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Parametric Insurance: In an Insurance-Principle and Regulation Compliant Way

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A Lloyd's Publication in June 2019 (available to participants only)
An academic (working) paper (available upon request)

Principal Investigator: W. Jean Kwon
Joint Researchers: Lin Xiao and Lloyd's Team

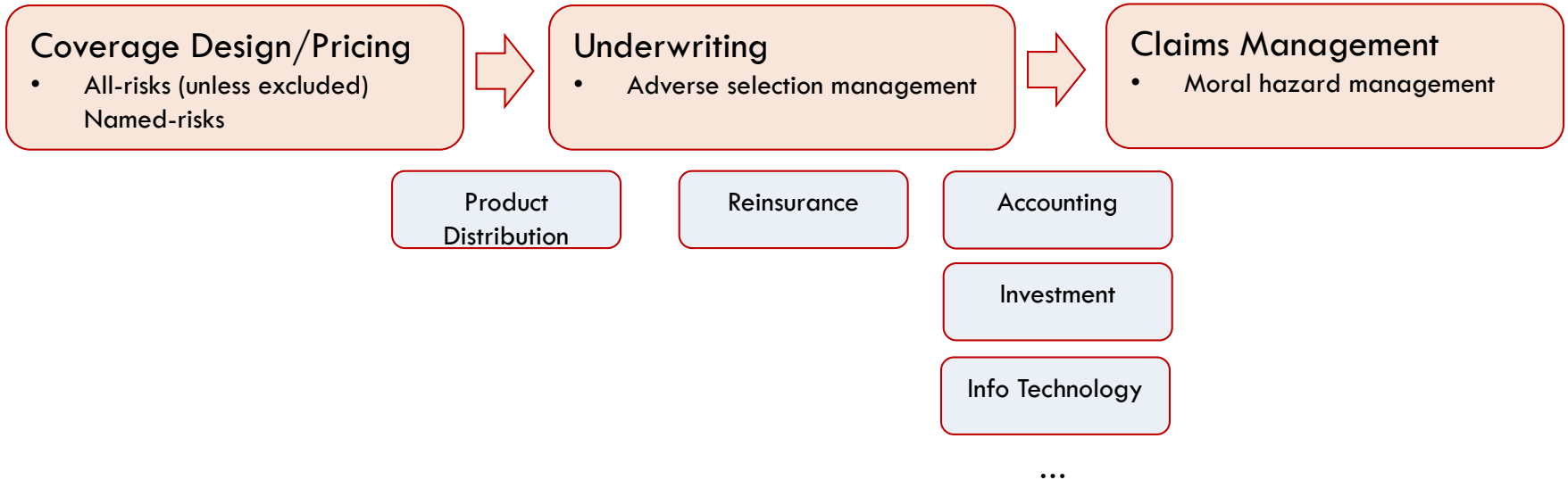


Background

Conventional Insurance

Indemnity and Valued Policies

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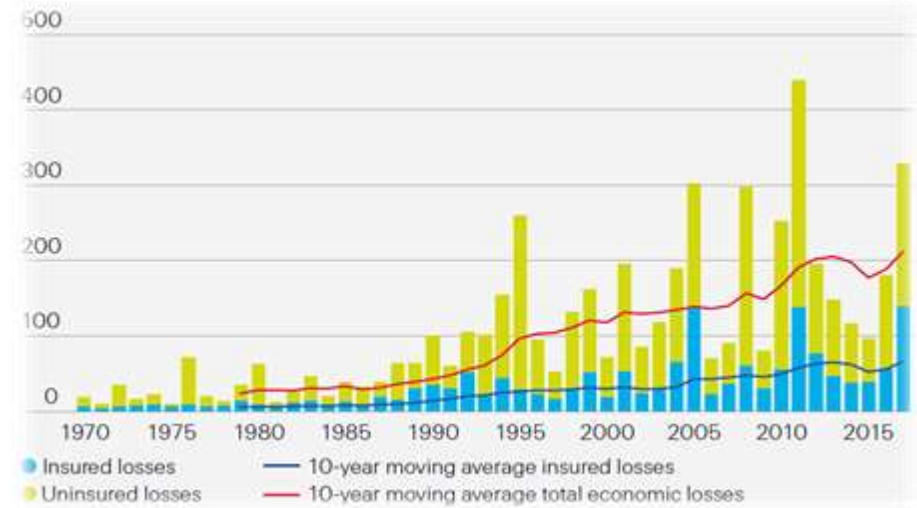


Traditional Insurance Market Issues

Coverage Availability, Inefficiency and Consumer Education

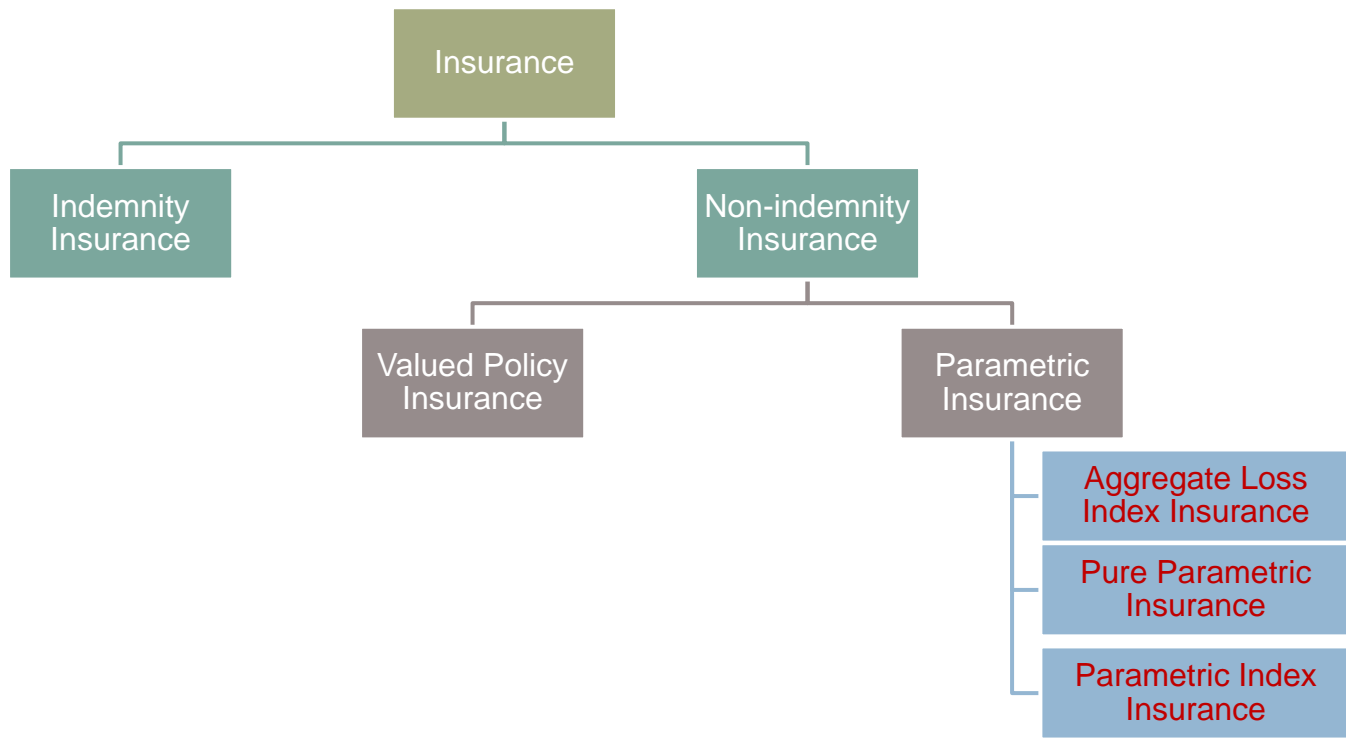
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- Private (indemnity) insurance **not** accommodating all risks or all consumers
 - The **protection gap** continues to rise!
- High transaction/operation costs
 - Marketing, underwriting, claims....
- Need for better perception of insurance value by consumers





A (re-invented) approach for the sake of simplicity, speed and efficiency?



Parametric Insurance

Classification Suggested

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- **Aggregate Loss Index Insurance**
 - Claim payments based on a parameter (index) which serves as a proxy for individual losses

- **Pure Parametric Insurance**
 - Pre-determined payments when a covered event strikes a specific trigger (e.g., wind exceeding a specified speed)

- **Parametric Index Insurance**
 - Claim payments controlled by the **model-driven** parameter
 - Most sophisticated



Parametric Insurance

Benefits and Drawbacks

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- Flexibility and simplicity in product design and risk accommodation
- Prompt settlement of claims
- Low transaction & insurer operation costs
- Reduction in informational frictions
- Front-end cost and policy transferability
- **Basis risk**
- Understanding about the value of parametric insurance
- **Compliance to local regulation**
 - ▣ An issue at the time of study

Parametric Insurance

What Motivates It?

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- Technological advances
- Data availability
 - Reliable and third-party verifiable
- International community's call for protection gap solutions
- Private insurers' desire for new markets



United Nations



WORLD BANK



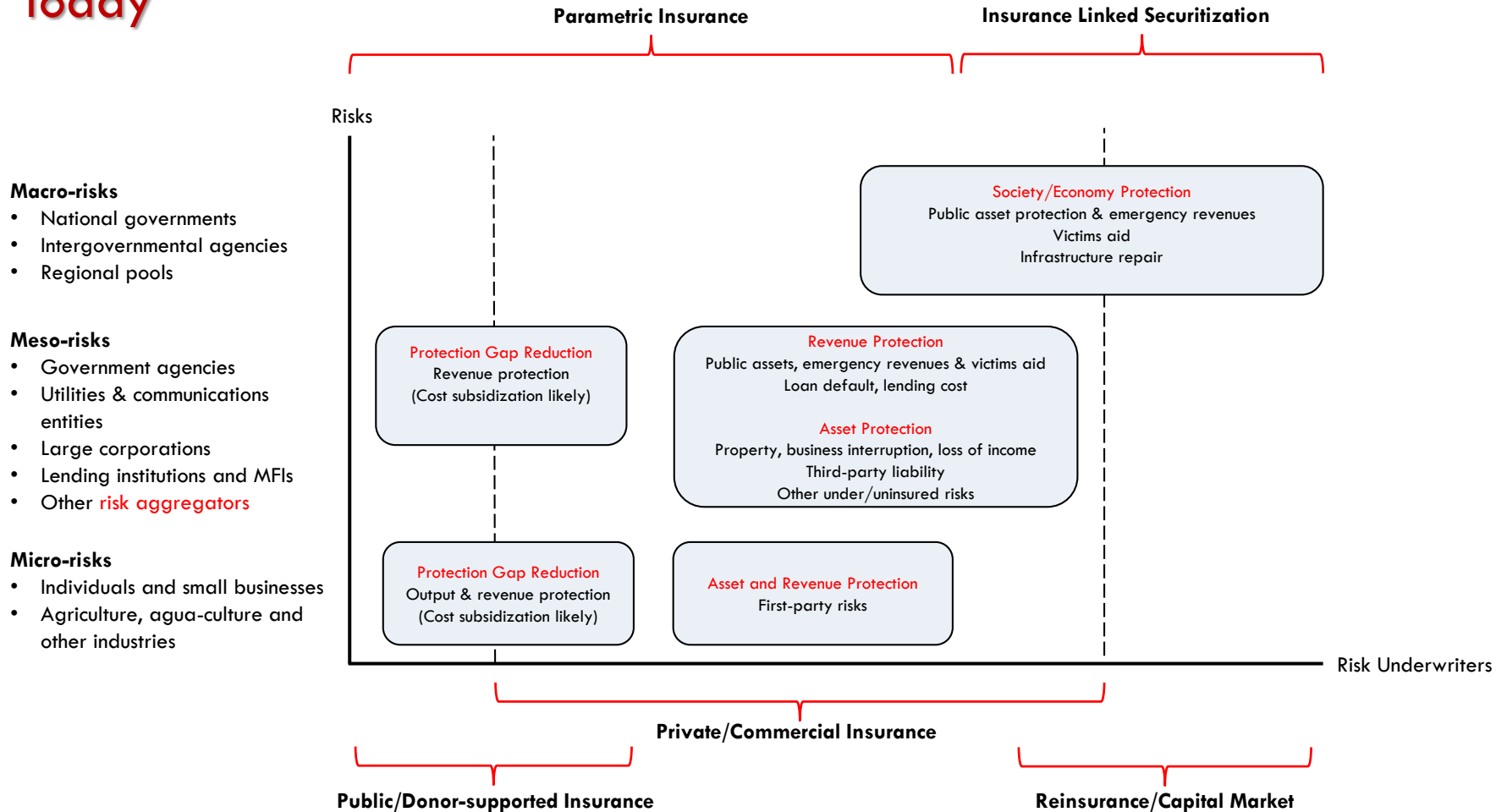
Asian Development Bank



中国人民保險集團公司
THE PEOPLE'S INSURANCE COMPANY GROUP OF CHINA

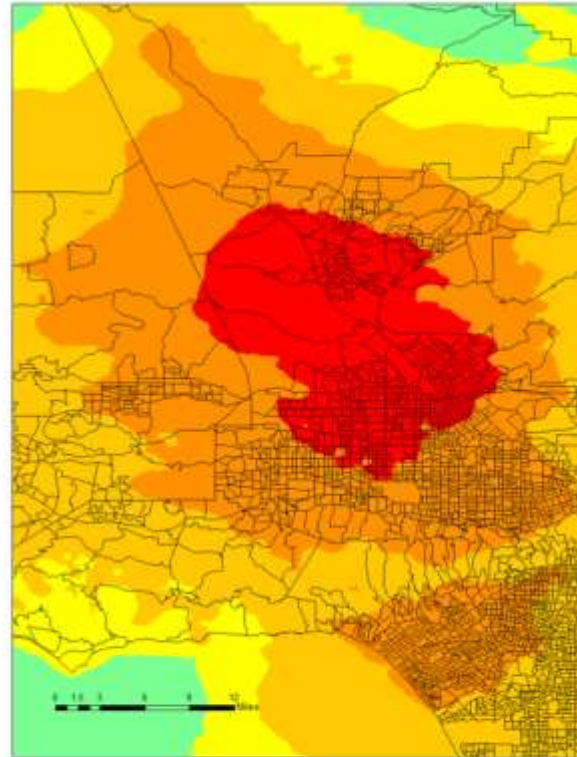
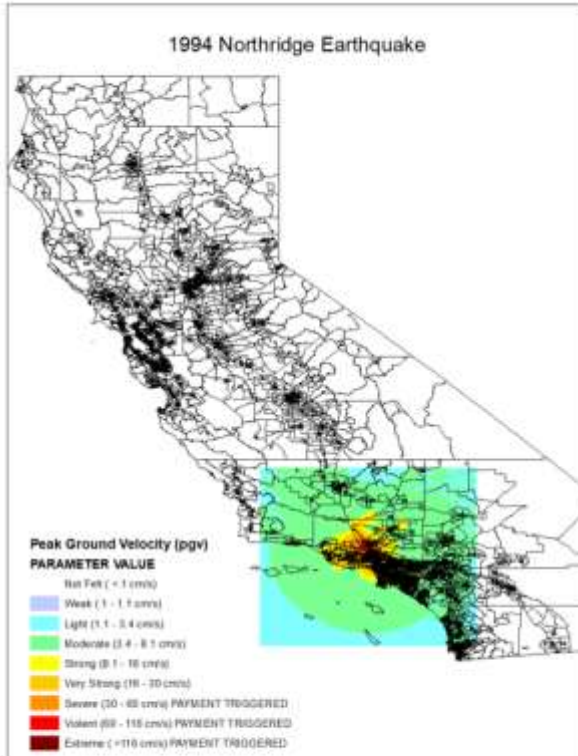


The Market Today



Simulation of 1994 Northridge Earthquake

Micro Risk



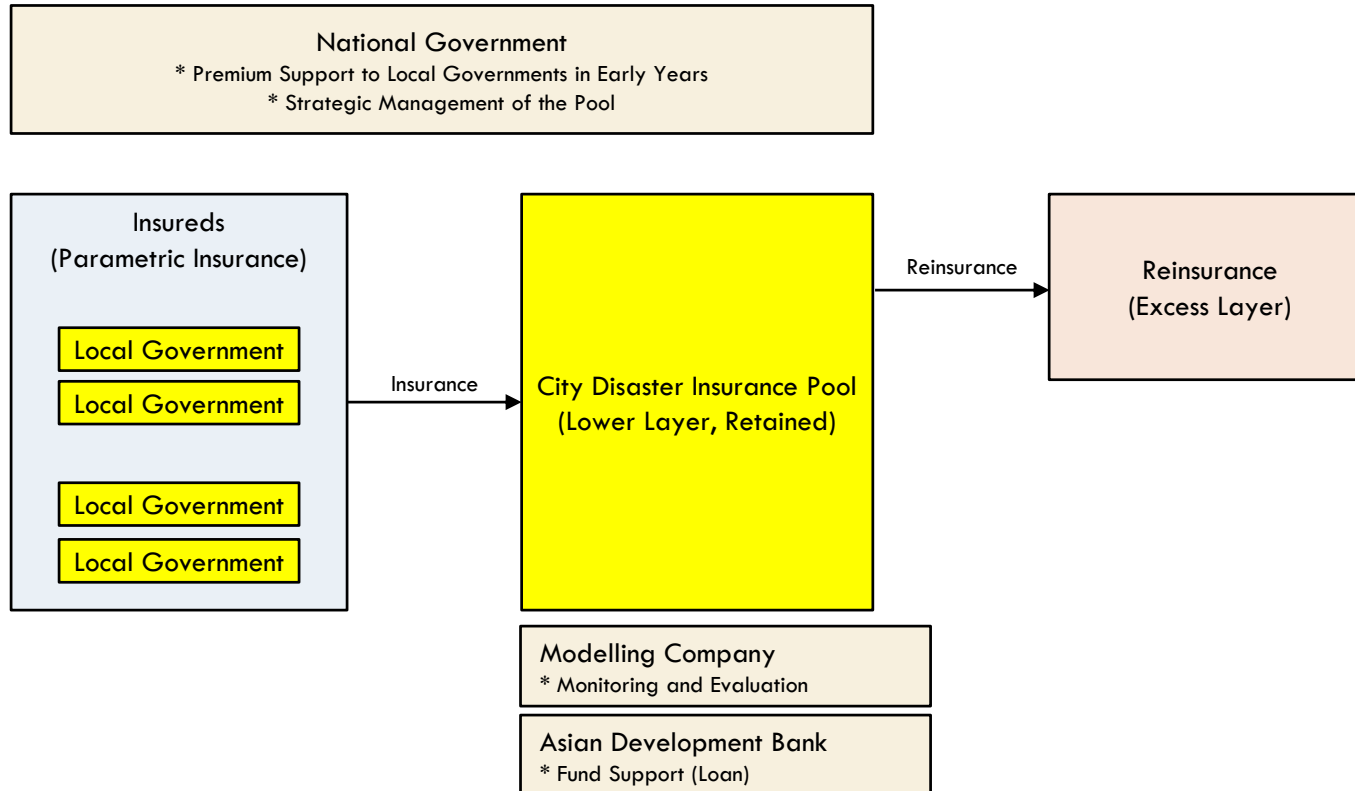
Left: areas impacted in term of PGV during the 1994 Northridge earthquake.

Right: zoomed areas with PGV of at least 30 cm/s (dark orange and red) that would reach the parametric trigger.

Source: Author's own

Philippine City Disaster Insurance Pool

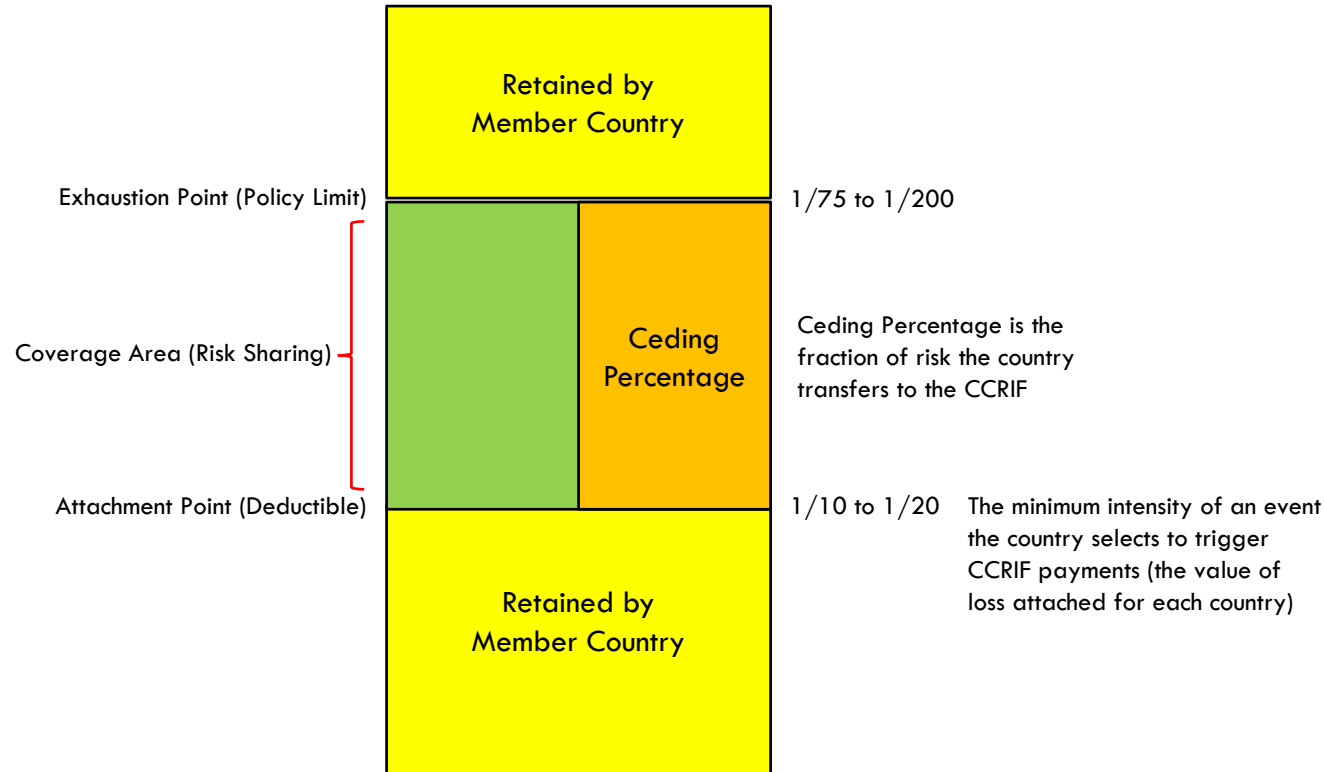
Meso Risk



Source: Asian Development Bank (2018)
Drawn not to scale

Caribbean Catastrophe Risk Insurance Facility

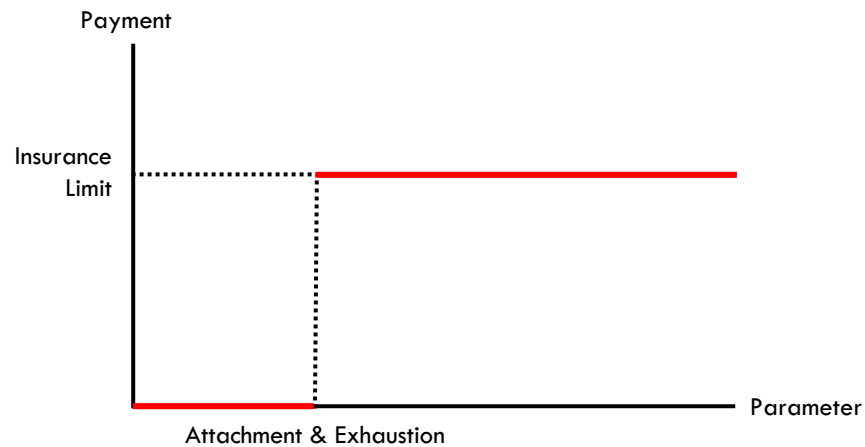
Macro Risk



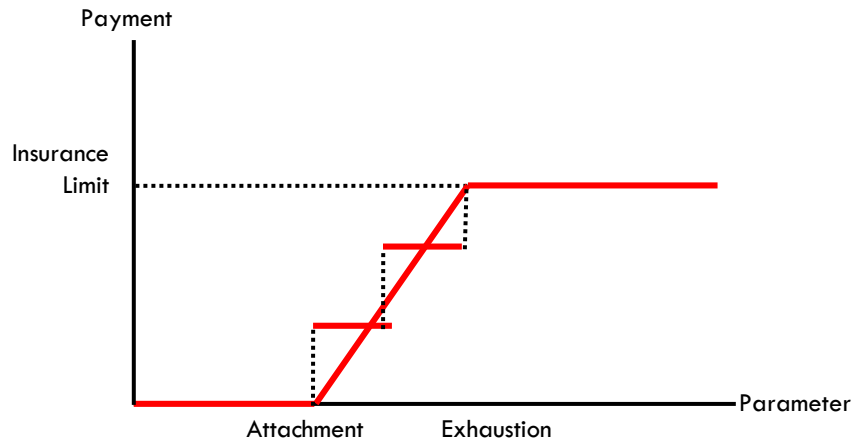
Source: CCRIF (2018)

Drawn not to scale

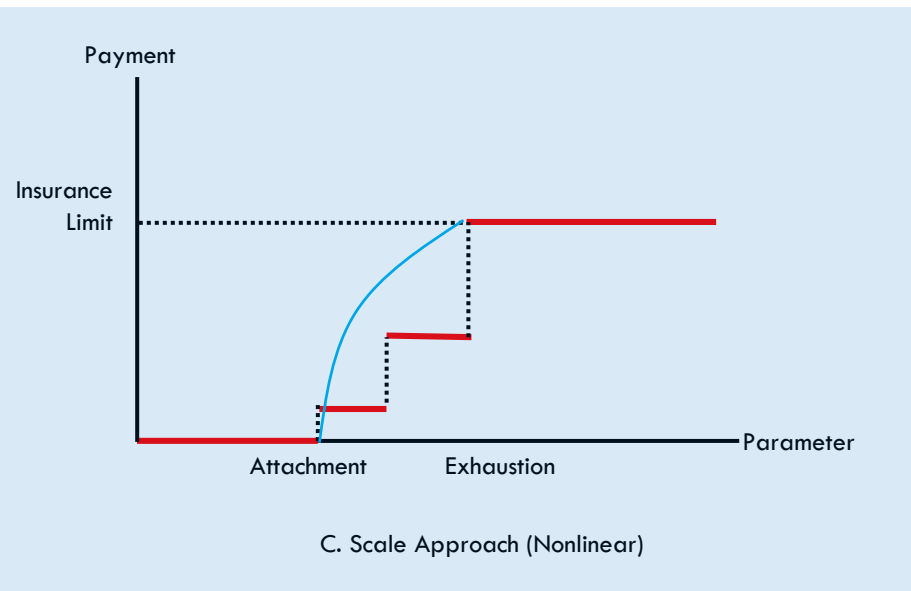
Claim Payout Designs



A. Binary Cut-off Approach



B. Scale Approach (Linear)



C. Scale Approach (Nonlinear)



Compliance Matters!

* Refer to the full report for a discussion about other regulatory/supervisory matters.

Insurable Interest

In General

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- Governments generally do not use a precise definition of insurance but a collection of principles to evaluate whether a contract is subject to insurance regulation.

That said,

- The insured must suffer from an economic loss – whether it involves a reduction of current wealth or loss of future income – if a covered event occurs.
 - ▣ Actual cash value method
 - ▣ Replacement cost method

Insurable Interest

In Parametric Insurance

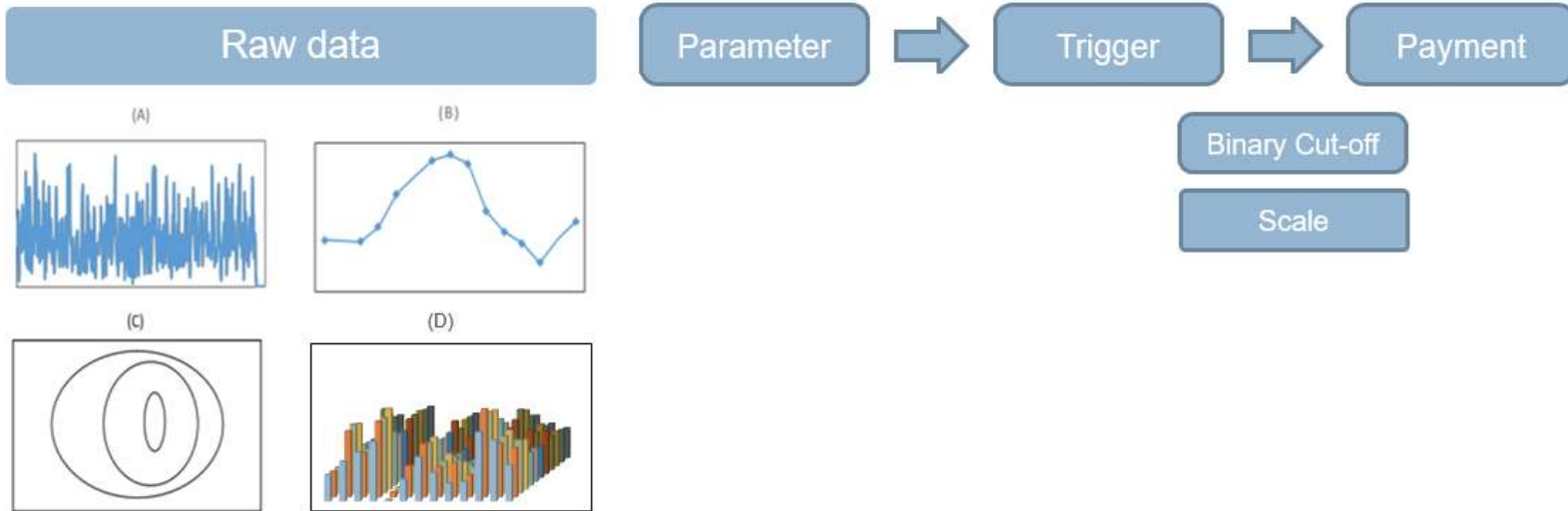
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- Parametric insurance is built on the statistical demonstration of the correlation between covered loss events and the trigger.
 - The trigger is a statistically acceptable proxy of insureds' loss exposures.
- It would not be of much regulatory concern whether the claim payments are greater or less than actual losses.
- No laws would state that the insurance claim shall not exceed the actual loss.
 - Reasonable deviations from actual losses are permitted as found in indemnity and valued policy insurance cases.

Model and Modeling

In Parametric Insurance

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- **Model Risk** – claim payments deviate from the actual loss due to the imperfection of the loss model
- **Idiosyncratic Risk** – vulnerability of the modelled loss due to the factors that fall outside design risk

Data and Data Sources

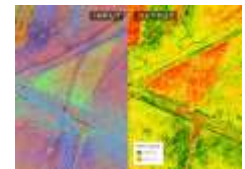
In Parametric Insurance

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- The nature of the data
 - Easily collectible and quickly available event data
 - Objectively measurable robust data
- Sources
 - Outcome-based data sources (yield data)
 - Hazard-based data sources (weather stations, satellite imagery, geologic hazards)



Synthetic Aperture Radar



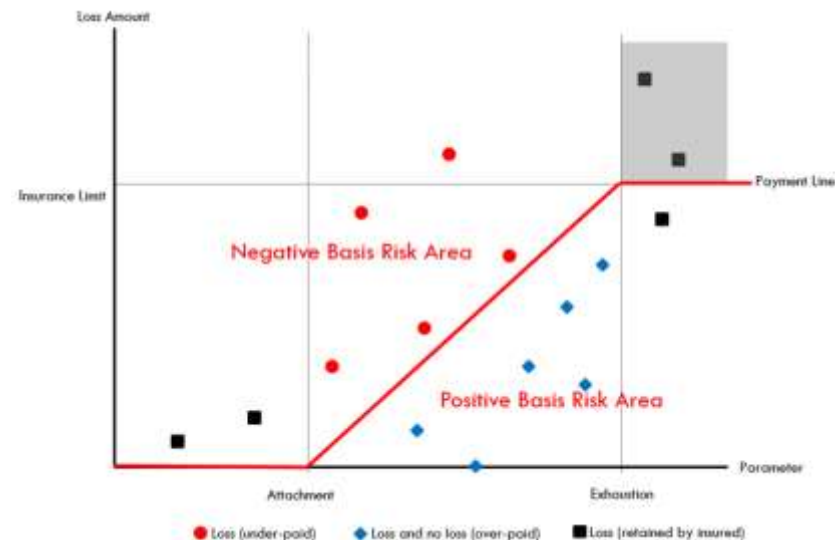
Normalized Differenced Vegetation Index (NDVI)

Basis Risk

In Parametric Insurance

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- The difference between the payment based on the simple parameter (or the loss model) and the actual loss of the insured
- **Positive basis risk**
 - Underpricing risks or charging insufficient premium rates retrospectively
- **Negative basis risk**
 - Underpayment of claims to those insureds that have paid premiums





Conclusions and Notes

Conclusions and Recommendations

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- Parametric insurance can be a solution, albeit partially.
 - A supplementary coverage to fill the underinsured gap in traditional insurance.
 - It allows insurers to significantly lower their underwriting and claim assessment costs, thus providing a solution to the problem of protection gaps.
 - It allows insurers to be innovative in designing new types of protections against the risks that would not meet the criteria for the indemnity insurance business



Additional Notes

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- A rise in commercial interest in recent months
- Consumer interest (market demand) still unknown
 - No price data available for comparison
 - No premium/loss data available
- Possible **competition risk**
 - Particularly in micro-risk markets where price competition is expected

Be Innovative in

- Product design
- Data analysis
- Basis risk management



Thank You!

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