Helping the Poor Manage Natural Disaster Risks

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GlobalAgRisk, Inc.

- Mission

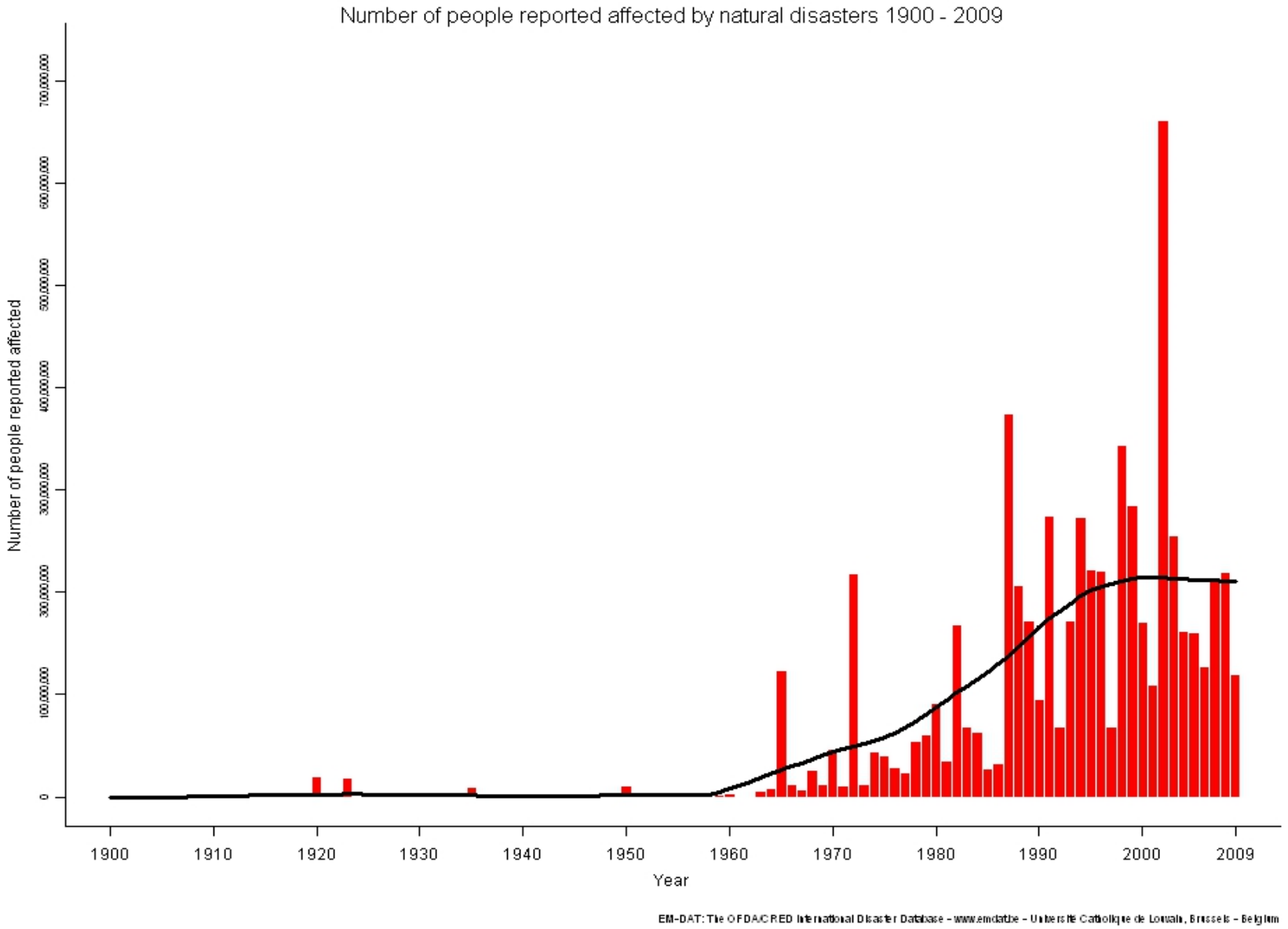
  Improve access to financial services for the rural poor through innovative approaches for transferring natural disaster risk

  - Activities
    - Research and development
    - Technical capacity building
    - Educational outreach
  - Supported by
    - Multinational donors
    - Governments
    - Nongovernment organizations

- Select Country Work
- Peru – El Niño/Flood
- Mongolia – Livestock
- Vietnam – Flood/Drought
- Mali – Drought
- Morocco – Drought
- Mexico – Drought
- Romania – Drought
- Ethiopia – Drought
- Next… Indonesia to bundle savings and earthquake insurance

Natural Disasters and Developing Countries

- **Risks for losses caused by climate-related natural hazards are rising**
  - 95 per cent of deaths from natural disasters in the last 25 years occurred in developing countries
  - Currently US$100 billion economic losses / annum
  - Limited allocation of financial resources so far to support adaptation
- **Developing countries**
  - Have lowest coping capacity, higher vulnerability (majority of fatalities)
- **Types of Major Natural Disasters**
  - Droughts
  - Floods
  - Earthquakes


Number of people reported affected by natural disasters 1900 - 2009
Number of people reported affected
0
100,000,000
200,000,000
300,000,000
400,000,000
500,000,000
600,000,000
700,000,000
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2009
Year
EM-DAT: The OFDA/CRED International Disaster Database - www.emdat.be - Université Catholique de Louvain, Brussels - Belgium

Rural Poverty

- More than 1 billion people currently live on less than one US dollar per day.
- Approximately 75 percent of those live in rural areas.
- The agricultural sector employs 40 percent of lower income countries workers
- Agricultural workers contribute over 20 percent of the GDP in over 60 lower income countries
- In many rural areas the risk of extreme weather events contributes to poverty and low rates of economic growth. Large numbers of working poor

Somebody Pays for Catastrophic Weather Risk

- The poor pay (*ex post* and *ex ante*)
- Financial institutions and firms in the value chain restrict services as they learn that the correlated losses of many of their borrowers and savers create significant problems in repaying
- Governments seek solutions — Disaster assistance, infrastructure investments, subsidized agricultural insurance
- Donors forgive debt and provide funds for recovery

Extreme Weather Events and Poverty

- Extreme weather events (e.g., drought or flood):
  - Directly destroy assets (obtained at very high opportunity cost in foregone consumption);
  - Cause households to liquidate assets (often when prices are very low); and/or
  - Cause households to reduce investment in assets (e.g., health or education).
- The diminished asset base reduces future economic growth.

Extreme Weather Events and Poverty

- Risk-averse households recognize their exposure to extreme weather events and thus, adopt low-risk, low-return strategies for using productive assets.
- Because many extreme weather events are spatially covariate, lenders and other "risk aggregators" become reluctant to provide valuable services to rural households.
- Implications: low rates of economic growth, hopelessness, poverty traps.

Informal Risk Management and Risk Coping

- Rural households manage risk informally by:
  - Mitigation (e.g., diversification of income generating activities, investments in improved crop inputs, share tenancy);
  - Self-insuring (e.g., savings, credit reserves, liquidating physical assets);
  - Risk-transfer (reciprocity obligations within families or local religious communities).
  - Parents take children out of schools and put them to work
- These mechanisms also tend to fail when extreme covariate weather events occur.

What is Index Insurance ?

Pays for losses based on an independent and objective third party measure that is highly correlated with losses

- Area county yields (U.S. Group Risk Plan)
- Rainfall deficit using weather station
- Excess flooding using river level
- Extreme sea surface temperatures (Peru)
- Area mortality rates for Mongolia
- NDVI measures for poor pasture conditions in Kenya
- Richter scale measures for earthquakes
- Wind speed for hurricane damage

Challenges with Weather Index Insurance

- Data limitations are perhaps the greatest challenge.
  - Data for determining relationship between potential indexes and realized losses.
  - Data for pricing the insurance and triggering indemnities.
- Other Challenges
  - Legal and Regulatory
  - Developing expertise of local insurance suppliers.
  - Creating an understanding of insurance products.
  - Obtaining reinsurance.

What's makes this interesting ?
"This I believe"

- Advances in technology to measure events that create catastrophic losses
- Financial innovations for transfer of natural disaster risk
- Improved thinking about legal and regulatory issues for implementing index insurance in developing countries
- Growing recognition that transfer of natural disaster risk our of the country is critically important for social safety net, government infrastructure, firms that serve the working poor, and for ultimately for small households

Consequential Losses from Natural Disaster
Data Come via Risk Assessment

- Ethiopia , Morocco, Kenya, etc.
- Mongolia — Livestock mortality
- Early flooding in the Mekong Delta
- Drought for coffee growers in Vietnam
- El Niño catastrophic flooding
- Livelihoods insurance for small households?













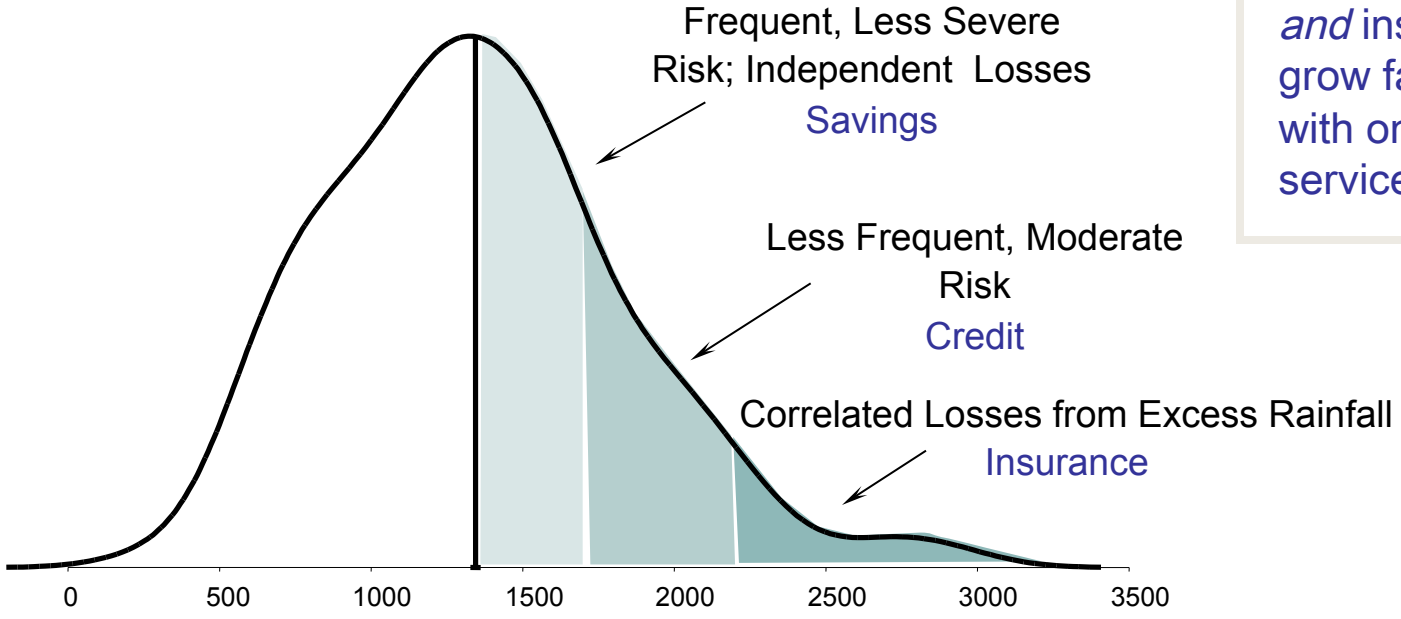

Taller Internacional
Reduciendo la Vulnerabilidad de las
Instituciones Financieras ante
Eventos Climáticos Extremos
Posibles Usos del Seguro
Fenómeno El Niño
La Positiva
Seguros Generales
GlobalAgRisk
INC.
IEP Instituto de Estudios Peruanos



Financial Services and Correlated Weather Risk

Financial services are complementary — A blend of savings, credit, and insurance is likely most effective for risk management

- Savings and credit best for small to moderate losses
- Insurance is best for catastrophic losses



Economies with banking *and* insurance markets grow faster than those with only banking services

Insurance is expensive — Focus must be catastrophic risk

Insurance is not for all segments

- Insurance is not an efficient or effective mechanism to transfer income Must be more careful about separating the social and the commercial aspects of index insurance
- The poorest of the poor need carefully developed safety net programs – cash transfers. These can use 'insurance-like' designs to reduce fraud and corruption.
- The working poor need access to effective insurance products: either directly or indirectly via the firms that they do business with

Market Development Process
Important — to Reach Scale Quickly

- To reach scale quickly, target risk aggregators first
- Introducing products with potential for significant scale engages the interest of key stakeholders (e.g., insurer, insurance regulator, global reinsurer) to provide input and services that are appropriate for longer-term sustainability
- Pilot projects that sell a few hundred policies to small households (small insured value) are often viewed as experimental and are less likely to receive the same attention

Mongolia — Index-based Livestock Insurance

The Risk

Severe livestock losses due to *dzud* (harsh winter weather)

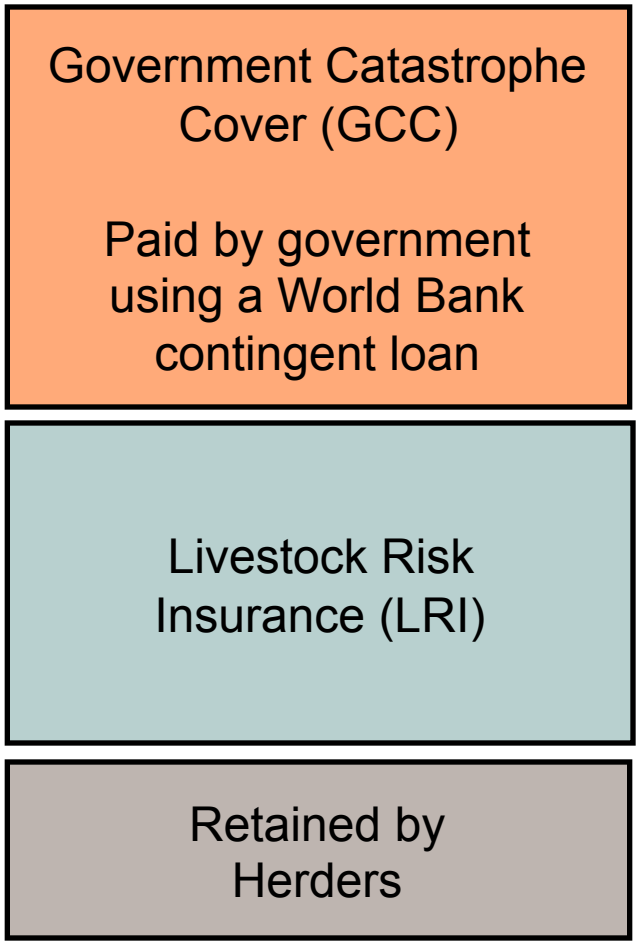
Target Users

Herders

Contract Structure

Payments based on livestock mortality rates at the soum (county) level

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



100% mortality

30% mortality

6% mortality

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 Experience after 5 Years of Sales

- In 2006, the first sales season, 2400 policies were sold in 3 *aimags* (provinces). In 2010, nearly 7,000 policies were sold in 9 *aimags*
- Participation has grown from under 8% of eligible herders to about 20% in the original pilot *aimags*
- Herders paid an average premium of USD 50 in 2009 and received an average USD 326 in 2010
- Insurance companies understand and support the pooling arrangement and regulations

El Niño Insurance for Flood
Innovation in Northern Peru

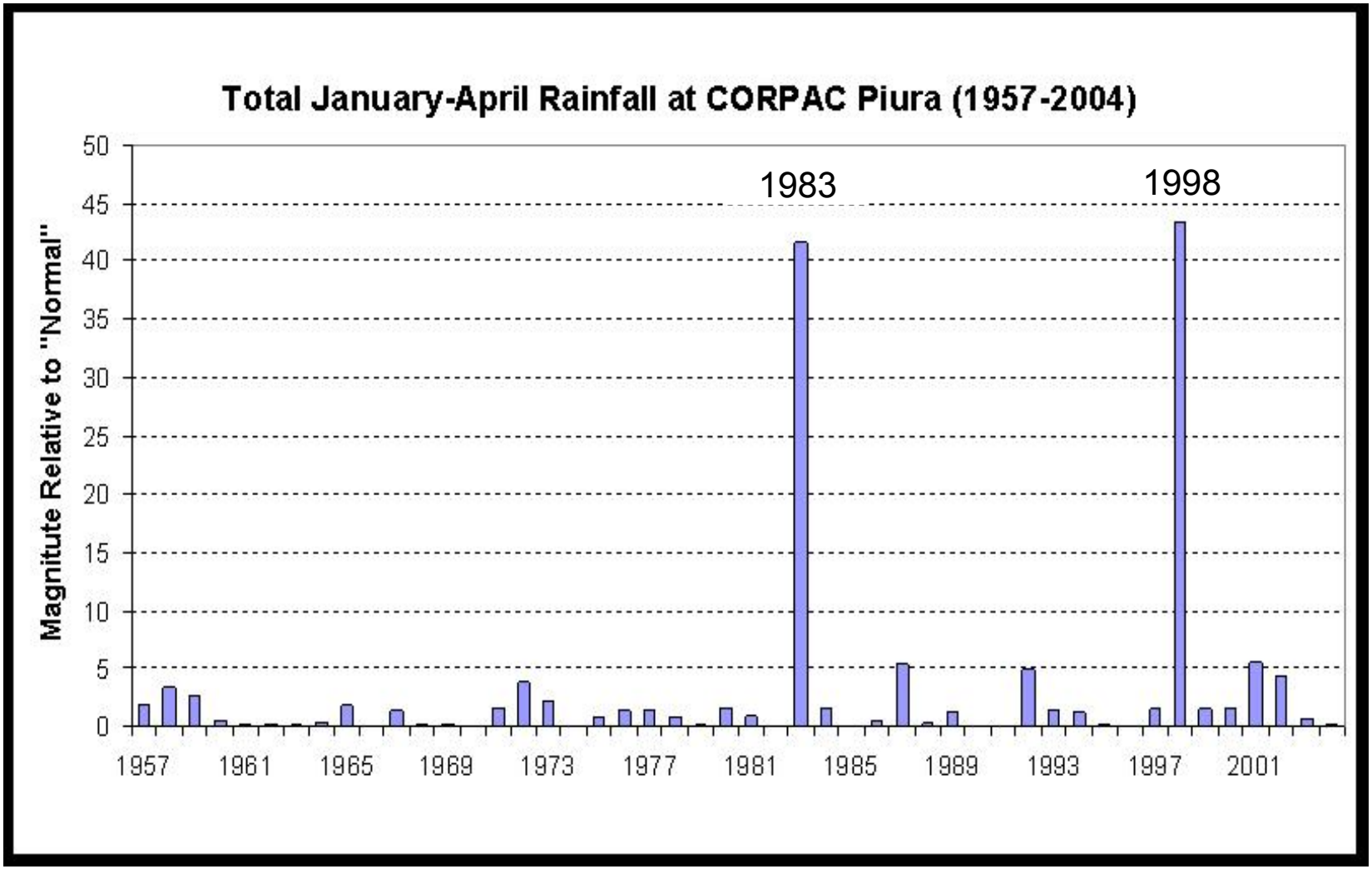




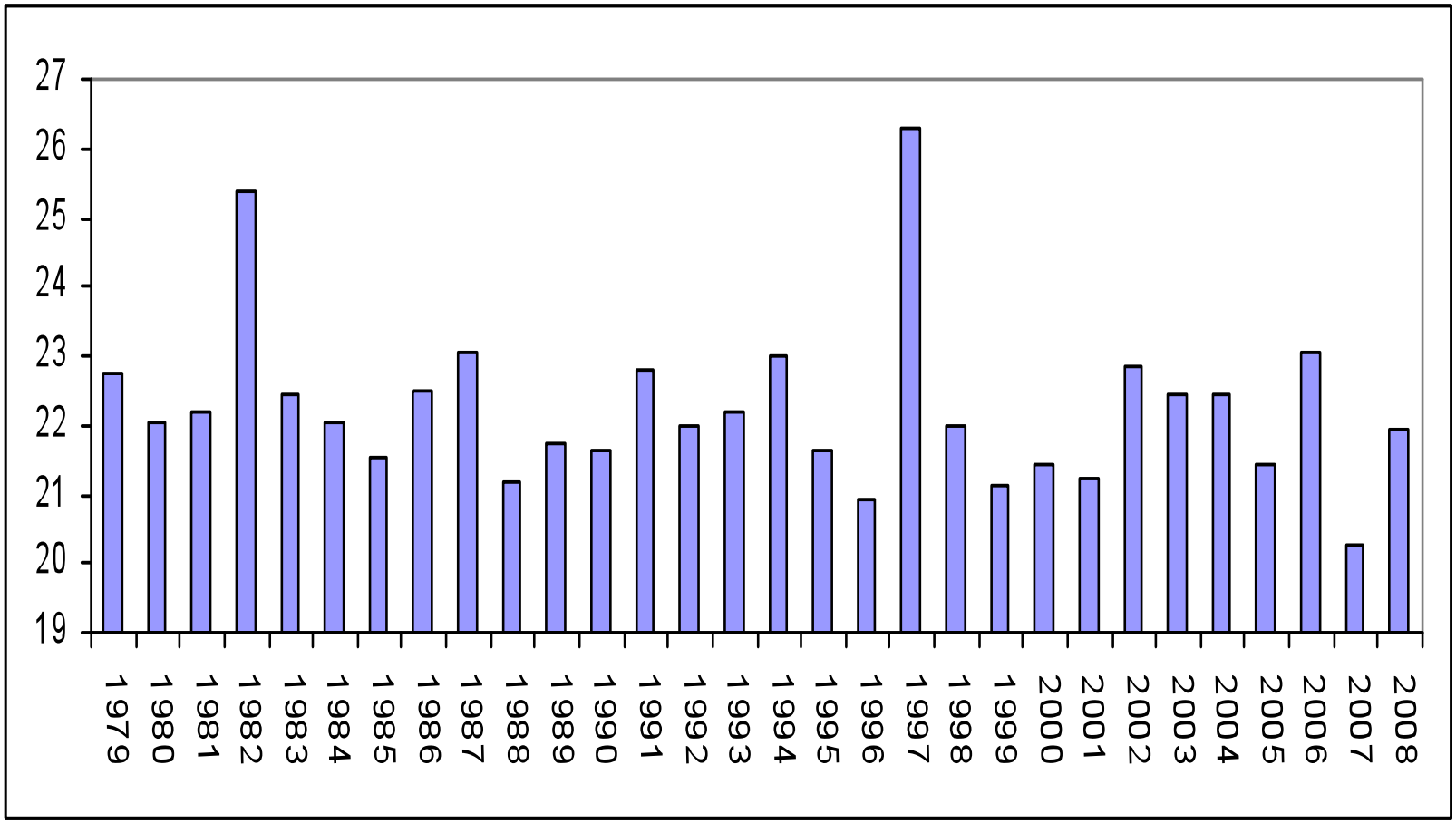
Extreme Flooding and El Niño

- Extreme flooding in Piura is directly tied to El Niño
  - Warm Pacific trade winds meet cold air coming down Andes Mountains
  - Result — Extreme, prolonged rainfall
  - Severe El Niño occurs roughly 1 in 15 years
- Most recent severe El Niño events: 1982/83 and 1997/98
  - Rainfall was 40x normal from January to April
  - For 1997/98, volume of Piura River was 41x median value
  - For 1982/83, volume of Piura River was 36x median value
- El Niño is the biggest risk event for agriculture, also affects many other sectors due to infrastructure breakdowns

Extreme El Niño Events of 1982/83 : 1997/98



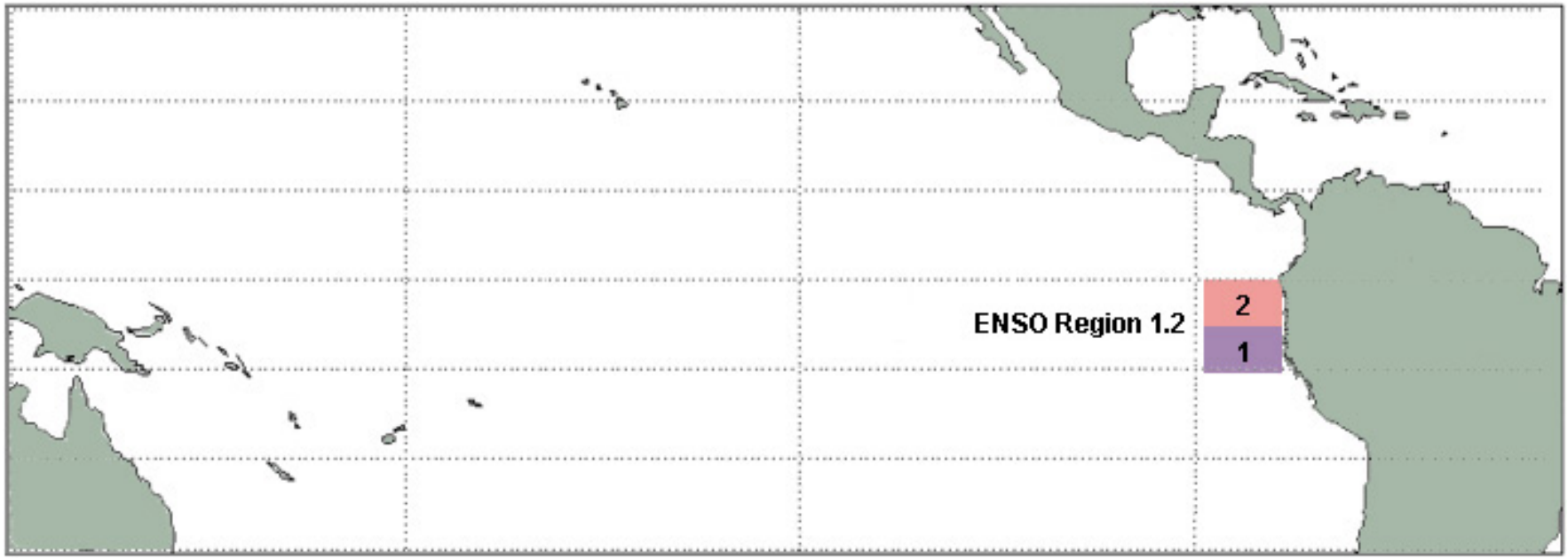
El Niño Southern Oscillation (ENSO) Index
(Nov–Dec) 1979–2008



1983 Payment Rate = 34%; 1998 Payment Rate = 71%
Start Threshold = 24.5; Exit Threshold = 27

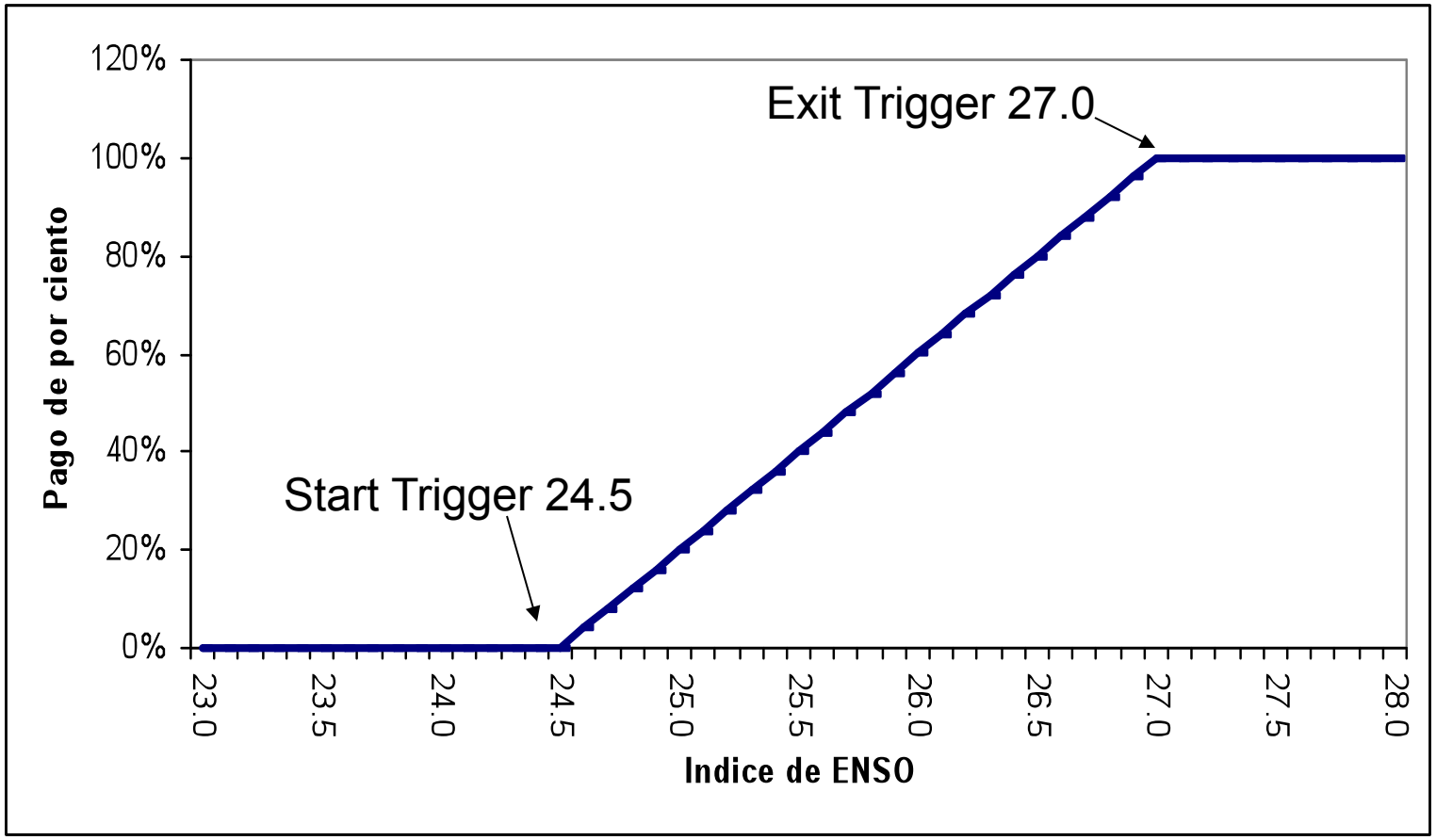
ENSO Region 1.2

- Measured and reported by the NOAA Climate Prediction Center for over 50 years
- Coordinates
  - (0°-5°S, 90°W-80°W and 5°S-10°S, 90°W-80°W)



Contract Payout Structure

First Regulated Insurance to Pay Based on Forecast



Linear payout so that if sea surface temperature is halfway between 24.5 and 27, or 25.75, the payout rate is 50%

Target Market: Commercial and Social

- Financial institutions
- Firms in value chain
- Fisheries
- Farm Groups
- Transportation
- Tourism
- Health Sector
- Civil defense
- Infrastructure

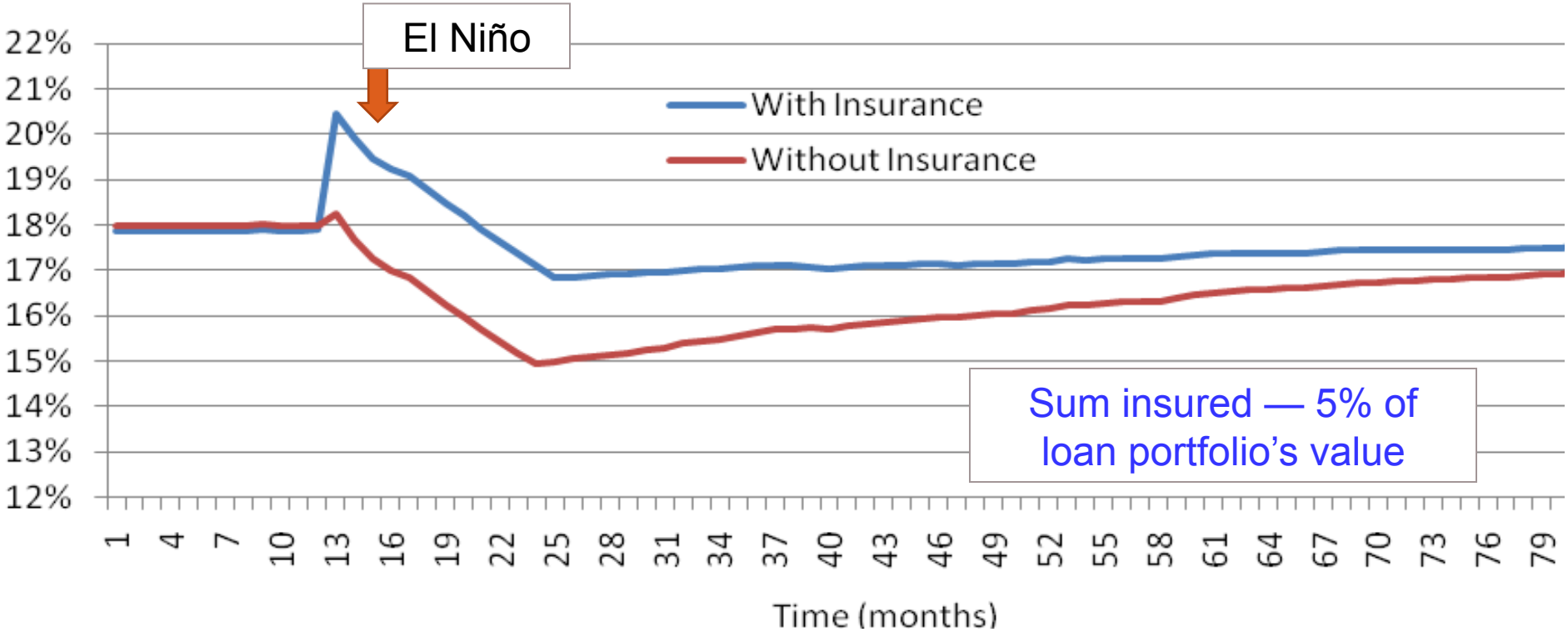
Natural Disaster Effects on MFIs

- Loan portfolio — Systemic repayment problems for borrowers, problems can remain for years
- Deposits — Depositors withdraw funds
- Costs increase — Costs of funds (e.g., Interbank loans), administrative costs
- Resulting problems
  - Liquidity
  - Profitability
  - Capital Adequacy
- Lending institutions have many ways of managing these risks (e.g., Provisions, restructuring loans, etc.)

Risk Assessment Includes Evaluating Current Risk Management Strategies

- Potential strategies for managing these risks and their costs
- Liquidity → Hold higher portion of assets in cash
  - Effect — Reduces investment in productive assets
- Profitability → Avoid exposed regions and sectors
  - Effect — Limits growth opportunities, especially for untapped markets
- Capital adequacy → Leverage a lower amount of equity to provide a "cushion" for the risk
  - Effect — Limits growth

,Equity/Net Credits
Approximation for Capital Adequacy

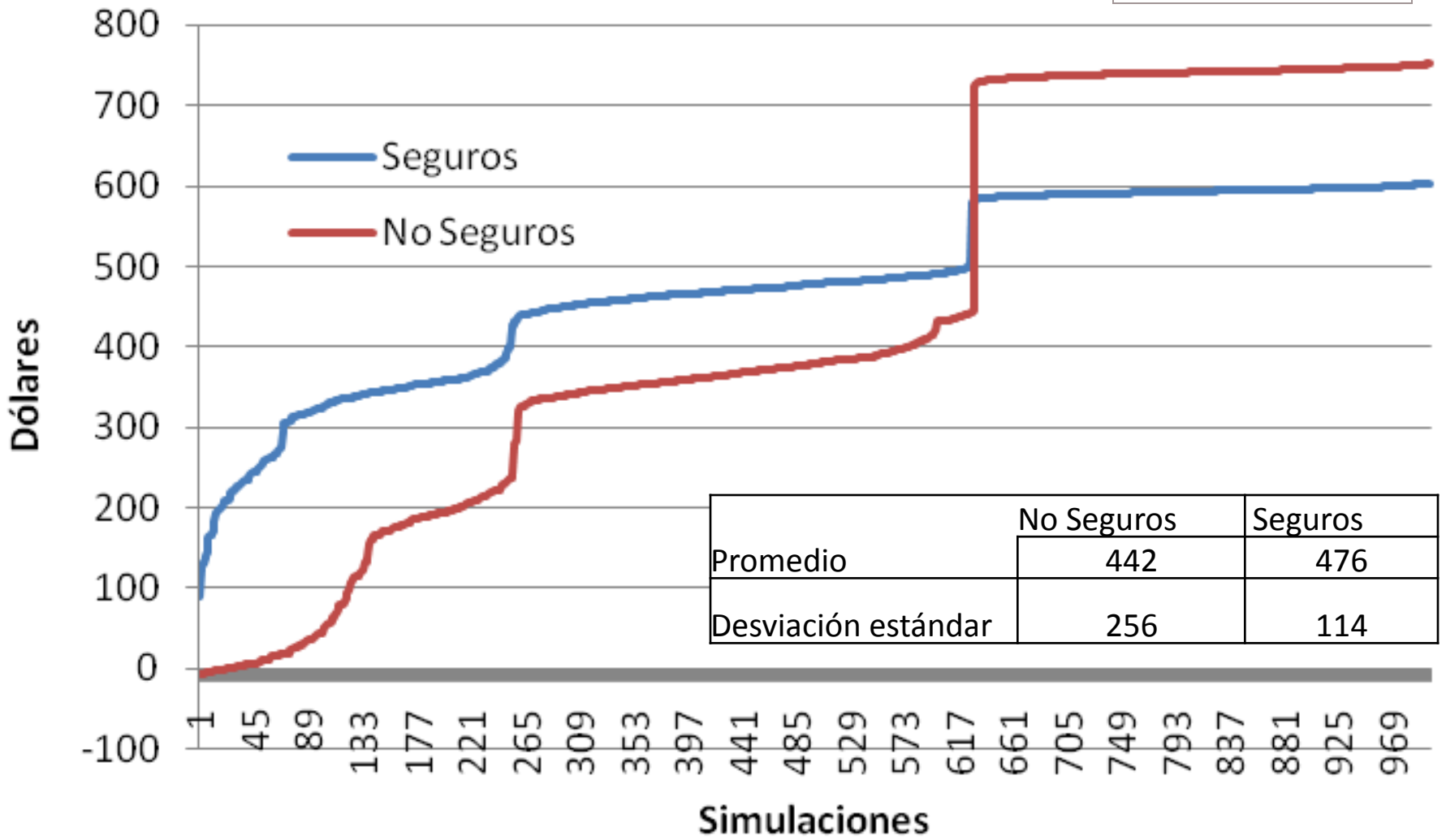


- Bank is localized in an exposed area
- Insurance payout enters balance sheet as an asset → Increases equity
- Prevents cyclical nature in lending
- Also allows bank to lend heavily in rebuilding effort after the disaster

Produced by Benjamin Collier

15 year ending net worth
Monte Carlo Simulation, 1000 trials

Sum insured is 5% of credit portfolio



	No Seguros	Seguros
Promedio	442	476
Desviación estándar	256	114

Produced by Benjamin Collier

Market Development Process
Recommendations

- Focus on legal and regulatory issues from the beginning
  - Enabling legal/regulatory environment supports market sustainability and growth
- Use subsidy only for start-up costs and market-failures instead of premiums – be clear about social versus commercial approaches
  - Premium conveys important signals that should not be distorted
  - Start up activities (risk assessment, education, training) provide a public good and can stimulate other markets
- Include plans for impact assessment from the start
  - Scalable and sustainable do not ensure poverty reduction

Conclusions and the Way Forward

Focus on

- Index insurance to insure against low-probability, catastrophic risks
  - Can minimize basis risk and provide protection against a layer of risk that is most difficult to manage through other means (e.g. savings, credit, traditional indemnity insurance)
- Insuring against the broader consequential losses that result from a weather event
  - Minimizes basis risk and should increase the value of the product to the target market in comparison to index insurance that is designed only around the vulnerabilities of a specific crop

Conclusions and the Way Forward *(Continued)*

- Targeting new index insurance markets towards risk aggregators
  - Can reduce data requirements and capacity building needs and is likely the only feasible means of extending weather index insurance products into many regions of the world, for the near future
  - Rural lenders
  - Value Chain
  - Farmer Associations
- Carefully move to micro products with concept of livelihoods insurance for consequential losses suffered by small households; challenges will remain for demand and delivery

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