Special Report

Catastrophe Bonds: Demonstrating Resilience in Tough Times

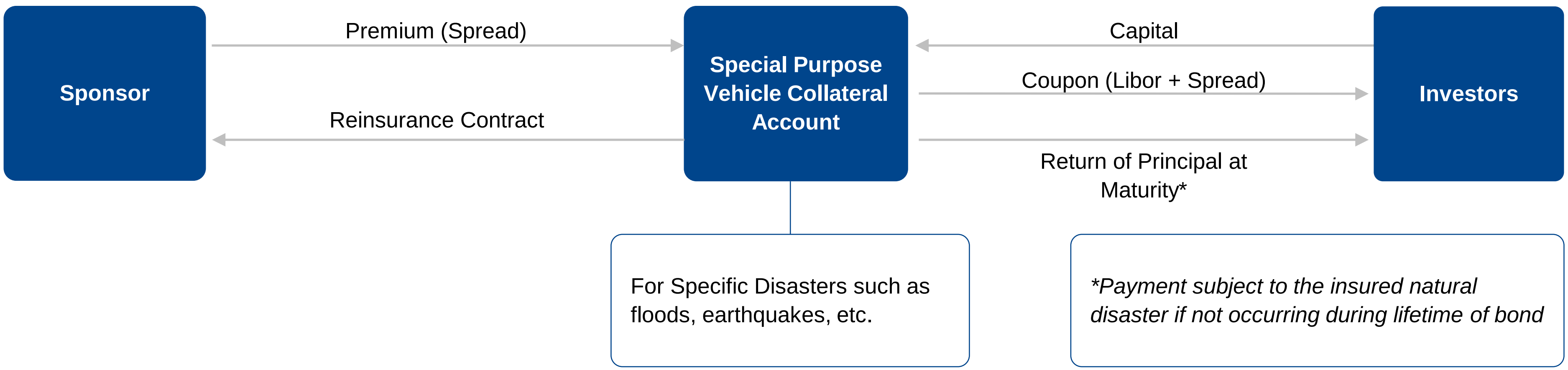
December 2021

Highlights

- The global pandemic had a catastrophic impact on human civilization and on the growing but little known area of capital markets - catastrophe (CAT) bonds.
- Countries around the world are taking measures to curb the financial losses due to COVID-19. The benefits of CAT bonds in pandemic have been proved, as noted with the World Bank's pandemic bond, which paid out $100 million after being triggered by COVID-19.
- Moreover, the growing intensity of natural disasters in different parts of the world pushes the need to leverage financial markets for improved risk mitigation.
- The rising popularity of CAT bonds appears to be a potentially viable innovative solution to channel private market contingent capital to be used in delivering pandemic response funding. The ability of CAT bonds to perform independent of financial market behavior makes them a useful source of alternative beta.

CAT bonds are binding contracts which specify what perils are covered and when funds are released or triggered…

- Catastrophe (CAT) bonds form a part of insurance-linked securities (ILS), also known as insurance securitization.
- CAT bonds provide issuers (insurers/reinsurers) financial protection in case of a major catastrophe. They are typically structured as 144A floating rate, principal-at-risk notes.
- Common sizes range from $50 million to $500 million, although the market has supported deals as large as $1 billion to $2 billion.
- The duration of these bonds typically ranges from one to five years, with three to four years being the maximum term.
- Most CAT bonds cover extreme natural events such as earthquakes or hurricanes, but some bonds cover pandemics such as COVID-19.
- CAT bonds were first issued in the 1990s after the Northbridge earthquake and Hurricane Andrew, which primarily affected the US states of Florida. However, the damages from these two events were so catastrophic that covering them caused many insurance companies to become insolvent. Thus, CAT bonds were developed to offset the risks faced by insurance companies.



Triggers | Indemnity | Parametric | Industry-Loss | Modeled-Loss

CAT bonds help create a diversified portfolio of insurance policies that might constitute an attractive investment opportunity

- Insurers can access capital from asset owners such as pension funds, endowments, and other institutional investors.
- Insurers usually need an extra layer of protection for themselves, as catastrophes typically cause severe destruction and a large sum of money is needed to be paid out suddenly, which threatens insurers with insolvency.
- Asset owners provide insurers with coverage in exchange of a hefty premium. Since natural disasters are not caused by economy and capital markets, from an investment perspective, CAT bonds help create a diversified portfolio of insurance policies that might constitute an attractive investment opportunity.

CAT Bond Payout Triggers

CAT Bond Triggers

Industry Loss

- Payouts Based on aggregate losses to the insurance industry
- Engage a third-party modeler to provide an independent estimate of the covered losses

Indemnity

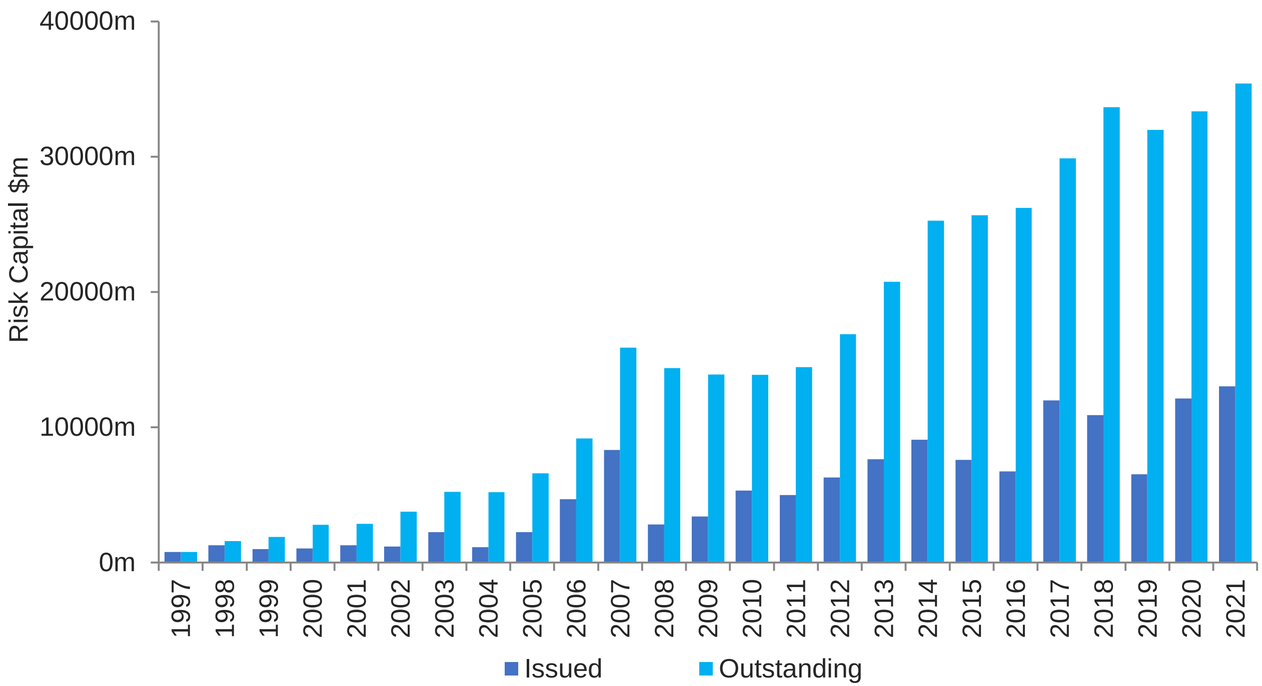
- Payouts Based on the actual insurance losses suffered by the issuer and work similar to traditional reinsurance

Parametric

- Payouts Based on the measured strength of the covered catastrophe, such as hurricane's wind speed and barometric pressure or earthquake's magnitude.

CAT bonds popularity is growing with a record increase in issuance in 2021, driven by robust investor demand and sponsor appetite for protection

CAT Bonds & ILS Risk Capital Issued & Outstanding by Year



- As per Artemis, CAT bonds and other ILS issuances rose to USD16.4 billion in 2020 from USD11.1 billion in 2019 and USD 13.9 billion in 2018.
- For the first time in the market history of ILS, CAT bonds and related ILS issuances surpassed USD 8 billion in a single quarter during Q2 2021, taking the H1 2021 mark to a massive USD13.12 billion.

CAT Bond Sponsors

AIG, Allianz, AXIS, ZURICH, USAA, RenaissanceRe, Swiss Re, FONDEN SECRETARÍA DE GOBERNACIÓN, EVEREST, Munich RE, AXA, XL Insurance Reinsurance, Mitsui Sumitomo Insurance

Source: *Artemis, Aranca Analysis*

In past few years the number of Human-induced Disasters drastically fell down but the natural disasters are setting a new record each year.

Human Induced Disasters

- The number of human-induced disasters peaked at 250 in 2005 and drastically fell to 85 in 2020.
- The two largest man-made disasters in 2020 were the riots and civil unrest in US, which affected 24 states, and the explosion in the harbor of Beirut, Lebanon, which damaged a significant portion of the city, amounting to over USD 4 billion in damages.

Natural Disasters

- The number of natural disasters rose to 189 in 2020 from 50 in 1970.
- This is majorly due to increased urbanization, which creates high population density and high property values.

Need for CAT Bonds

- Climate change is an increasing component aggravating the frequency of severe meteorological events which is expected to rise further taking a big toll on countries and human health.

- The fiscal burden on developing countries due to natural disasters is expected to continue to rise. Natural disasters and health-related emergencies can cause significant economic and fiscal shocks for countries.

- Emerging markets are more vulnerable than developed markets due to weak building codes, dense cities, and minimal insurance coverage.
- Countries struggle to fund the interim period, weeks, or months after a disaster occurs, when most emergency relief and recovery takes place. This liquidity gap can be filled by CAT bonds.

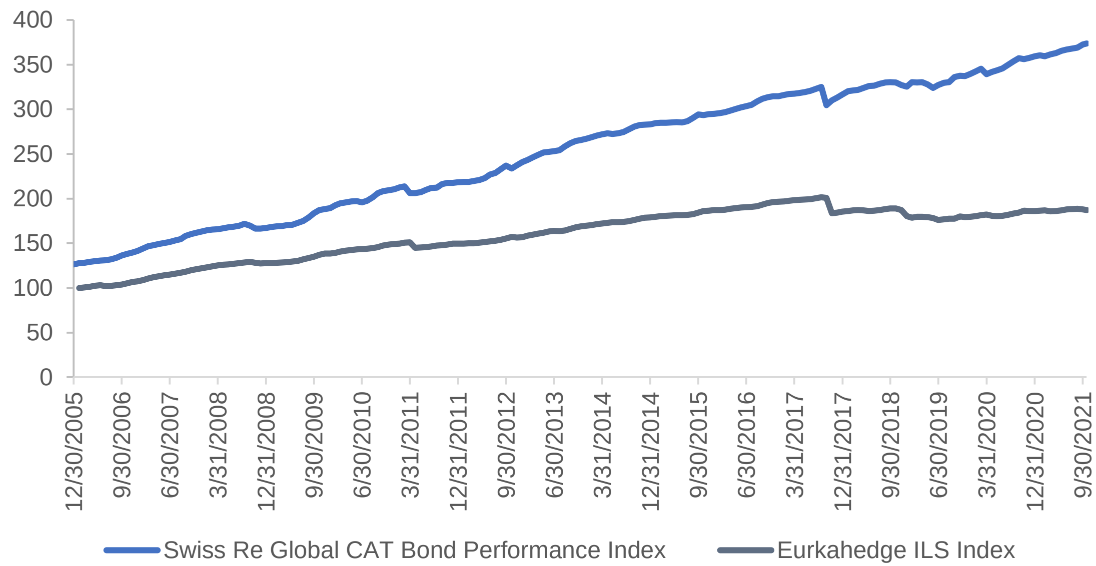
Due to compounding natural disasters, there has been an increase in the new CAT Bond deals. Few latest deals are mentioned below…

Date	Issuer	Sponsor	Risks/Perils Covered	Size
Dec 2021	Phoenician Re Ltd.	Alphabet Inc.	California earthquake	$275.5m
Dec 2021	Titania Re Ltd	Syndicate 1910 (Arial Re)	U.S., Puerto Rico, U.S. Virgin Islands, D.C., Canada named storm and earthquake	$175m
Dec 2021	Topanga Re	Farmers Insurance Group	US named storm, earthquake, severe weather, wildfire	≤160m
Dec 2021	Matterhorn Re Ltd	Swiss Re	U.S. named storm, U.S. and Canada earthquake	$150m
Dec 2021	Logistics Re Ltd	Prologis Inc.	U.S. earthquake	$95m
Nov 2021	Sanders Re II Ltd.	Allstate	US named storm, earthquake, severe weather, wildfire, volcanic eruption, meteorite impact (excl. Florida)	$400m
Nov 2021	Residential Reinsurance 2021 Limited	USAA	U.S. tropical cyclones, earthquakes (plus fire following), severe thunderstorm, winter storm, wildfire, volcanic eruption, meteorite impact, other perils (all including auto & renter policy flood losses)	$300m
Oct 2021	Acorn Re	Hannover Rück SE / Oak Tree Assurance, Ltd.	U.S. earthquake	$475m
Sep 2021	Nakama Re Pte.	Zenkyoren	Japan earthquake	$775m
Jul 2021	IBRD CAR 130	Govt. of Jamaica	Jamaica Named storms	$185m
Jul 2021	Claveau Re Ltd.	Arch Capital Group Ltd.	Global peak perils	$150m
Jun 2021	Merna Re Ltd	State Farm	U.S. Earthquake	$300m
Jun 2021	Mona Lisa Re Ltd	Renaissance Re and DaVinci Re	U.S., Puerto Rico, U.S. Virgin Islands, D.C. named storm and earthquakes, Canada earthquakes	$250m
Jun 2021	Umigame Re Pte. Ltd.	Tokio Marine & Nichido Fire Insurance Co. Ltd.	Japan typhoon, Japan flood	$200m

Source: *Artemis*

CAT bonds have delivered better risk-adjusted returns as compared to other asset classes and are know to act as effective portfolio diversifiers

Performance of CAT Bond Indices Over Time



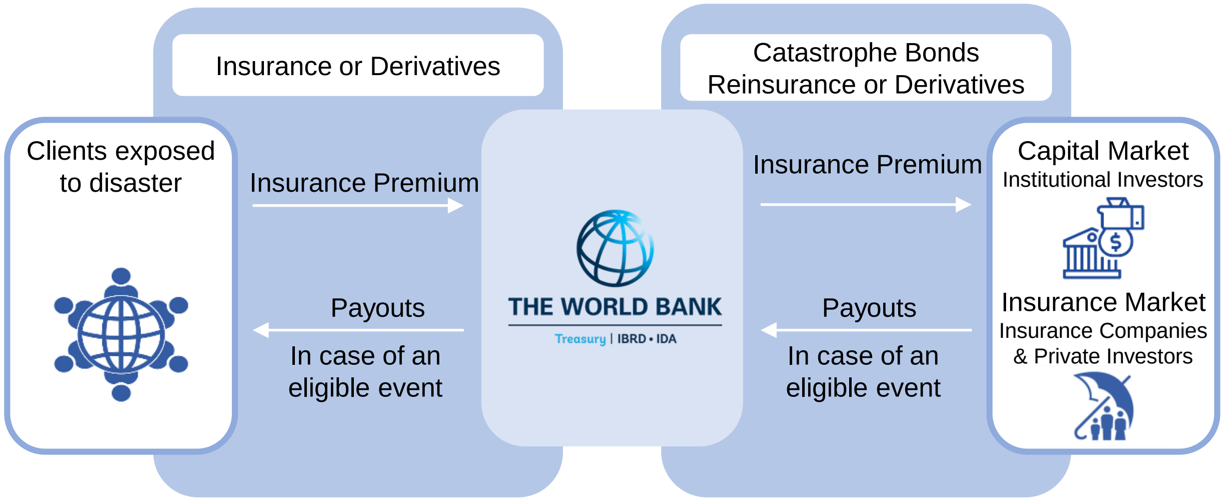
- There are two CAT bond indices in the public domain through which we can analyze the returns of CAT bonds.
- The SwissRe CatBond Index is a portfolio of diversified CAT bonds weighted by market capitalization, and the Eurekahedge ILS Advisers Index includes more than 30 equal-weighted fund managers focused primarily on CAT bonds.
- The SwissRe index does not inculcate costs, whereas the Eurekahedge index allows fund managers to import their track records, which incentivizes survivorship bias.

- The SwissRe CatBond Index achieved higher returns in 2005-–21, since it is being calculated gross of fees and transaction costs.
- CAT bond returns resulted in Sharpe ratios of approximately 2 due to exceptionally consistent returns over the period, which were significantly higher than any other asset class.
- The largest drawdown occurred in 2017, but the SwissRe index relatively recovered its losses quickly than its Eurekahedge counterpart, which did not fare well.
- Over the period of 2002-2020, the SwissRe Cat Bond Index posted an annualized return of 7%. While this is slightly lower than high yield bonds or equities, CAT bonds have delivered significantly better risk-adjusted returns, with a Sharpe Ratio of 1.8.
- Correlation with other asset classes has also been low, indicating CAT bonds' potential effectiveness as a portfolio diversifier.
- This stands to reason, given that the main determinant of CAT bond performance over time will be insurance events, whereas credit and equity performance is more tightly linked to broad economic and financial cycles.

Source: *Eurkahedge,Swiss Re,Factor Research; Aranca Analysis*

World Bank: Taking a lead in Catastrophe Bonds….

World Bank CAT Bond Structure



**Plus World Bank funding margin in the case of World Bank issued Catastrophe Bond*

- The World Bank issues CAT bonds for many client countries around the world.
- It launched its Capital at Risk Notes program in 2014 and issued CAT bonds providing clients USD 2.8 billion of insurance cover in the last three years.
- These transactions cover a range of risks, including earthquakes, hurricanes, tsunamis, and pandemics. With CAT bonds, countries can transfer some of their disaster risk exposure to capital markets without increasing their sovereign debt. Any counterparty credit risk concerns are eliminated as CAT bonds are fully funded transactions.
- Unlike a typical CAT bond structure, the World Bank uses its existing bond issuance infrastructure and does not require a special purpose vehicle (SPV) or any collateral arrangements. Therefore, the structuring is streamlined, and transaction costs are reduced for clients.

- Some countries that benefitted from World Bank CAT bonds are Mexico, Peru, Chile, and Colombia.
- The most recent Mexico CAT bond issued by the World Bank in March 2020 provides Federal Government of Mexico established Fondo de Desastres Naturales (FONDEN) with USD 485 million of insurance cover for earthquake and hurricane events for four years.
- The World Bank issued to capital market investors a CAT bond that provides the Philippines government with USD 225 million of insurance cover for earthquakes and typhoon events for three years which became the first sovereign in Asia to sponsor a CAT bond in November 2019.
- The World Bank has become an important supplier of collateral required for CAT bonds issued by third parties. It has now been used as a collateral solution for more than 60 CAT bonds in an aggregate amount of approximately USD13 billion.
- By choosing World Bank bonds as a collateral solution, CAT bond investors can enhance the sustainability of their investments without giving up returns or taking any additional risks.

Source: *World Bank; Aranca Analysis*

Innovation, Environmental and Sustainable Goals…

- CAT bonds are designed to increase a sponsor's resilience to climate-related hazards and natural disasters, effectively linking sustainability with disaster risk financing.
- In addition, CAT bonds can support the United Nations Sustainable Development Goals by investing the bond proceeds in sustainable programs.
- In the near term, the asset class could see efforts to model emerging threats such as cyber risks, terrorism risk non-property risk plans facing inadequate pricing/capacity issues, (e.g., workers' compensation, auto, health, etc.).

Examples of CAT Bonds that link to Innovation, Environmental and Sustainable Goals

- The recent example of sustainability is Generali pursuing the green CAT bond route for EUR 200 million Lion Re III renewal.

- World Bank bonds are also a safe, cost-efficient, and socially responsible option as a collateral for any CAT bond as the proceeds can be used to support the World Bank's sustainable development mission

- In 2014, the Hoplon II Insurance Ltd deal provided MyLotto24 with three years of fully collateralized protection for lottery jackpot risks on an annual aggregate and ultimate net loss basis.

- In 2019, the Pool Reinsurance Company, the mutual terrorism reinsurance facility supported by the UK government for the first time tapped capital markets for a source of retrocessional coverage, with a CAT bond to be issued through a UK domiciled and regulated ILS vehicle. This was the first terrorism CAT bond in history ever structured and issued.

- In 2003, FIFA issued a catastrophe bond to protect its investment in the 2006 World Cup in Germany. As a result of the attacks in the USA on September 11, 2001, and the subsequent withdrawal by insurers from the 2002 FIFA World Cup cancellation insurance policy, it required future protection to be immune from such risk..

The impact of COVID-19 on CAT bond market has been relatively limited but economic dislocations caused by it will place greater importance on disaster risk financing.

This limited impact of COVID-19 on CAT bond market is consistent with prior periods of extreme capital market volatility (such as during the financial crisis of 2007–08) wherein CAT bonds' performance also remained largely stable compared with other segments of capital markets. Such stability reflects the fact that CAT bonds are structured to perform as diversifiers to other financial market risks.

While there is limited life event exposure in the CAT bond market, for the most part, this exposure is to extreme mortality events, and, as of now, COVID-19 has not led to overall changes in mortality rates large enough to trigger these transactions.

The one exception is the World Bank's pandemic bond and swap transaction, which was triggered due to the COVID-19 outbreak, leading to a USD133 million payout from the bond (plus USD 63 million from the accompanying pandemic-risk linked swaps) to the least developed countries affected by the pandemic. The pandemic bond and swap transaction was designed specifically to respond to events such as COVID-19.

Forward-looking growth expectations are extremely positive for the CAT bonds market in the middle to long term, supported by a robust structural growth story

CAT Bond Market Future Outlook

Several CAT bonds were expected to mature throughout 2020, suggesting that there will be ample capacity in the market to absorb new CAT bond issuances. However, CAT bond and reinsurance pricing has continued to harden (still recovering from the catastrophe events of 2017, 2018, and 2019), resulting in increased insurance costs for sponsors.

Combination of attractive pricing following several years of high insurance losses and structural supply-and-demand dynamics will sustain CAT bond spreads at attractive levels.

Barriers to entry remain relatively high compared with those of other fixed income instruments. Strong relationships with major brokers and other intermediaries are critical, particularly in new issue allocations. Specialized modeling resources are also crucial for portfolio construction and risk management.

In many emerging countries, the number of COVID-19 cases has not yet peaked, and these countries are exposed to hurricanes, earthquake, droughts, and other shocks. With the concern of compound shocks growing, governments are now placing greater importance on disaster risk financing.

There is no anticipation of decline in interest in sovereign CAT bond and insurance transactions. With developing country budgets already stretched by COVID-19, related reductions in revenue, and increase in public health expenditure, the benefits of financial support for CAT bond and insurance programs costs are magnified. However, there is increased need for donor support programs such as that provided by the Global Risk Financing Facility

In a nutshell, conditions are currently highly favorable in the CAT bond market. Market fundamentals continue to strengthen, and forward-looking growth expectations are extremely positive in the middle to long term, supported by a robust structural growth story. The new issuance pipeline of CAT bonds appears healthy, and new issues are being brought to market at extremely attractive yields to buyers. These factors, combined with the potential tightening of spreads from their current highs, except any major event losses, could be an enthralling factor for CAT bonds in future.

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