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Bounce Back Better: Four Keys to Disaster Resilience in U.S. Communities

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Disasters are accelerating in U.S. communities. An analysis of recovery efforts provides insight into actions leaders can take to help affected communities recover faster and emerge stronger.

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Weather and climate disasters are becoming more frequent, wide-ranging, severe, and costly. While consequences for life and health are always at the forefront, one way to measure disaster impact is through estimates of economic impacts. The National Oceanic and Atmospheric Administration (NOAA) estimates that from 2019 to 2023, the U.S. experienced more than 100 $1 billion disasters, with total costs in excess of $0.5 trillion. This is four times the average number of $1 billion disasters and more than double the costs of any other five-year period since 2000. In 2023 alone, there were 28 $1 billion disasters, the highest number recorded since 1980 (when data became available). And these disasters affected 46 states, almost twice the number of states affected by $1 billion disasters in 2000. Indeed, the number of states experiencing $1 billion disasters has steadily risen year over year since 2000.[1]

1 NOAA National Centers for Environmental Information (NCEI), "U.S. Billion-Dollar Weather and Climate Disasters," last visited Sept. 16, 2024, https://www.ncei.noaa.gov/access/billions/.

More and worsening disasters across a broader swath of the country means more lives and livelihoods placed in harm's way and more communities likely facing intertwined economic and social consequences. Given current trends, state and local leaders are seeking ways to help their communities recover and rebuild effectively in the wake of disaster, restoring not only infrastructure and homes but economic competitiveness and social well-being. To help inform state and local recovery planning efforts, we examined quantitative and anecdotal evidence from U.S. communities that have demonstrated robust resilience in the face of disasters—what we termed leading recoveries—as well as for communities that experienced lower resilience where we saw lagging recoveries.

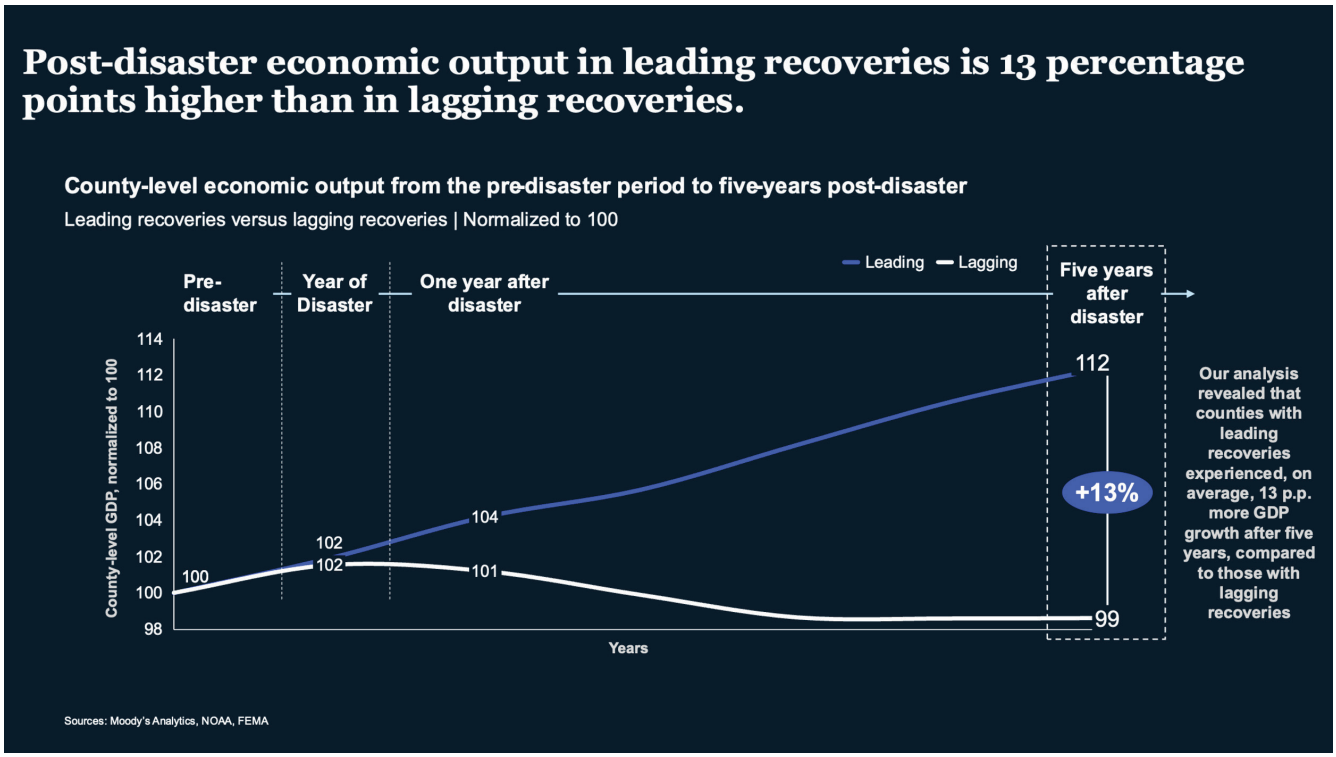
What are leading and lagging recoveries?

We investigated 2,797 county-level recoveries from $1 billion disasters:[2] in each case, damages were significant enough to warrant a major disaster declaration from the President and the county qualified for FEMA's primary disaster assistance programs for both individuals and communities (Public and Individual Assistance). Using the Compound Annual Growth Rate (CAGR) of GDP as a proxy for the strength of recovery, we identified 625 of the 2,797 as leading recoveries: economic growth in the first two years after the disaster exceeded pre-disaster levels and was sustained for at least five years after the disaster. We also identified 1,259 instances in which post- disaster GDP CAGR did not exceed pre-disaster levels by at least one percentage point in the five-year post-disaster period, which we termed lagging recoveries (see appendix "Research methodology").

While GDP CAGR does not account for factors such as post-disaster demographic shifts, the distribution of wealth and income, the informal economy, differences in industry composition, and the varying availability of financial resources—it does reflect economic activity, employment impact, business resilience, and net exports. And, in general, as GDP accounts for consumption, investment, government spending, and exports, GDP growth suggests residents returning to their communities, businesses reopening and thriving, and infrastructure being restored. This analysis suggests that if a quarter of the 1,259 lagging recoveries identified could be moved into the leading category, the United States could potentially add $175 billion to the national economy every decade **(Exhibit 1)**.

2 Disasters analyzed occurred between 2000 and 2017, enabling a review of available economic data covering a full 5-year post-disaster period.

Exhibit 1

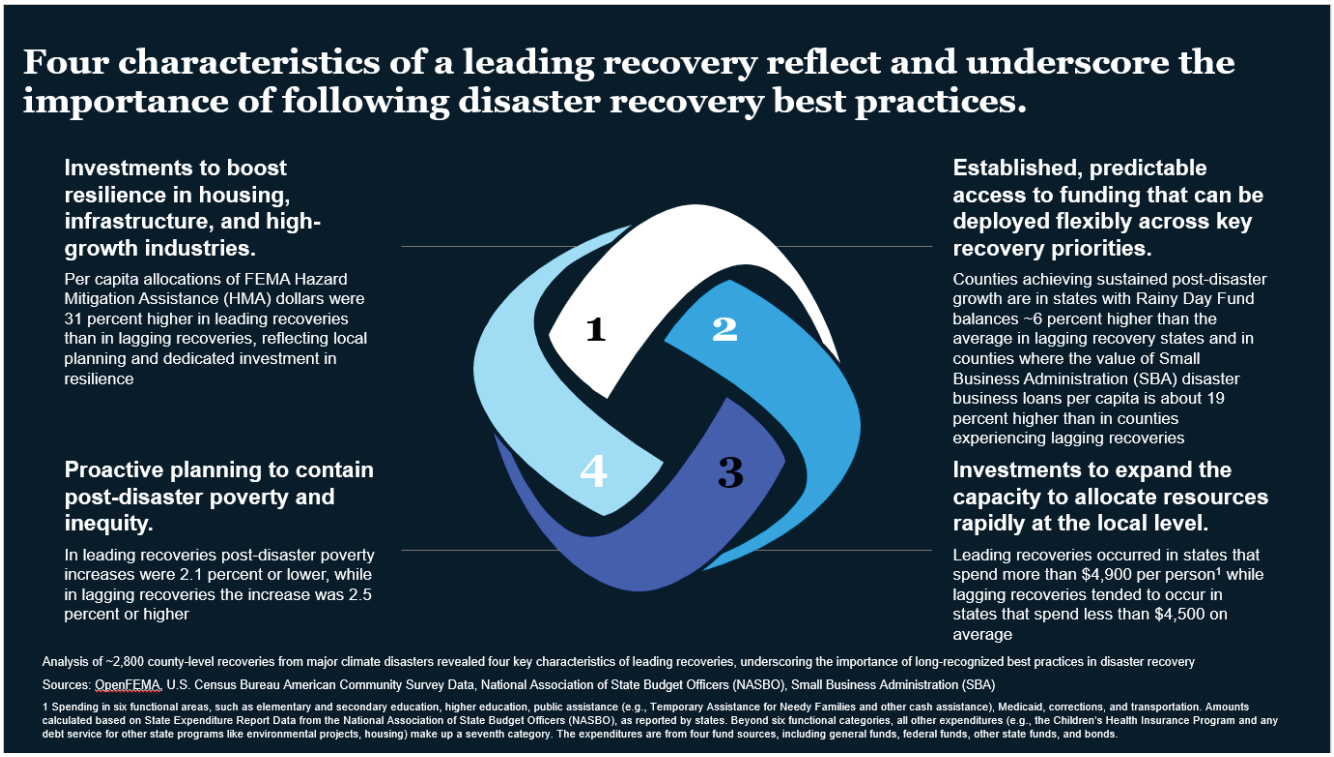


In addition to quantitative data, during interviews state officials shared their insights about what factors differentiate leading recoveries in their experience. There was unanimous agreement from officials on several critical factors for a successful recovery, including having a pre-disaster plan, securing rapid funding, and the need for strong stakeholder engagement. Many senior state officials from the economic development, housing, and emergency management sectors shared with us that while they do not track key economic indicators such as GDP, private business establishments, per capita income, or labor force participation in their recovery progress assessments, they agreed that doing so could help gauge the outcome of their efforts to revitalize communities.[3]

Combining these qualitative insights with the data analysis, four characteristics of leading recoveries emerged **(Exhibit 2)**.

3 Interviews conducted with officials from nine states between January and April 2024.

Exhibit 2



Each characteristic underscores the importance of long-recognized best practices in disaster recovery:

1. *Investments to boost resilience in housing, infrastructure, and high-growth industries.* This analysis revealed that in leading recoveries FEMA Hazard Mitigation Assistance (HMA) dollars were 31 percent higher per capita than in lagging recoveries.[4] This is significant because each HMA program requires specific non-Federal cost share contributions, which represent local planning and dedicated investment in building resilience prior to disaster. Beyond financial resources, all state officials interviewed asserted that pre-disaster recovery planning and risk mitigation were key to reducing the impact of severe weather. This supports what recovery specialists have observed in practice: mitigation investments and preparedness are correlated with faster, stronger economic recovery.

2. *Established, predictable access to funding that can be deployed flexibly across key recovery priorities.* Findings indicate that counties achieving sustained post-disaster growth—two percentage points higher than their pre-disaster growth for two years after a disaster—are in states with rainy day fund balances around 6 percent higher than the average in lagging

4 FEMA's hazard mitigation assistance provides funding for eligible mitigation measures that reduce disaster loss and could include funding via the Hazard Mitigation Assistance Program, Building Resilience Infrastructure and Communities, Flood Mitigation Assistance, and/or Pre-Disaster Mitigation.

recovery states[5] and in counties where the value of Small Business Administration (SBA) disaster business loans per capita is about 19 percent higher than in counties experiencing lagging recoveries.[6] This suggests getting capital moving quickly can make a meaningful difference. Additionally, leading recoveries were associated with a 30 percent greater likelihood of having HUD Community Development Block Grant Disaster Recovery[7] (CDBG-DR) funding at the state level. This data supports a theme from interviews conducted with state officials: flexible funding supports better recoveries. Additionally, pre-negotiated contracts could provide a potentially critical avenue to support rapid deployment of capital and resources in the immediate wake of a disaster.

3. *Investments to expand the capacity to allocate resources rapidly at the local level.* In the data analyzed, leading recoveries occurred in states that spend more than $4,900 per person in six functional areas, such as elementary and secondary education, higher education, public assistance (Temporary Assistance for Needy Families and other cash assistance), Medicaid, corrections, and transportation; in contrast, lagging recoveries tended to occur in states that spend less than $4,500 on average.[8] All interviewees reported what appears to be a recurring challenge in executing recovery efforts: local communities tend to lack rapid access to needed capacity, expertise, and recovery leadership experience, which can hamper efforts to bounce back quickly.

4. *Proactive planning to contain post-disaster poverty and inequity.* In addition to economic performance, in this analysis poverty levels appeared to be related to post-disaster recovery. In leading recoveries, poverty increased 2.1 percent or less after a disaster, while the increase was more than 2.5 percent in lagging recoveries.[9] National-level analysis reinforces the link between inequity and recovery challenges: the U.S. Census Bureau's 2024 Community Resilience Estimates (CRE) indicate that the share of residents socially vulnerable to disasters is nearly three percentage points higher in counties where income inequality is at

5 Rainy Day Funds are intended to provide states with financial cushion during economic downturns and emergencies. Amounts calculated based on data from the National Association of State Budget Officers (NASBO), which is available at https://www.nasbo.org/reports-data/historical-data.

6 U.S. Small Business Administration Disaster Loan data, which is available at https://data.sba.gov/dataset/disaster-loan-data.

7 CBDG-DR grant funds are appropriated by Congress and allocated by the U.S. Department of Housing and Urban Development to cities, counties, Indian tribes, and States to rebuild disaster-impacted areas and recover from Presidentially declared disasters.

8 Amounts calculated based on NASBO State Expenditure Report Data, which is available at https://www.nasbo.org/reports-data/historical-data. Beyond six functional categories, all other expenditures (e.g., the Children's Health Insurance Program and any debt service for other state programs like environmental projects, housing) make up a seventh category. The expenditures are from four fund sources, including general funds, federal funds, other state funds, and bonds.

9 U.S. Census Bureau American Community Survey Data, which is available at https://www2.census.gov/programs-surveys/saipe/datasets/.

or above the national average.[10] Prioritizing equity in resilience-building, recovery planning, and implementation is important to achieve better recoveries and ensure that all community members can benefit from recovery efforts.

Building on key characteristics to realize next-gen disaster recovery

These insights underscore critical elements that can contribute to successful post-disaster recovery and offer a roadmap for communities striving to rebuild. However, understanding these key characteristics is just the beginning. To foster a more resilient future, practical implementation strategies based on these key characteristics can be created to realize next-generation disaster recovery. By simultaneously addressing the four characteristics identified in this analysis, leaders could significantly enhance the likelihood of revitalizing disaster-affected communities and restoring economic prosperity **(Exhibit 3)**.

Exhibit 3

10 Chase Sawyer and Joey Marshall, "Community Resilience Estimates Show That 23.4% of People in Counties with High Income Inequality Are Socially Vulnerable to Disasters," U.S. Census Bureau, February 2024, https://www.census.gov/library/stories/2024/02/cre-for-equity.html.

Focusing on resilience for growth

The correlation found between pre-disaster investment, rapid economic recovery, and sustained economic growth highlights the critical role of pre-disaster action in mitigating economic losses post-disaster. In leading recoveries, GDP grew an average 5 percent post-disaster; in contrast, GDP fell an average 3.4 percent in lagging recoveries. Furthermore, 85 percent of counties in which leading recoveries took place surpassed their pre-disaster GDP growth by one percentage point within a year of the disaster.[11] Conducting pre-disaster resilience assessments with an eye toward future growth and economic competitiveness—rather than simply as a prerequisite for public funding—could prove foundational to future recovery when disaster hits. In planning, local leaders could consider which high-growth industries to prioritize, how to mitigate hazards to these industries, and which sectors could likely spur economic growth in the aftermath of disaster.

To focus on resilience for growth, leaders could consider:

- *Using local risk assessments to inform a resilience for growth plan.* Consider forward-looking scenarios to anticipate and plan for future risks; enable and restart high-growth industries; and build in resilience and risk reduction for those industries, especially in high-hazard environments. These plans can account for evolving disaster trends and potential impact on market dynamics to ensure long-term adaptability and sustainability.
- *Establishing a funding strategy for resilience investments.* Include compelling use cases for state and federal grants, public-private partnerships, and innovative financing options such as resilience bonds.
- *Standing up a resilience project delivery program.* Focus on streamlining processes, coordinating stakeholders, and utilizing best practices in project management to drive pre-disaster resilience and mitigation initiatives.
- *Tracking key economic indicators.* Build monitoring tools to consistently track and rapidly interpret key economic indicators to direct and prioritize response and recovery efforts.

Planning ahead for fast, flexible recovery funding

A well-structured financial strategy that includes various funding sources could ensure access to funds that help in the immediate aftermath of a disaster and support long-term recovery and

11 Calculated based on Moody's Analytics county-level GDP data.

economic growth. Such a strategy, ideally, prioritizes the rapid deployment of financial resources to address urgent needs and then adapts to address shifting recovery priorities over time. By securing a diverse mix of federal, state, and private funding, communities could build a more resilient financial foundation.

To create a fast, flexible funding plan, leaders could consider:

- *Devising a fast, flexible funding strategy.* Outline funding sources, criteria for disbursement, and protocols for rapid decision-making to quickly mobilize and deploy financial resources to address various priorities.
- *Defining a Rainy Day Fund strategy and plan.* When Rainy Day Funds are built before disasters, they can be accessed quickly after disasters and allow communities to meet immediate needs while kickstarting recovery and economic renewal.[12] Research by the Federal Reserve Bank of San Francisco suggests that larger Rainy Day Funds can help blunt post-disaster tax base declines, as employment and personal income may temporarily drop immediately after a disaster.[13]
- *Establishing a private sector funding and partnership outreach team.* Building pre-disaster partnerships with the private sector can help communities secure funding to supplement public funding, coordinate joint efforts to maximize resources and expertise, and create innovative solutions to enhance recovery efforts. For example, FEMA Community Disaster Resilience Zones (CDRZs) provide geographic focus for public, private, and philanthropic partnerships to plan and implement resilience projects that help communities reduce the impact of climate change and other natural hazards.[14]
- *Encouraging and supporting insurance coverage among residents and businesses.* Individual and business insurance coverage can help get capital flowing quickly for rebuilding efforts. Communities could help inform residents and business owners about the potential benefits of initial or expanded coverage with awareness campaigns, incentives, and collaborating with insurance providers to ensure the availability of affordable coverage options.

12 Based on research from Pew, 35 states and the District of Columbia allow the use of Rainy Day Fund for disasters, though only 14 and the district explicitly name disasters as an intended purpose for the fund. Seven others—MI, NJ, OK, OR, PA, SD, and VT—specify "emergencies," which may include natural disasters as well as fiscal or other crises, among their funds' designated uses. The Pew Charitable Trusts, "How States Pay for Natural Disasters in an Era of Rising Costs: A nationwide assessment of budgeting strategies and practice" (May 2020), available at https://www.pewtrusts.org/-/media/assets/2020/05/how-states-pay-for-natural-disasters-in-an-era-of-rising-costs.pdf.

13 Brigitte Roth Tran and Daniel Wilson, "The Local Economic Impact of Natural Disasters," Federal Reserve Bank of San Francisco, Working Paper 2020-34, February 2023, available at https://doi.org/10.24148/wp2020-34.

14 Federal Emergency Management Agency designated the first 483 Community Disaster Resilience Zones in all 50 states and the District of Columbia in September 2023.

- *Pursuing innovative insurance arrangements.* Parametric insurance, for example, provides payouts based on predefined triggers such as hurricane wind speed or earthquake magnitude rather than actual losses, and community-based insurance pools can offer faster, predicable payouts.

Building a rapid response roadmap

Pre-disaster recovery planning, including prioritizing where and how to deploy resources to ensure specific areas of vulnerability are supported, appeared in this analysis to influence recovery trajectory. Non-financial factors such as community cohesion, leadership coordination, access to expertise, and thorough planning can help bolster recovery success. When leaders prioritize proactive, robust preparedness measures, these measures can help empower communities to rebound from disasters. Promoting effective governance and fostering community resilience are key to building up and deploying resources with the speed and capacity needed to manage recovery efforts effectively.

To build a rapid response roadmap, leaders could consider:

- *Conducting a post-disaster capacity scale-up assessment.* Such an assessment helps identify gaps in capacity and inform recommendations for scaling up capabilities.
- *Developing emergency capabilities of key organizations and roles.* A statewide cadre of seasoned recovery leaders can help coach local officials who lack disaster experience or expertise. Standby contracts accessible to state and local agencies for a wide range of recovery management roles and skillsets can also help shore up capabilities and enhance efforts in the wake of a disaster.
- *Creating an inclusive, dedicated unified coordination group or its equivalent to drive recovery.* At a local level such a task force can help define a clear vision for recovery and coordinate recovery efforts across agencies and funding streams. This group could include representatives from key sectors and stakeholder groups to ensure a cohesive strategy.
- *Conducting recovery planning and exercises.* These proactive measures can define and consider various scenarios to inform the best application of likely funding streams, identify gaps, and plan to address gaps.
- *Providing incentives to boost execution speed.* Such incentives could take the form of financial bonuses, recognition programs, or expedited approval processes for projects that meet or exceed performance benchmarks to accelerate recovery and demonstrate tangible progress quickly.

Identifying and addressing inequity

The intersection of poverty and disaster recovery helps underscore the need for a holistic and inclusive approach to resilience planning. As ongoing research by the Coastal Resilience Center at the University of North Carolina at Chapel Hill suggests, few hazard mitigation plans acknowledge the particular needs and histories of marginalized communities—such as systemic discrimination via forced land removal and redlining—that have long-term impacts on their health and well-being and increase their vulnerability to disaster-related hazards and loss.[15, 16] Counties with higher and increasing rates of inequity may face greater challenges in recovery due to limited resources, social disparities, and reduced resilience. Ensuring that recovery initiatives are accessible and beneficial to all community members, regardless of socio-economic status, can help avoid exacerbating inequity following a disaster and foster a more inclusive and resilient society.

To identify and address inequity, leaders could consider:

- *Creating an inequity reduction plan in disaster-prone, high-vulnerability areas.* Such a plan could establish clear goals and strategies to address disparities and circumvent inequity in recovery efforts.
- *Basing rebuild efforts on community needs rather than restoring what existed.* When focused on rectifying pre-disaster conditions that impeded competitiveness and equity, recovery efforts can provide an opportunity to open new economic prospects.
- *Targeting risk reduction efforts.* Such efforts could include mitigation measures, increased insurance coverage, zoning, and land use improvements at the intersection of high hazard risk and high inequality related to poverty, high housing burdens, and other factors.
- *Improving cost-sharing arrangements.* Helping to make funding less onerous for areas with high indicators of inequality and vulnerability that also struggle to meet match and cost-sharing requirements can lower financial barriers that could otherwise impede recovery efforts.

15 Cassandra R. Davis, *et al., A Landscape Study of Social Equity Data Needs and its Access and Availability to Support the Disaster Resilience of Marginalized Communities: Year 2 Findings (Coastal Resilience Center at The University of North Carolina at Chapel Hill, September 2023).*

16 Note that FEMA's *Local Hazard Mitigation Planning Handbook (2023) and programs such as the Community Rating System update guidelines for developing local hazard mitigation plans to address equity.*

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This analysis highlights the critical need to refine the art and science of disaster recovery to focus more sharply on creating key competitive advantages for counties, states, and the nation as a whole. Examining thousands of recoveries and interviewing emergency management officials in nine states confirmed that the efforts of dedicated teams heading recoveries can be hampered by insufficient funding, resource limitations, and inadequate pre-planning and follow-up. The results suggest that once an immediate crisis has passed, recovery teams frequently find themselves lacking the resources and direction they need to sustain momentum, and this can hinder their efforts as well as the overall recovery. This small-scale, focused analysis can help spark the broader analyses and conversations necessary to shift to a more well-informed, nuanced, inclusive, and effective approach to recovery. By embracing systematic strategies and best practices discussed in this article, communities could enhance their resilience while creating a competitive edge to help them navigate uncertainties in the future.

Research methodology

To understand the factors that could affect speed and success of local disaster recovery, we analyzed 2,797 unique county-level disaster incidents, affecting 1,599 counties. We focused on a subset of communities that have been most affected by recent disaster incidents. To do so, we identified climate and weather disasters in the United States where overall damages and costs reached or exceeded $1 billion (2024 dollars, CPI adjusted) between 2000 and 2017 based on NOAA data. We further refined this list to include only disasters that were designated a major disaster by the President of the United States. Using FEMA's major disaster declaration data, we focused on counties that were authorized for both Public Assistance (PA) and Individual Assistance (IA), indicating there was damage to public infrastructure such as roads, bridges, schools, hospitals, and public utilities as well as uninsured losses suffered by individuals and households. Counties outside of the 50 states and the District of Columbia (e.g., Puerto Rico and U.S. territories) were excluded from this analysis due to lack of longitudinal economic indicator data (e.g., county-level GDP, per capita income). Disaster types considered were fire, flood, hurricane, severe storm, severe ice storm, and tornado.

Notably, there were multiple calendar years in which the same county or counties were affected by more than one $1 billion climate disaster; in these instances, the disasters and cumulative recovery are considered one county-disaster incident. This selection criteria yielded 2,797 unique county-disaster incidents in scope for analysis.

Determination of leading and lagging recovery. County-level GDP CAGR was used as a proxy to determine a county's speed and level of recovery, as it measures economic activity, employment impact, business resilience, and net exports within a specific area and is tracked on an annual basis for most U.S. localities. These metrics rise only once individuals have homes to return to, as businesses reopen and start to thrive, and as infrastructure is restored. By examining county-level GDP estimates from Moody's Analytics, we could assess the post-disaster economic situation as an area allocated resources and attempted to bounce back.

We calculated GDP CAGR in immediate aftermath of a disaster (from the year of the disaster to two years after) and medium-term (two to five years after the disaster) for each county-disaster incident.

- County-disaster incidents that resulted in an immediate and sustained economic rebound—at least one percentage point higher growth than pre-disaster levels in both time horizons—were deemed leading recoveries. Twenty-three percent (625) of incidents fit these criteria.

- County-disaster incidents followed by GDP CAGR that did not exceed pre-disaster levels in the immediate- or medium-term were considered lagging recoveries. Forty-five percent (1,259) of incidents fit these criteria.

- County-disaster incidents that achieved at least one percentage point higher growth in the immediate term or medium term (but not both) were considered mixed recoveries. Thirty-one percent (867) of incidents fit these criteria.

Determination of value at stake. To determine the potential economic value of improving recovery outcomes after a disaster, we analyzed the GDP growth differences between counties with leading and lagging recoveries over five years. Our analysis revealed that counties with leading recoveries experienced, on average, 13 percentage points more GDP growth compared to those with lagging recoveries after 5 years. We then modeled a scenario in which all lagging counties received a 13 percentage point bump in GDP after 5 years. After accounting for 2 percent annual inflation, we estimated that the lagging counties could have generated at least $1.2 trillion more in economic value. To avoid overestimation and recognizing that other factors may influence a county's ability to achieve economic growth, we assumed that 25 percent of this value is achievable, resulting in a potential value of over $300 billion over the 17-year span of the data analyzed here–more than $175 billion per decade. For context, this amount is comparable to the 2022 real GDP of the Orlando-Kissimmee-Sanford, FL, metropolitan area, which was approximately $166 billion per the Bureau of Economic Analysis.

Limitations. While our analysis aimed to capture the impact of outsized disasters on local communities, we did not track or include other factors that may have impacted local socioeconomic indicators during our period of interest, including:

- Human-caused disasters (e.g., industrial accidents, transportation accidents, oil spills, chemical leaks, nuclear accidents, acts of terrorism)
- Health emergencies such as pandemics and public health crises—notably, COVID-19—that can have widespread impacts on communities and economies
- Technological disasters resulting from failures of tech or infrastructure (e.g., power outages, cyberattacks, dam failures, structural collapses)
- Other types of Federal alerts (e.g., Emergency Declarations, Fire Management Assistance Declarations, or Fire Suppression Authorization)

In some cases, we have noted where these other factors could have impacted a county's ability to recover.

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