Better Economic Outcomes: Public-Private Partnerships in Risk Management

State Resilience and Economic Growth Summit

Alex Kaplan
The cost of disasters is growing and the portion absorbed by governments and its citizens are even greater.

Global natural catastrophe losses, 1970-2013 (in USD bn)

Source: Swiss Re *sigma* 1/2014
Disasters place a significant burden on the public sector

- Despite prevention and mitigation efforts, no country can fully insulate itself against extreme natural disasters.
- The brunt of economic losses from natural disasters ends up with individuals, corporations and governments, both on national and sub-national level.
- Government budgets are impacted by:
  - Primary effects include immediate expenses for emergency relief efforts, costs for rebuilding public infrastructure or loss of capital and durable goods.
  - Secondary effects, for instance, include lower economic growth, lower tax and non-tax revenues, budget deficits, increased indebtedness and costs from refinancing, higher inflation or currency movements.
The proportion of economic losses absorbed by the USG: Is this sustainable?

Figure 4: Ratio of Total Federal Government Disaster Expenditures to Measured Losses
Source: Cummins, Suher, and Zanjani (2010)²
Growth of values is the main driver of increasing natural catastrophe losses

Shanghai 1990 - 2010

- Increasing values
- Concentration in exposed areas
- Increasing vulnerability
- Growing insurance penetration
- Changing hazard (climate variability, climate change)

Loss history is not a good guide for risk, models are an indispensable tool

Source: weburbanist.com
The US has a high level of exposure to climate change

- Total insured value of property along the Atlantic and Gulf coast was $10.6 trillion, with New York and Florida topping the list at $2.9 trillion apiece.

- Sea level rise is accelerating, especially along the U.S. East Coast and Gulf of Mexico.

- Natural catastrophes (earthquake and weather related) cause average economic losses of $60-100 billion annually. (Hurricane Sandy = ~$70 billion)

- The US Government spent $96b in 2012 to pay for climate-related events (Source: NRDC).
  - If this so-called "Climate Disruption Budget" were included in the actual budget, it would be the largest non-defense discretionary budget item.
  - The Government paid more for climate-related losses than it did for transportation or education.
Closing the Gap: Including ex-ante instruments into the overall risk financing strategy

Including ex-ante instruments in the overall risk financing mix helps a government to lower its financial exposure to catastrophic risks, natural and man-made.
The Solutions
Case study United States: Alabama – First parametric cover for a government in an industrialized country

Solution features
- Insured peril: Hurricane
- Payments to offset economic costs of hurricanes
- Trigger type: Disaster occurring within a defined geographic area ("box") along coast ("cat-in-the-box")
  - Trigger based on wind speed of hurricane eye as it passes through pre-determined box
  - Payout in as little as two weeks
- Time horizon: July 2010 – July 2013
- First parametric catastrophe risk transfer for a government in an industrialized country

Involved parties
- Insured: State Insurance Fund of Alabama
- Swiss Re: Lead structurer and sole underwriter
Case study Uruguay: Largest Energy Risk Transfer to Protect Against Drought Risk

Solution features
• Insured peril: Drought
• Payments to be used to purchase energy from alternative sources when drought conditions cause lack of hydro power
• Derivative contract: between UTE, Uruguayan state-owned hydro-electric power company, and World Bank Treasury. Risk is then placed in the market
• Payment mechanics:
  – Trigger: Level of rainfall monitored at weather stations
  – Settlement: Market price of brent crude oil
• Time horizon: January 2014– July 2015
• Transaction Size: USD 500 million
• Largest of it’s kind in the weather risk management market

Involved parties
• Client: UTE (Uruguayan state-owned power company)
• Arranger: World Bank Treasury
• Risk Takers: Swiss Re and Allianz
Case study Mexico: MultiCat - Funding for immediate relief efforts after disasters

Solution features
- Insured perils: Earthquake and hurricane
- Payments to be used for immediate emergency relief after a disaster
- Parametric catastrophe bond: USD 315 million
- Trigger type: Index
  - Earthquake: physical trigger (quake magnitude)
  - Hurricane: physical trigger (barometric pressure)
- Time horizon: October 2012 – November 2015
- Renewed cat bond launched through the World Bank’s MultiCat facility and third cat bond for Mexico

Involved parties
- Insured: Fund for Natural Disasters (FONDEN) of Mexico
- Reinsured: AGROASEMEX S.A.
- Arranger: World Bank Treasury
- Swiss Re: Co-lead manager and joint bookrunner
Case study Caribbean: Caribbean Catastrophe Risk Insurance Facility (CCRIF)

Solution features
- The CCRIF offers parametric hurricane and earthquake insurance policies to 16 CARICOM governments
- The policies provide immediate liquidity to participating governments when affected by events with a probability of 1 in 15 years or over
- Member governments choose how much coverage they need up to an aggregate limit of USD 100 million
- The mechanism will be triggered by the intensity of the event (modelled loss triggers)
- The facility responded to events and made payments:
  - Dominica & St. Lucia after earthquake (2007)
  - Turks & Caicos after Hurricane Ike (2008)
  - Haiti, Barbados, St. Lucia, Anguilla and St. Vincent (2010)

Involved parties
- Reinsurers: Swiss Re and other overseas reinsurers
- Reinsurance program placed by Guy Carpenter
- Derivative placed by World Bank Treasury
Case study:
Miami Dade County Public Schools—Custom multi-year structured cover

Solution features
- Insured peril: Named Windstorm and associated flood
- Multi-year structured cover: USD 100m
- Covering indemnified losses from NWS to soften impact to broader school system
  - 3 year coverage with unlimited reinstatements
  - Term Aggregate Deductible
  - Fixed premium over term
  - No claims bonus
- Time horizon: May 2013– May 2016
- Customized multi-year structured risk transfer for major school district

Involved parties
- Insured: Miami-Dade County Public Schools
- Swiss Re: Lead structurer and sole underwriter
- Broker: AJ Gallagher
Economics of Climate Adaptation

Please find the full study at www.swissre.com/climatechange
Economics of Climate Adaptation (ECA)
Comprehensive Risk Assessment, from Hazard to Cost

• Assess total climate risk
  – Today's climate risk
  – Future climate change scenarios

• Using Swiss Re's proprietary catastrophe models, current and future hazards are translated to economic loss potential

• Various resiliency strategies can be implemented to demonstrate savings of each measure considered.

• Powerful tool to allow decision makers to understand current and future risk and benefit of long term action
### Results

**Loss Frequency Curve**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>2013</th>
<th>2020s</th>
<th>2050s</th>
</tr>
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<tbody>
<tr>
<td>USD 19 billion years</td>
<td>70</td>
<td>60</td>
<td>50</td>
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<tr>
<td>USD 35 billion years</td>
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<td>USD 90 billion years</td>
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70 year return period loss

Source: A Stronger, More Resilient New York
Results
Annual Expected Loss (AEL)

- Average annual impact to assets and GDP
- Some years will have a single or multiple large losses, other years will be zero.
- Today: USD 1.7 billion
- 2050s: USD 4.4 billion
  - USD 1.5 billion from sea level rise
  - USD 1.2 billion from changes in storm frequency

Source: A Stronger, More Resilient New York
Results
Cost-Benefit Analysis

• Model can be used to assess the financial savings from various mitigation efforts.

• Combining the modeled savings with cost estimates can provide helpful guidance for decision makers when selecting which efforts to focus on.

• NYC decided to focus on efforts where the cost-benefit ratio was less than 2.
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