Making Index Insurance Work for the Poor

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"It is odd that there appear to have been no practical proposals for establishing a set of markets to hedge the biggest risks to standards of living".

Robert Shiller (1993) "*Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks*"

Some examples

- **USA:** Case-Shiller housing price futures, agriculture derivatives etc.
- **Mexico:** Natural disaster relief fund FONDEN has purchased index insurance for large earthquake risks (based on Richter Scale earthquake magnitude) and has issued a CAT bond.
- **Philippines:** Typhoon index insurance, based on distance of farmer from central path of a typhoon, wind speed and coverage amount.
- **Indonesia:** Insurer Asuransi Wahana Tata offers flood insurance that pays off if water levels at a particular gauge rise above a “trigger” level.

Index insurance

- An insurance policy where payouts are linked to a publicly observable index:
  - E.g. (i) Rainfall in a nearby rain gauge; (ii) commodity price; (iii) aggregate crop yields, (iv) satellite data on vegetation (NDVI).

Key advantages of index insurance:

- Cheap to calculate payouts. No need for household to even file a claim. Minimizes transaction costs.
- Payouts can often be calculated and distributed quickly.
- Mitigates moral hazard / averse selection (e.g. farmer can't influence index).

Index Insurance

Key drawbacks:

- It covers one type of risk, producers may be exposed to many, that may be more relevant in certain contexts
  - Price risk
  - Supply chain risk
- Basis risk…

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	Correlation
Rainfall	0.293
Rainy day (1=Yes)	0.340
Payout Amount	0.148
Payout dummy (1=Yes)	0.302

Outline of today's talk

1. Primer on (rainfall) insurance
2. Demand of insurance
    i. Micro (Individual)
    ii. Meso (Financial Institutions / Producer groups)
    iii. Macro (Governments)
3. Impact of insurance
4. Design and Market Dynamics
5. Conclusions

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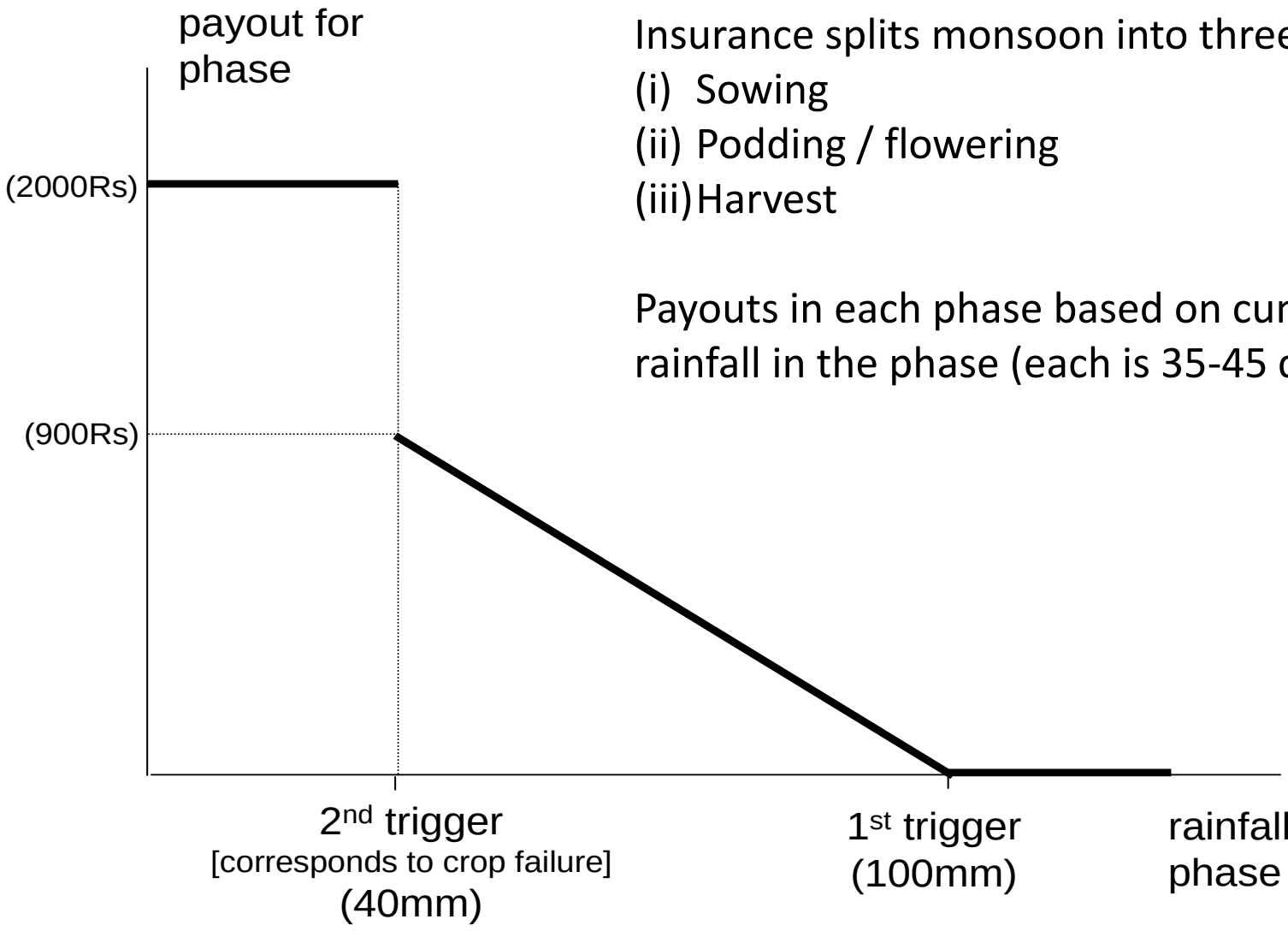
Insurance Product Example (Phase II: Narayanpet 2006)



Insurance splits monsoon into three phases:

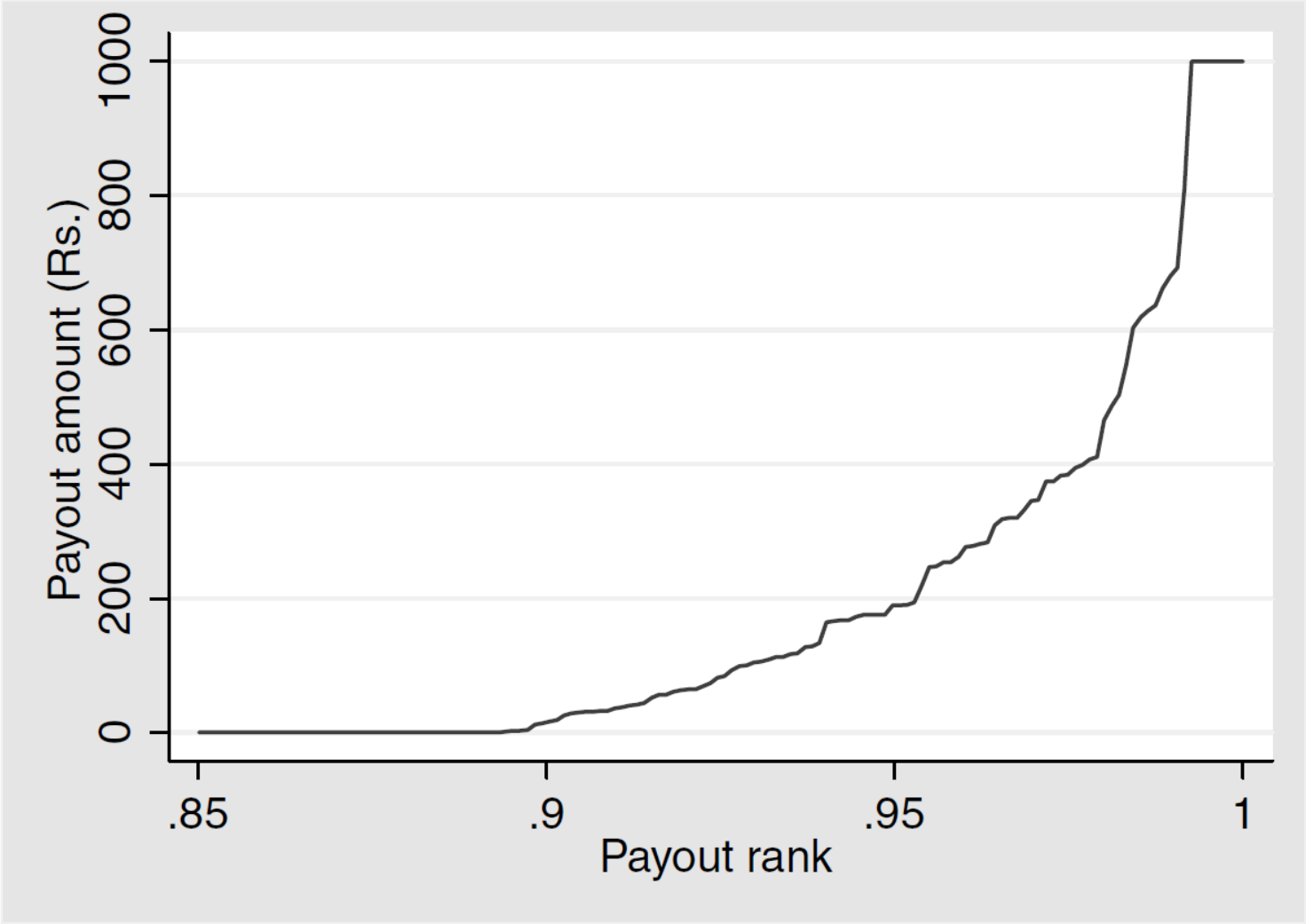
(i) Sowing

(ii) Podding / flowering

(iii) Harvest

Payouts in each phase based on cumulative rainfall in the phase (each is 35-45 days)

How often does the insurance policy pay out?



Source: Gine, Townsend and Vickery (AJAE, 2007)

How expensive is it relative to actuarial value?

Expected payouts relative to premia, based on historical rainfall data:

- **Andhra Pradesh:** 20%-50% .
- **Gujarat:** 50-57%.

Point of comparison: US auto and homeowner insurance:

- Payouts for these products are 65-76% of premia. (Source: Best's Aggregates and Averages).

Why do Indian payout ratios appear lower?

- High operating costs compared to low value of each policy.
- Same story for other financial products (Cull et al., 2009)

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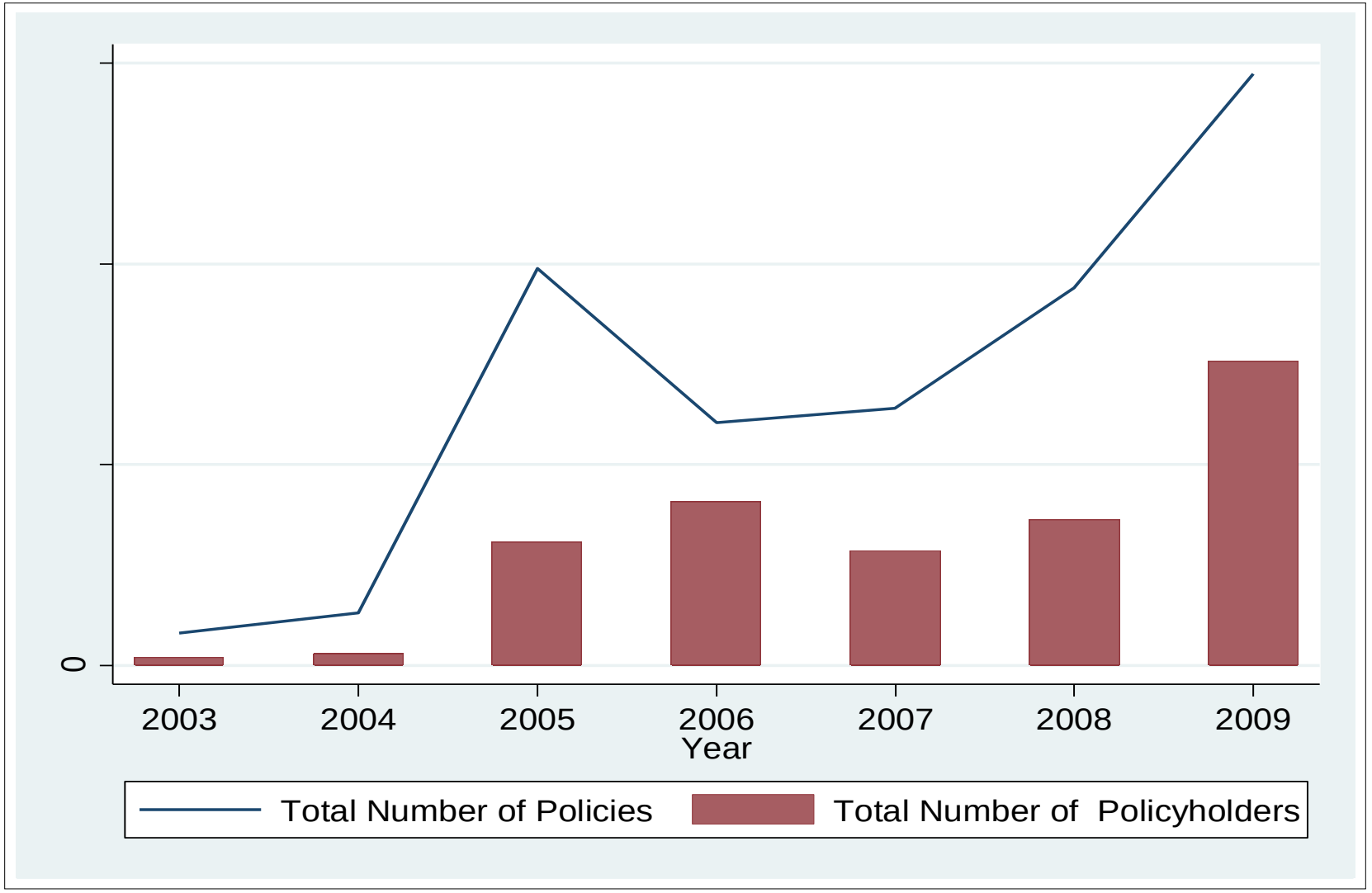
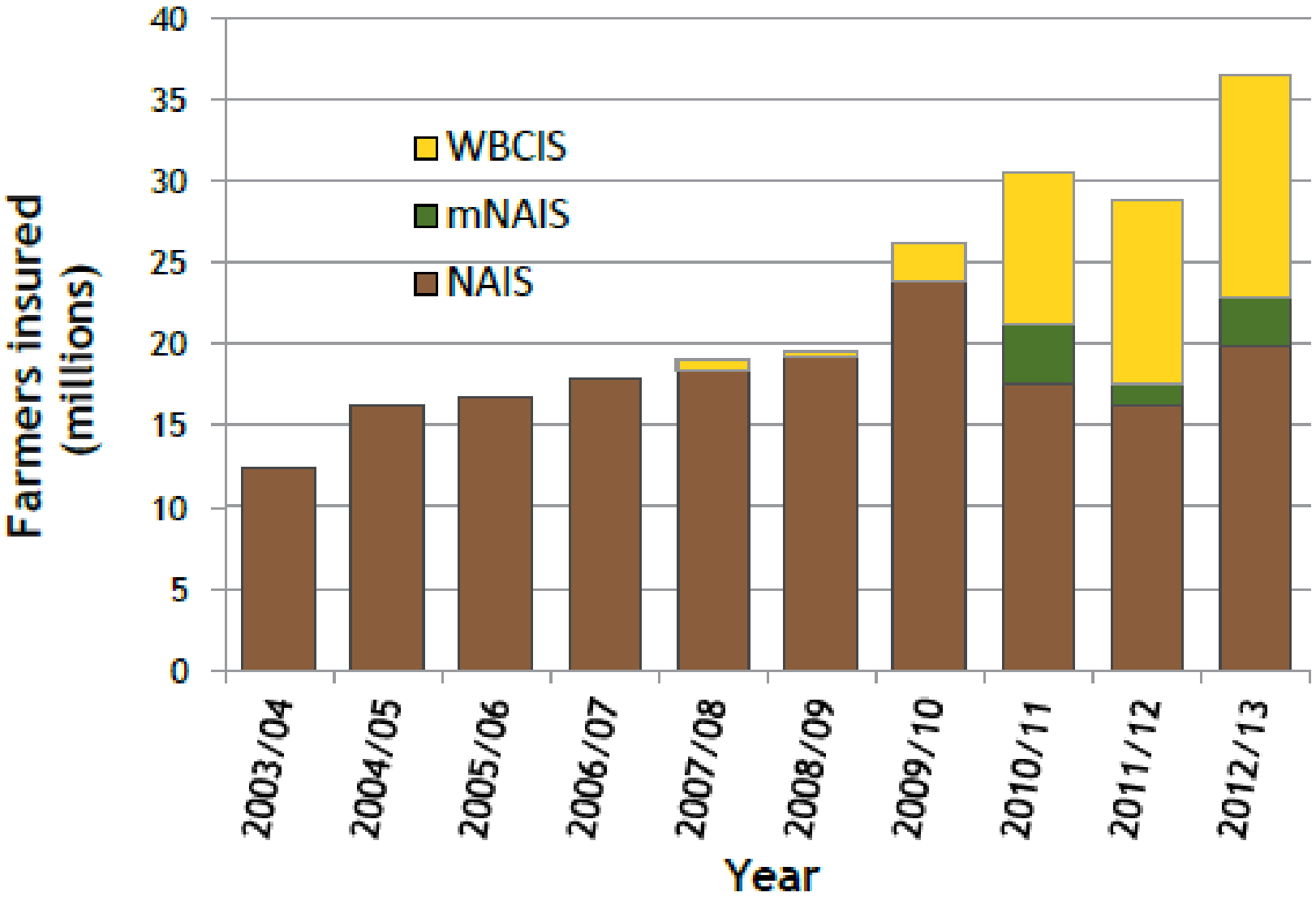
Demand for rainfall insurance in AP (micro level)



Demand for Insurance in India



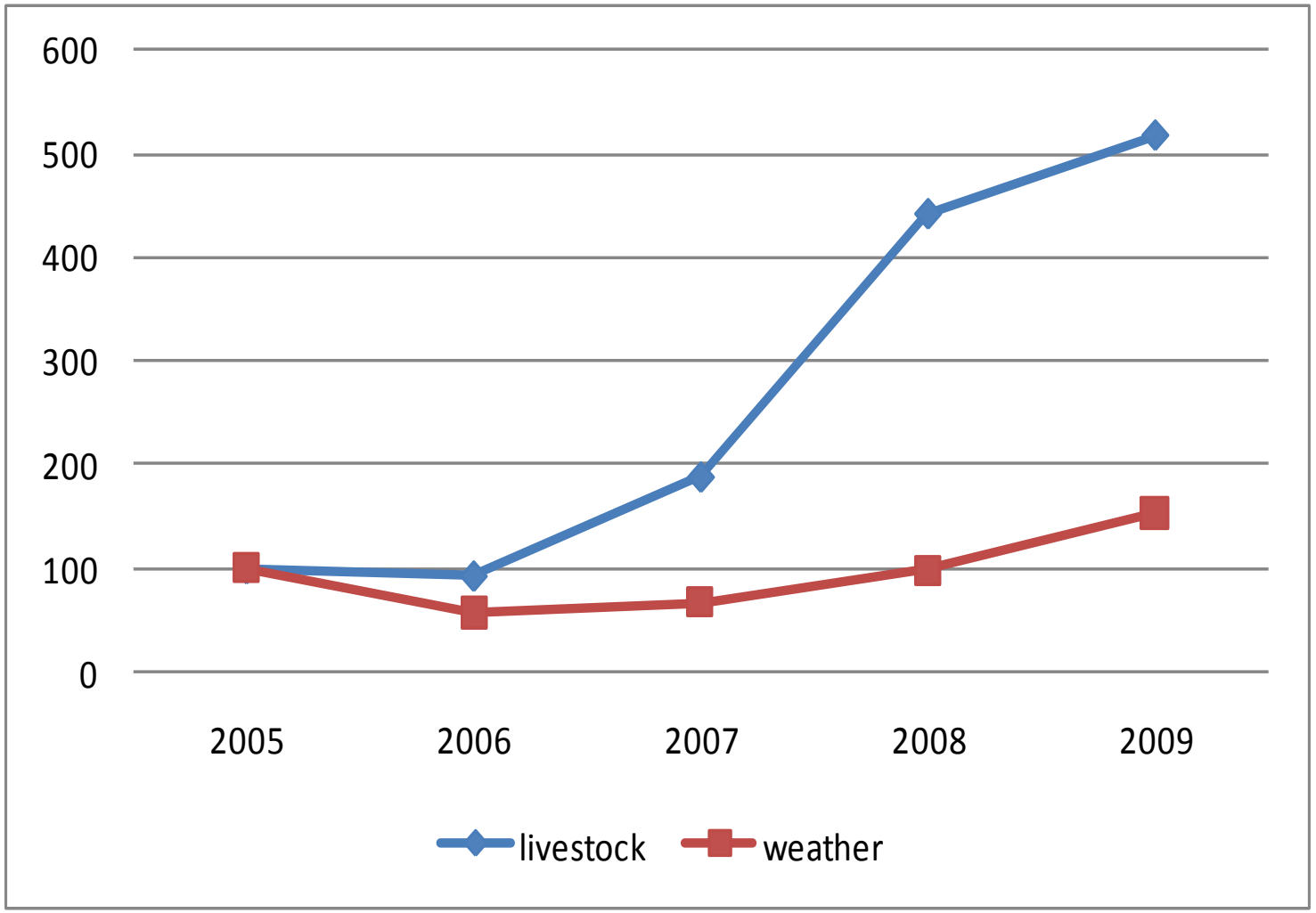
Demand for Insurance (micro level)

- **View #1: Price is the key constraint.** Perhaps the product is just too expensive to be attractive.
  - Could reflect transactions costs , lack of scale economies, high loading factor.
  - Insurance will be attractive if it improves risk management relative to the existing range of ex-ante and ex-post coping mechanisms:
    - Informal: Income smoothing, borrowing and saving, transfers from relatives and friends
    - Formal: Other government social protection programs (NREGA, etc)
  - But, even when offered at subsidized rates (positive NPV), demand is not universal.

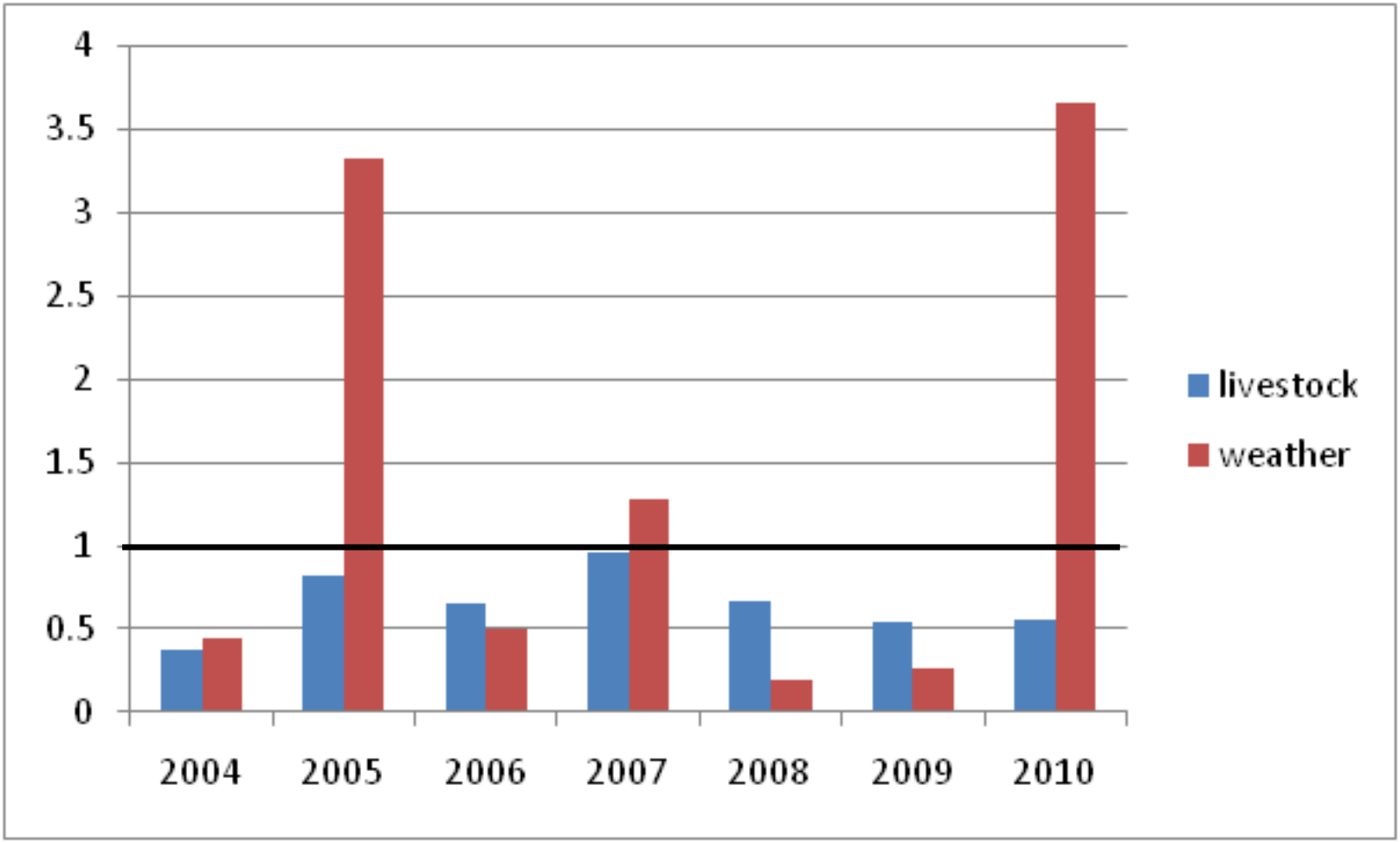
Demand for Insurance (micro level)

- **View #2: Non-price frictions are important.** Holding price fixed, other barriers significantly reduce insurance demand:
  - Liquidity constraints
  - Complexity

Demand of insurance products from BASIX in AP, India



Payouts relative to premia



Demand for Insurance (micro level)

- **View #2: Non-price frictions are important.** Holding price fixed, other barriers significantly reduce insurance demand:
  - Liquidity constraints
  - Trust
  - Education

Demand for Insurance (micro level)

- **View #2: Non-price frictions are important.** Holding price fixed, other barriers significantly reduce insurance demand:
  - Liquidity constraints
    - Increase in take-up of 34% (130% of baseline probability of purchase).
  - Trust
    - Endorsement by trusted third party increases take-up by 11% (41% of baseline probability).
  - Education
    - No effect on take-up (or knowledge!)

Pilots around the world…

Pilots around the world… that have scaled up

Demand for Insurance (meso level)

- Advantages:
  - Reduced Transaction costs
  - Crowd in Informal Insurance
  - Perceived as a win-win
    - Culture of Repayment?
    - Take-up?
      - Uninsured loan: 33.0%
      - Insured loan: 17.6%
- Disadvantages:
  - Lack of awareness (especially if compulsory or not made salient)

Demand for Insurance (macro level)

- Advantages
  - Allows for risk transfer
  - Governments can use weather hedges to help protect budget deficits.
    - After a natural disaster, relief aid and social protection programs are likely to increase and revenues are likely to fall.
    - Mexico's CADENA program
  - Some countries may find it cheaper than accessing capital markets directly
    - Caribbean Catastrophe Risk Insurance Facility (CCRIF)
    - Mexico's CAT bond

Demand for Insurance (macro level)

- Disadvantages
  - Index insurance at the macro level may be expensive
  - Moral Hazard…

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Impact of Insurance (Micro level)

Figure: Fraction of farmers who had planted cash crops by different points during 2009 monsoon season: difference between treatment and control group.

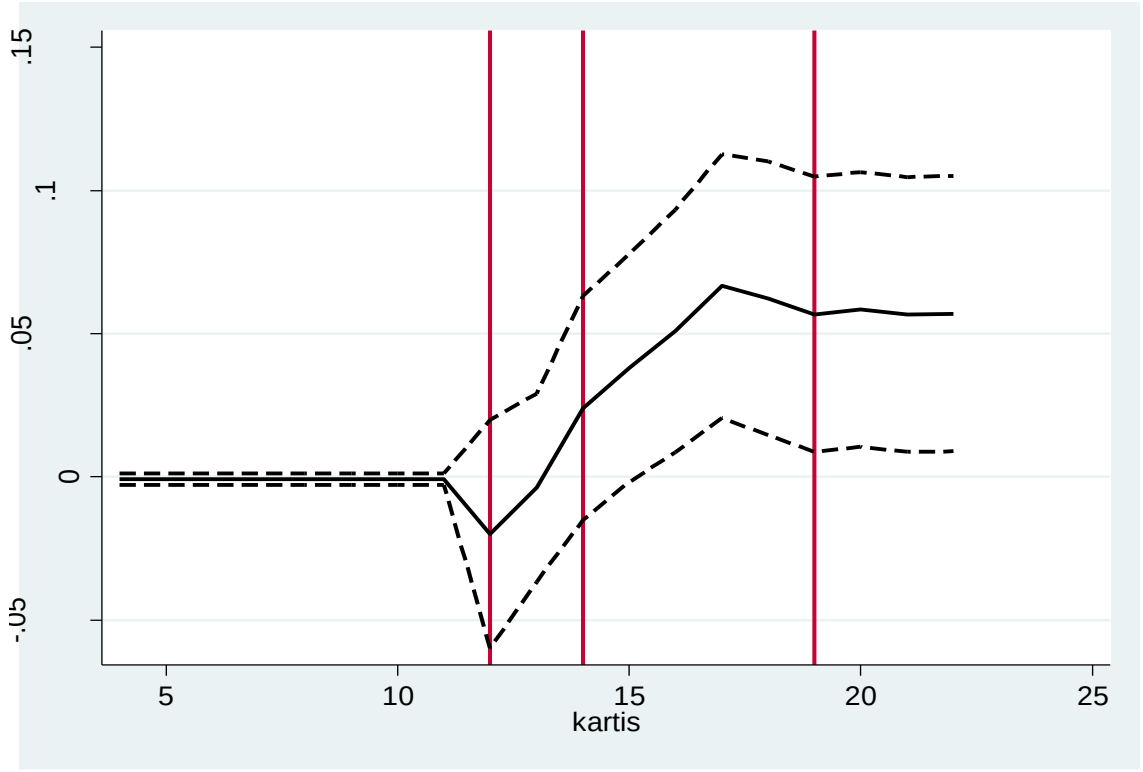

Figure note: Left and middle vertical lines show period during which field experiment was implemented. Right vertical line shows Kartis in which period of insurance coverage ended.

Impact of Insurance (Micro level)

- Wealth doesn't seem to matter but effects are largest among more educated farmers
- Effects are driven by "ex-ante" behavior
- **Consistent with…**
  - Karlan et al. (2013): Insurance increases total investment
  - Mobarak and Rosenzweig (2013): Indian farmers switch to riskier varieties of rice

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Design of Products

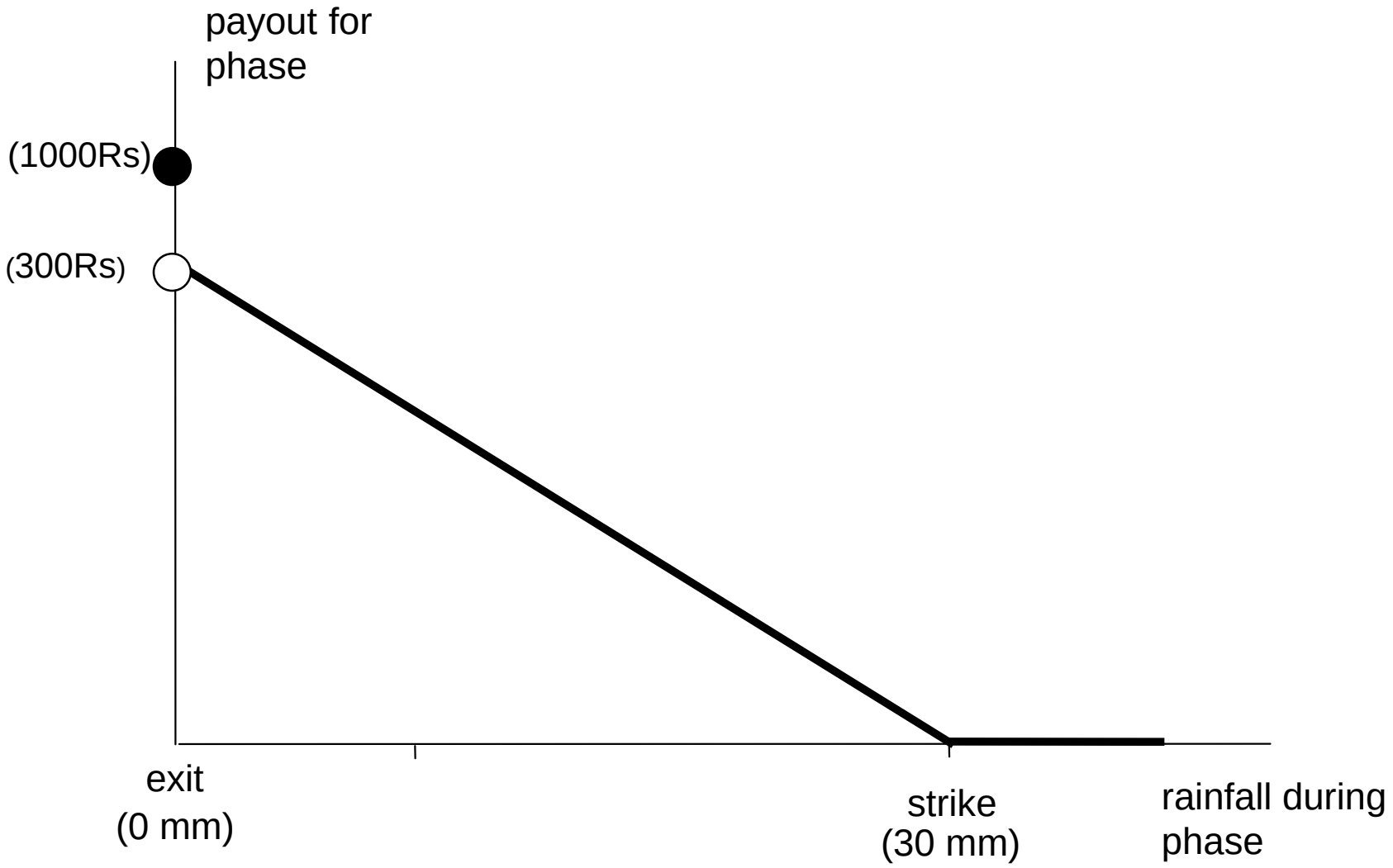
Can farmers effectively evaluate products?

- Evaluate willingness to pay for **four** policies
- (1) Actual policy designed for their geographical area
  - E.g., Anantapur Phase II, premium 110. Pays Rs. 1,000 on exit.

Gauge	Strike (mm)	Exit (mm)	Per mm	Exp Payout
Anantapur	30	0	10	44

- (2) mm deviation. Reduce the amount paid out per mm from 10 to 5
  - =>Reduces expected value from 44 to 22

Actual Contract in Anantapur



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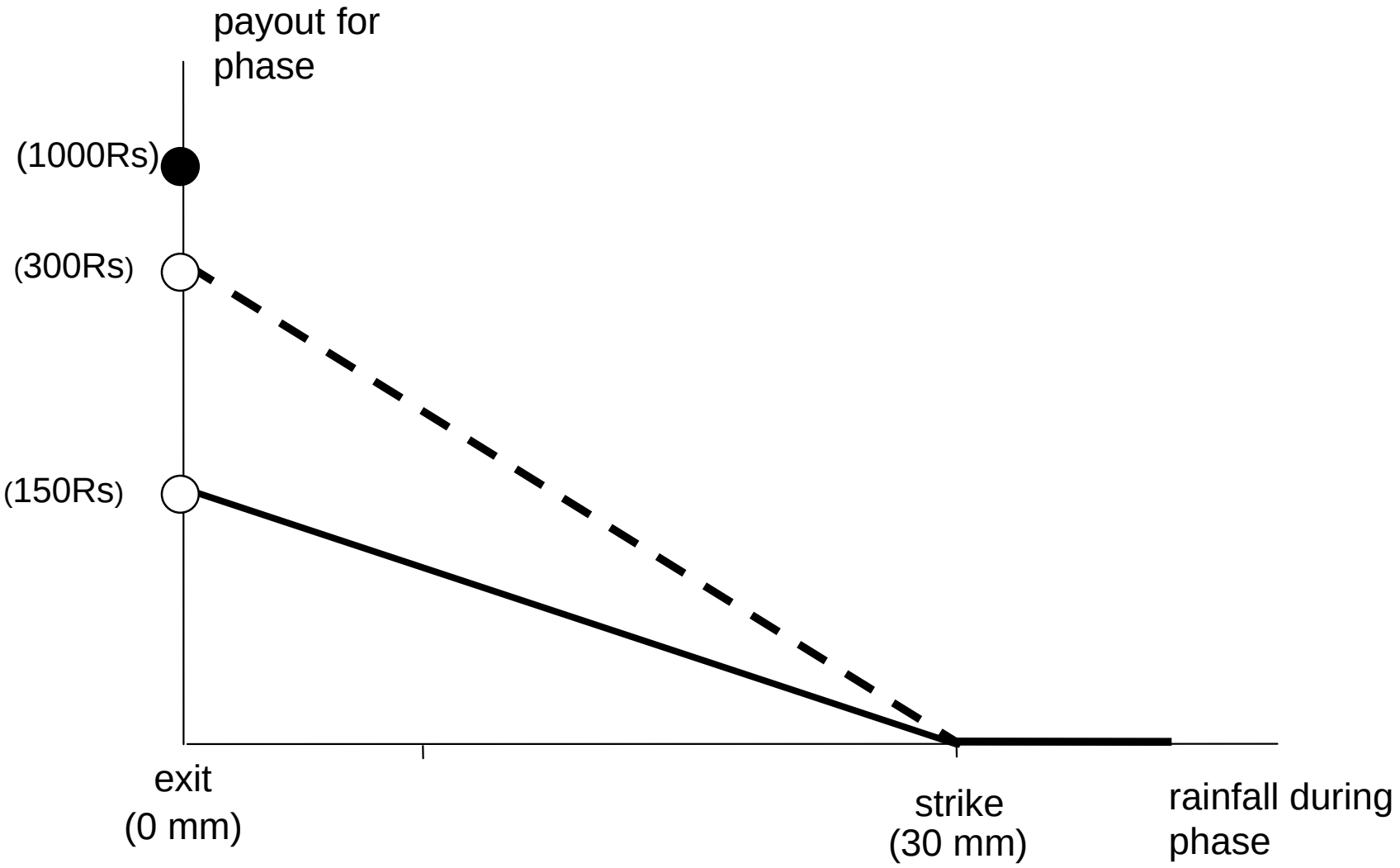

Experimental Design

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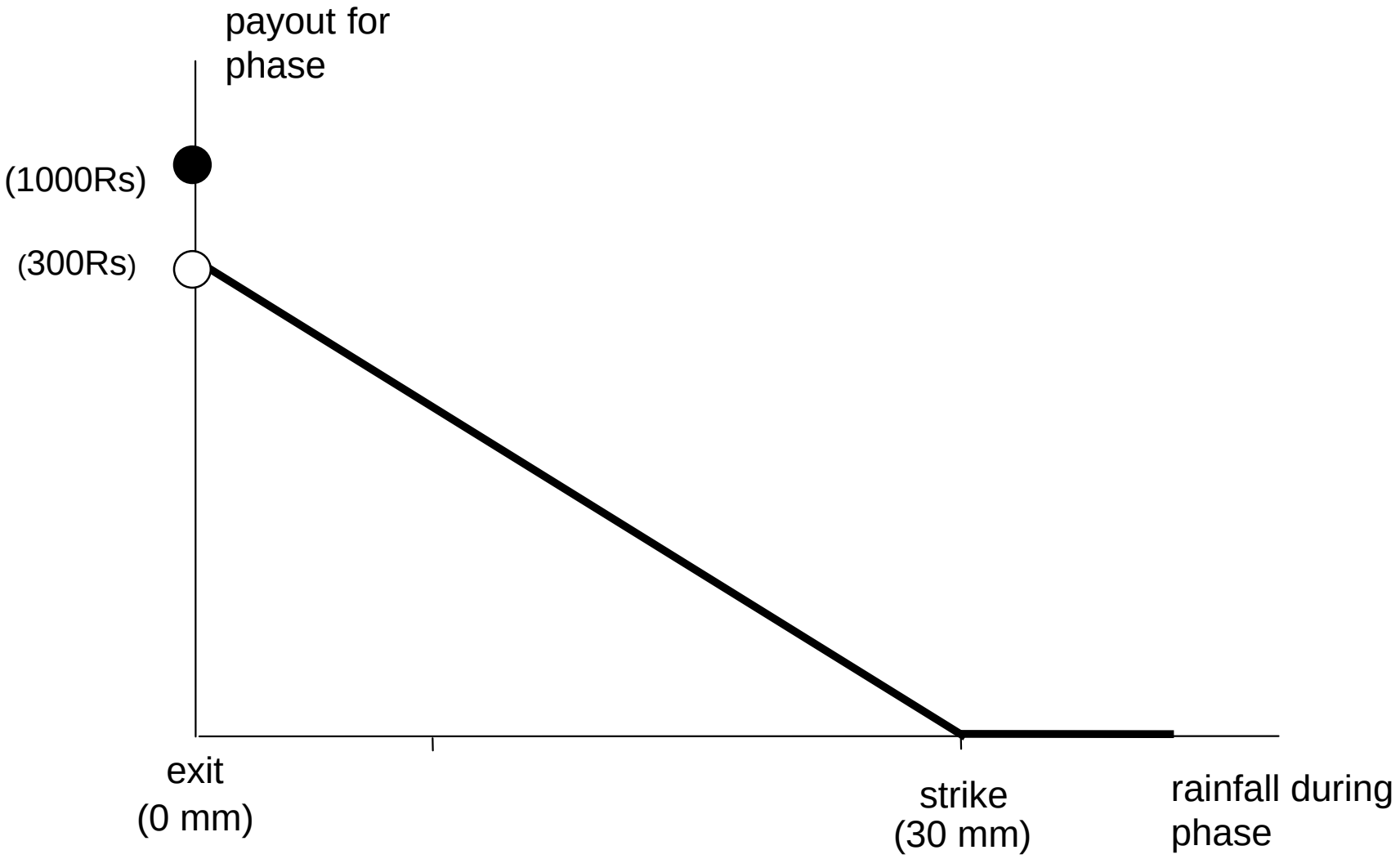
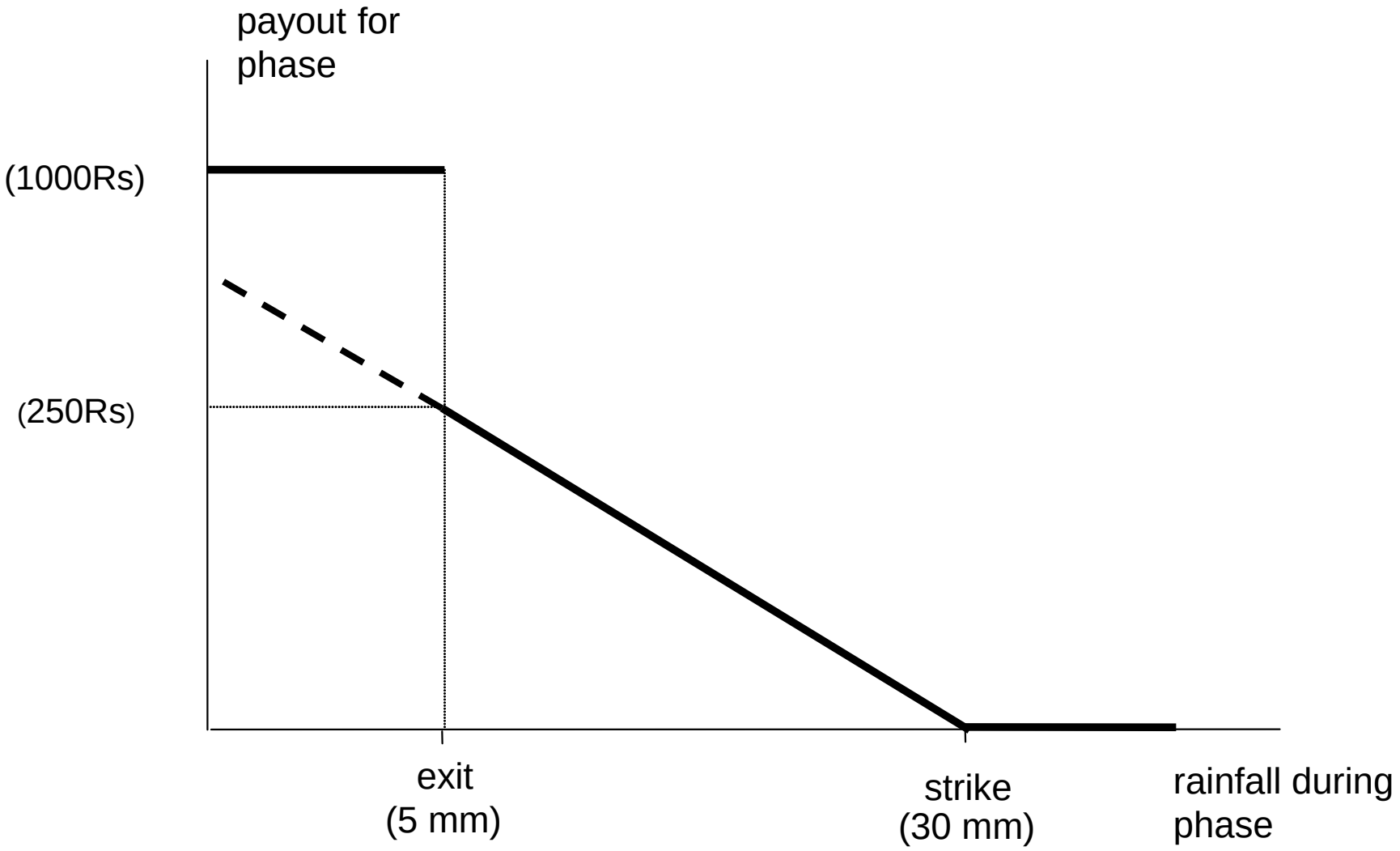
- (2) mm deviation. Reduce the amount paid out per mm from 10 to 5
  - =>Reduces expected value from 44 to 22
- (3) Higher Exit. Pay Rs. 1,000 if rainfall between 0 and 5 mm
  - =>Raises expected value from 44 to 110

Actual Contract in Anantapur



Insurance Design (Example contract)



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- (4) Basis Risk. Real policy, but written on distant rainfall station

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- (2) mm deviation. Reduce the amount paid out per mm from 10 to 5
  - Reduces EV by Rs 22, reduces WTP by Rs. 13
  - Affects payouts in moderate states of world
- (3) Higher Exit. Pay Rs. 1,000 if rainfall between 0 and 5 mm
  - Raises EV by 66, raises WTP by 11
  - Payout occurs in 'worst' state of the world
- (4) Basis Risk. Real policy, but written on distant rainfall station
  - No effect on expected value (in expectation)

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Conclusions

- Holistic Approach
- Farmer-driven design
- Target beneficiary?

Conclusions

- Holistic Approach
  - Yes but tension between awareness and compulsion
- Farmer-driven design
  - Distinction between needs and wants
- Target beneficiary?
  - Smallholder farmers are perhaps the hardest entry point for an effective risk-management policy