

Materials will be available at: www.eesi.org/050625insurance Post about the briefing: #eesitalk @eesionline

# **Risky Business: Insurance in the Era of Climate Change**

Tuesday, May 06, 2025

# About EESI





#### **Nonpartisan Educational Resources for Policymakers**

A bipartisan Congressional caucus founded EESI in 1984 to provide nonpartisan information on environmental, energy, and climate policies

## Direct Assistance for Equitable and Inclusive Financing Program

In addition to a full portfolio of federal policy work, EESI provides direct assistance to utilities to develop "on-bill financing" programs

## Commitment to Diversity, Equity, Inclusion, and Justice

We recognize that systemic barriers impede fair environmental, energy, and climate policies and limit the full participation of Black, Indigenous, people of color, and legacy and frontline communities in decision-making

## Sustainable Solutions

Our mission is to advance science-based solutions for climate change, energy, and environmental challenges in order to achieve our vision of a sustainable, resilient, and equitable world

# **Policymaker Education**



Live, in-person and online public briefings, archived recordings, and written summaries

## **Climate Change Solutions**

Bi-weekly newsletter with everything policymakers and concerned citizens need to know, including a legislation and hearings tracker

## **Fact Sheets and Issue Briefs**

Timely, objective coverage of environmental, clean energy, and climate change topics

# Social Media (@EESIonline)

Active engagement on Bluesky, Facebook, LinkedIn, X, and YouTube











# Upcoming Briefings



# The Next Era of Transportation and Infrastructure

Next Stop: Sustainable Public Transit and Mobility Tuesday, May 20, 3:00 pm - 4:00 pm

Like Trains? Then Choo-Choose to Learn About Federal Rail Policy Wednesday, May 28, 2:00 pm - 3:00 pm

Shifting Gears: Policies for a More Sustainable Highway System Friday, June 13, 12:00 pm - 1:00 pm

> Beating the Heat: A 2025 Heat Policy Agenda Tuesday, June 17, 2:00 pm - 3:00 pm

2025 Congressional Renewable Energy and Energy Efficiency EXPO and Policy Forum Thursday, July 24, 9:00 am - 7:00 pm

Sign up for our Climate Change Solutions newsletter here: <u>eesi.org/signup</u>



# What did you think of the briefing?

# Please take 2 minutes to let us know at: www.eesi.org/survey

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Tuesday, May 06, 2025

# Rebuilding Insurance for a Climate Future

Catastrophe Models, State Regulation, and the National Flood Insurance Program

**Dominick Dusseau, Woodwell Climate Research Center** 

May 6, 2025

# How Are Premiums Calculated: Catastrophe Models

Premium = Average Annual Loss: expected losses each year *Expense Load*: costs due to writing policies, loss adjustment, etc. *Risk Load*: capital to cover catastrophic loss and profit



# **Catastrophe Models: How They Work**



# **Catastrophe Models:** Their Value

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- Historical records for hurricanes and disaster losses are largely limited to the past ~50 years
- Solely relying on historical data could leave out rare and catastrophic events
- Catastrophe models fill the gaps in historical data

# **Historical Record Events**



Incomplete catalog of all possible disaster events

# **Catastrophe Model Events**



Full range of statistically possible events

Source: Google SEEDS

# Catastrophe Models: Their Drawbacks

- Average annual loss may be similar, but extreme event and property-level estimates have a wide range
- Only a handful of states review and regulate catastrophe model use in insurance ratemaking
- U.S. needs a national public catastrophe model for assessing private models and hazard mitigation planning

# Florida Hurricane Wind Damage 100-Year Event



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# **State Regulation: Climate Risk and Premiums Mismatch**

- Each state regulates insurance premiums independently
- Some states limit insurance premium increases more strictly than others
- A consequence is the cross-subsidization of risk across states
- One solution is creating an Optional Federal Charter through Congress where insurance regulation becomes similar to the dual banking system

# High Regulation vs Mid/Low Regulation States



Reproduced with permission from Oh, Sangmin S., Ishita Sen, and Ana-Maria Tenekedjieva (2022). "Pricing of Climate Risk Insurance: Regulation and Cross-Subsidies," Finance and Economics Discussion Series 2022-064. Washington: Board of Governors of the Federal Reserve System, https://doi.org/10.17016/FEDS.2022.064.

# National Flood Insurance Program (NFIP): Current Status

- Risk Rating 2.0 introduced actuarial pricing to the program in 2021
- Premiums have continued to rise under Risk Rating 2.0; many policies still don't represent "true-risk"
- Policy counts have dropped
- Means-based assistance would increase coverage for low-income households



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# National Flood Insurance Program: Community Rating System (CRS)

- Communities that implement flood risk reduction activities receive flood insurance discounts for their residents
- Examples include preserving open space, floodplain development regulation, flood warning systems, stormwater maintenance

## **CRS Credit Points, Classes and Premium Discounts**

CRS Credit Points	CRS Class	CRS Discount (Premium Reduction)
4,500+	1	45%
4,000 – 4,499	2	40%
3,500 – 3,999	3	35%
3,000 – 3,499	4	30%
2,500 – 2,999	5	25%
2,000 – 2,499	6	20%
1,500 – 1,999	7	15%
1,000 – 1,499	8	10%
500 – 999	9	5%
0 – 499	10	0

30% Discount

Community A (Class 4)



0% Discount

Community B (Class 10)







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Community Rating System Average Net Cost Added to Policies



Dusseau et al. (2025). Inequity in Action: U.S. Rural Counties Subsidize Flood Insurance Discounts. Under review at One Earth.

Community Rating System Average Net Cost Added to Policies



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#### Challenges Facing Property Insurance Markets: Affordability and Availability

Ben Keys Professor of Real Estate and Finance Wharton School, University of Pennsylvania

May 6, 2025

#### Property Insurance and the Cost of Climate Change

▶ The economic costs from increasing disaster risk on households are large

- Directly felt through higher insurance premiums
  - What caused the recent spike in insurance costs?
  - What is the relationship between disaster risk and premiums?
  - How are insurers responding to increased costs and increased risks?
- **The problem:** Existing data is inadequate to answer these questions
  - **Data Solution on Affordability:** New estimates derived from escrow payments
  - Data Solution on Availability: New non-renewal data from Senate Budget Committee

#### Keys and Mulder (2024) Escrow-Derived Premiums

- Our approach: Construct premiums from mortgage loan-level data
- Study where insurance premiums have changed over the last ten years
- Estimate time-varying relationship between risk and premiums
- Compare the influences of construction costs, risk, and reinsurance in explaining premium dynamics

#### Inferring Premiums from Escrow Payments

We create panel estimates of homeowner's insurance premiums paid by over 19 million mortgagors originated from 2014 to 2024

Over 84m premium observations inferred from mortgage escrow payments

- "PITI" Payments to Escrow: Total Payment = Principal + Interest + Taxes + Insurance
- ▶ In CoreLogic loan-level data, we observe Total Payment, P&I, and Taxes

 $\blacktriangleright$   $\rightarrow$  Insurance = Total Payment - P&I - Taxes

#### The Geography of Homeowners Premiums in 2024



#### Zip Code Premiums in Miami-Dade County in 2024



#### Premium Trends Over Time, 2014–2024



Premiums have increased 48% (20% real) from 2020 to 2024

#### Premium Dynamics by Disaster Risk Quintile, 2014–2024



Annual premiums increased over \$1100 in the top quintile of disaster risk versus only \$400 in the bottom quintile

#### Examining Drivers of Premium Increases

Average premiums increased nearly 50% between 2020 and 2024

- We estimate that 50% can be explained by rising structure values and another 30% by the rising "disaster risk beta"
- Zipcodes with more correlated risk saw larger increases in premiums, suggesting an important role for a "reinsurance shock"
  - Guy Carpenter Reinsurance Price Index doubled between 2017–2023
- ▶ We find that the reinsurance shock also slowed the growth of home prices
  - Potential channels: broader repricing of backward looking cat-risk models, shifting of homeowner beliefs about future premium trends

#### Thinking Ahead

- Premiums are rising for many reasons (rebuilding costs, general uncertainty about risk, limited capital to cover catastrophic risk)
- > These higher premiums are affecting housing and mortgage markets
- One implication: The cost of climate change will depend on efficiency of markets for sharing catastrophic risk
- Some broader views:
  - Market innovations or policy solutions for insuring correlated catastrophic risk will become increasingly important
  - Price regulation of homeowners insurance premiums will become increasingly untenable — more exits push risk to states
  - Big question is whether price signals will lead to large-scale adaptation

#### **Policy Implications**

- ▶ Households need high-quality & timely climate and insurance data
  - Data collection by FIO and Senate Budget Committee were good starts
  - Need weather and climate forecasts to be public and available to all
- Misaligned incentives can be re-aligned through government intervention
  e.g. short-term premium volatility and long-term pricing w/actuarial accuracy could be addressed through mortgage markets (Fannie/Freddie/FHA)
- Reinsurance market hardening suggests role for public backstop to provide continuous availability and coverage — "reinsurer of last resort"
- Ultimately we need to reduce our risks:
  - Invest (and experiment!) heavily in resiliency and preparedness
    - Financial products through Fannie/Freddie/private capital toward retrofits
    - Tax-advantaged disaster readiness accounts
  - Decarbonize the economy as fast as possible

Thank you! contact: benkeys@wharton.upenn.edu