Index Insurance
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Index-based insurance is an innovative financial product, which has been introduced in recent years in countries as diverse as India, Mongolia, Malawi and Thailand. It allows individual smallholder farmers to hedge against agricultural production risk, such as drought or flood. The product pays out in events that are triggered by a publicly observable index, such as rainfall recorded on a local rain gauge. Advocates argue that index insurance is transparent and inexpensive to administer, enables quick payouts, and minimizes moral hazard and adverse selection problems associated with other risk-coping mechanisms and insurance programs.

Figure 1 presents an example of a policy against deficient rainfall. As one can see, upper and lower rainfall thresholds are specified in the x-axis. The policy pays zero if accumulated rainfall exceeds the upper threshold; otherwise, the policy pays a fixed amount for each millimeter of shortfall relative to the upper threshold, until the lower threshold is reached. If rainfall falls below the lower threshold, the policy pays a fixed (higher) payout.

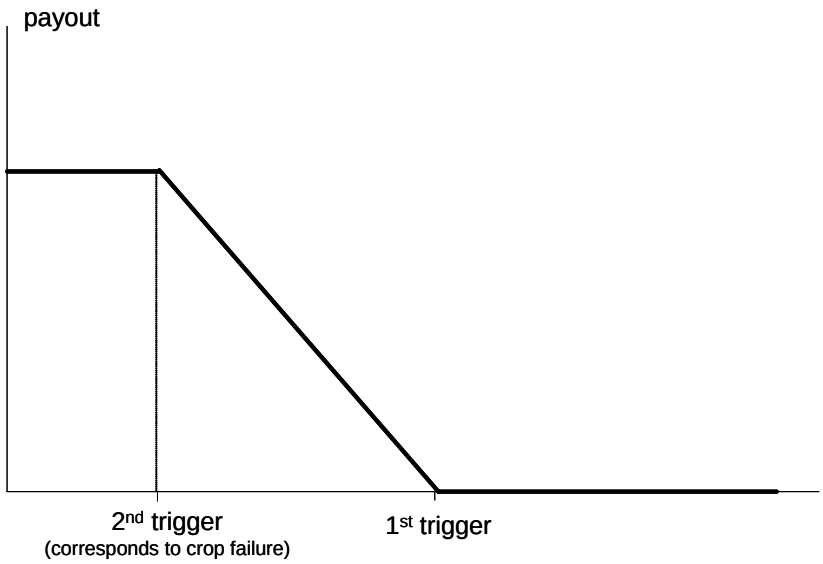

Figure 1: Phase-wise Payout as a function of rainfall

This financial innovation holds significant promise for rural households. Shocks to agricultural income, such as a drought-induced harvest failure, generate fluctuations in household consumption that are not perfectly insured; at the extreme they may lead to famine or death. The evidence suggests that households in developing countries are only partially insured against income shocks. Moreover, weather events tend to affect all households in a local geographic area, making other risk-sharing mechanisms, such as inter-household transfers and local credit and asset markets, less effective at reducing the impact of the shock.

These policies are typically sold without subsidies. The premium is calculated as the sum of the expected payouts, a share of its standard deviation and of the maximum sum insured in a year (loading factor), plus a percent administrative charge and government service tax.

A basic research question for the study of these micro-insurance products is estimating the determinants of household insurance take-up, and identifying the factors which prevent the remaining households from participating.

In this project we test competing theories of household insurance demand and draw conclusions about the barriers to widespread household participation. We do so through a set of randomized experiments, conducted in rural areas of two Indian states, Andhra Pradesh and Gujarat in collaboration with two partner institutions, BASIX in AP and SEWA in Gujarat. We estimate the price elasticity of demand for insurance by randomly varying the price of the policy. To understand the role of credit constraints, we randomly assign certain households positive liquidity shocks. To measure the importance of trust, we vary whether the household receives a product endorsement by a trusted local agent. To understand whether limited financial education about the product limits adoption, we provide additional information to a subset of households relating the unfamiliar concept of rainfall in millimeters to the familiar concept of soil moisture. Finally, to understand whether product framing influences take-up, we vary the presentation of information on probability and the tone of the product marketing.

Our main results are as follows. First, we document relatively low participation in the risk management product. In both survey areas, less than 5% of households in the villages we study purchase insurance, even though in principle the product is available to all. (Notably, the participation rate is significantly higher, around 20-30%, amongst households who receive one of our insurance treatments: either a home visit from an insurance representative, an informational flyer, or video information about the product). Also, the majority of participating households purchase only a single policy, which hedges on average only an estimated 2-5% of expected agricultural income.

Second, we find a pair of results that closely support standard theories of insurance demand. Product demand is sensitive to price, with a price elasticity of demand between -0.66 and -0.88. And liquidity constraints limit takeup: farmers who are randomly surprised with a positive liquidity shock at the time of the household visit are more than twice as likely to purchase insurance policies. Consistent with this finding, 64% of non-participating farmers in the AP sample cite “insufficient funds to buy” as their primary reason for not purchasing insurance.

Third, we find evidence that households have only a partial understanding of the risk management product, and that factors related to trust and financial literacy influence takeup to an economically significant degree. A product endorsement from a trusted third party increases the probability of purchase by 40%. Product takeup is higher in villages that have previously observed a positive insurance payout. The simple act of conducting a household visit, even not combined with other treatments, significantly increases

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insurance purchase, even though the rainfall insurance is readily available to all households in our survey villages. These findings appear consistent with a standard model augmented with costs of attention or information gathering or limited trust. Also consistent with models of costly attention, a significant fraction of households are unable to correctly answer simple questions about the way insurance payoffs are calculated, and about concepts relating to probability and the time value of money.

Fourth, we test whether insurance demand is influenced by subtle psychological manipulations in the way the product is presented to the household. A significant role for these factors would be more difficult to reconcile with a rational model, but consistent with various behavioral biases documented in the psychology literature. We find limited evidence that these cues influence household behavior, although our power to reject the null is relatively low.

Based on these empirical results, we draw several preliminary conclusions about the optimal design for this other household risk management contracts. The importance of liquidity constraints suggests policies should be designed to provide payouts as quickly as possible, especially during the monsoon season when our data suggests households are particularly credit constrained. Along these lines, the rainfall insurance underwriter ICICI Lombard has begun installing a network of automatic rain gauges, allowing them to immediately measure rainfall, calculate policy returns and begin delivering payouts to households. A second possible improvement: to alleviate liquidity constraints it may be beneficial to combine the product with a short-term loan, or equivalently, originate loans with interest rates that are explicitly state-contingent based on rainfall outcomes.

The sensitivity of insurance demand to price underlines the benefits of developing ways to minimize transactions costs and improve product market competition amongst suppliers of rainfall insurance.

The estimated significance of trust and a history of positive past insurance payouts suggests that product diffusion through the population may be relatively slow, as a track record is established. A potential contract design improvement to facilitate this learning is to amend the contract to pay a positive return with sufficient frequency.