Macroeconomics 3 Presentation

Article review :
Howell, Elliott, *Damages Done: The Longitudinal Impacts of Natural Hazards on Wealth Inequality in the United States*, 2019

GUGELMO CAVALHEIRO DIAS Paulo
SHARMA Vivan

September 21, 2024

Sciences Po

Introduction

Introduction

Study objects of the paper :

- Contribution of Natural Hazards to Wealth Inequality
- Contribution of Insurance Policies to Wealth Inequality

Focus on the empirical facts :

- The interaction between natural hazard and pre-existing social disparities
- The effect of private and public insurance

Outline

1. Introduction
2. Study Design
3. Wealth Inequality : the general effects
4. Wealth Inequality : a concrete example
5. Conclusion

Study Design

Explaining Wealth with Socioeconomic Variables

What is the effect of natural hazard on wealth inequalities ?
How does this effect vary in function of socioeconomic variables associated to an individual ?

$$\widehat{wealth} = \widehat{\alpha} + \widehat{\beta} \cdot \log(\text{natural hazard damages}) + \widehat{\gamma} \cdot X$$

With X socioeconomic variables (at the individual, local, and county levels) :

Race, Foreign Born, Education, Married, Homeownership, Socioeconomic Status of the Neighborhood, etc... (discussed below)

Datasets

- **Panel Study Income Dynamics (PSID)**
- **Spatial Hazard Events and Losses Database (SHELD)**
- **Census Data**
- **Federal Emergency Management Agency (FEMA) Projects Summary (2016)**

Datasets

Panel Study Income Dynamics (PSID)

- From 1968 to now, with a modification of followed individuals in 1999.
- Used sample : from 1999 to 2013, with a two-years interview period.
- Use of the restricted-access, geocoded version of the survey, with information on the neighborhood of the respondents.

Datasets

Spatial Hazard Events and Losses Database (SHELD)

- Maintained by the Hazards and Vulnerability Research Institute (HVRI) from 1960 to now.
- They collect information on 18 types of natural hazards and their associated fatalities and property damages.

Datasets

Census Data

Three datasets, from two different census :

- 2000 U.S. Decennial Census Long Form.
- 2006-2010 and 2011-2015 American Community Survey 5-year Summary Files.

Use :

- Socioeconomic status of neighborhoods.
- Total population.
- Urban / rural status.

Datasets

Federal Emergency Management Agency (FEMA) Projects Summary (2016)

- Immediate Needs Funding (INF).
- Individual and Household Program (IHP).
- Local housing vouchers, temporary units, financial grants, replacement of property, etc...

Wealth Inequality : the general effects

Wealth Inequality : the general effects

Table 4. Coefficients from Longitudinal Random Effects Models Predicting Wealth and Considering FEMA Aid, Interval to Interval, 1999-2013

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*
FEMA Aid, Logged	4.29 (1.52)*	0.13 (1.28)	2.28 (1.42)	−0.07 (1.28)	3.70 (1.59)*
Hazard Damage, Logged	2.68 (1.24)*	2.43 (1.23)*	2.55 (1.23)*	2.42 (1.23)	2.59 (1.23)*
Individual-Level Factors					
Race					
Black	−17.10 (4.86)*	−17.87 (4.85)*	−18.38 (4.85)*	−18.14 (4.85)*	−16.95 (4.86)*
Latino	−6.35 (8.89)	−7.39 (8.89)	−5.97 (8.88)	−5.74 (8.88)	−7.33 (8.89)
Other	−15.59 (9.85)	−15.53 (9.86)	−15.37 (9.86)	−15.43 (9.86)	−15.57 (9.85)
Foreign Born	−2.34 (22.77)	−2.23 (22.76)	0.17 (22.75)	−0.68 (22.75)	−2.95 (22.78)
Education	12.08 (2.19)*	12.47 (2.19)*	11.99 (2.19)*	12.07 (2.19)*	12.31 (2.19)*
Age	10.10 (2.17)*	10.41 (2.17)*	10.40 (2.17)*	10.47 (2.17)*	10.16 (2.17)*
Family-Level Factors					
Married	14.95 (3.21)*	14.85 (3.21)*	14.97 (3.21)*	15.10 (3.21)*	14.90 (3.21)*
Children at Home	1.56 (1.24)	2.01 (1.23)	2.10 (1.23)	2.19 (1.23)	1.53 (1.24)
Household-Level Factors					
Renter	−2.83 (3.36)	−2.38 (3.36)	−2.86 (3.36)	−2.80 (3.36)	−2.93 (3.36)
Moved	2.51 (2.51)	2.41 (2.51)	2.57 (2.51)	2.15 (2.51)	2.69 (2.51)
Wealth in 1999	139.52 (2.26)*	139.51 (2.26)*	139.62 (2.26)*	138.38 (2.27)*	138.51 (2.27)*
Neighborhood-Level Factors					
Socioeconomic Status	8.18 (1.66)*	8.32 (1.66)*	8.13 (1.66)*	8.35 (1.66)*	8.24 (1.66)*
County-Level Factors					
Total Population	1.36 (2.29)	1.27 (2.29)	1.25 (2.29)	1.31 (2.29)	1.19 (2.29)
Rural/Urban Scale	0.52 (1.14)	0.38 (1.14)	0.42 (1.14)	0.41 (1.13)	0.44 (1.13)

(*continued*)

Wealth Inequality : the general effects

Table 4. Coefficients from Longitudinal Random Effects Models Predicting Wealth and Considering FEMA Aid, Interval to Interval, 1999-2013 (continued)

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Property Insurance					
Yearly Insurance Cost	8.12 (1.11)*	8.04 (1.11)*	7.98 (1.11)*	8.12 (1.11)*	7.89 (1.11)*
Year	3.08 (0.63)*	3.14 (0.63)*	3.13 (0.62)*	3.18 (0.63)*	3.10 (0.63)*
Interaction Terms					
FEMA*Black	−11.35 (2.30)*				−7.64 (2.45)*
FEMA*Latino	−9.62 (3.70)*				−3.61 (3.93)
FEMA*Other	−8.79 (4.54)				−8.10 (4.55)
FEMA*Education		4.42 (0.98)*			3.07 (1.06)*
FEMA*Own			−8.04 (2.14)*		−3.14 (2.29)
FEMA*Wealth in 1999				5.89 (0.90)*	5.19 (0.91)*
Constant	1748.91 (4.48)	1748.04 (4.48)	1748.27 (4.48)	1747.84 (4.48)	1748.69 (4.48)
N of Individuals	3,408	3,408	3,408	3,408	3,408

*$p < .05$; two-tailed test.

Wealth Inequality : the general effects

Dollars : For wealth, damages, and aid, everything is adjusted to 2012 dollars. All graphical illustrations are done with non-transformed dollars.

Wealth : Definition of PSID, sum of saving accounts, checking accounts, real estate holdings, equity, vehicles, farms, businesses, stocks, annuities / IRAs, minus all reported debts. Addition of a global minimum and use of square root.

Damages : Due to right-skewed distribution, they use logarithm. Also, they standardize all values to 2012 dollars.

Rural scale : 1 corresponds to the most urban county, 9 to the most rural county.

Wealth Inequality : a concrete example

Wealth Inequality : a concrete example

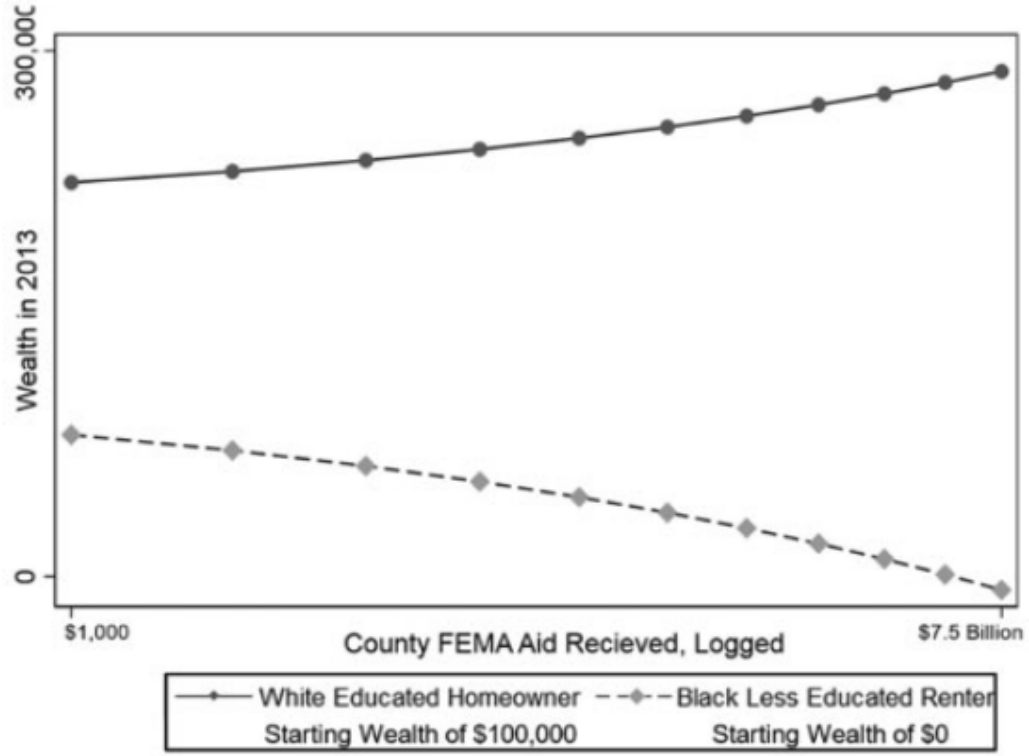

Figure 3. Estimated Wealth by Local FEMA Aid for a White, Educated, Homeowner with Starting Wealth of $100,000 Compared with a Black, Less Educated Renter with Starting Wealth of Zero, All Else Equal

Source: Model 4 of Table 5. All other covariates in the model are held constant at their sample means.

Note: The x-axis is on a log-linear scale; labeled ranges are reported in actual, non-logged dollars to facilitate interpretation.

Conclusion

Conclusion

1. In a broader scale, natural hazards shocks provoke an increase in wealth disparities. This paper points out the role of natural hazards and insurance in the increase of the wealth gap.

2. Faced with environmental risks, agents are differently exposed not only due to budget constraints, but also due to lacking insurance schemes that would provide better and more equitable coverage.

3. The authors call for further research on the precise mechanisms through which natural hazards affect wealth inequalities. They underly the need for a reform of the current insurance system, too much based on wealth and not enough on vulnerability.