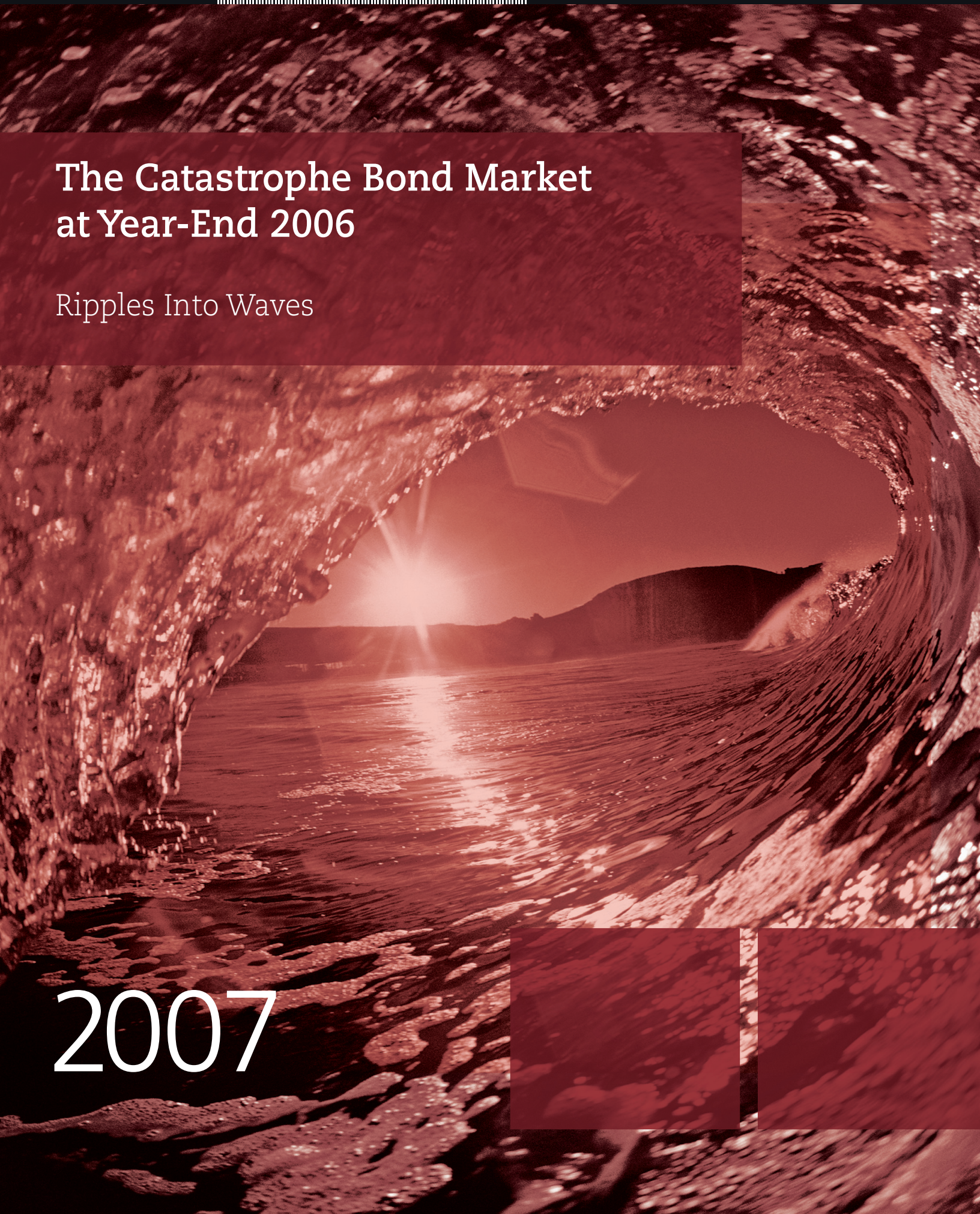
MMC SECURITIES

The Catastrophe Bond Market at Year-End 2006

Ripples Into Waves



2007

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Foreword

This report, cosponsored by Guy Carpenter & Company, LLC and MMC Securities Corp., marks the fifth installment of our annual review of the catastrophe bond market.[1] This report provides an update on cat bond transaction activity and market dynamics during the past year and is meant to serve as a stand-alone resource for the cat bond community at large. Also, specifically for readers who are new to catastrophe bonds, this year we have included "Appendix I: Catastrophe Bonds 101 – An Overview of Structure and Pricing," which provides a high-level overview of these evolving risk transfer instruments. For additional historical perspective, we encourage readers to review our previous publications, which are available online at www.guycarp.com.

This report focuses almost exclusively on securitization activity involving natural catastrophe and extreme mortality risk. While in previous years we confined the report to the catastrophe bond market, the activity of 2006 required us to slightly broaden our scope. This year, while the emphasis remains on the catastrophe bond market, we also provide commentary and appendices on sidecar activity as well as extreme mortality transactions. Not addressed are other insurance securitization transactions, such as instruments that securitize the risk of trade credit insurance policies, weather derivatives or embedded value life insurance transactions. In addition, as in the past, this report references only publicly disclosed transactions. Truly private placements — in which the bonds are marketed and sold to a single or a handful of investors and typically not disclosed to outside parties — are excluded from summary statistics. Finally, while potential catastrophe bond sponsors are our primary audience, we hope that all industry participants will find this report valuable.

An Important Note Concerning Methodology

The catastrophe bond market is constantly tested with new transaction structures and mechanics. This near-constant stream of innovation presents challenges when tracking cat bond market activity. Consistent with our previous reports, we have applied the following methodology to address these challenges:

- The total risk capital of tranches (whole bonds) that provide coverage for multiple perils (in which the total principal is exposed) is included in each of the peril categories it covers. Therefore, figures in these by-peril exhibits do not total the actual volume of bonds issued in certain years.

- With respect to shelf offerings, all takedowns of tranches in a given year are summed and considered a single issuance for that tranche during the year. If additional takedowns occur in a subsequent year, the volume of those subsequent-year takedowns is allocated only to the year in which the takedown occurred and is counted as a new transaction in that year.

- For all other exhibits (total volume and number by year, as well as issuances by size, trigger, bond tenor, sponsor type and sponsor experience), except as otherwise footnoted, all tranches of a specific transaction are combined and considered a single cat bond issuance.

[1] *Throughout this report, as a matter of convention, the terms "catastrophe bond," "cat bond," "bond" or "instrument" broadly refer to transactions involving the securitization of natural catastrophe or extreme mortality risk.*

- The catastrophe activity of 2004 and 2005 prompted the leading modeling agencies to consider whether current environmental conditions are causing a period of increased storm frequency and/or severity (relative to long-term historical averages) in the Atlantic Basin. While no clear consensus has been achieved, an industry norm has developed: As part of the risk analysis component of the documentation for a catastrophe bond with exposure to U.S. wind peril, modeling firms will typically provide estimates of expected loss under the assumption that this period of increased storm frequency and/or severity is actually occurring. Generally, a second estimate of expected loss, exclusive of the possible influence of increased hurricane frequency and severity, is also included. These estimates, provided under different sets of assumptions, have been well-received by investors, who tend to benchmark pricing based on the most conservative set of assumptions. Catastrophe bonds with no exposure to U.S. hurricane peril are not affected by these considerations.

In keeping with industry terminology and practice, we will refer to the estimate of expected loss as if the period of increased frequency and/or severity is occurring as the near-term estimate, while referring to the estimate of expected loss as if the period of increased frequency and severity is not occurring as the long-term estimate. Where applicable, unless otherwise indicated, all exhibits and commentary making reference to expected loss refer to the near-term expected loss, as this estimate has become the primary figure used by cat bond investors when making pricing/trading decisions.

Executive Summary

Continuing the momentum caused by the record storms of 2004 and 2005, 2006 was yet another record year in the catastrophe bond market. Across nearly all measurable dimensions, including the number of issuances, total risk capital issued, total risk capital outstanding, number of perils securitized, diversity of trigger type and offering structure, activity exceeded all previous annual records, generally by a large margin. Some notable events of 2006 include:

- Annual issuance in the cat bond market totaled $4.69 billion[2] in new transactions, more than doubling 2005's prior record of $1.99 billion. Total risk capital outstanding increased to $8.48 billion, compared to $4.90 billion in 2005. A record of 10 transactions set in 2005 doubled to 20 in 2006. Since 1997, 89 transactions have been completed representing $15.35 billion in catastrophe bond issuance. While a number of veteran cat bond sponsors returned to the market, seven were first-timers, an increase from 2005's record of six first-time issuers.

- Dramatic increases in securitization activity in non-bond form, such as sidecars, Industry Loss Warranties (ILWs) and other vehicles, as sponsors sought additional ways to transfer and manage catastrophe risk.

- An expansion of the risk profile of the catastrophe bond market in general. While the Standard & Poor's (S&P) BB[3] rating (or equivalent) remains the staple of the industry, for the second consecutive year there was a notable increase in the number of B-rated and unrated issuances. On the opposite side of the risk spectrum, 2006 saw the first catastrophe bond with a AA rating.

- The major modeling firms implemented changes in the methods used to model U.S. wind exposures, providing an allowance for a near-term view that assumes a current cycle of increased hurricane activity. In addition, in light of the data provided by the storm activity of 2004 and 2005, certain modeling firms made substantial changes to key vulnerability and post-event loss-amplification assumptions. All of these changes dramatically increased the perceived risk of U.S. hurricane activity, and, as a result, pricing on prior cat bond issuances in the secondary market shifted, and sponsors experienced increased reinsurance rates and greatly restricted capacity levels.

- Two catastrophe bond transactions were sponsored by non-insurance entities, the first by FONDEN, a facility created by the government of Mexico, the second by Dominion Resources Inc., a U.S.-based energy company.

- Four risks, Australian typhoon and earthquake, Mexican earthquake, and U.S. tornado and hail, were all securitized for the first time. In addition, Japanese typhoon risk was securitized for the first time since 2003. These non-peak and diversifying perils were priced at a notable discount to peak peril cat bonds with comparable expected losses, reflecting the desire of some cat bond investors to geographically diversify their investment portfolios.

[2] Unless stated otherwise, all figures are in U.S. dollars. For transactions issued in denominations other than U.S. dollars, principal amounts are converted as of the transaction issuance date.
[3] All ratings referenced are inclusive of modifiers, i.e., a "BB" reference includes all tranches rated "BB-," "BB" and "BB+."

- The shelf offering, once a small part of the catastrophe bond market, accounted for over half of the total dollar issuance for 2006. A shelf offering is a structure that, after the initial offering, allows sponsors to issue additional notes of a similar risk profile with abbreviated offering documents, on an as-needed basis throughout a transaction risk period.

- While the catastrophe bond issuance process itself became more standardized, sponsors (and structurers) showed increasing innovation including the introduction of hybrid triggers. These triggers, which generally rely on a combination of two or more existing trigger types, are intended to reduce sponsors' basis risk while, in most cases, preserving a non-indemnity structure that is palatable to most catastrophe bond investors.

Year-End 2006 Catastrophe Bond Market Update

2006 Transactions

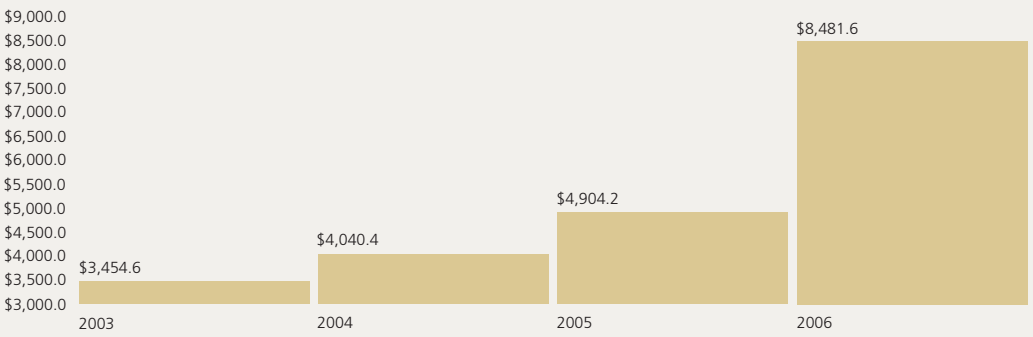
In our year-end 2005 Cat Bond Report published in February 2006, entitled "Ripple Effects from Record Storms," the effects of the storm activity of 2004 and 2005 were just beginning to be realized. In 2006, this fully manifested itself into a wave of new issuance.

By far, 2006 was the most active year in the history of the catastrophe bond market, with $4.69 billion of issuance. This record volume represents a 136 percent increase over last year's previous record performance of $1.99 billion, and a 311 percent increase over the $1.14 billion placed during 2004. In two years, total annual catastrophe bond issuance has more than tripled. During the year, a total of 20 transactions were completed by 15 sponsors, with Swiss Re and The Hartford accounting for four and two transactions, respectively. This represents a new record for transaction volume, doubling the previous record of 10 transactions completed in both 2005 and 1999, and more than tripling the six transactions completed during 2004. Since 1997, the first year in which multiple transactions occurred, 89 catastrophe bonds have been issued with total risk limits of $15.35 billion.

Figure 1: Annual Number of Transactions and Issue Size

When measured in terms of total risk capital outstanding, which is perhaps the most important measure for market size and risk-bearing capacity, 2006 also showed record growth. At year-end there was over $8.48 billion of bond principal outstanding, representing a 74 percent increase over the 2005 year-end total of $4.90 billion, and more than doubling the $4.04 billion in outstanding capacity at year-end 2004.

Figure 2: Year-End Risk Capital Outstanding



- On an annual basis, total risk capital outstanding (which measures the total bond principal currently at risk in the market as of the relevant year-end, regardless of issuance year) is distinct from total risk capital issued (which measures the incremental risk capital issued in a given year). Given that the vast majority of bonds are issued for a multi-year term, this distinction explains the significant difference in annual volume between figures 1 and 2.

The year's transaction activity began in late January when Swiss Re sponsored Australis Ltd., a $100 million issue, which provides protection against qualifying Australian earthquakes and typhoons. In February, Swiss Re followed Australis Ltd. with Redwood Capital VII/VIII Ltd., which provides $225 million of capacity for qualifying California earthquakes. Also, in February, The Hartford returned to the cat bond market, completing a $105 million takedown on its Foundation Re Ltd. program. This program, which was created in 2004, provides The Hartford with capacity for its U.S. hurricane and earthquake exposures. Throughout March and April 2006, there were no additional issuances as potential sponsors were focused on evaluating the likely capacity situation in the traditional reinsurance market for their upcoming mid-year renewals. In May, three additional transactions closed: FONDEN, a facility created by the government of Mexico, sponsored the $160 million CAT-Mex Ltd. transaction, which is designed to help fund expected government expenditures in the aftermath of qualifying earthquake events in Mexico; ACE American Insurance Co. (using Swiss Re as a transformer) sponsored Calabash Re Ltd. to obtain $100 million of capacity for U.S. East and Gulf Coast hurricane risks; and USAA, with its tenth consecutive annual offering, sponsored the $122.5 million Residential Re 2006 Limited transaction.

Five transactions closed during June making it the most active month of the year. Swiss Re sponsored the multi-peril, multi-geography Successor Ltd. program, which is designed as a shelf offering, and provided Swiss Re $1.19 billion of capacity during the year. Munich Re sponsored Carillon Ltd., an $85 million transaction that provides capacity for Munich's wind exposures along the U.S. eastern coastline stretching from Texas to Maine. Liberty Mutual entered the catastrophe bond market for the first time, sponsoring the Mystic Re Ltd. program from which it obtained $525 million of capacity for its U.S. wind exposures, through two takedowns completed during the year. Notably, this transaction only addressed Liberty Mutual's U.S. East Coast exposures located north of Washington, D.C. Transaction activity in June concluded with VASCO Re 2006 Ltd., a $50 million Florida wind risk transaction sponsored by Balboa Insurance Company; and DREWCAT Capital Ltd., a $50 million transaction sponsored by Dominion Resources, Inc. to obtain protection for its off-shore oil drilling platforms located off the U.S. Gulf Coast.

The sole transaction completed in July was the $150 million Eurus Ltd., sponsored by Hannover Re, providing capacity for its European windstorm exposures. August was an active month, with three transactions closing, including Shackleton Re Limited, a $235 million transaction originated from first-time sponsor Endurance Re. This transaction, which was partially structured as a bank loan rather than a 144A offering (another first for the market), provides Endurance Re with U.S. earthquake and hurricane capacity. Other August transactions included the $200 million Fhu-Jin Ltd. program (Japanese Typhoon risk), sponsored by Tokio Marine & Fire (using Swiss Re as a pass-through reinsurer); and the $300 million Cascadia II Limited (U.S. Pacific Northwest earthquake risk), sponsored by FM Global. In November, two transactions were completed. The Hartford obtained $247.5 million of capacity for U.S. hurricane, earthquake and tornado/hail risk through its Foundation Re II Ltd. program; and Catlin Insurance Company sponsored its first catastrophe bond, Bay Haven Ltd., which provides $200 million of capacity for multiple subsequent events worldwide after the occurrence of three deductible events. Covered perils in this transaction include U.S. wind, earthquake, European wind and Japanese typhoon and earthquake.

As has been the case in recent years, 2006 was rounded out with a flurry of activity in December. Using Munich Re as a pass-through reinsurer, Zurich returned to the capital markets for the first time since its 2005 KAMP Re Ltd. transaction, sponsoring Lakeside Re Ltd., a $190-million transaction providing capacity for California earthquake risk. Also in December, SCOR sponsored Atlas Reinsurance III p.l.c., a €120 million transaction providing cover for second-event Japanese earthquakes and European windstorms. The year's transaction activity concluded with Swiss Re's Redwood Capital IX Ltd., which provides $300 million of capacity for California earthquake risk.

Market Dynamics

The dramatic increase in transaction activity in the catastrophe bond market can be explained by a number of important, and in some cases conflicting, factors:

The Evolution of the Catastrophe Risk Transfer/Investment Spectrum

Aside from the remarkable increase in transaction activity, the most interesting development of 2006 was the increased utilization of alternative investment structures through which sponsors could transfer (and investors could access) catastrophe risk. While activity in the catastrophe bond market surged, market participants also shed or accessed catastrophe risk through a variety of alternative structures including capitalizing new independent (re)insurers (both rated and unrated), arranging sidecar transactions and buying and selling Industry Loss Warranties (ILWs). (For additional information on the mechanics of sidecars, see Appendix IV.)

Although 2006 was far from the first year in which these different investment structures were utilized, the year was characterized by the explicit interrelationships between the different structure options. This was most evident on the investor side of the market, as capital providers frequently evaluated catastrophe bonds not only against traditional (non-catastrophic risk) asset classes (as in years past), but also against alternative catastrophe risk investment structures. Sponsors, on the other hand, growing evermore comfortable with utilizing capital markets capacity to supplement their traditional reinsurance programs and capital bases, embraced the entire spectrum of capital markets' solutions as valuable, necessary tools to manage their catastrophe risk exposure.

The evolution of risk transfer options also helped enable the transfer of fundamentally distinct types of catastrophe risk into the capital markets, broadening the effectiveness of capital markets' solutions. For example, while catastrophe bonds and ILWs remained the primary vehicles for transferring extreme tail risk, sidecars (particularly the equity layers) allowed investors to gain access to low layer (higher yielding) risk more easily, and, in some cases, with a greater degree of control over the type of risks selected.

The record transaction activity in the cat bond market is even more remarkable in light of the increased investment by way of alternative structures. Although not direct substitutes for catastrophe bonds in all cases, it is clear that alternative investment structures were frequently marketed to (and invested in by) the same capital providers who, but for these alternatives, would likely have invested in catastrophe bonds. The debt layers of sidecar transactions exemplify this dynamic. Typically, sidecar debt attaches no lower the 1/100 year event, and can provide protection up to the 1/500 year event and beyond (a risk profile commonly associated with catastrophe bonds). Although structurally distinct, sidecar debt layers are quite similar to catastrophe bonds in terms of economic substance; and, from an investor's perspective, are practically equivalent. Accordingly, as investors were able to choose between sidecar debt and cat bonds when making capital allocations, the increase in sidecar activity likely reduced the capacity available in the traditional catastrophe bond market. In short, the availability of alternative investment structures likely contributed to a net reduction in cat bond issuance, making the record activity levels of 2006 all the more notable.

Basis Risk — A Key Constraint to Further Growth

In 2006, sponsors indicated that aside from price, basis risk was their primary concern when using the capital markets to manage catastrophe exposures — and, in some cases — basis risk was more important than price. The transaction activity of 2006, with only two indemnity transactions completed, suggests that the capital market continues to be resistant (at least, in general) to accept indemnity transactions, though there should be continued isolated exceptions to this rule.

The industry-wide focus on basis risk, however, is generating positive results. Over the course of the year several new trigger approaches were developed and successfully utilized. These new approaches, generally referred to as hybrids, are fundamentally driven by the desire to minimize the basis risk borne by the sponsor, while remaining non-indemnity based. Additional detail on hybrid triggers, which were positively received by the investor community, is provided later in the report. A leading industry rating agency, sensitive to the growing importance of basis risk, published a set of general guidelines and a methodology on which it would rely in its evaluation of the magnitude of basis risk implied by different catastrophe bond structures. Although the industry consensus is that the specifics of the methodology could perhaps use some additional refinement, the creation (and publishing) of the basics of a systematic analytical approach was generally applauded. Modeling firms and other industry participants, keenly aware of the impediment basis risk imposes, are devoting substantial resources toward developing more robust, customizable indices. The absence of available indices to which sponsors can closely correlate their probable sustained losses is viewed by many market participants as a key inhibitor to the development of a substantially larger catastrophe bond market.

Market Growth Drivers

The growth of the catastrophe bond market and, more generally, the involvement of capital markets investors in providing capacity for catastrophe risk during 2006 were principally driven by reactions to the U.S. hurricane activity of 2004 and 2005. In the wake of these storms, (i) the modeling firms revised upward their assessment of the frequency and severity of U.S. windstorms and (ii) the rating agencies increased their capital requirements for cat-exposed underwriters. These factors caused a sharp contraction in available reinsurance, which in turn caused a spike in price. As a result, more potential sponsors than ever turned to the capital markets for risk transfer solutions for their peak U.S. exposures, particularly southeast wind.

Catastrophe Model Updates — Dramatic Increase in Perceived Risk for U.S. Hurricane Peril

Of these contributing factors, the most pivotal was the modeling firms' collective reassessment of the frequency of Atlantic basin hurricane formation and severity of U.S. hurricane damages, particularly in the Southeast and Gulf regions.

The storm activity of 2004 and 2005, in conjunction with other weather data, prompted the scientific community to consider whether increased sea surface temperatures in the Atlantic basin could be related to an increase in hurricane formation rates. Essentially, the key question was whether current, arguably unusual environmental conditions were causing the rate of hurricane formation to deviate substantially from its long-term historical average. While no definitive conclusion has been reached, the three principal modeling firms, through different methods, each elected to reflect this possibility in their 2006 model releases. With specific respect to catastrophe bonds with exposure to U.S. hurricane peril (though terminology varied across the modeling firms), attachment, expected loss and exhaustion probabilities were now provided under both near-term and long-term frequency assumptions. Catastrophe bond investors, consistent with the long-standing practice of evaluating risk characteristics under the most conservative assumptions, and wanting to rely on a risk estimate consistent with their investment duration, tended to make pricing decisions based on the near-term estimates. A comparative analysis of pricing under near-term and long-term assumptions is provided later in this report.

In addition, though again without uniformity, the damage data from the storms of 2004 and 2005 prompted modeling firms to consider revising upward vulnerability estimates for insured physical structures and business interruption losses, although not all firms ultimately elected to do so. Finally, the reconstruction/replacement costs of the 2004 and 2005 storms indicated that, in general, existing loss amplification factors were insufficient. Post-loss inflation factors such as the shortage of available building materials and manpower were found to increase replacement costs more significantly than had previously been assumed.

The model changes were substantial. Although precise comparisons are difficult due to important methodology differences between modeling firms, in general, the combined effects of an allowance for increased hurricane frequency and the upward revision of damage vulnerability estimates increased expected loss estimates between 25 to 100 percent (primarily depending on the return period, class of business and geographic area in question) for U.S. Southeast and Gulf exposures.

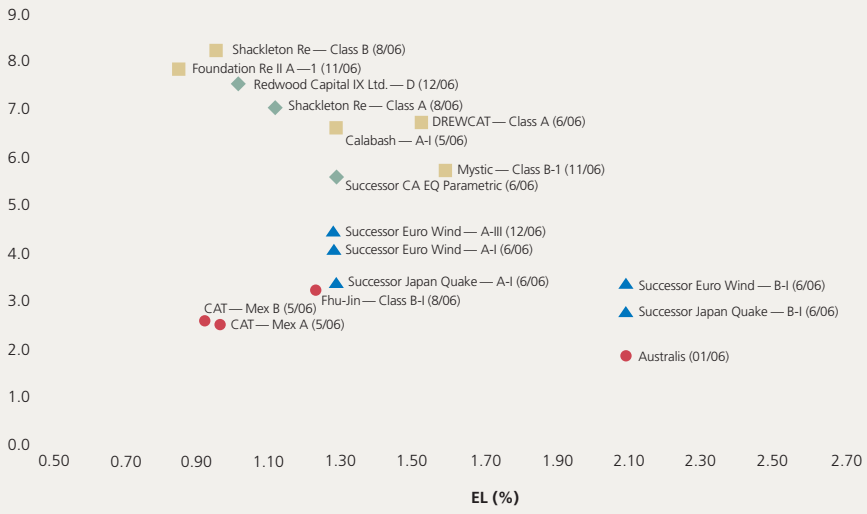
Peak versus Non-Peak Peril Pricing

The growth in demand for catastrophe bonds was tremendously unbalanced, as the effects mentioned above applied almost exclusively to U.S. wind peril alone. Catastrophe bond investors, many of whom seek to achieve balanced portfolios with exposures to a variety of different perils and geographies, became increasingly reluctant to accept additional amounts of stand-alone U.S. wind risk. For the first time in the history of the catastrophe bond market, peak peril transactions were often undersubscribed and at times only completed after substantial structural modification to appease investors. Conversely, investors were eager to acquire diversifying and non-peak exposures, primarily because these perils would favorably influence their concentration profiles and indirectly allow them to take on additional lucratively priced peak risk without violating allocation maximums.

This dynamic is illustrated in Figure 3, which for a sample of transactions completed during 2006, summarizes pricing on a risk-adjusted basis for the peak perils of U.S. hurricane and earthquake; non-peak perils of European windstorm and Japanese earthquake; and diversifying perils of Mexican earthquake, Australian earthquake and hurricane and Japanese typhoon. While the overriding tendency (across all perils) for transactions with higher expected loss estimates to price at more compressed multiples is evident; also clear is that during 2006, for a given expected loss, diversifying peril transactions generally priced lower than both non-peak and peak peril transactions.

Figure 3: Comparison of 2006 Peak, Non-Peak and Diversifying Peril Transactions
ROL vs. EL — All Issues

- Peak Perils (U.S. Earthquake)
- Peak Perils (U.S. Hurricane)
- Non-Peak Perils (European — Wind, Japanese Earthquake)
- Pure Diversifying Perils (Australian Typhoon and Earthquake, Mexican Earthquake, Japanese Typhoon)



- The range of the expected loss spectrum (i.e., the x-axis) was selected to include all diversifying peril transactions that closed during 2006. Because of the limited amount of data, readers are cautioned against extrapolating what pricing might be for other potential issuances on the basis of this figure alone.

Increased Popularity of the Shelf-Offering Mechanism

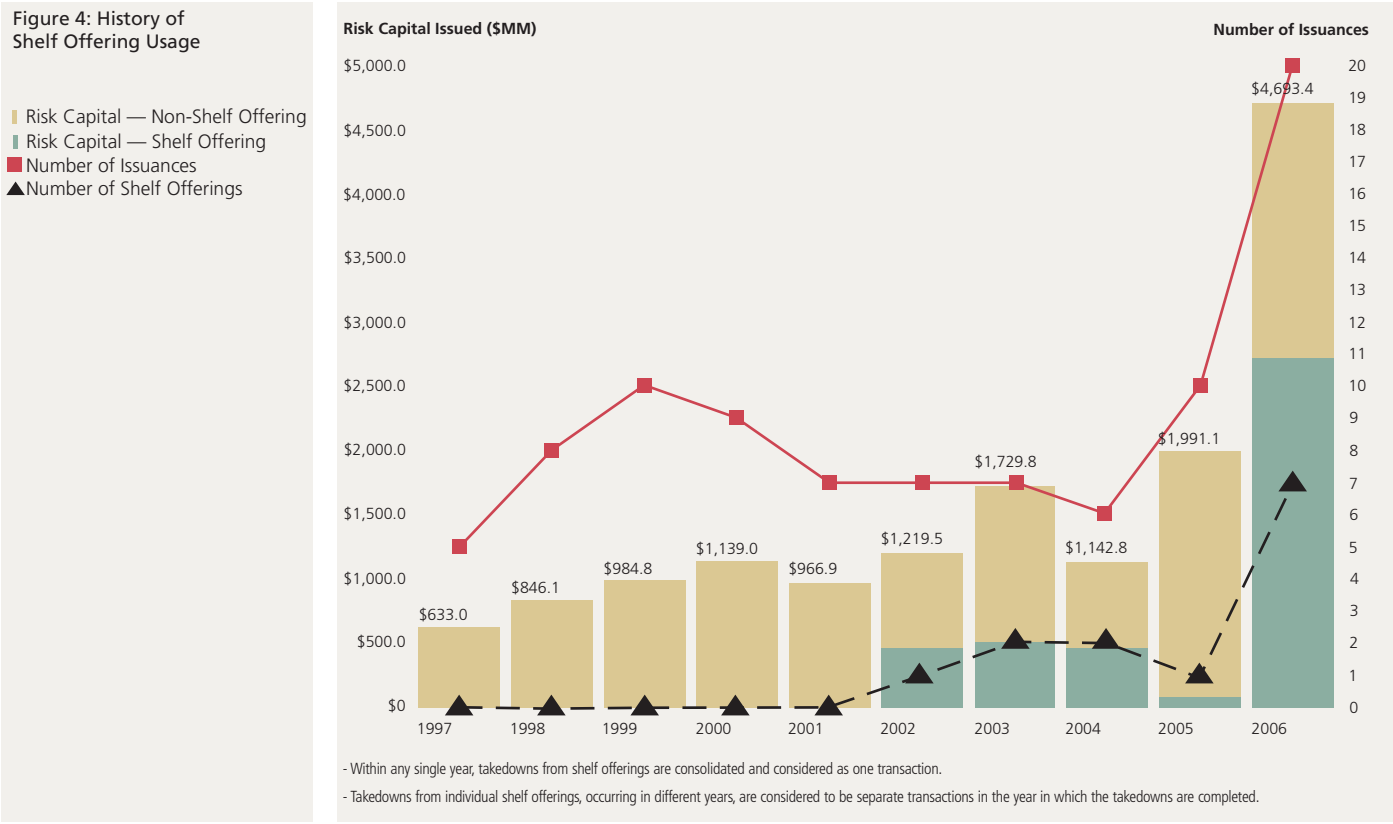
During 2006 there was a substantial increase in the number of shelf-offering transactions completed, and the amount of risk capital placed via shelf-offering structures, as shown in Figure 4. Shelf offerings, which are also known as programs, essentially allow sponsors to create a single set of offering documents summarizing the general characteristics of an offering, and then, primarily based on these documents, issue additional bonds (up to a maximum limit) over the course of a stated risk period. These additional issuances are known as takedowns.

First introduced into the cat bond market in 2002 by Swiss Re's Pioneer program, shelf offerings have several features that are attractive to sponsors. First, they allow sponsors to access capacity on an as-needed basis, rather than having to make an estimate of their capacity needs several years in advance. Second, because takedowns refer back to the original transaction documentation, the issuance expenses associated with takedowns are substantially lower than for stand-alone issuances. Third, shelf offerings are flexible and can be customized such that different classes of notes can address different risk layers, perils, geographies and have different maturities. Fourth, shelf offerings provide sponsors the ability to purchase additional capacity opportunistically, completing larger takedowns when pricing is favorable and postponing or downsizing takedowns when pricing is unattractive.

Catastrophe bond investors also view shelf offerings favorably as they tend to be a reliable source of transaction flow, a longstanding concern for the cat bond market (though significantly less so during 2006).

The increased use of shelf offerings is a positive sign for the catastrophe bond market. In general, it indicates a more broad-based intention on the part of sponsors to systematically incorporate cat bonds into their risk transfer programs (as opposed to only turning to the cat bond market for one-off solutions in times of crisis). Shelf offerings facilitate repeated interactions between sponsors and investors which have the ancillary benefit of building up a track record of successful transactions, thereby helping to raise the general confidence level of all market participants.

Figure 4: History of Shelf Offering Usage



- Within any single year, takedowns from shelf offerings are consolidated and considered as one transaction.
- Takedowns from individual shelf offerings, occurring in different years, are considered to be separate transactions in the year in which the takedowns are completed.

Standardization of Issuance Process as Transaction Mechanics Become Increasingly Complex
In previous reports, we have mentioned the industry's general expectation that, with the passage of time and the completion of additional transactions, one could expect transaction mechanics to become increasingly standardized, the timeline required to complete a catastrophe bond to compress, and the issuance costs associated with catastrophe bond issuance to fall. The transaction activity of 2006 indicates that, to an extent, these expectations were justified. The catastrophe bond issuance process has clearly become significantly more standardized relative to the process required during the more formative years of the market. A long-standing core of experienced, sophisticated investors anchor the investor base and new entrants tend to be savvy investors who bring substantial insurance industry expertise, and, in many cases, reinsurance underwriting experience. The roles and responsibilities of all critical parties (i.e., sponsors, legal firms, investment bankers, modeling firms, rating agencies and investors) have become better defined. With particular respect to the legal documentation required — a component that in the earlier days of the market took a considerable amount of time and expense to create — economies of scale are beginning to manifest themselves. All of these factors are helping to compress the amount of time required to complete a catastrophe bond, and reduce issuance expenses.

However, with respect to transaction mechanics, specifically trigger design, coupon mechanics and, to a lesser extent, form of offering, 2006 showed increased innovation and non-standardization. Four transactions utilized different types of previously untested hybrid triggers, providing sponsors with greater flexibility and helping to reduce expected basis risk. These trigger types, by and large, were well-received by the investor community. One transaction, Atlas Re III Ltd. (sponsored by SCOR), a second-event bond providing protection for qualifying Japanese earthquakes and European windstorms, utilizes a coupon step-up feature. Under the terms of this transaction, prior to the occurrence of the first activation event, investors receive an agreed coupon each quarter, however, after an activation event has occurred (i.e., the bond principal is exposed to losses associated with the next and subsequent qualifying events), the coupon payment increases to reflect increased risk. This type of mechanism is viewed positively by some investors, who, while seeking diversifying exposure to second-event risk, were reluctant to lock-in a fixed rate on a pre-activation event basis. Also attractive to investors, under this structure, the coupon payment step-up helps to defray the mark-to-market loss (in a post-activation event scenario) as the value reduction, which would otherwise have to be absorbed entirely by the bond principal, is partially off-set by the increased coupon payments.

Finally, one transaction, Shackleton Ltd (sponsored by Endurance Specialty Insurance Ltd.), was partially placed in a bank loan, rather than in the standard 144A form.

The increasing rate of mechanical innovation, occurring as a subprocess within a compressing transaction issuance timeframe, is yet another positive sign for the catastrophe bond market. Market participants are sufficiently informed and able to conceive of, process and evaluate new and potentially more effective trigger designs, which in turn should help to reduce sponsor basis risk while keeping transaction structures palatable to an expanding investor community.

Transaction Statistics (1997–2006)

Below is a brief review of the trends in each of the major aspects of a cat bond's structure — transaction size, covered perils, trigger type, number of perils, bond tenor, sponsor type, sponsor experience, bond rating and bond pricing.

Transaction Size

Average transaction size continued to increase during 2006, settling at $234.7 million (see Table 1). However, this measure is inflated by the Successor Program ($1.19 billion) which is counted as a single transaction. Excluding the Successor Program, average transaction size for 2006 would have been $184.3 million, a slight decrease from 2005's average of $199.1 million. During the year, eight transactions were completed with principal amounts between $100 and $200 million, partially reflecting the fact that certain issuances were undersubscribed. Also, for the second consecutive year, three transactions with less than $100 million of risk capital were placed, further indicators of a capacity supply shortfall.[4]

TABLE 1: TRANSACTIONS BY SIZE

YEAR	<$50MM	≥$50MM, <$100MM	≥$100MM, <$200MM	≥$200MM	DEAL SIZE ($MM) AVERAGE	MEDIAN
1997	2	1	1	1	126.6	90.0
1998	3	3	1	1	105.8	63.1
1999	3	1	5	1	98.5	100.0
2000	1	2	4	2	126.6	136.5
2001	0	0	7	0	138.1	150.0
2002	1	1	2	3	174.2	175.0
2003	0	0	3	4	247.1	231.8
2004	0	0	3	3	190.5	185.2
2005	0	3	3	4	199.1	183.0
2006	0	3	8	9	234.7	175.0
TOTAL	**10**	**14**	**37**	**28**	**$168.8**	**$139.7**

- Within any single year, takedowns from shelf offerings are consolidated and considered as one transaction.

- Takedowns from individual shelf offerings, occurring in different years, are considered to be separate transactions in the year in which the takedowns are completed.

- The Successor Program is considered to be a single transaction.

Covered Perils

Notwithstanding elevated pricing and the under-subscription of certain issues, during 2006, the catastrophe bond market continued to demonstrate its ability to absorb the peak perils of U.S. earthquake and hurricane (see Table 2). U.S. hurricane risk, for the first time was the most securitized peril (in terms of risk capital), slightly exceeding U.S. earthquake by $66.2 million. With respect to other frequently securitized though non-peak perils there also were increases year over year. Through a combination of Fhu Jin Ltd. and Bayhaven Ltd. $400.3 million of Japanese typhoon risk was placed, representing the first securitization of Japanese typhoon risk since 2003. As mentioned before, the market also showed a strong appetite for other non-peak and diversifying perils as catastrophe bond investors looked to maintain diversification despite heavy issuance activity for peak risks. For the first time, Mexican earthquake, Australian earthquake and wind and the combined peril of U.S. tornado and hail risk were successfully securitized through separate transactions.

[4]For the purposes of our analysis of transaction size, we have combined the total takedowns for shelf offerings over the course of the entire year and counted it as a single issuance (e.g., the Successor Hurricane Industry Index Class E Notes had a total of five takedowns during 2006, which we have aggregated to arrive at a total issuance of $120 million).

TABLE 2: RISK CAPITAL BY SPECIFIC PERIL ($MM)

YEAR	U.S. EARTHQUAKE	U.S. HURRICANE	EUROPEAN WINDSTORM	JAPANESE EARTHQUAKE	JAPANESE TYPHOON	OTHER
1997	112.0	395.0	0.0	90.0	0.0	36.0
1998	145.0	721.1	0.0	0.0	80.0	45.0
1999	327.8	507.8	167.0	217.0	17.0	10.0
2000	486.5	506.5	482.5	217.0	17.0	129.0
2001	696.9	551.9	431.9	150.0	0.0	120.0
2002	799.5	476.5	334.0	383.6	0.0	0.0
2003	803.8	416.1	474.1	691.2	277.5	100.0
2004	803.3	660.8	220.3	310.8	0.0	0.0
2005	1,269.0	994.0	830.1	138.0	0.0	405.0
2006	2,228.7	2,294.9	1,166.0	824.1	400.3	507.5
TOTAL	**$7,672.4**	**$7,524.6**	**$4,105.9**	**$3,021.6**	**$791.8**	**$1,352.5**

- The total principal amount of bonds covering two or more perils (in which the total principal is exposed) has been included in all the peril categories they cover; therefore, the total figures do not reflect the actual volume of bonds issued.
- "Other" perils include Europe hail, Monaco earthquake, Puerto Rico hurricane, Taiwan earthquake, third-party casualty liability, Australian earthquake, Australian wind, Mexican earthquake, U.S. tornado and hail and bonds for which the peril was not disclosed.

Trigger Type

In addition to the continued reliance on the four established trigger mechanisms (i.e., Indemnity, Parametric, PCS-Index and Modeled-Loss), during 2006, new hybrid triggers were introduced (see Table 3). These hybrid triggers, which are essentially formed from the combination of two or more existing trigger types within a single transaction or tranche, fall into two main classes: The first and more straightforward class, which was first used on the Successor Program, uses different trigger types for different perils within a single tranche. For example, a single tranche with exposure to both U.S. wind and Japanese earthquake perils could rely on a PCS-Index trigger to establish U.S. wind losses, and a Parametric trigger to establish Japanese earthquake losses. The second class of hybrid trigger applies different trigger types, in a sequential fashion, when establishing losses from a covered event. This type of hybrid trigger was first used in the Calabash Ltd. transaction (sponsored by ACE Ltd.). In this transaction, once a covered event has occurred, its parameters (such as average sustained wind speed) are run through two escrowed notional portfolios, one representing the sponsor's exposures, and the other representing the exposure of the industry. The resulting output of the sponsor is divided into the output for the industry to establish sponsor market share. This sponsor market share amount is then applied to the actual PCS losses associated with the covered event to establish losses to the bond. In essence, this hybrid trigger combines Modeled-Loss and PCS-Index trigger types, trying to reduce basis risk borne by the sponsor while still preserving a non-indemnity trigger mechanism.

Indemnity transactions continued to be difficult to place, as the investor universe, still focused on the possibility for non-modeled or inaccurately modeled losses to contribute to principal

loss, showed a reluctance to provide capacity on this basis. Two exclusively indemnity transactions were completed, Balboa's $50 million VASCO Ltd. and USAA's $122.5 million Residential Re 2006 Ltd. However, both provided capacity for personal lines risks for which the market generally tends to have a higher degree of confidence in the modeling results. Furthermore, USAA's ability to successfully place a sizeable indemnity transaction was also helped by its track record of consistent past sponsorship, and high-quality disclosure with respect to their issuances.

TABLE 3: RISK CAPITAL/ TRANSACTIONS BY TRIGGER TYPE

YEAR	INDEMNITY		PARAMETRIC		PCS (INDEX)		MODELED		HYBRID	
	$MM	#	$MM	#	$MM	#	$MM	#	$MM	#
1997	431.0	3	90.0	1	112.0	1	0.0	0	0	0
1998	846.1	8	0.0	0	0.0	0	0.0	0	0	0
1999	602.7	7	100.0	1	0.0	0	282.1	2	0	0
2000	507.0	4	303.0	2	150.0	1	179.0	2	0	0
2001	150.0	1	270.0	2	265.0	2	281.9	2	0	0
2002	355.0	2	631.5	3	200.0	1	33.0	1	0	0
2003	260.0	2	1,119.8	4	350.8	1	0.0	0	0	0
2004	227.5	1	267.8	2	547.5	2	100.0	1	0	0
2005	859.4	4	491.7	3	0	0	640.0	3	0	0
2006	172.5	2	1,260.0	7	1,422.0	6	157.2	1	1,681.7	4
TOTAL	**$4,411.2**	**34**	**$4,533.8**	**25**	**$3,046.5**	**14**	**$1,673.2**	**12**	**$1,681.7**	**4**

- Within any single year, takedowns from shelf offerings are consolidated and considered as one transaction.
- Takedowns from individual shelf offerings, occurring in different years, are considered to be separate transactions in the year in which the takedowns are completed.
- The Successor Program is considered to be a single transaction.

Number of Perils

Roughly equal amounts of risk capital were issued though single- and multi-peril transactions during 2006 (see Table 4). Single-peril transactions were commonly originated in response to capacity shortages for U.S. wind and U.S. earthquake risk in the traditional market. Sponsors turned to the capital markets to provide additional protection for these perils as traditional capacity for other catastrophic risks was more readily available. Multi-peril issuance reflects the bundling of U.S. earthquake and U.S. hurricane risk into single transactions, as well as the continued desire by some sponsors to construct broadly applicable protection capable of responding to a variety of different perils worldwide.

TABLE 4: RISK CAPITAL BY NUMBER OF PERILS ($MM)

YEAR	SINGLE PERIL	MULTIPLE PERIL
1997	603.0	30.0
1998	656.1	190.0
1999	730.0	254.8
2000	656.5	482.5
2001	415.0	551.9
2002	961.5	258.0
2003	1,093.8	636.0
2004	662.0	480.8
2005	922.1	1,069.0
2006	2,334.5	2,358.92
TOTAL	**$9,034.4**	**$6,311.9**

- Within any single year, takedowns from shelf offerings are consolidated and considered as one transaction.
- Takedowns from individual shelf offerings, occurring in different years, are considered to be separate transactions in the year in which the takedowns are completed.

Bond Tenor

Despite substantial innovation with respect to features such as trigger type, coupon mechanics, perils securitized and form of securitization (among others), the typical bond tenor remained, for the most part, unchanged during 2006. Three years remained by far the most frequent bond term. However, the distribution of bond tenor widened slightly as six transactions were completed with less than a three-year tenor, including two with tenors of only one year (see Table 5). This primarily reflects the reluctance of sponsors to lock-in rates at what were perceived to be elevated levels for more than one or two storm seasons. The successful closing of catastrophe bonds with tenors ranging from as short as one year up to as many as five years also shows the versatility of the catastrophe bond market as a solution for sponsors' immediate and longer-term capacity concerns.

TABLE 5: TRANSACTIONS BY BOND TENOR

YEAR	1-YEAR	2-YEAR	3-YEAR	4-YEAR	5-YEAR	10-YEAR
1997	2	1	1	0	0	1
1998	7	0	0	0	1	0
1999	5	0	3	0	2	0
2000	3	1	4	0	1	0
2001	2	1	3	1	0	0
2002	0	1	4	2	0	0
2003	0	1	3	1	2	0
2004	1	2	1	1	2	0
2005	1	2	7	0	1	0
2006	2	4	12	1	1	0
TOTAL	**23**	**13**	**38**	**6**	**10**	**1**

- Pioneer only counted in 2002 as a four-year deal, as subsequent takedowns in 2003 had the same maturity date.
- Due to different tenors between tranches, Arbor Program included as both a three- and four-year transaction in 2003 and a one- and two-year transaction in 2004; Atlantic & Western Re included as both a one- and three-year transaction in 2005.
- The Successor Program is considered to be a two-year transaction in 2006.
- Within any single year, takedowns from shelf offerings are consolidated and considered as one transaction.
- Takedowns from individual shelf offerings, occurring in different years, are considered to be separate transactions in the year in which the takedowns are completed.

Sponsor Type

Primarily reacting to the traditional reinsurance capacity shortages for the U.S. perils of hurricane and earthquake, primary insurers led cat bond sponsorship in 2006, both in number of deals and risk capital amount (see Table 6). Also for the first time since 2003, non-(re)insurance sponsors elected to access the cat bond market directly. The first such sponsor was the government of Mexico, which through its FONDEN facility sponsored the $160 million CAT-Mex Ltd. transaction in May 2006.

The second non-(re)insurer sponsor, Dominion Resources Inc., an energy producer that brought the $50 million DREWCAT Ltd. transaction, was attracted to the catastrophe bond market as a means to obtain protection for critical oil-drilling assets located off the coasts of Louisiana and Texas. Hurricane insurance coverage for these types of facilities, hit hardest by the storms of 2005, was particularly difficult to purchase during 2006.

TABLE 6: RISK CAPITAL/ TRANSACTIONS BY SPONSOR TYPE

YEAR	INSURER		REINSURER		CORPORATE/GOVERNMENT	
	$MM	#	$MM	#	$MM	#
1997	521.0	4	112.0	1	0.0	0
1998	575.0	4	271.1	4	0.0	0
1999	460.0	4	424.8	5	100.0	1
2000	469.0	4	670.0	5	0.0	0
2001	150.0	1	816.9	6	0.0	0
2002	195.0	2	849.5	4	175.0	1
2003	730.0	3	768.0	3	231.8	1
2004	600.0	3	542.8	3	0.0	0
2005	1,071.0	4	920.1	6	0.0	0
2006	2,575.3	12	1,908.2	6	210.0	2
TOTAL	**$7,346.3**	**41**	**$7,283.3**	**43**	**$716.8**	**5**

- Within any single year, takedowns from shelf offerings are consolidated and considered as one transaction.
- Takedowns from individual shelf offerings, occurring in different years, are considered to be separate transactions in the year in which the takedowns are completed.
- The Successor Program is considered to be a single transaction.

Sponsor Experience

Table 7 shows the volume, both in terms of number of deals and risk capital placed, of transactions each year based on whether the sponsoring company had ever previously completed a disclosed cat bond. While repeat sponsors nearly doubled first-time sponsors (an apparent reversal of 2005 activity) in terms of the number of transactions, it is important to recognize that the volume of first-time sponsor activity remains remarkably high. In terms of risk capital, issuance activity by first-time sponsors nearly matched the record set in 2005, and the seven transactions brought to market represent a new high surpassing the previous record of six first-time sponsored transactions achieved in each of 2005, 2000 and 1999. Considering that the pool of potential first-time sponsors tends to shrink over time (insurer and reinsurer start-ups notwithstanding), this performance highlights the reality that the circumstances of 2006 prompted a much broader universe of sponsors to consider (and in many cases utilize) the catastrophe bond market as a capacity resource.

TABLE 7: RISK CAPITAL/ TRANSACTIONS BY SPONSOR TRANSACTION EXPERIENCE

YEAR	FIRST TIME		REPEAT	
	$MM	#	$MM	#
1997	633.0	5	0.0	0
1998	297.0	4	549.1	4
1999	629.1	6	355.7	4
2000	785.5	6	353.5	3
2001	0.0	0	966.9	7
2002	508.0	4	711.5	3
2003	801.8	3	928.0	4
2004	372.5	2	770.3	4
2005	1,373.4	6	617.7	4
2006	1,320.3	7	3,373.2	13
TOTAL	**$6,720.6**	**43**	**$8,625.8**	**46**

- Within any single year, takedowns from shelf offerings are consolidated and considered as one transaction.
- Takedowns from individual shelf offerings, occurring in different years, are considered to be separate transactions in the year in which the takedowns are completed.
- The Successor Program is considered to be a single transaction.

Bond Rating

As shown in Table 8, the S&P BB- (or equivalent) rating continues to be the benchmark of the catastrophe bond market, surpassing all other ratings in both number of transactions and risk capital amount. However, continuing the trend of 2005, there was again an increase in the number of B-rated tranches. During 2006, 13 B-rated tranches were issued — more than double 2005's six, which itself was a record. Perhaps even more notably, from 1997–2004, $496 million of risk capital, comprised of seven B-rated tranches, was brought to market; in the last two years there have been $1.20 billion of B-rated risk capital issued, comprised of 19 tranches. This principally reflects the increasing influence of high-yield investors (particularly hedge funds), and also the desire of sponsors to utilize catastrophe bonds that attach at a lower point in their overall risk transfer program.

In 2006, there also was an increase in issuance activity for higher rated, more secure tranches with both the Redwood IX Ltd. and Bay Haven Ltd. transactions, each including a BBB-rated tranche, and Bay Haven Ltd. including a AA-rated tranche. This is the first cat bond tranche to carry a AA rating (awarded primarily on the basis that no fewer than three deductible events would have to occur before the principal of this tranche was on risk), and could serve as a harbinger for additional higher grade issuances as sponsors seek to manage stringent rating agency mandates while investors seek to achieve further diversification across event frequency in addition to geography and peril.

TABLE 8: RISK CAPITAL/ TRANCHES BY RATING

YEAR	B		BB		BBB		A		AA		AAA[1]	
	$MM	#	$MM	#	$MM	#	$MM	#	$MM	#	$MM	#
1997	0.0	0	468.0	4	37.0	2	0.0	0	0.0	0	82.0	1
1998	21.0	1	657.6	5	0.0	0	0.0	0	0.0	0	22.5	3
1999	20.0	1	883.4	10	50.0	1	0.0	0	0.0	0	1.4	1
2000	100.0	1	853.0	8	141.0	3	0.0	0	0.0	0	0.0	0
2001	4.9	1	905.4	12	0.0	0	50.0	1	0.0	0	0.0	0
2002	0.0	0	722.3	11	261.3	2	0.0	0	0.0	0	0.0	0
2003	163.9	1	624.9	12	814.5	6	26.5	1	0.0	0	0.0	0
2004	185.8	2	889.5	8	67.5	1	0.0	0	0.0	0	0.0	0
2005	573.0	6	1,194.7	8	0	0	135.0	1	0.0	0	0.0	0
2006	623.0	13	3,117.3	27	84.8	2	0	0	133.5	1	0.0	0
TOTAL	**$1,691.5**	**26**	**$10,316.0**	**105**	**$1,456.0**	**17**	**$211.5**	**3**	**$133.5**	**1**	**$105.9**	**5**

- Accounts separately for each rated tranche of all issues; excludes unrated bonds / tranches.
- Within any single year, takedowns from shelf offerings are consolidated and considered as one transaction.
- Takedowns from individual shelf offerings, occurring in different years, are considered to be separate transactions in the year in which the takedowns are completed.
- Uses S&P ratings if available; otherwise, uses Fitch or Moody's ratings, as applicable.
- Each category of rating also includes bonds modified with either "-" or "+" (e.g., "B" includes "B-," "B" and "B+").
- (1) All transactions structured with principal protection.

Bond Pricing Trends

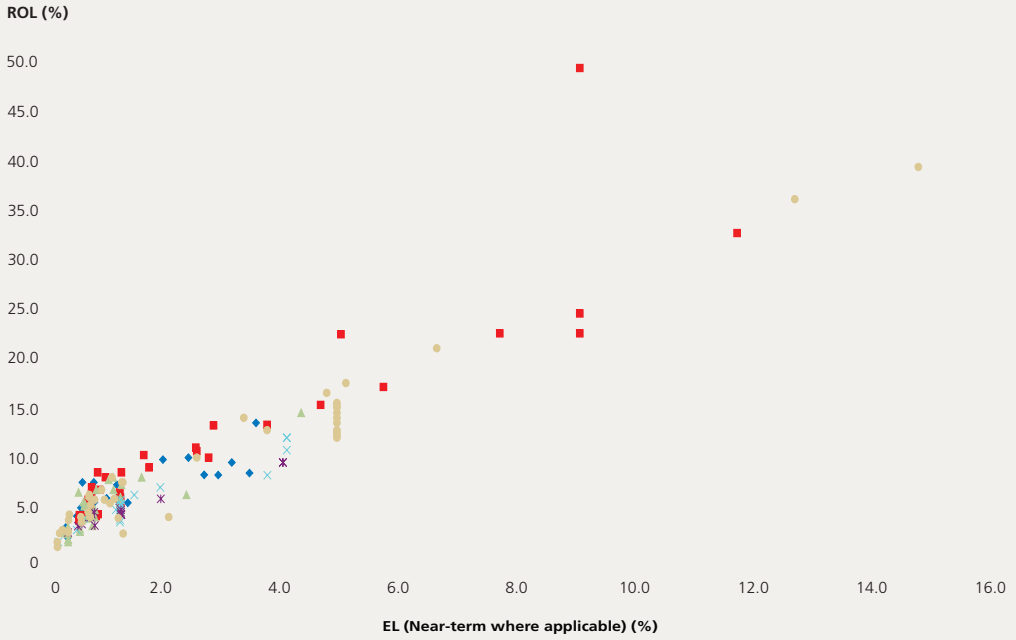
In this year's report, to reflect the widening risk profile addressable through catastrophe bonds, we have expanded the ranges included in Figures 5 and 6. In addition to the substantial increase in transaction volume and risk capital placed, the activity of 2006 was notable in that cat bonds were used to provide protection for risk layers far below the typical levels of previous years. Using annualized expected loss as a proxy for risk, prior to 2006, the most risky cat bond tranche ever placed had an annual expected loss of 4.86 percent; this tranche was brought to market in 2003. During 2006 alone, 10 tranches (and over $344 million of risk capital) with annualized expected losses of more than 6.00 percent were placed in the cat bond market. The year's most risky tranche, which raised $154.3 million, had an expected loss of 14.75 percent. This is further evidence that certain cat bond investors are seeking exposure to increasingly risky protection layers, as well as of sponsors' interest in securing high-quality, securitized coverage at more frequent return periods.

As shown in Figure 6, on a risk-adjusted basis, across all perils, the cat bond market continued to demonstrate a tendency toward primarily return-based (rather than risk-based) pricing during 2006. Coupon payments[5], expressed as a multiple of the annual expected loss, tend to compress as the expected loss increases, with peak peril transactions consistently pricing higher than non-peak peril transactions across the entire spectrum. This suggests cat bond investors continue to be concerned with minimum return/hurdle rates for issues at the low end of the spectrum, while the opportunity to access high-yield exposure prompts increased competition (and multiple compression) as the expected loss of a transaction increases.

[5]The terms "coupon payment," "spread" and "ROL" all refer to the pricing or risk premium that investors charge in excess of a risk-free rate, typically the three-month London Interbank Offered Rate (LIBOR), to take on the specific risk of the bond. Note: These risk premium figures do not reflect the transaction costs associated with issuing the bonds.

Figure 5: ROL vs. EL
All Issues (By Peril)

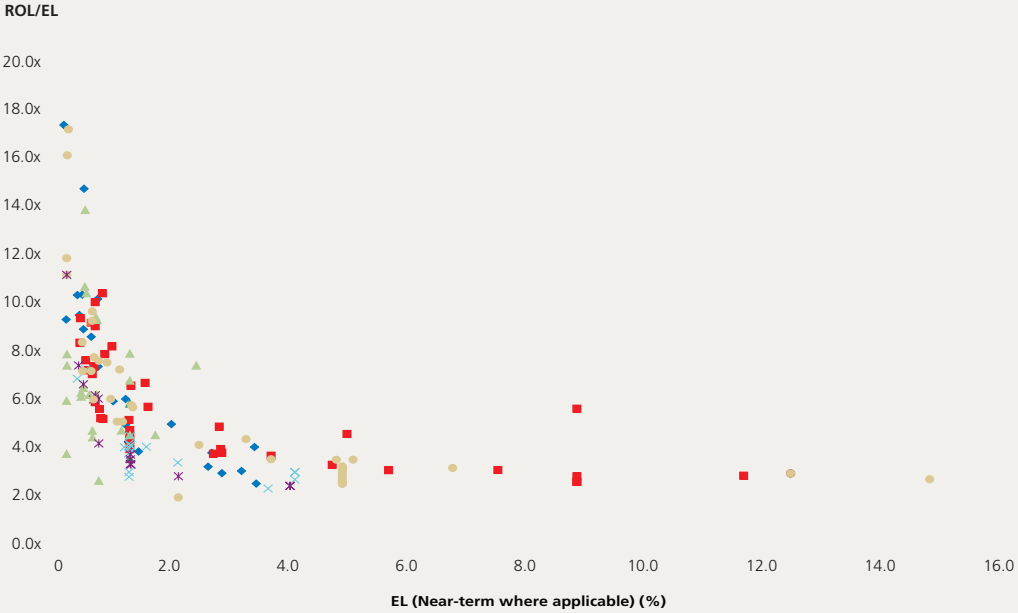
- U.S. Multiple
- U.S. Hurricane
- U.S. Earthquake
- International/European Wind
- International/Japan Earthquake
- International/Multiple



- Multiple takedowns of tranches with constant ELs that priced with constant ROLs are represented by a single data point.

Figure 6: ROL/EL vs. EL
All Issues (By Peril)

- U.S. Multiple
- U.S. Hurricane
- U.S. Earthquake
- International/European Wind
- International/Japanese Earthquake
- International/Multiple

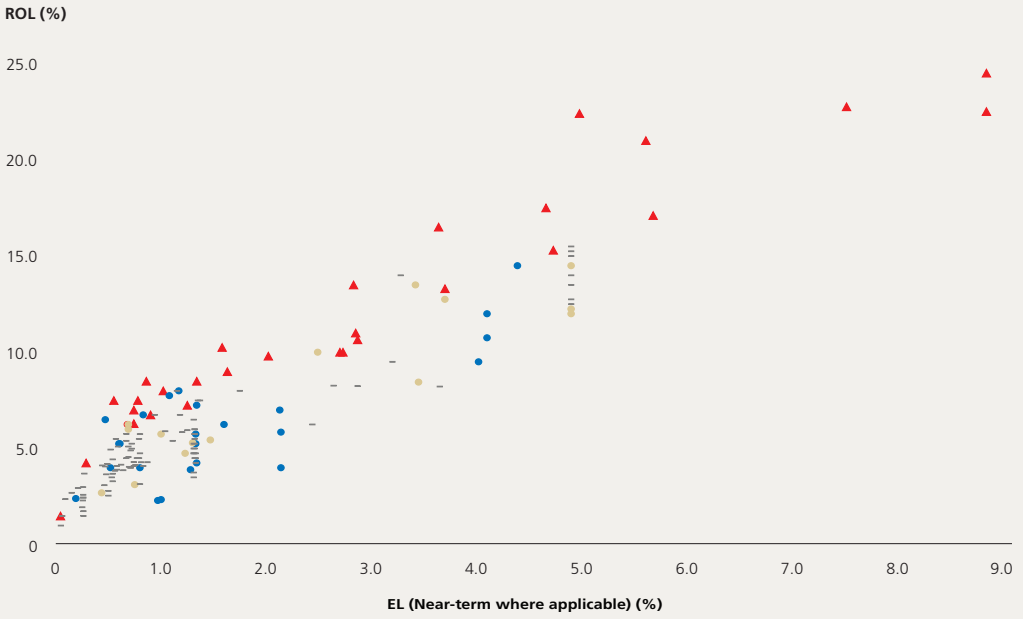


- Multiple takedowns of tranches with constant ELs that priced with constant ROLs are represented by a single data point.
- Excludes transactions that have an EL greater than 16.0% and/or ROL/EL greater than 20.0x.

Relative to 2005 and previous years, the pricing of catastrophe bonds, particularly for peak U.S. risks, generally increased during 2006, as shown in Figure 7. As previously mentioned, this can be primarily explained by the dramatic increase in catastrophe bond issuance as sponsors, unable to source sufficient peak peril capacity from traditional providers, turned to the catastrophe bond market for capacity. Although the attractive return profile of catastrophe risk and the increasingly diverse spectrum of investment structures attracted additional capital markets investors throughout the year, on balance, during 2006 growth in catastrophe bond sponsor demand (for peak peril capacity) outpaced growth in supply, driving up catastrophe bond pricing in general.

Figure 7: ROL vs. EL
2006 vs. 2005 and 1997–2004

▲ 2006 Transactions with U.S. HU exposure (ST EL)
• 2006 Transactions no U.S. HU exposure
• 2005 Transactions
– 1997–2004 Transactions

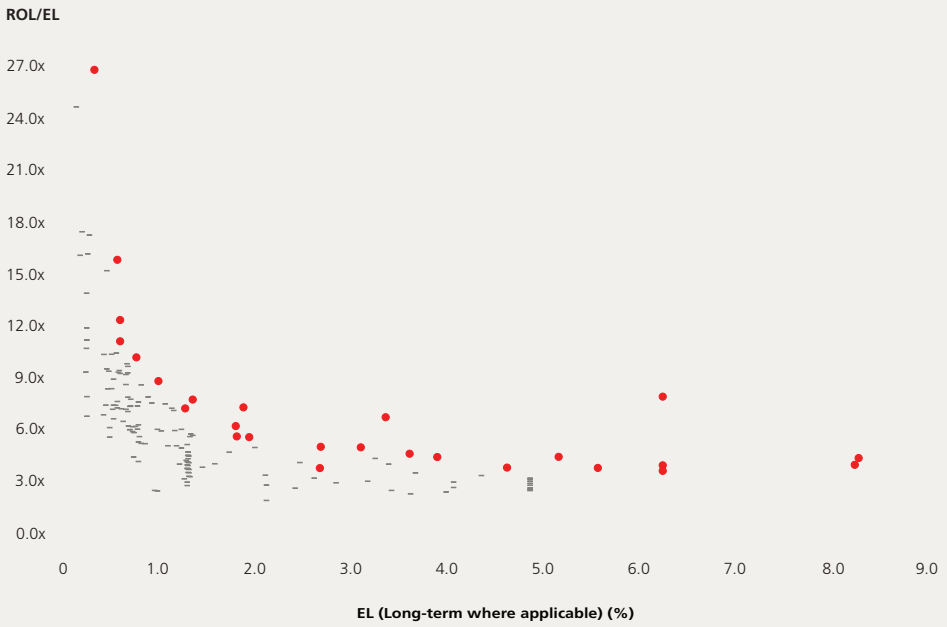


- Multiple takedowns of tranches with constant ELs that priced with constant ROLs are represented by a single data point.
- Excludes transactions with EL greater than 9.0% and/or ROL greater than 25.0%.

The pricing performance of 2006 also reflects the impact of model revisions (released in early 2006) as well as investors' general reliance on near-term loss estimates when provided. During 2006 pricing increased not only because more bonds were being placed in the market, but also because the perceived risk of cat bonds in general increased relative to previous years. On a risk-adjusted basis, Figures 8 and 9 summarize the pricing during 2006 relative to 2005 and previous years on both a long-term and near-term basis. Without considering the influence of the increased short-term expected loss estimates, peak peril multiples appeared to significantly expand during 2006. However, once these increases are adjusted for, the multiple expansions are far more muted.

Figure 8: Impact of Alternative Hurricane Frequency Estimates
ROL/EL vs. EL (long-term)

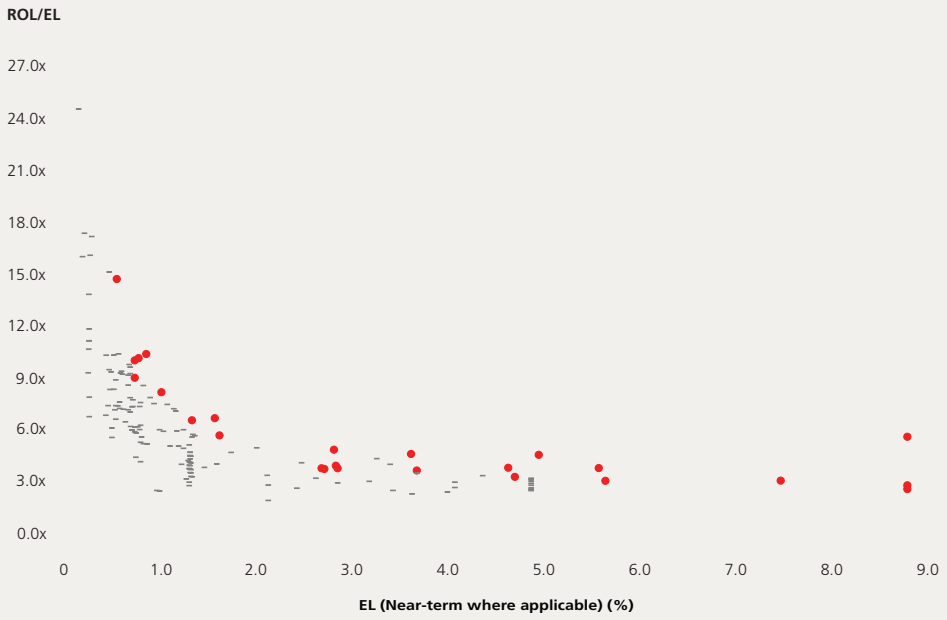
- 2006 Transactions with U.S. HU Exposure (LT EL)
- All Other Transactions



- Multiple takedowns of tranches with constant ELs that priced with constant ROLs are represented by a single data point.
- Excludes transactions that have an EL greater than 9.0% and/or ROL/EL greater than 27.0x.

Figure 9: Influence of Near-Term Frequency Estimates
ROL/EL vs. EL (near-term)

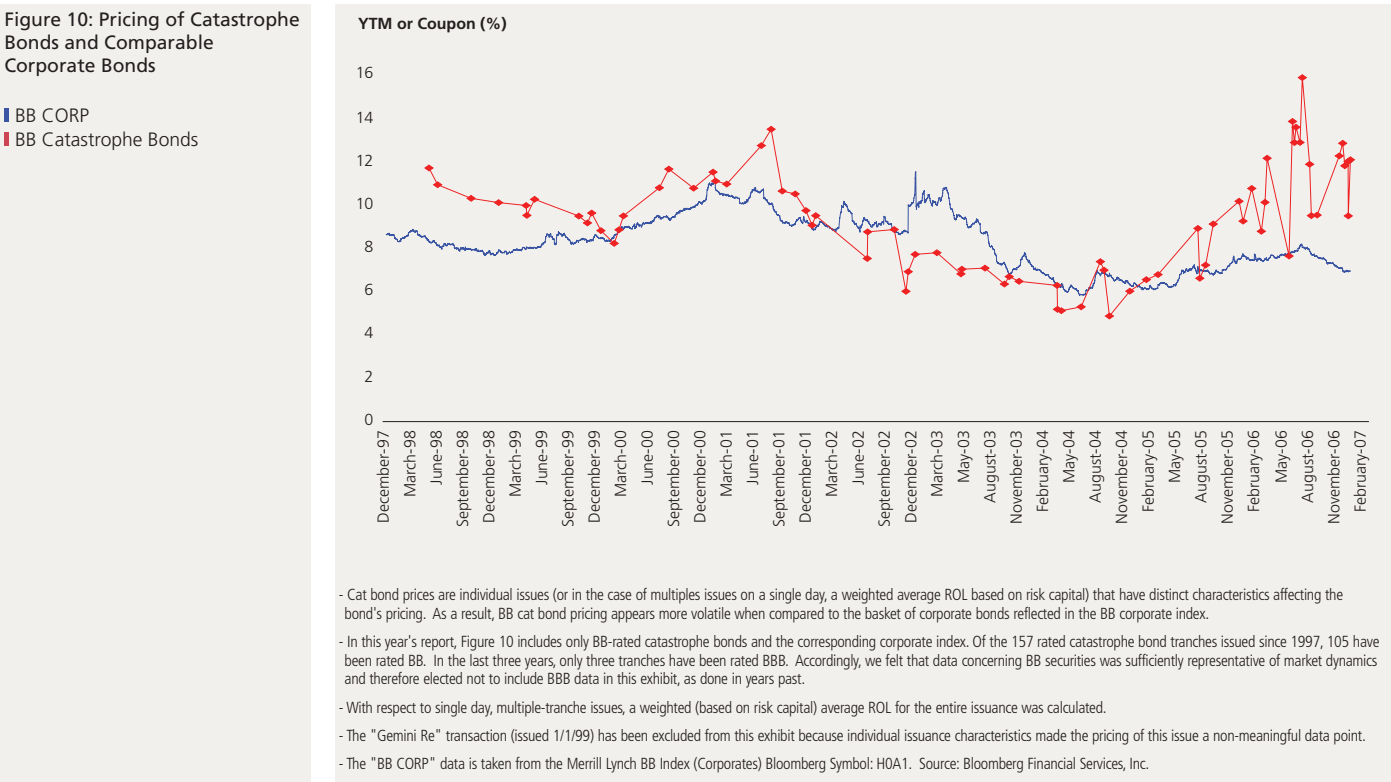
- 2006 Transactions with U.S. HU Exposure (NT EL)
- All Other Transactions



- Multiple takedowns of tranches with constant ELs that priced with constant ROLs are represented by a single data point.
- Excludes transactions that have an EL greater than 9.0% and/or ROL/EL greater than 27.0x.

Consistent with previous years, during 2006, catastrophe bonds tended to provide a higher yield when compared to similarly rated corporate bonds. Although the limited number of cat bond issuances has a tendency to make pricing appear more volatile than comparable corporate debt (as shown in Figure 10), it is safe to say that on average the spread between cat bonds and similarly rated corporates widened during 2006, as corporate spreads trended lower while cat bond spreads trended upward. This was driven by two key factors both related to the storm activity of late 2005:

Figure 10: Pricing of Catastrophe Bonds and Comparable Corporate Bonds



- Cat bond prices are individual issues (or in the case of multiples issues on a single day, a weighted average ROL based on risk capital) that have distinct characteristics affecting the bond's pricing. As a result, BB cat bond pricing appears more volatile when compared to the basket of corporate bonds reflected in the BB corporate index.
- In this year's report, Figure 10 includes only BB-rated catastrophe bonds and the corresponding corporate index. Of the 157 rated catastrophe bond tranches issued since 1997, 105 have been rated BB. In the last three years, only three tranches have been rated BBB. Accordingly, we felt that data concerning BB securities was sufficiently representative of market dynamics and therefore elected not to include BBB data in this exhibit, as done in years past.
- With respect to single day, multiple-tranche issues, a weighted (based on risk capital) average ROL for the entire issuance was calculated.
- The "Gemini Re" transaction (issued 1/1/99) has been excluded from this exhibit because individual issuance characteristics made the pricing of this issue a non-meaningful data point.
- The "BB CORP" data is taken from the Merrill Lynch BB Index (Corporates) Bloomberg Symbol: H0A1. Source: Bloomberg Financial Services, Inc.

- The storm activity of late 2005 served to decelerate what had previously been a rapidly growing level of confidence in the industry's ability to accurately model insured losses associated with natural disasters. Investors incorporated this uncertainty into their pricing, demanding increased spreads relative to prior years to accept the same amount of risk. In this sense, investors perceived an increased risk in BB-rated cat bonds and required a higher premium relative to similarly rated corporate bonds, which were not subject to the same types of uncertainty. Accordingly, the spread between cat bonds and corporate bonds widened as the required return on cat bonds increased.

- The 2005 storm activity also had a significant negative impact on the capital base of the insurance industry, with the brunt being borne by reinsurers. In the wake of substantial losses, and measures imposed by rating agencies and regulators, many catastrophe reinsurance writers were forced to reduce their capacity or exit the market entirely. The resulting scarcity bid up pricing for capacity, in the form of cat bonds or otherwise, and widened the spread between cat bonds and corporate debt.

Conclusion

While 2006 was in nearly every measurable way a record year, what this activity implies in the long-term view of the catastrophe bond market remains to be seen. Growth was driven by a number of factors, such as the capacity tightening and increased costs in the traditional market, model changes which redefined the view of risk held by sponsors and demand for non-peak and diversifying perils. All of the aforementioned factors had a single source — the record storm activity of 2004 and 2005.

Given that 2006 saw no U.S. hurricane activity, it is unclear if this momentum will continue and 2007 will be yet another record year in catastrophe bond issuance. However, 2006 was a significant year for more reasons than just the record issuances; it clearly demonstrated that the capital markets can play a significant role in a wide spectrum of the risk transfer arena.

The occurence of natural disasters will likely remain the primary driver of this market, the future growth of catastrophe bond and capital markets activity also depends upon:

- Sponsor ability to cope with basis risk, be it through internal risk assessment, the development of improved indices or additional usage of hybrid trigger approaches
- Investor appetite and the persistency of interest in the space. This will likely hinge on investors' ability to either (i) obtain risks needed to maintain portfolios that meet diversification requirements or (ii) earn sufficient returns to accept additional amounts of peak peril risk. Also, it remains to be seen whether committed cat bond investors will adjust their rate-of-return hurdles to more accurately reflect the likelihood of extreme catastrophic events occurring
- Pricing in the primary insurance and reinsurance market for peak perils, which in turn is effected by new capital entering the market in the form of start-up reinsurers and retrocessionaires, spawning increased competition and rate reductions

Taken as a whole, the securitization activity of 2006 provides further evidence of the broad-based convergence of the traditional and capital markets. More then ever before, during 2006 the barriers of years' past were broken down, as sponsors and investors, in a near seamless fashion, chose between traditional reinsurance, collateralized reinsurance, catastrophe bonds, sidecars, ILWs and other structures depending on transaction objectives. While certain structures are clearly more efficient for particular types of risk, the degree of interchangeability between alternatives, nevertheless, rose substantially.

The increased flexibility and transparency of the market, making it better able to meet the objectives of both investors and sponsors, is a strong signal that the capital markets will continue to develop into an increasingly vital, and perhaps less distinguishable, supplement to the traditional reinsurance marketplace.

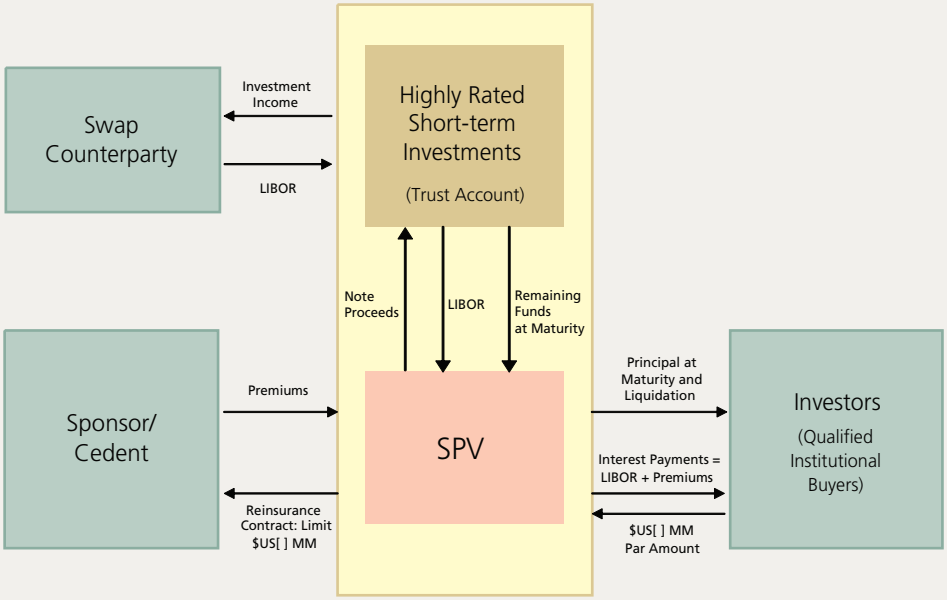
Appendix I: Catastrophe Bonds 101 — An Overview of Structure and Pricing Drivers

Catastrophe bonds were developed in the mid-1990s to facilitate the direct transfer of catastrophe insurance risk from insurers, reinsurers and corporations (referred to as the cat bonds' "sponsors") to investors. They were designed to protect sponsoring companies from financial losses caused by large natural catastrophes (such as Hurricane Katrina) by providing an alternative or supplement to traditional reinsurance. Sidecars usually target layers of risk with low annual loss probabilities, frequently less than one percent per annum, though many transactions (particularly during 2005 and 2006) have been completed with significantly higher expected loss estimates.

Catastrophe bonds have evolved significantly since the early days of the market. In the beginning, sponsors lacked the knowledge of what would work in the capital markets as well as an understanding of the important distinctions between the reinsurance and capital markets. In addition, investors were scarce and required substantial education before making a commitment. Today, the catastrophe bond marketplace features a solid, expanding core of experienced investors, often with funds dedicated to the sector. Rating agencies and cat modeling firms have also played critical roles increasing the confidence of market participants by working on and providing analysis of nearly all transactions. Increasing expertise and a track record of successful transactions have helped both investors, sponsors, rating agencies, modeling firms and regulators move along the learning curve. Falling transaction expenses have lowered the cost of issuance, making cat bonds more competitive with the reinsurance market. From the sponsor's perspective, the fully collateralized nature of cat bonds provides an important measure of comfort at a time when many are focused on reinsurer market security.

The ways in which catastrophe bonds are structured have evolved to the point where there is now a well-defined set of attributes that satisfy the competing demands and desires of investors, rating agencies, regulatory agencies and sponsors. The basic structure that is the most commonly used for the issuance of catastrophe bonds is shown in Figure 1.

Figure 1: Typical Catastrophe Bond Stucture



In this type of structure, the Special Purpose Vehicle (SPV) conducts two actions simultaneously: it issues notes (cat bonds) to investors, and it enters into a reinsurance contract with the sponsor. The proceeds from the notes issued are invested in high-quality, short-term securities and deposited into a trust account collateralizing the transaction. The actual returns generated from this account are swapped for London Interbank Offered Rate (LIBOR) with a highly rated swap counterparty. Through the swap mechanism, the bonds become floating rate notes from which interest rate risk is largely removed. Over the term of the bonds, the periodic interest payments paid by the SPV to the investors consist of two parts: the premiums paid by the sponsor and the LIBOR returns earned by the bond principal, which are guaranteed by the swap counterparty. At the conclusion of the bond term, assuming covered events have not occurred, the principal is returned to investors just as with other fixed-income investments.

Cat bonds have been targeted to provide risk transfer capacity for the ceding entity's layer of risk that, for example purposes, attaches at the one-in-100-year (1 percent per annum) and exhausts at the one-in-250-year (0.4 percent per annum) return periods. This segment of risk is attractive to both investors and ceding entities alike. This layer is often unreinsured by ceding companies for two main reasons. First, at this high-severity, low-frequency level, buyers of protection through uncollateralized transactions (e.g., reinsurance) become increasingly concerned about the counterparty credit risk of their reinsurers. Second, reinsurance pricing at this level has frequently been driven by minimum rate online charges, making purchases uneconomical.

Cat bonds remove the credit concern by providing full collateral for the risk limits offered through the transaction. In addition, in geographic areas where reinsurance costs are the highest, cat bonds have been cost competitive with reinsurance. The relative advantages of cat bonds when compared with traditional reinsurance, from a sponsor's perspective, are that they:

- Provide full collateralization of losses
- Lock in capacity and price over a multiyear period
- Provide a new, diversified source of risk capital
- Limit risks of future capacity and/or price shocks from the traditional reinsurance market

Evolution of the Catastrophe Bond

Much has changed with respect to catastrophe bond structures since the early days of this market. Initially, market participants experimented with many different approaches as they sought to meet the competing needs of sponsors, investors, rating agencies and regulators. Although cat bonds undoubtedly will continue to evolve, the market has reached a point where there are certain well understood and accepted structural approaches.

Bond Term

In the early years of the catastrophe bond market, bond terms varied dramatically from one year to as many as 10 years. As the market has matured, one-year and long-term (five years or greater) tenors have become increasingly rare. The recent trend is for transactions to have a tenor between two and four years, with the most common being three years.

This preferred two- to four-year tenor reflects several factors: Sponsors are able to lock in capacity at fixed costs over a multiyear period while still having a short enough time horizon to foresee risk management and portfolio changes. A multiyear term also allows fixed transaction costs to be spread over a number of years, rather than being incurred in each year. From an investor's point of view, three years is not an overly long term in light of the market's relative illiquidity, yet it helps avoid reinvestment risk and effort associated with one-year bonds. In addition, almost all catastrophe bonds have a floating-rate component to their coupons, usually three-month LIBOR, designed to mitigate interest rate risk during the risk period.

Multiple Peril versus Single-Peril Bonds

Ceding entities generally prefer to cover as many perils as possible in a single bond offering, as this derives cost benefits both in terms of transaction costs and through the sharing of limits across multiple territories. Investors, on the other hand, generally, though not exclusively, prefer single-peril transactions as this gives them greater freedom to assemble a risk portfolio according to their investment preferences. Despite these differences in preference, both single and multiple-peril bonds continue to be placed.

Payout Triggers

Indemnity Triggers

In the early days of the market, most insurance and reinsurance companies that considered using catastrophe bonds strongly preferred indemnity-based triggers, where payouts are based on the size of the sponsor's actual losses. This approach gives sponsors the lowest possible basis risk[6] and most closely replicates traditional reinsurance protection, but it also contains certain complexities that can be labor-intensive. For example, not only is the sponsor required to disclose details about the protected portfolio — sometimes including information that it would prefer to keep confidential for competitive reasons — but it is required to provide this data in a form that is suitable for a cat bond offering circular.

From investor and rating agency perspectives, the indemnity trigger approach requires an understanding of a sponsor's portfolio of risk assumed through the writing of insurance and reinsurance. Gaining this knowledge can be difficult, especially with regard to complex commercial insurance and reinsurance portfolios.

With payouts based on the sponsor's own losses, bond investors also need to be comfortable that the sponsor will settle catastrophe claims in a way that would not disadvantage investors — the so-called moral hazard issue.

Index Triggers

As a result of the issues surrounding indemnity triggers, there has been an increased number of transactions utilizing index-based triggers. From the investor's perspective, a payout linked to a well-constructed, manipulation-proof index eliminates concerns about the ceding entity's claims-handling practices or the investor's general information disadvantages relative to the ceding entity. From the ceding company's vantage point, the use of index triggers eliminates the need for burdensome and undesirable disclosure of proprietary underwriting information.

[6]Basis risk is the risk that, in the event of a covered loss, the payout determined by the bond calculation will differ from the actual loss incurred by the sponsor.

The primary concern with respect to the use of index-linked triggers is the basis risk retained by the ceding company. Nevertheless, the trend toward the greater use of indices also suggests that ceding companies are becoming increasingly comfortable assessing and retaining that risk, as well as structuring the index in such a way as to minimize basis risk. Index-based transactions follow one of three broad approaches: parametric, industry-loss and modeled-loss or some combination thereof, which we will refer to as a hybrid.

Parametric
With Parametric trigger indices, payouts are triggered by the occurrence of a catastrophic event with certain defined physical parameters (e.g., wind speed and location of a hurricane or magnitude and location of an earthquake).

Industry-Loss
The second broad category of index is triggered by an estimate of loss for the insurance industry as a whole from a catastrophe. Estimates are derived from a reporting service such as Property Claim Services (PCS).

Modeled-Loss
A modeled-loss trigger is calculated by running an actual event's physical parameters against a modeling firm's database of industry exposures. The resultant number is the modeling firm's estimate of an industry loss. Alternately, the cat bond sponsor may choose to substitute a representative sample of its own portfolio of exposures for the modeling firm's industry database when calculating the modeled losses from a specific event.

Hybrid Triggers
A hybrid trigger uses more than one trigger type in a single transaction or tranche. In its simplest form, a hybrid trigger could be used on a two-peril transaction, for example U.S. hurricane and Japanese earthquake perils, using a different kind of index trigger for each. In the event of a U.S. hurricane, the bond principal loss (if any) would be calculated by using a PCS index as described above, however, in the event of a Japanese earthquake, a parametric procedure could be followed. Another class of hybrid trigger involves the application of different trigger types, in a sequential fashion, when establishing principal loss from a covered event. For example, after the occurrence a qualifying U.S. earthquake, a modeled-loss procedure can be used to establish sponsor market share; then, this market share percentage can then be applied to the actual PCS index losses associated with the qualifying event to determine any principal reduction amount.

Advantages and Disadvantages of Each Payout Trigger
The following tables summarize the advantages and disadvantages of each type of trigger from both a sponsor and investor perspective.

TABLE 1: OVERVIEW OF TRIGGERS: ADVANTAGES AND DISADVANTAGES FOR SPONSORS

TRIGGER	ADVANTAGES	DISADVANTAGES
Indemnity	• No or limited basis risk – reflects sponsor's loss	• Substantial disclosure required by sponsor • More expensive • More detailed risk analysis by modeling firm • Longer ratings process • Adjustment to provide for sponsor's portfolio growth • Long loss recovery period • Less attractive to investors • Possible moral hazard
Parametric Index	• Simpler process to execute • Possible cost advantages due to greater investor interest • No need for sponsor to disclose confidential information • Rapid payout	• Basis risk • Possible accounting issues (mark-to-market)
Industry-Loss Index	• Simpler process to execute • Possible cost advantages due to greater investor interest • No need for sponsor to disclose confidential information	• Basis risk • Long payout period • Possible adjustment needed to provide for industry's portfolio growth • Possible accounting issues (mark-to-market)
Modeled-Loss Index	• Simpler process to execute • Possible cost advantages due to greater investor interest • No need for sponsor to disclose confidential information • Short payout period	• Basis risk (potentially less than other indices) • Possible adjustment needed to provide for industry's portfolio growth • Investors may be uncomfortable with a "black box" approach • Possible accounting issues (mark-to-market)
"Hybrid"	• Very flexible – different sub-trigger types can be used to address different perils within a single transaction • Should further reduce basis risk relative to other non-indemnity trigger types	• Basis risk, though in theory reduced, still remains • If trigger mechanics are too complex investors may be uncomfortable with the approach • May require additional time to construct, increasing total time required to complete transaction and potentially issuance expense

TABLE 2: OVERVIEW OF TRIGGERS: ADVANTAGES AND DISADVANTAGES FOR INVESTORS

TRIGGER	ADVANTAGES	DISADVANTAGES
Indemnity	• No advantage compared to industry loss or parametric triggers • Moral hazard issue	• Long delay time to calculate loss claims, leading to inefficient secondary trading
Parametric Index	• No moral hazard issue • Possibly more liquid • Quick verification of trigger	• No major disadvantages
Industry-Loss Index	• No moral hazard issue • Possibly more liquid • May provide more rapid verification of trigger than indemnity	• Long delay time needed to verify final PCS number, leading to inefficient secondary trading
Modeled-Loss Index	• No moral hazard issue • Possibly more liquid • May provide more rapid verification of trigger than indemnity	• Reliance on "black box" approach
"Hybrid"	• No moral hazard issue • Depending on hybrid components, possibly more rapid loss verification than industry-loss index triggers	• Complex triggers may make transaction difficult to understand • Certain hybrid triggers may involve an indemnity sub-trigger

Pricing: Variables Affecting Spread

The pricing of catastrophe bonds is affected by numerous variables, one or more of which helps to establish the bond's spread or coupon.

Modeling Results

The main driver of a cat bond's price is the probability of loss as modeled by one of the independent catastrophe-modeling firms (e.g., EQECAT, Inc., AIR Worldwide Corp. or Risk Management Solutions, Inc.). Modeling results are the key drivers of bond ratings, and a price range can be established for a newly issued bond by looking at prices charged for bonds with a similar rating.

Pricing of Similar Transactions

Investors generally evaluate bonds based on precedent issues with similar expected losses, peril exposures, geographic exposures, issue amounts and other features.

Spreads on Secondary Market Securities

The pricing of newly issued cat bonds also takes into account the current pricing of cat bonds traded in the secondary market. The yield on outstanding catastrophe bonds captures the secondary market's current return requirements.

Reinsurance Rates for the Same Layer and Exposure

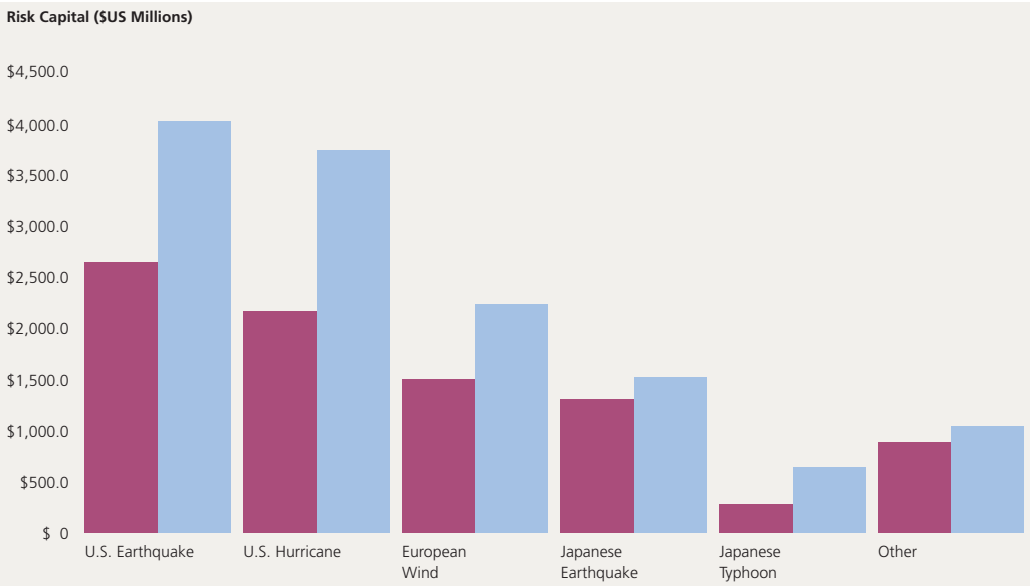
Reinsurance pricing for the same risk that is covered by the cat bond can also influence the bond's pricing. This was particularly true in the early days of the cat bond market, when new investors looked to the reinsurance market for guidance on pricing. Because many of the initial investors were reinsurers, they naturally applied traditional reinsurance pricing views to cat bonds.

Covered Peril Currently in the Market

Investors often try to limit their exposure to any one particular type of risk. A newly issued bond that covers the same risk as bonds currently held by investors will have its pricing adversely affected because investors will demand greater yield to absorb the additional risk concentration. Reinsurers and insurers also take a similar viewpoint when underwriting risks — premiums increase as risks become more concentrated.

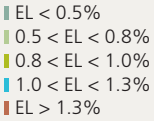
Appendix II: Summary of Catastrophe Bonds Currently Outstanding

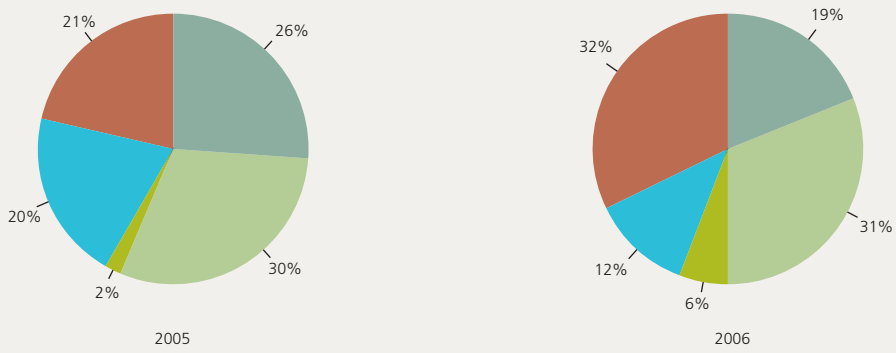
Figure 1: Outstanding Risk Capital by Peril



- Total risk capital at year-end 2005 of $4.90 billion, and at year-end 2006 of $8.48 billion.
- Data as of December 31 of the respective years.
- The total principal amount of bonds covering two or more perils (in which the total principal is exposed) has been included in all the peril categories they cover; therefore, the total figures do not reflect the actual volume of bonds issued.

Figure 2: Outstanding Risk Capital by Expected Loss





- Total risk capital at year-end 2005 of $4.90 billion, and at year-end 2006 of $8.48 billion.
- Data as of December 31 of the respective years.

Appendix III: Summary of Catastrophe Bond Transactions

YEAR OF ISSUE	SPECIAL PURPOSE VEHICLE	SPONSOR	RISK AMOUNT ($ MM)	TRANCHES	RATING	PERIL	RISK LOCATION
1997	Winterthur	Winterthur	6.0	Notes		Hail	Switzerland
1997	SLF Re I	Reliance National	30.0			Multiple	
1997 –	Residential Re I - 1997 –	USAA –	82.0 313.0	Class A-1 Notes Class A-2 Notes	AAA (SP) BB (SP)	Hurricane –	East / Gulf Coast –
1997 – – –	SR Earthquake Fund Ltd. – – –	Swiss Re – – –	25.0 12.0 60.0 15.0	Class A-1 Notes Class A-2 Notes Class B Notes Class C Notes	BBB- (F) BBB- (F) BB (F) BB- (F)	Earthquake – – –	California – – –
1997 –	Parametric Re –	Tokyo Marine & Fire * –	80.0 10.0	Notes Units	BB (F)	Earthquake –	Japan –
1998	SLF Re II	Reliance National	10.0			Multiple	U.S.
1998	SLF Re III	Reliance National	35.0			Multiple	U.S.
1998 –	Trinity Re I, Ltd. –	Centre Solutions (Zurich Re) –	11.0 61.0	Class A-1 Notes Class A-2 Notes	AAA (F) BB (F)	Hurricane –	Florida –
1998	Residential Re II - 1998	USAA	450.0	Notes	BB (F)	Hurricane	East / Gulf Coast
1998	Pacific Re	Yasuda Fire & Marine *	80.0	Notes	BB- (F)	Typhoon	Japan
1998 – –	Mosaic Re I – –	F&G Re (St. Paul) – –	9.0 15.0 21.0	Certificates Class A Notes Class B Notes	AAA (F) BB (F) B (F)	Multiple – –	U.S. – –
1998 –	XL Mid Ocean Swap –	Mid Ocean & X.L. Global Re –	50.0 50.0	Tranche A Tranche B		Multiple –	U.S. –
1998 –	Trinity Re II, Ltd. –	Centre Solutions (Zurich Re) –	2.5 51.6	Class A-1 Notes Class A-2 Notes	AAA (F) BB (F)	Hurricane –	Florida –
1999	Gemini Re, Ltd.	Allianz Risk Transfer	150.0	Notes	BB (F)	Windstorm	Germany
1999	SLF IV	Reliance National	10.0	–	–	Multiple	–
1999 – –	Mosaic Re II – –	F&G Re (St. Paul) – –	1.4 24.3 20.0	Certificates Class A Notes Class B Notes	AAA (F) BB (F) B (F)	Multiple – –	U.S. – –
1999	Halyard Re B.V.	Sorema	17.0	Notes	BB- (F)	Multiple	Euro / Japan
1999 –	Domestic, Inc. –	Kemper –	80.0 20.0	Notes Shares	BB+ (SP)	Earthquake –	New Madrid (U.S.) –
1999	Concentric, Ltd.	Oriental Land Co., Ltd.	100.0	Notes	BB+ (SP)	Earthquake	Japan
1999	Residential Re III - 1999	USAA	200.0	Notes	BB (SP)	Hurricane	East / Gulf Coast
1999	Juno Re	Gerling Global Re	80.0	Notes	BB (SP)	Hurricane	East / Gulf Coast
1999	Namazu Re, Ltd.	Gerling Global Re	100.0	Notes	BB (SP)	Earthquake	Japan
1999 – –	Gold Eagle Capital Ltd. – –	American Re – –	50.0 126.6 5.5	Class A Notes Class B Notes Class B Shares	BBB- (F) BB (F) BB+ (F)	Multiple – –	U.S. – –
2000 – –	Atlas Reinsurance p.l.c. – –	SCOR – –	70.0 30.0 100.0	Class A Notes Class B Notes Class C Notes	BBB+ (SP) BBB- (SP) B (SP)	Multiple – –	U.S. / Euro / Japan – –
2000 –	Seismic Limited –	Lehman Re –	145.5 4.5	Notes Shares	BB+ (SP)	Earthquake –	California –
2000	Halyard Re - 2000	Sorema	17.0	Notes		Multiple	Euro / Japan
2000 –	Alpha Wind 2000 –	Arrow Re/State Farm –	37.5 52.5	Shares Notes	BB (SP) BB+ (SP)	Hurricane –	Florida –
2000	Residential Re IV - 2000	USAA	200.0	Notes	BB+ (SP)	Hurricane	East / Gulf Coast
2000 –	NeHI –	Vesta Insurance –	41.5 8.5	Notes Shares	BB (F)	Windstorm –	Northeast / Hawaii –

SUMMARY OF CATASTROPHE BOND TRANSACTIONS *(continued)*

YEAR OF ISSUE	SPECIAL PURPOSE VEHICLE	SPONSOR	RISK AMOUNT ($ MM)	TRANCHES	RATING	PERIL	RISK LOCATION
2000	Mediterranean Re	AGF	41.0	Class A Notes	BBB+ (SP)	Multiple	Euro
–	–	–	88.0	Class B Notes	BB+ (SP)	–	–
2000	Prime Capital I Hurricane Ltd.	Munich Re	159.0	Notes	BB+ (SP)	Hurricane	NY / Miami
–	–	–	6.0	Shares		–	–
–	–	–	1.5	Units		–	–
2000	Prime Capital II Calquake & EuroWind Ltd.	Munich Re	129.0	Notes	BB (SP)	Multiple	California / Euro
–	–	–	6.0	Class B Shares		–	–
–	–	–	1.5	Units		–	–
2001	Western Capital	Swiss Re	97.0	Notes	BB+ (SP)	Earthquake	California
–	–	–	3.0	Shares		–	–
2001	Gold Eagle Capital 2001 Ltd.	American Re	116.4	Notes	BB+ (SP)	Multiple	U.S.
–	–	–	3.6	Class B Shares		–	–
2001	SR Wind Ltd.	Swiss Re	58.2	Class A-1 Notes	BB+ (SP)	Multiple	U.S. / Euro / P.R.
–	–	–	58.2	Class A-2 Notes	BB+ (SP)	–	–
–	–	–	1.8	Class B-1 Shares	BB (SP)	–	–
–	–	–	1.8	Class B-2 Shares	BB (SP)	–	–
2001	Trinom Ltd.	Zurich Re	60.0	Class A-1 Notes	BB (SP)	Multiple	U.S. / Euro
–	–	–	97.0	Class A-2 Notes	BB+ (SP)	–	–
–	–	–	4.9	Shares	B+	–	–
2001	Residential Re V - 2001	USAA	150.0	Notes	BB+ (SP)	Hurricane	East / Gulf Coast
2001	Redwood Capital I	Lehman Re	160.0	Notes	BB+ (SP)	Earthquake	California
–	–	–	5.0	Pref Shares	BB+ (SP)	–	–
2001	Atlas Reinsurance II p.l.c.	SCOR	50.0	Class A Notes	A- (SP)	Multiple	U.S. / Euro / Japan
–	–	–	100.0	Class B Notes	BB+ (SP)	–	–
2002	Redwood Capital II, Ltd.	Swiss Re	194.0	Notes	BBB- (SP)	Earthquake	California
–	–	–	6.0	Preference		–	–
2002	K3	Hannover Re	230.0			Multiple	U.S. / Euro / Japan
2002	St. Agatha Re Ltd.	Syndicate 33 (Lloyd's)	33.0	Notes	BB+ (SP)	Earthquake	Cal. & New Madrid
2002	Fujiyama Ltd.	Nissay Dowa General Ins Co *	67.9	Notes	BB+ (SP)	Earthquake	Japan
–	–	–	2.1	Pref Shares	BB (SP)	–	–
2002	Residential Re VI - 2002	USAA	125.0	Notes	BB+ (SP)	Hurricane	E / Glf Cst / Hawaii
2002	Pioneer 2002 Ltd.	Swiss Re	93.5	Class A Notes	BB+ (SP)	Hurricane	North Atlantic
–	–	–	76.0	Class B Notes	BB+ (SP)	Windstorm	Europe
–	–	–	66.2	Class C Notes	BB+ (SP)	Earthquake	California
–	–	–	67.3	Class D Notes	BBB- (SP)	Earthquake	Central U.S.
–	–	–	55.6	Class E Notes	BB+(SP)	Earthquake	Japan
–	–	–	28.0	Class F Notes	BB+ (SP)	Multiple	U.S. / Euro / Japan
2002	Studio Re Ltd.	Vivendi Universal	150.0	Notes	BB+ (SP)	Earthquake	Southern Cal.
–	–	–	25.0	Pref Shares	BB (SP)	–	–
2003	Pioneer 2002 Ltd. ('03 tkdwns)	Swiss Re	16.3	Class A Notes	BB+ (SP)	Hurricane	North Atlantic
–	–	–	20.3	Class B Notes	BB+ (SP)	Windstorm	Europe
–	–	–	13.8	Class C Notes	BB+ (SP)	Earthquake	California
–	–	–	59.1	Class D Notes	BBB- (SP)	Earthquake	Central U.S.
–	–	–	8.0	Class E Notes	BB+(SP)	Earthquake	Japan
–	–	–	8.1	Class F Notes	BB+ (SP)	Multiple	U.S. / Euro / Japan
2003	Residential Re 2003	USAA	160.0	Notes	BB+ (SP)	Multiple	U.S.
2003	Phoenix Quake Wind Ltd.	Zenkyoren *	192.5	Notes	BBB+ (SP)	Multiple	Japan
–	Phoenix Quake Ltd.	–	192.5	Notes	BBB+ (SP)	Earthquake	Japan
–	Phoenix Quake Wind II Ltd.	–	85.0	Notes	BBB- (SP)	Multiple	Japan

SUMMARY OF CATASTROPHE BOND TRANSACTIONS *(continued)*

YEAR OF ISSUE	SPECIAL PURPOSE VEHICLE	SPONSOR	RISK AMOUNT ($ MM)	TRANCHES	RATING	PERIL	RISK LOCATION
2003 – – – – –	Palm Capital Ltd. Oak Capital Ltd. Sequoia Capital Ltd. Sakura Ltd. Arbor I Ltd. Arbor II Ltd.	Swiss Re – – – – –	41.4 23.6 22.5 14.7 163.9 26.5	Notes Notes Notes Notes Notes Notes	BB+ (SP) BB+ (SP) BB+ (SP) BB+ (SP) B (SP) A+ (SP)	Hurricane Windstorm Earthquake Earthquake Multiple Multiple	North Atlantic Europe California Japan U.S. / Euro / Japan U.S. / Euro / Japan
2003	Formosa Re	Central Re (TREIP)	100.0	Notes		Earthquake	Taiwan
2003 –	Pylon Ltd. –	Electricite de France –	85.4 146.4	Series A Notes Series B Notes	BBB+ (SP) BB+ (SP)	Windstorm –	France –
2003	Redwood Capital III Redwood Capital IV	Swiss Re –	150.0 200.0	Notes Notes	BB+ (SP) BBB- (SP)	Earthquake –	California –
2004	Oak Capital Ltd. ('04 tkdwns) Sequoia Capital Ltd. ('04 tkdwns) Arbor I Ltd. ('04 tkdwns)	Swiss Re – –	34.5 22.5 85.8	Notes Notes Notes	BB+ (SP) BB+ (SP) B (SP)	Windstorm Earthquake Multiple	Europe California U.S. / Euro / Japan
2004 –	Residential Re 2004 –	USAA –	127.5 100.0	Class A Notes Class B Notes	BB (SP) B (SP)	Multiple –	U.S. –
2004	Helix 04 Limited	Converium Ltd.	100.0	Notes	BB+ (SP)	Multiple	U.S. / Euro / Japan
2004	Gi Capital Ltd.	Unnamed Japanese Insurer *	125.0	Notes	BB+ (SP)	Earthquake	Japan
2004 –	Foundation Re Ltd. –	Hartford Fire Ins. Co. –	180.0 67.5	Class A Notes Class B Notes	BB+ (SP) BBB+ (SP)	Hurricane Multiple	U.S. U.S.
2004	Redwood Capital V Redwood Capital VI	Swiss Re –	150.0 150.0	Notes Notes	BB+ (SP) BB+ (SP)	Earthquake –	California –
2005	Aura Reinsurance p.l.c.	AXA Cessions.	88.4	Notes		Windstorm	Europe
2005	Arbor I Ltd. ('05 tkdwns)	Swiss Re	63.0	Notes	B (SP)	Multiple	U.S. / Euro / Japan
2005 –	Residential Re 2005 –	USAA –	91.0 85.0	Class A Notes Class B Notes	BB (SP) B (SP)	Multiple –	U.S. –
2005	Cascadia Ltd.	FM Global	300.0	Notes	BB+ (SP)	Earthquake	NW U.S.
2005 – –	Avalon Re Ltd. – –	Oil Casualty Insurance, Ltd. – –	135.0 135.0 135.0	Class A Notes Class B Notes Class C Notes	A- (SP) BB+ (SP) B (SP)	Liability – –	Worldwide – –
2005	Kamp Re 2005 Ltd.	Zurich*	190.0	Notes	BB+	Multiple	U.S.
2005 –	Atlantic & Western Re Limited –	PXRE –	100.0 200.0	Class A Notes Class B Notes	BB+ (SP) B+ (SP)	Multiple –	U.S. / Euro –
2005	Aiolos Ltd.	Munich Re	128.7	Notes	BB+ (SP)	Windstorm	Europe
2005 –	Atlantic & Western Re II Limited –	PXRE –	125.0 125.0	Class A Notes Class B Notes	BB+ (SP) BB+ (SP)	Multiple –	U.S. / Euro –
2005 –	Champlain Ltd. –	Montpelier Re –	75.0 15.0	Class A Notes Class B Notes	B- (SP) B+ (SP)	Multiple –	U.S. / Japan U.S.
2006	Australis Ltd.	Swiss Re	100.0	Class A Notes	BB- (SP)	Multiple	Australia
2006 –	Redwood Capital VII Ltd. Redwood Capital VIII Ltd.	Swiss Re –	160.0 65.0	Notes Notes	BB+ (SP) BB+ (SP)	Earthquake –	California –
2006	Foundation Re Ltd.	Harford Fire Ins. Co.	105.0	Class D Notes	BB (SP)	Multiple	U.S.
2006 –	CAT-Mex Ltd. –	FONDEN –	150.0 10.0	Class A Notes Class B Notes	BB+ (SP) BB+ (SP)	Earthquake –	Mexico –
2006	Calabash Re Ltd.	ACE American Insurance Co.*	100.0	Class A Notes	BB (SP)	Hurricane	U.S.
2006 –	Residential Reinsurance 2006 Limited –	USAA –	47.5 75.0	Class A Notes Class C Notes	B (SP) BB+ (SP)	Multiple –	U.S. –

SUMMARY OF CATASTROPHE BOND TRANSACTIONS *(continued)*

YEAR OF ISSUE	SPECIAL PURPOSE VEHICLE	SPONSOR	RISK AMOUNT ($ MM)	TRANCHES	RATING	PERIL	RISK LOCATION
2006	Successor Hurricane Industry Ltd.	Swiss Re	14.0	Class B-I Notes	BB- (SP)	Hurricane	N. Atlantic
–	–	–	7.3	Class C-I Notes	B (SP)	–	–
–	–	–	34.3	Class D-I Notes	B (SP)	–	–
–	–	–	5.0	Class E-I Notes		–	–
–	–	–	54.0	Class F-I Notes	B (SP)	–	–
–	–	–	10.3	Class D-II Notes	B (SP)	–	–
–	–	–	35.0	Class E-II Notes		–	–
–	–	–	50.0	Class E-III Notes		–	–
–	–	–	4.0	Class E-IV Notes		–	–
–	–	–	26.0	Class E-V Notes		–	–
2006	Successor Hurricane Modeled Ltd.	Swiss Re	42.3	Class B-I Notes	BB- (SP)	Hurricane	N. Atlantic
2006	Successor Euro Wind Ltd.	Swiss Re	97.1	Class A-I Notes	BB (SP)	Windstorm	Europe
–	–	–	18.5	Class B-I Notes	BB- (SP)	–	–
–	–	–	3.0	Class A-II Notes	BB (SP)	–	–
–	–	–	110.8	Class C-I Notes	B (SP)	–	–
–	–	–	3.0	Class C-II Notes	BB (SP)	–	–
–	–	–	118.0	Class A-III Notes	BB (SP)	–	–
–	–	–	15.0	Class C-III Notes	B (SP)	–	–
2006	Successor Japan Quake Ltd.	Swiss Re	103.5	Class A-I Notes	BB (SP)	Earthquake	Japan
–	–	–	26.3	Class B-I Notes	BB- (SP)	–	–
–	–	–	70.8	Class C-I Notes	B (SP)	–	–
–	–	–	3.0	Class C-II Notes	B (SP)	–	–
2006	Successor Cal Quake Parametric Ltd.	Swiss Re	47.5	Class A-I Notes	BB (SP)	Earthquake	California
2006	Successor I	Swiss Re	4.0	Class B-I Notes		Multiple	U.S. / Euro. / Jap.
–	–	–	24.5	Class B-II Notes		–	–
2006	Successor II Ltd.	Swiss Re	73.2	Class A-I Notes	B (SP)	Multiple	U.S. / Euro. / Jap.
–	–	–	154.3	Class E-I Notes		–	–
2006	Successor III Ltd.	Swiss Re	7.2	Class A-I Notes		Multiple	U.S. / Euro. / Jap.
2006	Successor IV Ltd.	Swiss Re	30.0	Class A-I Notes	B (SP)	Multiple	U.S. / Euro.
2006	Carillon Ltd.	Munich Re	51.0	Class A-I Notes	B+(SP)	Hurricane	U.S.
–	–	–	23.5	Class A-II Notes	B+ (SP)	–	–
–	–	–	10.0	Class B Notes	B (SP)	–	–
2006	Mystic Re Ltd.	Liberty Mutual	200.0	Class A-I Notes	BB+ (SP)	Hurricane	U.S.
–	–	–	200.0	Class A-II Notes	BB+ (SP)	–	–
–	–	–	125.0	Class B-I Notes	BB (SP)	–	–
2006	VASCO Re 2006 Ltd.	Balboa	50.0	Class C Notes	BB+ (SP)	Hurricane	U.S.
2006	DREWCAT Capital, Ltd.	Dominion Resources	50.0	Class A Notes	BB- (SP)	Hurricane	U.S.
2006	Eurus Ltd.	Hannover Re	150.0	Class A Notes	BB (SP)	Windstorm	Europe
2006	Shackleton Re Ltd.	Endurance Specialty	125.0	Class A Notes		Earthquake	U.S.
–	–	–	50.0	Class B Notes**		Hurricane	U.S.
–	–	–	60.0	Class C Notes**		Multiple	U.S.
2006	Fhu-Jin Ltd.	Tokyo Marine & Fire *	200.0	Class B Notes	BB (SP)	Typhoon	Japan
2006	Cascadia II Limited	FM Global	300.0	Class A Notes	BB+ (SP)	Earthquake	U.S.
2006	Foundation Re II Ltd.	Hartford Fire Ins. Co.	180.0	Class A Notes	BB+ (SP)	Hurricane	U.S.
–	–	–	67.5	Class G Notes	B (SP)	Multiple	–
2006	Bay Haven Limited	Catlin Insurance Company	133.5	Class A Notes	AA (SP)	Multiple	U.S. / Euro. / Jap.
–	–	–	66.8	Class B Notes	BBB- (SP)	–	–
2006	Lakeside Re Ltd.	Zurich***	190.0	Notes	BB+(SP)	Earthquake	U.S.
2006	Atlas Reinsurance III p.l.c.	SCOR	157.2	Notes	BB+ (S&P)	Multiple	Euro / Japan
2006	Redwood Capital IX	Swiss Re	125.0	Class A Notes	BB (Composite)	Earthquake	U.S.
–	–	–	125.0	Class B Notes	BB (Composite)	–	–
–	–	–	18.0	Class C Notes	BBB- (Composite)	–	–
–	–	–	20.0	Class D Notes	BB- (Composite)	–	–
–	–	–	12.0	Class E Notes	B- (Composite)	–	–

** Sponsored through Swiss Re*
*** Packaged as bank loans*
**** Sponsored through Munich Re*

Appendix IV: Sidecars — An Overview of Structure and Summary of 2006 Transactions

2006 in Review

As previously mentioned, the catastrophic loss activity of 2004 and 2005 had a far-reaching impact on the reinsurance industry. Among other effects, the catastrophe losses directly reduced the capital base against which insurers and reinsurers write business; the magnitude of the losses (and frequency of the storms) prompted modeling agencies to re-examine and update their cat models; and finally, rating agencies, concerned over insurer and reinsurer credit quality in a more catastrophically active world, elected to increase the capital required to support a given credit rating. These effects collectively contributed to a significant increase in property catastrophe reinsurance rates, particularly for U.S. East and Gulf Coast wind exposures. In order to create replacement surplus to capitalize on this favorable pricing environment many reinsurers and, in one case, an insurer, elected to sponsor sidecar facilities. Over the course of 2006, 12 sidecar transactions were completed. In total, these transactions provided $2.91 billion of capacity to 10 transaction sponsors (additional detail on these transactions is provided in Table 1). These transactions, the mechanics of which are addressed within this appendix, proved to be a valuable capacity creation tool for the industry over the course of the year.

Background

Sidecars[7] are special purpose-entities formed and capitalized for the exclusive purpose of providing additional reinsurance/retrocessional capacity — typically on a collateralized quota-share basis — to a single sponsor/cedent.

While the notion of a securitized quota share is certainly far from new, the burst of transaction activity and media coverage during 2006 — and the increasing ability for capital markets investors to choose between catastrophe bonds, sidecars, industry loss warranties or other deployment structures when making investment decisions — makes an understanding of sidecar rationale and mechanics a critical subcomponent of a full understanding of the insurance securitization space in general.

Sidecar transactions, which typically have a duration of less than two years, allow a sponsor to quickly and in a cost-effective manner increase its underwriting capacity at opportune times. The increased capacity, when needed most, allows a sponsor to maintain its ability to consistently provide meaningful amounts of capacity to its clients, which has important long-run competitive benefits. In addition, sidecar transactions (discussed in more detail below) generally allow the sponsor to earn fee income by effectively renting its underwriting expertise in exchange for an administration fee, ceding commissions and/or profit sharing. Importantly, from the sponsor's perspective, capital provided by a sidecar is generally not consolidated, and therefore, to the extent that the business written is profitable, the sidecar will have a favorable effect on the sponsor's profitability and efficiency ratios.

From an investor's perspective, the sidecar structure allows access to specific lines of business, perils and geographies, potentially in large investment amounts, during intervals of the pricing cycle that are expected to be profitable. Investors are able to benefit from the underwriting track record and expertise of the sponsor's underwriting team, as well as the existing institutional relationships that the sponsor has developed, usually over several years (these difficult to replicate relationships provide access to potentially lucrative premium flow). The planned limited lifespan of most sidecar transactions provides (assuming the business is profitable) a guaranteed liquidity event known at transaction inception. Finally, relative to alternative avenues for accessing comparable types of business and risk levels, the start-up expenses associated with setting up a sidecar tend to be quite low.

[7]The term "sidecar" evolved as a shorthand way of characterizing the relationship between the special-purpose entity and the sponsor/cedent. In this type of structure, the special-purpose entity passively sits alongside the sponsor, conceptually, in similar fashion to the manner in which a sidecar attachment sits alongside a motorcycle.

Key Parties and Basic Transaction Mechanics

As illustrated in Figures 1 and 2, sidecars involve fairly straightforward mechanics.

Key parties and roles include:

- The sponsor/cedent — This entity is a professional insurer or reinsurer. Its role in the transaction is to source, underwrite and cede business that will comprise the subject business for the sidecar in accordance with parameters stipulated by the quota-share agreement. During the course of the transaction, the sponsor will also handle the administration of claims and losses.

- The sidecar facility — A virtual company that exists to provide collateralized reinsurance coverage to the sponsor/cedent. Assets generally consist solely of (i) premium ceded by the sponsor company and (ii) funding provided by debt and equity capital providers.

- The equity capital provider — The equity capital supplies funding that provides collateralization for losses ceded to the sidecar in excess of the ceded premium and up to the attachment point of the debt layer(s) or, if debt is not part of the sidecar capital structure, up to the total limit provided by the sidecar facility.

- The debt capital provider (if debt is included in the sidecar capital structure) — The debt capital provider supplies funding that provides collateral for losses ceded to the sidecar in excess of the equity capital amount up to the total limit provided by the sidecar facility. Sidecar debt layers typically attach at or above the 1/100 return period (roughly equivalent BB+ rating from S&P) and continue up through the limit of the sidecar capital structure.

Basic Transaction Mechanics

At the inception (or over the course) of a defined risk period the sponsor/cedent will bind business for which it will cede a portion of the premiums and responsibility for loss payments to the sidecar. Typically, from the gross premium received from its insureds, the sponsor will deduct a ceding commission or administration expense that is used to defray the origination and underwriting expenses it incurs. In addition to this upfront fee, the sponsor will commonly receive a profit commission to the extent that the business it cedes to the sidecar facility is profitable; this profit-sharing mechanism is helpful in maintaining interest alignment between the sponsor and capital providers.

After deducting transaction expenses, the total external funding required is generally the difference between (i) the sponsor's selected return period collateralization level and (ii) the premiums ceded into the sidecar facility. The total external funding amount can be segregated into debt and equity components. Generally, prospective equity providers will encourage the maximum use of leverage in order to amplify equity returns.

At the conclusion of the risk period, and usually a limited loss development period, equity providers are returned the entirety of the facility funding after deducting loss payments, sponsor profit commission and interest owed to debt holders.

Figure 1: Typical Sidecar Transaction Structure

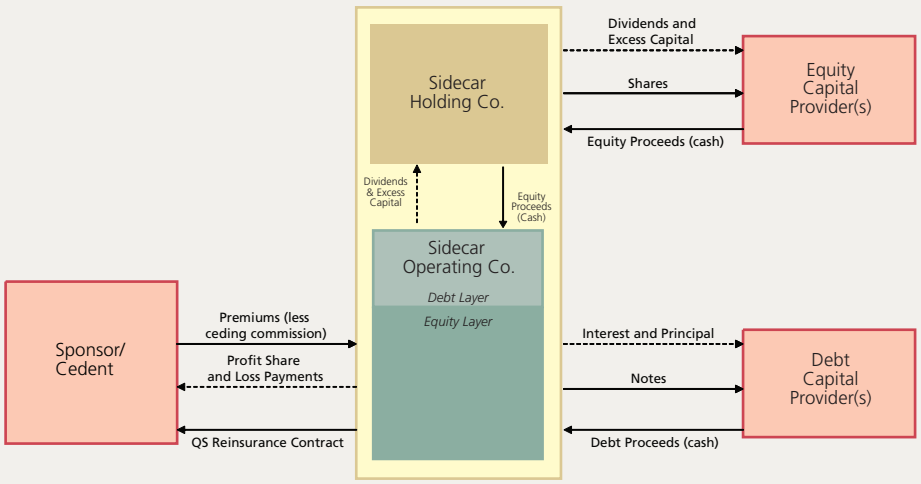
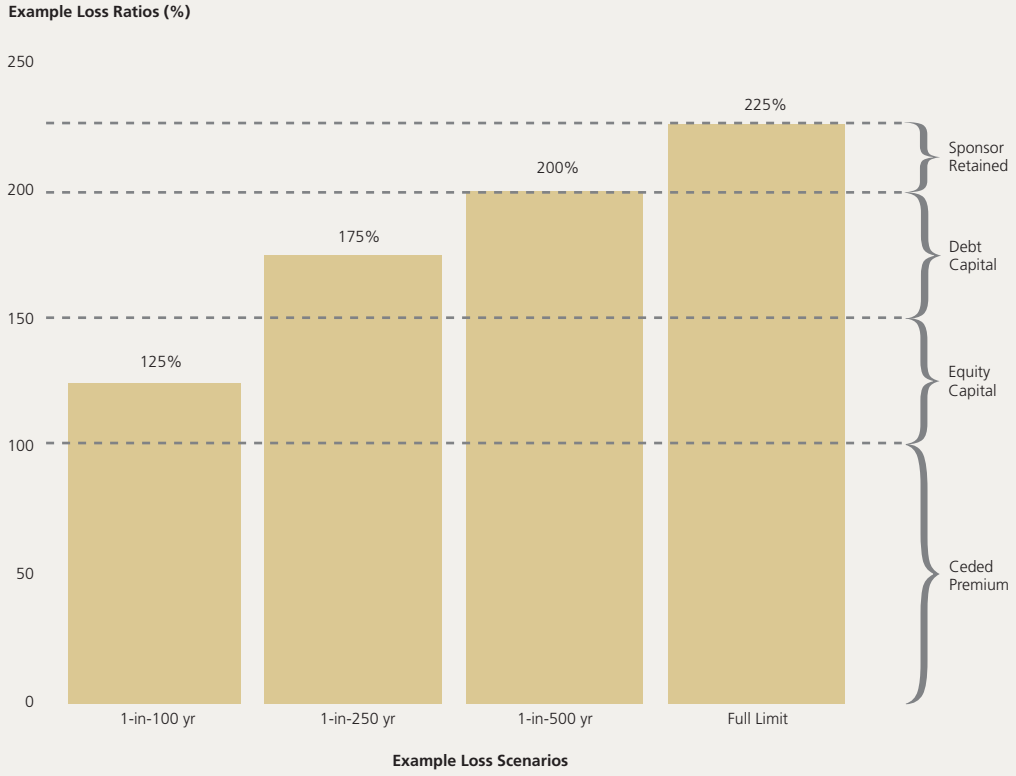


Figure 2: Example Sidecar Financial Responsibility Spectrum



2006 SIDECAR SUMMARY OF TRANSACTIONS

VEHICLE NAME	SPONSOR	CAPITALIZATION (US$,M)			COMMENTARY
		COMMON EQUITY	DEBT/NON-EQUITY	TOTAL	
Bay Point Re	Harborpoint	125.0	125.0	250.0	U.S. property catastrophe business
Concord Re	Lexington Insurance	375.0	375.0	750.0	Primary insurer sponsored transaction
Helicon Re	White Mountains	145.0	185.0	330.0	Capacity for Folksamerica short-tail business
Monte Forte Re	Flagstone Re	60.0	-	60.0	ILWs and peak zone exposures
Panther Re	Hiscox	144.0	216.0	360.0	40% quota share of synd. 33 property cat business
Petrel Re	Validus Re	200.0	-	200.0	Marine / Offshore energy business
Sirocco Re	Lancashire Re	95.0	-	95.0	Gulf of Mexico offshore energy business
Starbound Re	Rennaissance Re	127.0	184.0	311.0	Florida property catastrophe business
Stoneheath Re	XL Re	300.0	-	300.0	Offers "contingent capital" to XL companies
Timicuan Re	Rennaissance Re	50.0	20.0	70.0	
Triomphe Re	Paris Re	121.0	64.0	185.0	24% share of Paris Re 2007 property cat business
2006 TOTALS		**COMMON EQUITY**	**DEBT/NON-EQUITY**	**TOTAL**	
Capital raised		$1,742.0	$1,169.0	$2,911.0	
Aggregate debt to equity ratio				0.67x	
Transaction count				12	

- Broken out by equity and non-equity when data is available.
- Sources: Bear Stearns Equity Research, A.M. Best & Company, Inc., The Insurance Insider, *Guy Carpenter & Company, LLC.*

Appendix V: Extreme Mortality Transactions — An Overview of Structure and Summary of Transactions

2006 in Review

The substantial increase in capital markets transaction activity during 2006 was not limited to the property and casualty sector. Extreme mortality risk was another area in which securitization mechanics continued to be applied to address sponsor capacity needs. The first disclosed extreme mortality securitization occurred in 2003, with the $400 million Vita Capital Ltd. transaction (sponsored by Swiss Re). In 2005, Swiss Re followed up with Vita Capital II, which provided $362 million of capacity through three separate tranches. During 2006, two extreme mortality bonds were issued, providing $598.5 million of risk protection for the transaction sponsors. (Details on all of these transactions are provided in Table 1). While it is too early to tell if there will be an explosion of extreme mortality issuance in coming years — the main inhibitors include the fact the these transactions, in their current form, rely entirely on high-resolution demographic and mortality data that is only available in highly developed countries. With the exception of the limited number of sponsors who enjoy highly diversified books of business, there can be a significant amount of basis risk — what is clear is that the rising tide of insurance securitization transactions seems to have a tendency to raise all boats. It is certain that in the coming years there will continue to be additional work done in this area, which is likely to lead to an increase in the number of transactions completed.

Basic Transaction Mechanics

Extreme mortality transactions essentially allow life insurers and reinsurers to shed exposure to extreme (peak) mortality risk. If, over the transaction risk period, mortality rates in the subject regions spike (e.g., due to a pandemic, war or terrorist event), investors will forfeit bond principal as it will be released to the transaction sponsor in order to help fund claim payments the sponsor will likely have to make to its life insurance policyholders. Notably, these transactions, because they are based exclusively on population death rate data and are mostly unaffected by cause of death, are able to provide capacity for terrorism and pandemic risks (such as the so-called bird flu); coverages that are typically excluded from traditional reinsurance polices.

From both a conceptual and mechanical point of view extreme mortality bonds bear a strong resemblance to typical parametrically triggered catastrophe bonds (structure shown in Figure 1 on page 25). Although an indemnity-based transaction is theoretically possible, to date, only bonds utilizing parametric index triggers have been successfully brought to market. These transactions, therefore, involve basis risk to the sponsor as bond payout is not directly linked to actual sponsor sustained loss experience.

Trigger Discussion

The parametric index triggers for these transactions typically rely on an average death rate per 100,000 lives for the subject country or countries. Through various weighting mechanisms, these triggers are calibrated to appropriately reflect considerations such as gender, age and country of residence of the underlying populations.

A recent year (or short span of years) for which data is available is identified, the index value for the selected period is calculated and declared as the base index value. Over the course of the transaction period, the index value is recalculated using the observed mortality experience in the subject country or countries. Bond principal payout is determined based on the magnitude of the deviation between the base year index value and the observed year index value. For example, it could be the case that in the event that the index value in the observed year is equal to 120 percent of the base year index value, the bond will attach and principal reduction will commence. Principal reduction in these transactions is typically linear, with the amount of principal paid out being proportional to the calculated index value, up to an exhaustion amount (as opposed to a binary structure).

SUMMARY OF EXTREME MORTALITY BOND TRANSACTIONS

YEAR OF ISSUE	SPECIAL PURPOSE VEHICLE	SPONSOR	RISK AMOUNT ($ MM)	TRANCHES	RATING	PERIL	RISK LOCATION
2003	Vital Capital Ltd.	Swiss Re	400.0	Notes	A+ (S&P)	Extreme Mortality	U.S./UK/France/ Italy/Switzerland
2005	Vital Capital II Ltd.	Swiss Re	62.0	Class B Notes	A (S&P)	Extreme Mortality	U.S./UK/France/ Italy/Switzerland
–	–	–	200.0	Class C Notes	A- (S&P)	–	–
–	–	–	100.0	Class D Notes	BBB (S&P)	–	–
2006	Tartan Capital Ltd.	Scottish Re	75.0	Class A Notes	AAA (S&P)	Extreme Mortality	U.S.
–	–	–	80.0	Class B Notes	BB (S&P)	–	–
2006	Osiris Capital p.l.c.	AXA	129.0	Class B-1 Notes	AAA (S&P)	Extreme Mortality	U.S./France/Japan
–	–	–	64.5	Class B-2 Notes	A- (S&P)	–	–
–	–	–	150.0	Class C Notes	BBB (S&P)	–	–
–	–	–	100.0	Class D Notes	BB+ (S&P)	–	–

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