Parallel session 12

Scientific track – Economic analysis of microinsurance

By Maria Victoria Sáenz

Three research studies were presented in this session – on weather risks, health insurance, and index-based insurance.

Self-protection using improved maize varieties

For more than a decade, ways of managing weather risks for low-income farmers have included the use of drought-tolerant varieties of maize. A study conducted in Uganda by researchers at the Universities of Alabama and Georgia in 2017 evaluated the effects of using such improved maize varieties (IMV) and other self-protection practices like off-farm income. It shows that both IMV and off-farm income reduce the personal cost of risk among smallholder farmers.

The reduction varies across farms and farming characteristics. This effect of IMV is stronger on infertile than fertile land, and even stronger with low fertiliser use. Measuring different moments and conditions of the farmers, and analysing with different statistical tools, the study found that self-protection practices may contribute to crowding out insurance if its design fails to consider the reduction in the probability of crop failure due to self-protection.

Health insurance: a friend in need?

Health insurance can protect consumption from health shocks, but it can also crowd out informal transfers. A study using the PharmAccess Health and Financial Diaries project in Kenya collected high-frequency panel data on health and finances for a sample of dairy cooperative members in a rural part of the country. The study was conducted by researchers at the PharmAccess Foundation, University of Amsterdam and the International Food Policy Research Institute (IFPRI). It tests whether health insurance improves consumption smoothing in the face of health shocks, and to what extent the results obtained depend on households' access to informal transfers as a risk-coping strategy.

To analyse the effect of health insurance, the study uses the high-frequency panel nature of the diaries data, along with variation over time in a household's health insurance status. That is, many households in the sample experienced health shocks both in months with and without insurance coverage. Differences in the effect of health shocks between these insured and uninsured periods are interpreted as the effect of having health insurance. Using this identification strategy, the team found the following situations regarding the financial behaviour of users and non-users of mobile money in relation to health shocks (Table 3):

Table 3
Effects of insurance

Mobile money users	Non-mobile money users
Have stronger access to informal transfers to cope with health shocks	Have less access to informal transfers to cope with health shocks
When they have health problems, they can smooth consumption even without insurance because of the informal transfers received	When they have health problems, but no health insurance, they lower their non-health expenditure by 25 %
When they have health insurance, their overall healthcare is improved and having insurance does not crowd out the inflow of informal transfers	Health insurance lowers their out-of-pocket health expenditure and helps them smooth consumption.

Source: Kramer, Berber. Presentation "Health insurance: a friend in need? Evidence from financial and health diaries." 13th International Microinsurance Conference 2017.

91 — Sebastain Awondo, The University of Alabama, United States.

92 — Berber Kramer, Research Fellow, International Food Policy Research Institute (IFPRI), United States.

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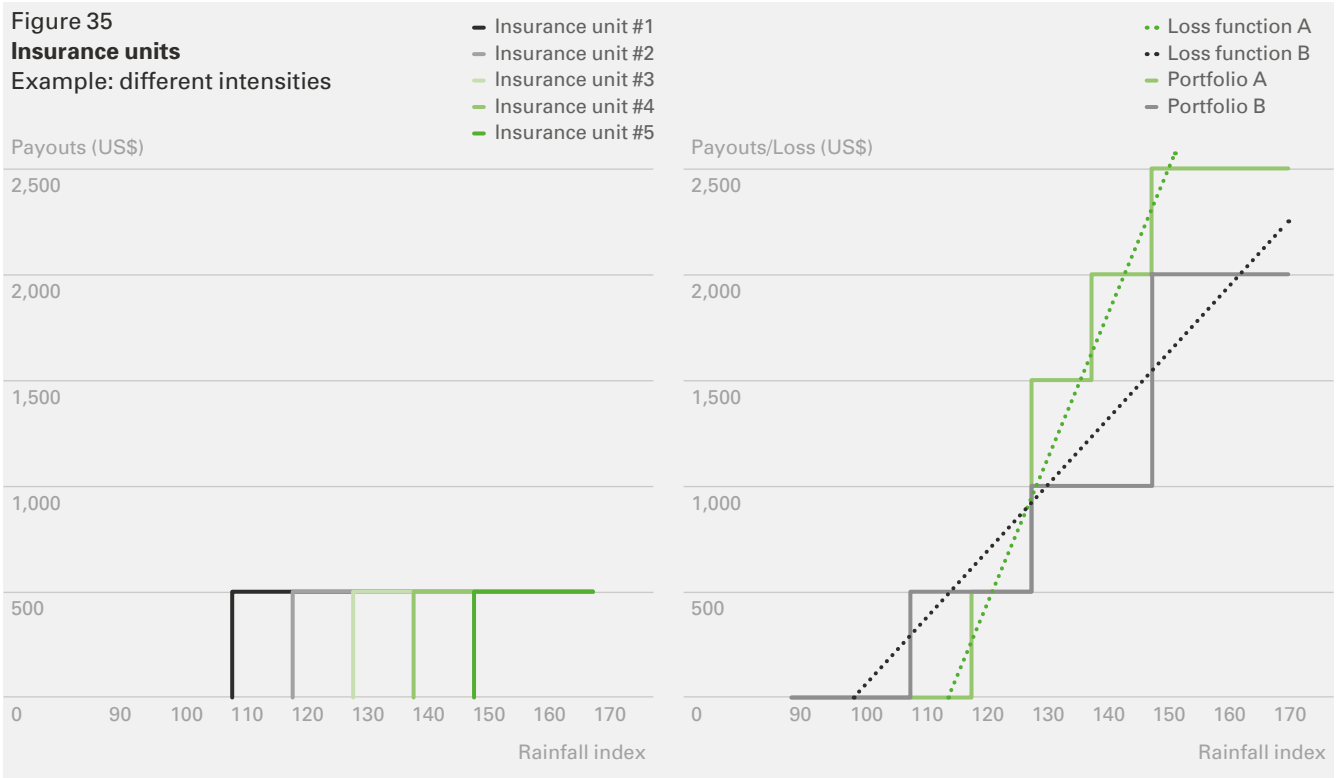
The findings have important implications for the design of health insurance and mobile health financing products. For instance, the finding that health insurance has different effects depending on mobile money usage suggests using this variable as an instrument in targeting health insurance premium subsidies to populations that need insurance most.

Demand heterogeneity: The case for flexible index-based insurance

In view of the low take-up of index-based insurance, the International Food Policy Research Institute (IFPRI) has been testing an innovative product that considers the heterogeneity in farmers' risk profiles due to factors such as mix and timing of crops, seed varieties, farming practices, risk-coping mechanisms, and soil characteristics. In contrast to the "one-size-fits-all" product that has generally been offered so far in index insurance implementations, IFPRI proposes the creation of a flexible product that can adapt to the heterogeneity of farmers. The product allows the possibility of buying different insurance "units" with a simple payout structure: a fixed compensation linked to a single trigger for the index. Farmers can then create their own portfolio, with various triggers to cover against different intensities of the risk and various coverage periods (see Figure 35).

An alternative way of explaining this system is with a matrix showing the six months of the harvest season with exposure to excess rainfall and the two different intensities of rainfall. The idea is for farmers to estimate, according to their own circumstances, for which months they need to purchase cover against this risk and at which intensities. To test this design, IFPRI led a project in the department of Canelones, Uruguay, with medium-income horticultural farmers exposed to excess rainfall during harvest. The insurance was offered commercially to all horticultural farmers during the 2014–2015 summer harvest season and was underwritten by Banco de Seguros del Estado (BSE). Farmers were encouraged to purchase a portfolio that best suited their individual needs. However, despite the highly subsidised premium, take-up was low, at 15%.

Figure 35
Insurance units
Example: different intensities



Source: Ceballos, Francisco. Presentation "Demand heterogeneity for index-based insurance: The case for flexible products." 13th International Microinsurance Conference 2017.

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Interestingly, farmers purchased a variety of portfolios of insurance units. The authors proceeded to test whether these portfolios are indeed related to the underlying heterogeneity in farmers' risk profiles by using a structural model using crop mix, timing of planting, soil drainage, product understanding and distance to the weather station as underlying farmer characteristics.

The results show that heterogeneity matters: farmers can build insurance portfolios that make sense given their risk profile. The results can be summarised as follows (see Figure 36):

More generally, rolling out a real-world system of flexible insurance products is feasible and farmers seem to value this flexibility.

Lessons learnt

— The studies offer some optimism about the future of index-based insurance, but also point to the need to analyse and overcome challenges when working with regulatory entities. In particular, a common denominator in the studies is to explicitly account for existing risk management strategies that beneficiaries already have.

— The insurance sector needs to be open-minded so that it can use academic research to design and price products better.

— Think tanks, academia and researchers must keep experimenting and sharing results with regulatory entities and other policymakers.

Figure 36
Results and welfare

Actual mix of crops
shows better fit than *average mix of crops*

Actual planting dates
shows better fit than *recommended planting dates*

Soil drainage matters
More tolerant of higher rainfall amounts (46 mm)

Lack of understanding reduces demand
Equivalent to 1/3 of potential product

Distance to weather station affects purchases
1 km farther = 0.07 lower correlation

Source: Ceballos, Francisco. Presentation "Demand for Heterogeneity for Index-Based Insurance. The case for flexible products." 13th International Microinsurance Conference 2017.

93 — Francisco Ceballos, Senior Research Analyst, IFPRI, United States.

94 — Glenn Harrison, C.V. Starr Chair of Risk Management & Insurance Director, Center for the Economic Analysis of Risk (CEAR) – Georgia State University, United States.

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