

# What influences the destination of disaster migrants? Evidence from Hurricane Katrina

AERE Conference Presentation

Robert Dinterman <sup>1</sup> Jonathan Eyer <sup>2</sup> Noah Miller <sup>2</sup> Adam Rose <sup>2</sup>

<sup>1</sup>The Ohio State University

<sup>2</sup>University of Southern California

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## Overview

Talk will cover:

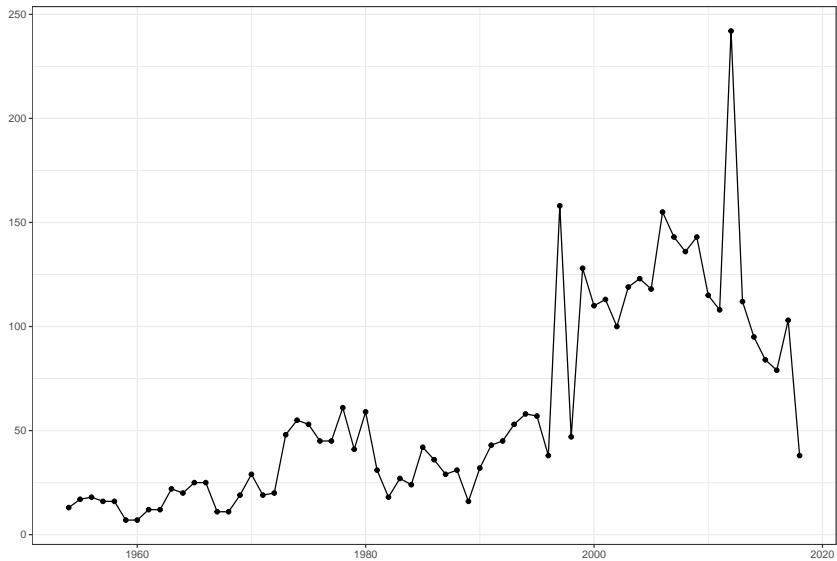
- ▶ Motivation and Research Question
- ▶ Data
- ▶ Empirical Strategy
- ▶ Results
- ▶ Economic Relevance

## Motivation and Research Question

# Growing Risks of Natural Disasters

- ▶ Climate change implies more frequent and more damaging disasters (Van Aalst 2006)
- ▶ Disasters do not discriminate with respect to wealth, but institutions and wealth can help mitigate deaths (Kahn 2005)
- ▶ Growing social costs within the United States
  - ▶ More frequent FEMA disaster declarations
  - ▶ Higher federal costs for declared disasters
  - ▶ Non-disaster government transfers increases may understate true cost (Deryugina 2016)

Annual FEMA Disaster Declarations



# Out of the Frying Pan?

- ▶ Some evidence that people move after big disasters
  - ▶ Boustan et al. (2017)
  - ▶ Carleton and Hsiang (2016)
- ▶ Rational actors respond to disasters by moving to new locations
  - ▶ Because their homes are destroyed?
  - ▶ Because the local economy is harmed?
  - ▶ Because they have updated their priors about risks?
- ▶ Move people out of dangerous areas, but does this lower future disaster costs?
- ▶ All else equal, higher exposure areas should see lower migration rates

## And Into the Fire?

- ▶ Disaster exposure is spatially correlated
- ▶ Disasters are negative income shocks and long moves are costly
- ▶ People tend to move relatively short distances
- ▶ If disasters induce shorter moves, migration may not lower future disaster costs
- ▶ **Shorter moves may not lower costs**
  - ▶ **Key question:** evaluating where disaster migrants locate to can establish if migration mitigates disaster impacts or simply rearranges the deck chairs



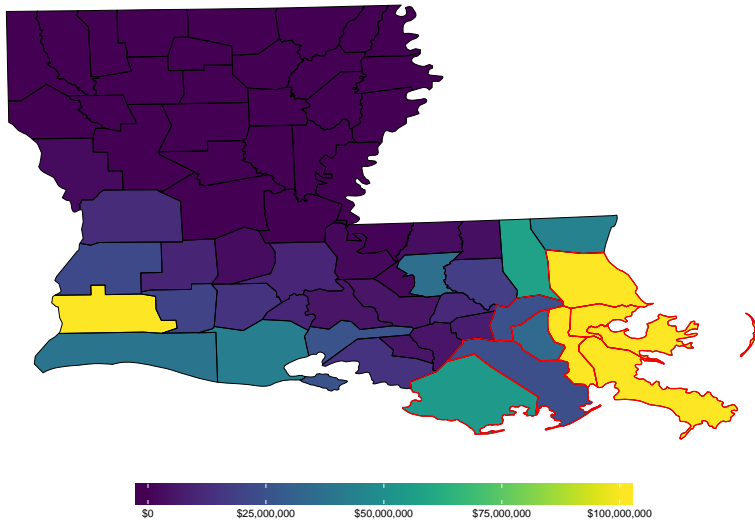
## Hurricane Katrina

# Impacts

- ▶ Category 3 Hurricane at landing (sustained winds of 100–140 miles per hour)
- ▶ Landed 25 August 2005 in Louisiana
- ▶ Total damage estimated at \$108 billion (Knobb, Rhome, and Brown 2005)
- ▶ Deaths appear to be at least 1,500 (Beven et al. 2008)
- ▶ Triggered response of over \$5.7 billion in FEMA disaster relief

## Post-Katrina

FEMA Individuals and Households Program Assistance



# How Did Katrina Affect New Orleans Migrants?

- ▶ Data from IRS county-to-county migration used, tracks filed tax returns at FIPS code from year to year
- ▶ Typical outmigration from New Orleans area from 2000 to 2010 excluding 2005 averaged 21,482 outmigrants per year (average population of 1,421,693)
  - ▶ Fairly stable spatial distribution - nearby and large metro regions
- ▶ In 2005, total of 181,854 outmigrants
  - ▶ Similar spatial pattern exists plus evident overflow

Outflow of Migrants in 2000  
from the 9 counties most affected by Katrina

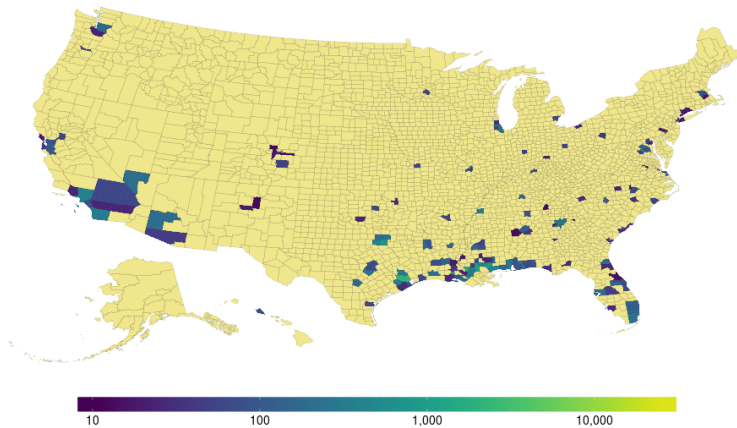


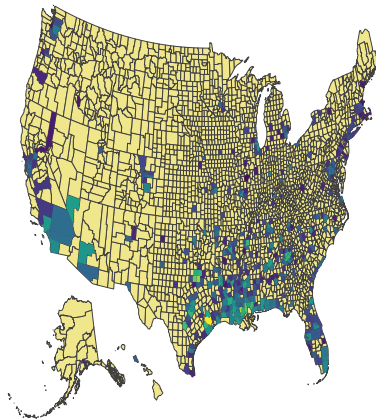
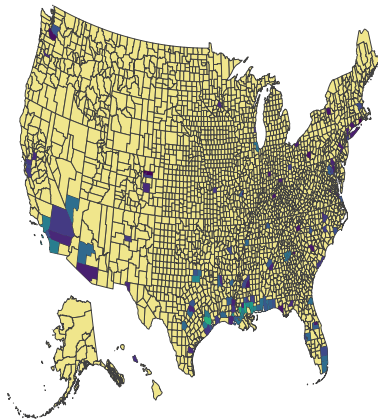
Figure 1:

## Outflow of Migrants

from the 9 counties most affected by Katrina

2004

2005

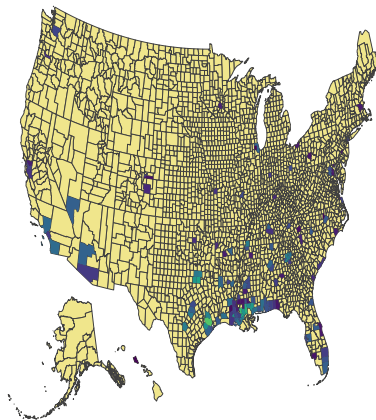
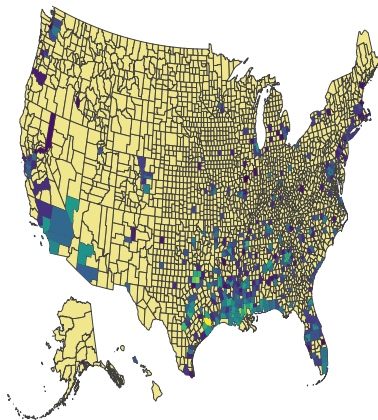


## Outflow of Migrants

from the 9 counties most affected by Katrina

2005

2006



## Empirical Strategy



# Gravity Model

Beginnings from Newtonian physics, which imply

$$F = G \frac{m_1 m_2}{r^2}$$

Princeton Astronomer James Q. Stewart observed the composition of students in his classroom (J. Q. Stewart 1941):

$$M_{ij} = k \frac{P_i^{\beta_1} P_j^{\beta_2}}{D_{ij}^{\gamma}}$$

Typical estimation involves taking logs of both sides to identify parameters.

# Modified

For outmigration from Katrina affected areas:

$$m_{i,t} = \alpha + \beta_1 P_{i,t} + \beta_2 \mathbf{X}_{i,t} + \beta_3 \text{Katrina} + \gamma D_i + \varepsilon_{i,t}$$

- ▶  $i$  indicates county destination and  $t$  indicates year
- ▶  $m$  is migration measure
  - ▶ Raw flow, inverse hyperbolic sine, share of outflow, and indicator of positive migration
- ▶  $P$  is the population for destination county
- ▶  $\mathbf{X}_{i,t}$  are economic characteristics: unemployment rate, median rent, average pay
- ▶  $\text{Katrina}$  is dummy variable for 2005
- ▶  $D$  indicates distance from centroid of affected area

## Modified

Model entails destination's population, economic indicators, distance, and a Katrina indicator.

- ▶ Panel of migration outflow from affected counties from 2000 to 2010
- ▶ Start with baseline model of New Orleans area destinations
- ▶ Interact explanatory variables with Katrina variable
- ▶ Attribute change in effects to the disaster response

## Results

## Table for Primary Covariates

Results

# Katrina Interactions

Results

## Conclusion

## A role for policy

- ▶ Katrina disaster migrants moving closer to New Orleans area than in non-disaster years
- ▶ Persists into the people who stayed in NOLA and moved in 2006
- ▶ Economic variables become *more* important during - after disaster
- ▶ Long distance, post-disaster migration subsidies?



# Thank You

Questions or comments?

- ▶ email: `dinterman.1@osu.edu`

## References

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