INCLUDE

Policy brief

The Cost-Effectiveness of Integrating Weather Index Agricultural Insurance into the Productive Safety Net Program in Ethiopia

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Introduction: The Potential of Weather Index Insurance as part of Social Protection Program

Poor farmers in developing countries often face constraints and uncertainties that greatly limit agricultural production and affect livelihood. In response, many governments provide social protection benefits to the poor and the vulnerable to ensure food security, support basic income and consumption, and preserve productive assets. Some governments also aim to promote production by subsidizing agricultural inputs and enabling loans. By alleviating cash and credit constraints, it is hoped that the rural poor can have better incentives and resources to increase yields and earn higher economic returns.

Nevertheless, major agricultural and income risks, such as those caused by severe weather conditions, are still primarily addressed through ad hoc provision of post-disaster assistance. Despite that the possibilities of major crop loss may compel farmers to adopt conservative farming practices and inhibit investments, few governments have offered formal mechanisms that help farmers mitigate these risks ex ante.

In recent years, innovations in weather index agricultural insurance (henceforth, index insurance) have greatly reduced the cost of income risk protection for farmers in many developing countries. Unlike traditional agricultural insurance which indemnifies individual crop loss and requires input monitoring and yield assessment at the farm level, index insurance offers protection against aggregate weather shocks which are often the primary risk smallholder farmers face. As payouts are linked to an objective index using data collected from ground stations or weather satellites, farmers cannot manipulate inputs or efforts for getting higher compensation. Significant reduction in operating costs thus allows governments and development agencies to consider providing index insurance through social protection programs to promote ex ante risk protection among poor and vulnerable farmers.

Index insurance may have attractive advantages over ad hoc post-disaster assistance on the promotion of agricultural development. First, formal ex ante protection against major weather risks may encourage farmers more boldly to make sound agricultural decisions for higher expected returns. By investing in high-yield crop varieties and adopting modern inputs, for example, poor farmers may more easily become food secure, economically self-reliant, accumulate productive assets, and ultimately graduate from government assistance programs. Second, as index insurance generates cash payouts upon negative weather shocks, poor farmers can recover some forgone agricultural investments and have more cash in hand for meeting basic needs. They can thus better maintain their livestock and productive assets for the next season instead of selling them for cash under stress. Third, with increasing weather risks due to global climate change, large-scale insurance take-up among poor and vulnerable populations can help governments more prudently to manage public spending more prudently. Pooling and transfer of agricultural risks across regions and contingency states reduce the needs for ad hoc re-appropriation of regular government budgets or appeal for emergency donations.

Methodology and fieldwork

We conduct a large-scale randomized controlled trial with over 1,100 farmers in the Tigray region for two years. Using administrative information of Tigray, we selected four drought-prone districts (Wereda), 32 drought-prone villages (eight per district), 96 hamlet communities (three per village) from the region. In each hamlet, we randomly sampled 12 farmers who were also PSNP beneficiaries. We interviewed sample farmers in December 2015 (baseline), December 2016 (midline), and December 2017 (endline). The surveys together formed a rich panel dataset for empirical analysis.

In the first year of our study, we randomly assigned farmers to either the control group or one of the two intervention groups. Farmers in the first intervention group received unconditional transfers earmarked for agricultural input purchase and this intervention targets to release cash and credit constraints on agricultural production (general cash grants like those in Karlan et al. (2014) and Jensen et al. (2017) can easily be spent on other household items). As poor farmers also face a high level of weather risks, in the second intervention we develop an intervention package with similar program costs and offer farmers a reduced amount of agricultural input transfer and an additional index insurance grant for supporting ex ante risk mitigation. The two intervention groups thus allow us to evaluate how public funds can cost-effectively improve agricultural production under significant credit and risk constraints. Farmers in the control group received no interventions from us and served as the PSNP comparison group. In the second year of the study, we redesigned our interventions to also evaluate index insurance demand. Specifically, we provided all previously treated farmers with a standard input transfer and randomized the level of subsidy for insurance participation. The control group remained untreated.

Project questions and goals

Existing theories and evidences on the demand for and effects of index insurance among poor farmers are mixed, however. On one hand, a number of studies have illustrated effective ways on promoting insurance take-up and positive benefits of index insurance protection. On the other hand, many studies find low demand for and weak effects of index insurance among poor farmers. Given unclear prospect of large-scale index insurance adoption among poor farmers in developing countries, some experts suggest that governments should take a larger role and facilitate the provision of index insurance through social protection programs (High Level Panel of Experts, 2012). Nonetheless, few index insurance studies have focused on poor and vulnerable farmers in social protection programs (Duru, 2016) or have compared the effects of relaxing credit and risk constraints on agricultural decisions (Karlan et al., 2014; Jensen et al., 2017).

There thus remain questions about whether public provision of index insurance can add value. First, how much subsidies are needed to promote large-scale insurance adoption among poor farmers? Second, as social protection programs typically offer ex post assistance after major crop loss, can index insurance effectively promote agricultural production and household welfare? Third, how do the effects of insurance compare with those of alternative measures that relax cash and credit constraints for agricultural investments, such as input subsidies as in the Agricultural Input Subsidy Program in Malawi and the Input Trade Fairs in Mozambique?

This study has three main research goals. First, we aim to examine the demand for index insurance among poor and vulnerable farmers who enrolled in social protection programs. Second, we aim to evaluate the effects of index insurance on agricultural production and household welfare. Third, we aim to compare the effects of index insurance with those of input transfer and assess their cost-effectiveness. We conducted a large-scale randomized controlled trial (RCT) in the Tigray region in

Northern Ethiopia among farmers who enrolled in the Productive Safety Net Program (PSNP).

Project and policy background

The Tigray region is located in Northern Ethiopia and has a total land area of approximately 50,000 square kilometers. The region is predominately rural and 80 percent of the seven million population live in the rural area. However, given complex terrains, arid climate and environmental degradation, only 15 percent of the land in the region is cultivable and the average landholding of rural households is less than one hectare. Average rural household size is around five and most households are smallholders earning their living from rainfed agriculture. Most of them also lack access to formal financial services and adopt conservative agricultural practices with limited tools, technology and irrigation. The region is thus extremely poor and the level of per capita rural income is only around US$1 per day.

The agricultural season of the region follows the rainy seasoning period which starts in June and ends in September. The region is dry is in other months and the level of annual rainfall fluctuates between 400 and 800 millimeters. Low and uncertain rainfall had caused widespread droughts and famines in the region. In 1973 and 1984, in particular, hundreds of thousands had starved to death and many more suffered from severe malnutrition and long-term health problems.

In 2005, the Ethiopian government launched the Productive Safety Net Programme (PSNP) with generous contributions from ten major international development agencies. As one of the world's largest safety net programs, PSNP aims to help rural poor who face chronic food insecurity to better resist shocks, meet basic food needs, avoid depletion of productive assets, and become agriculturally productive. Currently in Tigary, PSNP covers 31 of the 35 weredes (districts) and provides assistance to around one million beneficiaries in nearly 650 kebeles (villages). From 2010 to 2014, for example, PSNP had distributed over two billion birr in cash and over 3.5 million quant of grain in the region.

The enrolment criteria of PSNP include residency in food insecure areas, history of food shortage, and low level of household assets (mainly livestock and farmland). The program also aims to invest in community infrastructure, expand public services, and promote environmental transformation. Except for the elderly, the disabled and pregnant women, PSNP beneficiaries receive food and cash transfers by contributing labor to community public works, which include soil and water conservation, community road building, and various improvement projects for schools, health posts and farmer training centers. Beneficiaries typically graduate from the program when their level of productive assets passes a regional threshold. These households are considered to be able to meet their food needs and have better capacity to withstand a modest level of income shocks.

With over 10 years of PSNP implementation in different parts of the country and the partnership of public, non-governmental and private sectors for the development and provision of weather index insurance through development, the Ethiopian government and different international donors are exploring feasibilities and options to formally offer weather index insurance to poor farmers through PSNP (World Bank, 2013; 2017). Our fieldwork study can thus provide important empirical evidences on the potential benefits and unexpected pitfalls of the incorporation of weather index insurance in the public safety net program.

Major project results and implications

We find that demand among poor PSNP farmers in Ethiopia dropped quickly with the reduction in discount. Results obtained from our second-year experiment show that insurance participation rates

among farmers dropped from 80 percent to 25 percent when we lowered the subsidy rates from 80 percent to 40 percent. While free provision in the first year increased insurance demand in the second year, the impact was only at the size of a few percentage points and was smaller than the effect of increasing the subsidy rate by 10 percent. Insurance participation rates were also much lower among farmers who were members of the village savings and credit associations, which might serve as an informal network for agricultural and income risk management.

We also find that index insurance fails to promote agricultural investments or household welfare among poor farmers. Results from the two years of our study both show that index insurance could not raise the purchase or usage of different agricultural inputs. Many of the effect estimates are statistically insignificantly. There are is also limited evidence that insurance increased the size of farmland for agriculture, and the total farming effort by own and hired labor was possibly lowered. Nonetheless, these results may not be surprising, as the safeguard of post-shock assistance from social protection programs may reduce incentives for harnessing benefits from ex ante risk mitigation mechanisms. If this is the case, under the existing social protection arrangements, provision or subsidization of index insurance may only benefit farmers through additional cash payouts after a weather shock.

Third, we find positive and significant effects of input transfer on the purchase and usage of seeds and fertilizers (and hence on total agricultural costs). Input transfers are also found to increase the size of farmland for agriculture through renting in more, renting out less, and leaving less fallow. However, we find evidences of leakages and shirking of the input transfer intervention. Farmers only increased their total input costs by 40 to 65 percent of the transfer amount. They also spent extra money (roughly 20 percent of transfer value) to substitute their own farm labor with casual labor hired in the village. Nonetheless, compared with general cash grant programs where farmers face no cost or barrier on redirecting cash received on other household expenditure (Karlan et al., 2014), input transfers can still be an effective and cost-effective way for promoting agricultural production. Overall, among poor farmers receiving social protection benefits, relaxing cash and credit constraints through providing input transfers or subsidies can still add more values than innovative weather index insurance that targets to alleviate weather and agricultural income risk constraints.