AN ANALYSIS OF THE CALIFORNIA EARTHQUAKE INSURANCE MARKET SINCE ITS EARLY STAGES

A. Pothon[1;2], P. Guéguen[2], S. Buisine[1] and P.-Y. Bard[2]

(1): AXA Group Risk Management

(2): ISTerre, Université de Grenoble-Alpes

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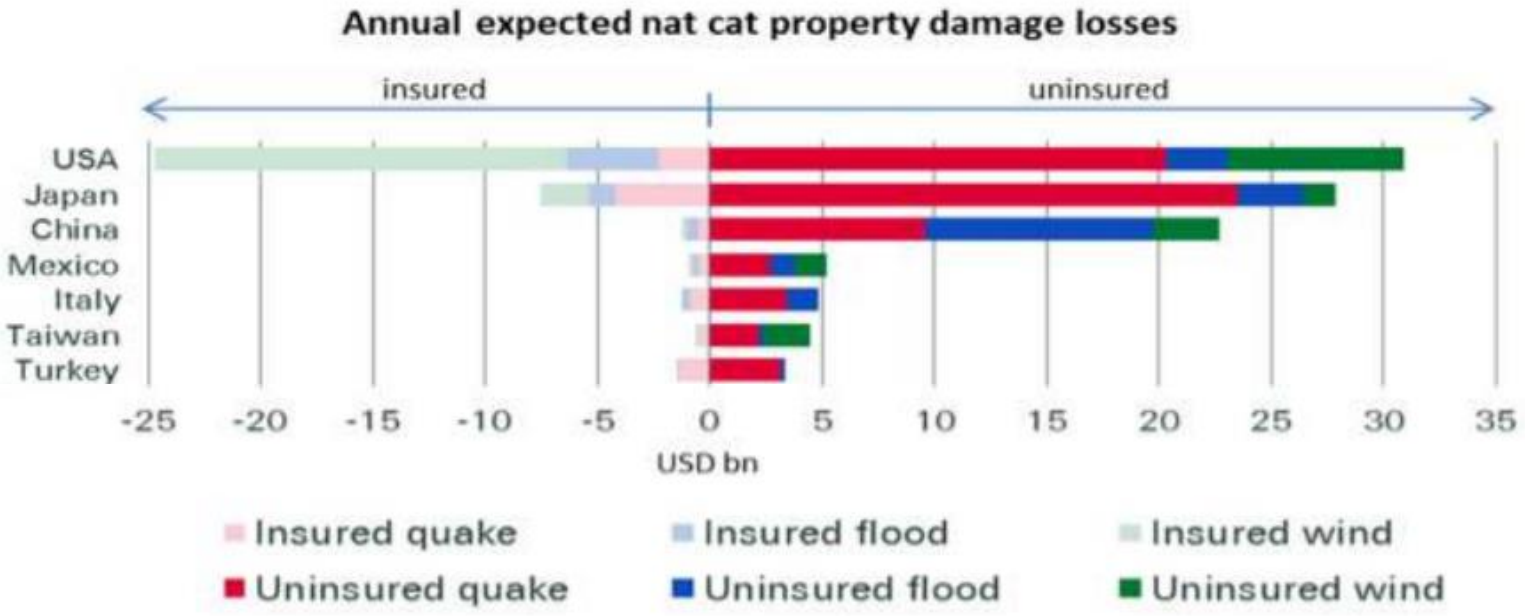
An analysis of the California earthquake insurance market since its early stages

Overview

- A large share of uninsured loss caused by natural catastrophes



Holzheu and Turner (2018)

- Focus on the USA : share of insured people against earthquake risk
  - → **California (2018): 13% (California Department of Insurance)**
  - → **Rest of the USA (2016): ≈ 6% (Statistica)**

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Analysis of the California earthquake insurance scheme at homeowner level

- Data
  - **Earthquake insurance market data (1915 – 2017)**
    - *Average premium amount (1915 – 2017)*
    - *Total premium amount collected (1915 – 2017)*
    - *Share of homeowners insured (1915 – 2017)*
  - **Socio-economic data (1915 – 2017)**
    - *Consumer Price Index*
    - *Average building price*
    - *Population density*
  - **Past earthquakes (1966 - 2016)**
    - *ShakeMaps footprints in intensity (MMI)*

- Modeling framework
  - **Homeowners subscribe earthquake insurance according to their awareness of earthquake risk and the premium amount (Expected Utility theory)**
  - **The earthquake risk awareness is calculated as the ratio between the believed and the historical probability for a homeowner to experience a MMI ≥ VIII**

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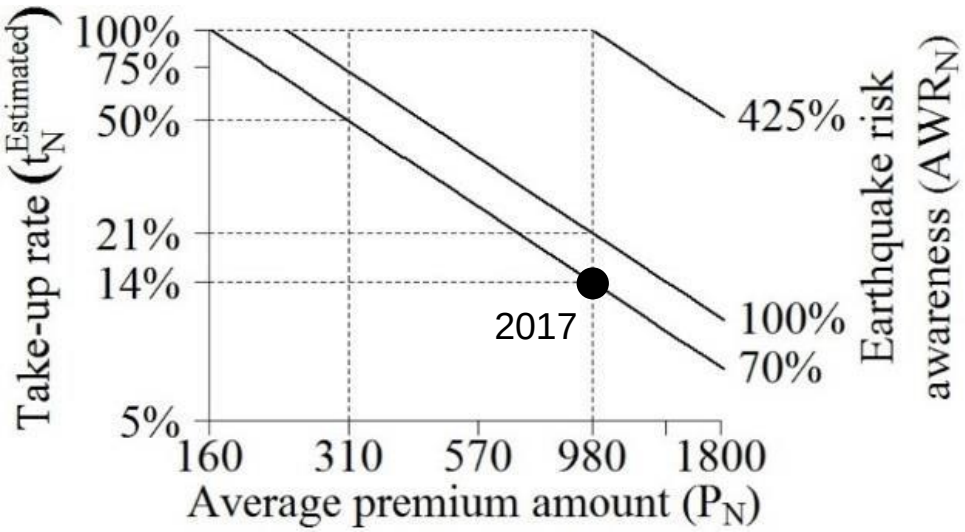
- Findings



Pothon et al. (2019)

- **To get most of California homeowners buying an earthquake insurance cover, there is two possibilities:**
  - *The threat of an imminent large earthquake (M6.7+). AWR_N=425% corresponds to a occurrence probability of 66% over the next year*
  - *A premium decrease by 66% (i.e. from $980 to $310)*
- **Need for a new earthquake insurance scheme to develop this market**

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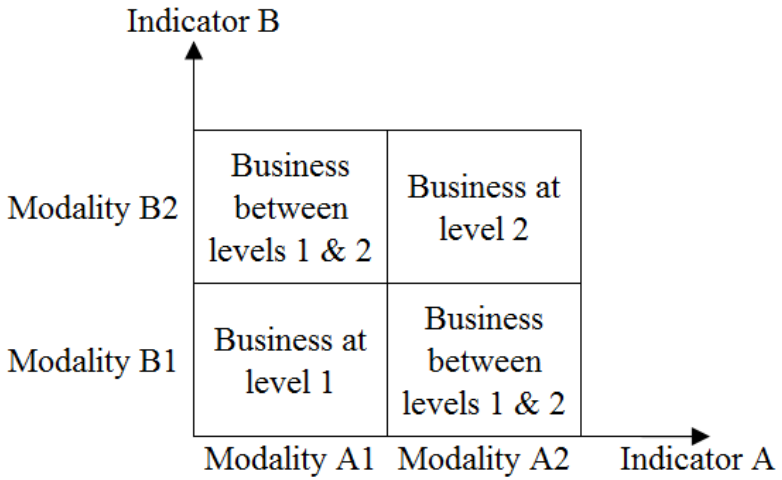
Analysis of the California earthquake insurance scheme at market level

- Data (1906 – 2018)
  - **Earthquake insurance market data**
  - **Litterature review**
    - *Earthquake prevention measures*
    - *Earthquake risk modeling*
    - *Political decision and official communication*
    - *Historical earthquakes and their socio-economic consequences*
  - **Benchmark with other earthquake insurance schemes**
    - *France (CAT-NAT plan)*
    - *India*
    - *Indonesia*

- Modeling framework
  - **Development of a maturity scale**
    - *Several indicators*
    - *Each indicator has several modalities*



Pothon et al. (2019)

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Findings

→ Details of each modality for each indicator of the maturity scale

Variable	Emerging	Standard	Advanced	Sustainable
Risk monitoring	**Not material:** A destructive earthquake is not expected to occur again	**Experienced:** Recent events showed the destructive power of an earthquake	**Controlled:** The risk is monitored and extreme events are modeled	**Anticipated:** The risk is monitored both at short term and long term view.
Premium affordability	**Very low:** The risk being ignored, the premium is low and considered as a profit	**Commercial-based:** The premium amount reflects the market and does not take into account the risk level	**Risk-based:** The premium is calculated based on the risk in order to guarantee the solvency of the insurance company	**Economic-based:** The premium depends on both the risk and the consumers' expectations
Market demand	**Low:** People do not feel the need to be protected against the risk	**High:** Following the last earthquakes, insurance need is spreading over the population	**Low:** High premiums lead to a trade-off between the risk and the cost. Only few people prefer to be insured, especially if no earthquake has occurred recently	**High:** Most of people purchase an earthquake insurance encouraged by a significant premium amount decrease and a better risk awareness
Prevention measures	**Emerging:** Only academic researches work on prevention measures. Applications are very few and on a very simple basis.	**Institutional:** Prevention measures are managed by the authorities and considered as a public mission	**Risk holders:** Prevention measures are supported both by the officials and the insurance companies	**Economical:** Prevention is funded by the market and is recognized as the only long-term efficient risk reduction process
Solvency level of insurance companies	**Low:** The solvency of insurance companies is questionable because the earthquake risk is not monitored	**Medium:** Insurance companies are subject to solvency regulations.	**High:** Insurance companies' reserves are designed to face a very extreme loss	**Secured:** Additional mechanisms are used to support insurance companies if their reserves are exceeded.

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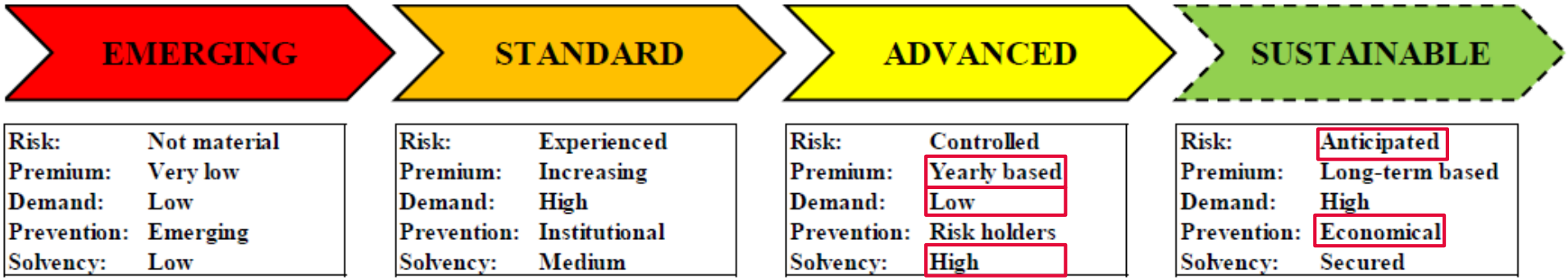
Findings



Pothon et al. (2019)

- **Current earthquake isnurance scheme in California lies between the grades « *Advanced* » and « *Sustainable* ».**
- **To improve the earthquake insurance scheme the effort must focus on:**
  - *A « Secured » Solvency (e.g. a State guarantee)*
  - *A « Long-term based » premium (e.g. calculated over a long time period)*
  - *A « High » demand (e.g. consecutive to a lower premium amount)*
- **A long-term based insurance policy has been designed as part of my PhD. The resulting premium amount is decreased up to 66%.**

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References

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