

## Catastrophe Bonds: the basics

### Summary

*Catastrophe bonds (“Cat Bonds”) are a form of insurance-linked security used to finance peak, non-recurrent insurance risks, such as hurricanes, tropical storms and earthquakes. Cat Bonds are the most common form of insurance-linked security and have grown in response to hard reinsurance markets and demand from specialist cat bond funds.*

*Cat Bonds are offered directly to capital markets, reducing cyclicity and expanding the risk bearing capacity of the reinsurance market. Cat Bonds are structured finance products that aim to isolate pure insurance risk from credit risk and other types of market risk and transform this risk into a capital markets form. Cat Bond volume has grown substantially in the last five years and Cat Bonds now occupy an important part of the property casualty retrocession market. Cat Bonds are attractive from an investor perspective because they are a non-correlated asset class and the yield is much higher than similarly rated corporate bonds. They do, however, require special expertise to analyze and tend to suffer a complete loss upon default.*

*This article broadly explains Cat Bonds: the most common forms; the reasons why (re)insurers and investors are attracted to Cat Bonds; shortcomings of Cat Bonds; how Cat Bonds are legally structured and regulated.*

### Introduction

Catastrophe bonds are a common form of insurance-linked security (“ILS”) used to finance peak, non-recurrent insurance risks, such as hurricanes, tropical storms and earthquakes. The first successful catastrophe bond was launched in 1997 and annual issuance has increased from \$633 million in 1997 to a peak of about \$7 billion in 2007. The first loss to a catastrophe bond occurred in December 2007 as a result of 2005’s Hurricane Katrina. Despite this and subsequent losses due to the Lehman Brothers collapse and the Great Tohoku Earthquake, catastrophe bond defaults have been rare.

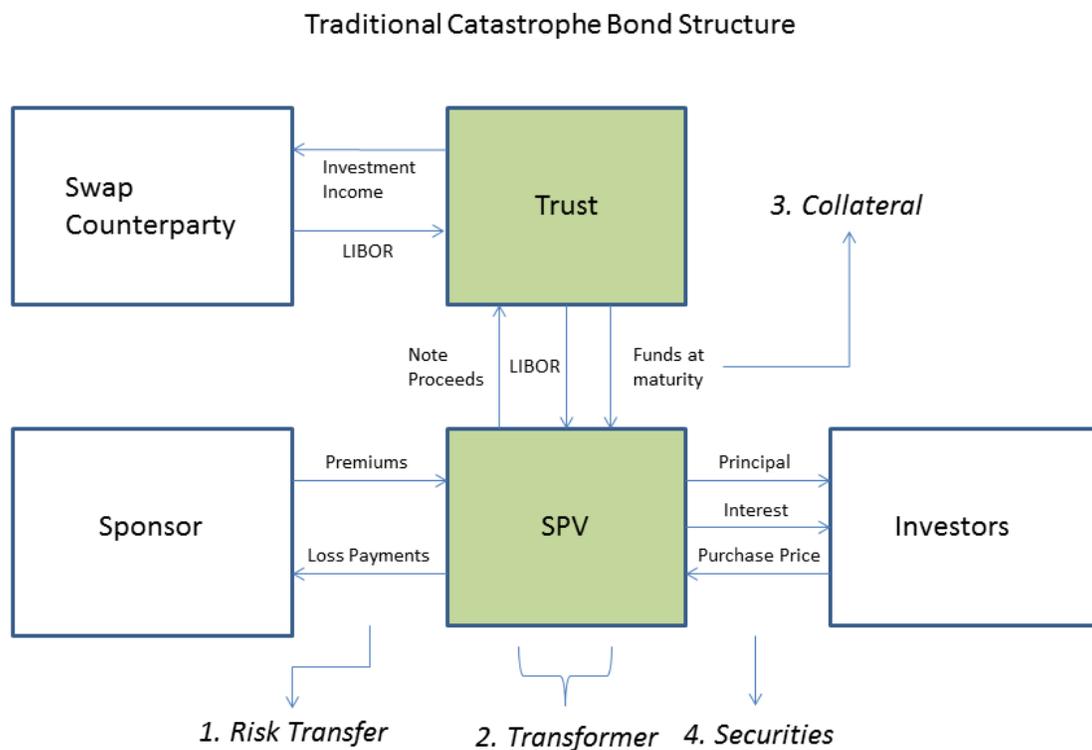
Traditional reinsurance capacity can quickly dry up when faced with catastrophe losses. This lack of capacity can lead to hard markets of high pricing and low supply, followed by increased supply and a persistent soft market of low pricing until the next catastrophe. This cyclicity introduces an element of uncertainty for (re)insurers and, ultimately, policy holders.

Catastrophe bonds aim to take advantage of the capital markets to share exposure caused by catastrophes, the notion being that catastrophe losses will have a more diluted effect on the larger financial markets. By retaining recurrent risks and transferring the high severity, low probability catastrophe exposure to capital markets, reinsurers can reduce cyclical and unpredictable loss.

The bond is issued to investors with the expectation that interest will be repaid periodically and the principal at maturity. The principal is, however, at risk of loss on the occurrence of a catastrophic event. The structure of the catastrophe bond is designed to isolate insurance risk from non-insurance risks, such as market risk, execution risk, interest rate risk, *etc.* By isolating insurance risk, catastrophe bonds aim to be a low beta, high yielding asset for investors and a solution to peak exposures for insurers.

This article discusses the key characteristics of catastrophe bonds with emphasis on the legal and regulatory framework for the instruments.

### Outline of Catastrophe Bonds



Catastrophe bonds are the most widely accepted ILS and have reached a greater level of standardization than other ILS. Catastrophe bonds represent a majority of the property catastrophe retrocession market and represent an increasing portion of the property catastrophe

reinsurance market. The catastrophe bond provides the sponsor with fully collateralized multi-year cover for risks on an excess of loss basis.

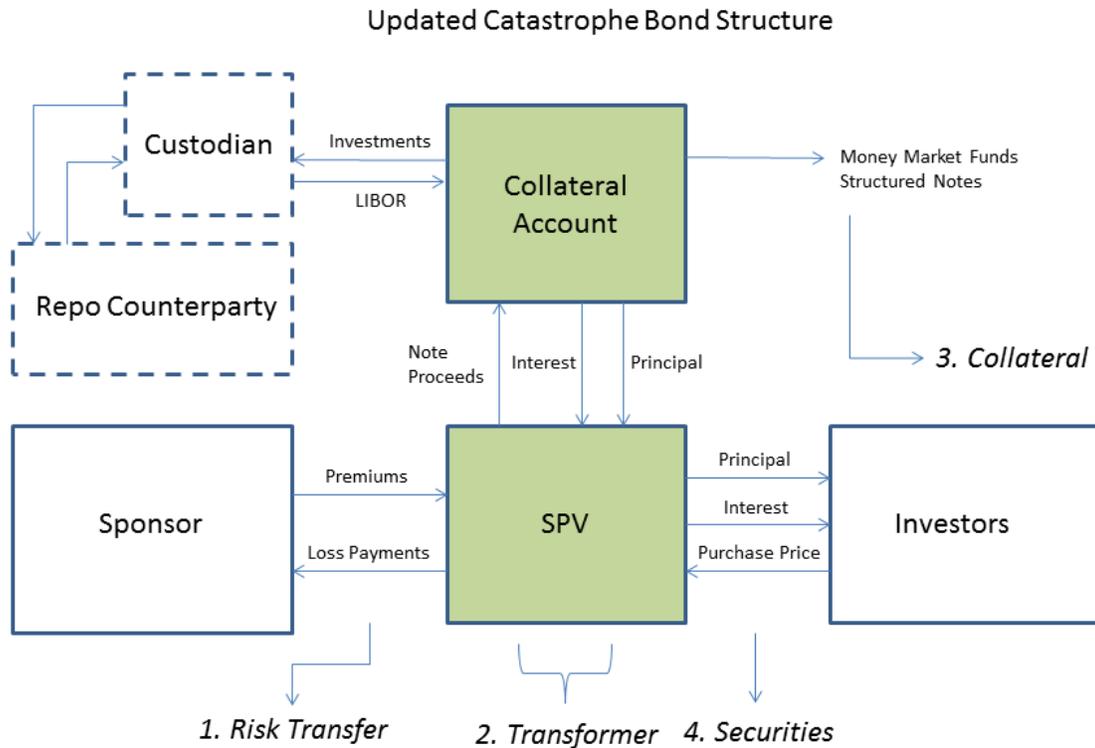
A catastrophe bond is a high-yield bond that contains a trigger that may cause the principal or interest payments due on the bonds to be delayed or forfeited if a qualifying loss is caused by a specified peril, such as a hurricane or earthquake. For a loss to qualify, it should occur at a particular location, exceed a damage threshold or might need to result from multiple events.

The trigger style may be indemnity, parametric, industry-wide loss or modeled. An indemnity trigger is based on the actual loss to the sponsor, parametric triggers are based on event characteristics derived from meteorological data and other third party sources, index triggers are based on industry estimates of loss and modeled triggers are based on an industry loss model determined by running event parameters through the modeling firm's database of industry exposures.

The protection buyer, also called the sponsor, creates a special purpose vehicle ("SPV", also known, in this context as a transformer) in an offshore jurisdiction. While legislation exists allowing for onshore SPVs, taxation has made it unfavorable to use them. The sponsor enters into a risk transfer agreement with the SPV and pays a premium to the SPV, the SPV issues bonds to qualified investors and uses the proceeds of the sale plus the premium to purchase highly rated short term investments. The SPV deposits these assets into a collateral trust or a custodial account. On older catastrophe bond structures, the SPV also enters a swap to match the periodic investment income from assets in the trust (typically, fixed rate) to interest payments to investors (LIBOR plus a spread). Because of defaulting swap counterparties in some catastrophe bond transactions, newer structures retain the offering proceeds in the collateral account (resulting in lower yields for investors), enter into tri-party repo transactions or invest in structured notes.

Interest on the bonds is paid periodically and, at maturity, the SPV repays the principal unless a loss occurs before maturity that triggers loss payments to the sponsor. The interest rate is a floating rate of a reference rate (LIBOR, EURIBOR) plus a spread. The average duration of a catastrophe bond is three years. The bonds are usually rated below investment grade but issuers can create multi-tranche bonds with the senior layers earning an investment grade rating. The investor audience for the bonds is limited by securities laws to sophisticated institutions and, of those investors, only a subset have the expertise to analyze the models that accompany these

bonds.



## Elements of Catastrophe Bonds

Catastrophe bonds transform insurance risk into securities created for capital market investors so that they can participate in the performance of the underlying insurance risk. The transaction straddles a number of regulatory regimes: securities law, insurance regulation, taxation and corporate organizations. The four main parts of the structure are: (i) the transfer of risk from the protection buyer to the SPV; (ii) the establishment of the SPV; (iii) the SPV collateral arrangements; and (iv) the purchase of securities by investors.

### Risk Transfer

The risk transfer is made through an agreement between the protection buyer and an SPV. The protection buyer is almost always a (re)insurer but certain large corporations, such as electrical utilities, and government entities have sponsored catastrophe bonds.

The essence of the risk transfer is that the protection buyer makes one or more fixed payments to the protection seller and the protection seller promises to make a floating (contingent) payment upon the occurrence of an uncertain event. The fixed payments made by the protection buyer occur in advance of interest payment dates and are used to pay interest due on bonds that exceeds

income generated by proceeds held in the collateral account (the spread) or breakage costs associated with an early termination or default. A floating payment is made by the SPV to the protection buyer (together with a corresponding reduction in outstanding principal on the bonds) if a qualifying event occurs during the risk period. The risk period is a fixed period that coincides with reinsurance renewal dates (*e.g.*, January 1, July 1) and will run for successive twelve month periods until scheduled maturity (*e.g.*, three annual periods). Whether or not an event qualifies depends on the nature of the trigger. For an industry loss trigger, a reporting agency (PCS or PERILS) will prepare a preliminary estimate of the loss from the event. The sponsor would then instruct a calculation agent (a designated cat risk modeler) to prepare a report that determines whether and to what extent the principal amount of the bonds should be reduced as a result of the event. The calculation agent does this by calculating an index value based on final loss estimates from the reporting agency, applying appropriate regional and industry weightings and comparing to a trigger and exhaustion threshold. The process can take several months as the reporting agency refines estimates. The maturity of the bonds will be extended, as necessary, during this loss development period. There may also be some scope for weighting factors and the threshold level to be reset before the maturity of the bonds where such changes do not result in an increase in attachment probability. Factors driving a reset might be an updated risk model, updated industry exposure data, currency changes, business book weighting, *etc.*

This economic effect can be replicated by reinsurance policies and derivatives. However, the legal treatment of a reinsurance policy and a derivative is quite different. In a typical catastrophe bond structure, a reinsurance policy is used for risk transfer as the protection buyer is a (re)insurer. For non-U.S. sponsors and non-insurer sponsors, a derivative contract is often substituted. Indeed, some catastrophe bonds interpose an intermediary between the sponsor and the SPV to convert reinsurance to derivatives and *vice versa*. It should also be noted that for U.S. based sponsors, reinsurance policies are subject to a 1% federal excise tax on premium while derivatives are not subject to this tax.

### *Reinsurance*

The key features of insurance contracts are insurable interest and protection against a fortuitous event. An insurance contract is an agreement whereby one party, the "insurer", is obligated to confer benefit of pecuniary value upon another party, the "insured", dependent upon the happening of a fortuitous event in which the insured has, or is expected to have at the time of such happening, a material interest which will be adversely affected by the happening of such event. A fortuitous event is an event the occurrence or failure to occur is to a substantial extent beyond the control of either party, such as a natural catastrophe. The material interest of the insured in the fortuitous event is referred to as the insurable interest. In this instance, an insurable interest exists where the insured may be reasonably expected to derive benefit from the continued existence or safety of the insured property or would be harmed by its loss or damage.

Historically, the concept of insurable interest has served to distinguish insurance business from wagering agreements. It follows that an insured must present proof of loss before an insurer will make an indemnity payment. This concept follows into the world of reinsurance through the “follow the fortunes” doctrine. This doctrine holds that a reinsurer must follow the underwriting fortunes of the insurer and, as claims are resolved, is bound by the good faith settlements made by the insurer so long as there is no evidence of fraud or bad faith. Without this doctrine, a reinsurer could potentially raise all of same defenses that the insurer could have raised against its insured. Most reinsurance policies will incorporate a “follow the fortunes” clause and will specify the instances where the doctrine might not apply.

The “follow the fortunes” doctrine is a subset of the doctrine of utmost good faith that attaches to insurance relationships. The doctrine of utmost good faith imposes an obligation on the insured to fully disclose material facts relating to the proposed policy and follows from the knowledge imbalance between insured and insurer. The insurer needs to know specific information about the insured to properly underwrite and price the risk and the insured is the only source of this information. Representations made to the insurer must also be accurate and complete. Failure of the insured to comply with such duties entitles the insurer to avoid performance, the contract becoming *void ab initio*. The result of such avoidance from inception is a return of premium and refusal or return of claims payments. The source of the non-disclosure can be innocent or negligent, might not have a direct bearing on the claim being made, and might not have even been asked of the insured. The severe consequences of the utmost good faith doctrine may explain why reinsurance documentation has long been relatively light as opposed to capital markets documentation. Capital markets offering circulars are replete with issuer side disclosure but reinsurance binders dwell entirely on the economic features of the cover and rarely prepared or reviewed by lawyers.

Insurance policies may only be issued by licensed insurers. Reinsurance policies, by definition, are contracts of insurance among insurers. Assuming risk under a contract of insurance without requisite authority will subject the protection seller to regulatory censure. Therefore, investors will not be able to directly utilize the insurance policy form of risk transfer without a licensed intermediary, such as a transformer, sitting between the protection buyer and seller. Obtaining insurance licenses onshore is a lengthy process but popular offshore jurisdictions issue licenses within a reasonable amount of time with adequate proof of financial wherewithal. In Bermuda, a “special purpose” license can be issued for catastrophe bond issuers and sidecars. Where the derivative form is used, the SPV does not need a license.

### *Derivatives*

The primary distinction between insurance policies and derivatives is that the protection buyer in a derivative contract does not require an insurable interest in the fortuitous event for which protection is purchased. This is a distinction that insurance regulators recognize in not classifying derivatives as insurance contracts and securities regulators in not classifying insurance contracts as swaps. Consequently, the protection buyer is not required to present a

proof of loss before floating payments under a derivative are made. Derivatives use a reference index as a proxy for actual loss. As insurable interest and proof of loss are irrelevant to a derivative contract, derivatives may not just be used as a risk management tool for hedging purposes, but may also serve to generate speculative profits irrespective of any exposure relating to an event triggering the payment of a specified contract amount. Similarly, even when used as a hedge, derivatives may expose the protection buyer to basis risk.

The settlement of derivatives is more streamlined than settlement of insurance claims. A protection buyer will be required to give notice of the occurrence of the event, a report of the reference index publisher providing estimates of damage from the covered event. Once received, the protection seller will have a week or so to pay the floating amount. There is little discretion left to the protection seller in the matter as payment amounts and timing are driven by movements of the underlying index. A reinsurance policy may take months to settle as the reinsurer can conduct a comprehensive review to scrutinize the claim and verify both validity and amount of a claims settlement.

Coverage that is not based on the insured's loss claims generally alleviate moral hazard and adverse selection concerns of protection sellers and hence the underwriting process for a derivative (and non-indemnity ILS) places emphasis on in-depth technical analysis of the parameters driving the trigger mechanism rather than protection buyer-specific disclosure. In short, derivatives solve issues of adverse selection and moral hazard at the expense of basis risk.

Over-the-counter ("OTC") derivatives were, until recently, exempt from securities, insurance and commodities regulation in the United States. The Dodd-Frank Act introduces a new regulatory framework for derivatives and attempts to increase transparency while reducing counterparty risk by forcing standardized derivatives to be settled through a clearing system and become subject to new margin and registration rules. Cleared swaps are not likely to be used as risk transfer instruments in catastrophe bonds as such swaps need to be authorized by both the clearing house and the regulator and may be difficult to customize after approval or have approved for one off transactions. Participating on an exchange also requires both parties to post margin with the clearing house. OTC derivatives will still be permitted under the "end user" exemption. This exempts swaps from the clearing requirements where one of the counterparties is using the transaction to hedge and is not a "financial entity". Financial entities include swaps dealer, major swap market participants, private funds, certain banks and persons engaged in a business financial in nature. Insurance is considered to be an activity that is financial in nature and therefore insurers and reinsurers cannot avail of the end user exemption. Of course, it should be noted that offshore protection buyers will not be affected by these regulations when outside the jurisdictional reach of the Dodd-Frank Act and may continue to use traditional OTC derivatives. In addition, commercial and governmental catastrophe bond sponsors may still be able to avail of the end user exemption.

Any instrument coming within the definition of “swap” will be regulated under the Dodd-Frank Act. The definition is exceptionally broad and encompasses most risk transfer agreements as well as many conventional insurance products. However, the SEC/CFTC has proposed rules and interpretive guidance to make it clear that certain insurance products would not be considered to be swaps. To qualify under the proposed rules, both the contract and the entity providing the contract will need to meet certain criteria. An insurance contract is not considered to be a swap where each of the following is satisfied:

- the beneficiary of the contract must have an insurable interest in the subject matter of the contract and thereby carry the risk of loss on that interest continuously throughout the duration of the contract;
- a loss must occur and be proved, and any payment or indemnification must be limited to the value of the insurable interest;
- the contract is not traded, separately from the insured interest, on an organized market or over-the-counter; and
- with respect to financial guaranty insurance only, in the event of payment default or insolvency of the obligor, any acceleration of payments under the policy is at the sole discretion of the insurer.

In addition, the insurance contract must be issued by a regulated insurer and regulated as insurance or, in the case of reinsurance, offered to a regulated insurer, reinsuring a qualified reinsurance policy and for an amount that does not exceed claims paid by the cedant. Under the interpretive guidance, certain types of products that do not meet the proposed criteria, if offered by a regulated insurance company, could still be considered insurance, rather than swaps or security-based swaps. Such products include surety bonds, life insurance, health insurance, long-term care insurance, title insurance, property and casualty insurance, and certain annuity products.

In general, any traditional reinsurance policy used as a risk transfer agreement should be exempt from regulation as a swap.

### *Trigger Mechanisms*

There are four types of triggers: indemnity, parametric, industry loss and modeled. While most bonds use a single trigger, catastrophe bonds may combine different trigger types by relating triggers to particular regions or attachment points within the same instrument.

Indemnity triggers mirror traditional excess of loss reinsurance coverage. Indemnity triggers are generally preferred by protection buyers as the loss payment will reflect the buyer’s actual loss and therefore reduce any basis risk and serve as a more effective hedge. A better hedge will be more effective at reducing cyclicalities in the (re)insurer sponsor’s results and will be favored by

credit rating agencies and regulators in assessing the sponsor's financial health and capital treatment.

Investors have tended to shy away from indemnity triggers as determining the amount of loss with accuracy can be time consuming. While catastrophe losses are "short tail" in the context of property casualty insurance, a capital markets investor with a three year bond, may be uncomfortable extending maturity by two or more years as the loss development period plays out. Further issues include the fact that the investors will require details of the insured risks and information in respect of various insurance practices including underwriting practices, policy terms and claims settlement procedures. A certain amount of moral hazard is introduced where an indemnified sponsor may freely settle all claims with the investors' money. As a result a sponsor may be required to disclose information in relation to both its business practice and portfolio which it would prefer to keep confidential.

The other forms of triggers have the advantage of avoiding these moral hazard and time-consuming due diligence practices at the expense of increased basis risk.

Industry loss index triggers use an industry loss measure published by an independent third party that is known to have the expertise and ability to calculate industry loss within an acceptable degree of accuracy. In the United States, the references are published by Property Claims Services ("PCS") and their data will be licensed for the transaction. In Europe, PERILS offer an ILS index and an industry exposure and loss database for use with catastrophe bonds. The sponsor will select among covered perils, territories and lines of business to find an industry loss measure that most closely matches its portfolio of exposures.

Parametric index triggers are based on observable and recordable meteorological data or other physical parameters of an event. In the case of a hurricane, the formula may use wind speed readings across a defined network of weather stations in a region. The formula will weigh each input to reflect changing geographical exposures and will give more weight to weather stations in the vicinity of larger potential loss, whether this exists through larger volumes of insured locations, more exposed occupancy types, different coverage types or any other feature with a bearing on loss potential. While models are not used to trigger loss, the models are used to design the parameters of the index and thus control basis risk.

Modeled loss index triggers use software simulations of catastrophe event parameters to calculate loss estimates. The model will be agreed upon before the transaction is closed and is designed to eliminate ambiguity in the interpretation of data. After the event occurs, a snapshot of parametric data is taken and used as input for the model. The event is then run through a set of pre-defined exposures to calculate the modeled loss experienced by these exposures for the event. The exposures might relate to the industry as a whole or an exposure set that closely mirrors the sponsor's own exposure data (a "notional portfolio" modeled loss index).

Bonds covering U.S. perils are predominantly indemnity based while non-U.S. exposures use either industry loss or parametric triggers. Modeled loss index triggers are the least often used. However, the popularity of triggers evolves over time and is driven by protection buyer needs in any given season.

### **Transformers/SPV**

A transformer is an SPV that issues and services catastrophe bonds. The term transformer refers to the entity's function as a platform that both assumes and hedges risk by writing reinsurance and issuing securities. In doing so, a transformer bridges reinsurance and capital markets and "transforms" or securitizes insurance risk into a capital market form.

SPV arrangements are usually designed such that the SPV is risk neutral and tax neutral. Investors ultimately serve as protection sellers and will assume the economic risk written by the SPV. Legally, however, a SPV will retain risk and investors participate in this insurance risk by holding event contingent debt. Debt instruments issued by a SPV exhibit equity features inasmuch as the investor's repayment claim is routinely subordinated to claims of the protection buyer, repo/swap counterparty and service providers. Many SPVs allow for the creation of CDO-like tranches of debt to enhance upper tiers of debt and secure certain tax benefits for investors at those levels.

The equity of the SPV is issued for a nominal amount and held in trust for charitable purposes, that is, any residual equity value after liquidation is given to a charity. The equity is not held by the sponsor to avoid consolidation for accounting purposes. It is also possible that a small preferred equity tranche be issued to investors to give the SPV some independent substance and to further distance the sponsor from accounting consolidation. There is also some risk that a bond holder might be required to consolidate the SPV in circumstances where it exercises a controlling financial interest in the SPV.

In addition to bridging reinsurance and capital markets, a SPV minimizes credit risk by being bankruptcy remote. Bankruptcy remoteness prevents bankruptcy and insolvency proceedings of related entities from distorting the economic terms of the transaction. In bankruptcy, a court is empowered to rehabilitate the debtor or maximize the value of the debtor's estate by unilaterally cancelling unfavorable contracts, prioritizing certain claims over others or substantively consolidating related entities. In particular, bankruptcy of the protection buyer would have the potential to distort the transaction. Another benefit to minimizing SPV credit risk is that the credit rating of the SPV is improved thus lowering the required yield on the bonds and, ultimately, the risk transfer premium.

The techniques applied to achieve bankruptcy remoteness are dictated by credit rating agencies and generally include the following: (i) restrictions on objects and powers; (ii) debt limitations; (iii) independent management; (iv) no merger or reorganization; (v) separateness covenants; and, (vi) security interests in assets.

The SPV is organized for a narrowly defined special purpose and is confined to activities needed to ensure the sufficiency of cash flow to pay securities such as entering and performing a risk transfer arrangement, issuing bonds, and maintaining collateral accounts. Other activities are prohibited to preclude unanticipated liabilities.

The SPV is prohibited from issuing additional debt unless the debt is fully subordinated and non-recourse to the assets of the SPV. Creditors may have an incentive to file a bankruptcy petition to seek repayment on the additional debt from other assets of the SPV. Issuing additional series of debt or multiple tranches within a series can be achieved by using segregated cells in Bermuda or the Cayman Islands or through traditional contractual limitations in an indenture. Typically, a certain amount of collateral is designated for repayment of a class of bonds and those bonds only have recourse to that collateral after the protection buyer and swap/repo counterparty has been paid.

The management of the SPV should be independent and not designated by the protection buyer. At the very least, the consent of an independent director is required before bankruptcy proceedings can be initiated and, in so doing, the interests of the creditors are taken into account. Typically third party professional managers and trustees are engaged for this purpose and those managers will supply independent directors to operate the SPV.

Separateness covenants are designed to provide comfort that the SPV will hold itself out to the world as an independent entity, on the theory that if the entity does not act as if it had an independent existence, a court may use principles of piercing the corporate veil, alter ego, or substantive consolidation to bring the SPV and its assets into a related entity's (such as a protection buyer) bankruptcy proceeding. The covenants cover various matters including commingling, separate accounts, books, financial statements and identity.

Another feature of bankruptcy remoteness is no recourse to other entities. For repayment purposes, investors can only look to specified assets of the issuing SPV that relate to the class of bonds that it owns and are not entitled to seek repayment from the protection buyer. This treatment flows from the techniques described above, is stated in the offering circular and the debt documentation. It is also common to include a standstill agreement to limit the involved parties' right to initiate voluntary bankruptcy proceedings during an ILS structure's life-span.

Where risk transfer proposed to be conducted by an SPV falls within the definition of insurance business as described by applicable legislation, proper authorization has to be secured prior to commencing business. The SPV maintains the required business license ultimate investors may not be able (or want to) to acquire. Therefore, a distinction between insurance business and non-insurance business can generally be drawn for most SPV activities.

Finally, SPVs are, as a matter of basic principle, designed to operate as cost effectively as possible. This includes speed and relative ease of incorporation, solid yet not too stringent regulation, the level of ordinary administration cost and tax. Historically, most SPVs have been

operated in off-shore jurisdictions such as Bermuda, Ireland and the Cayman Islands. Yet, the appeal of offshore domiciles is not limited to the benefits of a low or no corporate tax. Offshore locations have been offering a flexible environment capable of accommodating innovative structures. In a similar fashion, they have also developed and maintained clusters of critical auxiliary services such as legal and accounting advice or administration and auditing services. The expense of operating the SPV is reimbursed by the sponsor through a separate contractual arrangement.

### **Collateral**

Collateral arrangements also help minimize credit risk. The available collateral consists of offering proceeds, risk transfer premium and the investment return on such funds. The collateral secures, as a priority, the protection buyer's contingent claim, the claims of the repo/swap counterparty (if any) and then, the repayment of interest and principal to investors. Collateral is invested in high quality, liquid assets such as treasury bonds.

Investors in catastrophe bonds often expect a LIBOR plus yield (as distinct from the fixed rate paid on treasuries) and two different financing mechanisms are used to achieve these cash flows, structured notes and repos. Before 2010, total return swaps were universally used to provide LIBOR cash flow on the basket of investments held in the collateral account. However, as Lehman Brothers were used as the swap counterparty on many of these structures, some catastrophe bonds were unable to make interest payments when due as the swap counterparty failed to perform. This form of collateral was abandoned and is no longer used in new offerings.

Under a repo (or repurchase contract), the proceeds of the offering are used by the SPV to purchase eligible securities from the repo counterparty and the repo counterparty simultaneously agrees to repurchase the same amount and type of securities at a later stage. The securities are sold by the SPV to the counterparty at agreed intervals so that the purchase price for the securities will match the interest or principal payments due on the catastrophe bonds. Repos present a technical risk that the repo counterparty might fail to pay the purchase price against delivery of the securities. To prevent this, tri-party repos can be arranged so that the securities are held by a custodian and the securities are only released against payment.

The main advantage of the tri-party repo structure is that it enables the SPV to pay LIBOR based interest. In addition, unlike the older total return swaps, transactions that utilize tri-party repo agreements employ daily margining of assets and eliminate certain categories of securities (such as mortgage-backed securities, CDOs and securities issued by specified sovereigns or institutions) from the definition of eligible securities.

Ideally, no third party creditors should be involved in the collateral structure. The most conservative approach involves investment in liquid short-term instruments combined with permitting the protection buyer access to these funds in case of a triggering loss. This, of course, would require investors to accept lower yields on bonds or to expand the definition of acceptable

investments to include more floating rate instruments. In fact, most of the bonds issued in 2010 eliminated the LIBOR component and invested in U.S. Treasury-backed money market funds. Because of historically low yields from money market funds, some sponsors have looked to structured notes to improve yield. Some euro-denominated transactions have invested proceeds in floating rate structured notes from quasi-governmental entities such as the EBRD and IBRD. Investing in money market funds or structured notes allow structures to be simplified, removes counterparty credit risk and enhances the low correlation features of catastrophe bonds.

Collateral assets are housed in a custody account or collateral trust. A custody account (or collateral account) facilitates the control of bank credit risk as the legal ownership of funds typically remains with the SPV rather than with the financial institution (in contrast to a trust account where the trustee will hold legal title to the assets). Also, the bank's creditors do not have recourse to the assets held in custody except to the extent that the custodian itself has a claim against such assets. The contingent access of the protection buyer to these funds is structured by way of creating a security interest over the assets held in the account in favor of the protection buyer.

A collateral trust is a tri-party arrangement and can be established by the SPV as a grantor pursuant to a trust deed to be signed by the protection buyer as beneficiary and a third party administrator as trustee. Since an important number of catastrophe bonds are sponsored by U.S.-based carriers taking out cover for U.S. risks on an indemnity basis, sponsors are often concerned with New York Regulation 114 compliance. In order to qualify as a collateral arrangement permitting the protection buyer to enjoy credit-for-reinsurance under New York regulation, the trust must not only be clean, unconditional and invested in certain types of securities, but also allow the beneficiary to withdraw the assets held in trust at any time. This introduces an element of sponsor credit risk as there are instances where parties may not agree on the interpretation or operation of reinsurance treaties. Regulation 114 would allow the protection buyer withdraw the funds even where the payment is in question. Despite this, most offshore reinsurers operate under Regulation 114 vis-à-vis onshore insurers and the facility is not often abused.

A recent development for U.S. sponsors desiring credit-for-reinsurance treatment is a springing trust mechanism in lieu of depositing proceeds in a trust account throughout the life of the transaction. The proceeds of the offering are initially deposited in a collateral account. If there is a catastrophe event triggering loss payments under the reinsurance policy, assets in the collateral account will be liquidated and transferred to the trust account (for which the protection buyer is the sole beneficiary) in compliance with applicable credit-for-reinsurance rules. Depending on the needs of the protection buyer, the springing trust can arise upon the occurrence of a catastrophe event or, at a later time, only to the extent of loss payments owed by the SPV under the reinsurance policy.

The springing trust is intended to be superior to the permanent collateral trust in two ways. First, it permits the offering proceeds to be invested in highly rated assets that may not necessarily be

compliant with applicable credit-for-reinsurance rules, such as securities issued by non-U.S. domiciled issuers. Second, the springing trust addresses an investor concern that U.S. sponsors can withdraw funds from a trust account even when there has not been a loss on the bond. U.S. sponsors would not have this right to the extent that funds are in a collateral account.

### **Securities**

No catastrophe bonds are publicly offered or traded in the United States. There are, however, a number of mutual, private and exchange traded funds that commit a portion of their assets to ILS and fewer still that commit the majority of their assets to ILS. The latter, cat bond funds or ILS funds, are organized like hedge funds and restrict subscribers to selected institutional investors.

The bulk of catastrophe bonds are purchased by cat bond funds and other institutional investors. Reinsurers were once the predominant purchasers of catastrophe bonds but now account for only a small percentage of investment. Catastrophe bond issuance peaked in 2007 with about \$7 billion of bonds sold; in 2010, about \$4.8 billion in business was completed.

### **Placement and Disclosure**

The placement process is primarily concerned with raising an appropriate amount of funds from investors and, as such, proper disclosure and investor information is crucial. If a placement agent is engaged and is acting as an initial purchaser, it will assist in the preparation of appropriate disclosure documentation under applicable securities laws. Underwriters take on some liability for the quality of disclosure but also will want to use the disclosure in conjunction with marketing presentations.

Catastrophe bond offerings are customarily structured as private placements to avoid the complexity and expense inherent in public offerings which require the publication of an issuing prospectus and regulatory review. This filing and regulatory review has the effect of disclosing to competitors the fine details of the product, extending the time to market and also tends to invite regulatory interference. Private placements are restricted to individually contacting a limited number of prospective investors with whom the placement agent has an existing relationship, instead of conducting general solicitation. Placement activities rely on the exemption provided by Rule 144A, which generally restricts the resale of securities to qualified institutional buyers, and by Regulation D, with respect to accredited investors.

Catastrophe bond offering circulars follow Rule 144A disclosure conventions, which can be quite comprehensive prospectus-like documents but does not require any filing, publication or approval and the depth of disclosure can vary. Exchange listed catastrophe bonds must satisfy specific disclosure requirements such as EU Prospectus Directive (in the case of Irish listed bonds) or exchange rules (for Bermuda). The prospectus is submitted to the exchange for approval although the review received is fairly minimal compared to an SEC registered offering. Some “micro” catastrophe bonds have been privately placed through Regulation D where no offering circular is legally required.

In the United States, rules have been proposed (Regulation AB) that would require additional disclosure for structured finance products. To avail of the Rule 144A resale exemption, the issuer would have to make available to bond holders an IPO-style prospectus and certain ongoing reports. If adopted, the quality of disclosure (and related costs) for catastrophe bonds would increase materially.

### *Trading*

Catastrophe bonds are designed as tradable securities with a view to support a liquid secondary market and to foster a broader investor base. These securities are designed to be as free from transfer restrictions as possible and be fungible. Transfer restrictions inevitably result from securities laws, but there are also taxation related restrictions that should be anticipated.

SPVs, as issuers of catastrophe bonds, usually apply for the securities to be admitted to the exchange of their domicile. These listings, however, are not primarily sought to facilitate trading. They address formal buy-side restrictions prospective investors may be facing related to securities which are not listed on a regulated market. Actual trading activity takes place in a private setting, with a market maker (often the original underwriter) facilitating and executing orders for investors. Based on the Rule 144A exemption, catastrophe bonds in the secondary market are transferred among qualified institutional buyers.

The secondary market also performs an important function for valuation purposes. Executed transactions and quotes issued by broker/dealers allow for mark-to-market valuation while private transactions are marked to a valuation model and/or valued based on information provided by the protection buyer and potentially involve third party valuation agents.

Aggregate pricing information for catastrophe bonds is publicly available through indices published by Aon Benfield Securities (Aon Benfield ILS Index) and Swiss Re (Swiss Re Cat Bond Performance Index). These indices show the broad impact that a catastrophe, interest rates, downgrades, *etc.*, have on catastrophe bond pricing.

### *Credit Ratings*

Almost all catastrophe bonds are issued a credit rating and this rating plays an important part in the pricing and marketing of a bond. Ratings are issued by Standard & Poors and A.M. Best. Initial ratings for catastrophe bonds tend to be in the B- to BB+ range and are driven by the lowest rated component of the transaction among: (i) the implied rating for attachment probability; (ii) the sponsor rating; and (iii) the quality of collateral assets and related counterparties. In determining the attachment probability, the rating agency will rely upon data produced by the catastrophe modeler for the transaction and will perform stress testing on the model to account for the margin of error inherent in the model. According to Standard & Poors, a parametric trigger will receive the least onerous stress test with an indemnity trigger model taking the highest margin of error. A “BB+” bond rated by Standard & Poors would have a first year attachment probability of no more than 1.63%. Because of the way the matrix is structured, the highest rating a bond with first event cover can achieve is BBB. Rating agencies will take

into account the probability of catastrophe and model revisions when revising credit ratings, *e.g.*, many bonds were downgraded when RMS' new model was introduced earlier in 2011.

Recent rule changes in the United States (Rule 17g-5) have required sponsors to permit non-hired, independent credit rating agencies to issue ratings for bonds based upon the same data provided to the rating agency for the deal. This is intended to reduce conflict of interest concerns and applies to all structured finance offerings.

## Features of Catastrophe Bonds

### Transaction costs

Catastrophe bonds are expensive to execute compared to most traditional reinsurance and other forms of the ILS. The cost is comparable to other Rule 144A offerings of exotics instruments but since the size of catastrophe bond offerings is small compared to a corporate debt offering, the cost consumes a much larger portion of the deal's upside.

The underwriting process for catastrophe bonds, from the perspective of an investor, can be simplified when an index is used. The industry loss index is very transparent, and thus the underwriting process is simple to implement. There is no need to conduct due diligence on the sponsor and there is no information asymmetry between sponsor and investor. The investor, of course, will need to understand how the index works, how the model responds to catastrophes, whether it licenses an independent modeler, whether the structure and the collateral is adequate, *etc.*

While catastrophe bonds have become more standardized, each catastrophe bond trigger is customized for the sponsor. Each offering circular needs to reflect the terms and risks presented by that offering and, therefore, will be different for each deal. Some cost can be saved by putting up a "shelf" prospectus. The shelf contains standard terms that are common to all series of a bond offering of a particular SPV. In addition, some structural complexities can be reduced by opting for money market fund collateralization instead of a repo. However, the sheer number of third parties involved in a structured finance product (underwriters, lawyers, modelers, custodians, rating agencies, managers, *etc.*) means that fees are high until the process becomes routine and commoditized.

### Moral hazard

Moral hazard is dependent on the nature of the trigger employed. Non-indemnity bonds are unlikely to create moral hazard issues because payouts are based on an independent metric, rather than the insured's reported losses. For example, the use of an industry loss index reduces moral hazard because a company cannot influence industry losses to any great extent, whereas it can influence its own losses. Indemnity bonds, on the other hand, suffer the same moral hazards as a traditional reinsurance program.

### **Basis risk**

Basis risk arises in catastrophe bonds when the protection buyer attempts to protect a risk exposure with a proxy, *i.e.*, an index trigger, which provides payment that does not perfectly match the potential loss. Therefore, catastrophe bonds only represent an effective hedge for the sponsor if its portfolio highly matches the loss experience reflected in the trigger. However, the more granular the index and the closer the trigger resembles indemnity coverage, the greater the model's margin of error and associated probability of attachment.

### **Binary loss**

Catastrophe bonds tend to suffer a complete loss upon default. While very few catastrophe bonds have defaulted, the projected point between attachment and exhaustion is narrow. In practice, the losses required to trigger most catastrophe bonds are not only huge, they must also be caused by a specific peril and effect a particular region. Many catastrophe bonds also provide for tiers of risk using different triggers so that higher quality tranches may not suffer a loss of principal.

### **Counterparty risk**

One of the primary goals of the catastrophe bond structure is to eliminate counterparty credit risk. Sponsor credit risk still exists under the risk transfer agreement in respect of the sponsor's obligation to pay premium (to the extent not paid at closing), under the reimbursement agreement and service agreements for the payment of ongoing fees, under the trust agreement for the return of loss payments improperly claimed, *etc.* As illustrated in the case of swap counterparty defaults, the failure of the swap or repo counterparty can quickly result in a shortfall of cash flow for interest payments even when the assets themselves are preserved. There is also risk associated with the performance of underlying assets in the collateral account and the performance of key service providers, *e.g.*, custodian, modeler. The "risk factors" section of a catastrophe bond offering circular is replete with doomsday scenarios in this respect.

Nonetheless, the structures are very successful at reducing the sponsor's credit risk vis-à-vis a group of unaffiliated investors and compares favorably to the security a sponsor would have in dealing with a reinsurer for traditional coverage. The isolation of "insurance risk" from other forms of risk is central to the appeal of the instrument for investors.

### **Capacity and liquidity risks**

Capacity risk occurs when investors withdraw capital from the market. For catastrophe risks, this occurs after a large catastrophe that causes losses for investors. Essentially this means that no new capital is available to support new underwriting years. If capacity is scarce enough, insurers may be forced to look for alternative sources of financing such as catastrophe bonds. By the same token, during a soft market, sponsors may find that their needs are met by traditional reinsurance programs and will not need to enter the catastrophe bond market. Despite the increasing investor appetite for catastrophe bonds, new offerings can be scarce from time to time, *e.g.*, first half of 2008. This contraction and expansion of supply can affect liquidity and signals

that perhaps the catastrophe retrocession market may ultimately be too small to provide a constant stream of new offerings.

### **Modeling and data quality**

The catastrophe bond market is highly dependent on the acceptance of models and the plausibility of risk analysis presented to investors. Even where the loss trigger is not a modeled loss trigger, the modeled risk analysis applies historical data to the bond trigger and gives an investor a sense of the likelihood of a default. Investors find this model data comforting perhaps in a similar fashion to credit ratings.

The subject matter of the risk analysis is inherently unpredictable and, even assuming a model is accurate, running a model and selecting the correct parameters is very much a black art. The underlying data may also be inconsistent, incomplete and lack depth. Each catastrophe event and subsequent new revision of a model reveals failings in the old model. Therefore, investors should be mindful of the limitations of models and the somewhat random chance of default.

### **Regulation, Tax and Accounting**

The structure of catastrophe bonds will be influenced by the requirements imposed by the relevant jurisdictions and their domestic regulatory, legal, accounting and tax regimes.

The primary issues of insurance regulation in a catastrophe bond structure are: (i) the licensing of the SPV and/or the sponsor where a reinsurance policy is used for risk transfer; (ii) the characterization of the risk transfer agreement as a swap or an insurance contract; (iii) the availability of credit for reinsurance for the sponsor; and (iv) capital, reserve and solvency requirements for a licensed SPV.

In the United States, statutory accounting principles allow an insurance company that obtains reinsurance to reflect the transfer of risk for reinsurance on the financial statements that it files with state regulators under certain conditions. The regulatory requirements for allowing credit for reinsurance are designed to ensure that a meaningful transfer of risk has occurred and any recoveries from reinsurance are collectible. By obtaining reinsurance, ceding companies are able to write more policies and obtain premium income while transferring a portion of the liability risk to the reinsurer. The level of risk reflected by statutory accounts will naturally affect capital and surplus calculations for regulatory purposes, that is, the more credit for reinsurance received the lower risk-based capital required.

An insurer may also obtain risk reduction from an indemnity-based catastrophe bond; the recovery by the insurer would be similar to a traditional reinsurance transaction. The collectability of reinsurance is satisfied where a trust account is established to cover contractual obligations to the insurer and the insurer's uncontested ability to withdraw funds from the trust account to pay the losses covered under its contract. A meaningful risk of transfer is also achieved for indemnity-based risk transfer agreements as the SPV absorbs losses suffered by the sponsor without basis risk. However, if an insurer chooses to obtain risk reduction from

sponsoring an index-based catastrophe bond, the recovery could differ from the recovery provided by traditional reinsurance because of inherent basis risk. Even though the sponsor is reducing its risk, the accounting treatment would not allow a reduction of liability. Credit rating agencies do, however, grant reinsurance credit to sponsors for index-based products to the extent that the sponsor's potential loss from the covered event is reduced by the risk transfer agreement.

The taxation issues in a catastrophe bond structure are often driven by U.S. taxation requirements (whether or not U.S. exposures are involved) because of the presence of U.S. bond holders. The SPV will state in the offering circular whether a particular tranche should be treated as debt or equity. For example, principal at risk bonds are usually treated as equity for U.S. federal income tax purposes. This treatment can be challenged by tax authorities as the characterization is a matter of legal interpretation. For equity, interest payments are treated as dividends to the extent of the SPV's earnings and profits. The SPV will also be treated as a "passive foreign investment company" and, ideally, not a "controlled foreign corporation". Suffice it to say, if the expected treatment is not received, there may be negative tax consequences for U.S. bond holders.

The SPV is structured to be tax neutral, that is, the tax effect of the SPV is passed through to investors and the SPV pays no entity level taxation. For this reason, offshore jurisdictions such as Bermuda and the Cayman Island are popular. The structure and execution of the transaction must also be carefully designed so that it does not result in an entity which might be considered engaged in a trade or business in the US or trading in the UK in a manner which would subject it to taxation in those jurisdictions. In addition, the selected jurisdiction of the SPV should not impose tax on income earned on assets in the collateral account, any withholding taxes on distributions made to investors or transfer taxes on bond transfers.

Accounting issues for catastrophe bonds include variable interest entity ("VIE") rules applicable to all securitization vehicles. A VIE is a thinly capitalized entity that has insufficient equity to finance its activities without other forms of credit enhancement. Under GAAP, a catastrophe bond SPV is very likely to be a VIE. A company must consolidate any VIE in which it has a "controlling interest" thus bringing an off-balance sheet transaction on to the balance sheet. The standard requires a company to perform a qualitative analysis when determining whether it must consolidate a VIE. Under the standard, if the company has an interest in a VIE that provides it with control over the most significant activities of the entity (and the right to receive benefits or the obligation to absorb losses) the company must consolidate the VIE. A catastrophe bond should be structured so that no controlling interest exists but it is possible for the sponsor or a bond holder with a large position to become subject to the rules.

## **Conclusion**

As natural disaster seems to be more frequent and more damaging, the importance of catastrophe bonds is likely to increase. Catastrophe bonds can act both as a pressure relief valve to provide capacity during hard markets and as a source of stable financing through recurring shelf

programs. Catastrophe bonds effectively transfer risk to from limited insurance markets to larger capital markets and reduce cyclicity in reinsurance markets.

Catastrophe bonds are attractive for investors also because they are a low beta, non-correlated asset class and their yield is much higher than similarly rated corporate bonds. Because of high yield and low default rates, catastrophe bonds have outperformed most other bond classes over the last ten years. They are not, however, for the casual investor as bonds require special expertise to analyze and are driven by inherently unpredictable events.

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