

# Microinsurance: What we know and what we need to know

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# *The Journal of Risk and Insurance*

- Mission: to be internationally recognized as the premier academic field journal focused on rigorous, original research in insurance economics and risk management.
  - Continuous publication since 1933
- Areas of specialization include
  - industrial organization of insurance markets
  - management of risks in the private and public sectors
  - insurance finance, financial pricing, financial management
  - economics of employee benefits, pension plans, and social insurance
  - utility theory, demand for insurance, moral hazard, and adverse selection
  - insurance regulation
  - actuarial and statistical methodology
- Available in
  - 2,300 research libraries worldwide real-time and 6,000+ libraries with one-year lag
  - Participates in the International Network for the Availability of Scientific Publications.

# Microinsurance



What is the goal?  
Where is the demand?  
What is the impact?

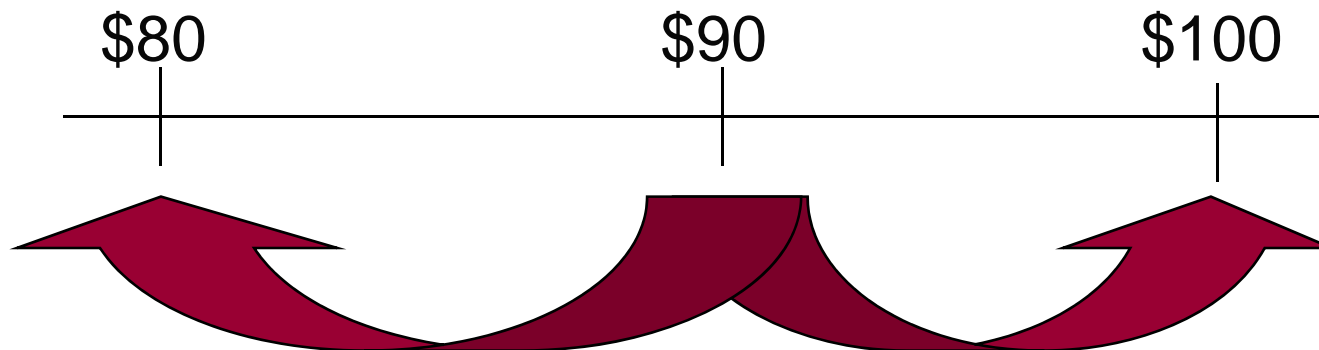
# Sectors

- Health
- Life
- Agriculture
- Husbandry
- Enterprise

# Insurance and Risk Management

- Example: Beginning of year a person has
  - Initial wealth \$100
  - 50% chance of losing \$20
  - “Average” wealth of person is

$$.5x(\$100) + .5x(\$80) = \$90$$



# What does insurance do?

- Suppose person can purchase \$10 of insurance at the fair price.
  - What is the fair price?

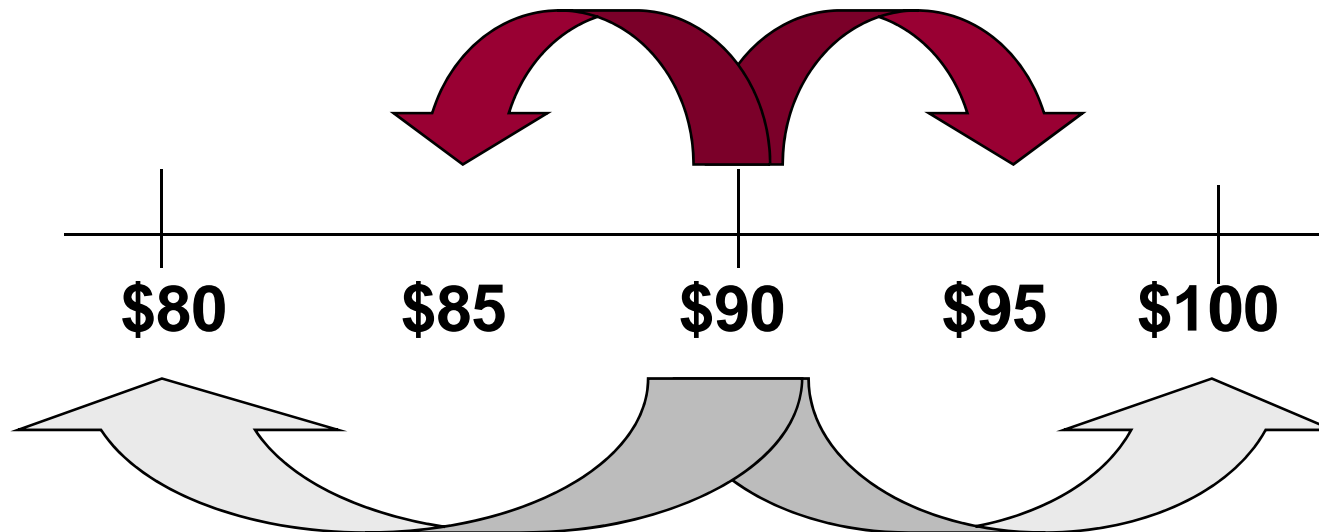
$$.5x(\$10) + .5x(\$0) = \$5$$

- What does the purchase do for the person?
  - “Average” wealth is now

$$.5x(\$100-\$5-\$20+\$10) + .5x(\$100-\$5)$$

$$.5x(\$85) + .5x(\$95) = \$90$$

# What insurance does!

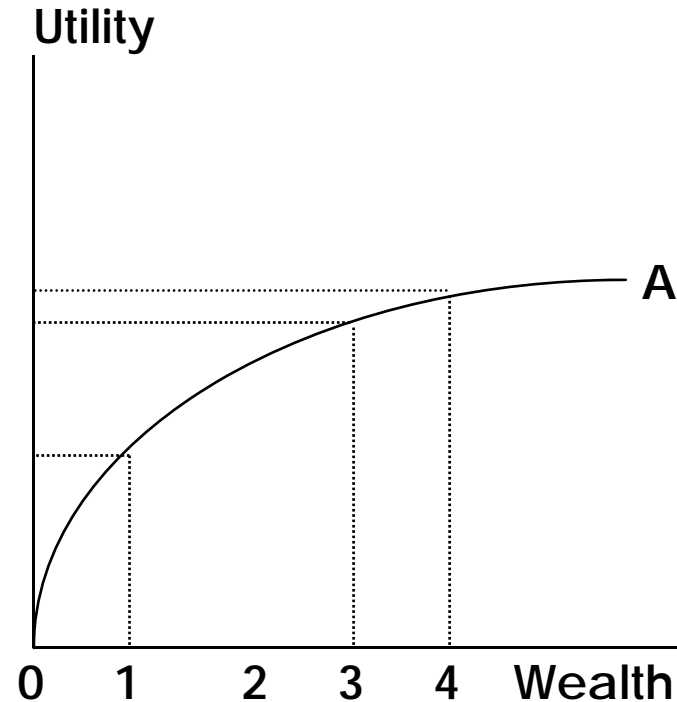


Question: what happens if you offer \$20 of insurance at the actuarially fair price?

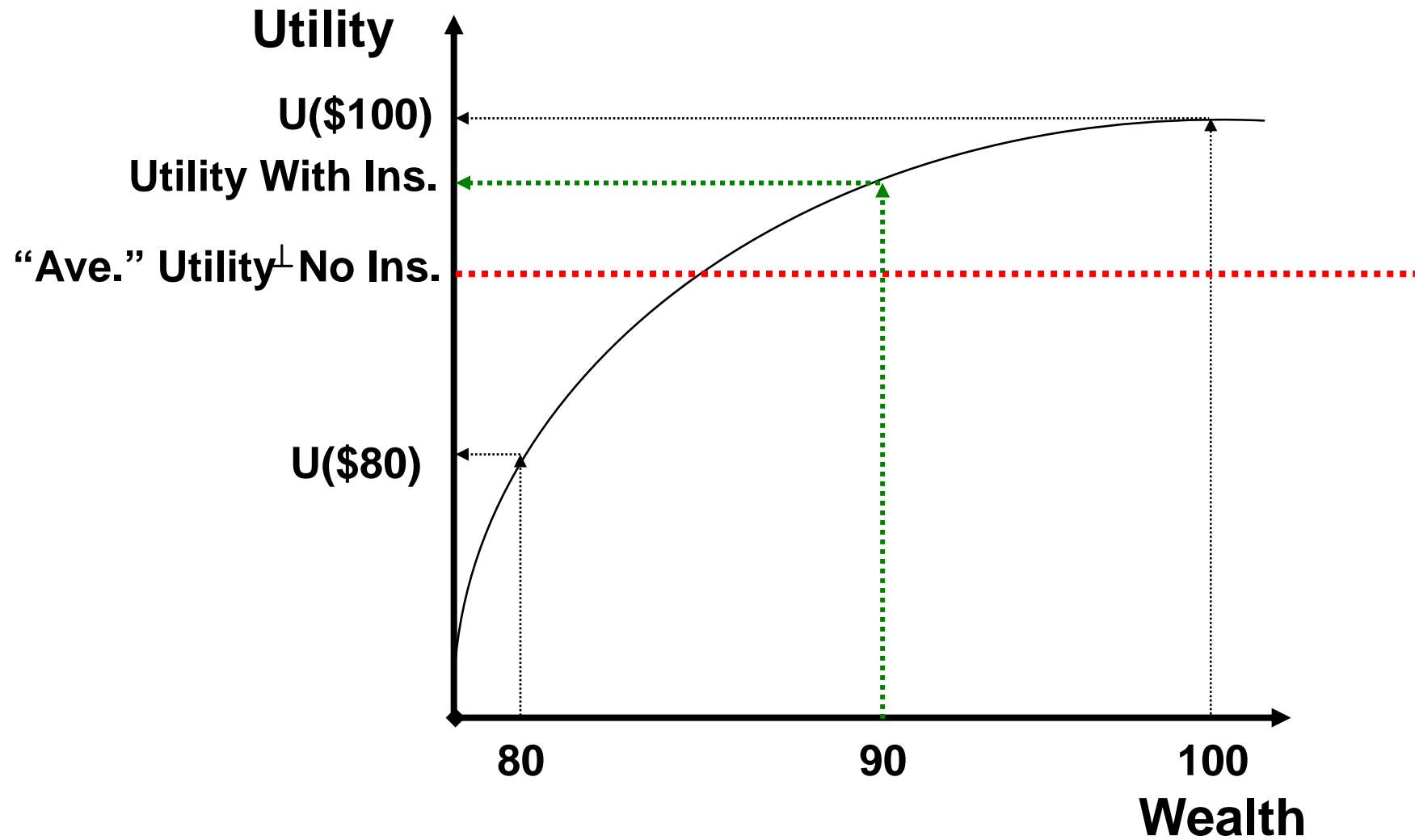
1. Fair price rises from \$5 to \$10
2. 100% chance of having \$90 at year end

# Risk Averse Utility Function

- More is better
- \$1 makes you happier when you are poor than when you are rich
- Line  $OA$  represents a utility function that satisfies these assumptions



# “Average” Utility, Risk and Insurance



# The Miracle of Insurance

- The result from the previous slides can be generalized as follows:

“Any risk-averse individual will demand full insurance when it is offered at actuarially fair premiums.”

A related concept in the development literature as the **Full Risk Sharing Hypothesis**

# Market Failures: Three Questions

- What is the market failure?
- What innovations solve the market failure?
- What is the impact from solving the market failure?

# Market Failures: Three Questions

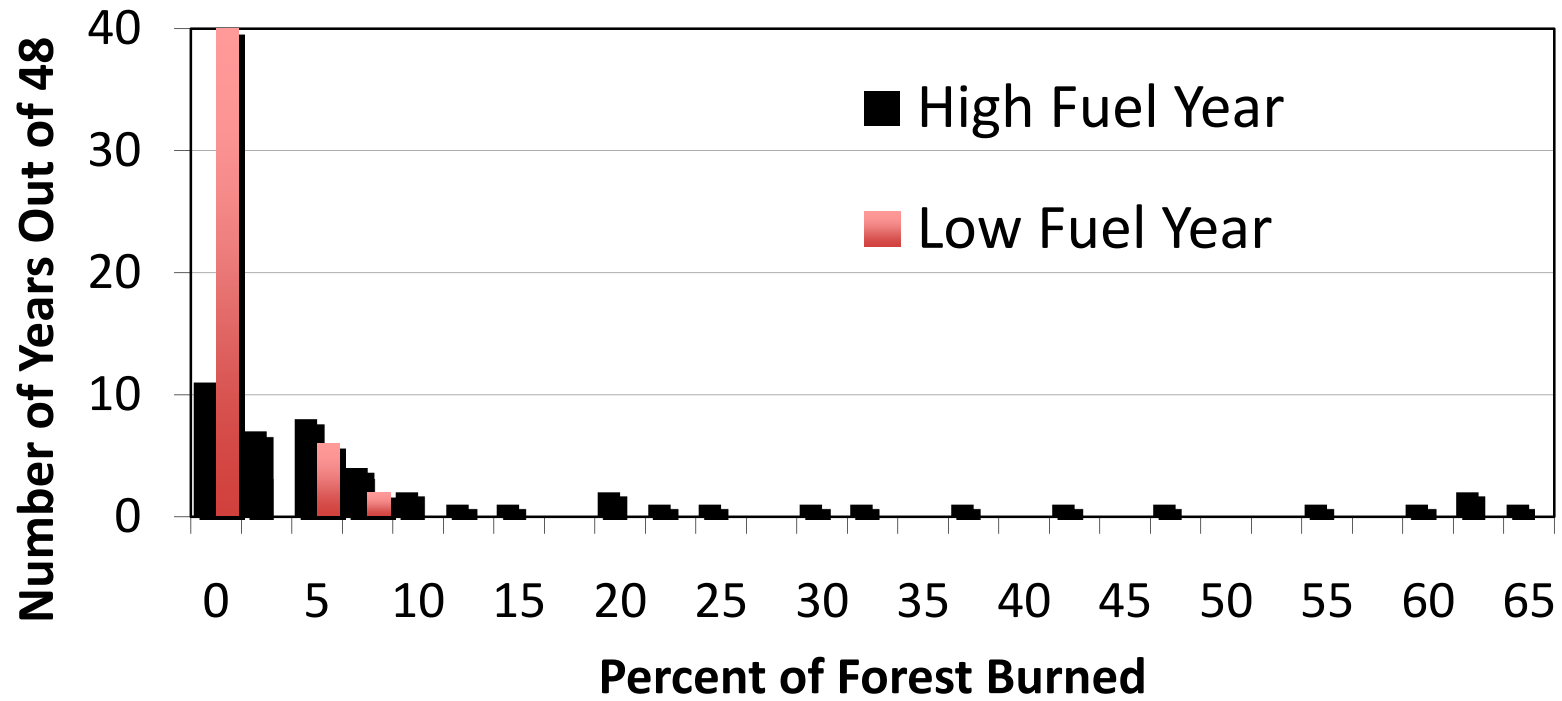
- What is the market failure?
  - Adverse selection
    - Advantageous selection also viable (health markets in particular)
  - Moral hazard
    - Overuse of health care
    - Obvious issues on agriculture with effort
  - Transaction costs
    - Channel and organizational: labor costs high to deliver services/products
    - Psychological/cognitive cost barriers: default status is uninsured
    - Judgment proof
    - Informational
      - Consumers don't have full information on terms
      - Consumers don't have full information on risks - form subjective beliefs

# How are Subjective Beliefs Formed?

- Example taken from Harrison, Rutström and Sen (2009)
- Suppose you live in a house that will burn down in two settings
  - High fuel load forest
  - Low fuel load forest
- Players are given information on aggregate historical fire damage
- But you must form beliefs based upon new and recent natural stochastic process
  - VR graphic rendering

# Historical Burn Data

## Frequency Histogram



Let's take a virtual walk through  
a low-fuel forest



... or even have a picnic



Load



Load



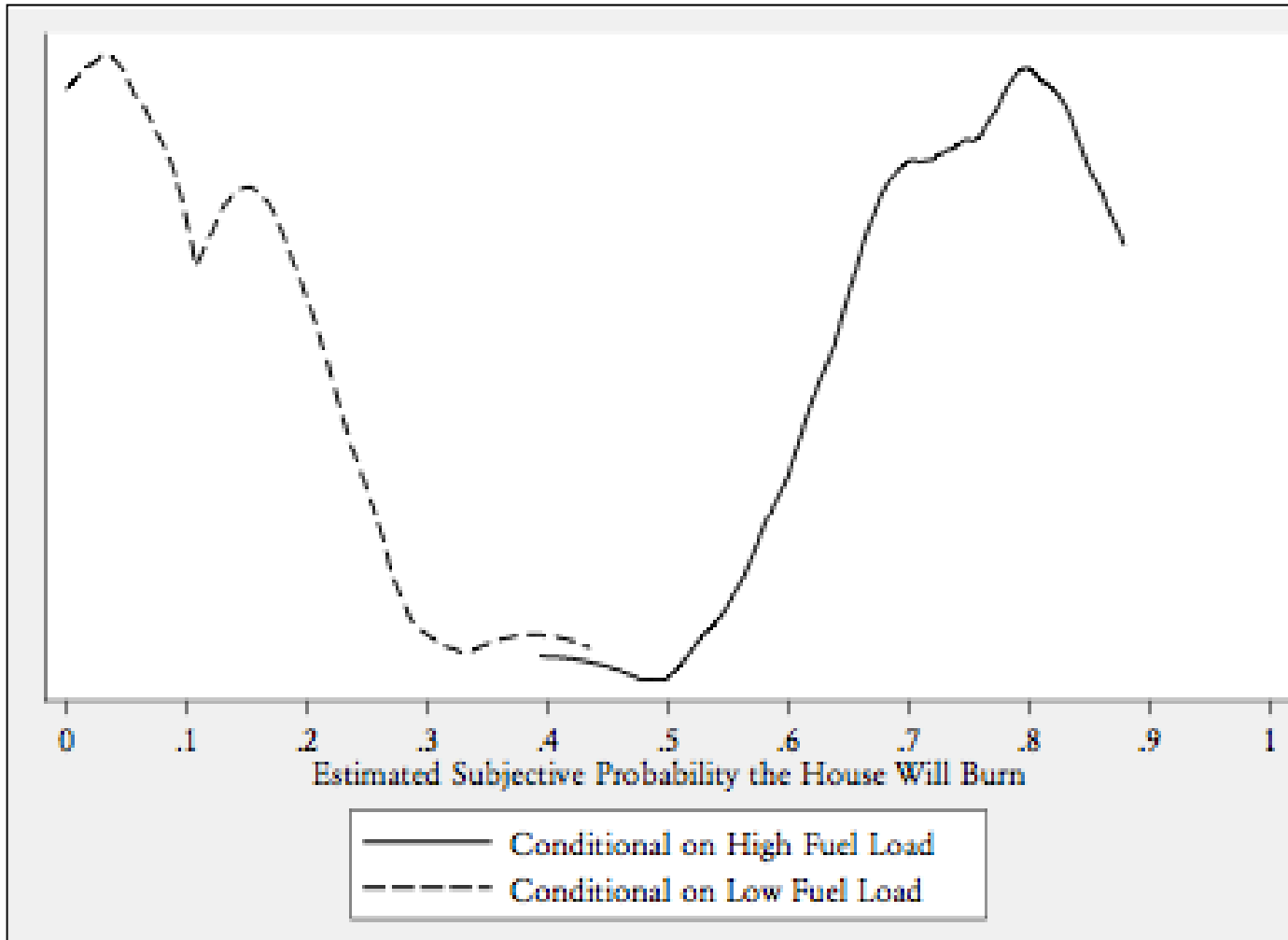
Load



Load



# Estimated Subjective Beliefs



# Market Failures: Three Questions

- What is the market failure?
- What innovations solve the market failure?
  - Adverse selection
    - Health: mandatory versus voluntary
    - Menu of contracts
  - Moral hazard
    - Rainfall
    - Crop price
  - Judgment Proof
    - Subsidies
  - Transaction costs
    - Channel and organizational: electronic sales, linked to other services
    - Psychological/cognitive cost barriers: default status, framing
    - Informational: training, informational advertising, public campaigns, etc.

# Market Failures: Three Questions

- What is the market failure?
- What innovations solve the market failure?
- What is the welfare implication from solving the market failure?
  - Consumption smoothing
  - Underinvestment
    - Health, agriculture, enterprise
  - What is 2<sup>nd</sup> best alternative?
    - Informal networks, credit, savings
    - Could be quite good. How much better is the insurance?

# Four Thoughts

- Bandaid for a gunshot
- Longer term
- Entry point (?)
- Design

# Band-aids

- Bandaid on a gunshot wound
- The idea just isn't enough to change behavior
  - The link to underinvestment just isn't there all alone
  - Too many other obstacles to investment, such that mitigating the risk just doesn't do anything?

# Longer term

- Requires social learning
- Requires seeing it to believe it
- Requires higher levels of training/education
- Requires longitudinal studies to measure long term impact on
  - Consumption smoothing
  - Increased incentives for investment/risk-taking
  - Increasing growth rates in household income

# Wrong entry point?

- (Note: I'm more skeptical of this one)
- Insure the lender, not the farmer
- Malawi
- Problem:
  - Message to the farmers to avoid default regardless of rainfall? What will they learn? How will this affect the next year?
  - See Ghana pilot... no changes for the farmers still
  - Was this really the only risk holding the banks back?

# Design not optimal

- Wrong outcome measure
  - Moral hazard problem of other outcomes.
  - Solvable through community pool?
- People just don't really understand the outcomes, don't trust the outcomes, don't feel the outcomes are the right ones, etc.
  - Solvable through community pool/allocation system?
- Costs:
  - Transaction costs not all about info asymmetries
  - Williamson logistical transaction costs stories make tons of sense here
    - Similar issue for credit....
  - Sometimes the “innovation” is just about service delivery and efficiently run organizations.

# How much better is the insurance?

## Example: Health Insurance in the Philippines

- Key questions:
  - What is the impact of offering health insurance?
  - Does *requiring* it mitigate adverse selection?
- Setting:
  - Green Bank of Caraga, Philippines
  - Kasapi: government health insurance
  - \$2/month premium, offered through employers
  - Program to offer through banks for microentrepreneurs

# Methodology

- Key problem when measuring impact:
  - How did the lives of the people change...
  - Compared to how they would have changed had they not had health insurance.
  
- First question fairly straightforward to answer.
- The second is much tougher.

# Methodology

- Why do some buy insurance and not others?
  - Perhaps they are sicker.
  - Perhaps they care more about their health.
    - Health status is a “stock asset” – not just a “cash flow”.
- What else is happening in the community?
  - Epidemics. Macroeconomic conditions. Other health initiatives.
- How does one control for these factors in an evaluation?

# Methodology

- Randomized control trials
- Same as for prescription drugs
- This generates comparison group that:
  - Does not have self-selection bias
  - Does not have a targeting bias
  - Experiences same outside factors
- Spillovers could be an important consideration
  - Design can accommodate this, but need to plan for it if considered to be an issue

# Design specifics

- 6248 clients of the Green Bank
- Randomly assigned to either:
  - Required to purchase health insurance, unless already had (1534)
  - Offered health insurance (1590)
  - No offer of health insurance – control (3124)

# Demand

- No adverse selection
- In fact, the opposite, sort of:
  - 34% enrollment in compulsory, 23% in voluntary
  - 1.9% claims rate in compulsory, 2.1% claims rate in voluntary group
  - Higher TOTAL claims in voluntary group (despite lower take-up).
  - Implication?
  - Perhaps: If made mandatory, not valued. Not understood. Not used.

# Demand

## Agricultural Insurance Products

- Malawi - Rainfall
- Ghana – Crop Price
- Ghana – Rainfall

## Lessons and Questions

# Malawi

- Xavier Gine and Dean Yang
- Credit with rainfall insurance (“fairly” priced)
  - actuarially fair plus admin costs
- Credit without rainfall insurance
- **Lower** borrowing in credit with rainfall insurance group
- Bottom line: Where is the demand?
  - Did they understand it?
  - Did they already see the loans as having rainfall insurance implicitly embedded?

# Ghana

## Loans to Farmers with Crop Price Indemnification

### Research Question

- Does mitigating crop price risk encourage borrowing for agriculture?
- How does risk faced from crop prices affect investment decisions?



# Setup

- Farmers marketed loans – ½ with crop price indemnification
  - 169 attended informational meetings about rural bank products
  - No mention of insurance in advance
  - All given opportunity to apply for loan
  - 1/2 randomly assigned to be marketed loan with crop price indemnification linked – for no extra charge
- Baseline survey conducted – socio-demographic, agricultural, risk, cognitive, financial history

# Randomization & Treatment

- Treatment: Loan where 50% of loan forgiven if official crop price fell below threshold
  - Farmers insured for 1 crop, either maize or garden egg
  - Threshold selected in partnership with Ministry of Food and Agriculture, based on historical crop prices
- Control: Loan with no indemnity clause

# Demand and Take-up

- Large demand for credit overall
- High application rates for all farmers: ~85%
- But no difference between treatment and control demand
- No difference in demand for credit with free indemnity clause

# Follow-up and Impact

## Questions:

- With protection against crop price fluctuations – what do we see?
- What happens to farming practices?
- Did the risk mitigation lead to → higher investment?
  
- Follow-up with 75% of farmers (small sample size, low power)
- No significant effects found for almost all outcomes:
  - Change in type, proportion of crops grown
  - Area under cultivation
  - Revenue, quantity harvested
  - Outcomes relative to farmers' expectations
  - Loan repayment

# Results 1: Sales

- Uninsured farmers more likely to sell to farmgate buyers – who pay part in advance but much lower rate
  - Guaranteed price (lower price) but set pre-harvest
- Insured farmers were much more likely to sell to market traders
  - Those with price insurance can bear some market risk, sell at the market, and get higher price
  - 26 percentage points difference (big!)
  - Difference is significant at 5%
- Suggests: price indemnity clause may replace farmgate/early-sales insurance mechanism?

## Results 2: Focusing Inputs

- Insured spend more on chemical inputs for their insured crop as percent of all crops
  - 18 percentage points (p-value 0.03)
  - Suggest concentration on insured/protected crop
- If had more insurance – more investment?
- Less conclusive: no differences in other inputs
  - Land
  - Labor
  - Seeds

## Open questions ...

- Did farmers understand the indemnity clause?
- Does indemnity offer a substitute for other informal insurance mechanisms, such as pre-sales to farmgate buyers?
- Would a higher price threshold or larger percent indemnity change the effect?
- Would other variations of insurance yield larger effects?

# Ghana

## Examining Underinvestment in Agriculture



- Looking at impact of rainfall insurance on investment in agriculture, as well as the impact of capital on investment
- Building on past lessons on key determinants of demand: pricing, timing, liquidity, trust, marketing
- What is willingness to pay initially and over time?

# Examining Underinvestment in Agriculture

- Year 1 – August 2008 – November 2009
  - Sample ~500 maize farmers
  - Free rainfall insurance
  - 100% take-up!
  - Results of endline/impact assessment in Feb 2010

# Examining Underinvestment in Agriculture

Forthcoming.....

- Year 2 - December 2009-December 2010
  - Sample ~ 1000 maize farmers
  - Rainfall insurance marketed for small fee (less 1 USD/acre) vs for free
- Year 3 – December 2010 – December 2011
  - Look at more prices
  - When priced fairly and competitively, what does demand look like?
  - Demand different based on payouts? Proximity to payouts? If received free insurance before?

# Reviewing Lessons

## Take Up and Price

- Lower take up for loans with free weather insurance
- Take up low for free and actuarially fair products
- Price does matter but any price too high when subsistence/in extreme poverty
- Without experience, knowledge or trust - even free products concerning/confusing
- **Improvements** - free stand alone simple product – high take-up

# Reviewing Lessons

## Timing, Marketing and Trust

- Farmer finances tight and linked with agricultural cycle
- Ability to purchase, cash availability specific to each context/crop/season/region
- Timing effects take-up and amount of protection purchased
- Simplicity of product, farmer understanding of product key
- Link between insurance model– and beneficiaries view of risk important
- Agent/trust matters -link with local NGO 10% increase take-up
- Being visited by marketer/surveyor increases likelihood of take-up

# Reviewing Lessons

## Potential Impacts

- Investment may increase
- May take risks marketing/sales – higher price
- If poorly understood – lower likelihood of impact or behavior change

# Thank you!

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