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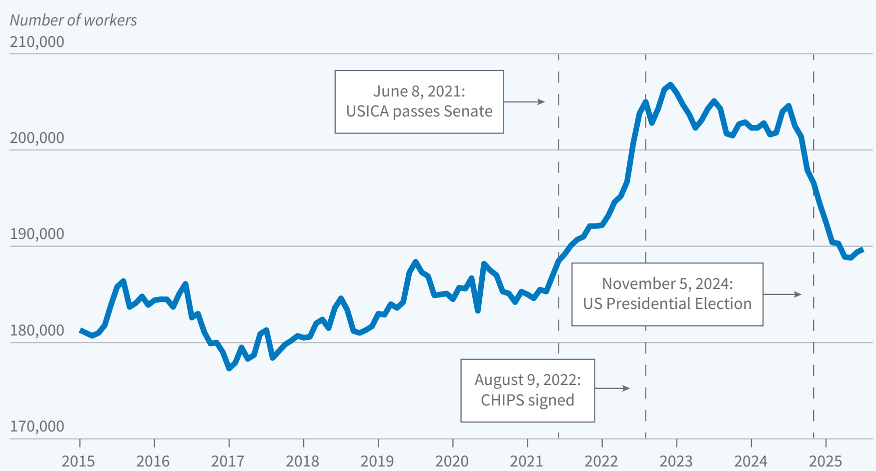
Job Growth in Counties Targeted by the CHIPS and Science Act

The CHIPS and Science Act, passed in August 2022, committed the federal government to spending nearly $53 billion to revitalize domestic semiconductor production. While job creation was a central argument of the legislation's proponents, there has been limited assessment since its passage of whether the act delivered on employment promises. In Employment Impacts of the CHIPS Act (NBER Working Paper 34625), Bilge Erten, Joseph E. Stiglitz, and Eric Verhoogen use county-level data to provide empirical evidence on the short-term employment effects of this legislation.

The study applies two difference-in-differences research designs to data from the Quarterly Census of Employment and Wages. The first compares 149 counties with preexisting semiconductor facilities to 752 counties with high-tech employment but no semiconductor production. The second compares 83 counties with semiconductor fabrication facilities, the facilities that were the focus of funding, to 66 counties with semiconductor facilities but no fabrication plants. Both research designs assume these pairs of county groups would have followed parallel employment trends absent the CHIPS Act.

The researchers find that employment increases in the counties that were better positioned for CHIPS Act support started when the precursor United States Innovation and Competition Act (USICA) was introduced to the Senate in May 2021 (where it quickly found bipartisan support). This suggests that firms anticipated eventual federal support and made hiring decisions accordingly. Stock market evidence supports this interpretation: semiconductor firms experienced significant abnormal returns on May 19, 2021, when the USICA was introduced, but showed little reaction to the act's actual passage or signing.

US Employment in the Semiconductor Industry



A modified version of the USICA became law as the CHIPS and Science Act.
Source: Researchers' calculations using data from the US Bureau of Labor Statistics.

The researchers estimate direct employment gains of 110 jobs per affected county in the semiconductor production sector in the first difference-in-differences design, representing a 12.7 percent increase relative to pre-USICA employment levels. They estimate larger absolute effects of 180 jobs per affected county with fabrication facilities in the second design, an 11.8 percent increase in these counties. These impacts emerged over the five quarters following the USICA's Senate passage and stabilized around the time the CHIPS Act was signed.

The study finds robust evidence of spillover effects on local construction employment. The researchers estimate that there were 136 additional nonresidential construction jobs per affected county with semiconductor production, and 203 jobs per county with fabrication facilities. The study does not find evidence, however, of spillovers to wages in the semiconductor sector, employment in upstream input industries, or county-level GDP.

Nationally, the researchers estimate that the legislation created approximately 15,000 jobs in the core semiconductor sector. Their estimate of the total employment gain, including jobs in related sectors such as semiconductor equipment and materials manufacturing, upstream inputs, and construction, is between 30,000 and 46,000 jobs.

The findings suggest that targeted industrial policy can generate measurable short-term employment gains in strategic sectors. However, the employment effects are modest relative to the CHIPS and Science Act appropriation, in part reflecting the highly capital-intensive nature of semiconductor production.

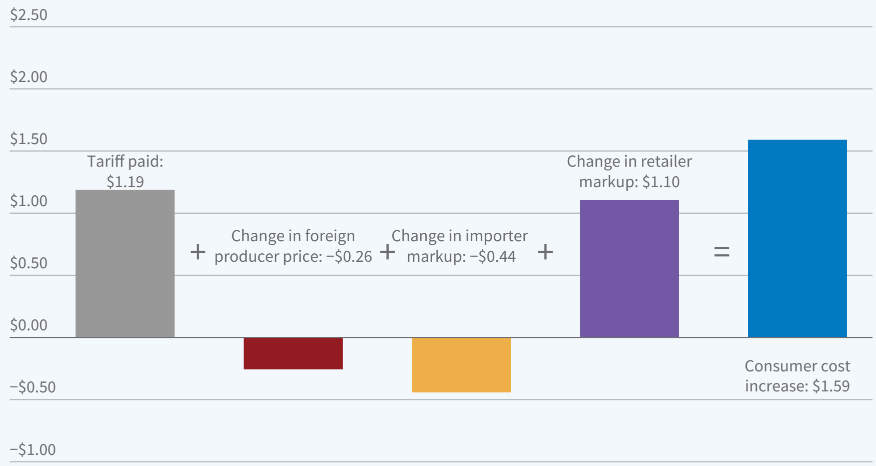
The researchers acknowledge support from the Alfred P. Sloan Foundation (grant no. G-2023-21088) and the Center for Political Economy's Firms and Industrial Policy Idea Lab at Columbia University.

Pass-Through of Tariffs: Evidence from European Wine Imports

The incidence of tariffs on producers, in the form of lower pre-tariff prices, and consumers, in the form of higher tariff-inclusive prices, is a long-standing issue in international economics. While economic theory suggests various possibilities, empirical evidence on the distribution of tariff burdens across the supply chain, from producers through distributors to retailers, is limited.

In Who Pays for Tariffs Along the Supply Chain? Evidence from European Wine Tariffs (NBER Working Paper 34392), Aaron B. Flaaen, Ali Hortaçsu, Felix Tintelnot, Nicolás Urdaneta, and Daniel Xu examine how tariff costs propagate through each stage of the wine distribution chain. The researchers trace price changes from foreign producers to US importers, to distributors, and finally to retail consumers.

Tariffs and the Price of Imported Wine



Cost changes are associated with one bottle of wine for which the importer paid $5 to the exporter before the imposition of tariffs.
Source: Researchers' calculations using data from a US wine importer and Wine-Searcher.

The study analyzes US tariffs on European wines that were implemented in October 2019 as part of the Airbus-Boeing subsidy dispute. These tariffs applied a 25 percent rate to still wines with 14 percent or less alcohol content by volume (ABV), packaged in containers of two liters or less, from France, Germany, Spain, and the United Kingdom. The tariffs remained in effect until March 2021.

The researchers employ confidential transaction-level data from a major US wine importer covering October 2018 through March 2022. These data include detailed purchase invoices from foreign suppliers and sales invoices to US distributors. The authors supplement this with Connecticut state price-posting data for distributor-to-retailer transactions and retail price data from e-commerce platform Wine-Searcher. They compare price changes for tariffed wines (still wines at or below 14 percent ABV) with price changes for a control group consisting of sparkling wines and still wines exceeding 14 percent ABV from producers selling only nontariffed products.

Foreign producers reduced their prices by 5.2 percent relative to the control group following the 25 percent tariff, absorbing about 20 percent of the tariff rate. The remaining 80 percent was passed forward as higher costs to US importers. On a bottle of wine for which the producer charged $5 before the tariff was imposed and $4.74 after, the tariff payment would have been $1.19. Importers, who the researchers estimate apply an 80 percent markup to the price they pay to producers, would have charged $9 to distributors before the tariff was imposed. The researchers estimate that they raised their prices to distributors by 5.4 percent, but on a base of $9 (= 1.8 x $5). This increase would be $0.49, so importers would be absorbing additional costs since they would pay $5.93 (= 1.25 x $4.74) to the producer and in tariffs. All told, the importer's dollar margins per bottle declined by $0.44.

The distributors who purchased from the importer also applied a markup, which the researchers estimate at approximately 75 percent. Retailers add a further 50 percent markup. The retail price, before tariffs, was about $23 (~ 1.8 x 1.75 x 1.5 x $5). The researchers estimate that the increase in the retail price to consumers was about 6.9 percent. This was on the $23 pre-tariff retail price, so it amounts to $1.59, which, in dollar terms, exceeded the tariff revenue collected.

Price adjustments occurred gradually along the supply chain. Import prices changed within three months of tariff implementation, but retail prices took approximately 12 months to fully reflect the tariff impact. Price increases persisted nearly one year after the tariffs expired.

The study also documents systematic tariff avoidance. The initial tariffs only applied to wines at or below 14 percent ABV and the researchers document a systematic shift in new product offerings toward higher alcohol content products that were exempt from these tariffs, as well as engineering of existing wines to modify the listed alcohol content for exemption from the tariffs. In France, for example, the share of label approvals for products switching from 14 percent or less ABV to more than 14 percent ABV jumped by nearly 10 percentage points in the months directly following the 2019 tariffs. This compositional shift created biases in implied pass-through rates based on aggregate trade statistics, suggesting lower pass-through than actually occurred at the product level.

Impact of Minimum Pay Rules on Gig Delivery Drivers

Platform-based delivery work has expanded dramatically over the past decade, creating millions of work opportunities for independent contractors who operate outside traditional employment protections. Because gig workers are not covered by standard minimum wage laws, several jurisdictions have implemented minimum pay standards specifically for them. In Delivering Higher Pay? The Impacts of a Task-Level Pay Standard in the Gig Economy (NBER Working Paper 34545), Yuan An, Andrew Garin, and Brian K. Kovak examine Seattle's App-Based Worker Minimum Payment Ordinance, which took effect in January 2024. The ordinance, which applies to tasks starting or ending within the city limits, establishes a minimum base compensation for delivery tasks as the greater of $0.44 per minute plus $0.74 per mile, or $5 per task.

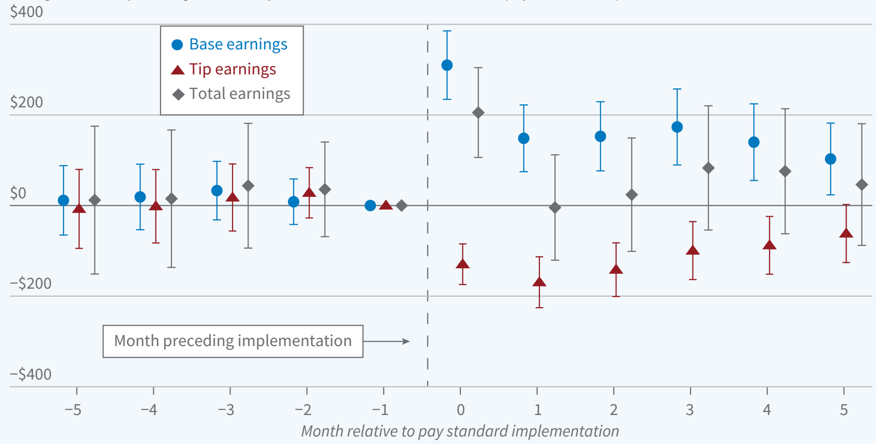
The researchers analyze unique data from Gridwise, a third-party app that tracks detailed gig work activity across multiple platforms. Their dataset covers over 2.8 million tasks completed by nearly 6,000 workers in Washington state from August 2023 through July 2024. It includes task-level information on base pay, tips, bonuses, locations, and timing. The researchers compare workers whose pre-reform delivery activity was concentrated in Seattle with workers active elsewhere in Washington state.

The minimum pay standard immediately doubled average base pay per task in Seattle from $5.37 to $12.52 while pay rates remained constant in the rest of the state. However, average tips per delivery declined substantially following the policy, offsetting over one-third of the base pay increase. This decline appears attributable in part to changes in app interfaces. Platforms like Uber Eats and Instacart disabled upfront tipping for Seattle customers, requiring tips to be added after delivery completion.

For highly attached incumbent drivers, who completed an above-median

Earnings of Gig Workers in Seattle

Change in monthly earnings for delivery workers, relative to month before pay standard implementation



A January 2025 law established a per-task minimum pay standard. Thin bars represent 95% confidence intervals.
Source: Researchers' calculations using data from Gridwise.

A minimum pay law for gig delivery workers in Seattle doubled base pay per task but resulted in reduced tips, fewer available tasks, and no net increase in monthly earnings.

number of tasks pre-reform (approximately 20 per month), increased base earnings per task were offset both by decreased tips and by a reduction in the number of tasks completed per month. By February 2024, the number of monthly tasks fell by at least 20 percent. Taken together, drivers' monthly earnings remained virtually unchanged after the reform.

Declining task availability translated into increased unpaid time for drivers. The utilization rate—the share of active time spent on revenue-generating tasks—fell by 11 percentage points for highly attached drivers. Wait times between tasks increased by approximately 5 minutes, and the straight-line distance driven between tasks rose by 0.25–0.30 miles. The researchers find no evidence that total hours spent on delivery apps declined, indicating that drivers continued working without earning more while incurring additional vehicle costs during idle periods.

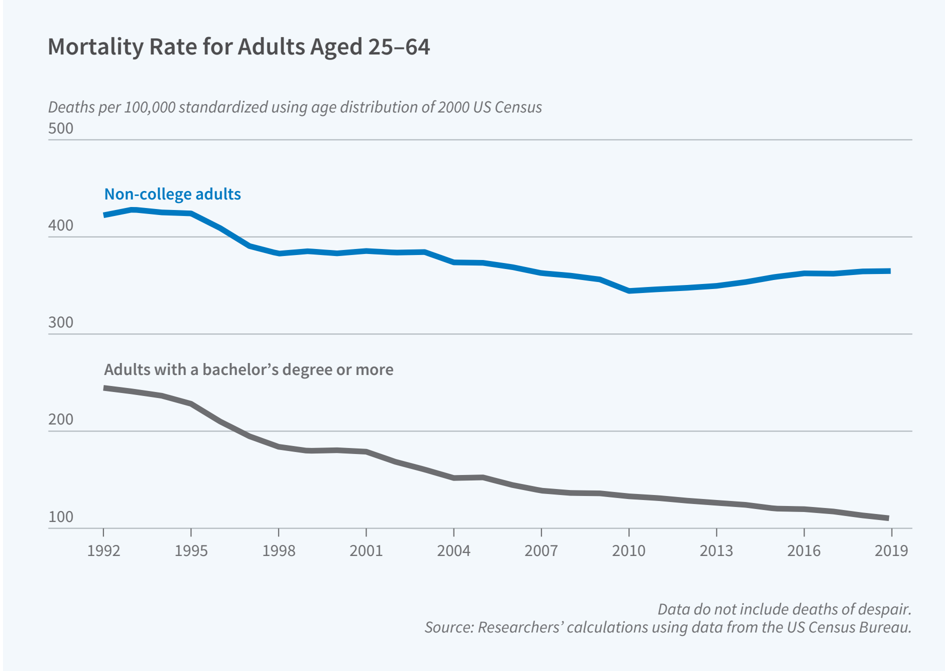
The pattern was somewhat different for less-attached incumbent workers (who completed a below-median number of tasks before the policy). These drivers experienced similar increases in pay per task but showed no significant decline in tasks completed per month. However, since these workers completed far fewer baseline tasks, around 6 per month versus 106 for above-average workers, the absolute earnings effects were small and statistically insignificant.

Within three months, new entrants accounted for the majority of Seattle delivery tasks, while incumbents completed twice as many tasks as entrants elsewhere in Washington. This influx of new workers competing for a declining pool of tasks helps explain why the earnings gains for incumbent drivers disappeared after the first month, consistent with a free-entry market where increased pay per task attracts additional workers until expected earnings return to pre-reform levels.

The researchers acknowledge support from the Block Center for Technology and Society at Carnegie Mellon University.

Smoking Patterns and the Widening US Mortality Gap

Over the past three decades, the life expectancy gap between Americans with and without college degrees widened from 2.6 years in 1992 to 6.3 years. At the same time, geographic differences in mortality have increased dramatically. Rural counties that once enjoyed lower mortality rates than urban areas now experience approximately 50 percent higher death rates. In Explaining the Widening Divides in US Midlife Mortality: Is There a Smoking Gun? (NBER Working Paper 34553), Christopher L. Foote, Ellen Meara, Jonathan S. Skinner, and Luke R. Stewart examine three coincident trends: the expanding education-mortality gradient, rising geographic inequality in death rates, and the reversal of the traditional rural health advantage.



Divergent smoking patterns can account for much of the widening mortality gap in the last three decades between college- and non-college-educated Americans and between places.

The researchers use restricted mortality data from the National Center for Health Statistics covering 44 states from 1992 to 2019 combined with county-level population data from the National Cancer Institute's SEER program. They calculate age-adjusted mortality rates for adults aged 25–64, separating college graduates from those without four-year degrees. To assess health behaviors, they draw on individual-level data from the Behavioral Risk Factor Surveillance System, averaging smoking and obesity rates within county-education groups from 1996 to 2010.

For college graduates, mortality rates declined substantially and converged across locations. Montana's college graduate mortality rate fell from 225 per 100,000 in 1992 to 135 in 2019. New York's fell from 337 to 120. In contrast, while average non-college mortality barely changed, spatial variation increased dramatically. New York's non-college rate fell from 521 to 385, while Montana's rose from 393 to 472.

It is well known that college graduates smoke far less often than non-college-graduates, and the researchers find that smoking rates are the strongest predictor of mortality changes at the county level. A 1-standard-deviation increase in the non-college smoking rate corresponds to 53 additional deaths per 100,000 persons, and close to half of the variation in non-college mortality changes can be explained by smoking rates, initial mortality rates, and rural-urban status. When the researchers include a number of other variables in their estimating equations—such as obesity, income, employment, manufacturing share, China trade shock exposure, and state policy liberalism—smoking retains its strong effect while the impact of the other variables is attenuated. Smoking rates show minimal predictive power, however, for explaining the mortality rates of college graduates.

The link between past smoking and current mortality operates through health capital depreciation. Individuals typically begin smoking around age 18, but experience mortality effects decades later, particularly between the ages of 55 and 64. Thus the researchers estimate that in 1992, a 10-percentage-point increase in a location's non-college smoking rate was associated with 98 additional deaths per 100,000 nearly three decades later, in 2019. A 10-percentage-point decline in smoking over the 1992–2019 period reduced 2019 mortality by 137 per 100,000.

The researchers acknowledge that the gap between college and non-college smoking rates has been narrowing recently. How then can smoking explain a widening gap in mortality? Data from the Tobacco Use Supplement to the Current Population Survey show that in 2018–19, 76 percent of college graduates aged 55–64 had never smoked, compared to 56 percent of non-college adults—a substantial divergence from the nearly identical 41 and 43 percent rates in 1992–93. That is, the long-lasting health effects of past smoking behavior—which correlates strongly with a variety of diseases—may still be leading to the current divergence in mortality. There is some good news, which is the decline in smoking rates for younger non-college graduates; future non-college midlife mortality is expected to decline as a consequence.

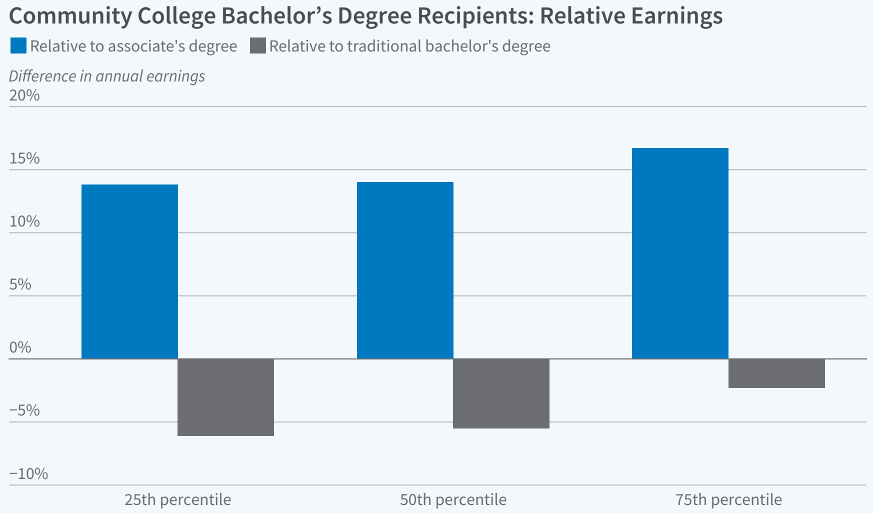
The Earnings of Community College Bachelor's Degree Graduates

Between 2004 and 2022, the share of community colleges offering bachelor's degrees increased from 2.1 percent to 16.5 percent, and the number of bachelor's degrees awarded by community colleges more than quadrupled. Twenty-four states now authorize these programs, which aim to provide more affordable and geographically accessible pathways to bachelor's credentials, particularly for underrepresented minority and low-income students who have historically enrolled at community colleges in disproportionate numbers.

In Community College Bachelor's Degrees: How CCB Graduates' Earnings Compare to AAs and BAs (NBER Working Paper 34684), Riley K. Acton, Camila Morales, Kalena Cortes, Julia A. Turner, and Lois Miller provide the first comprehensive national analysis of labor market outcomes for community college baccalaureate (CCB) graduates. Using data from the US Census Bureau's Post-Secondary Employment Outcomes (PSEO) system, which covers 10 of the 24 states offering CCB degrees, the researchers compare earnings of CCB graduates to those of both associate degree graduates of the same institutions and bachelor's degree recipients at traditional four-year public colleges.

The PSEO data link postsecondary transcript records with information on 96 percent of US employment. The researchers focus on earnings one year after degree completion. Their data sample includes nearly 13,000 CCB graduates. To isolate differences attributable to degree type, the researchers control for institution, field of study, cohort, and geography in their models.

They find that CCB graduates earn between $4,000 and $9,000 more annually than those who received associate degrees from the same institution and in the same field of study. Their median earnings are about $5,700 higher, representing an earnings premium of approximately 14 percent. However, CCB graduates earn about $2,800 less than traditional bachelor's degree recipients in the same state and field of study, a gap of approximately 5.5 percent.



The median Community College Bachelor's Degree graduate earns $5,684.90 more annually relative to associate's degree graduates. They earn $2768.60 less annually relative to traditional bachelor's degree graduates.
Source: Researchers' calculations using data from the US Census Bureau.

Students who receive bachelor's degrees from community colleges have median annual earnings 14 percent greater than associate degree holders from the same institutions, but earn less than traditional bachelor's graduates in the same fields and states.

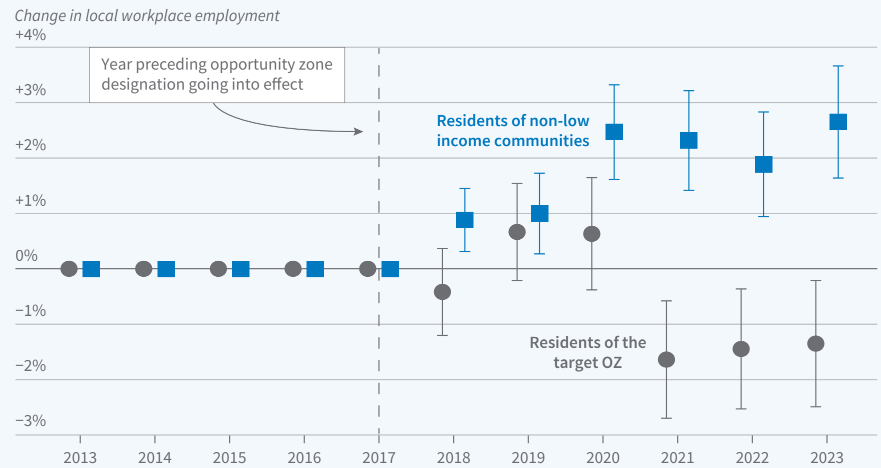
There is significant heterogeneity in these earnings differentials across field of study: in nursing and criminal justice, CCB graduates achieve earnings parity with traditional bachelor's degree holders. In contrast, CCB graduates in computer information technology and engineering technology face a large earnings penalty, about $30,000 at the median in computer science and information technology fields. The researchers find that fields with well-defined occupational pathways, such as nursing, show highly concentrated employment in aligned industries, where credential level may matter more than institution type. In fields serving broader sets of industries, like computer science, employment patterns are more dispersed and the signaling value of institution type may be more important.

Consistent with differences in earnings by credential type, tuition costs for CCB programs also fall between those of associate and traditional bachelor's degrees. Some institutions charge constant tuition rates across all course levels, while others use escalating structures where upper-division courses cost approximately 40 percent more than lower-level courses. The researchers also point out that the estimated earnings differentials are based only on short-term earnings of graduates with full-time employment, and that comparisons are descriptive in nature as they do not address potential selection into CCB programs.

The researchers acknowledge support from the Postsecondary Employment Outcomes (PSEO) Coalition, the Texas Higher Education Foundation (PSEO Research Grant #103), and Strada Education Foundation (Research Grant #1207, Title: Understanding Enrollment in and Returns to Community College Baccalaureate Degrees).

Employment Outcomes in Opportunity Zones

Opportunity Zone Designation and Employment



Thin bars represent 95% confidence intervals.
Source: Researchers' calculations using data from the LEHD Origin-Destination Employment Statistics.

The Opportunity Zone (OZ) program, created under the 2017 Tax Cuts and Jobs Act, represents one of the largest place-based economic development initiatives in US history. It offers substantial capital gains tax relief to investors who direct funds into 8,764 designated census tracts across the country. The foregone taxes associated with OZs cost the US Treasury an estimated $8.2 billion over the 2020–24 period.

In Understanding the Employment Effects of Opportunity Zones (NBER Working Paper 34589), Matthew Freedman, Noah Arman Kouchekinia, and David Neumark provide a comprehensive long-term assessment of the program's labor market impacts. They analyze both workplace employment (jobs located in OZ tracts) and resident employment (jobs held by people living in OZ tracts). The investigators use data from two primary sources: the LEHD Origin-Destination Employment Statistics and the American Community Survey for employment rates, earnings, and poverty measures.

The sample includes 6,866 designated OZ tracts and 20,522 non-designated low-income communities (LICs) that were eligible for designation but not selected. To address the fact that designated OZs were on stronger pre-treatment economic trajectories than non-designated LICs, the researchers use matching methods to build comparison groups with similar pre-program trends.

Their analysis reveals that OZ designation increased workplace jobs by 1.3 percent. However, approximately 84 percent of these gains were offset by declines in workplace jobs in adjacent low-income communities. When examining all tracts adjacent to OZs, including higher-income areas, the negative spillover effects were even larger, suggesting the program primarily reallocated jobs geographically rather than created net new employment. The researchers find positive and statistically significant effects of OZ designation on resident and workplace job growth in urban areas. In contrast, they find no evidence of positive impacts on jobs or on measures of employment, earnings, or poverty in rural tracts.

The research also demonstrates that newly created jobs in OZs disproportionately went to residents of more affluent non-LIC tracts. Overall, fewer than one in eight newly created jobs in OZs went to residents of the same or other OZs, while over 75 percent went to residents of comparatively affluent areas.

While OZ designation increased resident employment by 0.9 percent, the gain came entirely from jobs located outside OZs, particularly in non-LIC tracts. Changes in the demographic composition of OZ populations suggest these employment gains likely benefited more-advantaged new residents rather than less-advantaged original inhabitants. The researchers find that OZ designation was associated with a statistically significant increase in the White population share, a decline in the Hispanic share, and an increase in the college-educated share. OZs also experienced relatively high rates of in-migration from other metropolitan areas.

This urban-rural differential persists even after controlling for initial poverty rates and the geographic clustering of OZs, suggesting that something inherent about urban settings makes OZ investments more effective at generating employment.

The researchers acknowledge support from Arnold Ventures.