Factors Needed to Transfer Risk Using Cat Bonds

Thematic Session 4.4: Financing Disaster Risk
UN World Conference on Disaster Reduction
Kobe, Japan
20 January 2005

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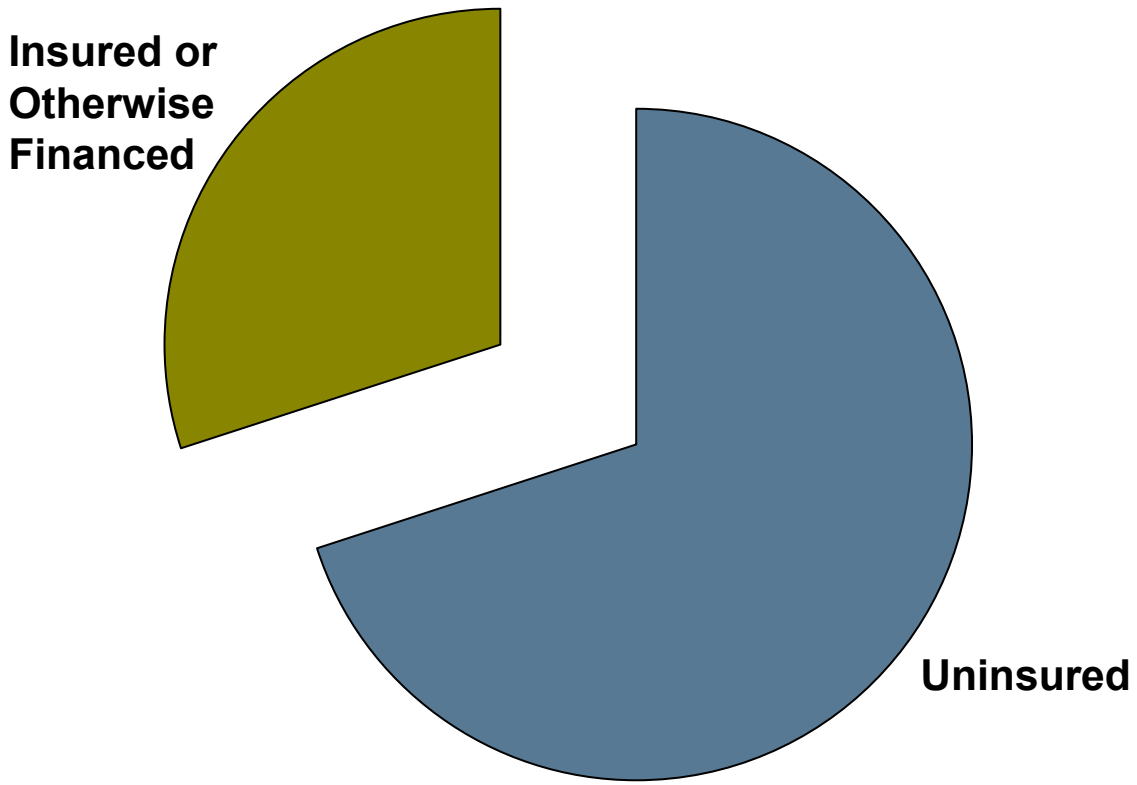
Much More Financing of Disaster Risk Is Needed

In 2003, of USD 70 billion in catastrophe losses worldwide, under USD 20 billion was insured.

2004 losses were larger. While final figures are not yet available, the same problem remains.



Source: Munich Re, Swiss Re

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Examples of Disaster Risk Financing Mechanisms

- Private Insurance and Reinsurance
- Private–Public-NGO Partnerships
  - Florida Hurricane Catastrophe Fund
  - France - Natural Catastrophe Insurance System
  - Turkey Earthquake Insurance Pool
  - Taiwan Residential Earthquake Insurance Pool
  - …
- Catastrophe Bonds
  - Taiwan – Formosa Re
  - …

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Discussion Topics

- Key factors needed to transfer risk using
  - Insurance/reinsurance
  - Cat bonds
- Importance of quantitative risk assessment, and the role that catastrophe modeling plays
- Examples from a current project analyzing seismic risk for Mexico
- Summary - important step to facilitate the risk assessment process

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Business Questions that Insurance and Reinsurance Executives Ask

- What losses are expected from catastrophes?
- Is the risk of expanding into a new market or adding business in an existing market manageable?
- Can we profitably underwrite the new business? How?
- How should rates be set considering the catastrophe risks?
- How does this fit within our overall portfolio?
- How should reinsurance be used to protect our company?

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Cat Bond Basics

- Advantages to Investors
  - Natural disaster risk is uncorrelated with stock/bond market risk offering benefit of diversification
  - Attractive returns
- Advantage to Issuers
  - Capacity, without credit risk
  - Coverage can be tailored to meet specific risk transfer needs and complement insurance programs
    - Specific perils and geographical regions
    - Choice of indemnity, parametric, or index triggers
    - First or second event
    - Multi-year coverage
    - … Etc.
  - Intangible benefits
- Costs to Issuers
  - Cost of insurance (bond interest to investors)
  - Transaction cost (investment bank, legal, modeling, rating agency, SPV, etc.)
  - Requires senior management attention
  - Establishment of regulatory and legal permissions to allow issuance

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Necessary Ingredients for Securitizing Risk Using Cat Bonds

- Is the country motivated enough to try a novel form of risk financing?
  - Will require legal framework to permit such a bond issuance (and all of the activities that lead up to the issuance)
- From a market point of view, can the risk be priced?
  - What bond interest do investors require to compensate them for taking on your risk?
  - Depends largely on calculated “expected loss”
- Will the rating agencies rate it?
- Will the investors invest?

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Role of Catastrophe Modeling in Issuing Cat Bonds

- Loss estimation — detailed analysis of loss probabilities, by peril, line of business, and geography (up front risk analysis and annual resets if multi-year deal)
- Ratings — sensitivity and stress tests for rating agencies
- Prospectus — offering circular documentation describing modeling process and detailing model results
- Investor meetings — road show and other investor meetings, conference calls, follow-ups, etc.
- Post event
  - Parametric index value
  - Post event loss calculations

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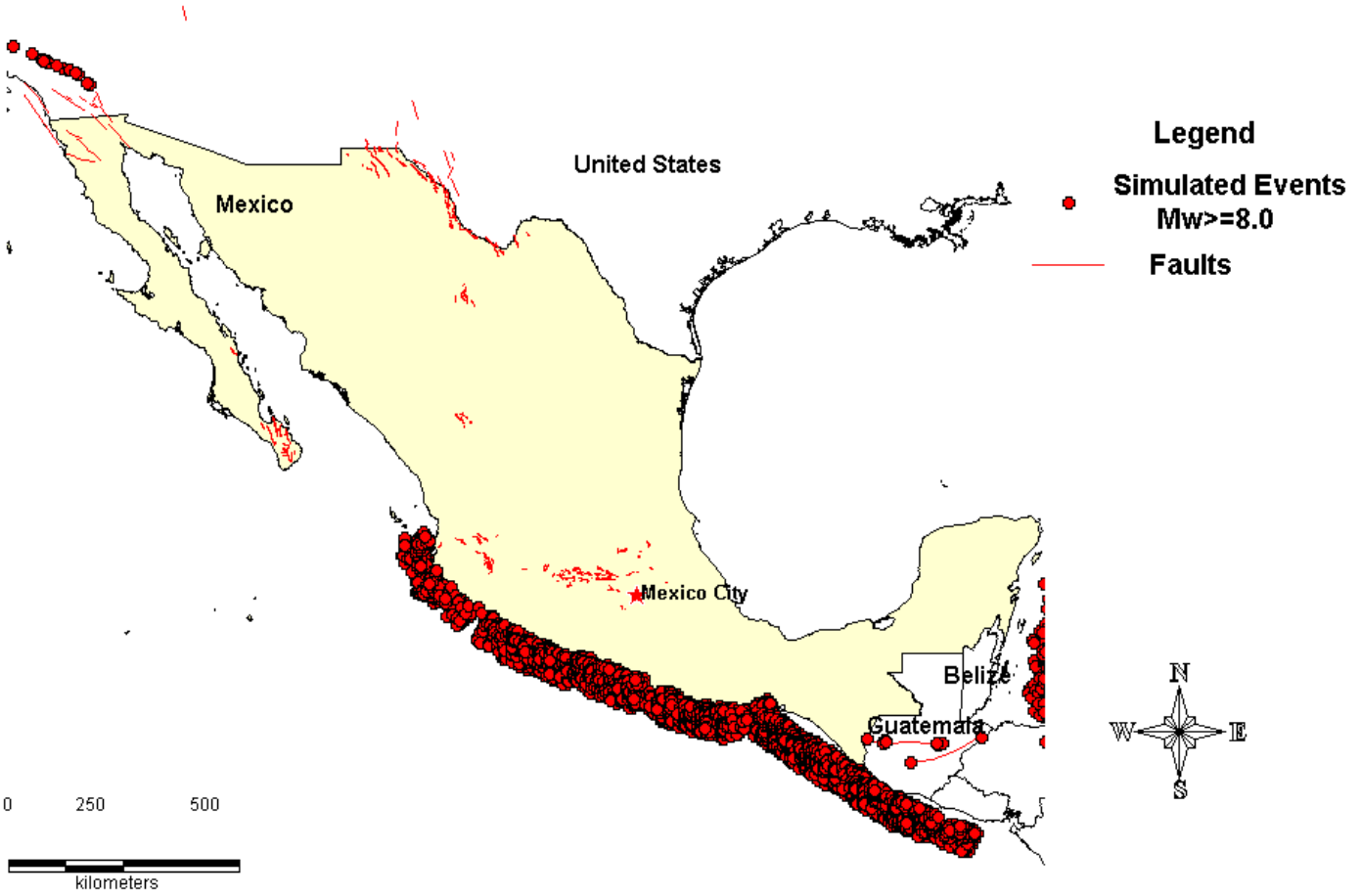
Models Use Statistical Simulations to Generate a Large Sample of Events that Can Cause Losses in the Future



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Fundamental Physical Characteristics of Catastrophe Events Are Expressed Mathematically and Then Superimposed on Current Building Stock to Estimate Potential Damage

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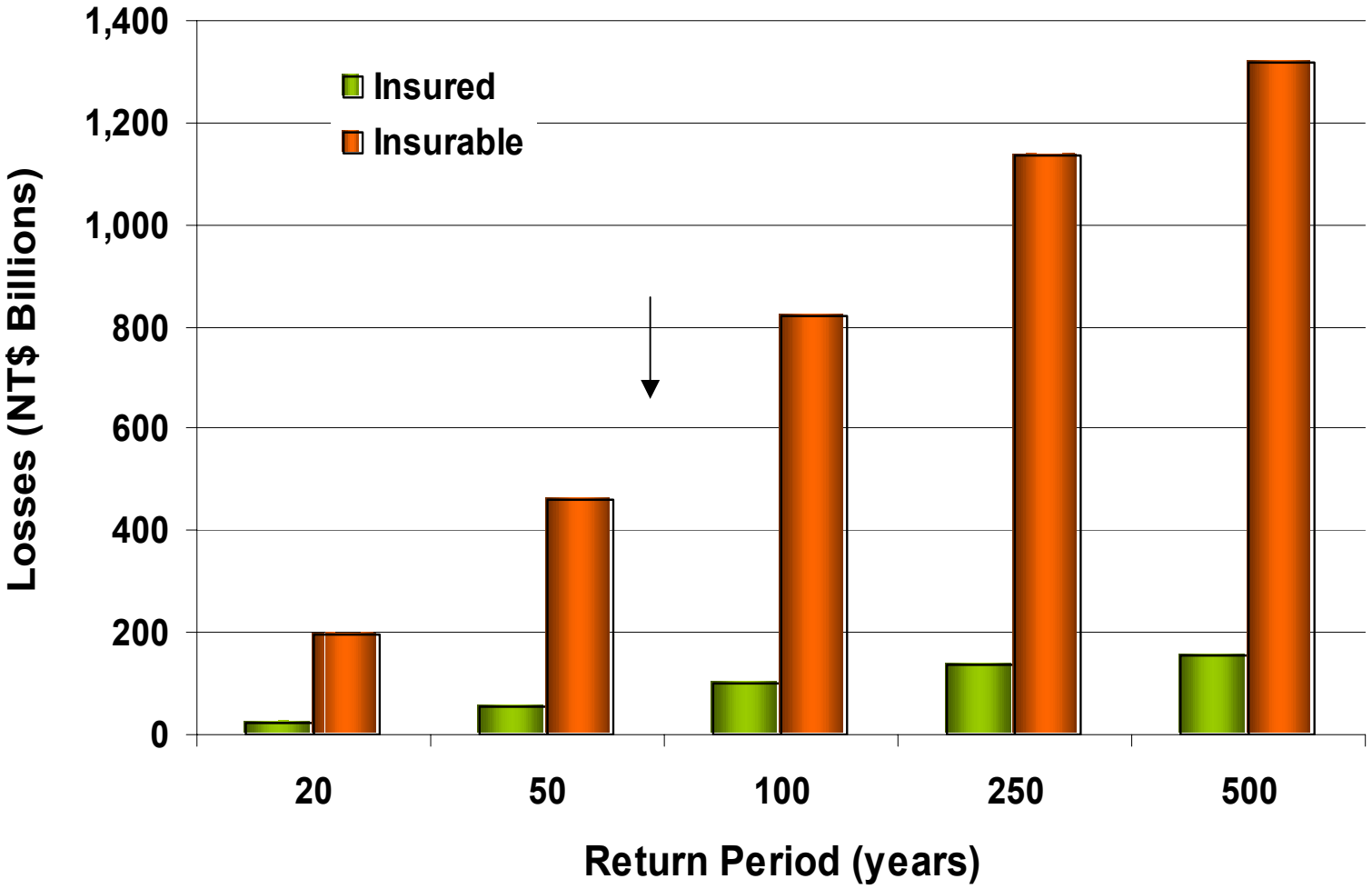
Model Results Are Expressed As a Distribution of Probabilities, or the Likelihood of Various Levels of Loss

(Sample Modeling Output: Taiwan Earthquake Countrywide Loss Distribution)



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Where to Start? Use of Modeling in Disaster Management Starts with Detailed Data

- The modeling firm will be equipped with most of the needed hazard information (e.g., location and magnitude of potential earthquakes, cyclones, etc.)
- Engineering information is also needed on vulnerability and damageability, by
  - Construction type (wood, steel, reinforced concrete, masonry, …)
  - Occupancy (residential, commercial, industrial, …)
- Finally, economic costs beyond property damage need to be estimated
  - Emergency costs
  - Recover costs
  - Rebuilding costs
- For developing countries, often the weakest part of the modeling is lack of data on exposures, by geographical regions
  - Numbers of people
  - Numbers of properties, by construction type
  - Infrastructure

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Summary

- The use of cat bonds is emerging as a viable alternative for financing disaster risk and one means of private sector participation
- A prerequisite for issuing a cat bond is quantification of the risk (for evaluating, pricing and rating the risk).
- Catastrophe modeling is a standard technique for global risk assessment and management by the private sector (insurance industry and capital markets), and is one of the primary tools for national Disaster Risk Managers, too.
- To facilitate future use of modeling tools, developing countries should institute appropriate data collection programs.

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