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Bailing Out Homeowners: Mortgage Default and Government Aid after Natural Disasters

EUROPEAN CENTRAL BANK

EUROSYSTEM

Bailing Out Homeowners:
Mortgage Default and Government Aid after Natural Disasters

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Motivation & Key Takeaways

- Natural disasters challenge homeowners and trigger **large government aid**.
- **Rising climate risks** require effective disaster relief.
- Homeowners hold **implicit insurance through default**.

This paper: develops incomplete market model to study the distributional and welfare effects of government aid.

First to include natural disaster + government aid + mortgage delinquency & foreclosures.

Main finding: Not better-off without government aid...
...but welfare can be improved through changed policy design!

Quantitative Model

Two regions with **heterogeneous disaster risk** and **federally funded aid.**
Incomplete-market model with **foreclosures and delinquencies.**
+ uninsurable income risk + financial constraints + insurance wedge + limited recourse

Household Side

- Perpetual youth model
- Born in one region & no moving
- Renters and homeowners
- **Choices:** consumption-saving c, b, housing h, mortgage m, insurance coverage i, mortgage default D, homeownership status O
- **Idiosyncratic uncertainty:** AR(1) income shock, natural-disaster shock

Rest of the Economy

- **Production:**
  construction of houses (labor + land)
  final-good producer (labor)
- **Rental agency:** zero profit → no-arbitrage condition
- **Financial intermediary:** zero profit → default risk priced
- **Insurance company:** intermediation wedge
- **Government:** balanced budget

Natural Disasters

- Damages $\delta \in \{0, d_S, d_L\}$ occur with regional probabilities $\pi_\delta = (\pi_{0,k}, \pi_{S,k}, \pi_{L,k})$
- Reduce housing equity: $p(1-\delta)h - (1+r)m$
- Require rebuilding investment: $\delta p h$
- Reduce contemporaneous utility flow from housing:

$$u(c,h,\delta) = \frac{(c^\alpha[(1-\delta)\psi_h h]^{1-\alpha})^{1-\sigma}}{1-\sigma}$$

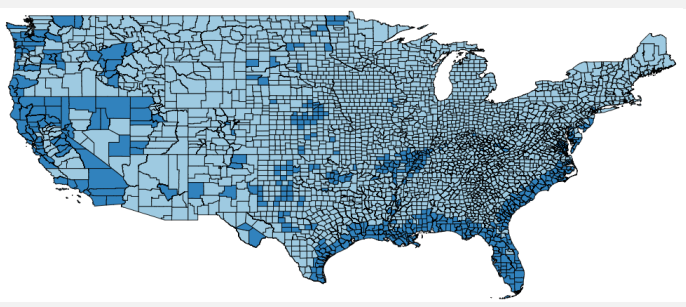
Public ex-post government aid

- **Financial aid:** proportional to rebuilding costs $p\delta h$ *net of insurance coverage* i up to a cap $\bar{\tau}_\delta$

$$\min\{\bar{\tau}_\delta, p\delta h - i\}$$

- **Foreclosure moratorium M:** limits foreclosures against affected homeowners in delinquency

Calibration



Classification of Counties

High risk region $(\theta_H = 0.0045)$
and
low risk region $(\theta_L = 0.0008)$

- U.S. economy, 2000–2020.

Calibrate damage distribution and classify regions based on:

- Property-level damages [OpenFEMA NFIP claims]
- Expected Annual Loss Rate [National Risk Index]

→ **25% of the population in the high-risk region**

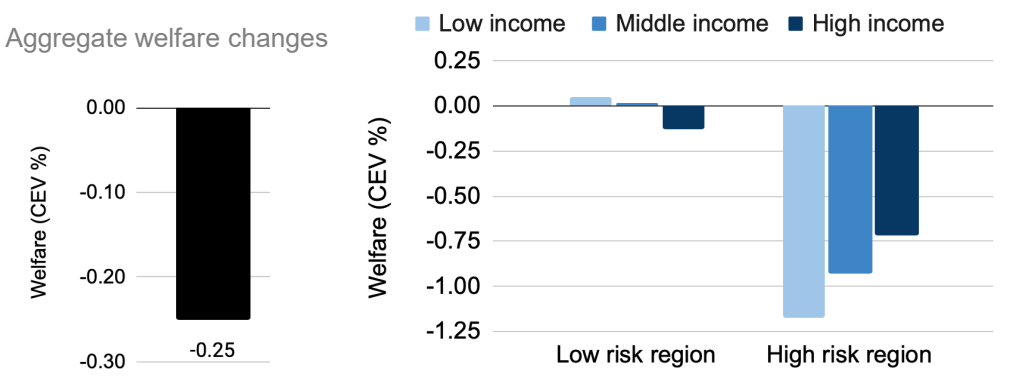
Main Findings

Approach: comparing steady states under different policy counterfactuals

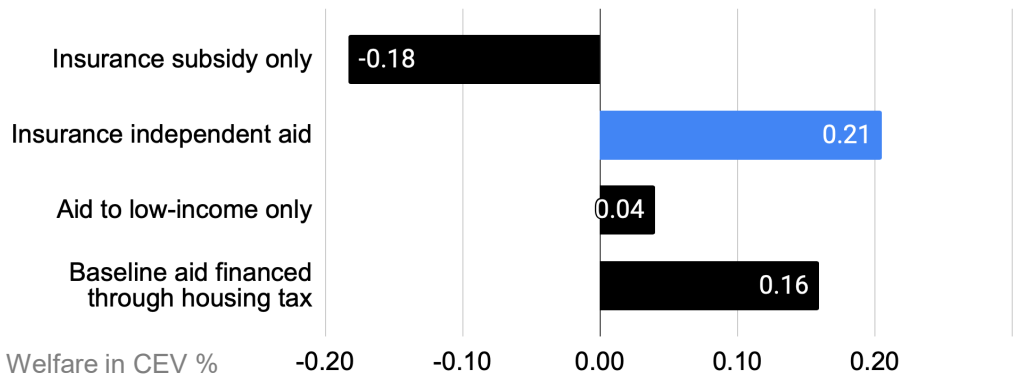
1. Government aid crowds out private insurance and leads to higher housing capital.

		Base-line	$\bar{\tau}_\delta = 0$	$M = 0$	No aid	New design
Insurance gap	**Total**	73.14	−48.90	1.32	**−48.91**	**−30.87**
	Low-risk	71.83	−47.43	1.73	**−47.43**	**−33.40**
	High-risk	77.10	−53.00	0.17	**−53.05**	**−23.82**
Owner-occupied housing	**Total**	3.75	−2.61	−0.46	**−2.61**	**2.49**
	Low-risk	3.78	0.46	−0.03	**0.46**	**3.00**
	High-risk	3.66	−12.14	−1.79	**−12.14**	**0.92**

2. Welfare declines without any government aid, with losses concentrated in high risk regions.



3. Higher welfare gains if aid is provided independently of insurance coverage.



4. Aid crowds in private insurance among households otherwise prone to default after a disaster.

		Insurance Independent Aid		No Government Aid	
Δ% from Base SS		Stay Share	Insurance Gap	Stay Share	Insurance Gap
Low risk	Low income	−0.5	**−40.0**	−62.1	**−21.7**
	Middle income	1.8	−27.8	−29.0	−62.3
	High income	−1.7	−33.5	−11.1	−53.3
High risk	Low income	−1.8	**−26.4**	−70.6	**−12.1**
	Middle income	1.0	−33.4	−32.5	−65.7
	High income	0.4	−16.5	−34.3	−58.2

Additional Findings & Conclusion

- Full public insurance does not generate highest welfare gains.
- Recourse regime matters for distribution of winners and losers.
- Under a climate-change scenario, aggregate welfare losses are modest (−0.17%) and disaster aid rises by only 0.06% due to changed housing demand.
  [+10% frequency of extreme events; total frequency unchanged]

Conclusion

1. Government aid crowds out private insurance and boosts housing accumulation.
2. Removing government aid reduces welfare (−0.25%), mainly in high-risk regions.
3. Insurance-independent aid generates gains relative to baseline (+0.21%).

Policy takeaway: Well-designed government aid can increase welfare.