



November 11, 2020

Parametric Insurance

Parametric Insurance (지수형 보험) for Micro, Meso and Macro Risks

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W. Jean Kwon, Ph.D., PCU

Edwin AG Manton Chair Professor in International Insurance and Risk Management
Director, the Center for the Study of Insurance Regulation
Research Director, the International Insurance Society
Editor-in-Chief, Asia-Pacific Journal of Risk and Insurance

Maurice R. Greenberg School of Risk Management, St. John's University, New York
KwonW@stjohns.edu
Facpub.stjohns.edu/~kwonw/; stjohns.edu/academics/faculty/w-jean-j-kwon-phd
Phone: (212) 277-5196



An Overview ←

Parametric Insurance Markets

Concluding Remarks



An Overview

Conventional Insurance

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Indemnity Insurance

- Indemnification primarily for restoration of the approximately measured financial position the insured had prior to the loss event, subject to policy limits, conditions and exclusions
 - This is for **asset protection** where the asset is:
 - Tangible (e.g., property)
 - Intangible (e.g., liability, human capital)
- Mainly in property insurance, coverage has been available for contingent economic losses (a.k.a., business interruption losses) for the agreed coinsurance period
 - This is for **derived revenue protection**.

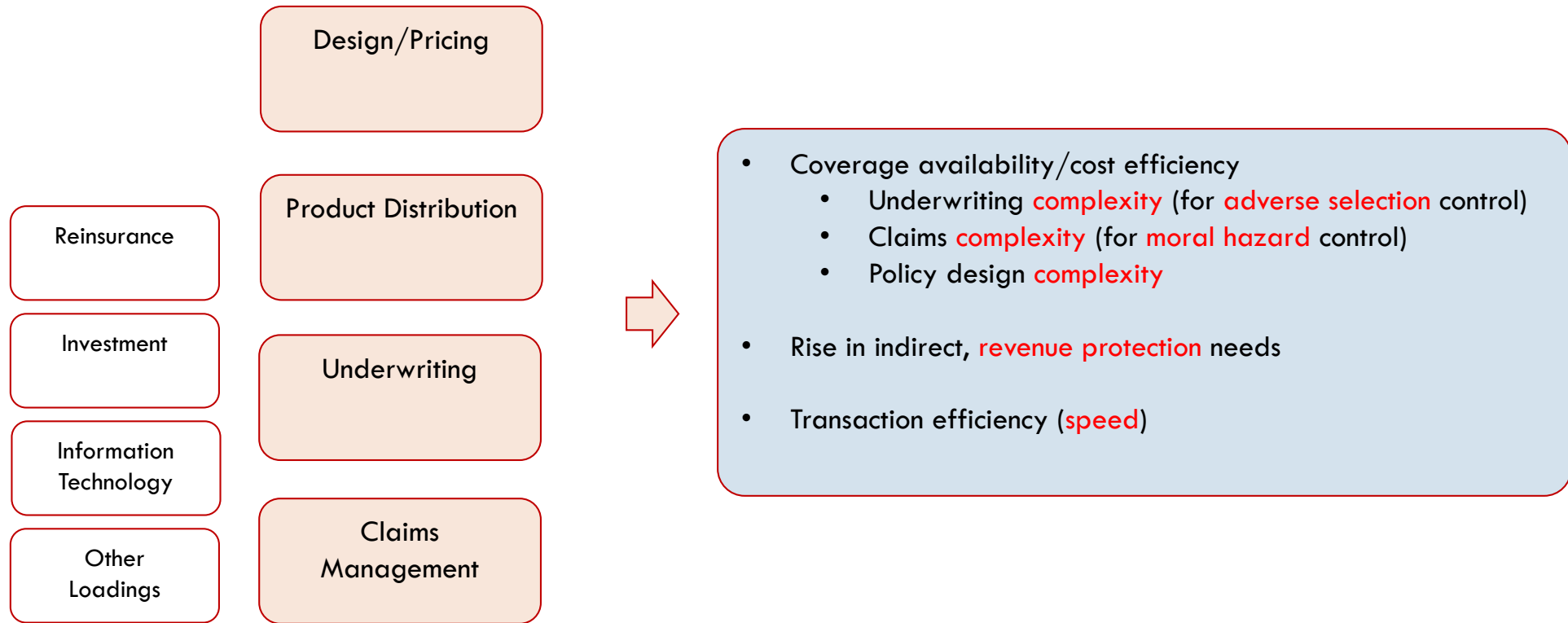
Valued Policy

- Found in life insurance, property insurance, and per diem insurance
 - Not based on the indemnity principle
 - The law of large numbers not required depending on the subject matter of insurance
- The insurer compensates the insured for a fixed or scheduled amount that it agreed with the insured at policy inception.

Conventional Insurance – Cost Factors

Example: Nonlife Insurance

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Can we (re)invent something for the sake of
simplicity, speed and efficiency?

Parametric insurance which offers a **pre-determined payout** upon the covered loss event being triggered **automatically** by the **pre-agreed** index or model-based parameter.

- Transparent and third-party verifiable parameter
- Frequency-based pricing model
- Increasingly for revenue protection



July 2019 (Internal)



Summer 2020

Insurable Interest

Parametric Insurance Must Be a “Principle and Regulation Compliant” Insurance.

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The principle of insurable interest must be preserved! Thus, the loss must be confirmed.

- Within a reasonable period even after the claim payment

Principles and laws are clear in that insurance is for protection against economic loss.

Parametric insurers thus need to exercise due diligence in managing claims investigation and payments.

- How insurers manage this critical issue....

Parametric insurance does **not eliminate but simplifies** the claims investigation/settlement process.

Noninsurance professionals may contend a complete elimination of the claims investigation step. **Unacceptable contention** it is.

Data and Data Sources

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- The nature of the data
 - ▣ Easily collectible and quickly available event data
 - ▣ Objectively measurable robust data

- Sources
 - ▣ Outcome-based
 - Yield data
 - ▣ Hazard-based
 - Weather stations, satellite imagery, geologic hazards

DF Insurance
Development
Forum

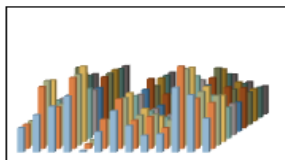
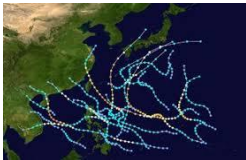
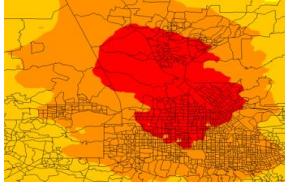
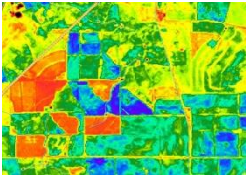
How technology can help
bridge the protection gap

September 2019

Modeling

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Raw data



Modeling and Pricing

- Basis risk control
 - Model risk
 - Idiosyncratic risk

Parameter and Payment

- Pure vs. model-based trigger
- Binary vs. cut-off payment

Pricing

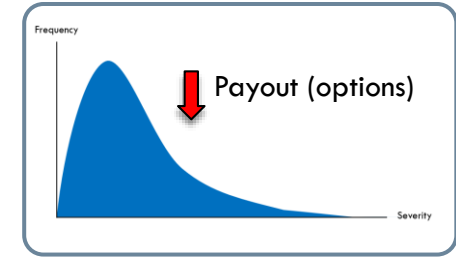
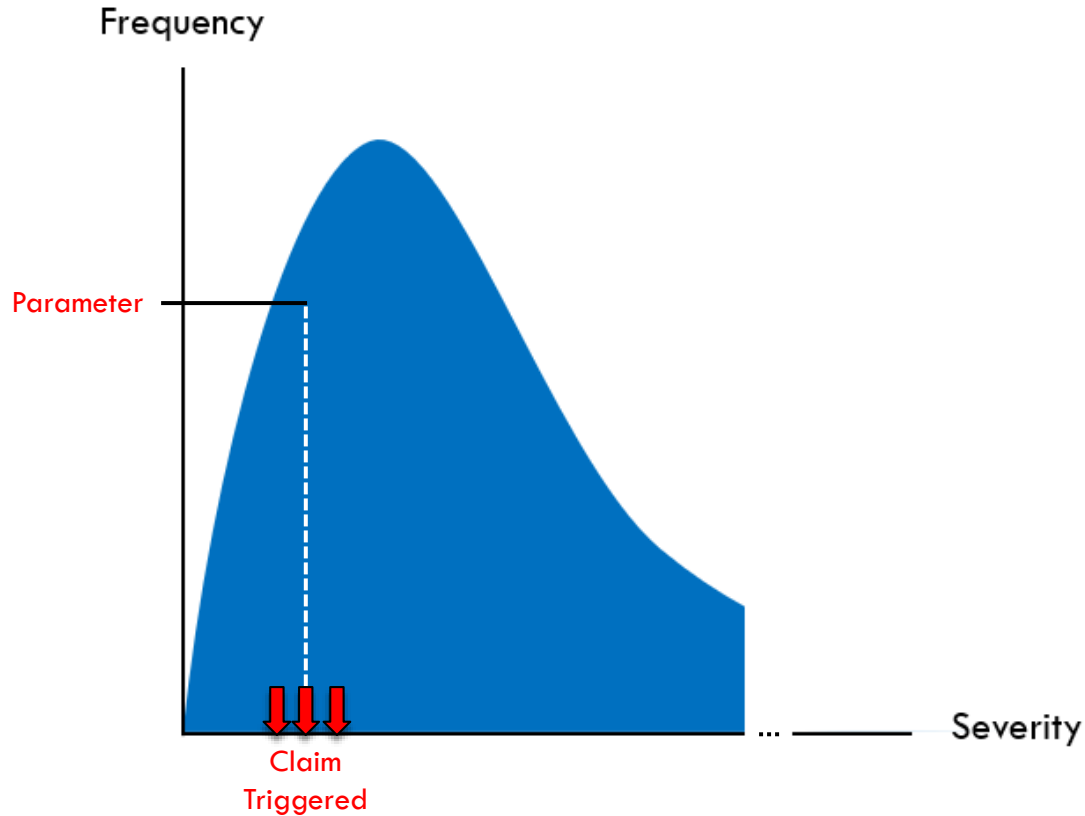
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$$Premium_{indemnity} = E(\text{Frequency}, \text{Severity}) + \text{Loadings } (\text{Underwriting}, \text{Claims}, \text{Other}) + \text{Profits}$$

$$Premium_{parametric} = E(\text{Frequency}, \overline{\text{Severity}}) + \text{Loadings } (\text{Smart Contract}, \text{Marketing}, \text{Other}) + \text{Profits}$$

Frequency Distribution Consideration

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What is/are the insurer's payout(s)?

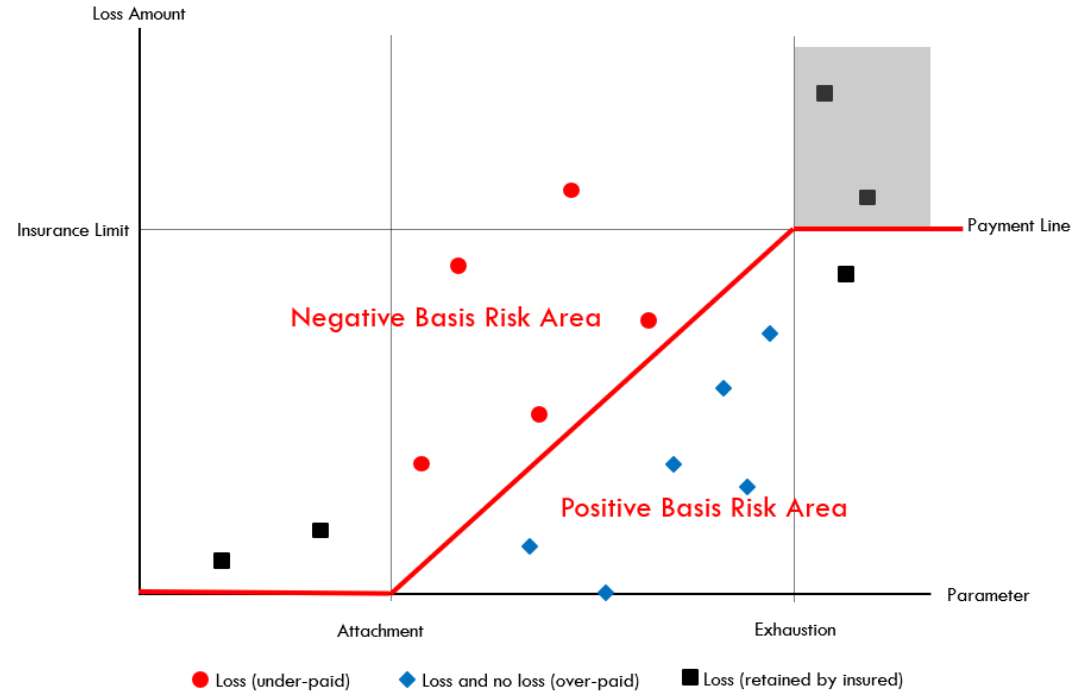
- Nature of the risk
- Severity of the loss on the insured's economic activity
- Market competition

Basis Risk

Simply Illustrated....

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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



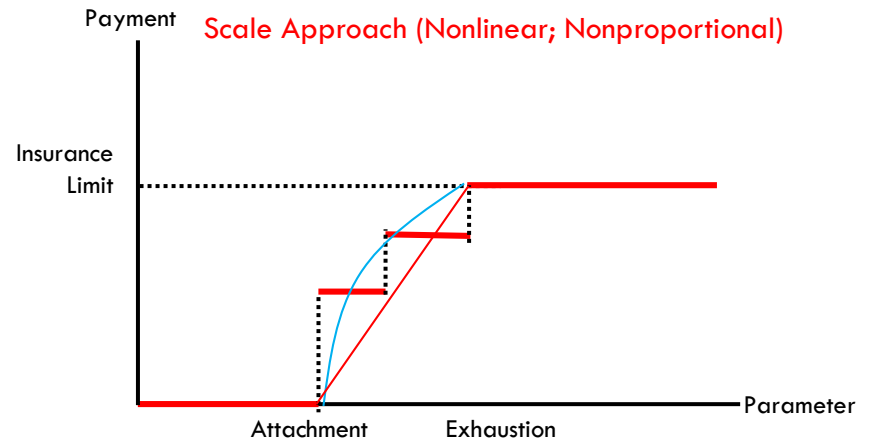
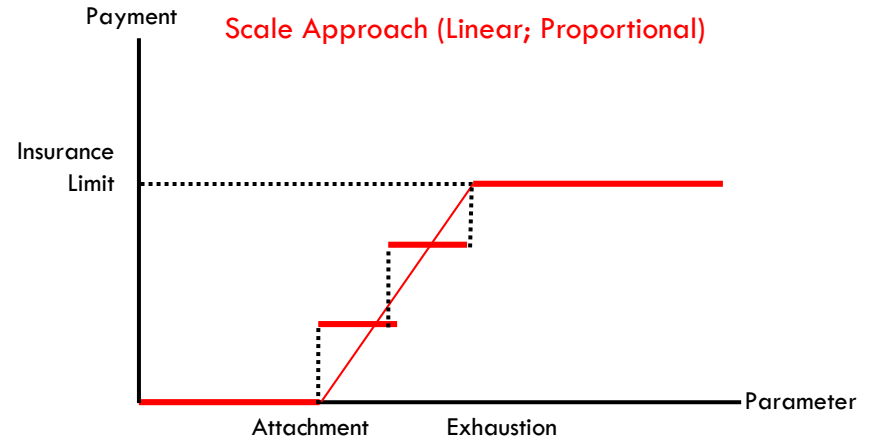
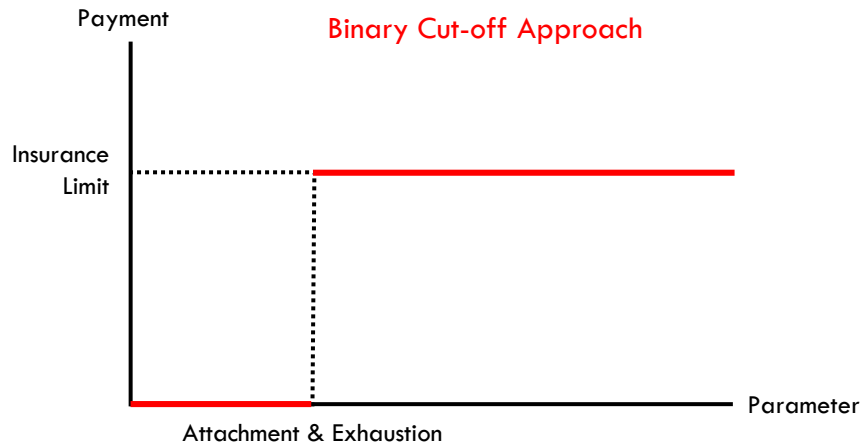
The Parameter and the Payout

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- A **sustainable measure** that is significantly and directly correlated to the loss event subject to the insurance coverage, thus indirectly correlated to the economic loss exposure of the insured
- **Transparent and independently verifiable** parameter
- (Semi-)automatic claims payments
 - ▣ Commonly binary or cut-off
 - ▣ Claims payment record must be made for verification of the loss

Loss verification

- Automatically when all are scientific, AI data.
- Automatic messaging and verification
- Manual recording within a reasonable period.



Drawn not to scale

Parametric Insurance

Benefits and Challenges

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Benefits

- Flexibility and simplicity in product design and risk accommodation
 - Even stand-alone **revenue protection coverages** are available.
- Reduction in informational frictions
- Prompt settlement of claims
- Low transaction and operating costs

Challenges

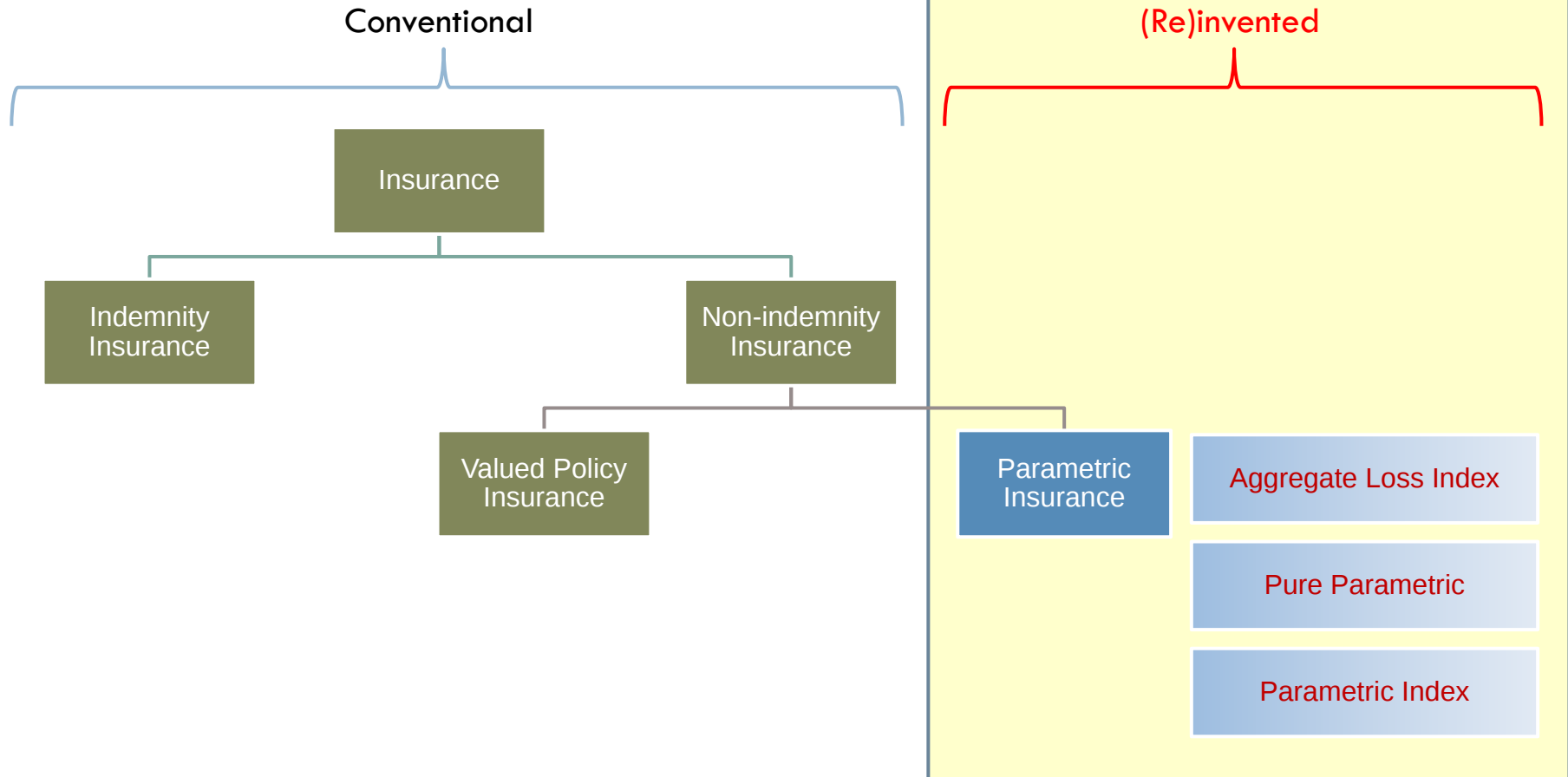
- Front-end cost and weak policy portability
 - **Parametric insurance is not necessarily cheap!**
- Basis risk
- Understanding the value of parametric insurance
 - By regulatory authorities
 - By consumers



Parametric Insurance Markets

Insurance Contracts

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Aggregate Loss Index Insurance

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- Simplest and oldest form where claim payments based on a parameter (index) measured by **some aggregate of loss exposures**
 - ▣ Traditionally of an area or region
 - Crop insurance
 - ▣ Increasingly inter-temporally based on
 - The insured experience
 - Area experience
- Operational issues
 - ▣ Data accuracy/reliability
 - ▣ Moral hazard if fails to monitor changes in insured behavior (e.g., crop changes)

Also known as:

- Area yield insurance
- Weather station/anemometer-measured index
- Crop insurance (microinsurance)



Parametric Insurance

Pure Parametric Insurance

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- Pre-determined payment becomes available when a covered event strikes a specific trigger
 - ▣ Simple to structure and easy to understand
 - Passenger flight/vessel delay insurance
 - Are used for **micro-risks** for **meso-risks**
- Can be used to protect people against relatively small loss exposures (e.g., to cover insurance deductible)
- The payment is commonly “binary” (a fixed amount or nothing)

Increasingly, blockchain and smart contract-based products from private insurers

Parametric Insurance

Parametric Index Insurance (Model-based)

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- Claim payment structure and pricing are **model and data-driven**
 - The claim payment is made according to the **modeled loss** in the event-affected area
- Critical to establish a statistically proven relationship
 - Between the triggering event and the loss
 - Between the modeled and actual loss
- Still being developed and refined
 - **Basis risk** management critical

It is where insurance expertise makes a difference between the winner and others.

Macro-risks

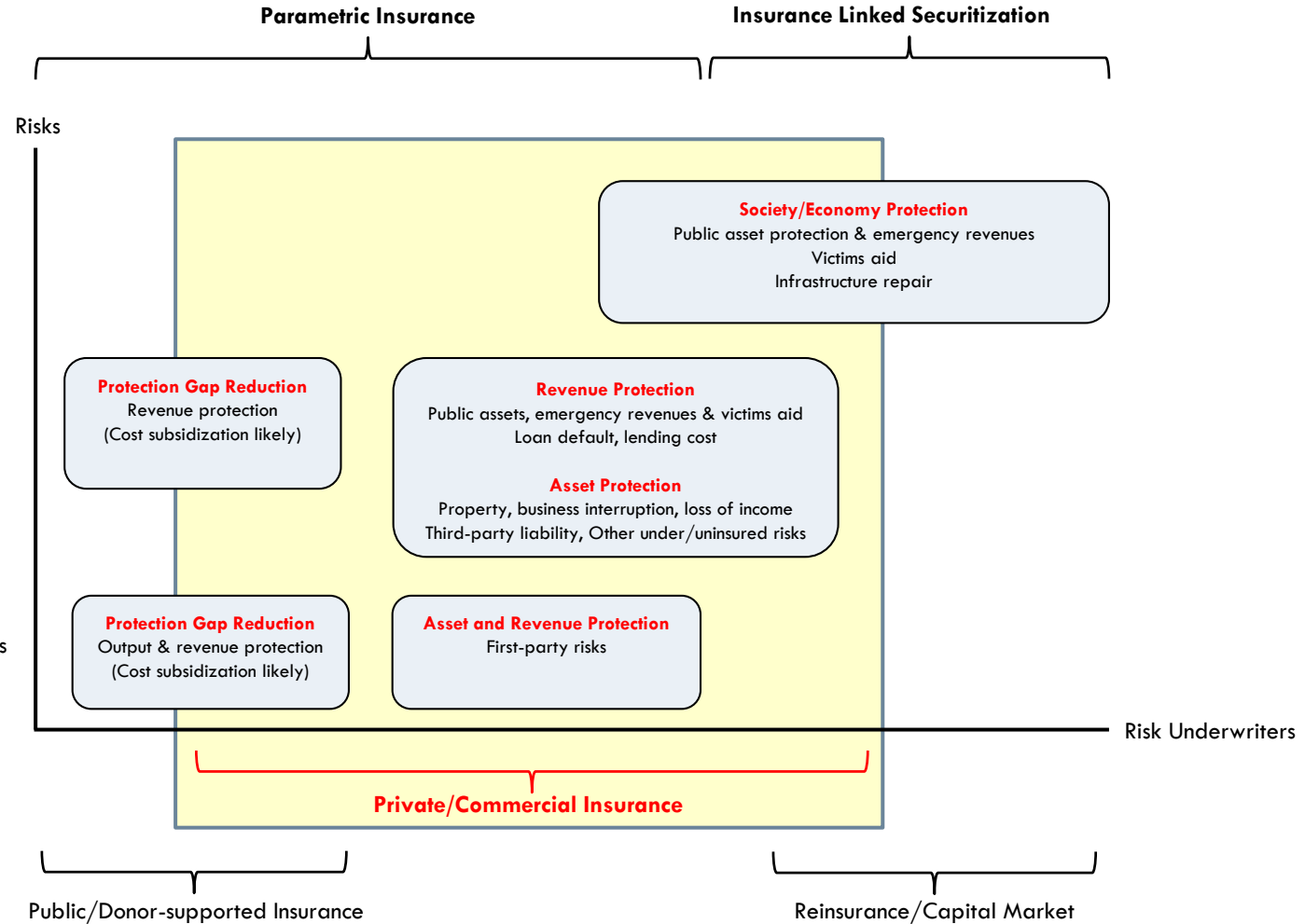
- National governments
- Intergovernmental agencies
- Regional pools

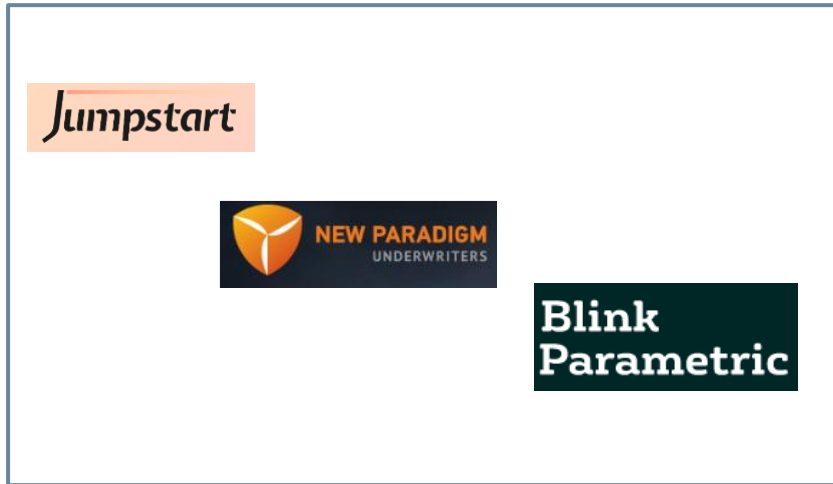
Meso-risks

- Government agencies
- Utilities & communications entities
- Large corporations
- Lending institutions and MFIs
- Other risk aggregators

Micro-risks

- Individuals and small businesses
- Agriculture, aqua-culture and other industries





Parametric Insurance Case

Macro-Risk (Intergovernmental Agencies)

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CCRIF to remain parametric 'for now'; launching new products

By Rebecca Hancock | 27 June 2018



The chief executive of the Caribbean Catastrophe Risk Insurance Facility (CCRIF) has dispelled speculation that the organisation is moving away from parametric triggers while confirming it is close to launching new products.

Speaking yesterday evening (26 June) at a Pool Re-sponsored event - reducing the protection gap for catastrophic risk – at Cass Business school, Isaac Anthony, the chief executive of the organisation said the CCRIF intended to “stay parametric, for now”.

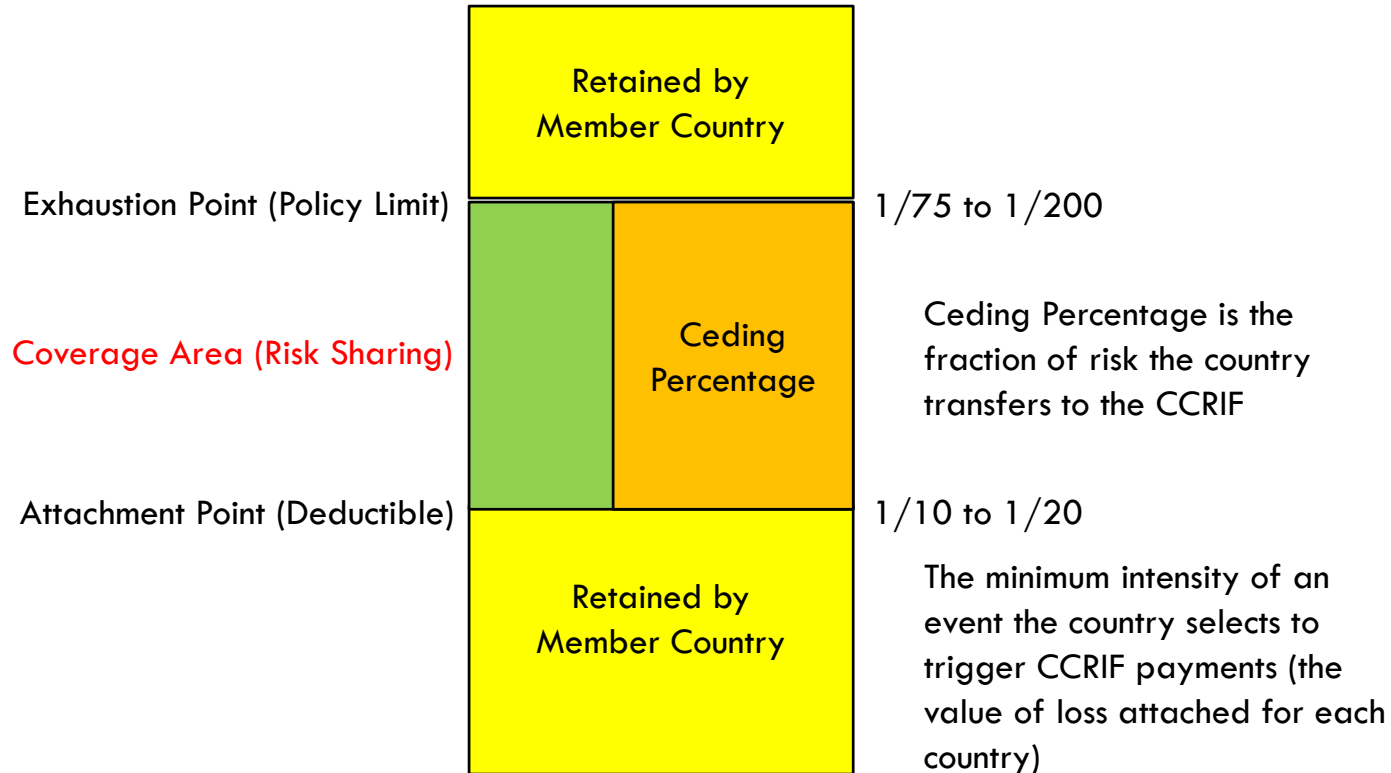
Anthony also revealed that the organisation was exploring opportunities that expand its breadth of coverage.

Caribbean Cat Fund Covers Over \$1 Billion in 2020 Risk

The European Union supports fund with grant of \$11.2 million.

DAVID PILLA | JULY 2020

Caribbean catastrophe fund CCRIF said its member governments in the Caribbean region all renewed their parametric insurance coverage for tropical cyclone, excess rainfall, earthquake and fisheries ahead of the 2020 Atlantic hurricane season, ceding more than \$1 billion in risk to CCRIF and increasing overall coverage by 8%.



Parametric Insurance Case

Meso-Risk (National Government)

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Philippines calls for establishment of ASEAN disaster risk management database

23 May 2018

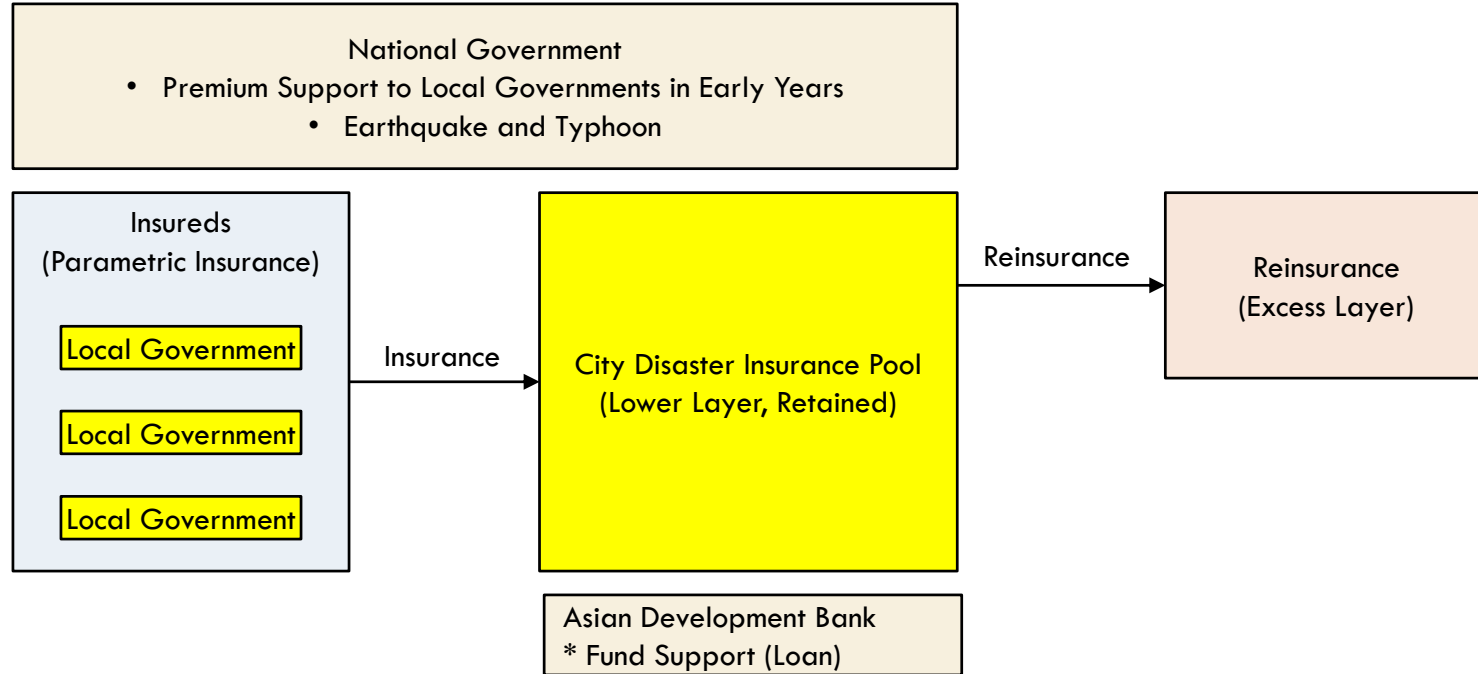
The Philippines is urging fellow Association of Southeast Asian Nation (ASEAN) member countries to build a region-wide database on disaster risk management, in order to facilitate information-sharing on mitigating the effects of climate change and timely cooperation in the face of calamities.

Finance Secretary Carlos Dominguez III issued this urgent call following a joint meeting with counterparts in Singapore last month, where fellow ASEAN finance ministers and the central bank underscored the importance of strengthening their respective countries' resilience against natural disasters.

He noted that within "existing capacity constraints," the Philippines is now spearheading this initiative by sharing information with its private sector to enable better coordination in times of disasters and other emergencies.

"This is a continuing effort...down the road, we are encouraging our partners in the ASEAN to participate in building a region-wide database for disaster risk management and possibly institutional structures that will enable timely cooperation in the face of calamities," he said.





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

Parametric Insurance Case

Meso-Risk (Large Corporation)

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AkinovA

Innovative Parametric Cyber Transaction

January 21, 2020

LONDON – 20 January 2020 – AkinovA, the electronic marketplace for the transfer and trading of re/insurance risk, together with Hiscox, Guy Carpenter, and PCS, recently announced that a **first of its kind parametric cyber risk transfer** had been completed on its marketplace. This trade was transacted electronically with full regulatory oversight from the Bermuda Monetary Authority (BMA), under AkinovA's **Insurance Regulatory Sandbox licence**.

The product traded was a quarterly parametric cyber instrument which was purchased by an asset manager in the financial services sector. The coverage focuses on assets which are exposed to cyber related disruption impacting underlying power generation assets in the US.

The parametric cyber instrument used PCS, a Verisk business, as the reporting agency. The trigger refers to a robust third-party power generation index combined with outage times and disruption levels.

Asset protection

- Trigger (third-party power generation index combined with outage times and disruption levels)

Parametric Insurance Case

Micro and Meso-Risks (Flight/Vessel Delays)

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Where no passenger compensation regulations apply....

- A **micro-risk** case
 - ▣ Individual passengers purchase the coverage online prior to departure.

Where passenger compensation regulations apply....

- A **meso-risk** case (e.g., EU regulation)
 - ▣ Airline companies purchase the coverage (likely for all scheduled flights to EU destinations).

Claim payments are automatically triggered when live flight data shows the delay will exceed the coverage or regulation-set threshold (e.g., 120 minutes)

Parametric Insurance Case

Micro-Risk (Flight Delays)

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French insurer adds fizz to flight delay cover

01 Nov 2017

fizzy is AXA's latest parametric insurance offering that leverages blockchain technology, and promises to automatically compensate policyholders whose flights are delayed more than two hours. **Mr Laurent Benichou**, Director of Research and Development for **AXA Next**, elaborates on how **fizzy** works, the challenges faced during its development and when it will be rolled out.

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Parametric Insurance Case

Micro-Risk (Nat Cats)

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- Becoming more active in the private market, for example, in collaboration between:
 - An international operator and a local insurer (or a consortium of insurers)
 - A Lloyd's coverholder and a local underwriting/marketing arm
 - An InsurTech company and an insurance underwriter

Parametric Insurance Case

Micro-Risk (Nat Cats) – Binary Payout

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- Earthquake expense coverage in California
 - ▣ Model-based estimate of the affected area and insureds
 - ▣ Binary payout
 - \$10,000 or nothing
 - Up to twice per coverage year
 - ▣ Trigger (Peak Ground Velocity of at least 30cm per second) based on USGS ShakeMap within a 24-hour period
 - ▣ Instant and automatic check via text message

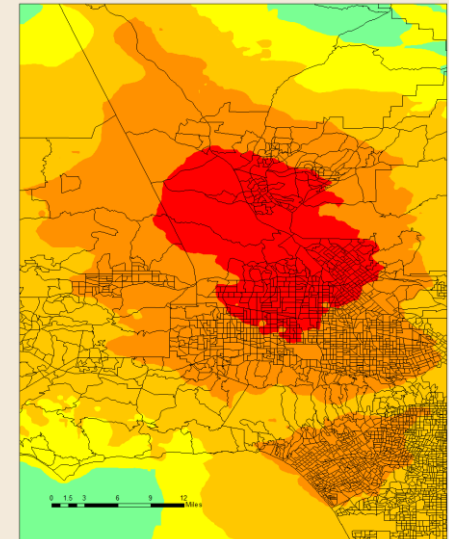
Bounce back from an earthquake

- > A new approach to earthquake insurance
- > For California renters and homeowners
- > Fast, lump-sum payouts with no deductible

Enter zip code

Get Instant Quote

Watch Our Video



Peak Ground Velocity (pgv)

PARAMETER VALUE

Not Felt (< 1 cm/s)
Weak (1.1 - 1.1 cm/s)
Light (1.1 - 3.4 cm/s)
Moderate (3.4 - 8.1 cm/s)
Strong (8.1 - 16 cm/s)
Very Strong (16 - 30 cm/s)
Severe (30 - 60 cm/s) PAYMENT TRIGGERED
Violent (60 - 116 cm/s) PAYMENT TRIGGERED
Extreme (> 116 cm/s) PAYMENT TRIGGERED

Parametric Insurance Case

Meso-Risk (Nat Cats) – Scaled Payout (Linear)

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- STORM, QUAKE, FLOW, HAIL and other nat cat coverages

- STORM (illustration)
 - Coverage (\$10 million per occurrence and term aggregate)
 - Trigger (Maximum sustained wind speed reported by RMS Hwind)
 - Payout (scaled)

WIND Payout Table (Sample)

Wind Speed (mph)	Payout (100% = \$10m)
70 – 79.9	20%
80 – 89.9	40%
90 – 99.9	60%
100 – 109.9	80%
110+	100%



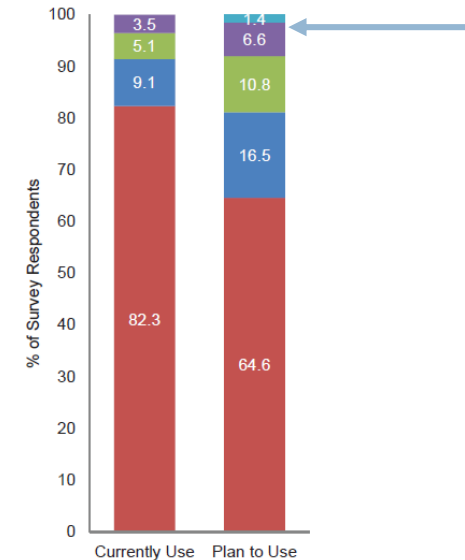
Concluding Remarks

Concluding Remarks

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- Parametric insurance can be a solution, albeit partially.
 - As supplementary coverage to fill the underinsured gap in traditional insurance
 - By lowering underwriting and claims operation expenses, while noting that the pure loss cost variation to the setting of the parameter
- Data and transparency matter.
 - Basis risk matters as well.
- It is a new market with the door widely open to innovative insurers.
 - No reliable market data available yet

Use of Sensors & IoT(March 2018)



- Provide Parametric Insurance (where sensor readings are used to make claim payments)
- Better Control Risk Pre-Event (e.g. Using Wearables to Reduce Worker Injuries)
- Provide Usage Based Insurance (UBI)
- Better Assess Risk (e.g. Getting 3rd party Data on Consumers)
- Do Not Use/ Plan to Use

Source: AM Best

감사합니다.



W. Jean Kwon
KwonW@stjohns.edu
Awjkwon@gmail.com