Technology Transforming Decision-making: Managing Natural Hazard Risk

Dr. Patricia Grossi
Research Director
Risk Management Solutions
Modeling Natural Disaster Risk

Hazard

Vulnerability

Exposure

RISK
Insurance and Catastrophe Risk

- Insurance is founded on the principle of risk diversification
  - When the magnitude of a potential loss is considered too great to bear, risk is transferred to an insurer (in exchange for a premium) to be pooled with other uncorrelated risks
  - Insurance is discretionary – insurer can choose what to insure and (in unregulated markets) at what price

- Key challenge to the insurance industry is risk correlation = Catastrophe (CAT) Risk
  - Insurers buy insurance from reinsurers to protect themselves against catastrophic (CAT) losses
CAT models are used within and across each organization of the pyramid.
Insurance Regulation in the U.S.

- Solvency regulation: Is an insurer sufficiently capitalized to meet its obligations?
- Rate (or market) regulation: Are insurance rates equitable and nondiscriminatory?
- Regulator plays a vital role in ensuring that a viable insurance market is functioning with coverage offered to consumers at affordable prices
- And catastrophe models play a vital role in calculating solvency requirements (PML) and establishing rates (AAL)
- Therefore, regulator benefits from a strong familiarity with catastrophe modeling and how it can best be used to create a well-regulated and successful insurance system
Catastrophe Modeling and the Regulatory Process

Catastrophe models present a challenge for regulators

- Provides a scientifically rational approach for quantifying an insurer’s risk … yet…
- Involves technical expertise outside a regulator’s traditional knowledge base
- Public acceptance of the use of models for rate-making is low (e.g., perceived as a tool for justifying higher rates)
The Case of California Earthquake Risk

- 1985: ‘Mandatory offer law’ compelled insurers who offered homeowners coverage in California to offer earthquake coverage as well.

- 1994: Northridge Earthquake losses were 28 times the collected 1993 premium and took 18 months to reach $15 billion.

- 1995: Insurance industry unsuccessfully sought repeal of mandatory EQ offer; 95% of residential market virtually stopped writing HO coverage.
California Earthquake Authority

■ 1996: CEA Established
  – Public instrument of the state
  – Privately financed and publicly managed
  – Homeowners market restored

■ 1997: Rate application filed, with rates determined through the use of a catastrophe model (“risk based, using best available scientific information”) – followed by a lengthy public rate hearing with the commissioner ruling in favor of the CEA

■ Today: Largest Provider of EQ Insurance in U.S.
  – 770,000 policyholders (70% of California residential EQ market)
  – $9.5 billion claim-paying capacity
  – However….take-up rate is extremely low
The Future of the CEA

- CEA’s vision:
  - Make CEA products more useful and appealing by developing new policy options
  - Work actively to gain Congressional approval of a federal debt guarantee
  - Promote compelling reasons for more Californians to prepare for financial recovery from earthquake damage

- However, there are barriers to increasing the take-up rates
  - Homeowner’s willingness to pay for coverage
  - Accumulation of capital by the CEA (e.g., CEA does not believe, given its current financial structure, that it could acquire enough affordable capital to support a 20% take-up rate.)
Use of Catastrophe Models will only grow...

- Catastrophe modeling has evolved considerably from the days when actuarial methods relying on past loss experience were used for risk assessment and management.

- For the CEA, an analysis of the impacts of insurance take-up rates and insurance coverage options is only achievable through the use of a catastrophe model.

- Catastrophe modeling is now part of the landscape of tools used by the insurance industry for a better understanding and management of risk. Updates to regulations will (most likely) require the use of catastrophe models.
Thank You