APPENDIX 7 Effect of microinsurance climate index

The microinsurance scheme is structured such that the insurance is “fair”. For instance, if the insurance provides payouts in 5% of the years, the annual cost is 1/20th of the payout. Similarly, if the insurance provides payouts in 20% of the years, the annual cost is 1/5th of the payout. Thus, an insurance scheme with more frequent payouts entails higher premium costs. As a result, an insurance scheme that provides more regular payouts provides a lower *net* benefit to the household in a year in which the insurance is triggered. (Note that the strike rate affects the rainfall value at which the insurance is triggered.)

This characteristic results in a tradeoff in our model with respect to the microinsurance climate index (Figure A7.1). Here, “climate condition” represents the annual realization of climate. The probability of a given climate condition occurring is influenced by the climate distribution (i.e., climatic context; here $\sim N(0.5, 0.2)$), but the *outcomes* in Figure A7.1 under a given climate condition depend only on the climate condition itself.

For example, under the most extreme plotted climate condition (0.05), an insurance payout is received for all insurance indexes (strike rates). This payout is the same for all insurance indexes (5% insured, 10% insured, etc.). However, the cost of the premium is highest in the 30% insured case (i.e., 30% of the payout). This high premium means that, despite the payout being received, the household receives a lower net benefit in this year. As a result, the probability with which it must sell livestock is higher (0.55) than under an insurance scheme that provides less regular payouts (e.g., 0.10 probability under the 5% insurance index).

However, the higher insurance indexes (e.g., 30% insured) also provide payouts under less extreme drought conditions. For example, when the climate condition is 0.4, a payout is received under the 30% insurance index but not under any of the other assessed indexes. As a result, the probability with which livestock selling is required is lowest for the 30% insurance index under this climate condition.

Together, this represents a tradeoff in which insurance that provides more regular payouts offers protection under moderate climate conditions at the expense of vulnerability under more severe climate conditions, whereas insurance that provides less regular payouts protects against the severe climate conditions at the expense of vulnerability under more moderate conditions. Depending on the distribution of the climate condition (here, $\sim N(0.5{,}0.2)$ truncated at 0 and 1), the net effect of this tradeoff will change as the probability of more and less extreme climate conditions shifts. In addition, farmer-level risk preferences may influence the aversion to different kinds of loss. Thus, the robust design of index-based microinsurance schemes in case study applications should consider the potential for this type of tradeoff.

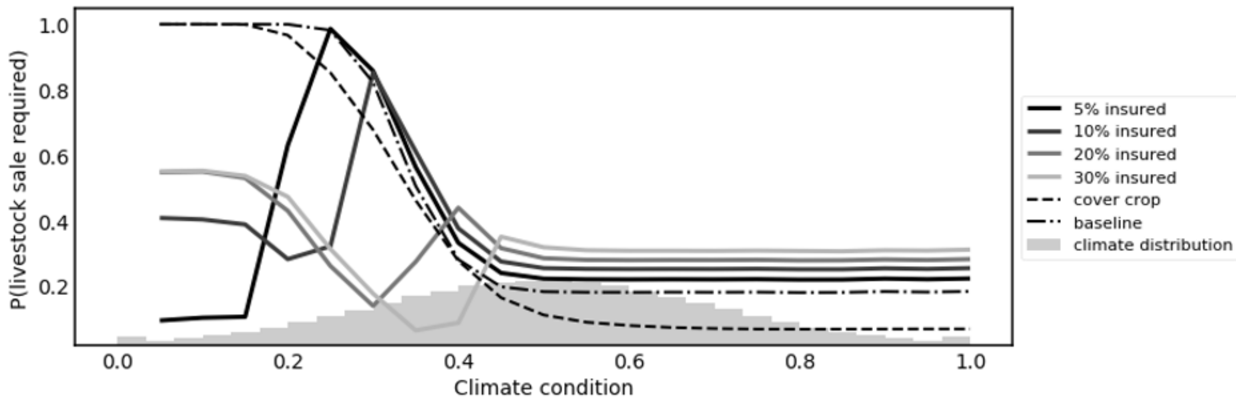

Figure A7.1: The probability that livestock selling as a coping measure is required as a function of the annual climate condition in a simulation under regular climate variability ($\sim N(\mu = 0.5, \sigma = 0.2)$) and different insurance coverages. For example, a point (0.4,0.7) represents a case in which during a year with a climate condition at 0.4 (affecting crop production – see section A1.3.4.2 in the ODD+D) there is a 70% chance that the household's annual income is insufficient to satisfy their consumption and they must sell livestock resources. 5% insured represents an index-based insurance in which a payment is received in 5% of years. This is for a land-poor household only.