Hedging Climate Risks

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Hedging climate change risks: conceptual issues

What's unique about hedging **climate risks**?

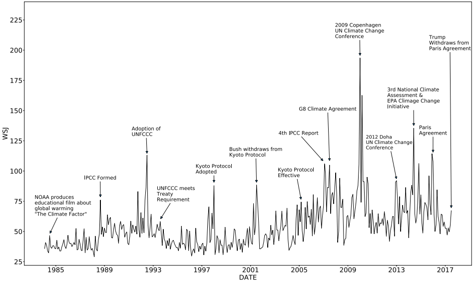
1. It's hard to specify the right **target** of the hedge
   - Given a target, it's easy to design a product
   - Climate variables, or the economic damages that result?
2. Obstacles to **market participation** and development
   - Very long horizons and counterparty risk
   - Generally limited knowledge about the dynamics of climate change
3. Limits to **quantitative analysis of risks**
   - Structural analysis (models): complex predictions, model uncertainty
   - Reduced-form analysis: little data on extreme scenarios

Hedging climate change risks: operational issues

1. How do we hedge such **long-term risks**?
   - Can we use short-term portfolios to hedge long-term climate change?
2. What **instruments** to use? Specialized derivatives or more easily available assets like equities?
3. What is the **cost** of the hedge?
   - What are the risk premia associated with climate change?

A first step: Engle et al. 2018

- **Target:** climate change **news** extracted from newspaper articles
- **Instruments:** large cross-section of equities; data on ESG scores
- **Horizon:** basic principle from option pricing: replicate payoff of ideal long-term security with a sequence of short-term portfolios



- Results: obtain **out-of-sample** correlations up to 30% with the target
- Identify firms (within and across industry) most important for the hedge

Designing a global derivative market

- Benefit: **precise targeting** not achievable with equity markets
- **Features** unique to a derivatives market for climate change
  - Markets need difference of exposures and views: exploit geographic heterogeneity (**global** market)
  - **Multiplicity of products:** climate change is a multi-faceted phenomenon, reduce basis risk
  - Policy: can climate insurance markets exacerbate the **tragedy of the commons** problem inherent with climate change?