

# “Measuring the Climate Risk Exposure of Insurers” Discussion

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# Overview

- Research question: How much are insurers exposed to climate risk?
- Motivation: Increasing cost of natural disasters may threaten insurers
- Approach: Construct forward-looking market-based measures of physical and transition risk
- Contribution: These measures are new, and newly applied to insurance
- Results: Insurers with high physical risk exposure experience a decline in stock returns following natural disasters; insurers with high transition risk exposure experience an increase in climate beta during fossil fuel price collapse

## Comment 1. Climate Risk Definition

- Key question: what is climate risk exposure?
- Climate risk exposure defined based on observed property damages in the previous year (2000-2023)
  - Realizations of climate risk vs. expected risk

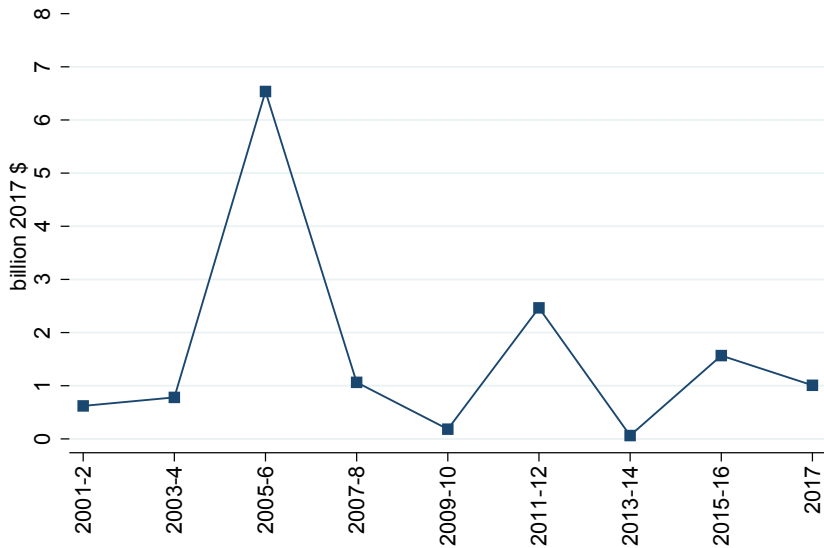
$$RISK_{i,t} = \sum_{s \in S} \left[ \left( \frac{DPE_{i,s,t-1}}{\sum_{s \in S} DPE_{i,s,t-1}} \right) \times \text{Property Damage}_{s,t-1} \right] \times \frac{1}{ME_{i,t-1}} \quad (4)$$

## Comment 1. Climate Risk Definition

- Do observed damages accurately capture climate risk?
- Is using observed damages forward-looking?
- If stocks respond to risk realizations, doesn't this suggest that underlying risk isn't priced in?
- Suggestions:
  - Robustness using risk models: First Street Foundation, Climate Impact Lab?

# Comment 1. Climate Risk Definition

## Time Series of NFIP Payouts

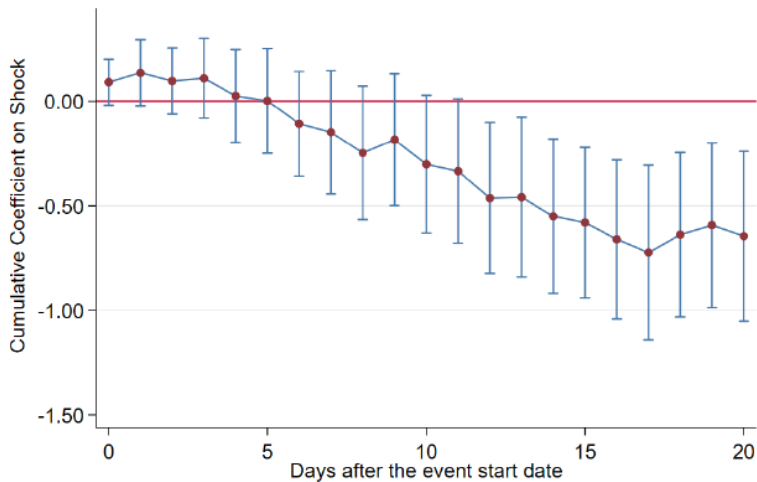


## Comment 2. Climate Risk Market Capitalization

- Market-based measures rely on the assumption that equity markets account for climate risk
  - Doesn't the fact that your physical climate risk measures respond to natural disaster events suggest that they don't?
  - Again, expectations versus realizations of risk
- Is this assumption reasonable?
  - Some of the literature seems to suggest the opposite (e.g., Bakkensen and Barrage 2021)
  - Additional discussion and nuance here seems warranted
  - How does the interpretation change if this assumption doesn't hold?

## Comment 2. Climate Risk Market Capitalization

(a) Insurer Premium Factor Responses



## Comment 3. Readability

- Many references to Jung et al. 2021 for CRISK, mCRISK, and climate beta methodologies and definitions
- Sense in which the paper assumes that the reader is familiar with this other paper
- Suggestion:
  - Include a brief section providing an overview of these methods
  - This paper should stand on its own



## Minor Comments

- Is average annual property damage the right definition of riskiness of states?
  - Texas, Florida, and California: highest annual property damage, but also most populous
  - Per capita damages might better reflect relative risk?
- Main results are that insurers with high physical risk experience a decline in stock returns following severe natural disasters
  - More discussion of interpretation of magnitudes, in addition to sign, would be helpful

# Overall

- Interesting and important topic
- Extension of nascent literature at the intersection of climate, finance, and insurance
- Look forward to seeing how this measure changes over time as insurers take climate risks into account!