Managing Sovereign Catastrophe Risk: Lessons from Mexico

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Stuart Miller, PhD
Risk Consultant
AIR Worldwide

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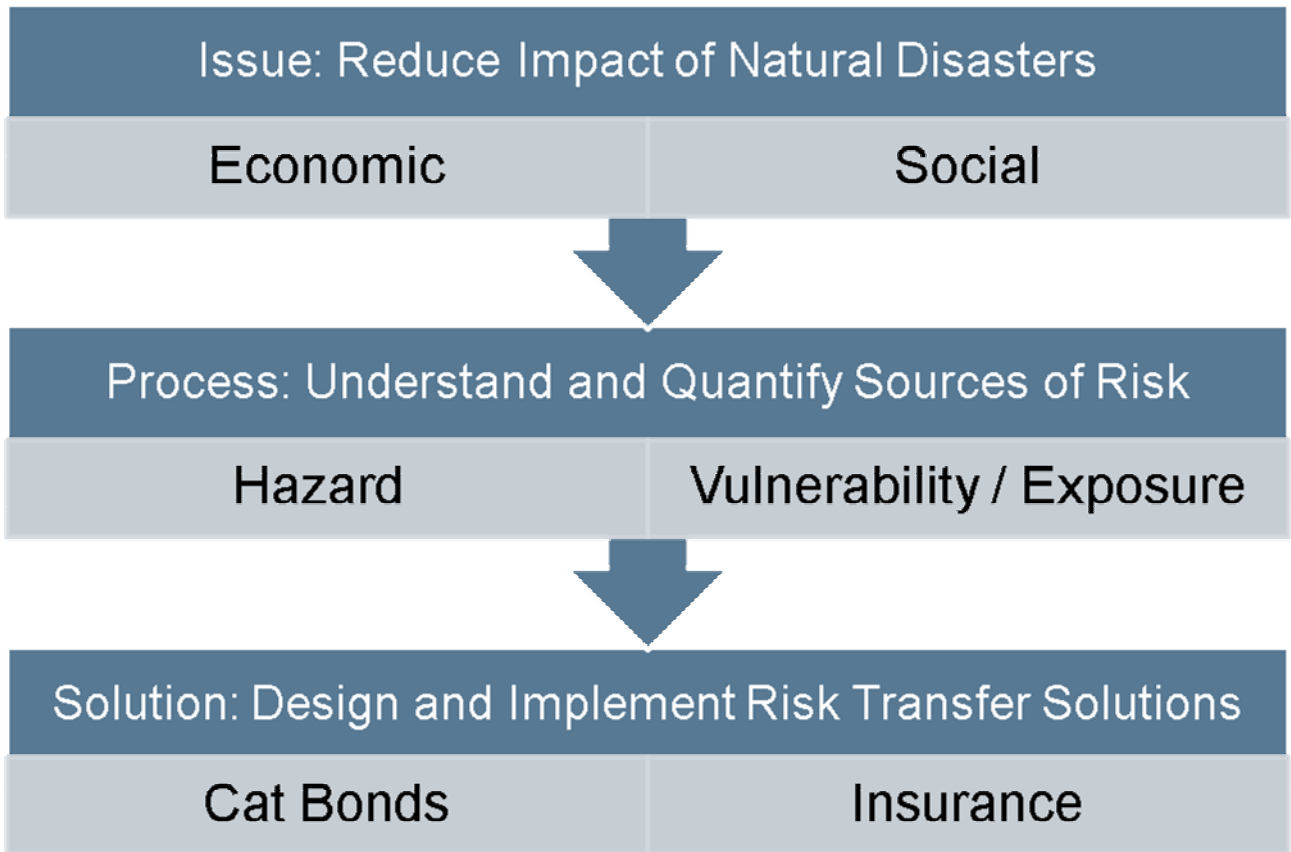
Managing Sovereign Catastrophe Risk



Impact of Natural Disasters

Recent Events

2008 Cyclone Nargis (top left)

2008 Sichuan Earthquake (bottom left)

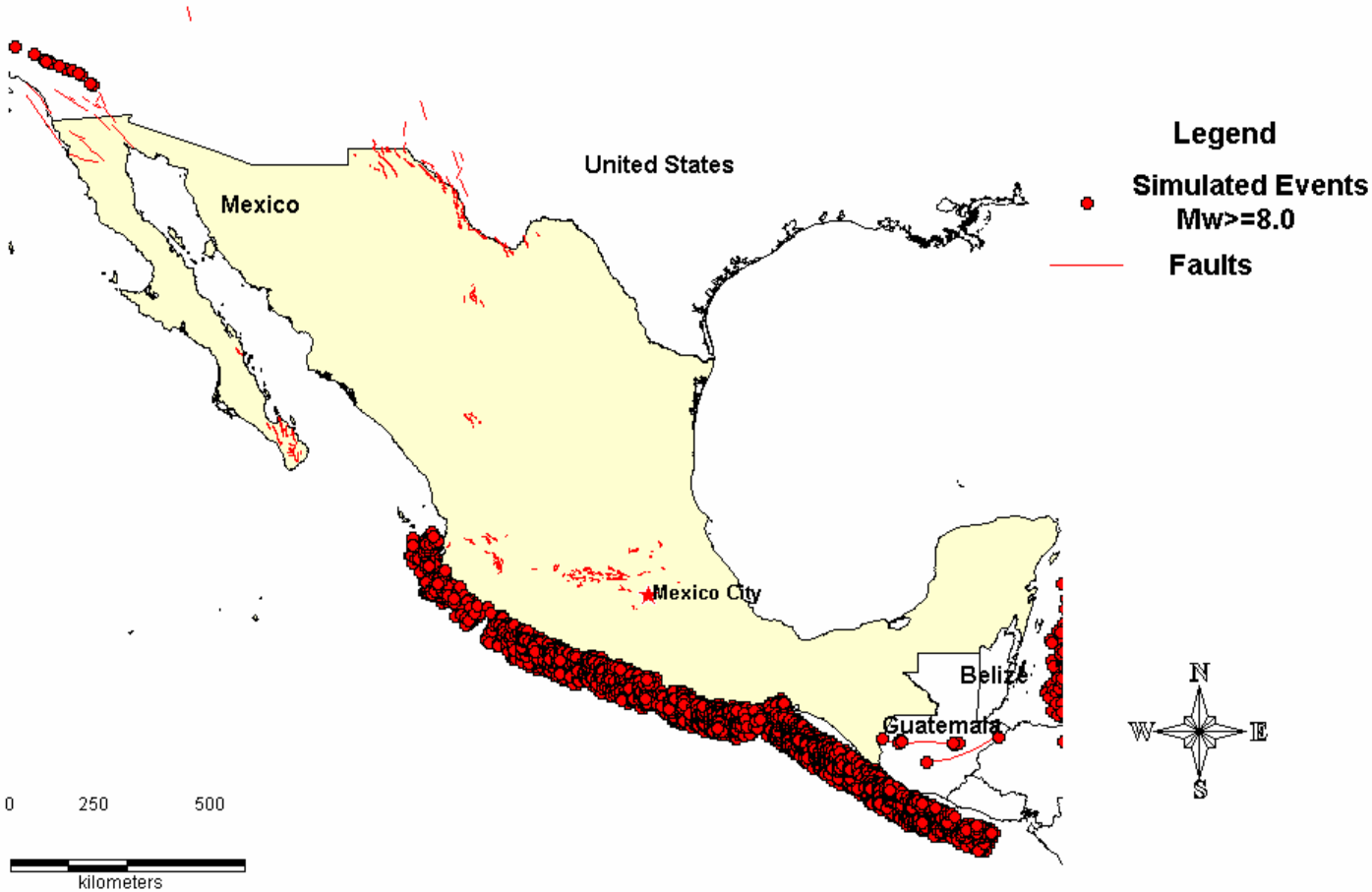
2005 Hurricane Katrina (right)

Role of Catastrophe Modeling

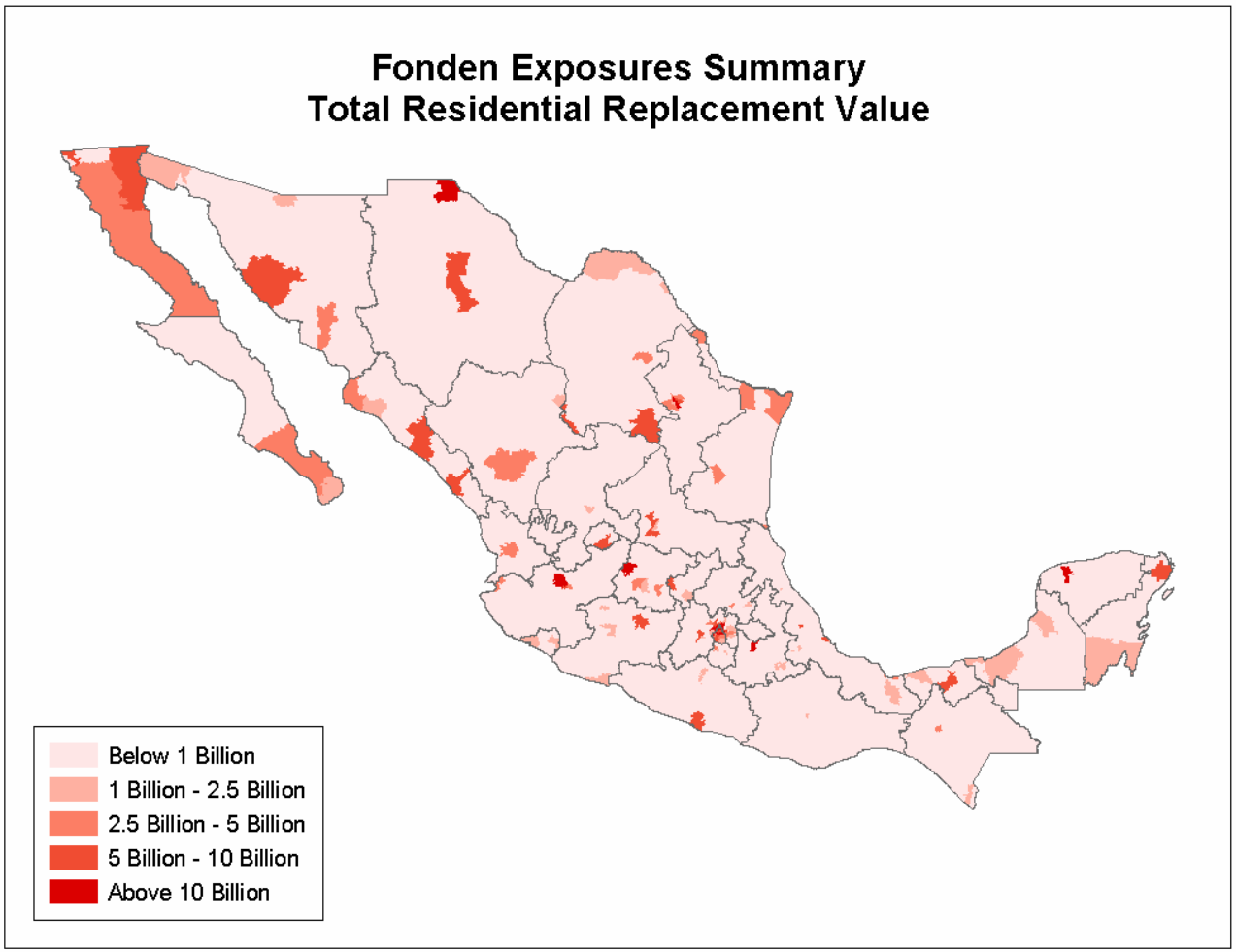
- Scarcity of historical loss data makes standard actuarial/statistical techniques of loss estimation inappropriate for catastrophe losses
  - Before the advent of catastrophe models, companies relied on arbitrarily derived PMLs or best “guesstimates”

- Catastrophe models answer questions like:
  - Where are future events likely to occur?
  - How big are they likely to be? How frequently are they likely to occur?
  - For each potential event, what will be the property damage and insured losses? What will be the number of people injured?

Understand and Quantify Sources of Risk: Hazard



Understand and Quantify Sources of Risk: Vulnerability



Cat Bonds: An Option for Post-Event Financing

- One challenge confronting developing economies is securing adequate funding in the post-disaster period.
- The transfer of catastrophe risk to capital markets with cat bonds is an accepted means for private sector entities to secure financial protection against their catastrophe risk.
- Cat bonds are also viable means of risk transfer for the public sector.
- Cat bonds are not debt instruments, but a form of financial protection similar to insurance. Instead of premium payments, interest payments are made in return for post-disaster coverage.
- While private and public sector entities both share the goal of securing financial protection, public sector issuers face a different set of challenges.

Transaction Summary: CAT-Mex

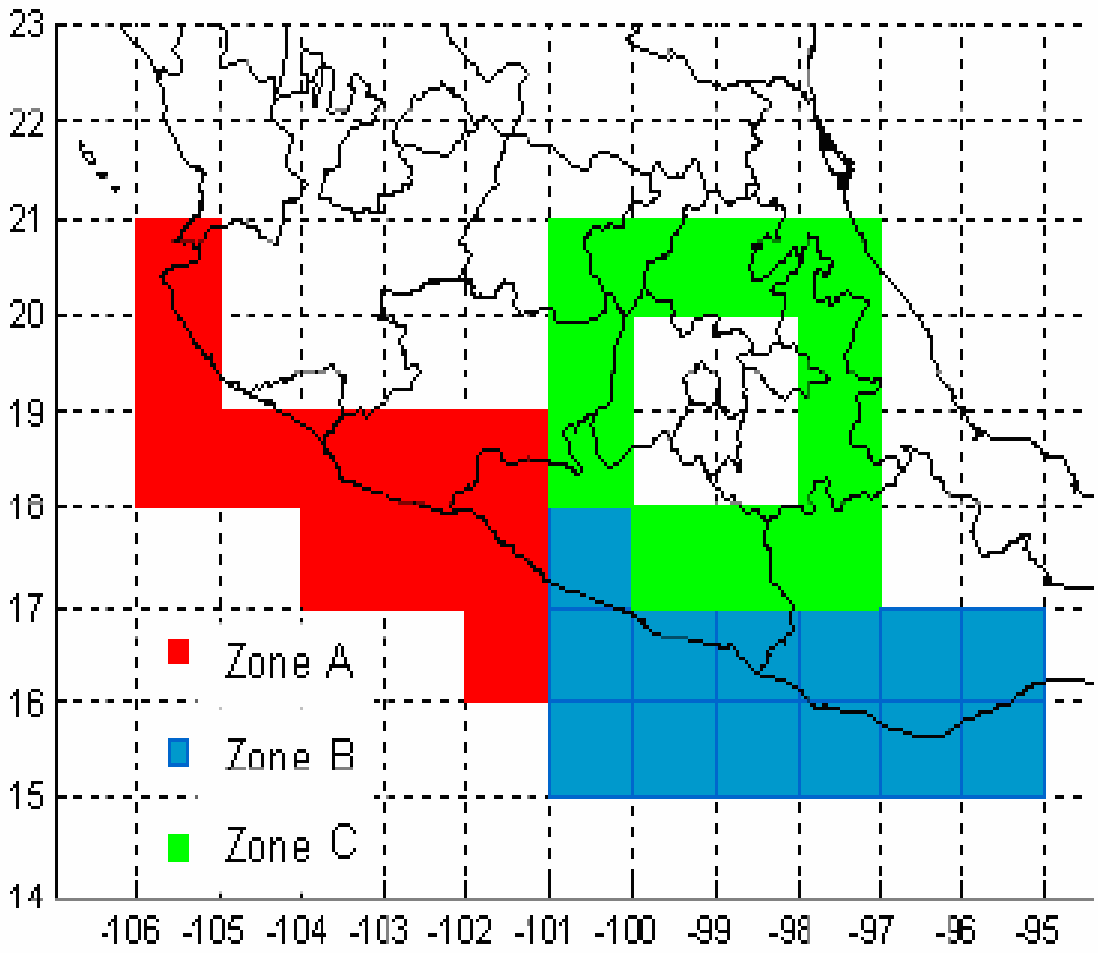
- Parametric trigger encompassing magnitude and depth of earthquakes in Mexico or offshore.
- Provides protection for emergency losses to the Mexican Government through Fondo de Desastres Naturales (FONDEN) from 2006 though 2009.
- $150mn of capacity issued in two classes of notes.
- Advised by Swiss Re Capital Markets and Deutsche Bank.
- Modeled by AIR Worldwide Corporation.
- Rated by S&P: Class A BB+; Class B BB+.
- Mexico also acquired $300 mn of cat reinsurance.

Transaction Summary (Continued)

- Class A Notes ($150 mn):

  Zone B
  - Trigger: 8.0+ Mw, depth <= 200Km along Pacific Coast south of Mexico City
  - Trigger probability: 0.96%
- Class B Notes ($10 mn):

  Zones A and C
  - Trigger: 8.0+ Mw, depth <= 200Km along Pacific Coast west of Mexico City
  - 7.5+ Mw, depth <= 150Km all around Mexico City
  - Trigger probability: 0.93%



CAT-Mex: Lessons Learned

Modeling

- A detailed analysis of the hazard and exposure serves as the foundation for any market-based transaction.
- The risk modeling benefits from external peer-review.
- With good exposure data, governments and modelers can assess risk with a high degree of precision.
- Parametric bonds may be increasingly viable solutions for sovereign risk securitization.
- Where exposure data is incomplete, modelers can use scientific and mathematical relationships to create a simulated reporting network.

Market Experience

- Sovereign cat bonds can be successfully placed.
- Public sector issuers can use cat bonds as part of a broader risk management strategy.
- Cat bonds offer sovereign issuers flexibility to use the funds as necessary to meet a wide range of post-disaster emergency expenses.
- Due to its diversification value, there is investor demand for sovereign catastrophe risk in new geographic areas.
- Public sector issuers are not penalized in the marketplace and can secure favorable pricing.

Modeling Differences: Public vs Private Issuers

Project Issue	Private Sector Issuance	Cat Mex Issuance
Understanding Risk Profile	Ongoing	Starting from Ground Up
Data Management	Ongoing	Gathered in the course of the project
Model Understanding	High	Education Needed
Life-Cycle	Months	Variable
Initial Structuring Preference	Narrowly Defined	Broadly Defined
Review of Modeling Results	Internal, Rating Agencies and Investors	Internal, Rating Agencies, Investors and Government Agencies

Conclusions

- While the occurrence of natural disasters cannot be prevented, their impact can be reduced with mitigation measures, and proactive fiscal measures can facilitate post-event aid and recovery.
- With more resources proactively allocated for post-disaster costs, this can alleviate demands for post-disaster aid and can free resources to be invested in mitigation.
- Cat bonds may also be used to provide coverage for local micro-insurance and micro-finance initiatives, which are internally diversified but vulnerable to catastrophes.
- As the cat bond market grows, the public sector can leverage expertise in structuring and catastrophe modeling to more precisely quantify its risk and transfer it to the capital markets at competitive prices.