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From indemnity, to index-based, and to group weather insurance contracts

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Offering insurance products that can help poor farmers decrease exposure to weather risks remains a major unresolved challenge. In as much as the microfinance revolution was successful at innovating new financial products for the poor, the micro-insurance revolution is largely stalled, with new products being offered but general lack of uptake without large subsidies. This brief discusses promising options using index-based group insurance combined with indemnity-based insurance among group members.

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▶ Classical indemnity insurance

In classical indemnity insurance contracts, pay-outs can only be made after the loss has been audited. The contract leaves unresolved problems of moral hazard and adverse selection. The optimal insurance contract is full insurance beyond a deductible used to limit the cost of audits. Because the adjustment cost is independent of the size of the payout, small contracts are relatively more expensive. The well-known general outcome has been low demand because the need for audits makes the insurance very expensive, particularly for smallholders. As a result, very few small farmers are insured, and they must absorb the high cost of self-insurance, which contributes to low investment and the perpetuation of poverty.

▶ Index-based insurance

Index-based insurance has been introduced as a promising alternative to indemnity insurance. With individual index-based insurance contracts, where the chosen index is a correlate to loss, there is no adjustment cost, no moral hazard and adverse selection, but there is now basis risk. In this case, the optimal contract is partial insurance, even if the premium is calculated at fair price. This is because the premium paid increases risk as it increases the cost of the worst outcomes, i.e., cases of loss with no payout due to basis risk, and yet a premium having been paid. This is one reason why there has been low demand for index-based insurance because it is very imperfect due to high basis risk and possibly worsens the extreme outcomes (Clarke).

There are several options to increase the value of index insurance that could help boost demand. They include: (1) reducing basis risk using index contracts based on area yield and using remote sensing data on vegetative growth (Carter), (2) interlinking insurance with credit to increase the availability of credit when there is heavy demand and lack of collateral (Carter, Cheng, and Sarris), and (3) offering farmers to pay insurance premiums on credit and insuring the corresponding loan against climatic shocks (McIntosh and Sarris).

▶ Potential benefits of group contracts and their design

Another option is to propose group contracts (Dercon and Clarke). A group contract can be thought-of as having two-levels: a higher-level contract between the insurer and the group; and a lower-level contract between the group and its members. Here the term "contract" is used loosely to include any arrangement, formal or informal. The underlying reasons for considering group contracts are: (1) reduction of the cost of retailing the product, and use of the group's administrative capacity in contracting, (2) the group can engage in loss assessment at a lower cost than the insurer due to asymmetrical information and repeated interactions that help overcome adverse selection and moral hazard, and (3) the group may have some capacity to self-insure.

The upper-level contract between the insurer and the group

In the contract between insurer and group, there are several alternative options to determine the aggregate payout:

i) The payout may be based on fully observable realized output at no cost. This is the case of cotton cooperatives in Mali where use is made of the administrative data collected by the monopolistic buyer (Bellemare and Guirkinger). This methodology would apply to other cooperatives for as long as there are no side sales by their members.

ii) The payout may be based on an audited yield sample as done for area-based yield insurance contracts. This is how payouts are determined in

the rice producing area of China (Cai et al.).
iii) The payout can use a weather-based external index that is cheap to observe and cannot be manipulated by any party to the contract. This is how payouts are determined for flood risk in Bangladesh and for drought and frost risks in Ethiopia (Dercon, Vargas-Hill, et al.).

In form, this contract does not make use of group membership and does not differ from index-based insurance contracts between insurer and individual farmers.

Within group allocation of the payout to members

When a shock occurs, the aggregate payout to the group can be distributed according to a formula based on the relative effective losses of members. This is due to the combined existence of individual basis risk within the group, ability of group members to have perfect information on each other, and possibility for the group members to agree on an allocation rule and to enforce the agreement. With individualized payouts proportional to relative losses, individual basis risk is reduced and the quality of the insurance product is enhanced. For this, the quality of cooperation, trust, and governance of the group are important in implementing the group insurance contract.

Trust in the person or mechanism in charge of implementing the allocation is, in particular, critical in determining the quality of the insurance product. In China, the aggregate payout is defined by the insurer as the estimated sum of losses above the deductible, and the village leader is responsible for determining the individual losses and allocating payouts accordingly. Yet, some 50% of the rice producers say they would prefer a uniform compensation, as opposed to a redistribution proportional to individual losses (Cai et al.). This suggests lack of trust by half the villagers in fairness of the leader in making payouts, at the cost of an efficiency loss in the quality of the insurance product.

Mutual insurance within the group

In addition to managing the allocation of external payouts, group members may be able to provide each other with some level of mutual insurance. Counting on this complementary source of insurance requires that the group has the ability to enforce the mechanism. Mutual insurance can be restricted to simple sharing within a time period, or can include some savings/borrowing over time by the group or the individual.

An example of a genuine local insurance contract with premium and payouts, and with an outside contract to reinsure the local insurance scheme, is the Mexican Fondos (Ibarra and Mahul, 2004). In this scheme, groups of 100-200 producers pay a premium to self-insure, and contract with the national insurance company Agroasemex for reinsurance on an index basis in case of large shocks. Unexpended funds in the self-insurance scheme are capitalized and help improve the level of self-insurance. This is undoubtedly one of the most advanced "hybrid" group insurance schemes in existence from which much can be learned.

Enhancing complementarity between group and individual insurance

There may be a positive or a negative interaction between the modern insurance external to the group and the traditional insurance internal to the group. If the external insurance is independent of the internal, then providing external insurance may reduce the internal mutual insurance (Attanasio and Rios-Rull). If the external insurance is expensive or if there is not much covariate risk to insure, then demand for the external insurance will be very low.

Here, we are considering an external insurance that insures against aggregate risk on an index basis, so by construction it is complementary to the internal arrangement that provides insurance on an indemnity basis. In this case,

we expect the demand for a group insurance for aggregate risk to be higher when there is an internal allocation that reduces basis risk. This is the most promising case for this two-level type of insurance scheme to help raise effective demand for weather insurance.

A first example of the synergy between group and individual insurance is the Ethiopian experiment run by Vargas-Hill using a randomized control approach. Farmers were taught how to mutualize the payouts received from the external insurer to compensate for intra-group differentials in basis risk. They observe that doing this improves the uptake by individual group members. A second example analyzed by de Janvry, Dequiedt, and Sadoulet is a situation where the group has a common asset to which individuals contribute according to their current income. In this case, members should optimally coordinate on their decision on whether to buy an insurance or not. The reason is that the marginal benefit of the insurance depends on whether the others are insured or not. A third example also analyzed by the same authors is a situation where being insured creates positive externalities on others through, for example, the quality of mutual insurance or the maintenance of a club good. In this case, market incentives fail. The demand from the group should be higher than the sum of the demands from individuals. This suggests that the group should act collectively in deciding on insurance uptake and not simply as an aggregator of individual demands.

► Conclusion

While the microfinance revolution successfully gave access to loans to poor people with no collateral to pledge, a corresponding micro-insurance revolution has yet to achieve its promise. A potentially significant advance was achieved with introduction of index-based (weather or area yield) insurance replacing excessively costly indemnity insurance. Yet, uptake has been disappointingly low, particularly among smallholder farmers. We explored here the specification of a two-level insurance scheme, where a group is externally insured on an index basis, while payout distribution and eventual mutual insurance are managed internally to the group on an indemnity basis taking advantage of the local information and governance capacity of the group. While offering this product is still in the making, one can expect that this new approach will help reduce the adoption gap in micro-insurance.

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