Catastrophe Models (and “Cat” Risk)
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Outline

• What are “cats” (chapter scope)
• Impact of cats
• Current trends
• Quantifying the risk
• Other factors
What are “cats” – chapter scope

• Property events with time limited impact
• This definition/scope excludes
  • Tort events (e.g., mass torts)
  • Biometric events, solar flares, cyber (generally)
  • Longer term trends
• Can be natural (e.g., windstorms, earthquake)
• Can be man-made (e.g., terrorist attack)
Impact of cats

• Property, Life, Health, Business Interruption
• Focus is on immediate impact, not long term
• Societal impact ≠ Insurance impact (take-up rates)
• Insurer solvency impacted by size and concentration
  • Lower the risk by increasing geographic spread
  • Company capacity vs. Industry capacity for a cat
  • Some risks bigger than the industry capacity
Current Trends

• Number and size of events increasing
• Much of this (so far) is due to demographic trends, not weather or other trends
• People and property are moving into harms way
Quantifying the risk

- Large cats are too infrequent to rely just on past experience
- No practical alternative to models
- Rarity of events also means model uncertainty is unavoidable
Cat Model Modules

- Event catalogs *(Physical characteristics, return periods)*
- Intensity formulas *(Physical impact on a location)*
- Damage functions *(Damage caused by that intensity, varying by property exposed – e.g., brick vs. wood)*
- Financial Module *(Claims/losses given exposed property, lives and insurance contract terms. Gross and net)*
Cat Model Data Needs

- Frequency of events
- Physical nature of events
- Physical nature of items exposed to the hazard
- Damage susceptibility given the above
Cat Model Uncertainties

- Frequency of events
  - Return period or even possibility of an event
- Footprint of event
- Damage from an event
- Contract, legal interpretations (in a stressed environment)
Other factors

• Non-modeled items

• Cash flow impacts
  • Models don’t estimate cashflows
  • The bigger the event, the slower the payout
  • Concentrated events overwhelm local resources – extended payouts
Other factors (continued)

- Data quality *(including location, building type precision)*
- Mitigation impacts/possibilities
  - Building codes
  - Risk-based rates *(incentives/disincentives to avoid areas)*
- Societal Impacts
- Environmental data *(soil characteristics, fault location/stress, floodplain changes)*
Thank you

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