

The Digest

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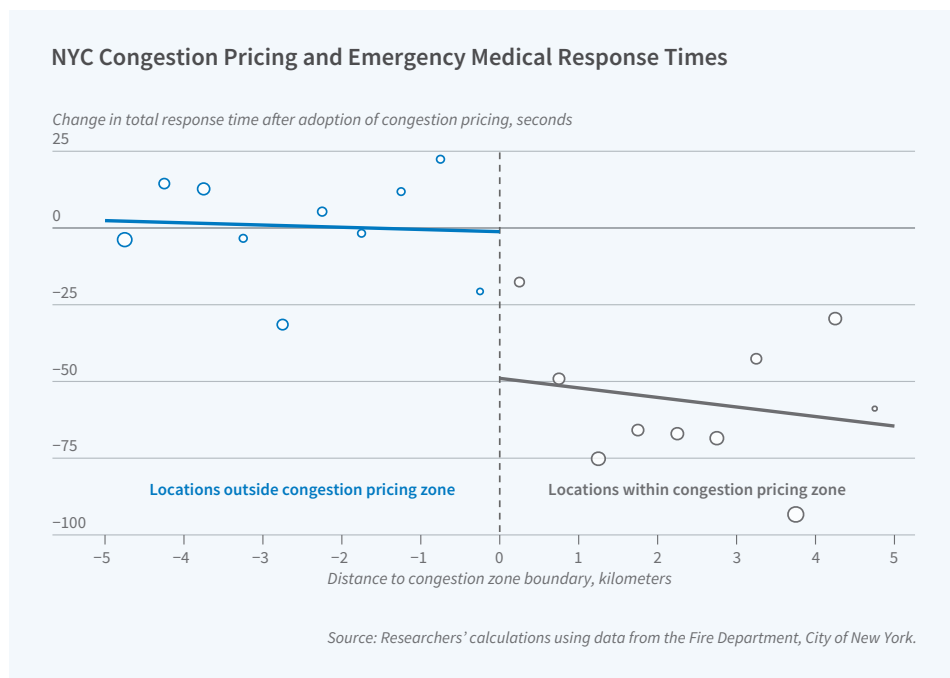
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Urban Congestion Pricing and the Response Times of Emergency Medical Services

Cities around the world, including London, Stockholm, Milan, and most recently, New York City (NYC), have adopted congestion pricing, charging drivers a fee to enter high-traffic zones. The primary motivation has been to reduce gridlock, but these policies also have other effects. In [Congestion Pricing and Emergency Medical Service Response: Evidence from New York City](#) (NBER Working Paper 35414), [Yulia Chikish](#), [Gregory J. Colman](#), [Dhaval M. Dave](#), [Brad R. Humphreys](#), [Zachary Santamaria](#), and [Zachary Winship](#) examine one of these other consequences: improvement in response time of emergency medical services (EMS). NYC implemented its congestion relief zone (CRZ), the first comprehensive congestion pricing program in the US, on January 5, 2025. The zone's boundary at 60th Street in Manhattan creates a sharp line separating tolled and untolled areas, allowing the researchers to compare locations just inside versus just outside the boundary, before and after congestion tolls took effect.

The researchers analyze dispatch records from the Fire Department of New York City for roughly half a million EMS incidents in 2024–2025, combined with traffic camera data from New York University's C2SMART research center that measures vehicle, truck, pedestrian, and bicycle density at fixed locations near the boundary. Within a 5-kilometer band around the boundary, hospital transport time—the interval between an ambulance



New York City's congestion pricing program cut total emergency medical service travel times by just over a minute on average.

leaving the incident scene and arriving at a hospital—fell by about 54–59 seconds, an improvement of roughly 8 percent relative to the pre-policy average of about 12 minutes. Total EMS travel time, combining response to the scene and transport to the hospital, declined by nearly 63–70 seconds, or almost 5–6 percent. Travel time to the incident scene itself fell by a smaller and less precisely estimated amount, about 7–9 seconds or 2 percent. Prior research has found that longer EMS response times are associated with higher 90-day mortality rates for the patients.

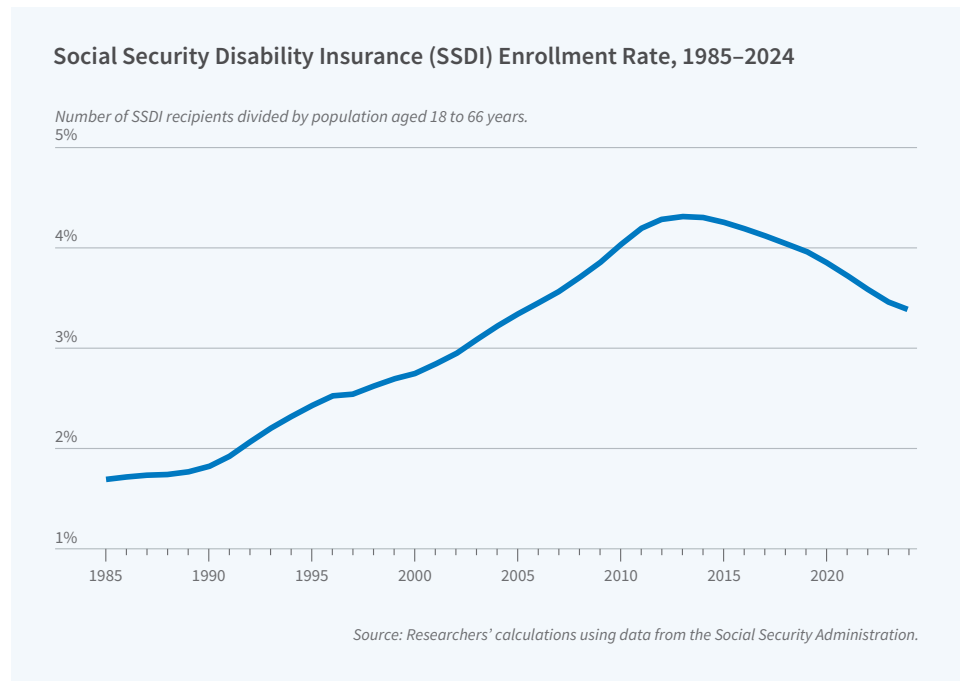
Underlying these improvements were substantial changes in traffic patterns near the boundary of the congestion pricing zone. Passenger vehicle density fell by approximately 21 percent and truck density by 18 percent, while pedestrian and bicycle density rose by roughly 14 percent and 20 percent, respectively. The EMS improvements emerged quickly after implementation and were concentrated spatially near the 60th Street boundary, with little evidence that congestion—or its associated costs to emergency response—simply shifted to nearby areas outside the CRZ.

Accounting for the Rise and Fall of Disability Insurance Enrollment

Enrollment in the Social Security Disability Insurance (SSDI) program rose sharply during the 1990s and 2000s, raising concerns among policymakers about program costs and whether benefits discouraged work. Since 2013, however, SSDI enrollment has been falling. Multiple explanations have been proposed for this decline, including the 2008 retraining of administrative law judges, population aging, improved economic conditions, and increased availability of substitute benefit programs.

Explaining the Historical Rise and Recent Decline in Social Security Disability Insurance Enrollment (NBER Working Paper 35300), by [Manasi Deshpande](#), [Maxwell Kellogg](#), [Magne Mogstad](#), and [Kuan-Ju Tseng](#), uses individual-level administrative data from the Social Security Administration to identify the sources of both the increase and decrease in SSDI enrollment. The researchers draw on the Continuous Work History Sample, a 10 percent sample of Social Security records, linked to earnings histories, disability applications, award decisions, and exit records from 1970 through 2022. They track individuals from application through award or denial and observe financial eligibility, demographic characteristics, and exit pathways (death, retirement, recovery) at the individual level. These details are unavailable in aggregated public statistics.

The researchers decompose changes in SSDI enrollment into two components: one due to shifts in population composition, such as age, sex, or earnings, and another due to changes in behavior within demographic groups, including changes in eligibility, application, award, and exit rates. They find that about 55 percent of the increase in enrollment in the 1990s and 2000s was due to higher entry rates, with another 25 percent due to lower exit rates. Population composition changes explain a smaller share, around 20 percent. The increase in entry during this period was



Rising Social Security Disability Insurance enrollment in the 1990s and 2000s was driven mainly by increasing entry rates among low-skilled women, while falling enrollment since 2013 is mainly due to declining application rates among low- to middle-skilled men.

driven disproportionately by low-skilled women. The researchers also find that virtually all of the decline in enrollment between 2010 and 2019 is attributable to declining entry rates within demographic groups, rather than to changes in population composition or exit rates. Lower application rates account for between 57 and 69 percent of the overall decrease, while lower award rates account for between 19 and 31 percent. Eligibility changes contribute very little.

The decline in applications is driven disproportionately by men, particularly younger men; older women show no decline. The decline in award rates, by contrast, is concentrated among younger women, a pattern attributed to administrative law judge retraining that reduced award rates more for less-verifiable conditions such as mental health diagnoses.

The researchers find that the decline in applications since 2010 came

disproportionately from applicants with moderate-to-severe conditions who were recently attached to the labor force, rather than from those with less-severe disabilities. Among low- to middle-skilled men, earnings rose substantially between 2010 and 2019. Improved employment opportunities for less-skilled men can explain 57 percent of the overall decline in SSDI applications and nearly all of the decline among men specifically.

Relatively little of the decline in applications can be attributed to lower award rates at the appeals level, rising administrative burdens as a result of field office closings, population health improvements, the opioid crisis, expanded access to other benefit programs including Medicaid, or population aging. Population aging actually had a positive effect on applications, since the working-age population shifted toward ages historically associated with higher SSDI receipt.

The researchers acknowledge funding from the Ronzetti Initiative for the Study of Labor Markets and the National Science Foundation (CAREER Grant 1941538).

Valuing the Dollar's Reserve Currency Status

The dollar's role as the world's primary reserve currency has allowed the United States to borrow more cheaply than other countries, an advantage that economists call the "exorbitant privilege." Foreign central banks, investors, and institutions hold Treasury bonds and other dollar assets not just for returns but for their value as safe, liquid instruments for payments and collateral. This demand generates what amounts to a fee, or seigniorage, paid by the rest of the world for access to dollar liquidity. There have been recent signs that this privilege is eroding: The premium investors pay to hold Treasuries over comparable foreign bonds has fallen since 2022. In the last two decades, foreign ownership of US public debt has dropped from roughly 45 to 30 percent, even as foreign holdings of private dollar assets have held steady.

In [Dollar Erosion: Understanding the Loss of Reserve Currency Status](#) (NBER Working Paper 35328), [Zhengyang Jiang](#), [Arvind Krishnamurthy](#), [Hanno Lustig](#), and [Robert J. Richmond](#) estimate how much US interest rates and the value of the dollar would change if the world no longer treated US safe assets as a special form of international liquidity. They develop and calibrate a general equilibrium model that incorporates Federal Reserve Flow of Funds data on the supply of US public and private safe assets and the share held by foreign investors, as well as trade data and convenience yield estimates from prior research measuring the premium investors pay for the safety and liquidity of dollar-denominated debt.

The researchers' model suggests that complete loss of reserve currency status would produce an 8.8 percent real depreciation of the dollar and a 0.9 percentage point increase in US real interest rates. These estimates correspond to a baseline calibration in which dollar bonds carry a 2 percent annual convenience yield, foreign investors hold dollar-safe

Share of Public US Dollar Bonds Held by Foreign Investors



Source: Researchers' calculations using data from the US Federal Reserve System.

Loss of the dollar's reserve currency status could result in more than an 8 percent real depreciation, an increase in US real interest rates, and a loss of US wealth of more than \$18 trillion.

assets equal to roughly 52 percent of US GDP, and the consumption-basket weight on foreign goods is 5 percent, which corresponds to a strong home bias in US consumption.

The size of the required depreciation depends heavily on the extent of home bias and on the elasticity of substitution between US and foreign goods, a measure of how readily consumers switch from one country's goods to another's when relative prices change. When this substitutability is low, or when home bias is strong, prices have to move more to bring goods markets back into balance, implying a larger currency adjustment. In an alternative calibration with a higher trade elasticity, the estimated depreciation falls to 5.1 percent. In another calibration that further restricts the consumption-relevant trade share, the depreciation estimate rises to at least 17 percent.

Loss of reserve status would require domestic investors to absorb dollar-denominated bonds worth roughly 50 percent of GDP that were

previously held abroad. Because domestic investors are only willing to hold a larger quantity if they receive a higher interest rate in return, this reabsorption is estimated to raise the US real interest rate by approximately 90 basis points. Unlike the exchange-rate response, the estimated change in the interest rate proves stable across different assumptions about trade elasticities and consumption patterns. It depends on bond-market rather than goods-market parameters.

Given the fall in the value of the dollar and the rise in real interest rates, the researchers calculate that the loss of reserve currency status would impose a wealth loss on the United States. Using historical values of risk-adjusted discount and growth rates, they estimate that the present value of the foregone seigniorage revenue equals approximately 60 percent of US GDP, or roughly \$18 trillion. With forward-looking estimates of discount and growth rates, this present value is even greater.

How Do Falling Birth Rates Affect Economic Growth?

The global crude birth rate—the number of births per 100 people—fell from 3.78 in 1950 to 1.71 in 2025. The United Nations projects that populations will begin shrinking in most countries later this century. This will be the first episode of sustained population decline since the fourteenth-century bubonic plague. China, Japan, and South Korea now have some of the lowest birth rates on record and are projected to see substantial population declines and sharply older workforces by the middle of the twenty-first century.

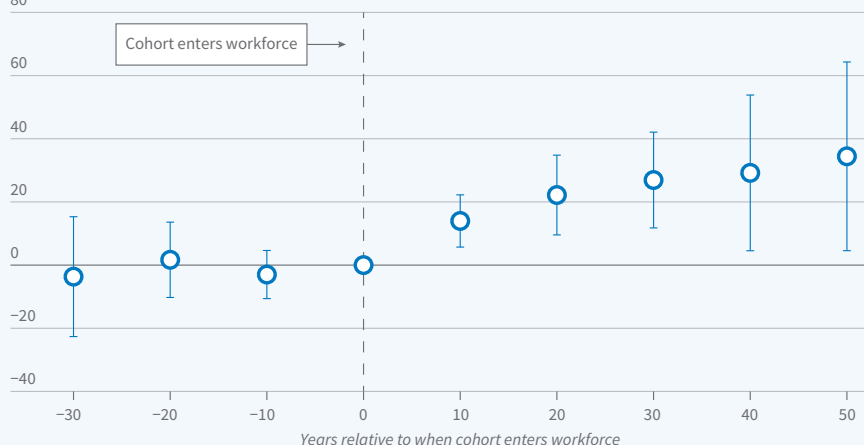
Older workers are often assumed to be less productive and innovative than their younger counterparts, so falling birth rates are sometimes viewed as harbingers of slowing economic growth. Shrinking labor forces can lower aggregate demand and investment. In *Baby Busts and Growth Booms: Demographic Change and the Macroeconomy* (NBER Working Paper 35401), [Daron Acemoglu](#), [David Autor](#), [Keelan Beirne](#), and [Andrew Scott](#) examine seven decades of demographic change to test whether falling birth rates have been associated with weaker economic performance.

The researchers use cross-country data from 1950 to 2020, relating birth rates to subsequent changes in GDP per working-age adult 20 years later (20 years being roughly the interval between birth and workforce entry). They also study age-composition-adjusted wage growth across 722 US commuting zones, controlling for initial income levels and the number of younger and older workers.

Across countries, a 1-percentage-point lower birth rate in 1950 is associated with 23 log points higher GDP per worker in 2020. A comparable relationship holds for US

Birth Rates and Log GDP per Worker Across US Commuting Zones, 1950–2020

Change in log GDP per worker from a 1 percentage point drop in birth rate 20 years before cohort enters workforce



Source: Researchers' calculations using data from the US Census Bureau.

Declining birth rates over the past seven decades have been associated with higher GDP per worker and higher wages, perhaps because labor scarcity spurs labor-saving technological innovation.

commuting zones: A 1-percentage-point lower birth rate in 1940 is associated with faster composition-adjusted wage growth, by about 15 log points, between 1960 and 2020. These relationships are robust to the inclusion of controls for education, urbanization, and regional trends, and are similar in magnitude whether measured using birth-rate variation from the baby-boom era or the baby-bust era.

Despite these gains in output and wages per worker, the researchers find no statistically significant relationship between birth rates and aggregate GDP or earnings. Lower birth rates raise income per worker without reducing total economic output, even though they shrink the working-age population.

Investigating the mechanism at work linking lower fertility with higher income per worker reveals that countries with lower birth rates show larger shares of high-tech exports, more patenting in labor-saving categories (such as automation and information/communication technologies), and faster growth in total factor productivity. A 1-percentage-point lower birth rate is associated with 15 log points higher total factor productivity growth over 30 years. US commuting zones with lower birth rates show a similar reallocation of employment toward high-tech and R&D-intensive industries and away from labor-intensive ones. Capital stocks also rise following declines in birth rates, in contrast to the prediction of standard growth models that a shrinking labor supply should reduce investment.

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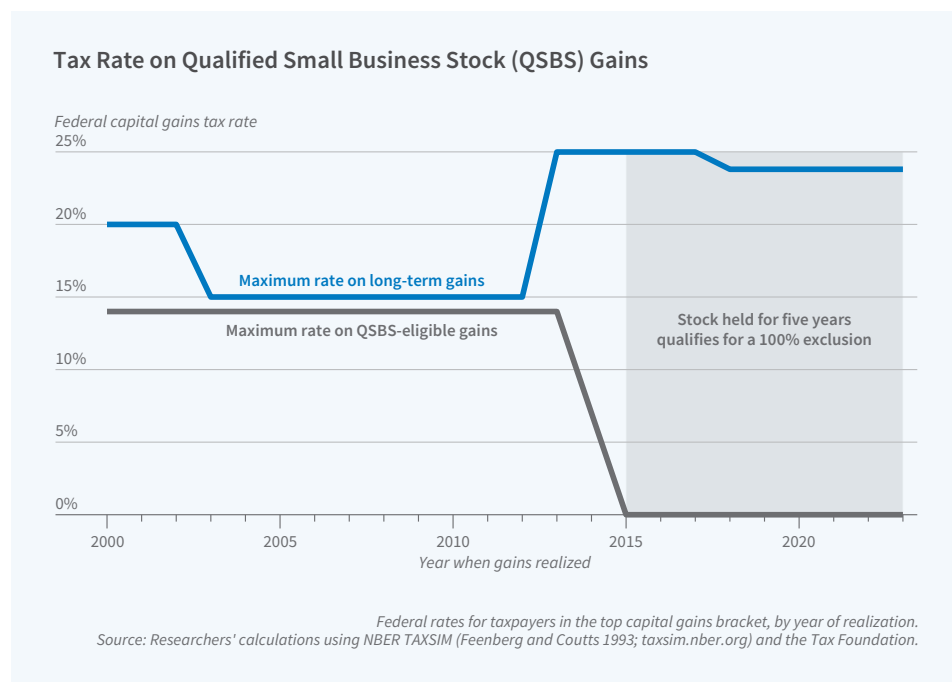
Capital Gains Taxation and Investor Risk-Taking

Many countries offer tax relief to investors in risky, young, innovative firms. Whether tax subsidies aimed at startup investing affect the level or direction of investment, or simply offer sophisticated investors a tax arbitrage opportunity that boosts returns without changing investment behavior, is a perennial question.

In [Tax Incentives and Venture Capital Risk-Taking: Evidence from the QSBS Program](#) (NBER Working Paper 35418), [Murillo Campello](#) and [Guilherme Junqueira](#) examine how investors respond to changes in the Qualified Small Business Stock (QSBS) program. This US tax incentive, offered by federal and state governments, reduces capital gains taxes on qualifying startup investments held for at least five years. The researchers focus in particular on venture capitalists (VCs), whose general partners receive incentive-based compensation tied to fund returns. They compare VC behavior to that of angel investors, who invest their own capital, and corporate investors, who face a different tax regime.

The researchers study the American Recovery and Reinvestment Act of 2009 and the Small Business Jobs Act of 2010, which together moved QSBS from excluding a small share of capital gains from taxation to eliminating capital gains taxes entirely on qualifying investments. The study draws on investment-level data from PitchBook covering 39,000 investors and 35,000 portfolio companies. These data track 158,000 investor-firm relationships between 2004 and 2022, following each from initial investment through exit or failure.

VCs systematically shift toward riskier investments when QSBS tax benefits apply, while angel and corporate investors show no comparable change. In eligible sectors after 2009, VC investments become 81 percent



Capital gains tax relief leads venture capitalists, but not angel or corporate investors, to shift their portfolios toward riskier, more innovative startups.

more likely to target pre-commercial-stage startups, whose viability is highly uncertain. When QSBS applies, VCs are also nearly twice as likely to invest in startups carrying preexisting debt, and they are more likely to invest in startups located outside their home state or industries in which they have no prior track record. At the same time, VCs reduce their reliance on external risk-sharing mechanisms: They are 16 percent less likely to participate in large investment syndicates.

Tax-advantaged VC investments in eligible sectors experience a 71 percent higher rate of complete business failure relative to non-tax-advantaged VC investments. At the same time, tax-advantaged VC investments that do succeed generate substantially higher returns than non-QSBS investments. Portfolio companies that qualify for QSBS and reach an exit show more

than double the valuations and are nearly four times as likely to achieve “unicorn” status (a valuation above \$1 billion). None of these patterns—the increased risk-taking in project selection, elevated failure rates, and valuation gains—appear among angel investors, who face the same tax subsidies, or among corporate investors, who are subject to a different tax regime.

The researchers also find that a 1-percentage-point increase in the tax subsidy is associated with an approximately 2 percent increase in the share of investors exiting exactly at the five-year threshold, indicating that investors strategically time their exits to capture the tax benefit. Larger VC funds, which earn higher carried-interest fees, and funds backed by more sophisticated limited partners, such as elite university endowments, show stronger risk-taking responses to the tax subsidy.

Artificial Intelligence and Hedge Fund Investing

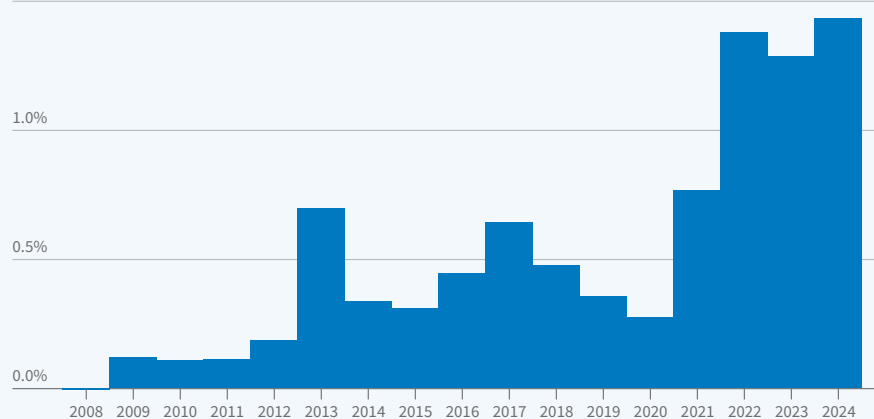
Asset managers are constantly searching for new ways to generate excess returns, since the value created by most existing strategies fades with time and scale. Artificial intelligence (AI) has emerged as one new approach, with managers increasingly applying machine learning and related techniques to predict price movements and generate trading signals. In [The Growth and Performance of Artificial Intelligence in Asset Management](#) (NBER Working Paper 35273), [Shuang Chen](#), [Clemens Sialm](#), and [David X. Xu](#) construct a large-scale dataset combining investment advisers' regulatory disclosures, job postings, and fund strategy descriptions to identify funds that use AI in investment decisions, as opposed to research support or operational efficiency.

The researchers analyze over 116,000 investment adviser disclosures filed with the SEC between 2012 and 2024, using a large language model to classify each filing into categories ranging from "AI-Autonomous," where AI directly drives investment decisions, to "AI Risk Disclosure," where AI is mentioned only in risk disclaimers. They also link advisers' regulatory filings to Lightcast job posting data to measure AI-related hiring intensity, and examine fund-level performance using year-by-year historical information from the Hedge Fund Research database spanning 2005 through 2024. They apply similar AI classifications to fund strategy descriptions for 7,896 US hedge funds. Funds are classified as "AI-driven" only if their strategy descriptions explicitly reference techniques for applying AI technologies to predictive modeling and trading signal generation.

AI-driven hedge funds outperformed non-AI funds by approximately

Assets Under Management of AI-Driven Hedge Funds

Percentage of USD-denominated US hedge fund assets
1.5%



Funds are labeled AI-driven if their quantitative strategy descriptions explicitly reference techniques for applying AI.
Source: Researchers' calculations using data from the Hedge Fund Research database.

50 basis points per month before 2017, but this outperformance was statistically indistinguishable from zero in later years. The findings are consistent with an annual decline of about 6 basis points in the monthly return advantage of AI-driven funds. Funds that adopted AI early did not retain a lasting advantage: Their outperformance also faded after 2017, suggesting that the decline reflects a trend among all AI funds rather than differences between early and late AI adopters.

The researchers compare AI-driven funds to non-AI "sibling" funds managed by the same adviser, a research design that controls for firm-level characteristics, and find that AI funds outperformed their siblings by approximately 35 basis points per month. This suggests that the documented outperformance is attributable to AI-driven strategies themselves rather than unobserved differences across advisory firms.

Contrary to concerns that AI adoption might increase herding and homogenize investment strategies across funds, AI-driven funds exhibit lower return comovement than non-AI funds within the same strategy category. The average pairwise correlation among AI-driven funds was 0.021, compared with 0.124 among non-AI funds. This suggests that AI-driven funds pursue diverse trading approaches rather than crowd into similar signals.

AI-driven investing is heavily concentrated in hedge funds pursuing diversified macro strategies trading liquid instruments. AI funds represented about 2.7 percent of sample hedge funds in 2023 and held about \$12 billion in assets under management in 2024. The researchers find no evidence that investors directed additional capital to funds based on AI disclosures alone, absent demonstrated returns.

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