inequities in long-term disaster recovery:
the inquiry, challenges & next steps

james r. elliott
professor of sociology
[the GAO] accepts your request “to determine the extent to which the structure and administration of [federal disaster programs] exacerbate racial and socioeconomic inequities”
challenges

1. conceptualization
2. data & design
3. unintended consequences
1. conceptualization

from ‘big events’ to ‘big picture’

558 natural hazards
$4.5B in direct damages

2015
42 federally declared ‘disasters’
$1.2B in direct damage
from places to **entire nation**

*source*: National Oceanic and Atmospheric Administration and [Washington Post](https://www.washingtonpost.com)
from single event to **ongoing impacts**
from event- to population-centered approach
3. unintended consequences

exhibit a: wealth

exhibit b: self-employment
N= 3,408 individuals x 8 interviews each (restricted data file)

* proxy for long-term recovery investments
interview data every 2 years, 1999-2013

**individual factors**
- gender
- race
- native/foreign born
- education
- age

**family factors**
- married/cohabiting
- # children in household
- annual insurance premiums paid ($)

**wealth** (adjusted $2012)

**neighborhood (tract) factors**
- median income
- % with Bachelor’s degree
- % of adults employed

**county factors**
- hazard damage
- FEMA assistance
- total population
- urban/rural scale (1-9)

**household factors**
- renter/owner
- non/mover
direct damages from natural hazards, 1999-2013

Source: SHELDUS v. 15.2, authors’ calculations
Table 2. Coefficients from Longitudinal Random Effects Models Predicting Wealth, Interval to Interval, 1999-2013.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
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<td><strong>Hazard Damage, Logged</strong></td>
<td>3.57 (1.27)*</td>
<td>2.86 (1.26)*</td>
<td>8.61 (1.61)*</td>
<td>3.04 (1.26)*</td>
<td>6.14 (1.42)*</td>
<td>8.56 (1.67)*</td>
<td>8.45 (1.59)*</td>
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<td><strong>Individual-Level Factors</strong></td>
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<tr>
<td>Race</td>
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<tr>
<td>Black</td>
<td>-19.43 (5.09)*</td>
<td>-18.89 (5.09)*</td>
<td>-19.33 (5.09)*</td>
<td>-19.33 (5.09)*</td>
<td>-18.99 (5.10)*</td>
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<td>-17.95 (4.84)*</td>
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<td>Latino</td>
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<td>-3.54 (9.38)</td>
<td>-4.22 (9.33)</td>
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<td>-4.43 (9.38)</td>
<td>-4.70 (8.93)</td>
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<td>Other</td>
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<td>-14.30 (10.37)</td>
<td>-15.14 (10.37)</td>
<td>-14.14 (10.37)</td>
<td>-15.02 (10.37)</td>
<td>-16.21 (9.86)</td>
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<td>13.45 (2.30)*</td>
<td>13.49 (2.30)*</td>
<td>13.49 (2.30)*</td>
<td>13.24 (2.30)*</td>
<td>13.36 (2.30)*</td>
<td>11.97 (2.19)*</td>
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<td>11.78 (2.28)*</td>
<td>12.02 (2.28)*</td>
<td>12.10 (2.28)*</td>
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<td>10.20 (2.17)*</td>
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<td>Married</td>
<td>20.08 (3.35)*</td>
<td>20.03 (3.35)*</td>
<td>20.02 (3.35)*</td>
<td>20.17 (3.35)*</td>
<td>20.17 (3.35)*</td>
<td>20.03 (3.34)*</td>
<td>15.06 (3.21)*</td>
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<td>1.96 (1.29)</td>
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<td>Renter</td>
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<td>-7.01 (3.46)</td>
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<td>2.71 (2.51)</td>
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<td>141.49 (2.38)*</td>
<td>141.50 (2.38)*</td>
<td>141.59 (2.38)*</td>
<td>141.47 (2.38)*</td>
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<td>Socioeconomic Status</td>
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<td>8.05 (1.75)*</td>
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<td>8.18 (1.75)*</td>
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<td>8.18 (1.66)*</td>
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<td>Total Population</td>
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<td>1.15 (2.29)</td>
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<td>Yearly Premiums Paid</td>
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<td>Hazard*Black</td>
<td>-12.62 (2.34)*</td>
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<tr>
<td>Hazard*Latino</td>
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<tr>
<td>Hazard*Other</td>
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<tr>
<td>Hazard*Education</td>
<td>5.98 (1.05)*</td>
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<td>Hazard*Renter</td>
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<td><strong>Constant</strong></td>
<td>1747.14 (3.32)</td>
<td>1747.62 (4.64)</td>
<td>1748.75 (4.64)</td>
<td>1747.63 (4.64)</td>
<td>1747.82 (4.64)</td>
<td>1748.49 (4.64)</td>
<td>1748.84 (4.42)</td>
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<td>N of Individuals</td>
<td>3,408</td>
<td>3,408</td>
<td>3,408</td>
<td>3,408</td>
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</tbody>
</table>

* p < .05; two-tailed test.
estimated wealth in 2013 with $0 in natural hazard damage, all else equal (including starting wealth & insurance premiums)

wealth gap of ~$60K after 14 years

white educated homeowner

black uneducated renter
as natural hazard damage increases, the wealth of **socially vulnerable** populations decreases, all else equal.
but, the wealth of **socially privileged** populations increases
does federal public assistance reduce this polarization?

1999-2013 FEMA Public Projects Assistance

Every respondent’s county received some of this assistance

Range: $1K - $7.5B

Mean, 2001: $5.2M

Mean, 2013: $263M
estimated wealth in 2013, with $0 FEMA public assistance, all else equal (including natural hazard damage)
as FEMA public assistance increases, the wealth of socially vulnerable populations decreases, all else equal
but, the wealth of **socially privileged** populations **increases**
3. unintended consequences

exhibit b: self-employment rates
research design

unit: counties

data: > 5% PUMS (self-employment rates by race: puma > county)
> census & ACS (population data)
> SHELDUS (direct hazard damages)
> FEMA public assistance funded projects summaries file
> FEMA disaster declarations summaries file

time frame: 2000-2010

sample: \textbf{n= 267} central metro \textbf{counties}

with 1000+ residents of each race/ethnicity (white; black; hispanic) and < $1.3B in damages to avoid outliers (e.g., New Orleans)
change-score model, by race and ethnicity

\[ \Delta \text{self-emp. rate}_{j, 2000-10} = B_0 + B_1 \text{damage}_{j, 2000-09} + B_2 \text{FEMA aid}_{j, 2000-09} + B_i[X_{i,j}] + e_j \]

where \([X_{i,j}]\) are controls:
- natural hazard damage, 1999
- number of federally declared disasters, 1990-99
- \(\Delta\) in population, 2000-10
natural hazard damage increases self-employment, for whites only (all else equal)

<table>
<thead>
<tr>
<th></th>
<th>Whites</th>
<th></th>
<th>Blacks</th>
<th></th>
<th>Hispanics</th>
<th></th>
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<tr>
<td></td>
<td>1a</td>
<td>1b</td>
<td>2a</td>
<td>2b</td>
<td>3a</td>
<td>3b</td>
</tr>
<tr>
<td>2000-2009 natural hazard damage (in 2015 $100 millions)</td>
<td>.018*</td>
<td>(.008)</td>
<td>-.014</td>
<td>(.021)</td>
<td>.037</td>
<td>(.028)</td>
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<tr>
<td>2000-2009 FEMA recovery assistance (in 2015 $100 millions)</td>
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</tbody>
</table>

* p < .05 (two-tailed test)

controlling for natural hazard damage, 1999; number of federally declared disasters, 1990-90; Δ in population, 2000-10
**FEMA assistance explains that increase for whites**

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
</tr>
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<tbody>
<tr>
<td>2000-2009 natural hazard damage (in 2015 $100 millions)</td>
<td>.018*</td>
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<td>.037</td>
</tr>
<tr>
<td></td>
<td>(.008)</td>
<td>(.021)</td>
<td>(.028)</td>
</tr>
<tr>
<td>2000-2009 FEMA recovery assistance (in 2015 $100 millions)</td>
<td>.188*</td>
<td>.056</td>
<td>-.188</td>
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<tr>
<td></td>
<td>(.095)</td>
<td>(.172)</td>
<td>(.355)</td>
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</tbody>
</table>

* p < .05 (two-tailed test)

controlling for natural hazard damage, 1999; number of federally declared disasters, 1990-90; Δ in population, 2000-10
model 1b illustrated (for whites)

Comparison of Change in Self-Employment at $1$ million, $100$ million, and $1$ billion of 2000-2009 Natural Hazard Damage and FEMA Recovery Asst.

Notes:
2000 and 2010 Public Use Microdata Series; SHELDUS 15.2; FEMA Public Asst. Projects Summaries
2000-2009 Natural Hazard Damage and FEMA Recovery Asst. reported in $\$100$ millions
next steps

1. legal
2. legislative
3. empirical
1. legal

challenges to ‘propertied citizenship’

Lawsuit by four Texas renters says State of Texas, HUD discriminate on race in Hurricane Harvey aid

BY JOHN HENNEBERGER
OCTOBER 14, 2019
advances in the GAO inquiry

May 6, 2019

The Honorable Bennie G. Thompson
Chairman, Committee on Homeland Security
House of Representatives

Dear Mr. Chairman:

Thank you for your letter, jointly signed by Senator Elizabeth Warren, requesting that the Government Accountability Office review federal disaster relief programs to determine the extent to which the structure and administration of those programs exacerbate racial and socioeconomic inequities in the U.S., and the extent to which they have a disparate impact on Native tribal nations.

GAO accepts your request as work that is within the scope of its authority. At the current time we anticipate that staff with the required skills will be available to initiate an engagement in about five months. Your request has been assigned to Mr. Charles M. Johnson, Jr., Managing Director, Homeland Security and Justice. Closer to the time GAO can start this engagement, Mr. Johnson or a member of his team will contact your office to confirm that this request continues to be your priority for us. As applicable, we will also be in contact with the cognizant Inspector General's office to ensure that we are not duplicating efforts. If an issue arises during this coordination, we will consult with you regarding its resolution.

If you have any questions, please contact Mr. Johnson at 202-512-7331 or johnsoncm@gao.gov, or Mr. Chuck Wilson, Assistant Director, Congressional Relations on my staff at 202-512-6891 or WilsonCE@gao.gov.

Sincerely yours,

Orice Williams Brown
Managing Director
Congressional Relations

cc: Lauren McClain
Ref: CCAR 19-0722
3. empirical

enhancements in FEMA’s new strategic plan

- increase data availability, integration, and access
- target social inequities in long-term recovery


james.r.elliott@rice.edu
https://sociology.rice.edu/jim-elliott
INEQUALITY IN DISASTER RECOVERY: HOUSING AND MIGRATION

Elizabeth Fussell, PhD
Brown University, Population Studies and Training Center and Institute at Brown on Environment and Society

PAA at GAO presentation, November 13, 2019

Funding support: NICHD R24HD041020 Population Studies and Training Center, Brown University; NICHD P01HD082032; and HUD RP-15-RI-006
NEW ORLEANS POPULATION AND HOUSING RECOVERY AFTER HURRICANE KATRINA
Flooding damaged majority of housing units

<table>
<thead>
<tr>
<th>Damage</th>
<th>Pop.</th>
<th>%</th>
<th>HUs</th>
<th>%</th>
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<td>122,073</td>
<td>25.2</td>
<td>52,718</td>
<td>28.0</td>
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<td>Minor</td>
<td>26,617</td>
<td>5.5</td>
<td>10,534</td>
<td>6.0</td>
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<tr>
<td>Serious</td>
<td>67,853</td>
<td>14.0</td>
<td>26,898</td>
<td>14.0</td>
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<td>Severe</td>
<td>268,131</td>
<td>55.3</td>
<td>98,101</td>
<td>52.0</td>
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<td>Total</td>
<td>484,674</td>
<td>100.0</td>
<td>188,251</td>
<td>100.0</td>
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</table>

Population and Housing Units (HUs) by flood-damage strata for Orleans Parish


Flood print, August 31, 2005

Source: National Oceanic and Atmospheric Agency
Net migration drove population change

Components of Change in New Orleans' Population
Housing stock recovered slower than population, and rental housing slower than owner-occupied housing

Population and housing trends, 2000-2017

Owner: renter ratio, 2000-2017

Source: Author’s compilation from U.S. Census, American Factfinder
Homeowners received more assistance sooner

- Homeowners insurance, 9/05
- FEMA temporary rental assistance, 9/05 – 5/09
- LA Road Home (Homeowners), 8/06
- LA Road Home (Small Rentals), 1/07
- Housing Authority of New Orleans (HANO) placed in Federal Receivership, 10/09
Blacks and those with less than college education returned later and less often

### Duration of displacement (age 18+)

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<th></th>
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<th>White/Other</th>
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<td>Total (months)</td>
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<td>2</td>
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<tr>
<td>Race</td>
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<tr>
<td>Black</td>
<td>3</td>
<td>&gt;14</td>
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<tr>
<td>White/Other</td>
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<td>Education</td>
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<td>Less than BA</td>
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<td>14</td>
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<td>BA+</td>
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Blacks were a smaller proportion of New Orleans’ reduced population
DATA AND METHODS TO MOVE BEYOND CASE STUDY APPROACHES
Case study design for disaster research

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<th>Disaster exposure</th>
<th>Pre-disaster measures</th>
<th>Exposure measure</th>
<th>Post-disaster measures</th>
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<td>T2..X</td>
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Panel study design for disaster research

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Panel study design for disaster research without accounting for mobility

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<th>Pre-disaster measures</th>
<th>Exposure measure</th>
<th>Post-disaster migration</th>
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<td>D</td>
<td>M</td>
<td>T1</td>
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<tr>
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Exposed: X, Unexposed: X
Panel study design for disaster research accounting for mobility

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<th>Exposure measure</th>
<th>Post-disaster migration</th>
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T0: Pre-disaster period
D: Pre-disaster measure
M: Post-disaster measure
T1, T2..X: Post-disaster periods
Opportunities exist for panel studies of disaster outcomes

• Administrative data, linked records
  • US Census Bureau, Census Longitudinal Infrastructure Project
  • Equifax Consumer Credit Panel

• Panel studies with nationally representative samples
  • Panel Study of Income Dynamics
  • National Health and Nutrition Examination Survey
  • Others…
DISASTER-RELATED RESIDENTIAL MOBILITY
Disaster-related moves are only 0.7% of all recent household moves.

Households that moved in previous 24 months:
- Non-movers: 77.9%
- Movers: 22.1%

Reasons for moving among recent movers:
- Family/housing: 63.3%
- Work: 21.7%
- Other forced: 14.4%
- Disaster: 0.7%

Source: Author’s calculations from American Housing Survey, 1997-2013
More disaster-related mobility in regions affected by destructive hurricane seasons

Predicted probability of moving because of a disaster

1997 1999 2001 2003 2005 2007 2009 2011 2013

Northeast  Midwest  South  West
Disaster-related mobility is related to household sociodemographics

Predicted probability of disaster-related mobility

- Overall
- NH Black
- Hispanics
- Age 30
- HS degree
- Less than HS
- Member <18
- Male householder
- Member 65+
- NH White
- Married couple
- Age 65
- BA or more
- NH Other
Disaster-related residential mobility is unequal

- Evidence is mounting to show that disaster recovery occurs unequally
  - Pre-disaster housing characteristics matter
  - Demographic groups are unequally affected
  - More research on long-term outcomes of disaster-affected individuals and households is forthcoming
Disaster-related residential mobility is unequal

- Stafford Act: Return people to their pre-disaster condition
  - Is this what is happening?
  - Is this what should happen?
  - Why not take disasters and disaster planning as opportunity to improve housing and move people away from hazards?