

# Catastrophe risk and parametric insurance

Category: Opinion 26 Apr 2016

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## INSURANCE FORUM

A PARAMETRIC insurance has been defined as “a type of insurance that does not indemnify the pure loss, but ex ante agrees to make a payment upon the occurrence of a triggering event. The triggering event is often a catastrophic natural event that may ordinarily precipitate a loss or a series of losses. But parametric insurance principles are also applied to agricultural crop insurance

and other normal risks not of the nature of disaster, if the outcome of the risk is correlated to a parameter or an index of parameters.”

It has also been defined “as an insurance contract where the ultimate payment or contract settlement is determined by a weather or geological observation or index, such as average temperature or rainfall over a given period or the intensity of an earthquake or wind storm. Parametric insurance payouts are not based on individual loss adjustments, but are determined according to the measurement of a highly correlated index. Therefore, there is the potential for a mismatch between parametric insurance claims settlement and the actual losses of the insured, which is generally referred to as basis risk.”

In 2011 losses due to catastrophic events totalled \$116 billion, the second most costly for the insurance industry. In most catastrophic events, only 20 percent to 40 percent of the damage are insured. In terms of risk transfer, the risks are transferred from the national government to the parametric insurers or reinsurers.

Parametric insurance is generally applied to natural catastrophic perils, such as earthquakes, flooding and hurricanes, and agricultural risks. Payments are made based not on the actual losses but at the occurrence of certain parametric triggers, or index-based triggers (or index measures), at specified levels. It is not indemnity based where the sum insured is based on the loss sustained by the policyholder, such as in fire insurance. For example, in insuring drought as the risk event, the index measure may be the amount of rainfall or the area-yield production index (crop yield). For hurricanes, the index measure may be data obtained from the National Oceanic and Atmospheric Administration (NOAA). And for earthquakes, it may be by Richter scale readings or data from the US Geological Survey (USGS). The occurrence of these triggers is easily

determinable whereas the determination of actual losses will have to be actually determined and quantified. As a result, payment of benefits is easier and faster. Without parametric insurance, adjusters will have to determine each and every loss, which inevitably will lead to delays and sufferings. In the Philippines the Insurance Commission has approved weather index-based insurance, such as the Typhoon Guard Policy and the Drought Weather Index-Based Crop Microinsurance Policy.

An example of a parametric insurance is GlobeCat established by Swiss Re. It addressed windstorms in the United States, earthquakes in California, Guatemala and El Salvador. Risk analysis is usually studied by engaging a risk modelling companies. Another scheme developed by the World Bank, with a funding assistance from Japan, is the Caribbean Catastrophe Risk Insurance Facility (CCRIF) in 2007. Swiss Re is a colead reinsurer of CCRIF. What is interesting about CCRIF is the participation of 16 Caribbean nations, thereby creating the world's first regional (or multinational) parametric insurance. It had a maximum coverage of \$100 million for each peril. It covered earthquake and hurricane perils. It retains a portion of the risk and reinsures the rest. During the risk modelling to estimate damages, the USGS was tapped for the earthquake modelling and NOAA was used for the hurricane modelling. The CCRIF was developed by the World Bank in the aftermath of Hurricane Ivan in 2004. The hurricane impacted 200 percent of the annual GDP of both Grenada and the Cayman Islands in the Caribbean. The Cayman government suffered a \$36.7-million budget deficit, the largest in its history. Policies that may be written by CCRIF are, however, capped at 20 percent of a country's total estimated losses.

In November 2007 a 7-magnitude earthquake hit Haiti and CCRIF paid \$8 million in insurance benefits. Other examples would include the Central America Natural Disaster Insurance Facility, also developed by Swiss Re in partnership with the Inter-American Development Bank (IDB); the MultiCat Mexico developed by Swiss Re together with the World Bank; the Malawi Weather Insurance, where Swiss Re committed to pay a maximum amount of \$5 million to the World Bank, which, in turn, pays the Malawi government for drought-related damages in corn production. The World Bank has emerged as a leader in financing catastrophe risks.

Another financial risk-transfer tool that has emerged in the 1990s is Catastrophe Securitization, or the issuance of catastrophe bonds. In broad strokes, Daniel Peterson explained in a paper the concept, thus: "These products operate essentially as futures contracts with parametric triggers; if the contracted event occurs, meeting predetermined thresholds [e.g., surface wind speed], a certain amount of the investment [perhaps all of it] goes to the issuing insurer in order to offset its payouts to policyholders as a result of the event. However, if the event does not occur within the contracted time period, the principal is returned to the investor, with a high rate of interest."

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