

PARAMETRIC INSURANCE FOR DISASTER RESPONSE

Definition of parametric insurance

Parametric insurance (also called index-based insurance) is a type of insurance that pays out when an event of a certain agreed-on severity takes place – that is, it does not pay out based on the actual damage or losses sustained. The objective measure that determines a payout is often known as the parametric “trigger.”

Table 1: Advantages of parametric insurance over traditional indemnity insurance

	Traditional indemnity insurance	Parametric insurance
Speed of payout	Payouts can be very slow (take several weeks or months) because the value of the loss must be assessed (in a process known as claims adjustment).	Rapid payouts (taking less than two weeks) are possible, as no claims adjustment process necessary.
Claims handling cost	Cost is higher due to expense of the claims adjustment process.	Cost is lower due to absence of a claims adjustment process.
Claims transparency	Claim amounts can be contested, as they depend on the claims adjustment process and applicability of any policy terms / exclusions. The loss adjustment process is also imperfect and may not be well understood.	Claim amounts are predefined with a transparent calculation process (although expert knowledge may be required to understand calculation).
Use of payout	Payout is usually used to repair the damage or loss incurred.	Payout can be very flexible and used as budget support with few or no restrictions.
Customization of policy	Products and contract wordings are standardized, with some customization such as excesses; and No Claims Bonuses (NCBs), which influence the premium amount.	The product is highly customized, with many parameters selected by the policyholder, including the premium amount; there is a high level of structuring flexibility.

Source: Adapted from Singapore Reinsurers’ Association, “Parametric Risk Transfer: A Solution to Narrow Asia’s Protection Gap,” <https://mvvsp1.5gcdn.net/7d840e3d78914a3d8c3e9270889c7020>.

The advantages and disadvantages of parametric over traditional indemnity insurance are always context-specific and depend on the objectives of the insured in securing financial protection.

Parametric triggers

In the context of parametric insurance for disasters, payout triggers are usually related to the intensity of an event and can take one of two forms:

1. **Pure parametric trigger.** With this type of trigger, the payout is based on physical characteristics of an event, such as the wind speed of a cyclone, magnitude of an earthquake, or amount of rainfall occurring in a particular location.
2. **Modeled loss trigger.** With this type of trigger, the payout is based on estimated losses for a given event from a catastrophe model.

It is possible for parametric policies to have multiple triggers, which can result in different levels of payouts. The main requirements for a parametric trigger are (i) that the measure is objective and can be modeled; (ii) that the measure is independently verifiable by a third party immediately after a disaster; and (iii) that the measure is correlated with the actual losses incurred following a disaster. Neither the insured nor the risk taker should be able to influence the trigger (or its calculation or reporting).

Key consideration: Basis risk¹

The main drawback of parametric insurance is that it entails basis risk, which can be defined as the risk that any payout under the policy may deviate from the actual losses sustained from an eligible event. Such a deviation can occur in either direction—that is, calculated payouts can be below the sustained losses to the insured (negative basis risk) or above them (positive basis risk).

Parametric insurance includes some residual basis risk because any index or parameter used as the basis for a payout is an imperfect proxy for the actual financial loss sustained. In structuring a parametric product, the aim is to ensure that resulting payouts correlate as closely as possible with the actual loss sustained, thereby minimizing basis risk. The best way to achieve this close correlation is by tailoring parametric insurance to the risk profile and needs of the prospective policyholder, through proper choice of the underlying index and payout schemes, and possibly the inclusion of multiple trigger conditions. Recent advances in data analytics, more granular reporting, improved modeling techniques, and innovations in parameters are collectively leading to a reduction in basis risk. However, some basis risk will always remain, because no index can perfectly foresee and match how actual losses unfold after an event.

Key takeaway

The advantages of parametric insurance make it highly appropriate for financing immediate disaster relief and early recovery activities. Parametric insurance typically covers only a relatively small proportion of losses incurred after a disaster, but it can provide a rapid payout within two weeks of a disaster and places few restrictions on how payouts are used. However, the payout from parametric insurance is usually a fixed amount and does not cover the main losses from a disaster related to rebuilding of damaged assets.

Example

In July 2017, the Government of the Philippines placed on the international financial markets a portfolio of catastrophe risk that transferred typhoon and earthquake risk from the Philippines through the World Bank to the international reinsurance market in local currency. In 2018, the government purchased a second insurance policy, doubling the amount of coverage. These policies were parametric and provided rapid payouts to support disaster response in affected Local Government Units and National Government Agencies.¹ There were three payouts to the government over the two years when the program was in place (two payouts from typhoons and one from an earthquake).

CATASTROPHE BONDS

Definition of catastrophe bond

A catastrophe bond (also called a CAT bond) is a type of alternative risk transfer instrument that transfers risk from a sponsor to an investor. Catastrophe bonds are typically used by insurers (acting as the sponsor) as an alternative to traditional catastrophe reinsurance, although sovereign governments can also be sponsors of catastrophe bonds to secure financial protection against disaster risk. Catastrophe bonds are issued by the capital markets (i.e., investors), which offer an alternative to traditional insurance and reinsurance markets.

From the perspective of the sponsor (e.g., sovereign government), a catastrophe bond functions like insurance: a premium is paid, and a payout is received if a disaster event meets certain pre-agreed criteria. The investor can receive an interest rate over the life of the bond that is greater than that of most fixed-income securities, but some or all of the principles may be lost if a disaster occurs.

Most catastrophe bonds are parametric in nature, with the triggers taking the same form as in parametric insurance.

Table 2: Advantages and disadvantages of catastrophe bonds for sovereign governments

Advantages	Disadvantages
<ul style="list-style-type: none"> Additional capacity from capital market investors provides a way of securing higher levels of coverage than is offered by international reinsurers. 	<ul style="list-style-type: none"> Transaction costs are usually higher than for parametric insurance. Complicated structure is more difficult to understand than insurance, despite serving essentially the same purpose.

¹ World Bank, "Lessons Learned: The Philippines Parametric Catastrophe Risk Insurance Program Pilot," World Bank Group, Washington, DC, 2020, <https://openknowledge.worldbank.org/bitstream/handle/10986/36013/The-Philippines-Parametric-Catastrophe-Risk-Insurance-Program-Pilot-Lessons-Learned.pdf>.

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- CAT bonds can secure coverage for multiple years.
 - For high levels of coverage, pricing can be favorable compared to reinsurance.
 - The benefits of parametric insurance also apply to catastrophe bonds (rapid payout, no loss adjustment process, transparent calculation of payout, and predetermined payout amounts).
 - Typically CAT bonds take longer to prepare and place than parametric insurance.
 - The main drawback of parametric insurance (basis risk) also applies to catastrophe bonds.
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Key takeaway

Catastrophe bonds are best suited to extreme-severity / low-frequency risks, and in particular where a high level of coverage is being sought (typically greater than US\$100 million) over multiple years. While transaction costs are high, catastrophe bonds can offer an alternative way of securing high levels of coverage and can provide price savings for multiyear contracts.

Example

In 2019 the World Bank issued two tranches of CAT bonds to provide the Government of the Philippines with three years of financial protection of up to US\$75 million for losses from earthquakes and US\$150 million for losses from tropical cyclones. The bonds were issued under the IBRD (International Bank for Reconstruction and Development) Capital at Risk Notes program, which allows developing countries to transfer natural disasters and other risks to the capital markets.²

SOVEREIGN RISK POOLS

Definition of sovereign risk pools

Sovereign risk pools are entities that provide disaster insurance to countries, typically within a single region; pooling the risk from multiple countries creates economies of scale and diversifies risk, which results in lower premiums.

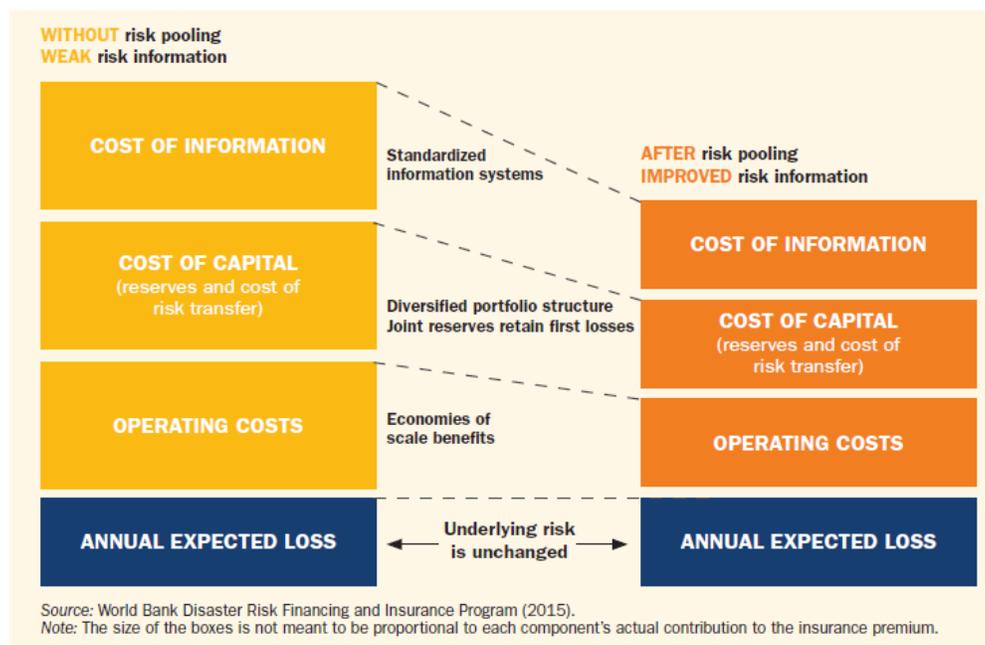
Sovereign risk pools currently exist in the Caribbean and Central America (Caribbean Catastrophe Risk Insurance Facility Segregated Portfolio Company, CCRIF SPC), Africa (African Risk Capacity, ARC), the Pacific (Pacific Catastrophe Risk Insurance Company, PCRIC), and Southeast Asia (Southeast Asia Disaster Risk Insurance Facility, SEADRIF).

² World Bank, "World Bank Catastrophe Bond Transaction Insures the Republic of Philippines against Natural Disaster-Related Losses Up to US\$225 Million," press release, November 24, 2019, <https://www.worldbank.org/en/news/press-release/2019/11/25/world-bank-catastrophe-bond-transaction-insures-the-republic-of-philippines-against-natural-disaster-related-losses-up-to-usd225-million>.

How sovereign risk pools reduce insurance premiums

Sovereign risk pools leverage economies of scale in areas such as operating costs, the cost of capital and administrative functions such as having standardized information systems and analytics. This leads to a reduction in the insurance premiums charged to member countries.

Figure 1: Without Risk Pooling



Source: World Bank Group, "Sovereign Climate and Disaster Risk Pooling," World Bank Technical Contribution to the G20," 2017, <https://openknowledge.worldbank.org/handle/10986/28311>.

Donor funding is often provided to sovereign risk pools for premium subsidies, start-up costs, ongoing operating costs, and seed capital, thus further reducing the costs of insurance to member countries.

Although risk pools have traditionally provided **parametric insurance** to help countries respond quickly to disasters, some pools are now starting to expand their range of products to other kinds of insurance, and to offer policies at levels other than just the sovereign level (e.g., subnational level or for specific sectors). Sovereign risk pools have helped countries work together to enhance their financial protection against disasters. Risk pools do more than reduce the costs of insurance; for some countries, they are the only means of accessing disaster insurance.

Table 3: Advantages and disadvantages of sovereign risk pools

Advantages	Disadvantages
<ul style="list-style-type: none">• May be the only way that some countries can purchase sovereign insurance.• Can offer pricing benefits compared to direct purchase of insurance by individual countries due to greater diversification, economies of scale, and access to donor financing.• Can provide additional services beyond insurance policies such as technical capacity building.	<ul style="list-style-type: none">• Usually, a very lengthy process to set up.• Full benefits of a risk pool can be realized only if multiple countries purchase policies.

Example

In February 2021, as its first product, the SEADRIF Insurance Company launched a regional catastrophe risk insurance product—the first regional product in Asia—that provides cover against flood risks in the Lao People’s Democratic Republic. This can be expanded to additional countries in the future.³

³ SEADRIF, “The SEADRIF Insurance Company: Providing Catastrophe Risk Insurance Coverage,” <https://seadrif.org/the-seadrif-insurance-company/>.