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# *Designing Insurance Contracts to Improve Well-being & Investment by Small-scale Farmers & Herders*


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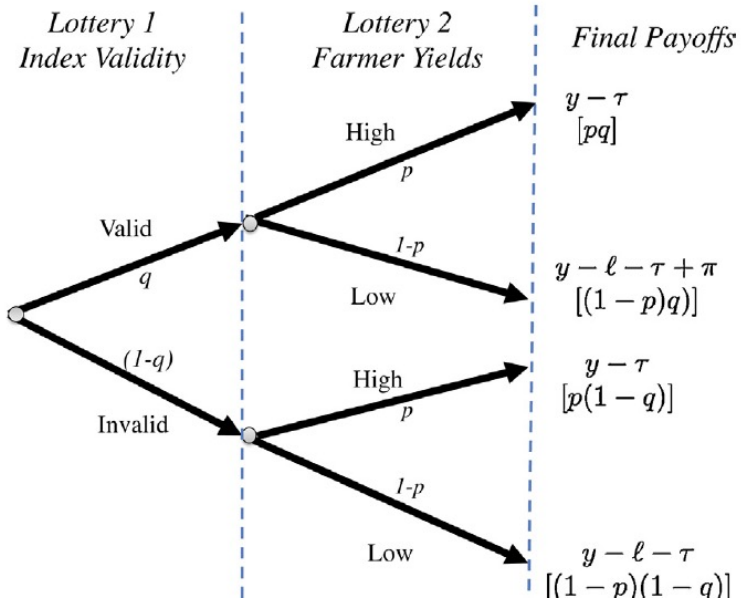
# Understanding the Demand for Index Insurance

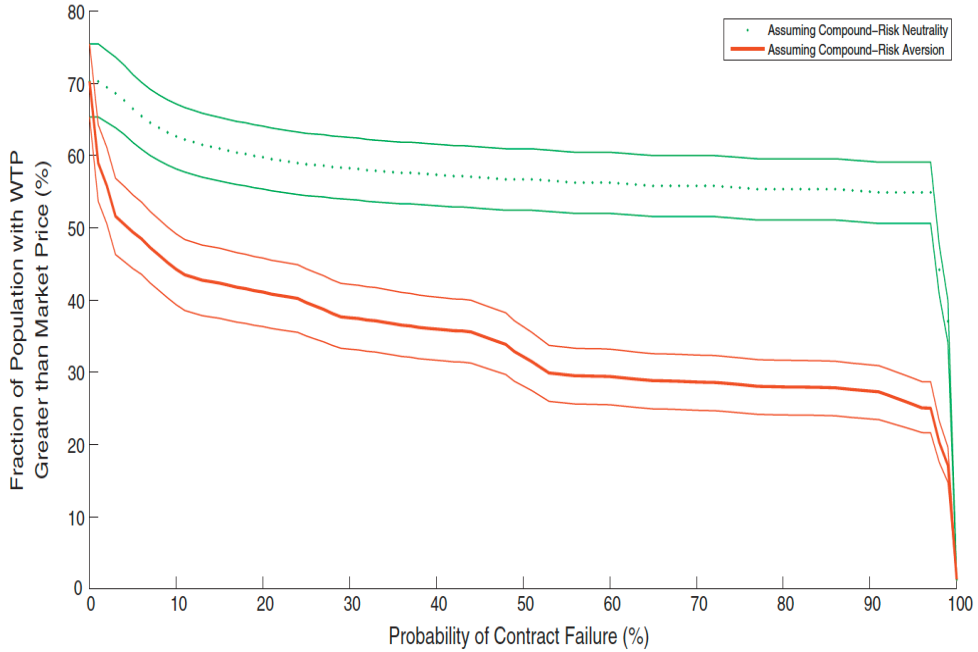
- Index insurance has remerged over the last decade as a potential solution to the age-old problem that uninsured risk dampens technological change and productivity growth, especially amongst small-scale agriculturalists.
  - Index insurance operates by grouping farmers into insurance zones.
  - Payments are made based on an objective index for the zone (*e.g.*, of weather conditions or average plant growth) that proxies for farmer losses in the zone.
- A fundamental strength of index insurance is that it does not require costly individual loss verification, making it possible to offer insurance to small-scale agriculturalists whose small coverage levels make loss verification uneconomical.
- Unfortunately, this fundamental advantage of index insurance is also its Achilles heel as the index may fail to accurately capture losses experienced by the insured farmers ("basis risk").

# Understanding the Demand for Index Insurance

- While we know that the cost of farmers' autarkic risk management strategies are often high, demand for index insurance is often low
- Possible explanations include
  - Lack of understanding or trust
  - Often sold at prices high relative to expected payments
- Basis risk also discourages purchase, especially the least and most risk averse
- As we discussed yesterday, basis risk might be especially discouraging if farmers violate the standard economics assumption and are allergic to compound lotteries:

# Index Insurance as Complex & Ambiguous




- One design implication is to go for contracts that minimize basis risk
- But let's look at other features of insurance that behavioral economics suggest may discourage the purchase of insurance despite the presumption of standard economic perspectives on behavior
- Along the way, we can get a flavor of how behavioral economic experiments work and get further ideas on how to make insurance better resonate with a broader array of people

# The Allais Paradox

- Consider Experiment 1 where you choose between 2 lotteries:

| Experiment 1 | | | |
|---|---|---|---|
| *Lottery 1A* | | *Lottery 1B* | |
| Pay-offs | Prob. | Pay-offs | Prob. |
| 0 | 89% | 0 | 90% |
| \$1 million | 11% | | |
| | | \$5 million | 10% |

- Indicate on your poll which you would rather play

# The Allais Paradox

- Now consider Experiment 2:

| Experiment 2 | | | |
|---|---|---|---|
| *Lottery 2A* | | *Lottery 2B* | |
| Pay-offs | Prob. | Pay-offs | Prob. |
| | | 0 | 1% |
| \$1 million | 100% | \$1 million | 89% |
| | | \$5 million | 10% |

- Indicate on your poll which you would rather play

# What this Experiment Tells us about Behavior

- From an expected utility perspective, our preference for 1B over 1A implies that:

$$89\% \times u(\$0) + 11\% \times u(\$1m) < 90\% \times u(\$0) + 10\% \times u(\$5m)$$

or

$$11\% \times u(\$1m) < 1\% \times u(\$0) + 10\% \times u(\$5m)$$

- In words, our preference for 1B to 1A implies that the 11% chance of $1m is valued *less* than a 1% chance of $0 plus the 10% chance of $5m. Seems reasonable, no?
- But in Experiment 2, most of us preferred 2A over 2B, implying that:

$$100\% \times u(\$1m) > 1\% \times u(\$0) + 89\% \times u(\$1m) + 10\% \times u(\$5m)$$

or,

$$11\% \times u(\$1m) > 1\% \times u(\$0) + 10\% \times u(\$5m)$$

- In words, our preference for 2A over 2B implies exactly the opposite: an 11% chance of $1m is valued *more* than than a 1% chance of $0 plus the 10% chance of $5m
- So clearly most of us are not making choices in the face of risk in the way that standard, expected utility analysis posits
- So what does this mean for microinsurance?

# The Allais Paradox & Insurance

- In Allais' own language, individuals simply tend to “greatly value” certainty
- More recent experiments show that people largely make decisions consistent with the expected utility paradigm (which has very favorable predictions for insurance demand), except when tempted by the “allure of certainty”
- So how does all this relate to insurance? – Insurance is an alien commodity precisely because it (usually) has a certain cost (the premium), but an uncertain benefit
- In explaining insurance to the never before insured, we often strongly emphasize this point so that farmers understand they may not in any particular year receive anything in return for their insurance purchase
- But if Allais is correct, then in making insurance purchase decisions, do we overweight the certain cost (the negative element of the contract) relative to the uncertain benefits of the contract, implying lower than expected insurance demand?
- Can we exploit this behavioral knowledge and make insurance more attractive to people, especially microinsurance where purchase is usually a voluntary decision

# Using Allais to Make Microinsurance More Effective for Burkina Faso Cotton Farmers

- Set up a framed field experiment with Burkinabe cotton farmers meant to mimic their reality:
  - 1 hectare of land to use to cultivate cotton
  - Random yields with 1200 kg of cotton in good year (80% probability) & 600 kg in bad year (20% probability)
  - Cotton price & input costs set at realistic levels, giving net revenue (family income) shown to farmers
  - Endowed with an initial wealth of 50,000 CFA
- After learning how to play, the game farmers offered insurance under one of two randomly offered contract frames:
  - *Standard Premium Frame*: you must pay your premium with 100% certainty
  - *Premium Rebate Frame*: premium rebated in bad years (but payout lower by the amount of the rebate)
- A separate exercise was used to determine which farmers “greatly value certainty” and which ones behave like expected utility maximizers to whom the framing would make no difference

# What did We Learn from Allais and the Cotton Farmers?

- About one third of farmers exhibited a strong certainty preference in the independent measurement
- Across all farmers, the willingness to pay for cotton insurance in the game was 15 percentage points (increasing average WTP from 151% to 165% of the actuarially fair price
- This is large enough to make a difference in the real world
- More intriguingly, under these average results we find that those farmers with a strong certainty preference value insurance by 40 percentage points more (with WTP rising from 135% to 176% of the actuarially fair price, while the alternative faming had no effect on “expected utility types
- Seems like a no-brainer to use the rebate frame
- Using results from impact studies, which show that when insured farmers invest more, this shift should increase demand for insurance substantially and increase total cotton production by almost 5% nationally (every year!).
- This would be a huge rate of return from a simple intervention that would be easy to implement in the context of the cotton value chain