Introduction to risk sharing and risk transfer with examples from Mongolia and Peru

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Special Thanks to GlobalAgRisk Team!

GlobalAgRisk, Inc.

Mission

GlobalAgRisk is committed to improving the rural poor's access to financial services and other markets with innovative approaches to transferring natural disaster risk.

Activities

- Research and development tied to University of Kentucky research program
- Technical capacity building
- Educational outreach

Supported by

- Multinational donors
- Governments
- Nongovernment organizations

Select Country Work

- Peru – El Niño/Flood
- Mongolia – Livestock
- Vietnam – Flood/Drought
- Indonesia – Earthquakes
- Mali – Drought
- Morocco – Drought
- Mexico – Drought
- Romania – Drought
- Ethiopia – Drought

Recent work in Peru has been supported by

- *Bill and Melinda Gates Foundation, UNDP and GIZ*

Insurance involves ex ante financing of big losses with steady low payments of premium

- The variance of a pool of independent risks is lower than the variance of the individuals in the pool
- In laymen's terms: When you collect a payment after a car accident other people are paying in. When they collect, you are paying in.
  - So the price of the insurance only requires an estimate of the background level of accidents
  - The insurance would go bust if everyone got in a car accident

    (and filed a claim) at the same time…
- Correlated risks are those for which you expect a large number of claims at the same time

Advantages Ex Ante *Risk Financing*

- Financial risk transfer provides access to global capital markets that can absorb the financial exposure of catastrophes
- Better planning and resilience to economic impact of catastrophe: Smoothing of budgets
- Faster response to disaster
- More structured rules: reducing corruption
- Better planning for more effective, efficient and equitable responses
- Potentially better targeting
- Improved incentives for risk reduction systems

Types of Risk Financing

- **Reserves / Savings**
  - Covers low severity, high frequency events
  - Viability depends on opportunity cost of capital
- **Contingent credit**
  - Stand-by line of credit drawn down immediately after a pre-defined disaster
  - Annual commitment fee
- **Indemnity-based insurance**
  - Loss specific
  - High deductible/high administrative costs
- **Index-based insurance / Catastrophe Bonds**
  - Payments based on an index (e.g., rainfall level, hurricane intensity, area yield losses)
  - Quick disbursement
  - Lower transaction costs
  - Imperfect coverage (basis risk)

Source: Adapted from Mahul, 2005

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Natural Disasters — Market Failure?

- Given these challenges, governments in the developed world have started their own *ex ante* management programs
- The social importance of some form of protection is clear
- But often these interventions actually undermine the emergence of markets (Crowding out)
- New moral hazard/adverse selection — *If you pay people to take risks, they take more risks – this can slow adaptation!*
- Bad Examples: U.S. Crop Insurance, U.S. Flood Insurance

Skees, J. R. "The Bad Harvest: More Crop Insurance Reform: A Good Idea?" Regulation: The CATO Review of Business and Government Vol. 24, No 1, 2001, pp. 16–21.

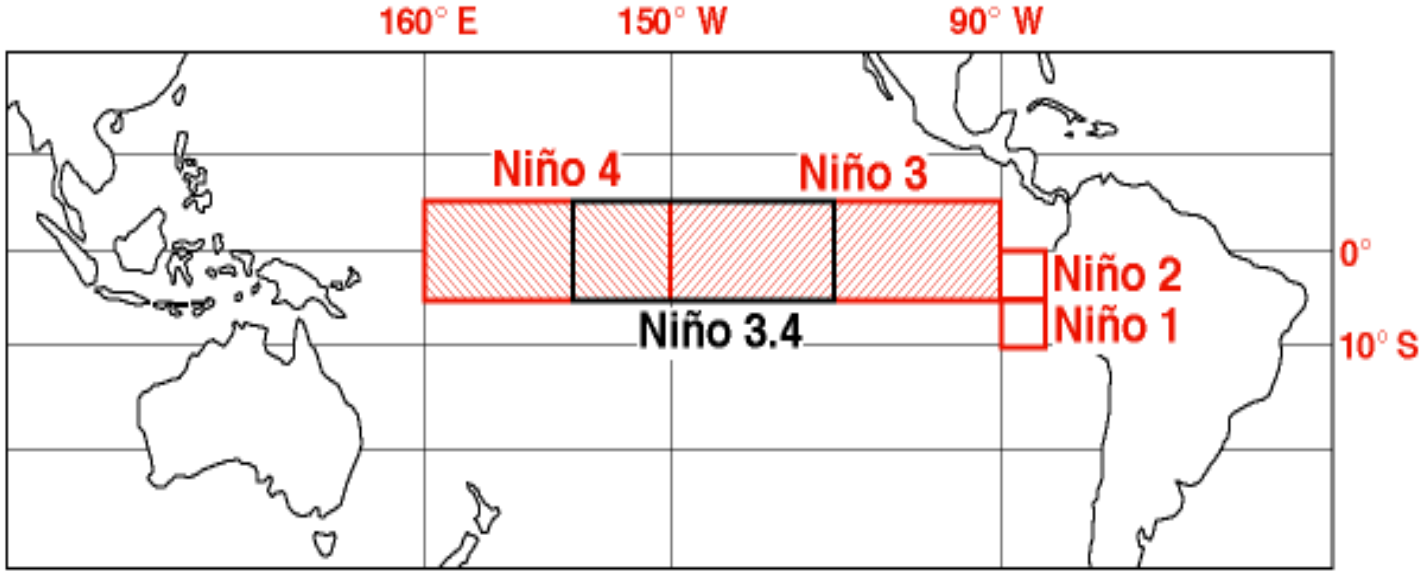
Michel-Kerjan, E. O. "Catastrophe Economics: The National Flood Insurance Program." *Journal of Economic Perspectives* 24(2010): 165–186.

Reinsurance price cycle

- Insurance gets expensive after an event, just when demand is highest
  - That may sound like normal economics (something that is scarce fetches a higher price)…but the underlying risk has not changed (save for some probability updating)
- Demand and prices dip after a long period without an event
  - This is only partially consistent with Bayesian updating (big events shouldn't disappear from our collective mind so quickly…insurers and the insured seem to be *forgetful Bayesians*) (Froot, 2001)

El Niño Insurance for Flood
Innovation in Northern Peru

Contract Is Written Using NOAA Data

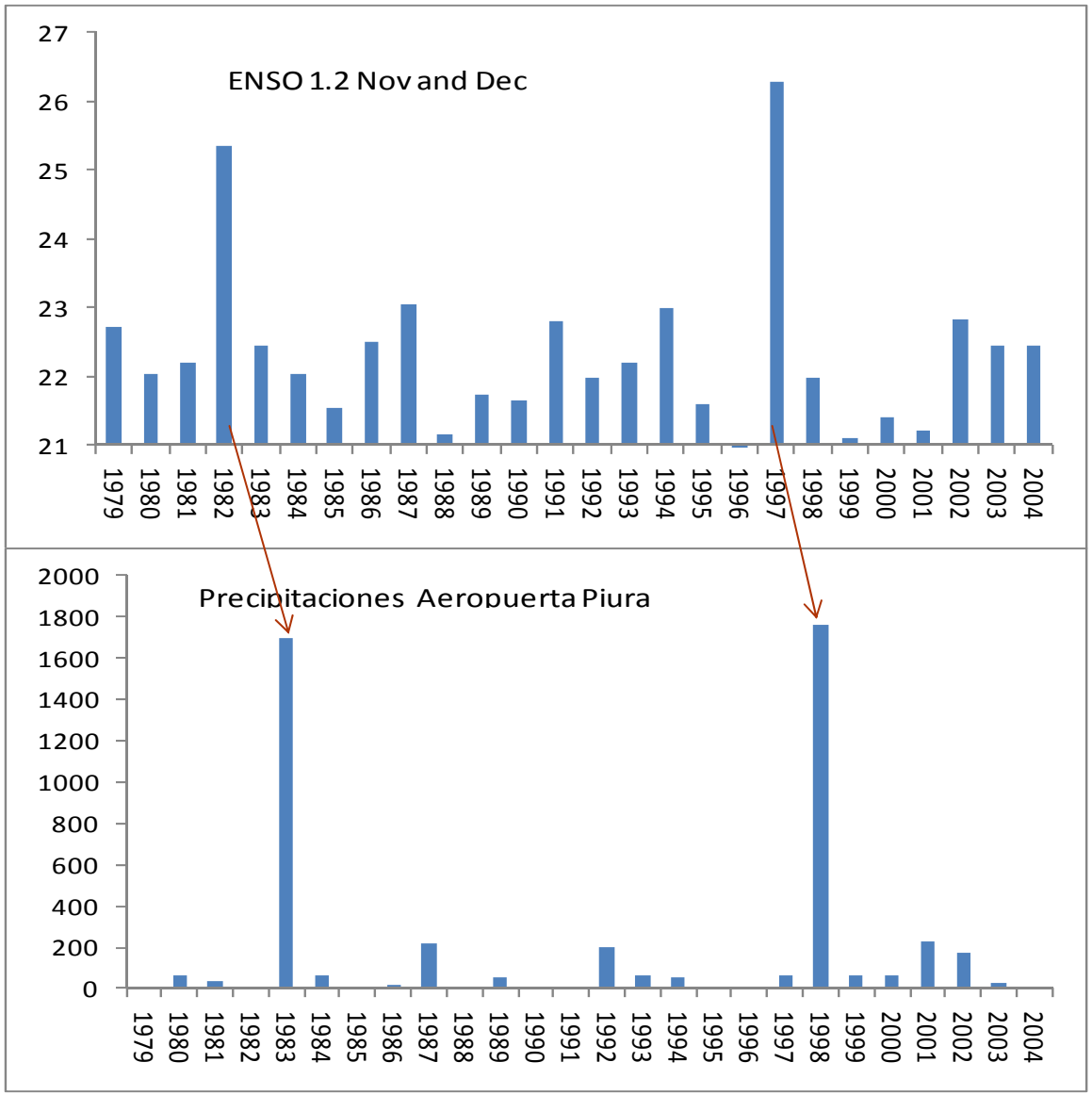


- El Niño estimates derived from — Satellite data, observations of buoys, and readings of the temperature on the surface and at deeper levels
- Data are publicly available monthly from NOAA (The U.S. National Oceanic and Atmospheric Administration)

http://www.cdc.noaa.gov/Correlation/nina1.data

Strong El Niño in 1982–83 and 1997–98

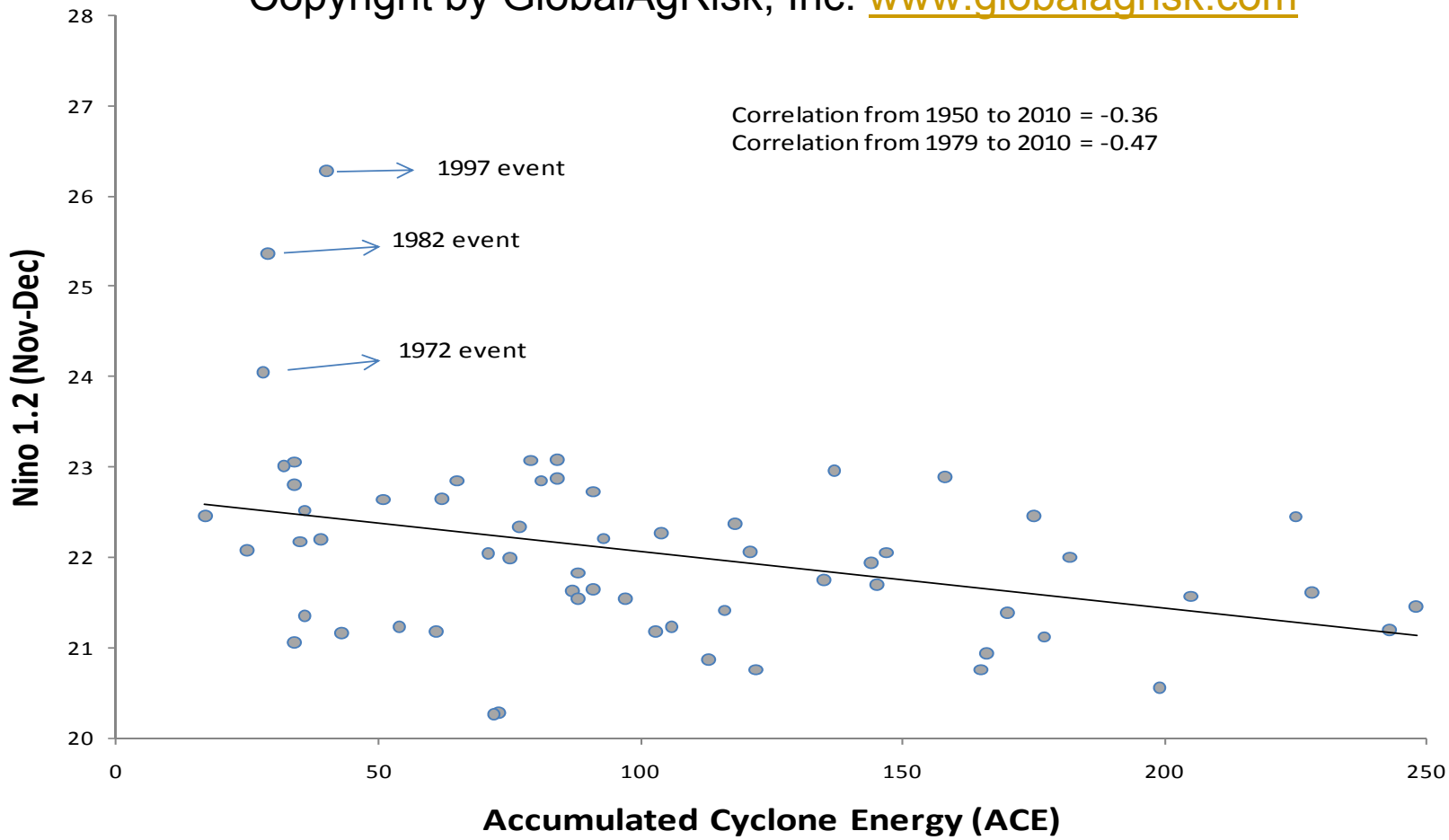
Two extreme events in the last 32 years



Target Market — Commercial and Social

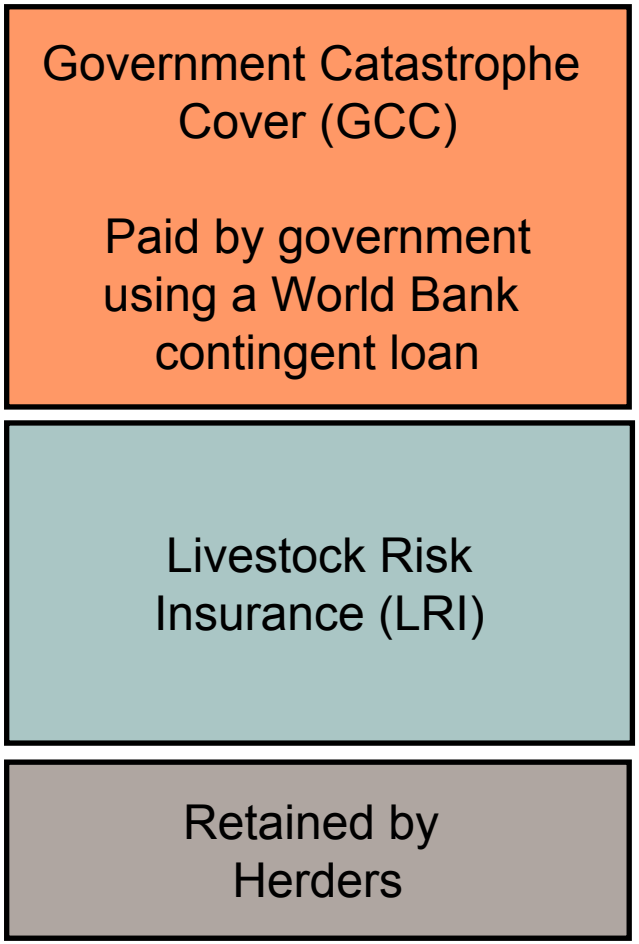
- Financial institutions
- Firms in value chain
- Fisheries
- Farm groups
- Transportation
- Tourism
- Health sector
- Civil defense
- Infrastructure

The Nino Index is Negatively Correlated with Intensity of Atlantic storms and Hurricanes



NOAA develops the ACE Index to reflect the "total seasonal activity" whiche measures the collective intensity and duration of Atlantic named storms and hurricanes occurring during a given season. The ACE index is a wind energy index, defined as the sum of the squares of the maximum sustained surface wind speed (knots)

Index-based Livestock Insurance — Risk Layering
A New Model for Public-Private Partnerships



GCC — Social Insurance

A layer of very infrequent risk where decision makers may have a cognitive failure problem

LRI — Commercial Insurance

Offered by private companies with reinsurance from government and now a global reinsurer

If the government can't continue to pay for extreme losses, the commercial layer can continue

Mongolia — A Role for Everyone

- Allow governments to deal with the layers of risk that suffer from the most “market failure”
- Leave markets to manage lower levels of catastrophic risk
- Individuals manage threats with high basis risk
- Not only is each party doing what it does best (efficiency), but, unlike many subsidy schemes, this should be relatively robust to changes in policy — *If the subsidy goes away, the commercial level of insurance survives*
- “Crowding in”

Conclusion

- Strong risk management plans explicitly recognize the weaknesses (and strengths) of all stakeholders
- Use this knowledge to design insurance that
  - Motivates more stakeholders to buy catastrophic insurance, creating a culture of insurance
  - Motivates governments to support those participants in true market failure circumstances — but recognizing that there are risk of using market failure arguments to justify heavy subsidies
  - Uses global capital to protect against risk that governments can't cover

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