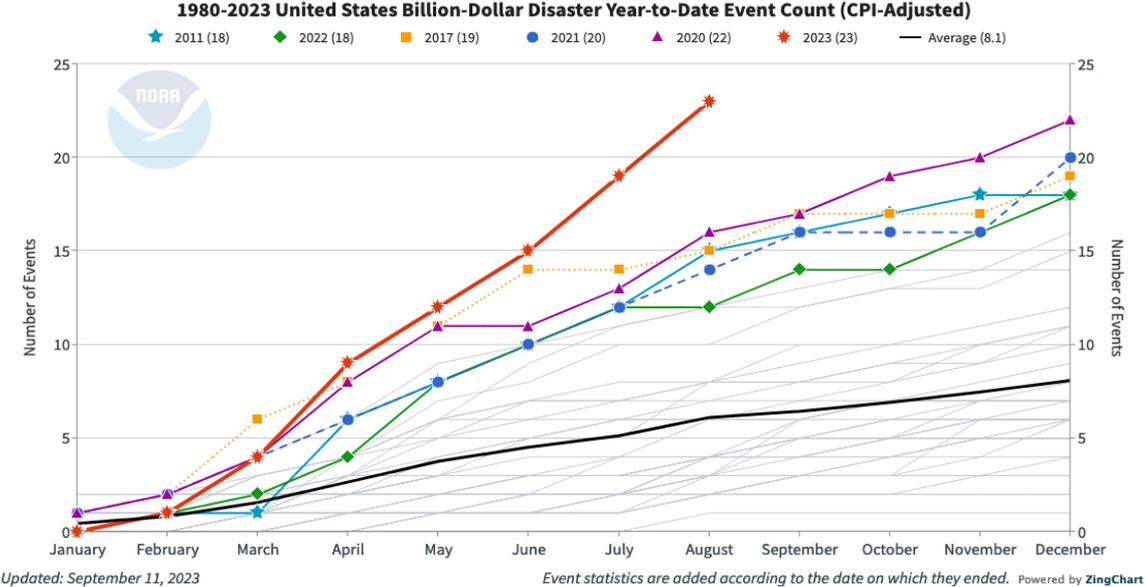# Pricing of Climate Risk Insurance: Regulation and Cross-Subsidies

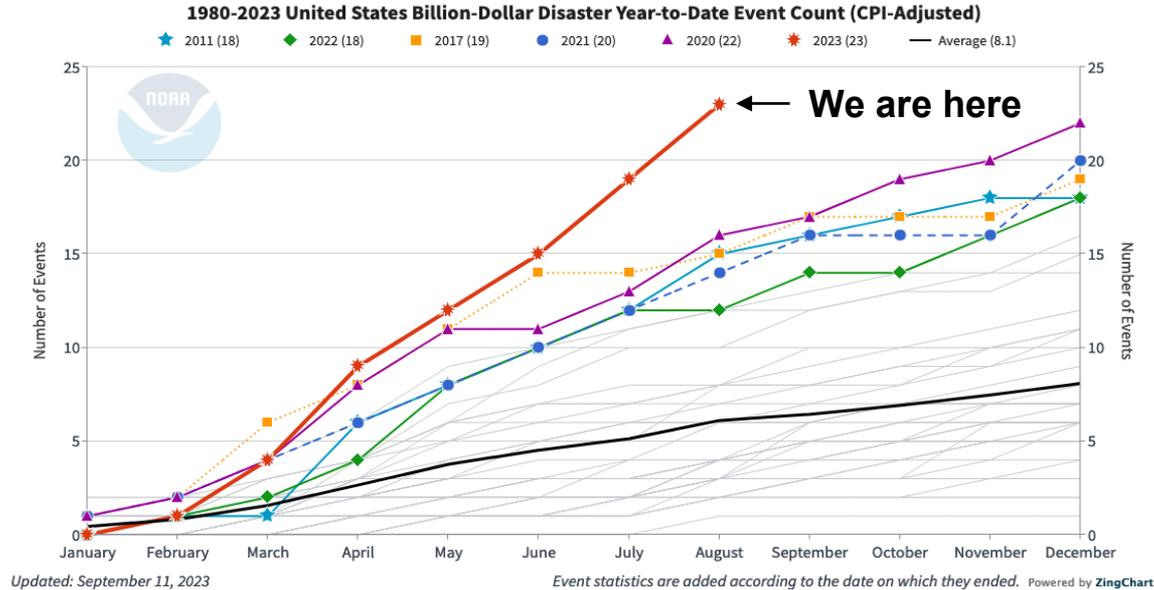Sangmin S. Oh, Ishita Sen, Ana-Maria Tenekedjieva

FHFA Climate Summit 2023
Discussion by Joakim Weill

These are my views only, not those of anyone else involved with the Federal Reserve System.

Disaster losses are growing

1980-2023 United States Billion-Dollar Disaster Year-to-Date Event Count (CPI-Adjusted)

★ 2011 (18) ◆ 2022 (18) ■ 2017 (19) ● 2021 (20) ▲ 2020 (22) ✷ 2023 (23) — Average (8.1)

Updated: September 11, 2023

Event statistics are added according to the date on which they ended. Powered by **ZingChart**

Disaster losses are growing

1980-2023 United States Billion-Dollar Disaster Year-to-Date Event Count (CPI-Adjusted)

Legend: 2011 (18), 2022 (18), 2017 (19), 2021 (20), 2020 (22), 2023 (23), Average (8.1)

We are here

Updated: September 11, 2023
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Homeowner insurance: **$15T coverage**, required for most mortgages
Pricing insurance correctly is crucial to (i) provide correct incentives and
(ii) ensure that insurers can pay out the claims

What is the right price of insurance?

McCarran-Ferguson Act of 1945: (i) regulation of insurance is a state matter +
(ii) "*rates shall not be **excessive**, **inadequate** or **unfairly discriminatory**"*

In standard model, price of contract should be equal to expected claims (for each property) + admin costs (~MC pricing)

<u>Concerns</u>:

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The New York Times

Allstate Is No Longer Offering New Policies in California

Like State Farm, which announced a similar move last week, Allstate cited worsening climate conditions that had made doing business there difficult.

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3. Disasters are "rare", historical averages are poor estimates of **adequate** prices

   → CAT models are available, but predictions quality nearly impossible to assess (only scientific integrity can)

Right price is hard to figure out for the social planner…

The New York Times

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What happens when there is not 1 planner, but 50?

This paper: one slide recap

New data on insurer underwriting statements
+ regulatory rate filings at the state-insurer-year
+ Standard set of rates at the zipcode level for additional analysis.

Measure **"Frictions"** at the state level: wedge between target and approved rates

→ Large heterogeneity between states: Low vs High friction states

→ Following big losses, insurers can't adjust the rates in high friction states…

…so they adjust in lower friction states instead!

This is an important paper

- Crucial question. Few papers on homeowner insurance & climate risks

- Severe data constraints, this paper proposes novel use of rate filings records

- "Totality of evidence" approach: not one bullet-proof natural experiment, but **multiple** results rationalized by a unique story

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Policy implications are large, but nuanced. Insurer exit appears unattractive, and market power is likely substantial.
Should state regulation become more like DC or California?

Paper is extremely convincing. Novelty of the approaches could benefit from additional analyses in two areas:

1. Leverage measures of frictions even more
2. Add on the climate narrative and empirics

Measuring frictions

Measuring frictions has a large descriptive value. Lots we could learn from this!

$$\text{Rate Wedge}_{ist} = \frac{\text{Rate}\Delta\text{Received}_{ist}}{\text{Rate}\Delta\text{Target}_{ist}}. \qquad \text{Friction}_s = 1 - \text{Rate Wedge}_s$$

<u>Main argument:</u> there are low and high friction states

How much do **states** drive these frictions?

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How much do **states** drive these frictions? Get $Frictions_{ist}$

$\rightarrow$ Reg $Frictions_{ist}$ on State + Insurer + Year FE, compare Insurer+Year FE only
$\rightarrow$ Similar exercise on probability of filing (do high friction states deter filing?).

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Ideas for auxiliary measures of frictions: get average number of words/pages in rate-filing cases by state? Average length between submission and approval?

Climate empirics

Are insurers filing and receiving updated rates because of disaster losses?

$$(3) \quad Y_{ist} = \gamma SSL_{ist-1} + \gamma^M SSL_{ist-1} \times Med_s + \gamma^L SSL_{ist-1} \times Low_s + \alpha_{is} + \alpha_{st} + \theta X_{it} + \epsilon_{ist},$$

$$(4) \quad Y_{ist} = \beta OSL_{ist-1} + \beta^M OSL_{ist-1} \times Med_s + \beta^L OSL_{ist-1} \times Low_s + \theta X_{ist} + \alpha_{is} + \alpha_{st} + \epsilon_{ist}.$$

Reader may have all kinds of stories for why insurer losses might be endogenous. Can leverage disasters exogeneity!

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Similarly, (6) $$Y_{iz(\in b)t} = \gamma Low_z \times Post_{bt} + \alpha_{ib} + \alpha_z + \alpha_{bt} + \xi X_{it} + \epsilon_{izt},$$

2. Rather than empirical distribution of losses, use disasters to define *Post*

Minor comments

- SwissRE "93%" in the paper is for the whole world, US closer to 70-80%
- Briefly mention surplus lines
- "more than $600 billion in the United States over the last two decade" – number is twice as large if we use NOAA data, not sure why
- Intensive margin analysis: should you focus on insurers who file only? Number of observations on Table 2 suggests you are imputing data when there is no filing
- Regressions: can you put in word what identifying assumptions you are relying on (especially for the spillovers/cross-subsidy regressions)

Thank you!
joakim.a.weill@frb.gov

CLIMATE

States at the forefront of fights over wetlands protections after justices slash federal rules

1 of 7 | Homes are under construction near wetlands, left, in Oak Island, N.C., Tuesday, Aug. 29, 2023. The Biden Administration weakened protections for wetlands on Tuesday, a win for developers and agricultural groups in some states. (AP Photo/Karl B DeBlaker)

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BY JOHN FLESHER AND MICHAEL PHILLIS
Updated 12:04 PM EDT, August 30, 2023

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State regulators have a key role to help keep climate risks insurable.