whose outcomes should be all but unrelated in a truly mobile society. Within Black and White groups separately, accounting for extended kin lowers mobility only slightly below what two-generation estimates imply, suggesting a small amount of excess persistence. Pooling groups for a national picture, however, shows that two-generation estimates substantially overstate long-run mobility because persistent racial inequality slows the rate at which families converge to the average across generations.

In another paper, Ward with Priti Kalsi turn to generational wealth.⁸ Did being born into an extremely wealthy family give children and grandchildren larger advantages than being merely well-off? This is hard to address with standard historical mobility measures that rely on occupational titles that do not distinguish an especially wealthy farmer or merchant from a middling one. To capture extreme advantage directly, we draw on markers of wealth recorded in the historical censuses, such as property values, and signs of affluence, like employing several live-in servants. We then link millions of records to trace the wealthiest families across their own lifetimes, from parents to children and from grandparents to grandchildren. We find that the top tail was surprisingly fluid. Most elite families did not hold their position for long, and the majority fell out of the top within a single generation. Yet mobility was nonlinear across the wealth distribution. Starting at the top sharply raised the odds of staying there, whether measured by grandchildren's wage income, college attainment, or home values (Figure 3). Extreme wealth was the most persistent, such that the advantages of the richest families faded more slowly across generations.

Finally, we acknowledge that while our own work and that of others has focused on the transmission of socioeconomic status, much of the value of status lies in the benefits it confers. These include access to resources that are necessary for health and happiness. Unfortunately, these measures of well-being are not widely available in historical data sources, but using the same genealogy platform that we used to create the Census Tree, Price with Sandra Black, Neil Duzett, Adriana Lleras-Muney, and Nolan Pope are

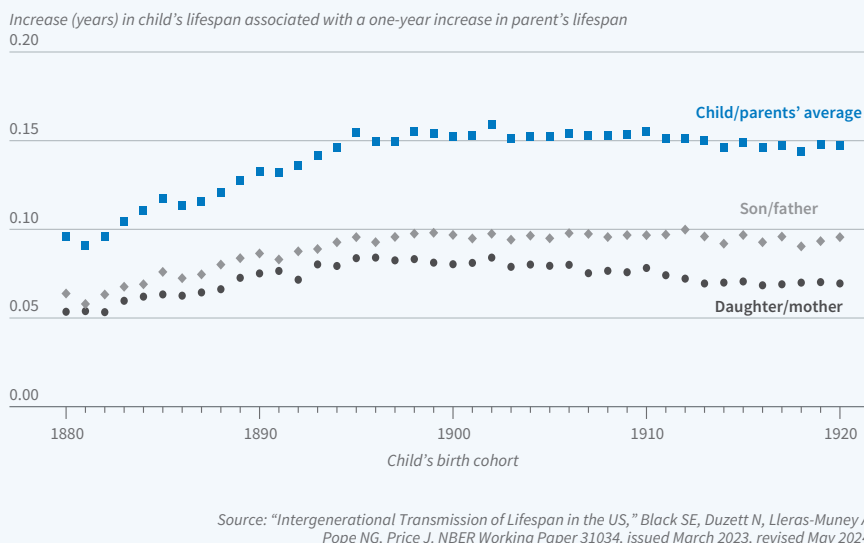
Grandfather Wealth and Grandchildren College Attainment, Gilded Age

Figure 3



Intergenerational Persistence in Longevity

Figure 4



able to observe lifespan—a proxy for health—across generations for over 26 million people born between 1880 and 1920.⁹ Using both parent-child and sibling pairs, we find that the intergenerational persistence of lifespan has never been much larger than 0.15 (Figure 4).

These small estimates are surprising given the important genetic determinants of health and the strong transmission of occupation-based status. Even among twins, the correlations in lifespan are low, indicating that there is a large stochastic component in lifespan that is unrelated to family influences such as genetics or shared

environments. This suggests that measures that incorporate health or other measures of well-being may show more intergenerational mobility than measures of socioeconomic status alone.

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Kasey Buckles

[Kasey Buckles](#) is the Stepan Family College Professor of Economics at the University of Notre Dame and an NBER Research Associate affiliated with the Children and Families program. Her research focuses on the economics of the family, economic demography, economic history, and child health and wellbeing, including work on fertility trends and the Census Tree project. She has published in outlets including *The Review of Economics and Statistics*, *The Economic Journal*, the *Journal of Human Resources*, and the *Journal of Health Economics*. She has held leadership roles including President of the Midwest Economics Association and Associate Chair and Director of Mentoring for the American Economic Association’s Committee on the Status of Women in the Economics Profession. Buckles has received numerous teaching and mentoring honors, including Notre Dame’s Joyce Award for Excellence in undergraduate teaching and their 2026 Graduate Student Mentorship Award. She received her master’s and PhD from Boston University, and her BA from the University of Kentucky.

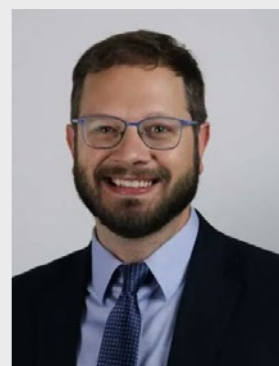


Joseph Price

[Joseph Price](#) is a professor of economics at Brigham Young University and Director of the BYU Record Linking Lab, where his research combines machine learning and family history to generate large, longitudinal historical datasets to study the long-run impact of factors influencing health, education, and family formation. He is a Research Associate affiliated with the Labor Studies, Children and Families, and Development of the American Economy programs at the NBER. Price has published over 50 articles in journals such as *The Quarterly Journal of Economics*, the *Journal of Labor Economics*, the *Journal of Human Resources*, the *Journal of Health Economics*, *Demography*, and *Management Science*. He earned his BA in economics from Brigham Young University and his PhD in economics from Cornell University.

Zachary Ward

[Zachary Ward](#) is the Herman Lay Chair of Private Enterprise and associate professor of economics at Baylor University and a Research Associate affiliated with the NBER Development of the American Economy program. His research spans economic history and labor economics, with a focus on immigration, inequality, and intergenerational mobility, and has been published in outlets such as the *American Economic Review*, the *Journal of Human Resources*, and the *American Economic Journal: Applied Economics*. Ward is an affiliate of the Stone Center for Research on Wealth Inequality and Mobility at the University of Chicago, and the Centre for Economic History at the Australian National University. He earned his BA in economics and mathematics from Wheaton College and his PhD in economics from the University of Colorado Boulder.



Karen Mills Elected Chair of NBER Board of Directors; Douglas Peterson Elected Vice Chair



(L to R) Karen G. Mills and Douglas L. Peterson

Karen G. Mills was elected Chair of the NBER's Board of Directors, and Douglas L. Peterson was elected Vice Chair, at the board's September 28 meeting.

Mills, who has served as Vice Chair for the last three years, is a leading authority on US competitiveness, entrepreneurship, and innovation. She is the president of Tootsie Roll Industries, an American manufacturer of confectionery products. From 2014 to 2025 she was a senior fellow on the entrepreneurship faculty at Harvard Business School. She served in President Barack Obama's cabinet as Administrator of the US Small Business Administration and was a member of the National Economic Council. She is the author of *Fintech*, *Small Business & the American Dream*, and numerous other publications on

innovation and the supply chain economy. She serves on the board of directors of Skillsoft, an educational technology company, as a director of several Churchill Capital entities. She is a past member of the Harvard Corporation and a past Vice Chair of the Harvard Overseers. Mills earned an undergraduate degree in economics from Harvard and an MBA from Harvard Business School, where she was a Baker Scholar.

Mills succeeds Peter Blair Henry, the Class of 1984 Senior Fellow at Stanford University's Hoover Institution and dean emeritus of New York University's Stern School of Business, who served as board Chair from 2023 to 2026.

Peterson, who was elected to the NBER board in 2017, is a senior advisor to S&P Global. He was President and Chief Executive Officer from 2013 until November 2024. He joined the company in 2011 as President of Standard & Poor's Ratings. During his tenure, he repositioned S&P Global to power the global capital and commodity markets of the future with transparent, innovative, and independent credit ratings, benchmarks, analytics, and data. Before joining S&P Global, he served as the Chief Operating Officer of Citibank, where he had also been CEO of Citigroup Japan as well as Chief Auditor. A leading voice on sustainability and the energy transition, he serves on the board of the UN Global Compact as well as a range of other nonprofit business-related, academic, and arts organizations. He received his undergraduate degree from Claremont McKenna College and an MBA from the Wharton School at the University of Pennsylvania.

Three New Directors Elected to NBER Board, Fall 2026



(L to R) Mark Mason, Jack Porter, and Mark Wolfson

Mark Mason, Jack Porter, and Mark Wolfson were elected to the NBER Board of Directors at the Board's September 28 meeting.

Mason, an at-large board member, is the Executive Vice Chair and Senior Executive Advisor to the Chair and CEO of Citigroup. He served as Citi's Chief Financial Officer from February 2019 to March 2026, providing financial stewardship during a period of substantial macroeconomic disruption. He joined Citi in 2001 and held a variety of roles including CEO of Citi Private Bank and Citi Holdings; prior to joining Citi he was director of Strategy and Business Development at Lucent Technologies. He serves on the Microsoft Board of Directors and is Vice Chair of the Howard University Board of Trustees. Mason earned his undergraduate degree at Howard University and holds an MBA from Harvard Business School.

Porter represents the University of Wisconsin–Madison, where he holds the Richard E. Stockwell Distinguished Chair in Economics. He is an econometrician whose research addresses core problems in econometric theory such as statistical treatment rules, moment inequality identification, and inference under weak instruments. He is a Fellow of the Econometric Society. Porter received his AB in applied mathematics and economics from Harvard University and his PhD in economics from MIT.

Mark Wolfson, also an at-large member, is a Founder and Partner of Jasper Ridge Partners, a wealth management and private investment firm. He joined the Stanford Business School faculty in 1977 and became a chaired professor and Associate Dean before joining the Robert M. Bass/Oak Hill organizations in 1995. He continued to teach courses at Stanford on investment management and philanthropic strategy until 2025. He has been an advisor to the Investment Committee of the William and Flora Hewlett Foundation and serves on the board of the Stanford Institute for Economic Policy Research and the advisory board for Stanford's Knight-Hennessy Scholars Program. He is President of Arrow Impact, a charitable foundation focused on creating pathways to economic prosperity for under-resourced communities and on improving the efficiency of the philanthropic ecosystem. Wolfson earned bachelor's and master's degrees from the University of Illinois and a PhD from the University of Texas at Austin.

The Board also re-elected at-large directors Mohamed El-Erian and Lisa Jordan, Timothy Bresnahan, who represents Stanford University, Bo Honoré, who represents Princeton University, and Maureen O'Hara, who represents the American Finance Association. Kathleen Cooper and John Reed were elected to emeritus rank.

Summer Institute 2026

More than 2,700 researchers, hailing from 39 countries, traveled to Cambridge, MA, for the [49th annual NBER Summer Institute](#) in mid-July. The Summer Institute included 49 distinct workshops arranged by more than 150 organizers. Most of the meetings were streamed on the [NBER's YouTube channel](#).

The participants represented more than 400

universities, central banks, think tanks, businesses, and government agencies. Just over one-third were NBER affiliates, and nearly one-sixth—470—were attending Summer Institute for the first time.

The 591 research papers presented over the three weeks were selected from 3,986 submissions, implying an acceptance rate of 14.8 percent.

Phelan and Rey Take New Roles at CEA and BIS

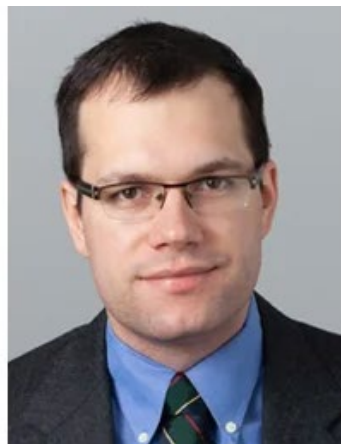


(L to R) Christopher Phelan and Hélène Rey

NBER Research Associates [Christopher Phelan](#) and [Hélène Rey](#) have taken up new roles at the US Council of Economic Advisers (CEA) and the Bank for International Settlements (BIS), respectively. Phelan was confirmed as CEA Chair in early August. He is a professor of economics at the University of Minnesota and an adviser to the research department of the Federal Reserve Bank of Minneapolis, is an expert on macroeconomics and economic theory. He resigned from his position as a Research Associate in the Economic Fluctuations and Growth program when he was nominated for his new position. Rey, a professor of economics at the London Business School whose research focuses on monetary economics and international finance, has been appointed the Economic Adviser and Head of the Monetary and Economic Department at the BIS, which is headquartered in Basel,

Switzerland. Rey, a Research Associate in the Asset Pricing and International Finance and Macroeconomics programs, has also been a co-organizer of the NBER's annual International Seminar on Macroeconomics. She will be on leave from the NBER for the duration of her appointment.

Four 2026 Robert Summers Fellowships Awarded



(L to R) Dirk Van Duym, Christopher Goetz, Hugh Montag, and Ben Rodriguez

The NBER awarded four Robert Summers fellowships that enabled economic statisticians to attend the Conference on Research in Income and Wealth (CRIW) meeting on July 20–21, 2026, in Cambridge, MA. Founded in 1936 by Simon Kuznets, the CRIW provides a forum for academics, government representatives, and business economists to present and discuss the latest research in this area. The fellows participated in the meeting, which is part of the NBER Summer Institute, and had an opportunity to interact with leading scholars and practitioners in the field of economic measurement.

The fellowship program, which was launched in 2023, honors Robert Summers, a distinguished CRIW member and professor at the University of Pennsylvania, who

made substantial contributions to the study of international price and output comparisons. Summers, together with Alan Heston and Irving Kravis, developed the Penn World Table (PWT), a comprehensive dataset that provides consistent national income and economic data across a wide range of countries and years. Today, the PWT includes information from 190 countries and serves as a critical resource for cross-country economic analysis.

The 2026 fellowship recipients are: Dirk Van Duym of the Bureau of Economic Analysis, Christopher Goetz of the US Census Bureau, Hugh Montag of the Bureau of Labor Statistics, and Ben Rodriguez of the University of Maryland. The fellows' interests range widely across the creation and application of economic statistics.

Lisa Kahn and Isaac Sorkin to Co-Direct Labor Studies Program



(L to R) Lisa Kahn and Isaac Sorkin

Research Associates [Lisa Kahn](#) and [Isaac Sorkin](#) became the co-directors of the [Labor Studies Program](#) on September 1, 2026. Kahn is the Helen F. and Fred H. Gowen Professor in the Social Sciences, and a professor of economics at the University of Rochester. Her research focuses on the effect of technological change, organizational structure, and education on labor market outcomes. Sorkin is an associate professor and Trione Faculty Scholar at Stanford University. He has studied the effects of social insurance programs and minimum wages, and earnings inequality.

Kahn and Sorkin succeeded [David Autor](#) of the Massachusetts Institute of Technology and [Alexandre Mas](#) of the University of California, Berkeley, who co-directed the program since 2017.

Melissa Dell and Ashesh Rambachan Present 2026 Methods Lectures



(L to R) Melissa Dell and Ashesh Rambachan

Research Associate Melissa Dell of Harvard University and Ashesh Rambachan of MIT delivered the 2026 Methods Lectures on “Estimation and Inference with AI-Generated Data.” They described both the rapidly expanding ways in which large language models and other AI tools are being used for economic measurement, as well as the new econometric issues that are presented by the analysis of these data. Their lectures provided an overview of the theory underlying some of the new econometric tools and illustrated their application in several different settings.

NBER Appoints 35 Research Associates, Fall 2026

The NBER Board of Directors appointed 35 Research Associates at its September 2026 meeting. Research Associates must be tenured faculty members at North American colleges or universities; their appointments are recommended to the board by directors of the NBER's 19 research programs, typically after consultation with a steering committee of leading scholars. The

new Research Associates are affiliated with 24 different colleges and universities, and they received graduate training at 18 different institutions. Following these appointments, the NBER has 1,619 Research Associates and 284 Faculty Research Fellows. The names and universities of the new Research Associates and their NBER program affiliations are listed below.

Name	University Affiliation	University of PhD	Program
Rodrigo Adão	University of Chicago	MIT	International Trade and Investment
Hassan Afrouzi	Columbia University	UT Austin	Economic Fluctuations and Growth, Monetary Economics
Abby Alpert	University of Pennsylvania	University of Maryland	Economics of Health
Youssef Benzarti	UC Santa Barbara	UC Berkeley	Public Economics
Michael Best	Columbia University	LSE	Development Economics, Public Economics
Corina Boar	New York University	University of Rochester	Economic Fluctuations and Growth
Judson Boomhower	UC San Diego	UC Berkeley	Environment and Energy Economics
Giulia Brancaccio	New York University	Princeton University	Industrial Organization
Kevin Bryan	University of Toronto	Northwestern University	Productivity, Innovation, and Entrepreneurship
Russell Cooper	University of Austin	University of Pennsylvania	Economic Fluctuations and Growth
Rebecca Dizon-Ross	University of Michigan	Stanford University	Economics of Education, Development Economics
Thomas Drechsel	Johns Hopkins University	LSE	Monetary Economics
James Feigenbaum	Boston University	Harvard University	Development of the American Economy
Sharat Ganapati	Georgetown University	Yale University	International Trade and Investment
Andrew Garin	Carnegie Mellon University	Harvard University	Labor Studies

Name	University Affiliation	University of PhD	Program
Daniel Gross	Duke University	UC Berkeley	Development of the American Economy, Productivity, Innovation, and Entrepreneurship
Gaston Illanes	Northwestern University	MIT	Industrial Organization
Akshaya Jha	Carnegie Mellon University	Stanford University	Environment and Energy Economics
Lawrence Jin	Cornell University	Yale University	Asset Pricing
Andrew Johnston	UT Austin	University of Pennsylvania	Economics of Education, Public Economics
Maggie Jones	McGill University	Queens University	Development of the American Economy
Reka Juhasz	University of British Columbia	LSE	Development of the American Economy, International Trade and Investment
Matthias Kehrig	Duke University	Northwestern University	Productivity, Innovation, and Entrepreneurship
Eoin McGuirk	Tufts University	University of Dublin	Development Economics, Political Economy
Ferdinando Monte	Georgetown University	University of Chicago	International Trade and Investment
Aurelie Ouss	University of Pennsylvania	Harvard University	Law and Economics
Adam Sacarny	Columbia University	MIT	Economics of Aging, Economics of Health
Tobias Salz	MIT	New York University	Industrial Organization
Lawrence Schmidt	UC San Diego	UC San Diego	Asset Pricing
Elizabeth Setren	Tufts University	MIT	Children and Families, Economics of Education
Yotam Shem-Tov	UCLA	UC Berkeley	Labor Studies
Mark Shepard	Harvard University	Harvard University	Economics of Aging, Economics of Health
Chris Stanton	Harvard University	Stanford University	Labor Studies
Christian Wolf	MIT	Princeton University	Economic Fluctuations and Growth, Monetary Economics
Woan Foong Wong	University of Oregon	University of Wisconsin–Madison	International Trade and Investment

Conferences and Meetings

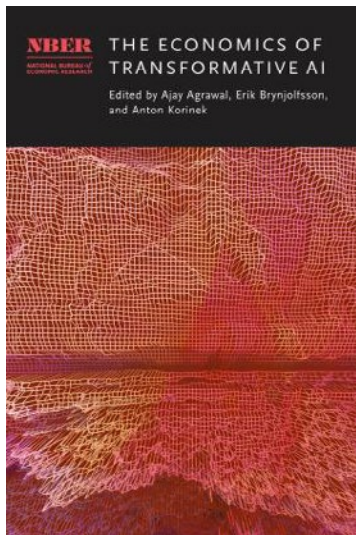
Detailed programs for NBER conferences are available at nber.org/conferences

Title of Conference/Meeting	Organizers	Dates
International Finance and Macroeconomics Data Session	Jesse Schreger and Chenzi Xu	July 13, 2026
Corporate Finance	Antoinette Schoar and Amir Sufi	July 13–14, 2026
Capital Markets and the Economy	Janice C. Eberly and Deborah J. Lucas	July 13–15, 2026
International Trade & Investment	Treb Allen and Natalia Ramondo	July 13–15, 2026
Development of the American Economy	Leah Platt Boustan, William J. Collins, Shari Eli, James J. Feigenbaum, and Eric Hilt	July 13–16, 2026
Impulse and Propagation Mechanisms	Lawrence Christiano and Martin S. Eichenbaum	July 13–17, 2026
Monetary Economics	Emi Nakamura and Jón Steinsson	July 13–17, 2026
International Trade & Macroeconomics	Yan Bai and Michael E. Waugh	July 14, 2026
International Finance & Macroeconomics	Pablo Ottonello and Vincenzo Quadrini	July 14–16, 2026
Forecasting & Empirical Methods	Allan Timmermann and Jonathan H. Wright	July 14–17, 2026
Macro, Money and Financial Frictions	Markus K. Brunnermeier, Arvind Krishnamurthy, and Guillermo Ordoñez	July 15–16, 2026
Workshop on Methods and Applications for Dynamic Equilibrium Models	S. Borağan Aruoba, Luigi Bocola, Jesús Fernández-Villaverde, and Christian K. Wolf	July 15–16, 2026
International Economics and Geopolitics	Matteo Maggiori and Jesse Schreger	July 16, 2026
Economic Growth and Long-Run Macroeconomic Development	Michael Peters, Tommaso Porzio, and Pascual Restrepo	July 16–17, 2026
Asset Pricing	Andrea L. Eisfeldt and Sydney C. Ludvigson	July 16–17, 2026
Behavioral Macro	Andrew Caplin and Ulrike Malmendier	July 17, 2026
Innovation Research Boot Camp	Benjamin Jones and Heidi L. Williams	July 17–23, 2026
Financial Market Structure	Tarun Chordia, Paolo Pasquariello, Gideon Saar, and Mao Ye	July 18, 2026
Economic Fluctuations and Growth Program Meeting	Mark Gertler and Peter J. Klenow	July 18, 2026
Place-Based Policies and Entrepreneurship Pre-Conference	Sabrina T. Howell, Josh Lerner, and David T. Robinson	July 19, 2026
Entrepreneurship	Yael Hochberg, Josh Lerner, and David T. Robinson	July 20, 2026
Macroeconomics Within and Across Borders	Mark A. Aguiar, Cristina Arellano, Patrick J. Kehoe, and Mark L.J. Wright	July 20, 2026
Conference on Research in Income and Wealth	Susanto Basu, David M. Byrne, and Karen Dynan	July 20–21, 2026
The Micro and Macro Perspectives of the Aggregate Labor Market	Philipp Kircher, Guido Menzio, and Giuseppe Moscarini	July 20–23, 2026
Micro Data and Macro Models	Erik Hurst, Greg Kaplan, and Giovanni L. Violante	July 20–23, 2026
Entrepreneurship Research Boot Camp	Jorge Guzman and David T. Robinson	July 20–24, 2026

Title of Conference/Meeting	Organizers	Dates
Macroeconomics and Productivity	Susanto Basu, Nicholas Bloom, Raffaella Sadun, and Chad Syverson	July 21, 2026
Innovation	Benjamin Jones and Heidi L. Williams	July 21–22, 2026
Political Economy	Stelios Michalopoulos, Vincent Pons, Enrico Spolaore, and Stefanie Stantcheva	July 21–22, 2026
Inequality and Macroeconomics	Roland Bénabou, Raquel Fernández, and Jonathan Heathcote	July 21–22, 2026
Digital Economics and Artificial Intelligence	Erik Brynjolfsson, Avi Goldfarb, and Catherine Tucker	July 22–24, 2026
Macro Public Finance	Dirk Krueger, Florian Scheuer, Stefanie Stantcheva, and Aleh Tsyvinski	July 23, 2026
Science of Science Funding	Megan MacGarvie, Paula Stephan, and Reinhilde Veugelers	July 23–24, 2026
Industrial Organization	Meghan R. Busse, Juan Camilo Castillo, Allan Collard-Wexler, Liran Einav, and Benjamin Rosa	July 23–24, 2026
Household Finance	Raymond Kluender, Adair Morse, and Stephen P. Zeldes	July 23–24, 2026
Environment and Energy Economics	Lint Barrage, Ryan Kellogg, Anna Russo, and Wolfram Schlenker	July 27–28, 2026
Workshop on Aging	David M. Cutler, Kosali I. Simon, and Jonathan S. Skinner	July 27–28, 2026
Development Economics	Vittorio Bassi, Jing Cai, Eric V. Edmonds, Frederico Finan, Douglas Gollin, Seema Jayachandran, Melanie Morten, and Sandip Sukhtankar	July 27–28, 2026
Labor Studies	Abi Adams, David Autor, Anders Humlum, Lisa B. Kahn, Lorenzo Lagos, Alexandre Mas, Joseph Price, Simon Quach, and Raffaele Saggio	July 27–29, 2026
Personnel Economics	Alan M. Benson and Mitchell Hoffman	July 28–29, 2026
Public Economics	Naoki Aizawa, Raj Chetty, Itzik Fadlon, Tatiana Homonoff, Lee Lockwood, Mathilde Muñoz, and Maria Polyakova	July 28–29, 2026
Gender in the Economy	Taryn Dinkelman, Jessica Goldberg, Claudia Goldin, Claudia Olivetti, and Melanie Wasserman	July 28–29, 2026
Martin Feldstein Lecture	James M. Poterba	July 29, 2026
Economics of Social Security	Manasi Deshpande and James M. Poterba	July 29, 2026
Economics of Education	Caroline M. Hoxby	July 29, 2026
Real Estate	Milena Almagro, Adam Guren, Benjamin J. Keys, and Tomasz Piskorski	July 29–30, 2026
Law and Economics	Christine Jolls	July 29–30, 2026
Economics of Health	Abby E. Alpert, Marika Cabral, Christopher S. Carpenter, Amy Finkelstein, Atul Gupta, Petra Persson, Michael R. Richards, and Molly Schnell	July 29–30, 2026

Title of Conference/Meeting	Organizers	Dates
Frontier Econometric Methods	Isaiah Andrews, Susan Athey, and Christopher R. Walters	July 30, 2026
Children and Families	Anna Aizer and Janet Currie	July 30–31, 2026
Economics of Crime	Jens Ludwig and Crystal Yang	July 30–31, 2026
Urban Economics	Rebecca Diamond, Jonathan I. Dingel, and Edward L. Glaeser	July 30–31, 2026
Methods Lecture: Estimation and Inference with AI-Generated Data	James M. Poterba	July 30, 2026
Japan Project Meeting	Kosuke Aoki, Shiro P. Armstrong, Charles Yuji Horioka, and David Weinstein	August 4–5, 2026

Books



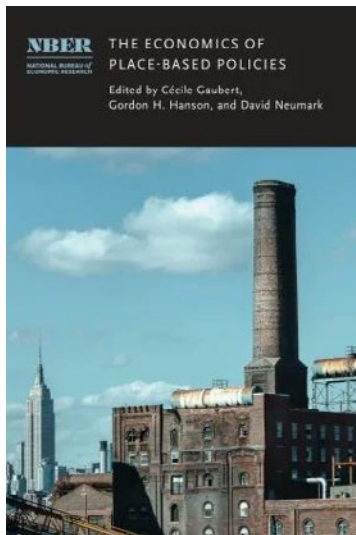
The Political Economy of Artificial Intelligence

Ajay K. Agrawal, Erik Brynjolfsson, and Anton Korinek, editors

What happens to an economy when machines can think as well as, or even better than, humans? **The Economics of Transformative AI** tackles this issue, which is one of the most consequential economic questions of our time.

Sixteen research studies from top economists examine how transformative AI reshapes everything from innovation and market structure to employment, inequality, and human purpose. They explore both opportunities, such as personalized algorithmic assistance, accelerated scientific discovery, and new forms of organization, as well as profound challenges, including potential labor displacement, rising concentration of power, changes in the information ecosystem collapse, and even possible existential risks to humanity.

The studies in this volume develop economic frameworks for understanding the conditions under which AI might enhance or undermine human flourishing. They offer policymakers, researchers, and business leaders the analytical tools needed to prepare for the potential economic transformations ahead.



The Economics of Place-Based Policies

Cecile Gaubert, Gordon H. Hanson, and David Neumark, editors

After decades of skepticism about place-based policies, recent initiatives including Opportunity Zones and some elements of the Inflation Reduction Act signal renewed policy interest in targeting economically distressed areas. The **volume** surveys empirical findings from the US and Europe on the effectiveness of these policies, explores new theoretical rationales for geographic targeting, and examines the institutional contexts that shape policy design and implementation.

Contributors evaluate major place-based initiatives and consider nontraditional approaches to supporting regional economies, including large-scale industrial interventions, public employment reallocation, and economic development on American Indian Reservations.

The **volume** is not limited to empirical policy impact evaluations; it takes a broader perspective. The contributors present evaluation evidence while also emphasizing the features, implementation processes, and institutional settings that shape policy effectiveness.

They address critical questions such as: What new insights from economic theory can inform the design of place-based policies? What lessons from past policies are reflected—or ignored—in current approaches? How does US policymaking compare with European practices, and what takeaways can be derived from comparison of the two?

This **book** provides policymakers with evidence-based guidance on the design of effective interventions while offering researchers a comprehensive foundation for future study of how public policy can address geographic economic disparities.

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