

Losses from Natural Disasters: New County-Level Data and Resilient Consumer Spending

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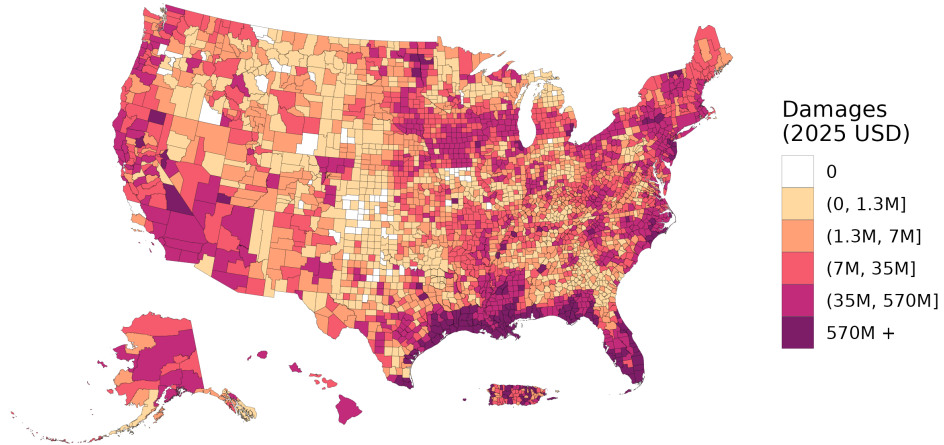
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Motivation

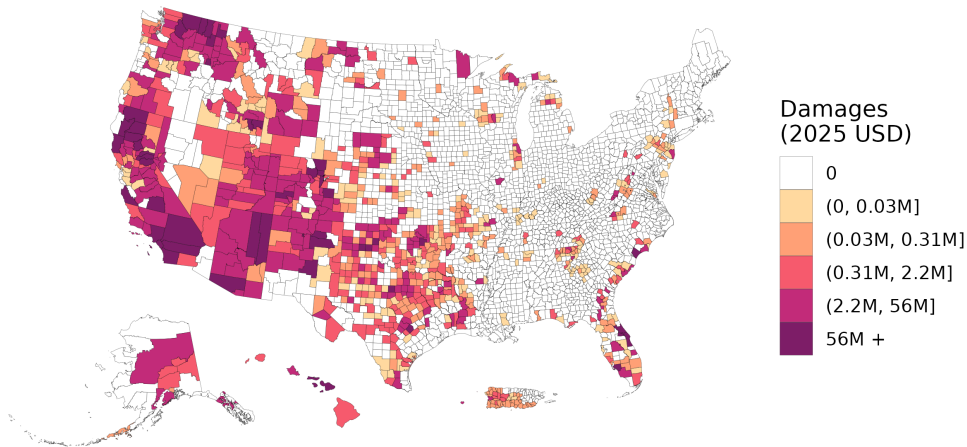
- Disasters disrupt local economies and strain household finances
- Studying these effects requires losses linked to economic data
- Nearly 40% of NOAA events use zones that do not match counties
- Existing sources limit access or omit undeclared and smaller disasters

Floods, hurricanes, coastal disasters: South East + East



Cumulative county damages, 1996–2025; December 2025 USD. Sources: NOAA, U.S. Census Bureau.

Wildfire damages are concentrated in the West



Cumulative county damages, 1996–2025; December 2025 USD. Sources: NOAA, U.S. Census Bureau.

What we do

- Build public county-level disaster loss data from 1996 onward
- Allocate zone losses using population, housing, and economic weights
- Link disaster timing and losses to spending and consumer credit
- Spending rebounds quickly while credit strain can persist

Outline

- Methodology
- Damages across disaster types
- Resilient household spending
- Financial consequences for households

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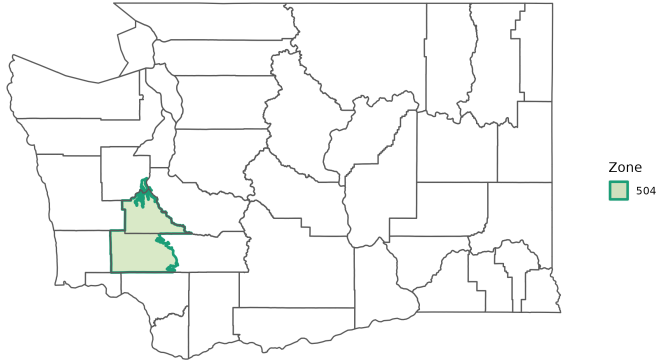
The official source: NOAA Storm Events Database

- Nationwide coverage of 55+ weather event types since 1996
- Reports of significant or unusual weather, verified by 123 NWS offices
- Direct property and crop damages; direct and indirect human losses
- Updates arrive with an approximately three-month lag

Weather zones and counties do not line up

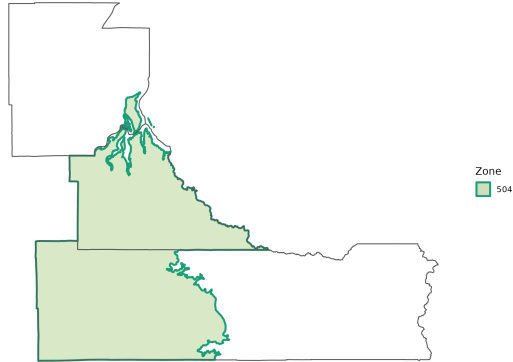
Event type	Event group	Geographic designator
Flood	Flood	County
Wildfire	Wildfire	Zone
Hurricane (Typhoon)	Hurricane/Trop. Storm	Zone
Tornado	Tornado	County
Heavy Snow	Winter Weather	Zone
High Wind	Wind	Zone

Mapping zone 504 in Washington state



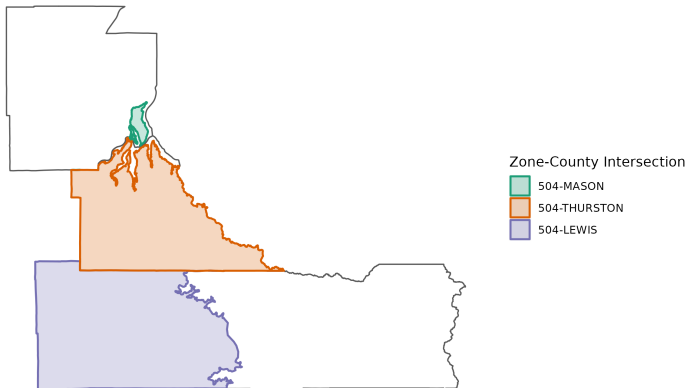
- Start with a historical NOAA zone map
- Overlay county boundaries from the same year

One zone overlaps three counties



- Mason, Thurston, and Lewis
- Each county contains only part of zone 504

Intersect zones with counties



One observation per zone–county intersection

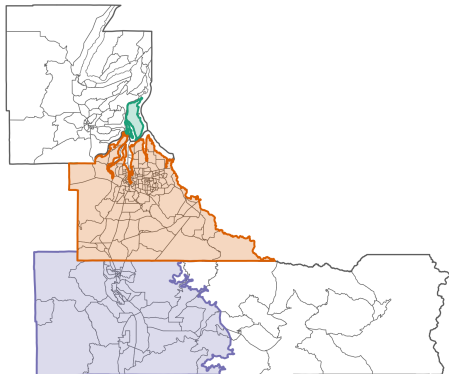
$$w_{z,c}^f = \frac{f(z \cap c)}{\sum_j f(z \cap c_j)}$$

County loss: $w_{z,c}^f \times$ zone loss

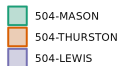
f : area, population, employment, income, or housing units.

Weights sum to one within each zone. Sources: NOAA, U.S. Census Bureau.

Use Census block groups to allocate losses



Zone-County Intersection



Sum Census characteristics within each intersection

Apportion split block groups by area

Thurston County's share

Equal weights	33.3%
Area	40.4%
Population	79.9%

The Thurston portion includes Olympia.

A national dataset with historical crosswalks

- Cover all 50 states, D.C., and Puerto Rico
- Build crosswalks for 46 NOAA map vintages, 2006–2025

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Wildfires are costly and geographically concentrated

- Wildfires have the largest mean and median county losses
- The largest drought episodes reach many more county–episode pairs

Disaster type	County damage (\$m)		County–episode observations
	Mean	Median	
Wildfire	1,518.4	413.7	25
Coastal	1,058.9	21.7	124
Hurricane	742.1	58.7	196
Drought	47.4	22.4	335

Ten largest episodes per type, 2001–2025. County–episode observations; population weights.

Damages are inflation-adjusted USD millions. Counts refer to county–episode observations, not unique counties.

Disaster types hit different communities

- Major wildfires affect more affluent counties
- Droughts and winter weather affect lower-income counties

Disaster type	Mean population (thousands)	Mean income per capita (\$ thousands)
Wildfire	449	46
Drought	33	32
Winter weather	150	30

Ten largest episodes per type, 2001–2025. County–episode observations; population weights.

Sources: NOAA, U.S. Census Bureau, BEA; 2024 BEA values carried forward where 2025 data are unavailable.

Property and crop losses differ sharply

- Property losses dominate wildfire, coastal, and flood damages
- Crop losses dominate drought damage and exceed half of winter losses

Disaster type	Mean county damage (\$m)	
	Property	Crop
Wildfire	1,516.6	1.8
Coastal	1,056.0	2.9
Flood	707.2	0.3
Drought	4.3	43.1
Winter weather	26.0	35.0

Ten largest episodes per type, 2001–2025. County–episode observations; population weights.
Inflation-adjusted USD millions. Property and crop losses are direct physical damages.

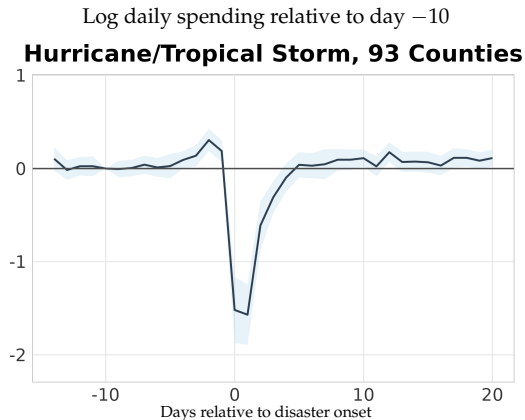
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Daily spending across U.S. disaster types

- Numerator: 150,000+ households across 90%+ of residential ZIP codes
- Physical and digital receipts, plus linked loyalty accounts
- Daily spending by store county; exclude online purchases
- Extend Katrina (Gallagher and Hartley, 2017)) and Chennai (Agarwal et al., 2024)
- Up to ten episodes per type, 2019–2025, from day -14 to $+20$
- Local spending can fall when residents shop elsewhere

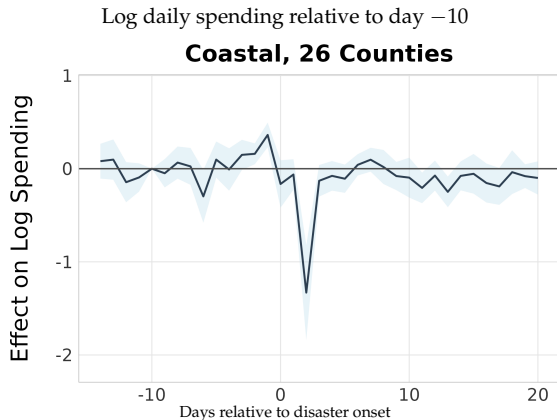
Hurricanes: spending recovers within a week



Purchases rise before onset, fall sharply, then return near baseline

Numerator; county-day event studies, 2019–2025; 95% CI County and weekday FE, lagged local controls; county-clustered SE

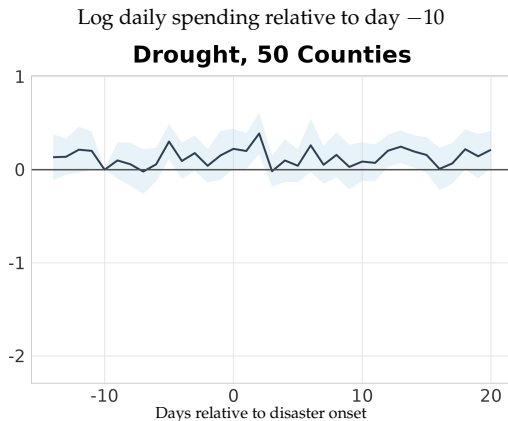
Coastal disasters: a sharp but brief decline



Local spending rebounds quickly after the initial disruption

Numerator; county-day event studies, 2019–2025; 95% CI County and weekday FE, lagged local controls; county-clustered SE

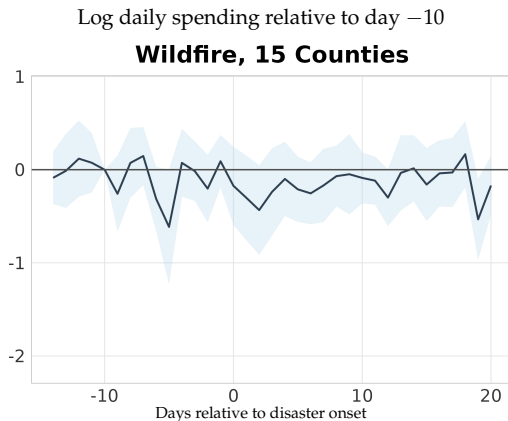
Droughts: no abrupt spending contraction



No sharp daily break around the recorded onset

Numerator; county-day event studies, 2019–2025; 95% CI County and weekday FE, lagged local controls; county-clustered SE

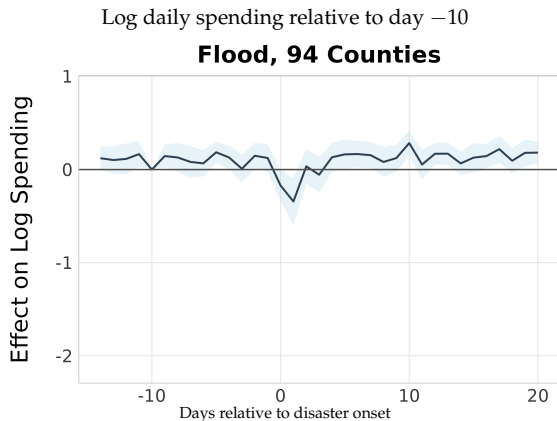
Wildfires: no detectable spending contraction



Large physical losses coexist with an imprecise spending response

Numerator; county-day event studies, 2019–2025; 95% CI County and weekday FE, lagged local controls; county-clustered SE

Floods: a smaller, short-lived spending decline



The onset decline is much smaller than for hurricanes

Numerator; county-day event studies, 2019–2025; 95% CI County and weekday FE, lagged local controls; county-clustered SE

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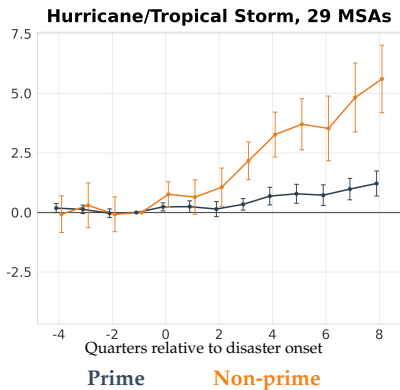
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Credit use after spending recovers

- Public Philadelphia Fed credit data, based on CCP/Equifax
- MSA-quarter data, 2005–2025; share with card use at 75%+ of limits
- Compare prime and non-prime borrowers for persistent financial strain

Hurricanes: financial strain persists

Change in the share of borrowers with high card utilization

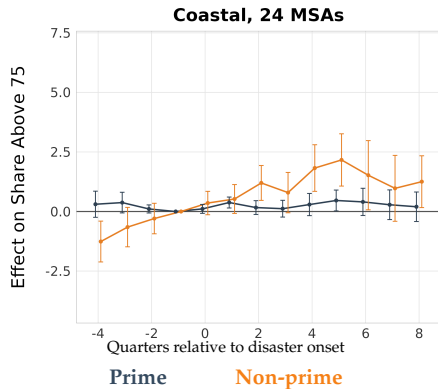


The high-utilization share rises more for non-prime borrowers

NY Fed CCP/Equifax via Philadelphia Fed Consumer Credit Explorer. MSA-quarter estimates, 2005–25; quarter –1 reference; 95% CI.

Coastal disasters: higher non-prime utilization

Change in the share of borrowers with high card utilization

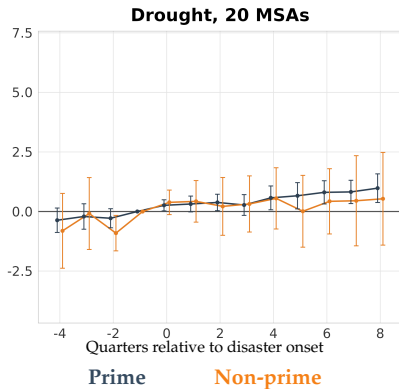


Pre-event differences make the group comparison suggestive

NY Fed CCP/Equifax via Philadelphia Fed Consumer Credit Explorer. MSA-quarter estimates, 2005–25; quarter –1 reference; 95% CI.

Droughts: modest, imprecise credit responses

Change in the share of borrowers with high card utilization

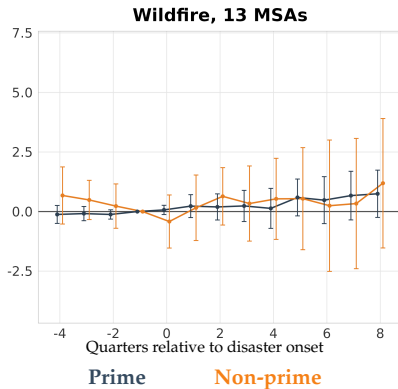


The full-sample estimates show no large, precise increase

NY Fed CCP/Equifax via Philadelphia Fed Consumer Credit Explorer. MSA-quarter estimates, 2005–25; quarter –1 reference; 95% CI.

Wildfires: imprecise credit responses

Change in the share of borrowers with high card utilization

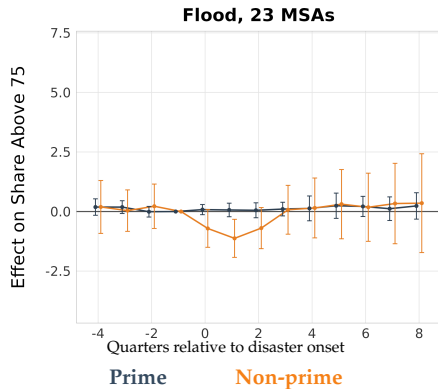


Wide confidence intervals limit the conclusions

NY Fed CCP/Equifax via Philadelphia Fed Consumer Credit Explorer. MSA-quarter estimates, 2005–25; quarter –1 reference; 95% CI.

Floods: no persistent utilization increase

Change in the share of borrowers with high card utilization



The baseline estimates return near zero after an initial decline

NY Fed CCP/Equifax via Philadelphia Fed Consumer Credit Explorer. MSA-quarter estimates, 2005–25; quarter –1 reference; 95% CI.

Conclusion

- Public county-level data link disaster losses to economic outcomes
 - Hurricanes and coastal disasters disrupt spending, which recovers quickly
 - High credit use can persist, especially among non-prime borrowers
- newyorkfed.org/research/policy/natural-disaster-losses