

The Digest

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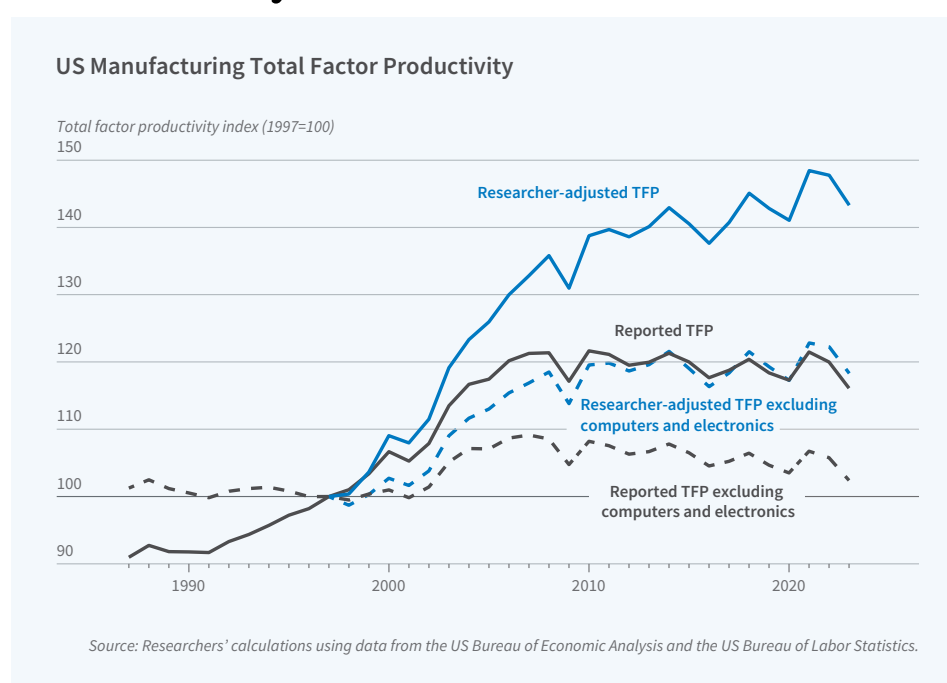
Product Quality Improvement and US Manufacturing Productivity

Conventional measures suggest that US manufacturing productivity has stagnated over the past 15 years. In [Why Is Manufacturing Productivity Growth So Low?](#) (NBER Working Paper 34264), [Enghin Atalay](#), [Ali Hortaçsu](#), [Nicole Kimmel](#), and [Chad Syverson](#) challenge this finding and suggest changes to the calculation methodology.

The Bureau of Labor Statistics (BLS) total factor productivity index for manufacturing increased by 1.2 percent per year between 1987 and 2009, outpacing the 0.9 percent growth rate for the overall economy. But the pattern flipped from 2009 to 2023 when the annual growth rate of manufacturing productivity fell slightly and the overall economy maintained a 0.8 percent annual growth rate. Manufacturing's apparent stagnation is of particular significance because its quality gains tend to spill over to the larger economy.

The BLS relies on producer-facing price indices, gross output deflators, and import price indices when distinguishing between price increases attributable to quality improvements and those due to inflation. The researchers contend that in manufacturing, producer-facing indices fail to fully capture quality improvements. The Personal Consumption Expenditures (PCE) Price Index, which is largely derived from the Consumer Price Index, identifies quality changes in many more product categories and may be a better gauge for estimating productivity growth.

The gap between the PCE Price Index and the producer-facing indices



is most pronounced for durable goods, which have benefited a great deal from quality changes. The average annual price increase is 2.6 percentage points higher when using producer-facing indices than when using the PCE Price Index. The researchers find no such gap between indices in nonmanufacturing sectors of the economy.

Nearly all the manufacturing sector's productivity growth since 1987 stems from a single subsector: Computer and Electronic Products. Televisions are an example of a product in this subsector. Between 1997 and 2023, the average price change was –15.4 percent per year, according to the PCE Price Index, but only –3.0 percent as measured in the producer-facing price indices.

The researchers correct for productivity mismeasurement through a series of calculations involving input and output prices. They find that annual growth is most understated in the Computer and Electronic Products subsector. Their estimate is 5.7 percentage points per year above the conventional measure. For the durable goods sector, their estimate is 1.6 percentage points higher. For nondurable manufacturing, it is 0.5 percentage point per year higher. For the overall manufacturing sector, the researchers continue to find a decline in growth, but at higher levels. They estimate that the growth rate fell from 2.2 percent between 1997 and 2009 to 0.6 percent between 2009 and 2023.

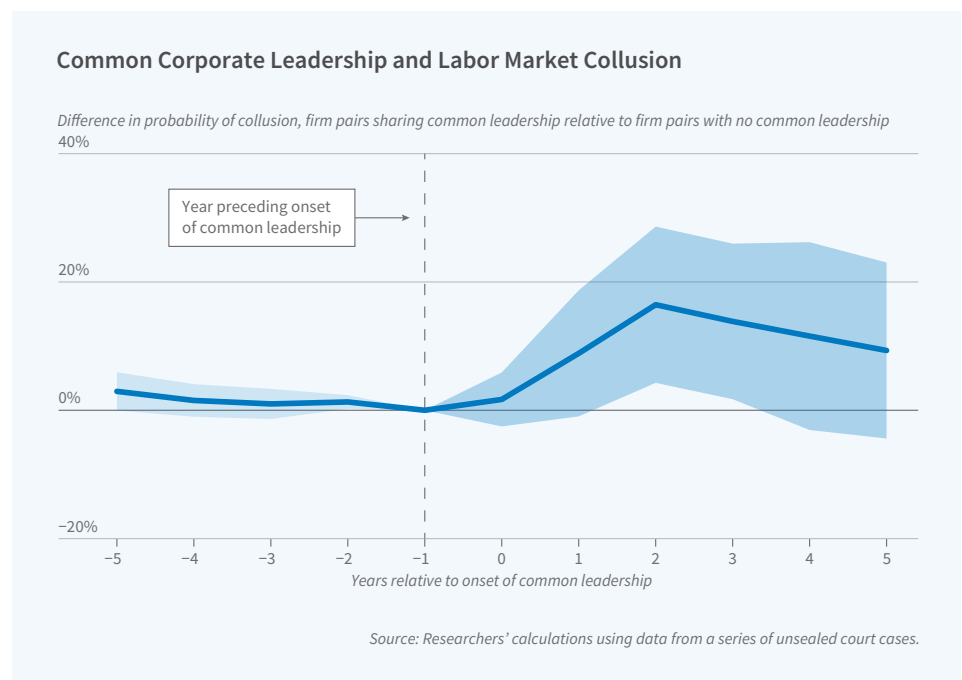
—Steve Maas

Overlap in Corporate Leadership Increases Collusion

Firms are more likely to agree not to recruit each other's employees if they share the same senior executives or members of their boards. In [Collusion Through Common Leadership](#) (NBER Working Paper 33866), [Alejandro Herrera-Caicedo](#), [Jessica Jeffers](#), and [Elena Prager](#) analyze information and records that became available in connection with “the largest known case of modern US labor market collusion.” The records came to light as the result of a court case brought against eight Silicon Valley firms by the US Department of Justice in 2010, followed by civil lawsuits implicating several dozen more firms. The information includes email trails and human resource documents that detail “no-poaching” agreements.

The behavior that was prosecuted in the cases began in the early 2000s, when tech companies faced a talent shortage. They would “cold call” other firms’ employees with attractive job offers, believing them to be of higher quality than people who had applied for a job on their own. Bidding wars would often ensue, driving up worker compensation generally, not just for the workers being recruited. To avoid this outcome, some firms established no-poaching agreements with their rivals, typically ruling out making unsolicited job offers to any of a rival’s employees. Some agreements went further and proscribed bidding wars even when an employee independently applied for a job at a rival company.

One of the earliest no-poaching agreements was established in 2005 when Apple CEO Steve Jobs asked Google co-founder Sergey Brin to stop recruiting Apple workers. That agreement triggered a wave of pacts



Common leadership between two firms increases the probability of a no-poaching agreement by 11 percentage points.

that eventually implicated 65 companies. By entering into agreements to not compete for workers, the firms were violating federal antitrust laws. The companies apparently felt that they had little to fear, since historically antitrust laws had rarely been enforced in labor collusion cases.

The researchers’ sample covers 43 colluding firms, 63 percent of which shared a leader with at least one other firm that was in the research sample between 2000 and 2009. For reference, 38 percent of public companies nationwide share a high-level leader with another public firm, often another firm in the same industry. In the study, the probability of adopting a no-poaching agreement rose by 11 percentage points after the onset of common leadership, compared with a baseline rate of 1.2 percent among firms without shared leader-

ship. The probability of establishing a no-poaching agreement peaked two years after the onset of common leadership. Collusion may have been more likely if the shared leaders were executives—and thus more hands-on—than if they were board members. It was more likely if the firms shared labor pools and slightly more likely if the firms had a high degree of common ownership, but it was not related to product market competition.

The researchers conclude that common leaders may serve as a useful flag for competition authorities. Although enforcing the existing prohibition on common leaders may come with other costs, extra scrutiny of competing firms that share leaders is likely to reduce collusion.

—Steve Maas

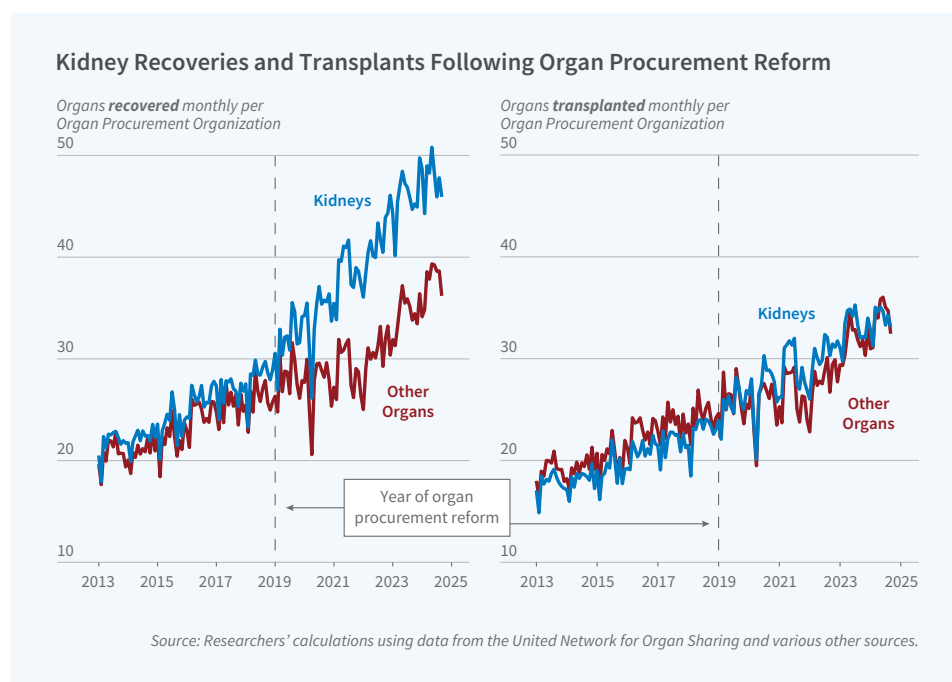
Consequences of Organ Procurement Reform

In 2019, the United States introduced new regulations for Organ Procurement Organizations (OPOs) designed to increase transparency and accountability in the organ donation system. These changes implemented stronger performance incentives aimed at improving outcomes in a sector that handles over 45,000 transplants annually and manages a waiting list of more than 100,000 patients. In [Economic Incentives and Organ Procurement: Evidence from a US Reform](#) (NBER Working Paper 34140), [Erkut Y Ozbay](#), [Ariel Rava](#), [Sergio S Urzúa](#), and [Emanuel Zur](#) examine the impact of this reform on organ donations, transplant activity, and system costs.

The reform replaced inconsistent, self-reported performance metrics with standardized, independently verified measures. Currently, the 56 OPOs operating across the United States hold monopolistic rights within their designated service areas to recover donor organs from the deceased. The reform introduced a three-tier performance ranking system that automatically recertifies high-performing OPOs, while lower-performing organizations face intensified oversight or potential decertification.

Using comprehensive data from Freedom of Information Act requests and official transplant records from 2015 to 2024, the researchers compare kidney procurement with that of other organs. Because Medicare provides full reimbursement for kidney procurement costs, the OPOs have strong financial incentives to prioritize kidney recovery over recovery of other organs.

After the reform, the average number of kidneys procured per OPO per month increased by just over 7, a nearly 30 percent increase relative



A 2019 US reform of Organ Procurement Organizations increased kidney recoveries by 29 percent and resulted in an estimated \$359 million in fiscal savings.

to the pre-reform baseline of about 25. However, only 39 percent of these newly recovered kidneys were transplanted, compared to 81 percent prior to the reform, suggesting that financial incentives drove procurement activity even when transplant outcomes were uncertain.

The reform's impact varied across OPO performance tiers. Mid-performing OPOs showed the largest increases with 8.7 additional kidneys per month, compared to 7.4 for top-performing and 6.0 for low-performing OPOs. The increased organ recovery came primarily from strengthening relationships with hospitals that had only occasional pre-reform interactions with OPOs, rather than establishing entirely new partnerships.

Increased procurement came with higher costs. Total kidney-related procurement costs rose by an

average of \$2.63 million per OPO per year. The researchers estimate that between January 2019 and September 2024, the reform generated approximately \$1.96 billion in reduced aggregate dialysis costs. After accounting for increased OPO operational spending, they calculate net savings of roughly \$359 million to US taxpayers through 2023.

While the reform, along with Medicare's guaranteed reimbursement for kidney procurement, increased organ procurement and generated fiscal benefits, the researchers note that it may also have led to resource concentration on kidneys at the potential expense of other organs, like hearts, livers, and lungs, which have shorter viability windows and face more complex reimbursement structures.

—Abby Hiller

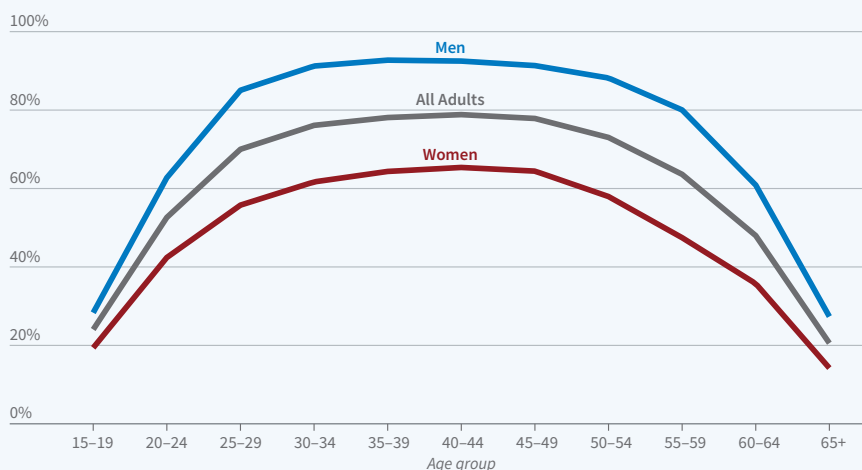
Variation in Working Hours Across Countries and Over Time

Past studies of working hours have covered limited sets of countries or focused primarily on wealthy nations, leaving significant gaps in our understanding of global labor patterns. In *Global Working Hours* (NBER Working Paper 34217), Amory Gethin and Emmanuel Saez construct the most comprehensive database on working hours to date, covering 160 countries and 97 percent of the world's population. They combine labor force surveys from multiple sources, including the International Labour Organization, the World Bank, and national statistical offices, and assemble both cross-sectional data for recent years and time series spanning over 20 years for 86 countries.

The researchers find that globally, adults aged 15 and older supply an average of 24.5 hours per week to market work, with 59 percent of adults employed. Women account for 35 percent of global market work hours, with the gender gap driven primarily by lower employment rates for women (47 percent) than for men (71 percent). The relationship between economic development and working hours is complex. Hours worked per adult increase modestly from 23 in low-income countries to 26 in upper-middle-income countries, then decrease sharply to 20 hours in high-income countries.

Globally, individuals between the ages of 15 and 19 work 7.4 hours per week on average, while those over the age of 60 work 11 hours. Prime-age adults aged 20–59, 72 percent of whom are employed, work an average of 43.5 hours when employed, resulting in an average of 30.6 hours of work. The researchers find that increasing school attendance by 1 percentage point decreases youth work by about 0.25 hours per week. Both youth and

Global Employment Rates by Age



The sample includes 160 countries, covering 97% of the world adult population. Source: Researchers' calculations using multiple sources on global household data.

Global working hours follow a bell-shaped pattern with economic development, with prime-age hours remaining remarkably stable as male hours fall and female hours rise.

elderly hours decline with development, while prime-age hours show remarkable stability.

Male prime-age hours decline from 35 per week in lower-middle-income countries to 24 in high-income countries. Women's prime-age hours show the opposite pattern, increasing with development. The researchers find that moving from 0 percent to 100 percent Muslim/Hindu population share reduces female work by 12 hours, while being a former communist country is associated with an increase of 5.5 hours in female working time.

Agricultural workers maintain steady hours around 40 per week across all development levels. In middle-income countries, manufacturing and market services workers average around 50 hours per week, substantially higher than agricultural workers. The researchers note that

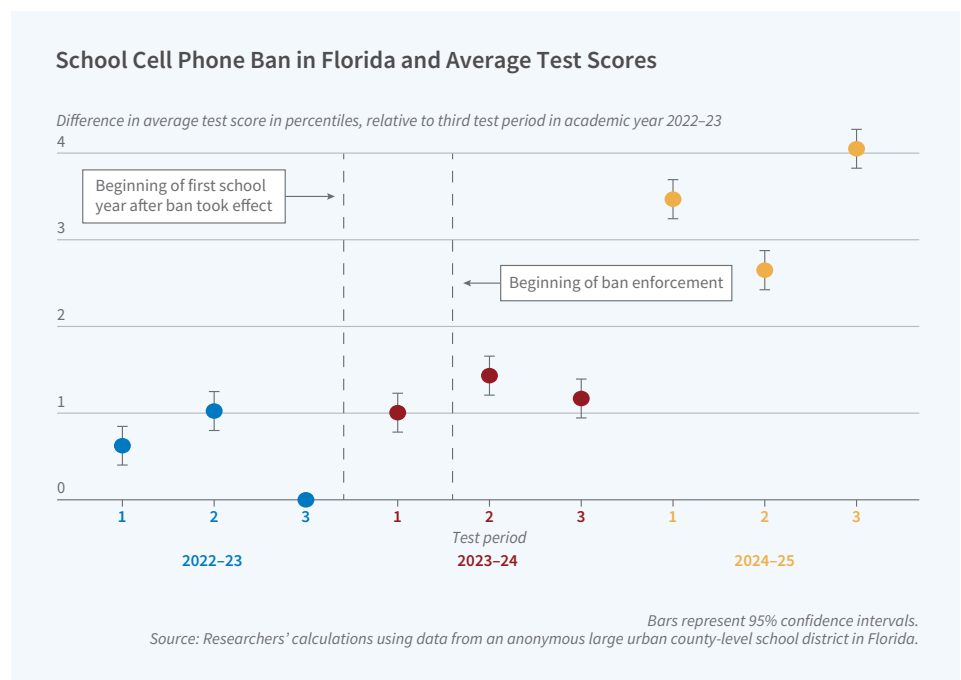
because the share of agriculture is large in poor countries and declines dramatically with development, this structural transformation contributes to the increase in hours in the early stage of development.

Additionally, the researchers examine how hours vary with the level of government spending on social programs, the fraction of workers in formal jobs with contracts and protections, and the stringency of workplace rules. An increase in social spending of 1 percent of GDP is associated with a decline in work hours of between 2 and 3 percent. Moving from a setting with no workers with formal jobs to one with all workers in formal employment is associated with close to a 50 percent drop in working hours. Similarly, countries with the strictest workplace regulations (like France) see about 20 percent fewer working hours than countries with no regulations.

School Cell Phone Bans and Student Achievement

Two years after the imposition of a student cell phone ban, student test scores in a large urban school district were significantly higher than before, [David N. Figlio](#) and [Umut Özek](#) find in [The Impact of Cell phone Bans in Schools on Student Outcomes: Evidence from Florida](#) (NBER Working Paper 34388). The study examines data from one of the 10 largest school districts in the United States, a large urban county-level school district in Florida. While Florida's statewide law banned cell phone use during instructional time, this district implemented a stricter policy requiring students to keep phones silenced and stored in backpacks during the entire school day, including lunch and transitions between classes.

The researchers combined two datasets to conduct this analysis. First, they accessed student administrative data for the year prior to the ban (AY 2022–23) and two years following the ban (AY 2023–24 and AY 2024–25). These data are reported to the district three times annually and include information on student demographics, attendance, disciplinary actions, and standardized test scores. Second, they examined building-level smartphone activity data from Advan for district schools. This data traced the average number of unique smartphone pings between 9 am and 1 pm on school days. To isolate the effects of student usage, the team compared normal school days to professional-only working days. They then compared the last two months of AY 2022–23 (pre-ban) to the first two months of AY 2023–24 and AY 2024–25 (post-ban) and found an average drop in usage of approximately two-thirds. The relative level of usage reduction was used to sort the district's schools into high-effect (top tercile of pre-ban usage) and



An all-day cell phone ban within a Florida school district improved test scores, particularly for male students and in middle and high schools.

low-effect (bottom tercile of pre-ban usage) pools.

During the first month of the ban (September 2023), student suspensions rose 25 percent relative to the same month of the prior school year. Elevated disciplinary rates persisted for the full school year. The effects were particularly stark among Black male students, whose in-school suspension rates increased 30 percent at the highly affected schools. Even among the most affected schools and population groups, however, disciplinary action rates fell to near pre-ban levels by the start of the following school year. The researchers posited that this represented a period of adjustment to the new policy rather than an indication of a long-term negative effect of the ban's implementation.

There were no statistically significant changes in test scores during the first year of the ban, when disciplinary rates were high. During the

second year of the ban, in contrast, test scores increased significantly, with positive effects concentrated during the spring semester (scores increased 1.1 percentiles, on average). The researchers suggest that this may be due to the higher stakes of spring tests, which can affect grade advancement and high school graduation. Test score improvements were also concentrated among male students (up 1.4 percentiles, on average) and among middle and high school students (up 1.3 percentiles, on average).

When comparing high-effect and low-effect schools, the researchers note significant reductions in unexcused absences during the two years following the cell phone ban. They posit that increased attendance could explain as much as half of the test score improvements noted in their primary analysis.

—Emma Salomon

The researchers thank the Smith Richardson Foundation for generous research funding.

Consumer Response to a Tax on Sweetened Beverages

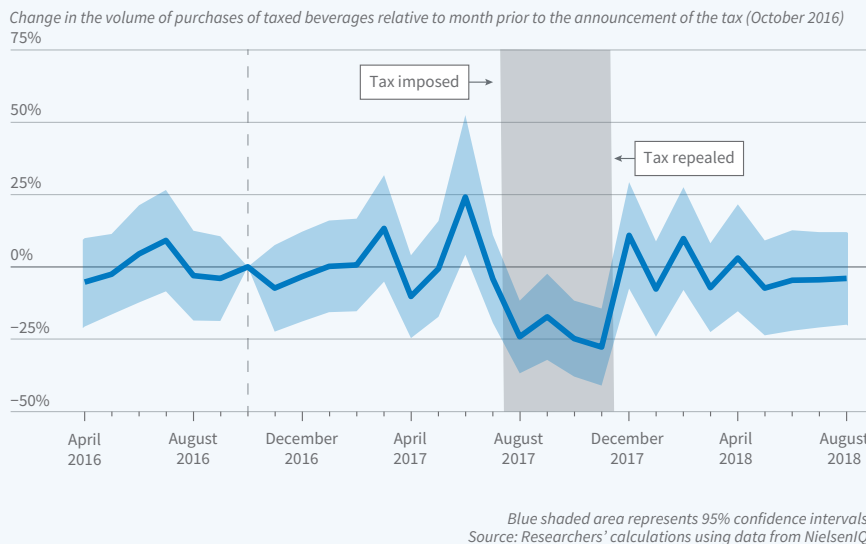
Sugar-sweetened beverages contribute over 40 percent of American adults' daily intake of added sugars and are associated with weight gain, which can lead to elevated rates of obesity and diabetes. In response, numerous cities and regions worldwide have implemented taxes on sweetened beverages to encourage healthier consumption patterns.

In *The Cook County Tax on Sweetened Beverages: The Impact on Purchases of Its Announcement, Implementation, and Repeal* (NBER Working Paper 34412), Felipe Lozano Rojas, John Cawley, and David E Frisvold examine how consumers responded to a one-cent-per-ounce tax on both sugar-sweetened and artificially sweetened beverages that was enacted in Cook County, Illinois, in November 2016, implemented in August 2017, and repealed just four months later in December 2017.

The researchers analyze data from the NielsenIQ Homescan Panel, which tracks household purchases. They use a balanced panel of 1,311 households observed continuously from January 2016 through December 2018, including 712 households in Cook County and 599 in comparison counties (St. Louis, Hennepin, and Ramsey counties). The study covers 10 months before announcement, 9 months between announcement and implementation, 4 months when the tax was effective, and 13 months after repeal.

The study finds no detectable impact on purchases from merely announcing the tax. However, implementation reduced purchases by 22.5 percent for all taxed beverages, 16.5

Consumer Purchases of Taxed Beverages: Cook County, Illinois



A one-cent-per-ounce tax on sweetened beverages in Cook County, Illinois, reduced household purchases of taxed beverages by 22.5 percent during its four-month implementation, but purchases returned to baseline levels immediately after repeal.

percent for high-calorie taxed beverages, and 33.0 percent for low-calorie taxed beverages. These reductions translate to approximately four fewer 12-ounce cans per person per month.

The tax's impact did not vary significantly by household income, education, race, or presence of children. Notably, the tax produced no detectable increase in purchases of potential substitutes including bottled water, 100 percent fruit juice, or milk. After the repeal of the tax, purchases returned to baseline levels with no evidence of lasting behavioral change or habit formation.

Most of the tax effect was on the extensive margin—whether households purchased taxed beverages at all—rather than the intensive margin of how much they bought conditional on purchasing any. During the tax period, Cook County households were 37.6 percent less likely to purchase any taxed beverages in a given month. The probability of purchasing high-calorie taxed beverages fell 31.9 percentage points. Store-level data from Cook County show similar but slightly larger reductions in sales than the household data on purchases, perhaps reflecting cross-border shopping.

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