The fiscal impacts of declared and non-declared natural disasters on New York State local governments

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Background

- Local governments take primary responsibilities in disaster response, but there is a lack of understanding on the impacts of natural disasters on local financial management
- Most research focus on major disasters and there is a lack of research on medium-size or minor disasters.
- Lack of research on the economic and fiscal impacts of natural disasters.

Local government's responsibilities

- For federally declared disasters:
  - FEMA (Federal Emergency Management Agency) usually covers 75% of disaster response and recovery costs
  - State and local governments share the rest of costs.
  - Declaration decisions are highly affected by politics (Garrett & Sobel 2003; Sylves and Buzas 2007; Husted and Nickerson 2014).

- For non-declared disasters:
  - Most emergencies are handled locally without state or federal assistances.
  - State resources are available for state declared disasters.
  - Statewide disaster accounts (in some states).

Natural disasters in New York State (1996-2012)

	Non-declared Disasters	Federally Declared Disasters
Injuries	858	175
Fatalities	255	103
Property damage	$1,080m ($67m/year)	$3,950m ($232m/year)
Occurrence (time * county)	9675	1722

	Non-declared disasters year	Percent	Federally declared disaster year	Percent
Disaster related expense	$7.2 m/year	100%	$18.1 m/year	100%
Federal + state aids	$5.3 m/year	74%	$13.2 m/year	73%
Local		26%		27%

Question and Data

- Research question:
  - What are the impacts of natural disasters on local government's liquidity, fund balance, debt burden, revenues and expenditures?
- Panel data: 1996-2012 (17 years), 57 counties and 61 cities
  - Disaster events data: SHELDUS
  - Local finance data: New York State counties and cities CAFRs

Fiscal impacts by disaster year

	No disaster year	Non-declared disaster year	Federally declared disaster year
Cash ratio	.423	.364 ↓13.95%	.363 ↓14.18%
Operating position	.252	.250 ↓0.79%	.251 ↓0.40%
Debt service ratio	.057	.069 ↑21.05%	.068 ↑19.30%
Short-term debt outstanding	.404	.509 ↑25.99%	.501 ↑24.01%
Per capita	**No disaster year**	**Non-declared disaster year**	**Federally declared disaster year**
Transportation	$144	$109 ↓24.31%	$107 ↓13.95%
Employee benefits	$236	$192 ↓18.64%	$178 ↓13.95%
Property tax	$460	$396 ↓13.91%	$371 ↓19.35%
Sales tax	$318	$313 ↓1.57%	$293 ↓7.86%

Regression: impact on financial ratios

VARIABLES	Cash ratio	Cash ratio	Operating position	Operating position	Short-term debt	Short-term debt
Property damage (log)	0.04 ***	-0.004	0.01 ***	0.002	0.004	0.007 ***
Federal declaration	-0.11 ***	-0.02	-0.04 ***	-0.004	0.05 **	0.006
Federal declaration * Property damage (log)	0.01	0.02***	0.01*	0.001	-0.01*	-0.009 **
State and local disaster aids (log)		-0.00		-0.002**		-0.002
Lagged cash ratio		0.98 ***				
Lagged operating position				0.94 ***		
Lagged short term debt						0.93 ***

Model: OLS, all counties and cities, control for population density
* p<0.1, **p<0.05, *** p<0.01

- Interpretation:
  - In general, damage from natural disasters does not negatively impact local financial ratios.
  - In federally declaration year,
    - Cash ratio reduces by 11 percentage points
    - Fund balance reduces by 4 percentage points
    - Short term debt balance increases by 5 percentage points
  - When prior year's ratios are factored into the models, the impacts of federal declaration are eliminated.

Impacts on local revenues

VARIABLES	Property tax (t)	Sales tax (t)	Property tax (t+1)	Sales tax (t+1)
Property damage (log)	-0.03***	-0.04***	-0.02***	-0.03***
Federal declaration	0.04	0.03	0.001	0.01
Federal declaration * Property damage (log)	-0.006	-0.012	-0.004	-0.007
State and local disaster aids	0.009*	0.008	0.007	0.008

Model: fixed effect, only counties, control for population density
* p<0.1, **p<0.05, *** p<0.01

- Interpretation:
  - 1% increase in property damage from natural disasters
    - Reduces property tax by 3% for the current year and by 2% for the following year
    - Reduces property tax by 4% for the current year and by 3% for the following year
  - State and local disaster aids reduce the negative impact of disasters on current year's property tax

Impacts on local spending

VARIABLES	Employee benefits	Public safety	Transportation
Property damage (log)	-6.42***	-3.53***	-2.06**
Federal declaration	9.20	2.50	0.57
Federal declaration * Property damage (log)	-3.04	-1.46	-1.72
Federal and state disaster aids	3.43**	3.51***	1.09

Model: fixed effect, only counties, control for population density
* p<0.1, **p<0.05, *** p<0.01

- Interpretation:
  - 1% increase in property damage from natural disasters
    - Reduce local spending on employee benefits by $6.42 per capita
    - Reduce public safety spending by $3.53 per capita
    - Reduce transportation spending by $2.06 per capita
  - Federal and state aids reduce disaster's negative impacts on local spending.

Summary of Preliminary Findings

- Impacts of natural disasters on local finance
  - Federally declaration status negatively affects local government's liquidity ratio and fund balance, and is positively related to local government's short-term debt outstanding.
  - Severity of natural disasters is negatively associated with local government's nonessential spending and revenues.
- Fiscal institutions can mitigate the negative impacts of disasters
  - State and local disaster aids reduce the impacts of disasters on local spending.
  - Prior financial conditions influence the negative impacts of disasters.

- Next steps:
  - The system of local response to natural disasters
  - How can local governments financially prepared for natural disasters (such as setting up reserve funds)

Thank you!

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