

Financing Catastrophe Risk for Famine Relief Using Early Warning Systems

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The concept

Information from early warning systems can be used to index risk on a regional basis allowing these risks to be priced and sold in the international insurance and capital markets. A number of stakeholders could purchase index-based insurance products providing quick cash to pay for food imports and food aid.

Converging events

Recent events have combined to create new demands for alternatives in providing famine relief. The political problems associated with traditional food assistance programs beg for new solutions in light of shortages of grain stocks in the U.S. coupled with several major droughts in poor countries. Traditional use of food surpluses to alleviate famine is inefficient and many times ineffective. The aid can come too late and be too difficult to distribute. Significant improvements may be possible if more market-based systems could be developed whereby ready cash would be forthcoming when early warning systems sound the alarm. Cash is the most

fungible means of financing catastrophic risk associated with major droughts, floods or other weather driven events that cause serious food shortages. More importantly, if the cash could be tied to the events in such a fashion that private sector food importers and others would have the needed funds to offset food shortages, this may provide the impetus needed to counterbalance poor government policies that exacerbate famine.

Traditional insurance works best when the events creating losses are independent (e.g., auto or life insurance). However, when many people have a loss at the same time from a correlated risk, it requires special ex ante financing to pay possible large losses. A number of developments in capital markets open the door to new solutions for protecting against losses that are highly correlated.

First, insurers and reinsurers have been actively involved in indexing natural disasters as a means of hedging against catastrophe losses. Second, the weather markets have paved the way for new thinking about how to use historic weather data to develop new risk-sharing instruments. And third, the new market players have become involved in providing access to the larger capital markets via the introduction of catastrophe bonds. These financial innovations can be used to provide cash to a host of stakeholders when a regional food shortage is emerging.

Insurance, reinsurance, and catastrophe bonds have been written using parametric indexes. For example, catastrophe bonds have been designed to directly tie to events such as wind speed for hurricane losses or the Richter scale for earthquake losses. Payments are generally scaled so that those at risk receive increasingly more cash as the measured event becomes more severe. Having a time series of the events

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provides the needed information to price such contracts. Technological advances in satellite imagery and significant investments in early warning systems provide the needed information to effectively use the financial innovations. In short, a convergence of a number of projects, developments, and needs motivate this proposal.

In recent years, state-of-the-art methods to forecast food shortages created by bad weather have significantly improved. For example, the East African Livestock Early Warning System (LEWS) is now able to provide reliable estimates of the deviation below normal up to 90 days prior to serious problems. These systems use a variety of information: 1) satellite images; 2) weather data from traditional ground instruments; 3) weather data from new systems; and 4) sampling from grasslands to determine nutrient content. More importantly, these systems allow problems to be forecast at a local level using geographic information systems. Since many of the early warning systems have now been in place for as long as twenty years, it is now possible to model the risk and begin pricing insurance contracts.

How might this work?

Information from early warning systems can be used to develop and price insurance type products that would pay when conditions are forecast to be significantly below normal. The most simple contract design would use the percentage below a threshold for catastrophes as the metric to base a payment. If having the early warning index forecast at 25 percent below normal creates severe hunger problems, then payments could be begin for levels below a threshold of 25 percent below normal. These payments could be based on the percentage below that threshold. Those at risk, or those wishing to have cash when a problem is emerging,

would purchase a dollar-based insurance product that would make payments based on the product of the total dollars of protection purchased multiplied by the percentage below the threshold. Rainfall measures could be used similarly to pay for either serious excess or shortages of rain. These concepts and contract types could be sold to any number of stakeholders: 1) food importers; 2) country-states; 3) NGOs who wish to provide food aid during a famine; and 4) local groups within the country (e.g., microfinance entities; local governments; farmer cooperatives; etc.). A consortium of international reinsurers may be the logical clearing house for structured insurance contracts that could be sold to a variety of end-users.

Importantly, the same information can be used to target various contracts to different end users. A global system pooling these risks can make them more diversifiable. Not all countries are expected to have significant weather-related famine problems at the same time. A global system to pool these risks could lead to a multinational effort toward famine assistance by bringing together a variety of users and creating the opportunity to establish a global catastrophe bond for famine. This instrument could then be used to finance the catastrophe risk of more targeted insurance type products that would be sold at the regional, country, or local level. In short, the same concepts can be used to develop index-insurance products for natural hazard risks that cause famine at many different geographic levels. By using market-based instruments to provide cash payments during a crisis, this system would create significant efficiencies in addressing famine throughout the world.