PARAMETRIC INSURANCE: GENERAL MARKET TRENDS AND PERSPECTIVES FOR THE AFRICAN INSURANCE SECTOR

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INTRODUCTION

The consensus in the international development community is that over the last 35 years, there has been an increase in both the frequency of natural disasters and the number of people living in vulnerable areas, resulting in increased exposure to the negative impact of natural disasters. There is therefore a growing awareness of the need to promote market-based approaches to transfer unhedged systemic exposures from developing countries. The challenging reality is that insurance penetration remains very low in these countries.

Innovations in the global financial markets, such as the development of the parametric weather insurance in the late 1990's and the securitization of catastrophe risks during the early 2000's, have had limited impact in developing countries thus far. The flexibility offered by these innovations is attractive, particularly in the light of difficulties in building traditional insurance models in developing countries, due to institutional and technological constraints, the lack of experience data, heavy transaction costs and the challenge of managing moral hazard and adverse selection. It is important to note that the traditional insurance model for climate and catastrophe risks should not be discarded but that parametric models have been put forward as a potential starting point for certain applications.

The development community has strongly supported several pilot projects with the objective of assessing the feasibility of implementing risk transfer solutions for developing countries based on these innovations. The contribution from this community has been remarkable in proving the concept and has provided invaluable case studies. Given the success achieved so far, it is now appropriate to plan the development of scalable and sustainable local parametric insurance markets in developing countries.

Within the international reinsurance market, PartnerRe has pioneered initiatives to engage in local market development efforts with financial institutions in developing countries for implementing parametric weather and parametric catastrophe products. PartnerRe has supported the design and implementation of programmes in developing countries at both macro and micro levels.

Based on Partner Re's experience, this article aims to provide an overview of the current market development efforts and to set out what are considered to be the key constraints that impede the sustainable development of private parametric insurance markets in developing countries. The article recommends an approach that facilitates the participation of local financial institutions in the development of sustainable risk transfer markets.

WHAT IS A PARAMETRIC OR INDEX-BASED INSURANCE PRODUCT?

A parametric insurance product can be 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.

PARAMETRIC INSURANCE MARKETS IN DEVELOPING COUNTRIES: CURRENT STATUS

The development community has been exploring the potential applications of the weather derivatives markets for developing countries since 1999, although most of the efforts remained at the research level until 2003. However, since then, the list of countries in the implementation phase of pilot parametric insurance programmes has grown rapidly. Available information suggests that more than 30 pilot projects are underway in about 20 countries. See Appendix 1 for a more detailed list by Skees & Collier (2008)[1].

The commercial reality is that few countries have more than one or two years of operational experience. In the context of the African region, two cases are worth mentioning: Ethiopia and Malawi. The projects implemented in these two countries merit special attention as they represent two ends of a very wide spectrum of the possible use of weather index insurance products in Africa. In Ethiopia, a risk transfer product was purchased by The World Food Programme to supplement emergency aid. In Malawi, a risk transfer product was purchased by smallholder farmers as part of a loan for an input package that encouraged the adoption of new technologies.

Projects in Ethiopia and Malawi have been extremely successful in terms of raising public awareness by:

- Showing that a market-based risk management approach for catastrophe natural perils is feasible for developing and, in particular, low-income countries.

- Providing evidence of the multi-dimensional impact of weather shocks and the feasibility of using risk transfer products to manage the exposure at different levels of society, from the Small farmer to sovereign governments and the international community.

Nevertheless, from a scalability and sustainability perspective, it is worthwhile highlighting the fact that most projects in operation in developing and emerging countries (with the exception of India and Mexico) have either been executed only on a pilot basis or are in the initial stages of expansion within a controlled environment. As a result, preference has often been given to projects with any of the following:

(i) Better quality data,
(ii) A limited risk exposure reducing the need for risk capital from international markets,
(iii) The ability to overcome local institutional weaknesses by reducing the scope of the project.

Many current tests of parametric index insurance have focused on households engaged in agricultural production as the ultimate beneficiaries. Although some innovative delivery mechanisms have been conceived, there is still a need to test alternatives such as composite products (that link insurance to credit or goods and services in the agricultural value chain) as hedging tools for

[1] Skees & Collier: "The Potential of Weather Index Insurance for Spurring a Green Revolution in Africa"; Paper prepared for the Alliance for Green Revolution in Africa Policy Workshop; Nairobi, Kenya, June 23-25, 2008

financial intermediaries in both the formal and informal sectors, or even as a risk transfer alternative for firms in the agricultural value chain whose revenues are affected by the weather.

Governments and donors can also purchase weather index insurance to support relief efforts for natural disasters or even protect the exposure of public infrastructure or low income population assets that are difficult to insure through traditional products. The example of Mexico, where the Government has been pursuing a risk transfer programme that includes emergency relief, government infrastructure as well as low income population assets, serves as an interesting reference model.

While the pilot approach has shown that these instruments are feasible, the international community has realised that there are several challenges to be met in order to achieve meaningful scalability in these markets. Later sections of this article provide insight into the market needs for achieving a sustainable development approach for parametric insurance applications.

REINSURANCE APPETITE

While there is a view that the international reinsurance market would support parametric insurance programmes in developing countries, Partner Re in its interactions with countries/institutions that are developing parametric insurance products has found the market reality to prove otherwise. The current pipeline of parametric insurance pilot projects has been actively supported by the international reinsurance community which has an incentive to support these new kinds of insurance programs from emerging countries only because they offer opportunities for diversification.

In addition, the reinsurance sector has invested in the technical and operational infrastructure required to profitably underwrite parametric-related risks. Additional work needs to be done in order to address current market constraints in developing countries, but the reinsurance industry's experience in developing parametric risk transfer markets in emerging countries will help shorten the development cycle for subsequent markets.

MARKET NEEDS

Within the international reinsurance market, PartnerRe is pioneering market development efforts with local financial institutions in developing countries. PartnerRe has supported the design and implementation of weather index insurance programmes at both macro and micro levels. The company's experience has demonstrated the importance of addressing several constraints existing in the marketplace to achieve the sustainable development of profitable parametric insurance markets in developing countries. The main market requirements that have been identified by PartnerRe are as follows:

- **Legal and Regulatory framework:** Most emerging markets have not addressed the legal and regulatory implications of parametric risk transfer mechanism and its classification as insurance. Regulators need to understand the idiosyncrasies of parametric products and approve the given level of basis risk and the trigger levels under the payout mechanism prior to product implementation.

- **Client Capacity:** In order to successfully implement risk transfer programmes, it is necessary to cultivate a risk management mentality among the targeted client base. Educating potential clients, especially smallholders, is time consuming. Surveys have shown that a relationship of trust between the client and a local financial institution is the key to

successful product launches in emerging markets. Nonetheless, there are a number of barriers.

On the macro level, many governments see no need to purchase risk management covers as they expect the international donor community to assist in the event of a large disaster. The cooperation of donors will be required so that many developing countries can shift from relying on free aid to a proactive, responsible risk management approach.

- **Capacity Building:** In order to develop a self-sustaining marketplace, local financial institutions must be trained with regard to parametric risk transfer products. Many financial institutions in developing countries do not have the technical capacity to assess risk exposures or build accurate financial loss distributions. Thus, launching a new product in these environments requires significant groundwork. Local insurers often need help in writing parametric insurance policies, rating parametric products and educating their regulator concerning the products. Since local institutions lack the technical expertise to design products, new programmes do not get off the ground without the support of organizations that possess commercial expertise in these areas.

- **Alternative Technologies for Contract Settlement:** Quality data is central to risk assessment and product development for parametric insurance products. The absence of quality weather data is a major constraint to the spread of weather index insurance in many regions. Given the importance of data and the potential cost of creating and maintaining new data systems, there is a need to explore alternative technologies for contract settlements that are acceptable to the end-user and the underwriter.

- **Alternative Delivery Models for Parametric Insurance Products:** Insurance distribution systems in some developing countries may need to be enhanced to reach target markets. Most insurers' operational infrastructure is centralized in urban areas and access to potential clients in rural areas is limited. Recent literature has identified Africa's largely rural economy as an important source of potential demand[2], including possible applications for financial intermediaries, input suppliers, processors and aggregators, etc.

  In essence, there is a need for an appropriate platform to support a wide potential clientele of financial institutions, with the capacity to offer different types of contracts so that transactions can be facilitated through a diverse pool of institutions.

- **Sustainable Economics:** The economics of risk transfer must be viable for both the insurer and the insured. Clients must feel they are not overpaying for risk transfer and likewise, reinsurers must receive an adequate return for taking risk.

- **Viable Risk Transfer Structures:** Risk management programmes must be customized to the needs of individual clients. Products must be structured to manage basis risk and maximize customer confidence. Drought covers will have varying loss triggers depending on the crop. Structures have differing levels of susceptibility to windstorms and earthquakes depending on design and construction methods. However, product design cannot succeed without consideration to data availability, the client's risk profile, the delivery model, the underwriter's appetite and the regulatory framework. Product design without the participation of the financial markets often results in limited growth potential.

[2] Skees & Collier: "The Potential of Weather Index Insurance for Spurring a Green Revolution in Africa" ; Paper prepared for the Alliance for Green Revolution in Africa Policy Workshop; Nairobi, Kenya, June 23-25, 2008

PRIVATE SECTOR MARKET DEVELOPMENT CONSTRAINTS

Local insurance intermediaries and international reinsurance companies face difficulties in facilitating the development of market capacity for catastrophe natural perils in emerging countries. The aforementioned challenges result in limited investments in market development. Additional barriers to investment that are usually overlooked are:

- Lack of appropriate infrastructure and business strategy;
- High probability that client/end-users from developing countries may not purchase insurance due to lack of incentives or inability to bear the cost;
- Rapid commoditisation of new products and elimination of any first mover advantage;
- Long development cycles (from inception to sustainability of investments);
- There is little detailed information available for comparing the implementation schedules of the different weather and catastrophe index insurance projects worldwide. One of the few sources of information available is the World Bank publication, "Managing Agricultural Production Risk".[3] Based on the case studies reviewed, the time span between the inception and the implementation of the weather index insurance pilot projects ranges from two to seven years. The median reported is approximately three years;

However, once the entry barriers have been overcome and a market established, access is ensured for all other players who can then be more aggressive in pricing due to their lower upfront investment. In summary, the private sector faces tremendous difficulties in capitalizing on any first mover advantage. This creates a vicious circle because the optimal strategy would be to wait for someone else to incur all the development cost.

So far the donor community has borne the majority of the development cost. Conservative estimates suggest that it has spent more than US$40 million supporting the awareness efforts of public and private sectors, as well as the design and execution of the pilot projects.

MARKET DEVELOPMENT FRAMEWORK: A PATH TOWARDS SUSTAINABILITY

Given the challenges outlined so far in this article, some relevant questions emerge:

- How can this conceptual framework evolve into a broader local market development strategy?
- Can the insurance sector add value to the development process and how?

Experience of other insurance markets has proved that the sustainability and scalability of local financial markets are dependent on the strength and capabilities of local commercial institutions. PartnerRe has adopted this approach by facilitating the participation of these institutions in the development of sustainable parametric risk transfer markets. PartnerRe has witnessed firsthand, the potential impact of promoting a market development framework for parametric products based on investments in local delivery systems. A strong and specialized local insurance sector provides the most efficient platform for the design and execution of new product strategies.

It is clear that the needs and constraints of the African market are acute at all levels: lack of data, station networks, regulatory framework, access to technology and underwriting. PartnerRe and Africa-Re have been working to provide a market development platform for local insurance

[3] "Managing Agriculture Production Risk: Innovation in Developing Countries"; World Bank Report 32727-GLB (2006)

companies in the African region. The philosophy is that local financial institutions are in the best position to detect and capitalize on new market opportunities. The proposed platform is being designed to bridge the lack of access to appropriate technology by local institutions through the establishment of a strategic partnership framework that facilitates the transfer of product development, risk evaluation and rating resources to local financial institutions that are progressive, entrepreneurial, well-prepared, willing to invest and have access to targeted markets.

In addition, PartnerRe and Africa-Re will provide technical assistance for local institutions that will enable them access different sources of financing for the initial development phase with the ultimate objective of facilitating the creation of specialized teams within local insurance institutions that can act as project leaders and focal points in mainstreaming parametric insurance as a new line of business.

CONCLUSION

- Parametric insurance applications have proved to be effective risk transfer alternatives for certain risks in developing countries. They offer flexibility both in terms of scope of risks and potential outreach for these countries.
- The international reinsurance community has provided valuable support during the initial stages of the market development initiatives and has expressed readiness to continue its support within the context of a broader market development effort.
- More efforts need to be focused on developing sustainable and scalable local markets.
- Parametric insurance applications are potentially an attractive new line of business for local insurance companies, which however often require the help of experienced commercial institutions.
- PartnerRe and Africa Re have been playing an active role within the region by engaging in discussions with the development community about potential models that could be implemented through the African insurance industry.

Appendix 1 – List of Countries with Projects Under Execution Aimed at Designing and Implementing Parametric Insurance Alternatives in Developing Countries

Country	Risk Event	Contract Structure	Index Measure	Target User	Status
Bangladesh	Drought	Index insurance linked to lending	Rainfall	Smallholder rice farmers	In development; pilot launch planned for 2008
Caribbean Catastrophe Risk Insurance Facility	Hurricanes and earthquakes	Index insurance contracts with risk pooling	Indexed data from NOAA and USGS	Caribbean country governments	Implemented in 2007
China	Low, intermittent rainfall	Index insurance	Rainfall and storm day count	Smallholder watermelon farmers	Implemented June, 2007 in Shanghai only; includes a 40% premium subsidy
Ethiopia	Drought	Index insurance	Rainfall	WFP operations in Ethiopia	USD 7 million insured for 2006; policy not renewed for 2007 due to lack of donor support
	Drought	Index insurance	Rainfall	Smallholder grain farmers	2006 pilot; Implemented 2008, Sold by private insurer
	Drought	Weather derivative	Satellite and weather data	NGO	Implemented in 2007
Honduras	Drought	Index Insurance	Rainfall	Smallholder	Implemented in 2008
India	Drought and flood	Index insurance linked to lending; offered directly to farmers	Rainfall	Smallholder farmers	Began with pilot in 2003; index insurance products now offered by private sector and government; As of March 2008, close to 1 million contracts have been sold[4]
Kazakhstan	Drought	Index insurance linked to MPCI program	Rainfall	Medium and large farms	In development
Kenya	Drought	Weather derivative	Satellite and weather data	NGO	Implemented in 2007
Mali	Drought	Weather derivative	Satellite and weather data	NGO	Implemented in 2007
Malawi	Drought	Index insurance linked to lending	Rainfall	Groundnut and maize farmers who are members of NASFAM	Pilot began in 2005; 1710 policies sold in 2006/2007 pilot season; $5238 in premium volume
Mexico	Natural disasters impacting smallholder farmers, primarily drought	Index insurance	Rainfall	State governments for disaster relief; Supports the FONDEN program	Pilot began in 2002; available in 26 of 32 states; currently 28% (2.3 million ha) of dryland cropland is covered

[4] Estimate based on Manuamorn (2007) and personal communication between Jerry Skees and Kolli Rao of AICI, March 29, 2008.

Country	Risk Event	Contract Structure	Index Measure	Target User	Status
	Major earthquakes	Index-linked cat bond and index insurance contracts	Richter scale readings	Mexican government to support FONDEN	Introduced in 2006; cat bond provides up to USD 160 million; index insurance coverage up to USD 290 million
	Drought affecting livestock	Index insurance	Normalized Difference Vegetation Index	Livestock breeders	Launched in 2007, sum insured USD 22.5 million across 7 states, insured 913,000 cattle
	Insufficient irrigation supply	Index insurance	Reservoir levels	Water user groups in the Rio Mayo area	Feasibility assessment conducted;
Mongolia	Large livestock losses due to severe weather	Index insurance with direct sales to herders	Area livestock mortality rate	Nomadic herders	Third sales season of pilot completed in 2008; offered in 3 provinces; 17% of eligible herders participated; about 4,000 policies sold
Morocco	Drought	Index insurance	Rainfall	Smallholder farmers	No interest from market due to declining trend in rainfall
Nicaragua	Drought, excess rain, and excess humidity	Index insurance	Rainfall	Groundnut and rice farmers	Launched in 2006
Peru	Flooding, torrential rainfall from El Niño	Index insurance	ENSO anomalies in Pacific Ocean	Rural financial institutions	Feasibility assessment and preliminary market development work conducted.
	Drought	Index insurance linked to lending	Area-yield production index	Cotton farmers	First sales season launched in 2008
Senegal	Drought	Index insurance linked to area-yield insurance	Rainfall and crop yield	Smallholder farmers	Proposed
Tanzania	Drought	Index insurance linked to lending	Rainfall	Smallholder maize farmers	Pilot implementation in 2007
Thailand	Drought	Index insurance linked to lending	Rainfall	Smallholder maize farmers	Pilot implementation in 2007
	Flood	Index insurance	River level or Rainfall	Smallholder rice farmers	Proposed
Ukraine	Drought	Index insurance	Rainfall	Smallholders	Implemented in 2005; currently closed due to limited sales
Vietnam	Flooding during rice harvest	Index insurance linked to lending	River level	The state agricultural bank and, ultimately, smallholder rice farmers	In development; a draft business interruption insurance contract is being considered by the state agricultural bank

Source: Skees and Collier 2008