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## Insuring against the Weather

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**Weather risk remains a major challenge to farming in poor countries that face frequent droughts. Recent evidence on index-based weather insurance points to low take-up rates largely due to basis risk (i.e. residual risk left uninsured by the index). Using randomized control trials, we study to what extent traditional groups can be utilized to mitigate basis risk by retailing insurance through these groups. We find that selling insurance through iddirs, with pre-defined sharing rules, increases take-up—suggesting that groups are better placed to reduce basis risk. We also find that insurance strengthens existing risk-sharing behavior within groups, for example, by improving access to loans from the iddir to cover crop losses and improving perceived ability to finance emergencies. Insurance has also improved household welfare in the short term considered in this study, albeit to a limited extent.**

Weather related risk remains a major challenge to households in low-income economies whose livelihoods depend on agriculture. With changes in climatic conditions, agriculture has become an increasingly uncertain business. Well organized insurance markets have the potential to help mitigate the adverse consequences of such risks and consequently the provision of simple and affordable insurance products to those households has received significant attention in recent years. Recent developments in index-based weather insurance offer new possibilities of providing insurance for smallholder farmers in those areas and, as such, help farmers adapt to and build resilience against changing weather conditions. However, basis risk—residual risk left uninsured by the index—remains a key challenge to index-based weather insurance, reducing the latter's value for farmers.

This study from Ethiopia is an effort to tackle this problem. A unique feature of the index insurance policy studied in Ethiopia is that the insurance is sold through risk-sharing groups (iddirs), which, besides reducing transaction costs and increasing individual farmers' trust, can help mitigate basis risk.

### Insurance policy design

We designed two index-based weather insurance policies for each month of the rainy season (May–September): a severe-loss policy that pays out 500 Birr with probability of 0.1 and a moderate-loss policy that pays out 500 Birr with a probability of 0.2. These policies would pay if rainfall in a specific month is short of a given threshold specified for each selected weather station. Weather station based historical (30–40 years) rainfall data is used to design this index. We checked whether or not these policies are good policies for smallholder farmers (i.e., whether the policies would insure a sufficiently large part of the rainfall risk reported by households), using historical rainfall data and long-run data on agricultural income and consumption. We found several distinctive positive correlations between the years that these policies would have paid and reports of droughts, indicating that these policies were useful to farmers. The policies also perform well when compared to qualitative data obtained through focus group discussions.

### Pilot design and marketing

A total of 110 villages were randomly selected from Shashemene, Dodota, and Bako-Tibe woredas of Oromia region in Ethiopia. The product was offered in 60 villages and 50 villages were controls. Of the treated, 35 villages were randomly selected to receive group marketing of the insurance contract through the iddirs (“iddir villages”) and the remaining 25 villages were randomly selected to receive individual marketing of insurance (“individual villages”).

In the iddir villages, iddirs were also encouraged to strengthen their ability to make interest free loans to members who had experienced adverse events not covered by the insurance policy. For example pests that reduced yields or ill health that prevented members from agricultural work. In 18 villages pre-specified guidelines about how the loans were to be made were mandated (“mandated villages”) and in 17 villages no guidelines were pre-specified (“non-mandated villages”). To encourage groups to set up rules governing the loans, a cash payment was promised at the end of the insured period to all groups that participated. Similar cash transfers were made to selected individuals in the individual villages.

First insurance policy sale activities took place in April 2011. As very few policies were purchased in May and June, some discounts and free-insurance were offered for September 2011. A total of 1,281 policies were issued. Rains were poor, resulting in substantial crop losses for farmers, so payouts were made at the end of October. Second season sales took place in April 2012, with “gap insurance” added to the product; the feature allows farmers to get a second chance of claiming verification of their harvests in the event that the weather station fails to predict the rainfall situation on their plots. A total of 1,537 policies were sold in this second season.

### Data and method

A baseline and two follow-up surveys (in December 2011 and March 2012) were conducted in all 110 villages (1,760 households) to assess the treatment impacts. A simple ANCOVA method was implemented to compare outcomes between the control and the treatment groups.

## Insurance take-up

We first explored the impact of treatments on insurance take-up and changes in iddir rules. Results show that insurance purchases were higher in both individual and mandated villages, compared to the iddir villages in which there was no mandate on sharing rules. The results also indicate differences between individual and iddir villages in changes of perceptions regarding payout size and information flow. Compared to individual villages, those in iddir villages (both mandated and non-mandated) thought the size of insurance payouts were more likely to be large enough to help the family in a time of need, and those in iddir villages, especially those with mandated rules, reported they are more likely to know others that received a payout.

Payouts were found to have a significant impact on a household's trust that 'financial institutions would honor insurance policies'. This was the case both for the insurance payouts and the promised money to iddirs and individuals at the end of the period. This provides evidence to support the observation that nothing sells insurance like insurance payouts. Further, it highlights the importance of insurance payouts in encouraging and sustaining insurance demand over time. This is an important finding for index insurance where policies are designed to cover extreme events and payouts occur quite infrequently.

## Impact on risk-sharing

As expected, mandating increased lending by iddirs. Respondents in iddir villages were more likely to report that their iddir had started making loans for crop losses. However, this was driven by changes in mandated iddir villages, given that no difference was observed between the non-mandated iddir villages and the control villages (Table 1). This suggests that the intervention did result in anticipated iddir rule changes in mandated iddir villages, and additional risk-sharing may have been crowded in. As a result, we find that the perceived and actual ability of individuals to receive transfers in times of need was higher in mandated iddir villages.

**Table 1—Access to loans and transfers**

	Grant or loan for crop loss	Grant or loan for crop loss	Loan for crop loss	Loan for crop loss
Iddir	0.051** (0.022)		0.066*** (0.022)	
Iddir (not mandated)		0.010 (0.027)		0.024 (0.026)
Iddir (mandated)		0.087*** (0.029)		0.102*** (0.029)
Individual	0.024 (0.023)	0.024 (0.023)	0.042* (0.022)	0.042* (0.022)
Constant	0.199*** (0.017)	0.199*** (0.017)	0.177*** (0.017)	0.177*** (0.017)
R-squared	0.010	0.013	0.013	0.016

Source: Authors' calculation based on survey data.

Notes: 3,850 observations; Standard Errors in brackets; \*\*\*, \*\*, \* Significant at 1%, 5%, and 10% level, respectively.

## Impact on welfare

We found significant differences in a number of welfare outcomes as a result of insurance purchases and changes in iddir

rules. This is particularly the case in Shashemene where there were insurance payouts.

Households in mandated iddir villages in Shashemene were more likely to make purchases of durable consumption goods (clothing, footwear, and mobile phones) and hold livestock assets than comparable households in the control villages. Although they were less likely to have purchased inputs for Belg production, they were planning to make more purchases for the forthcoming Kiremt season than households in control villages.

Few systematic differences between households in individual villages and control villages were observed. It may be the case that insurance payouts had a positive impact on households in individual villages, however with only 9 percent of households purchasing insurance, without some redistribution of these payouts (as was mandated in the mandated iddir villages), we are unlikely to have enough power to detect any effect.

We do not observe any difference in food consumption patterns across the treatment and control groups. This may be because insurance payouts will have an impact on food consumption later in the year as the lean season is reached, but further analysis of data collected at that time will determine whether this is the case.

## Conclusions

Index-based weather insurance has a potential to minimize livelihood uncertainties in poor rural areas. However, basis risk remains a challenge. Traditional groups—such as iddirs—prevalent in rural Ethiopia are the most common forms of informal insurance in developing countries. However, they too are prone to covariant shocks that hamper wide areas.

Integrating index-based weather insurance with traditional groups has the dual advantages of reducing basis risk, which will allow index-based insurance to function in those areas, and at the same time, enhancing the resilience and adaptation of traditional groups in the face of covariant shocks. Moreover, iddirs can be used as sustainable retail outlets for index insurance thereby reducing transaction costs, increasing trust, and potentially, elevating the organization of iddir functioning to national level. Integrating formal insurance with informal insurance requires strengthening existing (iddir) rules to reflect new circumstances arising from the integration. Finally, institutionalizations of new rules to the iddir and insurance payouts have had significant impacts on insurance take-up, household welfare, and trust.

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