Do Politics Shape Economic Recovery through Disaster Aid? County-Level Evidence from U.S.

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Background

- Average $\#$ of natural disasters annually in USA $\sim$ 118.
- Yearly damages caused by natural disasters $\sim$ \$12 billions.
- Impact to USA economy is small (.1% GDP), but large to local counties (up to 2% GDP).
- Yearly disaster aid $\sim$ \$2.8 billions (FEMA).
- Yearly disaster recovery loans $\sim$ \$1.9 billions (SBA).

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Disasters declared under FEMA

Number of FEMA Disaster Declarations in each County (2003-2021)

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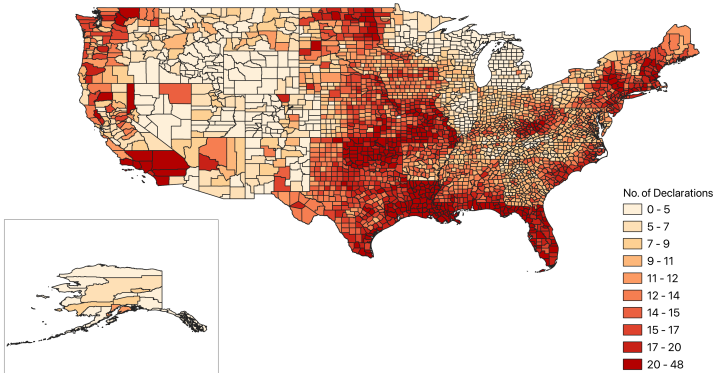
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Research Question

1. Does disaster aid facilitate local GDP recovery in the USA?
2. How being politically competitive affects disaster aid?

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Summary of Results

- Used IV regression on yearly level data from 2000-2021.
- 1% increase in disaster aid lead to an average 0.03% points increase in GDP growth rate in the following year (county level).
- Swing counties are positively associated with GDP growth rate only in swing states.
- Swing counties receive higher aid in non swing states.

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Context - FEMA

Disaster Declaration

1. Post disaster, the governor requests a declaration from president.

2. FEMA conducts an assessment and recommends to the president whether to approve the request.

3. The president makes a decision.

Distribution

1. Households, businesses and local governments apply for assistance.

2. FEMA accepts/rejects the application.

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Small Business Administration

1. Post disaster, SBA administrator decides on the declaration.
2. $\sim$ 300 disasters declarations per year.
3. Households and businesses apply for low-cost loans.

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Existing Literature

Disaster negatively effect economic outcomes in short run.

Hsiang and Jina (2014), Lazzaroni and Bergeijk (2014), Klomp and Valckx (2014), Botzen, Deschenes and Sanders (2019) etc.

Effects of aid/adaptation/creative destruction on economics outcomes in the long run.

Tran and Wilson (2024), Belasen and Polachek (2008), Deryugina (2017), Groen, Kutzbach and Polivka (2020), Hornbeck and Keniston (2017), Jerch et al. (2023) etc.

-Find causal effect of aid on GDP recovery using IV. Previous studies used DiD.

-Did not find evidence for the long term effect

Political Competitiveness positively effect economic outcomes.

Ma and Mclaren (2018), Besley, Persson and Sturm (2010) etc.

-Find heterogeneous evidence for county level in US.

Political Competitiveness effect aid positively.

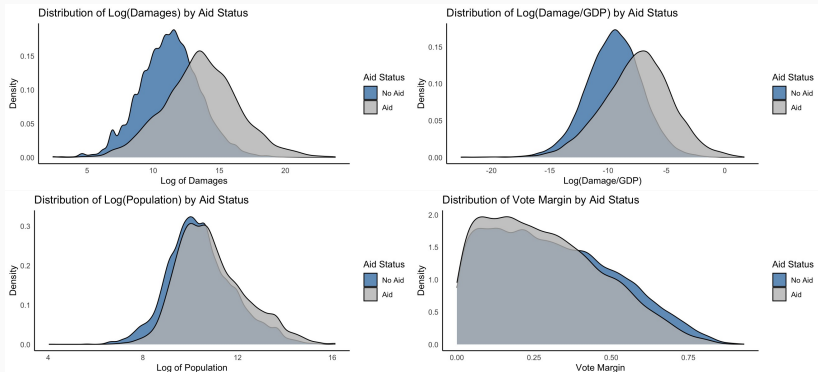Stramp (2013), Garrett and Sobel (2007) etc.

-Find heterogeneuos evidence at county level in US.

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Data

1,524 disasters affecting 870 counties (total observations: 224,463).

Variable	Mean	SD	Min	Median	Max
Unemployment Insurance	31,930,503	247,019,086	1,000	3,819,000	31,503,026,000
Number of Jobs	60,705	210,683	53	125,57	6582546
Population	104,003	330,104	55	26,721	10123521
Damages	1039,488	53,819,009	0	0	11750135000
Income per Capita	37,476	12,603	11,522	35,232	318,297
Total Applications	91	3,027	0	0	615,608
Election Spending	35,495	1,798,985	0	0	535,041,907
Votes Margin	0.32	0.21	0.00	0.30	0.94
County GDP	4,787,279,251	20,936,953,585	7,468,000	787,464,000	647,355,553,000

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Factors Affecting Disaster Aid

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Effect of Aid on GDP Recovery

$$\Delta \log(\text{GDP})_{t+2,t+1} = \beta \text{Aid}_{c,t} + \gamma \mathbf{X}_{c,t} + \delta_c + \tau_t + \epsilon_{c,t}$$

Table 1: Estimated impact of Disaster Aid on GDP growth.

Dependent Variable:	$\Delta \log(\text{GDP})_{t+2,t+1}$			
Data:	Aggregate^c	SBA^c	FEMA^c	FEMA^d
Log Aid	8.12×10^{-5}	0.0001	0.0002	0.0002
	(0.0001)	(0.0001)	(0.0004)	(0.0004)
Quarter/County FE	Yes	Yes	Yes	Yes
Disaster FE	No	No	Yes	Yes
Observations	82,849	81,313	84,775	84,775
R^2	0.14960	0.15061	0.18598	0.18598

c: County Level Clustering; d: Disaster Level Clustering
Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

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Endogeniety

- Selection bias exists as aid is not randomly distributed among affected counties.

- Aid distribution depends on damages, insurance, political factors etc. The criteria is not known.

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IV Proposal

- IV Proposal - Political Competition at County level
    1. Votes margin in the past presidential elections.
    2. Number of quarters between disaster timing and next elections.
- Why?
    - Swing counties likely receive higher aid closer to elections.
- Potential problems?
    - Swing counties have better economic outcomes due to political competition.

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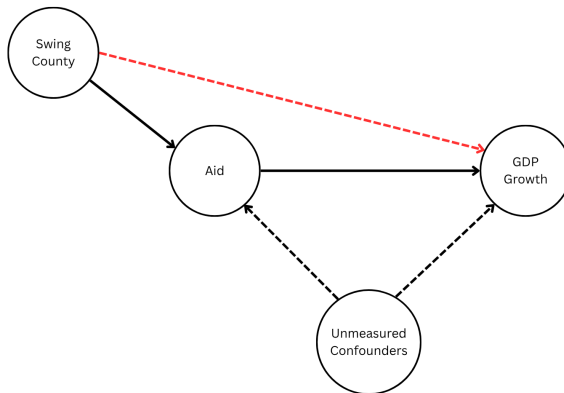
Endogeneity in IV

$$\Delta \log(\text{GDP})_{c,t+2,t+1} = \beta_1 \text{Margin}_{c,t} + \gamma \mathbf{X}_{c,t} + \delta_c + \tau_t + \epsilon_{c,t}$$

Table 2: Estimated impact of political competition on GDP growth.

Dependent Variable:	$\Delta \log(\text{GDP})_{t+2,t+1}$		
Panel:	All Data	Disasters	No Disasters
	(1)	(2)	(3)
Votes Margin	-0.0329***	-0.0520***	-0.0208**
	(0.0065)	(0.0066)	(0.0084)
Observations	200,271	81,313	118,958
R^2	0.02174	0.02227	0.02181

Clustered (County) standard-errors in parentheses
Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

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US Presidential Elections

1. Voters in each state cast votes for president.

2. Each state has a number of electoral votes equal to its seats in Congress.

3. Winner-Takes-All: Candidate who gets the most votes statewide receives all of that state's electoral votes

4. Hypothesis: Swing counties incentive to perform well in non swing states is low.

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Exogeneity Condition

$$\Delta \log(\text{GDP})_{c,t+8,t+4} = \beta_1 \text{Margin}_{c,t} + \gamma \mathbf{X}_{c,t} + \delta_c + \tau_t + \epsilon_{c,t}$$

Table 3: Estimated impact of political competition on GDP growth for subset of data with no disasters.

Dependent Variable:	$\Delta \log(\text{GDP})_{t+2,t+1}$	
	Swing States	Non-Swing States
Votes Margin	-0.0443***	-0.0099
	(0.0093)	(0.0115)
Observations	38,883	80,075
Avg. No. of States	15	32.6

Clustered (County) standard-errors in parentheses
Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

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Final IV

- Assumption: For non swing states, political competition does not affect GDP growth rate and hence the IV has some exogeneity variation.
- Final IV - Political competition at county level in non swing states
    1. Votes margin in the past presidential elections.
    2. Number of quarters between disaster timing and next elections.

IV Results

First Stage - Relevance Condition

$$\log(\text{Aid})_{c,t} = \beta_1 \text{Margin}_{c,t} + \gamma \mathbf{X}_{c,t} + \delta_c + \tau_t + \epsilon_{c,t}$$

Table 4: Estimated impact of political competition on Disaster Aid.

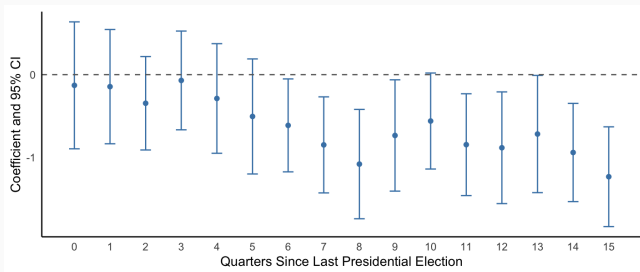| Dependent Variable:	Log Aid		
Panel:	All Data	Swing	Non-Swing
	(1)	(2)	(3)
Margin	-0.3382**	0.0791	-0.6788***
	(0.1584)	(0.2571)	(0.2050)
Observations	89,257	35,140	54,117
Within R^2	0.54835	0.49516	0.56378

Clustered (County) standard-errors in parentheses
Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

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First Stage - Relevance Condition

$$\log(\text{Aid})_{c,t} = \sum_{q=0}^{15} \delta_q \big(\text{Margin}_{c,t} \times \mathbb{I}_t(\text{PostElection} = q)\big) + \gamma \mathbf{X}_{c,t} + \delta_c + \tau_t + \epsilon_{c,t}$$

Figure 2: Coefficients for the first stage regression. Data restricted to non swing states.

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Second Stage

$$\Delta \log(\text{GDP})_{c,t+2,t+1} = \beta_1 \widehat{\log \text{Aid}} + \gamma \mathbf{X}_{c,t} + \delta_c + \tau_t + \epsilon_{c,t}$$

Table 5: Second stage IV regression with county level clustering

Dependent Variable:	$\Delta \log(\text{GDP})_{t+2,t+1}$
$\widehat{\log \text{Aid}}$	0.0286***
	(0.0095)
Observations	49,340

Clustered (County) standard-errors in parentheses
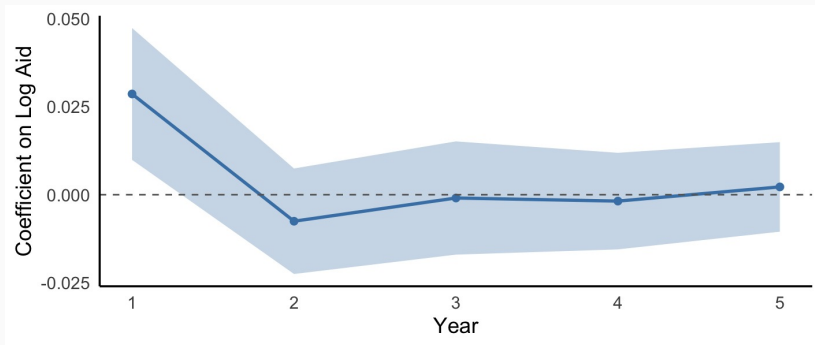*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

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Long Term Impact

Figure 3: Long term impact of Disaster Aid on GDP growth rate

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To Do List

- Whether aid is the reason for long-term improved economic outcomes?
- Lobbying affects Aid?
- Disaster-type heterogeneous effects.
- Calculate fiscal multiplier

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Thank you!

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Appendix

Table 6: Second stage IV regression

Dependent Variable:	$\Delta \log(\text{GDP})_{t+2,t+1}$			
Data:	Aggregate[c]	SBA[c]	FEMA[c]	FEMA[d]
	(1)	(2)	(3)	(4)
$\widehat{\text{Log Aid}}$	0.0286***	0.0133**	0.0824**	0.0824**
	(0.0095)	(0.0055)	(0.0395)	(0.0377)
Quarter FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Disaster FE	No	No	Yes	Yes

c: County Level Clustering; d: Disaster Level Clustering
Signif. Codes: ***: 0.01, **: 0.05, *: 0.1