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Measuring the Virus Risk of Essential Workers and Dependents

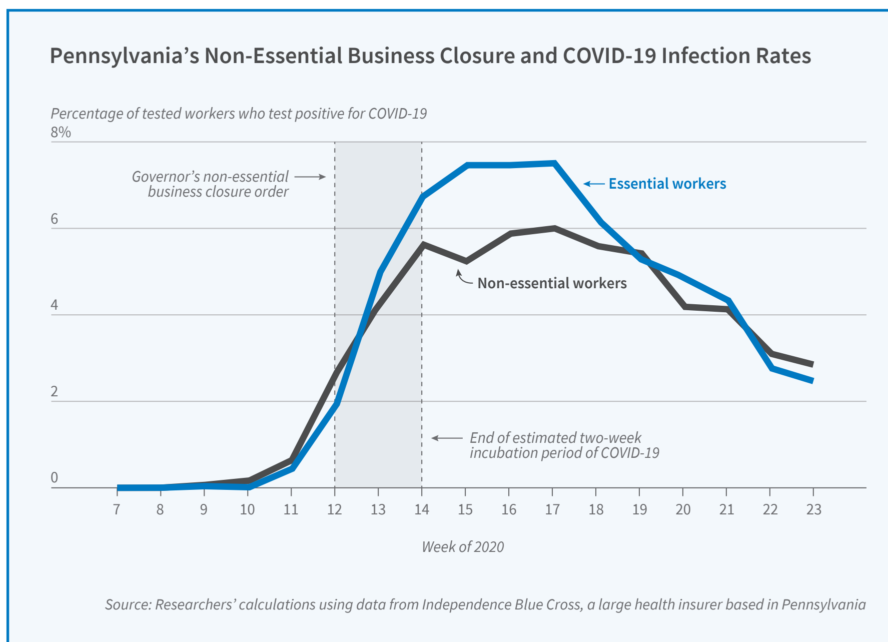
For 12 weeks beginning in March 2020, Pennsylvania closed all nonessential businesses as part of a program to reduce the spread of COVID-19. A new study examines how this lockdown affected the relative health of employees in essential and nonessential businesses.

In **The Impact of the Nonessential Business Closure Policy on COVID-19 Infection Rates** (NBER Working Paper 28374), Hummy Song, Ryan M. McKenna, Angela T. Chen, Guy David, and Aaron Smith-McLallen analyze medical claims data from Independence Blue Cross, which covers more than half of the commercially insured individuals in Greater Philadelphia. They combine this with zip-code-level demographic and economic data to control for factors that could affect COVID-19 illness rates, such as age, gender, occupation, socioeconomic status, comorbidities, and virus time trends.

The data sample consists of 416,000 primary policyholders and 387,000 cohabiting dependents covered by the primary policyholder. The average coronavirus positivity rate of people in the sample is 1.36 percent.

Data on 800,000 commercially insured individuals in Philadelphia suggest that during lockdown essential workers were 55 percent more likely than others to get COVID-19.

The researchers find that the share of essential workers who receive a positive test result is 0.76 percent higher than the share of non-essential workers, a gap of 55 percent relative to the population average. Even after excluding those in the health care and social assistance sectors, who are more likely to have intimate, prolonged contact with infected patients, the remaining essential workers are 21 percent more likely to become infected than nonessential workers. They also find that dependents living with essential workers face a risk of infection 17 percent higher than those living with nonessential workers, and that nondependent, nonessential workers who live with essential workers — mostly adult roommates — have a 38 percent higher probability of testing positive.



Source: Researchers' calculations using data from Independence Blue Cross, a large health insurer based in Pennsylvania

The researchers caution that since their sample includes only com-

mercially insured individuals, the results may not be fully applicable to the general population. Their findings may in fact underestimate the risks faced by households of the many essential workers who have no insurance coverage, such as part-time grocery clerks, home health aides, and independent delivery drivers.

The researchers note that while in normal times workers take on high-risk jobs in return for higher pay or job satisfaction, during the pandemic the risks for essential workers have increased with little or no change in compensation. They argue that the disproportionate health risks faced by essential workers and their families should be recognized when policymakers weigh the costs and benefits of expanding economic activity amid a pandemic.

—Steve Maas

Bank Ordering of Debit Charges and the Use of Payday Lenders

At the end of each business day, banks post the day's transactions to their customers' accounts. Some banks post deposits, debit card transactions, cash withdrawals, and wire transfers without regard to transaction size. If the funds in the account are insufficient to cover the charges, accounts with overdraft arrangements may automatically receive a loan to cover the shortfall. The banks charge fees for overdraft transactions, and penalize accounts with insufficient funds.

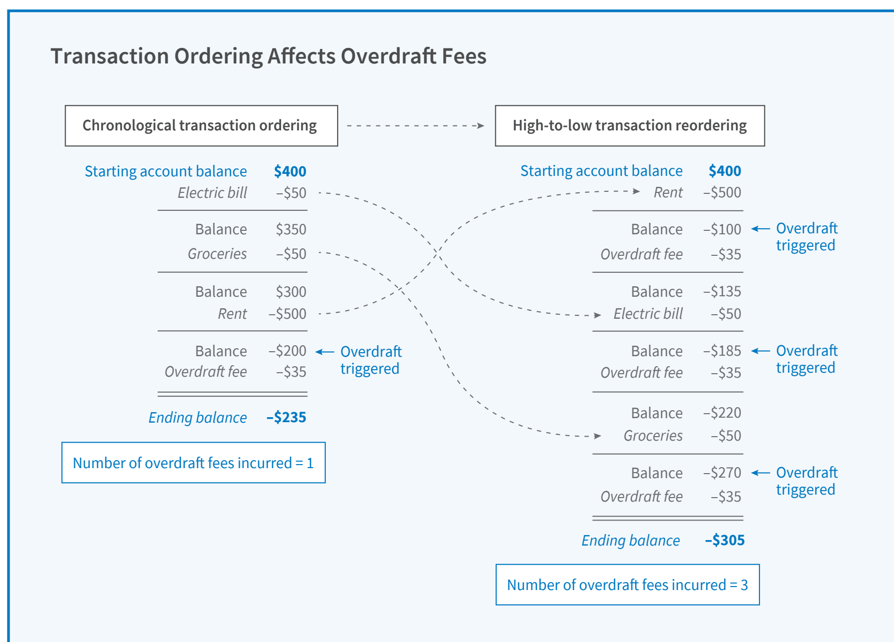
Some banks, rather than posting transactions chronologically, post using a high-to-low reordering rule. In this case, transactions of all types are posted in order of their size, from the largest amount to the smallest. This order can generate large and unexpected fees for customers.

Consider an individual who has $500 in a checking account at the beginning of the day, withdraws $110 in cash from an ATM in the morning, writes a check for groceries for $60, has $400 in rent automatically deducted in the afternoon, and later deposits $70. Absent high-to-low reordering, the account ends the day with a zero balance, and incurs few if any overdraft fees.

Under a high-to-low reordering rule, however, the account is first charged for $400 in rent. The next debit, $110 from the ATM, generates an overdraft. If a $35 overdraft fee is added immediately, the account balance becomes -$45. Adding the $70 deposit brings the account balance to $25. Debiting the $60 grocery check overdraws the account again, generating another $35 overdraft fee. The account ends the day overdrawn by $70, the amount of the two fees.

A new study by Marco Di Maggio, Angela T. Ma, and Emily Williams, **In the Red: Overdrafts, Payday Lending and the Underbanked** (NBER Working Paper 28242), finds that the fees generated by high-to-low processing may encourage low-income people to substitute the more expensive services of payday lenders and check cashing services for those of traditional banks. Using data from a Pew Charitable Trusts study of the 50 largest US banks from 2012 to 2015, they show that roughly one in five bank branches in each zip code used high-to-low processing, and that those that did were more likely to have branches near payday lenders and check cashers than banks in the same zip code that did not use this processing rule.

> After a ban on high-to-low ordering of debit charges, micro loans from alternative lenders in zip codes with below median income fell by about 16 percent.



The researchers used judgements from 37 lawsuits to identify banks that had been enjoined from using high-to-low reordering. By analyzing data from Clarity, a credit bureau that tracks credit from payday lenders and title lenders, they find that, in the year following these bans, quarterly micro loans from alternative lenders in zip codes with below median income fell by $84 per borrower per quarter, or about 16

percent. Analysis of a representative sample of Equifax borrowers showed that installment loans also fell by about $200 per borrower per quarter, a 6 percent reduction.

Household finances appeared to improve after high-to-low reordering was banned. In two years, average credit card limits increased by $190 while balances increased by $110. In three years, credit limits were up by $335 and balances were up by $195.

Some bank branches depend on overdraft fees for a substantial part of their income. Following a ban on high-to-low reordering, the probability of a bank branch closure increased by as much as 2 percent, and the increase was particularly pronounced in zip codes with fewer branches and lower incomes.

—Linda Gorman

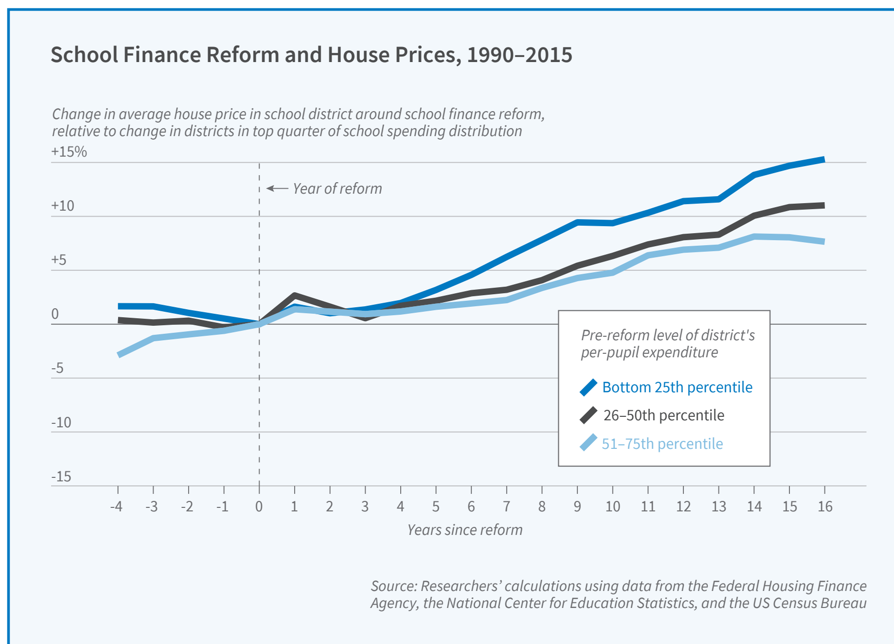
House Prices and Local Spending on Public School Teachers

House prices can provide a lens for studying the extent to which households value public school spending and whether such funding is set at an efficient level. In **A National Study of School Spending and House Prices** (NBER Working Paper 28255), Patrick Bayer, Peter Q. Blair, and Kenneth Whaley conclude that, starting from current levels, increases in spending on teachers' salaries are associated with higher house prices.

The researchers study changes in local school spending and taxation that result from court-ordered school finance reforms over the 1990–2015 period. They match information on the change in school spending with information on local house prices. House prices are measured using local "constant quality house" price indices that are constructed by the Federal Housing Finance Agency. This approach allows the researchers to separate state and federal school support from funding that is paid for with local taxes. It also allows the researchers to consider a nationwide sample of tax reforms and price changes and provides them with a source of variation in school spending that is not determined by local preferences for schools, or by other factors that might confound the effect of spending changes on house values. By focusing on this source of variation, the researchers are able to measure the causal impact of school spending.

A 1 percent increase in spending on teacher salaries increases house prices by nearly 2 percent, while increased spending on capital projects has little or no effect.

The researchers find that increases in state and federal school funding are associated with higher house prices, implying that prospective home buyers value spending on schools. Identifying the effect of school spending financed by local taxes on house prices is more challenging, since local tax and spending levels are highly correlated with the socioeconomic composition of the district and with local economic conditions. To overcome this confounding relationship, the researchers focus on tax and spending changes that occur as part of statewide school finance reforms that discourage tax-financed spending in high-spending districts and encourage such spending in low-spending districts. They point out that the effects of such financing reforms can take several years to manifest in spending patterns, and can affect spending for a long time. Their analysis explores the impact of school finance reform on house prices over periods as long as 15 years.



The study finds that the effect of local school spending on house prices depends on how the money is spent. A 1 percent increase in spending on teacher salaries increases house prices by 2 percent, suggesting that house buyers value the increase in either the number of teach-

ers hired, which might reduce class size, or teachers' average salary, which might improve teacher quality.

In contrast, locally financed spending on capital projects is associated with lower house prices, which suggests that house buyers do not see such projects as generating substantial benefits. The fact that capital expenditures are typically funded by issuing bonds, which place future property tax burdens on homeowners, may be related to the decline in prices.

The researchers conclude that in many locations, homeowners would value increased spending on teachers' salaries, and that this valuation would be reflected in higher house prices. They note that their findings also shed light on the broad question of whether current levels of public spending are set efficiently.

—Brett M. Rhyne

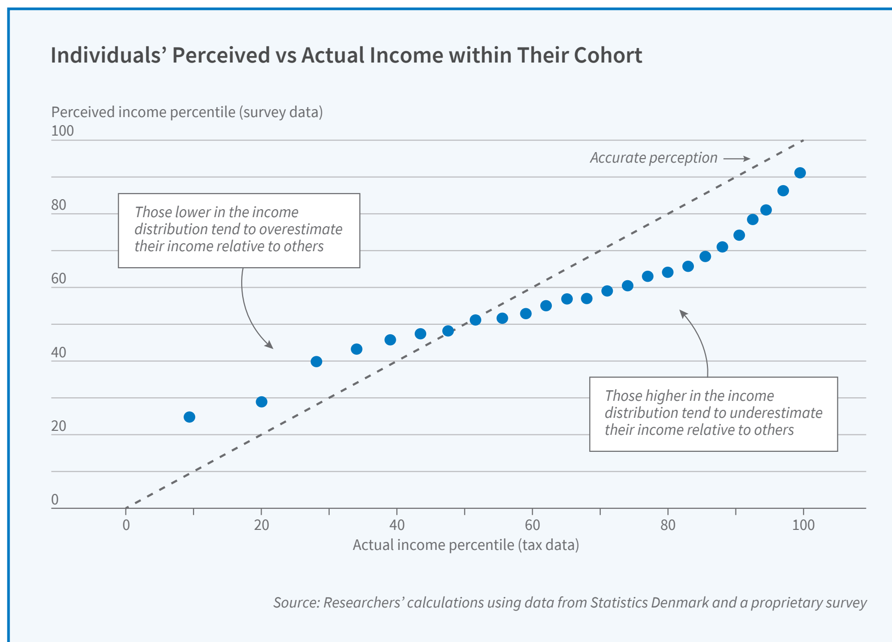
Determinants of Views on the Fairness of Inequality

The degree of income inequality is often underestimated, and individuals' views on whether disparities are "fair" are strongly related to their own position in the income distribution. Inequality within a person's own education group or occupation is viewed as particularly unfair.

These are the main findings of **Social Position and Fairness Views** (NBER Working Paper 28099), a new study by Kristoffer B. Hvidberg, Claus Kreiner, and Stefanie Stantcheva. It analyzes survey data for a large sample of individuals aged 45–49 in Denmark that include current income, perceptions of relative income positions, and views regarding the fairness of those positions. The researchers compare this information with administrative data on the survey respondents' actual income positions, income histories, life events, and "reference" groups based on education level, place of residence, sector of work, and gender.

While most individuals believe that others are closer to them in income than they really are, the degree of misperception is not large. Aside from the highest and lowest earners, people at different positions in the income distribution on average perceive the median income level correctly within 5 percent of the actual value.

Survey data from Denmark, a very equal society, show that income inequality among individuals with similar education and in similar jobs is seen as the most unfair.



When asked about fairness, respondents view inequality within their own education group and between coworkers as most unfair. These are also the reference groups within which the degree of inequality is most likely to be underestimated. Those with lower incomes overestimate their position in their sector of work: those at the 20th percentile believe, on average, that they are above the 40th percentile. The opposite is true of high earners, although to a lesser extent.

Views on the fairness of income inequality are related to the respondent's current income position. Higher earners systematically perceive income differences within their reference groups as less unfair, regardless of whether their high position in the group is real or perceived. Higher earners also believe that effort is more important than luck in determining incomes.

Across all reference groups, those who have experienced a negative life event—unemployment, disability, or hospitalization—during the previous six years are significantly more likely to see inequality as unfair. Those who faced disability are less likely to believe that effort is more important than luck in determining income. In contrast, those who were promoted are less likely to view inequality as unfair, especially within their own sector.

In general, income inequality is viewed as less unfair by those who overestimate their own income position. When they are told their actual position, their views realign with those at the same income level who did not overestimate their position.

—Dylan Parry

Are Federal and Private Research Funding Substitutes?

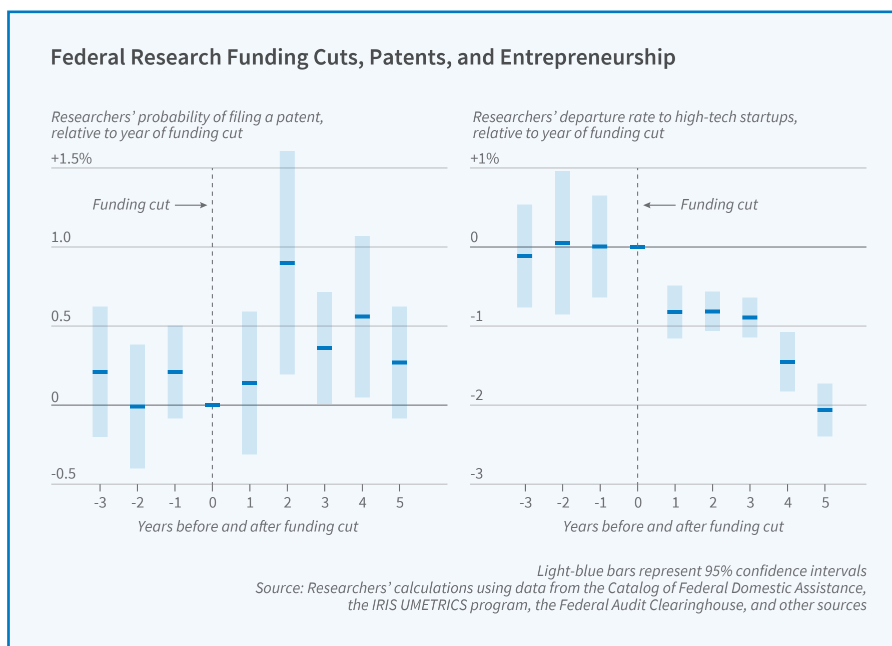
Levels of government and private support for scientific research in the United States have varied over time. Over the last 15 years, government support for university R&D has markedly decreased. Funding sources also vary across research areas, within research areas over time, and even for an individual researcher over time. In **The Color of Money: Federal vs. Industry Funding of University Research** (NBER Working Paper 28160), Tania Babina, Alex Xi He, Sabrina T. Howell, Elisabeth Ruth Perlman, and Joseph Staudt investigate whether the source of funding — federal versus private — leads to different scientific outputs and different career trajectories for university researchers.

The researchers study a dataset that includes more than 235,000 individuals at 22 universities who received research support between 2001 and 2016. Of these researchers, 44.5 percent were graduate students or post-docs, 28.8 percent were staff members, 19.3 percent were faculty members, and 13.4 percent were undergraduates. They characterize the source of funding for each researcher's grants, finding that the federal government provided 82 percent of funding and the private sector provided 11 percent (the rest is from other sources).

To assess the effect of an individual's composition of funding sources, the researchers make use of changes to aggregate federal support in the individual's research area. They show that changes in congressional funding priorities alter the distribution of funds across narrow research fields and thereby influence the supply of federal funding and researchers' composition of funding sources. The aggregate changes are highly volatile and mean-reverting, and especially for one-time large shocks, they are not correlated with technological opportunities or downstream subsidies.

Relative to privately funded university research, federally funded university research outputs are less likely to be patented and more likely to be commercialized in startups.

The researchers find that a 10 percent increase in the share of funding that comes from the federal government caused a 0.4 percentage point reduction in the probability of receiving any patents, about half of the average level. There was no effect on the probability of a highly cited patent, indicating that although federal funding leads to fewer patents, those patents are more highly cited. The federal funding share increased the probability of receiving a general patent, one that is cited across many fields. Consistent with firms being interested in owning the patents produced by their sponsored research, a higher share of private funding substantially increased the probability that a patent had a private assignee. Furthermore, 40 percent of patents with private assignees are assigned to the firm funding the research.



The source of funding also influenced the future careers of graduate students and post-docs. A 10 percent increase in the share of federal funding increased a researcher's probability of working for a high-tech startup by 0.34 percent, compared with an average probability of 0.74 percent. It also increased the probability of remaining in academia. The effects were strongest in Engineering and Bio/Med/Pharma, and absent in Science and Liberal Arts. In contrast, a higher share of private funding increased the propensity to work at incumbent firms, suggesting that one reason firms may sponsor research is to train or recruit researchers. Consistent with this, one-fifth of the individuals whose research was privately funded and who were subsequently employed at a funder firm worked for the firm that funded their project.

In general, the results demonstrate that private and federal funding are not substitutes. Federal funding keeps researchers on an academic track and "in institutions where they are likely to continue to be involved with academic research." Their research outputs are less likely to be patented and "more likely to end up in high-tech startups founded by researchers themselves." Private funding is more often appropriated by the private sector, particularly the funder, while federal funding leads to more open outputs that can more easily transition to startups.

— *Linda Gorman*

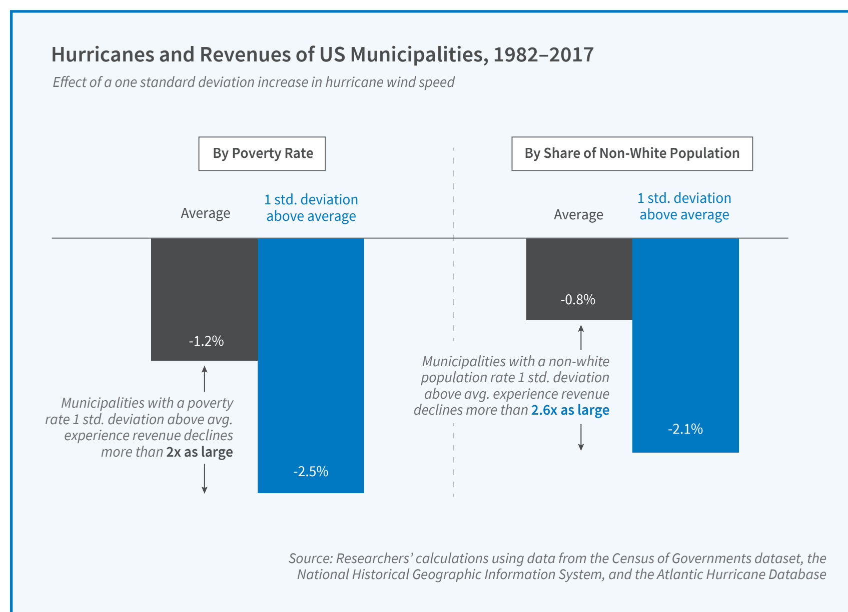
Hurricanes' Long-Term Impact on Municipal Revenue and Services

Hurricanes struck more than 2,000 municipalities in US Atlantic and Gulf states between 1980 to 2017. Even a decade after the winds die down and the flood waters recede, municipalities thrashed by hurricanes still are experiencing lower revenues and associated declines in public services and investment relative to otherwise similar communities spared by the damaging storms.

Tax revenues drop immediately after a storm, as business is disrupted and some residents may move away. Although an influx of aid provides a short-term cushion, localities hit by storms see their revenue bases erode as people move out and property values and economic activity decline. In the five year period between six and ten years after a hurricane hits, local tax revenues are still 7.2 percent lower than they would have been without the storm. These findings are reported in **Local Public Finance Dynamics and Hurricane Shocks** (NBER Working Paper 28050) by Rhiannon Jerch, Matthew E. Kahn, and Gary C. Lin. Even a minor hurricane can lead to a 3 percent decline in taxes, fees, and other local revenue sources over the same period.

The researchers arrive at their estimates by comparing municipalities in the same state that possess similar demographic and geographic characteristics but differ in whether fate put them in the path of a hurricane. In the decade following a major hurricane —one with winds exceeding 96 knots—total revenue declines more than four times more than in the case of a minor hurricane. Employment falls by 4 percent after a major storm, compared with 0.4 percent after a minor one.

A decline in business activity and the out-migration of residents take a toll on tax revenues and result in cutbacks of spending programs that benefit low-income households.



The revenue drop leaves storm-struck towns and cities with less to spend on local services, which include schools, sanitation, policing, parks and recreation, and public works. In 2017, local government accounted for 35 percent of total government goods and services spending—spending exclusive of transfers.

Less-affluent municipalities—those with poorer, less-educated residents and a higher proportion of racial minorities—are hardest hit by the post-storm dislocation, and the budget ax often falls hardest on programs that benefit low-income households, such as public transportation.

Battered budgets make borrowing for capital expenditures, including infrastructure projects that could reduce the cost of future storms, more difficult. Rating agencies often downgrade the bond ratings of municipalities that suffer severe storm damage. Facing higher interest costs, sampled municipalities cut back on total debt by between 19.2 and 25.9 percent in the decade after a major hurricane. This suggests a potential "vicious cycle" for local governments, as natural disasters increase their cost of debt and deplete their tax base, thereby inhibiting their ability to make new investments.

—Steve Maas

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