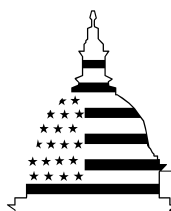


September 2003

CATASTROPHE INSURANCE RISKS

Status of Efforts to Securitize Natural Catastrophe and Terrorism Risk



G A O

Accountability * Integrity * Reliability



Highlights of [GAO-03-1033](#), a report to the Chairman, House Committee on Financial Services, the Chairman, Subcommittee on Capital Markets, Insurance, and Government Sponsored Enterprises, and House Members

Why GAO Did This Study

In addition to potentially costing hundreds or thousands of lives, a natural or terrorist catastrophe in the United States could place enormous financial demands on the insurance industry, businesses, and taxpayers. Given these financial demands, interest has been raised in bonds that are sold in the capital markets and thereby diversify catastrophe funding sources. GAO was asked to update a 2002 report on "catastrophe bonds" and assess (1) their progress in transferring natural catastrophe risks to the capital markets, (2) factors that may affect the issuance of catastrophe bonds by insurance companies, (3) factors that may affect investment in catastrophe bonds, and (4) the potential for and challenges associated with securitizing terrorism-related financial risks.

GAO does not make any recommendations in this report.

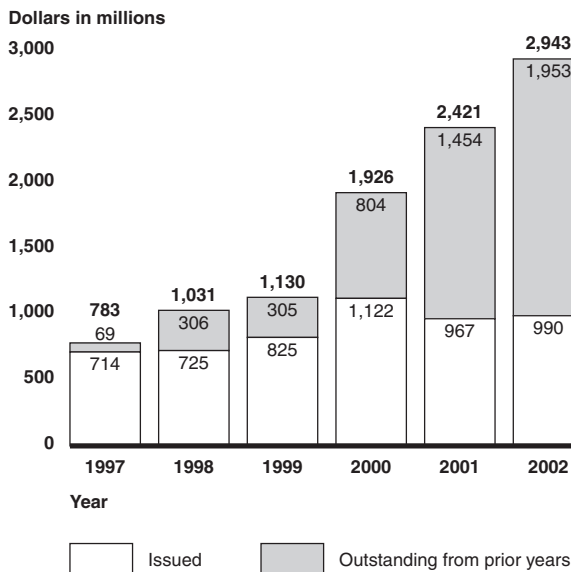
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What GAO Found

The market for catastrophe bonds, as discussed in our 2002 report, has transferred a small portion of natural catastrophe risk to the capital markets. From 1997 through 2002, a private firm has estimated that a total of 46 catastrophe bonds were issued or about 8 per year. Another firm estimated that the nearly \$3 billion in catastrophe bonds outstanding for 2002 (see figure) represented 2.5 to 3.0 percent of the worldwide catastrophe reinsurance market. Some insurance and reinsurance companies issue catastrophe bonds because they allow for risk transfer and may lower the costs of insuring against the most severe catastrophes. However, other insurers do not issue catastrophe bonds because their costs are higher than transferring risks to other insurers. Although some investors see catastrophe bonds as an attractive investment because they offer high returns and portfolio diversification, others believe that the bonds' risks are too high or too costly to assess. To date, no catastrophe bonds related to terrorism have been issued covering potential targets in the United States, and the general consensus of most experts GAO contacted is that issuing such securities would not be practical at this time due in part to the challenges of predicting the frequency and severity of terrorist attacks.

Catastrophe Bond Issuance and Amount Outstanding (1997-2002)



Source: GAO, based on data provided by Swiss Re Capital Markets.

Note: Totals shown in bold above each bar represent the amount outstanding at end of year.

www.gao.gov/cgi-bin/getrpt?GAO-03-1033.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Davi M. D'Agostino at (202) 512-8678 or dagostinod@gao.gov.

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Abbreviations

BMA	Bond Market Association
CDO	Collateralized Debt Obligation
CEA	California Earthquake Authority
DEP	Direct Earned Premium
FASB	Financial Accounting Standards Board
FHCF	Florida Hurricane Catastrophe Fund
FIFA	Federation Internationale de Football Association
LIBOR	London Interbank Offered Rate
NAIC	National Association of Insurance Commissioners
RAA	Reinsurance Association of America
S&P	Standard & Poors
SEC	Securities and Exchange Commission
SPE	special purpose entity
SRPV	special purpose reinsurance vehicle
TRIA	Terrorism Risk Insurance Act
TWIA	Texas Windstorm Insurance Association
USAA	United Services Automobile Association
VIE	variable interest entities

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United States General Accounting Office
Washington, D.C. 20548

September 24, 2003

The Honorable Michael G. Oxley
Chairman, Committee on Financial Services
House of Representatives

The Honorable Richard H. Baker
Chairman, Subcommittee on Capital Markets,
Insurance, and Government Sponsored Enterprises
House of Representatives

The Honorable Steve Israel
The Honorable Brad Sherman
The Honorable Dave Weldon
House of Representatives

In addition to potentially costing hundreds or thousands of lives, a natural or terrorist catastrophe in the United States could place enormous financial demands on the insurance industry, businesses, and taxpayers. According to insurance industry estimates, a major hurricane striking densely populated regions of the United States could result in losses as high as \$110 billion, a major earthquake could cause losses as high as \$225 billion, and both types of events would generate serious financial difficulties for some insurance companies. Further, the September 11, 2001, terrorist attacks resulted in an estimated \$80 billion in losses—about half of which was insured—and another large scale attack or series of attacks has the potential for similar results. With the passage of the Terrorism Risk Insurance Act of 2002 (TRIA), the federal government assumed potential liability of \$100 billion in terrorism-related losses annually (until the act expires in 2004, but may be extended through 2005).¹

Given the enormous financial losses associated with such catastrophes and concerns about the capacity of the insurance industry to cover

¹TRIA provides coverage for certified acts of terrorism. The program is triggered when there has been an act committed on behalf of any foreign person or foreign interest that results in at least \$5 million in insured losses in the United States. In the event of an act of terrorism, the federal government, insurers, and policyholders share the risk of loss. The federal government is responsible for paying 90 percent of each insurer's primary property and casualty losses after an insurer's exposure exceeds 7 percent of its direct earned premium (DEP) in 2003, 10 percent of its DEP in 2004, or 15 percent of its DEP in 2005. Federal funds paid out under the program are capped at \$100 billion for each program year.

catastrophes without dramatic increases in premium prices or reductions in coverage, interest has been generated in transferring some of these risks to the capital markets, which had a total value of about \$29 trillion as of the end of the first quarter of 2003.² Since the mid-1990s, some insurance companies, reinsurance companies, and capital market participants have developed financial instruments called risk-linked securities that transfer various insurance-related risks to the capital markets. The largest category of these instruments are called catastrophe bonds and, due to their size in the marketplace, are the subject of this report.³ Risk-linked securities—such as catastrophe bonds—can offer a relatively high rate of return to investors who are willing to accept some of the substantial financial risks associated with such disasters. Last year we reported on the risks of natural catastrophes; the structure of risk-linked securities—particularly catastrophe bonds; and regulatory, accounting, tax, and investor factors potentially affecting the use of such securities.⁴

Because of your continuing concerns about the potential costs to the federal government associated with natural and terrorist catastrophes and interest in diversifying the potential funding sources to cover such risks, you asked that we update our 2002 report. Specifically, you asked that we (1) assess the progress of catastrophe bonds in transferring natural catastrophe risks to the capital markets; (2) assess factors that may affect the issuance or sponsorship of catastrophe bonds by insurance and reinsurance companies, including a status report on accounting issues raised in our previous report; (3) assess factors that may affect investment

²This figure represents the value of U.S. Treasury securities, agency securities, municipal securities, corporate and foreign bonds, and corporate equities as of March 31, 2003. The source is the Federal Reserve Flow of Funds data.

³Catastrophe bonds are an example of a class of securities called risk-linked securities, which include quota share transactions, life insurance securities, catastrophe options, and other insurance related financial instruments. This report focuses on catastrophe bonds, which are privately placed securities sold to qualified institutional investors as defined under Securities and Exchange Commission Rule 144A. In general, a qualified institutional investor under Rule 144A owns and invests on a discretionary basis at least \$100 million in securities of issuers that are not affiliated with the investor.

⁴See U.S. General Accounting Office, *Catastrophe Insurance Risks: The Role of Risk-Linked Securities and Factors Affecting Their Use*, [GAO-02-941](#) (Washington, D.C.: Sept. 24, 2002) and U.S. General Accounting Office, *Catastrophe Insurance Risks: The Role of Risk-Linked Securities*, [GAO-03-195T](#) (Washington, D.C.: Oct. 8, 2002). These products focused primarily on catastrophe bonds but also mentioned other risk-linked securities.

in catastrophe bonds, and (4) analyze the potential for and challenges associated with securitizing terrorism-related financial risks.⁵

During our follow-up work, we contacted representatives from primary insurance companies and reinsurance companies, investment banks that underwrite catastrophe bonds, rating agencies, hedge funds that purchase catastrophe bonds, large mutual fund companies, accounting firms, firms that model natural catastrophe and terrorism risk, a state insurance regulator representing the National Association of Insurance Commissioners (NAIC), and state natural catastrophe authorities in Texas and California.⁶ We obtained data on the financial risks associated with natural catastrophes and terrorism as well as the issuance of catastrophe bonds from 1997 to 2002. We did not test the reliability of data we obtained from the private sector. We asked officials whom we contacted to provide their views on the development and potential of the market for catastrophe bonds. We conducted our work between March and August 2003 in New York, Massachusetts, Ohio, Illinois, Pennsylvania, Texas, and Washington, D.C. A more extensive discussion of our scope and methodology is in appendix I.

⁵The financial industry has developed instruments through which primary financial products, such as lending or insurance, can be funded in the capital markets. Lenders and insurers continue to provide the primary products to the customers, but these financial instruments allow the funding of the products to be “unbundled” from the lending and insurance business; instead, the funding comes from securities sold to capital market investors. This process, called securitization, can give insurers access to the resources of the capital markets.

⁶Primary insurance companies can purchase insurance for some or all of their risks from reinsurance companies. Additionally, reinsurance companies can purchase insurance for some or all of their risks from other insurance companies (a process known as retrocessional coverage). In the securitization process, ratings agencies, such as Standard & Poors, Moody’s, and Fitch, typically assign ratings to securities that are sold to the public or in private placements.

Results in Brief

Private sector data indicate that the market for catastrophe bonds, as discussed in our 2002 report, has to date transferred a small portion of insurers' natural catastrophe risk to the capital markets. According to Marsh and McLennan Securities, from 1997 through 2002, 46 catastrophe bonds were issued (about 8 per year).⁷ According to Swiss Reinsurance Company (Swiss Re) Capital Markets, there were nearly \$3 billion in catastrophe bonds outstanding at the end of 2002. Swiss Re also estimated that outstanding catastrophe bonds represented about 2.5 to 3.0 percent of worldwide catastrophe reinsurance coverage in 2002.⁸

Although catastrophe bonds played an important role for some insurance companies and reinsurance companies, representatives from other insurers and financial market participants said that the costs associated with the bonds and other factors have limited their use.⁹ Some insurance and reinsurance companies used catastrophe bonds as a supplement to traditional approaches to managing natural catastrophe risks—such as reinsurance and limiting coverage in high-risk areas. Representatives from one insurance company also told us that the bonds lower the costs associated with providing coverage for the most severe types of catastrophic risks.¹⁰ However, representatives from two large insurance companies we contacted, two state authorities that offer natural catastrophe coverage, and financial market participants said that the total

⁷Our previous report stated that there had been some 70 risk-linked securities issued by August 2002. We report a lower number this time because our report focuses on catastrophe bonds.

⁸The reinsurance market represents that portion of their exposure that primary insurance companies have decided to transfer from their books. In our previous report, we reported that Swiss Re estimated that catastrophe bonds accounted for 0.5 percent of the worldwide catastrophe market. The 0.5 percent figure represented Swiss Re's estimate of the amount of reinsurance premiums that insurers dedicate to fund catastrophe bonds (see Background) as compared to the total amount of reinsurance premiums paid to cover catastrophe risks. Swiss Re officials said that the premium measure is also an appropriate measure of catastrophe bond's presence in the worldwide catastrophe insurance market and that the 0.5 percent figure had not changed as of December 31, 2002.

⁹Although technically the initiator of the catastrophe bond transaction—the insurance company, reinsurance company, or noninsurance company—is different from the special purpose reinsurance vehicle that issues the catastrophe bond (see Background), for the purpose of simplicity, we use the terms “issue” or “issuer” in this report to describe organizations that initiate catastrophe bonds.

¹⁰Natural catastrophes—such as hurricanes or earthquakes—of such severity that they are only expected to occur every 100 to 250 years.

costs of catastrophe bonds—including relatively high rates of return paid to investors and administrative costs—significantly exceed the costs associated with purchasing reinsurance coverage. On the other hand, some financial market participants question the insurers’ analysis of the costs associated with catastrophe bonds. For example, investment bank officials said that the insurers’ analysis failed to account for the fact that many reinsurance companies have experienced financial difficulties and may not be able to meet their obligations if a catastrophe occurs.¹¹

We found that NAIC is still considering one statutory accounting issue discussed in our previous report that potentially affects the use of catastrophe bonds, while the potential effects of a separate accounting issue remain unclear.¹² The first issue concerned the differing statutory accounting standards that apply to traditional reinsurance and to certain financial instruments, which can include certain types of catastrophe bonds.¹³ Current statutory accounting standards allow insurers that purchase traditional reinsurance to reflect the transfer of risk in financial reports that they file with state insurance regulators and thereby improve their stated financial condition, which may make the insurers more willing to write additional policies. However, this accounting treatment is not currently permitted for certain financial instruments—including certain catastrophe bonds—because these instruments have not been viewed as comparable to reinsurance. Although one NAIC committee has approved a proposal that would allow similar accounting treatment for these instruments under specified conditions, another NAIC committee has not

¹¹Due to the costs associated with the September 11, 2001, terrorist attacks and declines in worldwide stock markets, several reinsurance companies—particularly those headquartered in Europe—have experienced declining credit quality since 2000. Some financial analysts believe that potential reinsurer defaults during a catastrophe are costs that need to be considered in comparing catastrophe bonds to reinsurance.

¹²NAIC establishes statutory accounting standards for insurance companies that may be adopted by states and their insurance regulators. Statutory accounting standards may differ from U.S. generally accepted accounting principles.

¹³Current statutory accounting allows an insurance company that has obtained traditional reinsurance or issues indemnity based catastrophe bonds to reflect this transfer of risk on the financial statements that it files with state insurance regulators. By obtaining this accounting treatment, insurance companies may be more willing to write additional policies. However, current statutory accounting standards do not allow similar accounting treatment for nonindemnity based instruments that hedge insurance risk, which can include nonindemnity based catastrophe bonds, because such instruments have not been viewed as comparable to reinsurance or indemnity based catastrophe bonds. See this report and appendix II for a detailed discussion.

approved the proposal.¹⁴ The second accounting issue—a 2002 proposal by the Financial Accounting Standards Board (FASB) that could have limited the appeal of catastrophe bonds—has been revised.¹⁵ Accounting firms and other financial market participants said that it was not clear (as of the date of this report) what effects FASB’s revised guidance—would have on catastrophe bonds. Although the revised guidance could make catastrophe bonds less attractive to issuers and investors, it remains to be seen how the guidance will be interpreted and implemented.¹⁶

Representatives from institutional investors—such as pension and mutual funds—we contacted provided mixed views on the purchase of catastrophe bonds. Some institutions favored catastrophe bonds because of their relatively high rates of return and usefulness in diversifying investment portfolios. However, because of the risks associated with catastrophe bonds, the institutions said that they limited their investments in the bonds to no more than 3.0 percent of their total portfolios. Representatives from several other institutional investors—such as some large mutual funds—said that they avoided purchasing catastrophe bonds altogether because of their perceived risks or because it would not be cost-effective for them to develop the technical capacity to analyze the risks of securities so different from the securities in which they currently invested. Some large mutual fund representatives also told us that they were not willing to purchase catastrophe bonds because of their relative illiquidity when compared with traditional bonds and equities.¹⁷

Catastrophe bonds involving terrorism risks have not been issued by insurers to cover targets in the United States, and insurance industry and

¹⁴NAIC is considering a proposal that would allow similar accounting treatment for financial instruments that effectively hedge insurers’ risks. This issue is discussed in more detail in this report.

¹⁵FASB is a private body that establishes accounting and auditing rules under generally accepted accounting principles. FASB’s Interpretation No. 46, clarifies accounting policy for special purpose entities to improve financial reporting and disclosure by companies using these entities. See this report and appendix III for a detailed discussion.

¹⁶As discussed in this report, consolidation could make insurers less willing to issue catastrophe bonds. We note that while consolidation may be required under generally accepted accounting principles it is not required under NAIC’s statutory accounting standards.

¹⁷In an illiquid market, securities cannot be converted into cash easily or without incurring a substantial reduction in the price of the security.

financial market participants we contacted noted that issuing such a security would be challenging. One challenge involves developing statistical models to predict with some certainty the frequency and severity of terrorist attacks. Developing such models would be difficult because terrorist attacks may be influenced by a wide variety of factors that may be difficult to quantify or predict. These factors include terrorist intentions, the ability of terrorists to enter the United States, target vulnerability, types of weapons that may be used, and the effectiveness of the efforts to prevent terrorist acts. Nevertheless, several modeling firms are developing models that were being used to assist insurers in providing terrorism insurance. However, the view of most financial market participants we contacted was that the models are too new and untested to support catastrophe bonds related to terrorism. Moreover, investor concerns about the risks associated with catastrophe bonds covering terrorism in the United States might also make the costs associated with issuing securities related to terrorism prohibitive. For example, investors might not believe that they have sufficient information about insurers' underwriting standards and efforts to limit the insurer's financial exposure to terrorism. Consequently, investors might demand a "risk-premium" to invest in a security related to terrorism that would be above the rate that insurance companies would be willing to pay.

We are not making any recommendations in this report.

We provided a draft of this report to NAIC, the Bond Market Association (BMA), and the Reinsurance Association of America (RAA), which are reprinted in appendixes V, VI, and VII respectively. We also received technical comments from these organizations, which have been incorporated where appropriate. In general, these organizations commented that the draft report provided a fair and useful analysis of efforts to securitize natural catastrophe and terrorism risks. However, BMA and RAA also disagreed with certain aspects of our analysis. Our evaluations of the NAIC, BMA, and RAA comments are discussed later in this report and in appendixes V, VI, and VII.

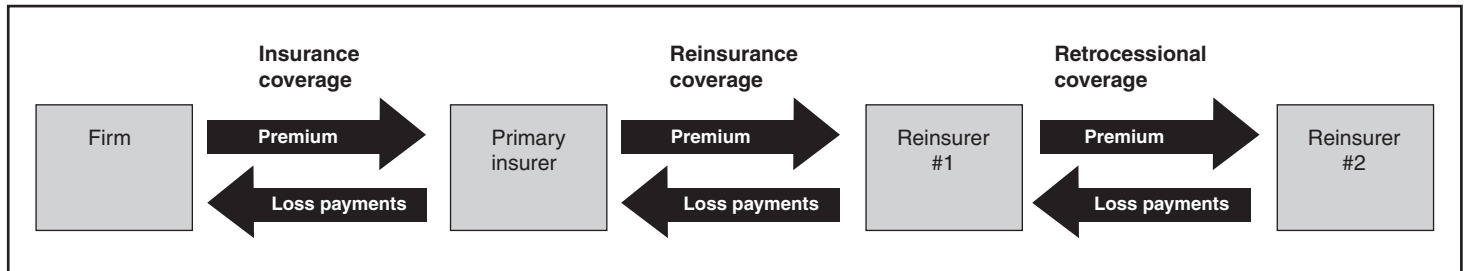
Background

This section provides an overview of (1) insurance coverage for natural and terrorist catastrophe risk and (2) the complex structure of natural catastrophe bonds.

Overview of Natural and Terrorist Catastrophe Insurance Coverage

The insurance industry consists of primary and reinsurance companies, which provide coverage—including coverage for natural catastrophe and terrorism risk—to their customers through property-casualty, homeowners, automobile, and commercial policies among others (see fig. 1). Primary insurers typically write policies for residential and commercial customers and are responsible for reviewing customer claims and making payments if consistent with the customers’ policies. Primary insurers, however, often hold more exposure to risk than management considers appropriate. For example, a primary property and casualty insurer may hold a large number of homeowners insurance policies along the Florida coast. If a catastrophic hurricane were to hit this area, the insurer would have to pay out on those policies, which could damage the company’s financial condition. In order to transfer some of this risk, primary insurers purchase coverage from a reinsurance company. Reinsurers cover specific portions of the risk the primary insurer carries. For example, a reinsurer may cover events that cost the primary insurer more than \$100 million. Likewise, reinsurers may also carry more risk exposure than they consider prudent and so they may contract with other reinsurers for coverage, which is a process referred to as retrocessional coverage.

Figure 1: Traditional Insurance, Reinsurance, and Retrocessional Transactions



Source: GAO.

The insurance industry faces potentially significant financial exposure due to natural and terrorist catastrophes. Heavily populated areas along the coast in the Northeast, Southeast, Texas, and California have among the highest value of insured properties in the United States. Moreover, some of these areas also face the highest likelihood of major hurricanes—in the cases of the Northeast, Southeast, and Texas—and major earthquakes in the case of California. According to insurance industry estimates, a large hurricane in urban Florida or earthquake in urban California could cause

up to \$110 billion in insured losses with total losses as high as \$225 billion. We also note that a major earthquake in the central Mississippi Valley—which includes the New Madrid fault—could also result in significant loss of life and financial losses.¹⁸ Several states—including Florida, California, and Texas—have established authorities to help ensure that coverage is available in areas particularly prone to these events.¹⁹ In addition, the insurance industry faces potentially large losses associated with terrorist attacks as demonstrated by the industry’s \$40 billion in expected losses resulting from the September 11, 2001, attacks. With the passage of TRIA, the federal government also has substantial potential financial exposure to terrorist attacks.

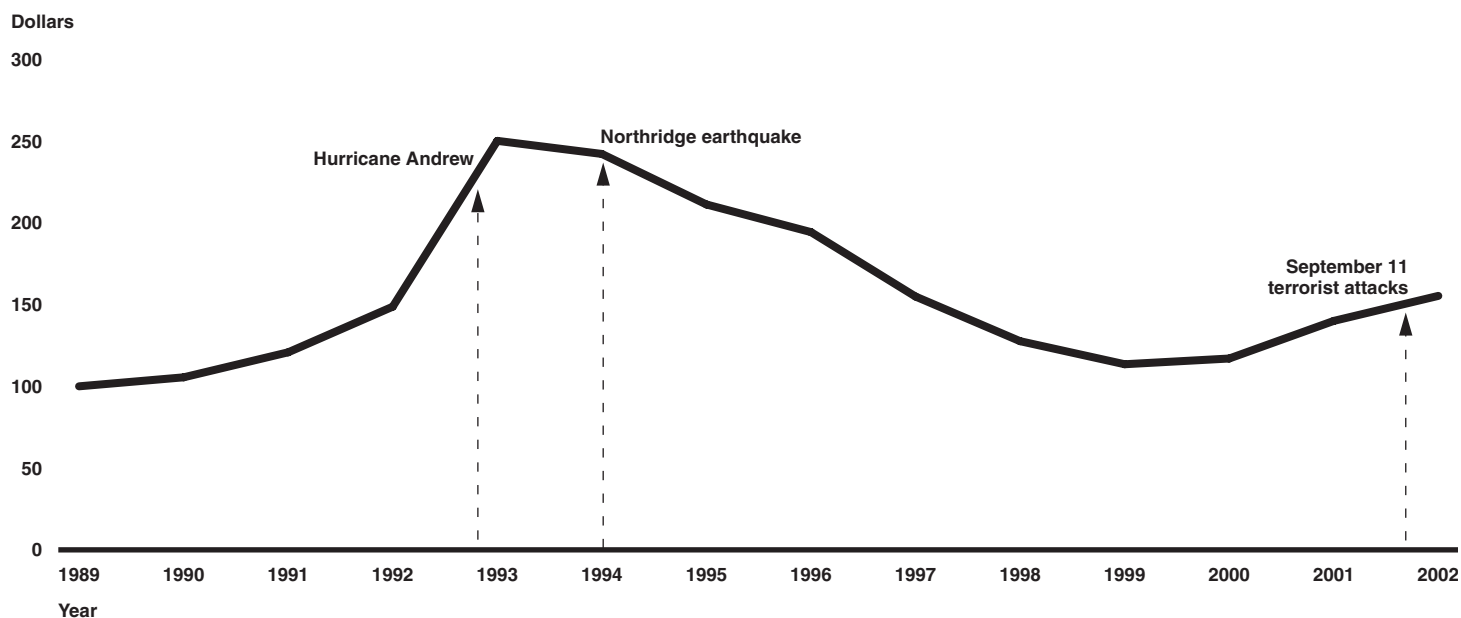
The costs associated with providing insurance coverage for natural catastrophes helped generate the market for risk-linked securities—such as catastrophe bonds—as an alternative means of risk transfer for primary insurance companies and reinsurance companies. As shown in figure 2, reinsurance prices increased significantly in 1992, which was the year that Hurricane Andrew struck Florida. Reinsurance prices may increase after major catastrophes as reinsurance companies attempt to restore their financial condition through higher revenues or coverage restrictions. Because of the increase in reinsurance prices and restricted coverage in the mid 1990s, some insurance companies developed catastrophe bonds with the view that the capital markets would be able to provide coverage for some natural catastrophes at a lower cost than reinsurers. We note that after declining in the mid-to-late 1990’s, reinsurance prices increased from 1999 to 2002 due to several factors including losses associated with hurricanes, adverse loss development on business written in 1997 through 2000, adverse loss development relating to asbestos, the declining credit quality of some European reinsurers due to declining stock prices, the

¹⁸The New Madrid seismic zone lies within the central Mississippi Valley, extending from northeast Arkansas, through southeast Missouri, western Tennessee, and western Kentucky to southern Illinois. Historically, this area has been the site of some of the largest earthquakes in North America. Between 1811 and 1812, four catastrophic earthquakes, with magnitudes greater than 7.0 occurred during a 3-month period. Since 1974 when seismic instruments were installed around this area, more than 4,000 earthquakes have been located, most of which were too small to be felt. The probability for an earthquake of magnitude 6.0 or greater is significant in the near future. A quake with a magnitude equal to that of the 1811-1812 quakes could result in great loss of life and property damage in the billions of dollars.

¹⁹Our 2002 report provided information on the Florida Hurricane Catastrophe Fund and the California Earthquake Authority. This report provides information about the Texas Windstorm Insurance Association. See appendix IV.

declining investment income due to decreased interest rates, and the costs associated with the September 11, 2001, terrorist attacks.

Figure 2: Reinsurance Prices in the United States, 1989-2002^a



Source: Guy Carpenter & Company, Inc., a subsidiary of Marsh & McLennan Companies.

^aThis figure shows a price index set equal to 100 in 1989 normalized prices.

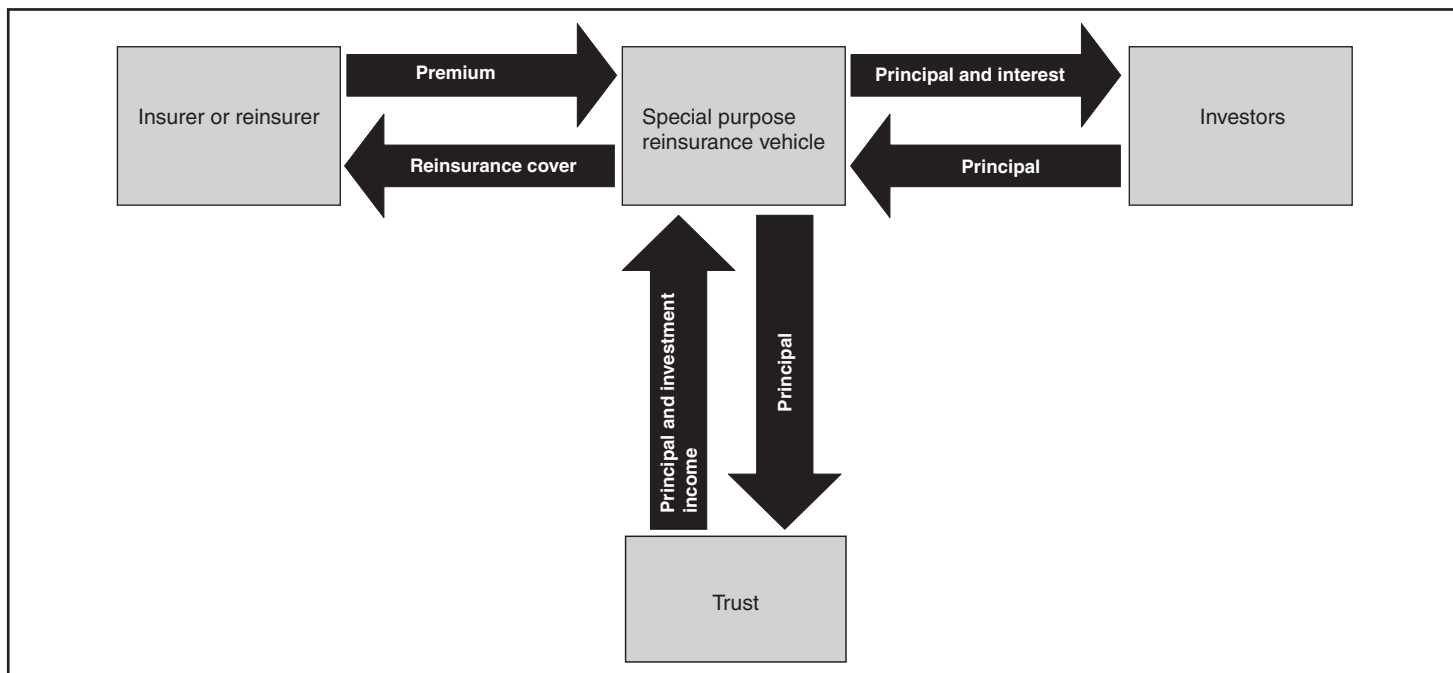
Catastrophe Bonds Employ Complex Structures

As discussed in our previous report, risk-linked securities—including catastrophe bonds—have complex structures. Figure 3 illustrates the cash flows among the participants in a catastrophe bond. Typically, a catastrophe bond offering is made through an entity called a special purpose reinsurance vehicle (SPRV) that may be sponsored by an insurance or reinsurance company.²⁰ The insurance company enters into a reinsurance contract and pays reinsurance premiums to the SPRV to cover specified claims. The SPRV issues bonds or debt or debt securities for purchase by investors. The catastrophe bond offering defines a catastrophe

²⁰SPRVs are a type of special purpose entity. Most SPRVs are based offshore for tax, regulatory, and legal purposes.

that would trigger a loss of investor principal and, if triggered, a formula to specify the compensation level from the investor to the SPRV. The SPRV is to hold the funds from the catastrophe bond offering in a trust in the form of Treasury securities and other highly rated assets. The SPRV deposits the payment from the investor as well as the premium income from the company into a trust account. The premium paid by the insurance or reinsurance company and the investment income on the trust account provide the funding for the interest payments to investors and the costs of running the SPRV. If no event occurs that triggers the bond's provisions and it matures, the SPRV is responsible for paying investors the principal and interest that they are owed.

Figure 3: Special Purpose Reinsurance Vehicle



Source: GAO.

Catastrophe bonds also have the following characteristics:

1. The bonds are typically only offered to qualified institutional investors under Securities and Exchange Commission (SEC) Rule 144A and are not available for direct purchase by retail investors.
2. The bonds typically offer a return to investors based on the London Interbank Offered Rate (LIBOR) plus an agreed spread.²¹ The return to investors on catastrophe bonds is relatively high, either equaling or exceeding the returns on some comparable fixed-rate investments, such as high-yield corporate debt.²² Under some catastrophe bond structures, however, investors may face the risk of losing all or substantially all of their principal if a catastrophe triggering the bond's provisions occurs.²³
3. The bonds typically receive noninvestment grade ratings from bond ratings agencies such as Fitch, Moody's, and Standard & Poors (S&P) because bond holders face potentially large losses on the securities. The ratings agencies rely in part on three major modeling firms to help understand the risks associated with specific catastrophe bonds. The modeling firms use sophisticated computer systems and large databases of past natural catastrophes to assess loss probabilities and financial severities.
4. The bonds typically cover risks that are considered the lowest probability and highest severity. That is, the bonds typically cover hurricanes or earthquakes that are expected to occur no more than once every 100 to 250 years. The bonds do not typically provide

²¹LIBOR is the rate most international creditworthy banks charge one another for large loans.

²²Cochran, Caronia Securities LLC reports that catastrophe bonds returned on average 9.07 percent in 2002, 9.45 percent in 2001, and 11.42 percent in 2000. The 9.07 percent return in 2002 exceeded selected fixed-income sector returns for high-yield (or noninvestment grade) corporate debt. According to the Bond Market Association, the yields on catastrophe bonds have been comparable to the yields on noninvestment grade corporate debt.

²³However, some catastrophe bonds have been structured to contain different risk tranches having varying probabilities of loss occurrence. If the probability of loss occurrence for a bond tranche is very low, such as might occur if the bond's payout provisions could be triggered only upon the occurrence of a third consecutive specified catastrophic event within a set time period, the bond tranche could even receive a triple-A investment-grade rating.

coverage for events expected to occur more frequently than once every 100 years.

5. To offset investors' lack of information about insurer underwriting practices, the bonds are typically nonindemnity rather than indemnity-based and specify industry loss estimates or parametric triggers (such as wind speed during a hurricane or ground movement during an earthquake) as the events that trigger the bonds' provisions.²⁴ By tying payment to an estimate of industry losses or an objective measure such as wind speed, investors do not have to completely understand an individual company's underwriting practices.²⁵

²⁴Indemnity coverage specifies a simple relationship that is based on the insurer's actual incurred claims. For example, an insurer could contract with a reinsurer to cover half of all claims—up to \$100 million in claims—from a hurricane over a specified period for a geographic area. If a hurricane occurs where the insurer incurs \$100 million or more in claims, the reinsurer would pay the insurer \$50 million. In contrast, nonindemnity coverage is not related to actual or incurred claims. The provisions of a catastrophe bond, for example, may provide \$100 million in coverage to the issuing insurance company if a hurricane or earthquake of a specified magnitude occurs or established insurance industry formulas estimate that a catastrophe causes industry wide losses of a specified amount.

²⁵One factor that may limit investors' understanding of an insurers' underwriting practices is moral hazard, which means that two parties to a contract change their behavior because of that contract. Due to moral hazard, the potential exists that an insurer would increase its risk-taking, such as by providing coverage for properties more vulnerable to natural catastrophes or in paying claims without adequate review. Moral hazard may be present in other insurance arrangements—besides catastrophe bonds—such as in the case of an insurer providing coverage for natural catastrophe risk through residential or business policies. Because reinsurers have established business relationships with insurers, they may be able to better monitor insurer underwriting practices than investors.

Catastrophe Bond Issuance Has Been Limited

Private sector data indicate that the catastrophe bond market accounts for a small share of the worldwide reinsurance market for catastrophe risk.²⁶ According to Marsh & McLennan Securities, between 1997 and 2002, a total of 46 catastrophe bonds were issued, or about 8 per year as shown in figure 4.²⁷ Figure 5 shows that the annual dollar volume of catastrophe bond issuance remained relatively stable between 1997 and 2002, with 2000 representing the highest volume with a total of \$1.1 billion in total issuance.²⁸ Between 1997 and 2002, the total value of outstanding catastrophe bonds increased more than three-fold from about \$800 million to \$2.9 billion. However, outstanding catastrophe bonds accounted for only 2.5 to 3.0 percent of worldwide catastrophe reinsurance coverage.²⁹ As of September 2003, no natural catastrophe had occurred that would have triggered one of the 46 bonds' provisions and resulted in payments to issuers to cover their losses.³⁰

²⁶Organizations involved in the catastrophe bond market may also report additional figures for other risk-linked securities or methods that transfer catastrophe risk or other insurance risk to securities markets. Such other securities and methods include collateralized debt obligations (CDO), quota share arrangements, swaps, options, and contingent capital. A catastrophe-related CDO is a portfolio of already issued catastrophe bonds and other risk-linked securities. Investors in securitized quota share arrangements share directly in the performance of a reinsurance portfolio, sharing losses as well as gains.

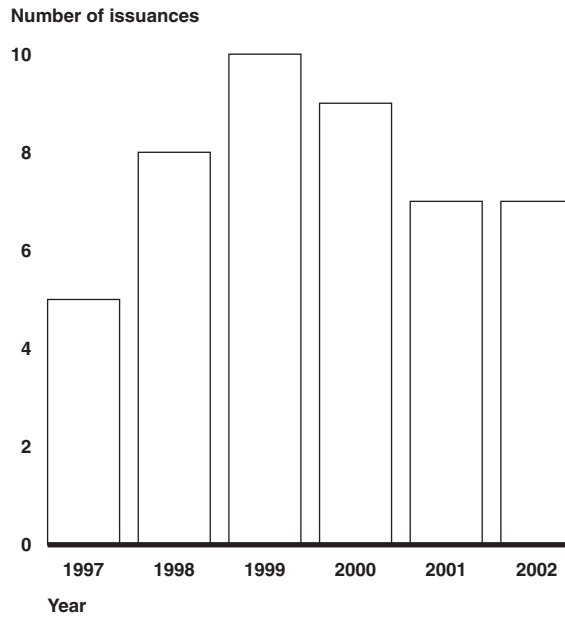
²⁷Marsh & McLennan Securities did not report catastrophe bond issuance prior to 1997. However, available data indicate that three bonds were issued in the period 1994-96. We chose to report catastrophe bond issuance starting in 1997 (through 2002) because this is the first year that the market expanded to include a number of issuers. According to securities market participants, a total of four catastrophe bonds were issued in 2003 through July.

²⁸In 2002, Swiss Re introduced "shelf issuance" of catastrophe bonds, which allows them to periodically issue bonds over a several year period based on one offering statement to investors. Marsh & McLennan reported Swiss Re's three quarterly issuances of this bond as one issuance in 2002.

²⁹Estimates obtained from Swiss Re and Fermat Capital Management.

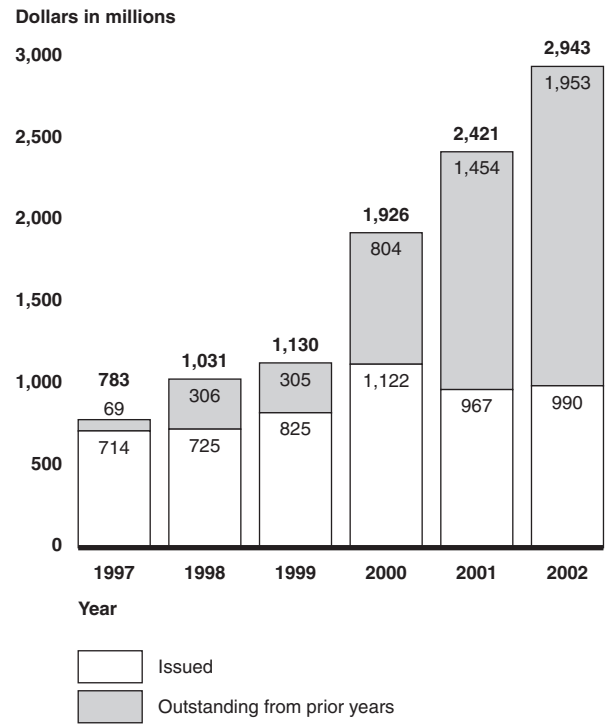
³⁰According to an investment bank we contacted, the payout provisions of one catastrophe bond issued in 1996 have been triggered.

Figure 4: Annual Issuance of Catastrophe Bonds, 1997-2002



Source: GAO, based on data provided by Marsh & McLennan Securities.

Figure 5: Catastrophe Bond Issuance and Amount Outstanding 1997-2002

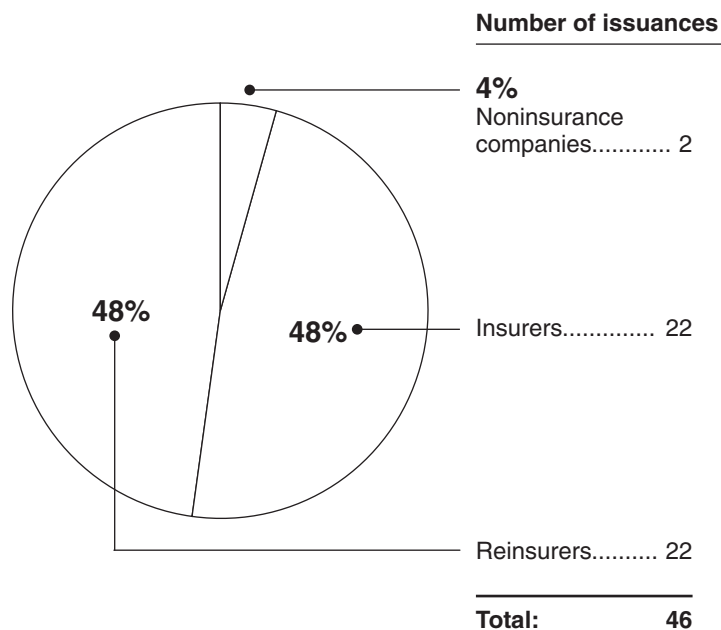


Source: GAO, based on data provided by Swiss Re Capital Markets.

Note: Total shown by figure at top of bar is amount outstanding at year end.

Figure 6 shows that insurance and reinsurance companies have issued almost all catastrophe bonds. Insurance companies accounted for 22 of the 46 catastrophe bonds issued in 1997 through 2002, reinsurers accounted for 22, and two commercial companies—Oriental Land and Vivendi, SA—issued the other two securities. Figure 7 provides a recent example of a catastrophe bond issuance. The following section provides reasons why some insurance and reinsurance companies use catastrophe bonds while others do not.

Figure 6: Type of Catastrophe Bond Issuer 1997-2002



Source: GAO, based on data provided by Marsh & McLennan Securities.

Figure 7: Residential Reinsurance Issuances

One example of a catastrophe bond is a \$125 million of variable rate notes issued by Residential Reinsurance 2002 Limited, a special purpose reinsurance company, for the ultimate benefit of United Services Automobile Association (USAA). Offered only to qualified institutional buyers as defined by SEC Rule 144A, these bonds were privately placed by Goldman, Sachs & Co., Lehman Brothers, and Merrill Lynch & Co. These bonds were sold to investors with a coupon of 3-month LIBOR plus 4.9 percent during the loss occurrence period and received ratings of Ba3 from Moody's and BB+ from S&P, both noninvestment grade ratings.^a The ratings reflect the expected loss to note holders, calculated by a catastrophe-modeling firm, relative to the promise of receiving the present value of the required interest and principal payments as provided by the governing documents.

The issuer provides reinsurance coverage for 3 years to USAA against hurricane losses in the East and Gulf Coast states of the United States and in Hawaii beginning June 1, 2002. Losses to investors are tied to actual losses experienced by USAA due to qualified hurricanes affecting its portfolio of exposures in the covered areas at any time during the risk period. Qualified hurricanes are those classified on the Saffir-Simpson scale as a Category 3, 4, or 5.^b If more than one qualifying event were to occur in any given year, only one event, at the discretion of USAA, will be considered in calculating losses to the notes. An independent third party is to review loss payout. The proceeds from issuance of the bonds were deposited into a trust account and invested in high quality-rated commercial paper or money market instruments and investment-grade securities.

In 2003, Residential Reinsurance issued another \$160 million of variable rate notes, its seventh consecutive placement of catastrophic risk for the benefit of USAA. The bonds provided aggregate coverage for USAA's hurricane and earthquake risk in the United States, including the risk of loss caused by fire following an earthquake. This issue was the first catastrophe bond to include Alaska and Hawaii earthquake risk. The bonds were sold with a coupon of 3-month LIBOR plus 4.95 percent and received noninvestment grade ratings of Ba2 (Moody's) / BB+ (S&P). The bonds were privately placed by Goldman Sachs and BNP Paribas.

Source: GAO analysis based on information from Moody's Investors' Service, *Residential Reinsurance 2002 Limited Catastrophe Linked Notes, Structured Finance New Issue Report, July 30, 2002* and Marsh & McLennan Securities, *Market Update: The Catastrophe Bond Market at Year-End 2002*.

^aLibor is the rate that creditworthy international banks generally charge each other for large loans.

^bThe Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's intensity. This is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale, as storm surge values (used to estimate flooding) are highly dependent on the slope of the continental shelf in the landfall region.

Catastrophe Bonds Benefit Some Insurers, but Others Believe That the Bonds' Costs Are Too High

Representatives from some insurance and reinsurance companies told us that catastrophe bonds served a useful role in their overall approach to managing their natural catastrophe risk exposures and that such bonds lowered the costs associated with the most severe types of catastrophe risk. However, representatives from two large insurers and two state authorities said that the total costs associated with the bonds were high compared with traditional reinsurance and affected their willingness to

issue the bonds.³¹ Other financial market participants believed that insurers' comparisons of the prices of catastrophe bonds and traditional reinsurance do not fully account for important factors, such as the credit quality of reinsurers. This section also provides information on the status of two accounting issues that potentially affect the use of catastrophe bonds and which we discussed in our previous report.

Some Insurance and Reinsurance Companies Identified Benefits of Catastrophe Bonds

Representatives from some large insurers and reinsurers we contacted said that catastrophe bonds were a complement to several other basic risk management tools: raising more equity capital by selling more company stock, transferring risks to the reinsurance markets, and limiting risks through the underwriting and asset management process. Representatives from one insurance company said that of the natural catastrophe exposure that was transferred by their company, 76 percent was sold to traditional reinsurance companies and 24 percent was transferred through catastrophe bonds. Company representatives said that while reinsurance accounted for most risk transfer needs, catastrophe bonds were also beneficial in this regard. Representatives from a reinsurance company said that catastrophe bonds allowed the company to transfer a portion of its natural catastrophe exposures to the capital markets rather than retaining the exposure on its books or retroceding the risks to other reinsurers.

As discussed in our 2002 report, catastrophe bonds can play a role in lowering the costs of reinsuring catastrophe risks. According to various financial market representatives, because of the larger amount of capital that traditional reinsurers need to hold for lower probability and higher financial severity areas of catastrophe risk—such as the risk of hurricanes in Florida or earthquakes in California expected to occur only once every 100 to 250 years—these reinsurers limit their coverage and charge increasingly higher premiums for these risks. Many of the catastrophe bonds issued to date have provided coverage for such severe catastrophe risks. Representatives from one insurance company said that the company cannot obtain the amount of reinsurance it needs in this risk category from traditional reinsurers at reasonable prices. As a result, the company has

³¹As discussed in our previous report, one of these authorities—the California Earthquake Authority (CEA)—also does not issue catastrophe bonds because they are based offshore. While CEA has not issued catastrophe bonds through SPRVs, some of its catastrophe risks have been included in catastrophe bonds issued by a reinsurer with whom CEA has a business relationship.

obtained some of its reinsurance coverage in this risk category from catastrophe bonds. The officials said that they believed that the catastrophe bond market has had a moderating effect on reinsurance prices, which, as shown in figure 2, increased from 1999 through 2002. Other market participants also said that the presence of catastrophe bonds as an alternative means of transferring natural catastrophe risk may have prevented reinsurance prices from increasing any faster than they did.

We note that two noninsurance corporations—Oriental Land and Vivendi—have issued catastrophe bonds to address some of the risks facing their properties from hurricanes and earthquakes. Oriental Land—the operator of Tokyo Disneyland—sponsored the Concentric, Ltd. security that provides \$100 million in coverage for an earthquake or earthquakes in a particular region of Japan over a 5-year period ending in 2004. The transaction allows Oriental Land to directly insure against certain earthquake risks. Vivendi sponsored a \$175 million catastrophe bond to provide coverage for certain earthquakes affecting Southern California.³²

Several Insurers Said That Catastrophe Bonds Were More Expensive Than Traditional Natural Catastrophe Reinsurance

Although some insurance and reinsurance companies have found catastrophe bonds to be cost-effective for some of their catastrophe coverage, representatives from two large insurance companies and two state authorities, as well as other market participants, said that the costs associated with catastrophe bonds could be significantly higher than the costs of buying traditional reinsurance coverage. The insurance company and state authority representatives said that they monitored the costs associated with catastrophe bonds by reviewing price information provided by investment banks and comparing these prices to quotes offered on reinsurance contracts. Some insurance company officials and state authority representatives estimated that the total costs associated with catastrophe bonds could be as much as twice as high as traditional reinsurance. In addition, representatives from two investment banks that have participated in many catastrophe bond transactions, insurance brokers that monitor the market, and other market participants said that catastrophe bond costs typically exceeded the cost of reinsurance for many insurers.

³²Vivendi Universal, S.A. did this transaction through its affiliated company, Gulfstream Insurance Ltd., located in Ireland. Gulfstream Insurance entered into a reinsurance contract with Swiss Re, which, in turn, entered into a retrocessional contract with Studio Re Ltd., the special purpose reinsurer that issued the catastrophe bonds and preference shares.

One of the costs associated with catastrophe bonds are the interest costs that insurers must pay to compensate investors for purchasing securities that involve a substantial risk of loss of principal. As discussed previously, the yields on catastrophe bonds have generally equaled or exceeded the yields on some risky fixed-income investments, such as high-yield corporate debt. Representatives from two large insurers and a state authority told us that quotes that they received from investment banks on the interest costs associated with catastrophe bonds exceeded the costs of comparable reinsurance. Additionally, representatives from two large insurance companies said that the insurance rates they develop to cover their expected losses on natural catastrophes and operating expenses and then file with state regulators are frequently denied as being too high. As a result, a representative of one of the insurers said that the company did not earn sufficient premium income to cover the costs associated with catastrophe bonds and tended to restrict coverage in states that do not allow for adequate premium increases. NAIC commented that the process of determining appropriate insurance rates is complex and that insurers and state regulators can reasonably disagree on the proper rate to charge for a specific insurance product.

Insurance industry representatives as well as other market participants cited administrative and transaction costs as another reason for the relatively high costs associated with catastrophe bonds as compared to reinsurance. Representatives from a state authority estimated that transaction costs represented 2 percent of the total coverage provided by a catastrophe bond (for example, \$2 million for a security providing \$100 million in coverage). These costs include:

- underwriting fees charged by investment banks;
- fees charged by modeling firms to develop models to predict the frequency and severity of the event—such as the hurricane or earthquake—that is covered by the security;
- fees charged by the rating agencies to assign a rating to the securities; and
- legal fees associated with preparing the provisions of the security and preparing disclosures for investors.

The price of a reinsurance contract would not typically include such additional fees.

Insurers' preference for traditional reinsurance as compared to catastrophe bonds may also be explained by their long-standing business relationships with reinsurance companies and the general nature of reinsurance contracts. Reinsurance contracts often cover a range of a primary insurer's risks including natural catastrophe and other risks, and the insurer's premium payments to the reinsurer cover all potential losses to the insurance company after some initial retention of risk by the insurer. Moreover, reinsurance contracts typically cover an insurer's losses, such as those resulting from hurricanes in a specified area up to a specified dollar limit, such as \$100 million. In contrast, catastrophe bonds focus on one type of risk (for example, natural catastrophe) and can be highly customized (for example, the development of parametric triggers) which may add to their administrative costs and require a greater commitment of management time to develop, particularly the first time that they are used.

Some Financial Market Participants Questioned Insurers' Analysis of the Costs Associated with Catastrophe Bonds

Some financial market participants that supported the use of catastrophe bonds—such as investment banks—and some insurers questioned other insurers' analysis of cost differences between catastrophe bonds and traditional reinsurance. These representatives said that catastrophe bonds may be cost-competitive with traditional reinsurance for high severity and low probability risks, for retrocessional coverage, and for larger-sized transactions. The representatives also said that insurers tended to undervalue the risk that—due to credit deterioration—reinsurers might not be able to honor their reinsurance contracts if a natural catastrophe were to occur. They said catastrophe bonds, on the other hand, pose no or minimal credit risk to insurers because the funds are immediately deposited into a trust account upon the bonds' issuance to investors. Representatives from insurers we contacted said that while they recognized that some reinsurers' credit quality had declined, they have established credit standards for the companies with whom they do business and continually monitored their financial condition.³³

³³In addition, when dealing with a reinsurer with poorer credit quality, a representative of one insurer that purchases a large amount of reinsurance also said that his company and other firms put the reinsurance premiums into a "funds held" account, paying the reinsurer only interest on the premium funds held for the duration of the reinsurance contract. However, this method collateralizes only the premiums paid, not the full amount of the insurance coverage. Another method used is to obtain a letter of credit up to the full amount of the exposure that is ceded.

Some financial market participants also said that various provisions in reinsurance contracts—such as deductibles, termination clauses, and reinstatement premiums—may also raise their costs and should be factored into the cost comparison between catastrophe bonds and reinsurance costs. Furthermore, they said that because catastrophe bond funds were held in trust accounts, insurers would likely be able to quickly claim the funds to cover natural catastrophe losses. In contrast, the representatives said that reinsurance contracts frequently involved litigation over whether insurer claims should be paid. RAA disagreed with this statement and said that reinsurance contracts rarely involve litigation and that the contracts typically include arbitration clauses. RAA said that arbitration typically settles disputes more quickly than does litigation. RAA also commented that because the provisions of catastrophe bonds have never been triggered, it is not clear that such bond payments would not be subject to litigation.³⁴

One reinsurance company has developed a method of issuing catastrophe bonds that may lower issuance costs. The reinsurer—Swiss Re—issued a security known as Pioneer in June 2002. Pioneer’s structure contains six separate “tranches,” or individual bonds, that cover five types of perils—hurricanes in the North Atlantic, windstorms in Europe, earthquakes in California, earthquakes in the central United States, earthquakes in Japan—and one that covers all of the five perils. Pioneer is also an “off-the-shelf” security, which means that Swiss Re can issue the security to investors over a period of time as necessary to meet its business needs and the demand of investors. By covering multiple perils and allowing risks to be transferred over time, market participants said that the security could pay a lower yield because the market would not have to absorb a relatively larger issuance in a shorter time span. In addition, it would lower administrative costs because most of the paperwork and disclosures to issue the security would already be in place, which means they do not have to be recreated, as is the case with other catastrophe bonds.

³⁴Although none of the 46 catastrophe bonds issued from 1997 through 2002 have generated investor losses, one investment bank told us that the payout provisions of a catastrophe bond issued in 1996 had been triggered and generated investor losses.

Some Insurers Noted That Catastrophe Bonds Were Not Cost-Effective for Natural Catastrophes That Were More Likely to Occur or for Lower Coverage Amounts

Besides cost, some insurance company and state authority representatives we contacted cited other reasons why they did not choose to issue catastrophe bonds. They said that they were not attracted to catastrophe bonds' traditional focus on covering events with the lowest frequency and the highest severity (for example, hurricanes or earthquakes expected to occur every 100 to 250 years). Rather, the representatives said that their coverage needs were for less severe events expected to take place more frequently than every 100 years. In addition, they and other market representatives said that it is not cost-effective to issue catastrophe bonds below a certain level. They estimated that this level ranged from \$100 million to \$800 million. Some insurers said that they typically bought reinsurance for smaller amounts and might be more willing to issue catastrophe bonds if they were offered coverage in amounts less than \$100 million. BMA commented that catastrophe bonds have been issued in smaller denominations than \$100 million.

RAA commented that nonindemnity based catastrophe bonds may not be appealing to insurers because of basis risk, which is the risk to the insurer that the payment from the catastrophe bond will not cover all of its losses. Traditional reinsurance and indemnity based catastrophe bonds mitigate basis risk. In addition, RAA said that catastrophe bonds may not appeal to insurers because they do not adequately cover "tail risk," which is the risk to the insurer that it will take a protracted period (perhaps years) to settle all of the claims associated with a natural catastrophe. RAA stated that traditional reinsurance remains an "open account" to settle such claims when they come due while catastrophe bond contracts typically require that all claims be quickly settled (perhaps within 2 years). RAA commented that the insurer could ultimately become responsible for any claims filed after the catastrophe bond cut-off period.

Impact of Accounting Issues Potentially Affecting the Use of Catastrophe Bonds Still Unclear

Our previous report stated that NAIC's current statutory accounting requirements might affect insurers' use of nonindemnity-based catastrophe bonds.³⁵ Under statutory accounting, an insurance company that buys traditional indemnity-based reinsurance or issues an indemnity based catastrophe bond can reflect the transfer of risk (effected by the purchase of reinsurance) on the financial statements that it files with state regulators. As a result of the risk transfer, the insurance company can improve its stated financial condition and it may be willing to write additional insurance policies. However, statutory accounting rules currently do not allow insurance companies to obtain a similar credit for using nonindemnity based financial instruments that hedge insurance risk—which can include nonindemnity-based catastrophe bond structures—and may therefore limit the appeal of these types of catastrophe bonds to potential issuers. Statutory accounting standards have differed because unlike traditional reinsurance, instruments that are nonindemnity-based have not been viewed as providing a true transfer of insurers' risks. However, during 2003, NAIC's Securitization Working Group approved a proposal that would establish criteria for allowing reinsurance like accounting treatment for such instruments—including nonindemnity-based catastrophe bonds—that provide a highly effective hedge against insurer losses. The proposal must still be considered by NAIC's Statutory Accounting Committee, which must give final approval before the accounting treatment is put into effect. According to an NAIC official, if NAIC were to ultimately approve a reinsurance credit for financial instruments that effectively hedge insurer losses, it could take about 1 year for the new standards to be implemented. See appendix II for a detailed discussion of this accounting issue.

³⁵NAIC is currently considering the appropriate accounting treatment for nonindemnity based financial instruments that hedge insurance risk, which could include nonindemnity-based catastrophe bonds. Both exchange-traded instruments and over-the-counter instruments can be used to hedge underwriting results (i.e., to offset risk). The triggering event on a catastrophe bond contract must be closely correlated to the insurance risks being hedged so that the pay-off is expected to be consistent with the expected claims, even though there is some risk that it will not (referred to as "basis risk"). This correlation is known as "hedge effectiveness" and NAIC is currently considering how it should be measured. Should NAIC determine a hedge-effectiveness measure, statutory accounting standards could be changed so that a fair value measure of the catastrophe bond contract could be calculated and recognized as an offset to insurance losses, hence allowing credit to the insurer similar to that granted for reinsurance. If nonindemnity-based catastrophe bonds are accepted as an effective hedge of underwriting results, they could become more attractive to potential issuers. We note that the process for developing an effective measure to account for risk reduction through the issuance of nonindemnity-based coverage is difficult and complex.

In September 2002, we also reported that FASB was considering a new approach for accounting for special purpose entities (SPE)—special purpose reinsurance vehicles (SPRV) used to issue catastrophe bonds are a type of SPE—that had the potential to raise the costs associated with issuing catastrophe bonds and make them less attractive to issuers.³⁶ The proposal was considered in response to the problems at Enron Corporation, which raised questions about the accounting for SPEs. FASB’s proposed interpretation could have, among other things, (1) required the primary beneficiary of an SPE to consolidate the assets and liabilities of the SPE in its financial statements and (2) set a presumptive equity investment requirement for SPEs at 10 percent as compared to the previous standard of 3 percent.

In January 2003, FASB issued Interpretation No. 46, *Consolidation of Variable Interest Entities* (FIN 46), which revised the guidance under consideration in 2002. FIN 46 is quite complex and does not expressly discuss reinsurance, but provides criteria to determine if consolidation is required.³⁷ FIN 46 introduces “variable interest entities” (VIE), a new term that encompasses most SPEs. A VIE is broadly defined as an entity which meets either of two conditions: (1) equity investors have not invested enough for the entity to stand on its own (insufficiency is presumed if the equity investment is less than 10 percent of the equity’s total assets) or (2) equity investors lack any of the characteristics of a controlling financial interest (the risks or rewards of ownership). If an entity is deemed a VIE, then it is evaluated for possible consolidation according to the new risk and reward approach in FIN 46. Accounting firm officials that we contacted said that most catastrophe bond structures likely qualify as VIEs because most SPRVs do not meet the ten percent equity threshold. Moreover, an accounting firm official said that insurance companies may be less likely to issue catastrophe bonds if they were required to consolidate SPRV assets and liabilities on their balance sheets. The official said that insurance companies do not typically believe that they “own” SPRV assets or “owe” SPRV liabilities. The official said that insurance companies may decide that the costs associated with issuing confusing and potentially misleading financial statements would outweigh the benefits of issuing catastrophe bonds through SPRVs.

³⁶Companies have used SPEs for many years to carry out specific financial transactions.

³⁷FIN 46 is applicable under U.S. generally accepted accounting principles and has no direct application to insurance company financial statements prepared according to statutory accounting principles or accounting principles outside the United States.

However, accounting firm and insurance officials also told us that FIN 46 is very complex and that it is not yet certain whether it would require issuers of catastrophe bonds to consolidate the SPRVs on their financial statements.³⁸ The officials said the potential exists that FIN 46 could require investors in catastrophe bonds to consolidate the bonds on their balance sheets or it may not require consolidation by either issuers or investors. FIN 46 is currently in effect for VIEs created after January 31, 2003, and is effective for existing VIEs beginning in the first fiscal year or quarter beginning after June 15, 2003. Because FIN 46 became effective during 2003 and each transaction could be structured differently, it remains to be seen how FIN 46 will affect future catastrophe bond transactions. Additional information should be available after December 2003, when insurers that issue catastrophe bonds evaluate the substance of their catastrophe bonds for purposes of reporting their year-end financial statements. See appendix III for additional information about FIN 46.

Institutional Investors Provided Mixed Views on Catastrophe Bonds

Representatives from some institutional investors told us that catastrophe bonds served a useful but limited role in their overall approach to managing their investment portfolios by often providing higher yields than traditional investments and diversification. Other institutional investors said that the risks of catastrophe bonds were too high or not worth the costs associated with assessing the risks. Some institutional investors also said that they had decided not to purchase catastrophe bonds because they were illiquid.

Some Institutions Invested in Catastrophe Bonds for High Yields and Portfolio Diversification

The relatively high rates of return offered by catastrophe bonds make them attractive to some institutional investors, such as pension funds, hedge funds, and mutual funds—including mutual funds that specialize in catastrophe bond investments. As discussed previously, catastrophe bonds carry noninvestment-grade ratings and, during certain time periods, high spreads relative to alternative fixed-income investments, such as high-yield

³⁸Determining whether consolidation is required under FIN 46 requires an analysis of what entity—either the issuer or investor in catastrophe bonds—bears the majority of the expected risks and expected rewards. An accounting firm official we contacted said that in his view it is unlikely that insurers would be required to consolidate under FIN 46 because they do not bear the risks associated with catastrophe bonds. Rather, the accounting firm official said that an investor in the bonds may be required to consolidate if it holds more than half of the outstanding bonds in a particular issuance. Determining whether consolidation by an investor is necessary under FIN 46 could require an analysis of the percentage of outstanding bonds held by particular investors.

corporate bonds. Officials from one large pension fund said that catastrophe bonds were attractive because they often paid higher rates than similarly rated instruments. Representatives from a hedge fund said that since September 11, 2001, the rate of return on catastrophe bonds has been high and the demand for the bonds has exceeded the supply.

Another reason that some large institutional investors—such as pension funds—purchased catastrophe bonds is that they were uncorrelated with other credit risks in their bond portfolios and help diversify their investment risks. In general, institutional investors attempt to invest in equities and debt from a wide range of companies, industries, and geographic locations to minimize their exposure to any particular risk in the event of an economic downturn. Representatives from some institutional investors told us that catastrophe bonds complemented their general diversification strategy. The securities were tied to the occurrence of hurricanes and earthquakes rather than the performance of the economy. That is, investors might realize a relatively high rate of return on catastrophe bonds during an economic downturn, while other assets were performing poorly (assuming that no natural catastrophe occurred to trigger the securities' provisions). However, due to the potential risks associated with catastrophe bonds, the institutional investor representatives said that they confined their investments to no more than 3 percent of their total portfolios. We note that some specialized institutional investors—such as hedge funds and mutual funds that focus on catastrophe bond investments—may assign a greater percentage of their investment portfolios to catastrophe bonds than large institutions.

Some Institutional Investors Cited High Risks, Lack of Analytical Capacity, and Illiquidity as Primary Reasons for Not Purchasing Catastrophe Bonds

As discussed in our previous report, the investor market for catastrophe bonds is not broad and some institutional investors—such as mutual funds—did not purchase them.³⁹ Representatives from three large mutual funds we contacted for our follow-up work said they did not purchase catastrophe bonds because of their perceived risks. The mutual fund officials said that their traditional approach to investing in high-yield debt involved assessing a company's business strategy, management talent,

³⁹In testimony before the House Financial Services Committee on October 8, 2002, representatives from Swiss Re—one of the largest issuers of risk-linked securities—said that lack of interest by many money managers was the primary reason that the market has not expanded. See *The Risk-Linked Securities Market: Testimony before the House Financial Services Committee, Subcommittee on Oversight and Investigations, U.S. House of Representatives*. (Oct. 8, 2002).

assets, and cash flow to justify risking customer assets in purchasing the company's debt. Even if a company failed, one mutual fund official said that as creditors they might be able to take over the business, insert new management, sell assets, and turn the company around. In contrast, a mutual fund official said that catastrophe bonds differed substantially from their traditional company-oriented approach and posed unacceptably high risks of loss to customer funds. The official also expressed doubt about the accuracy of models that have been developed to predict hurricanes and earthquakes or said that they lacked the technical expertise to analyze the models. The official said that insurance companies were in the best position to assess the risks associated with their natural catastrophe exposures and that they were not interested in purchasing risks that the companies did not want to keep on their books. Further, a mutual fund official said that if a natural catastrophe occurred and the provisions of catastrophe bonds were activated, creditors would have no opportunities to minimize their losses as occurs when companies go into bankruptcy. BMA commented that it is not inevitable that investors will lose all of their principal if a catastrophe bond is triggered (as discussed previously, some bond structures minimize the chances that investors will lose all of their principal).

Mutual fund representatives also said that it was not cost-effective for them to develop the technical expertise necessary to analyze catastrophe bonds and determine if they represent a sound investment. First, a mutual fund official said that it was much safer to simply buy the stocks and bonds of insurance companies if the fund believed the management of such companies had the skills necessary to profitably manage their natural catastrophe and other exposures. Second, a mutual fund official said that there were alternative investments—such as high-yield corporate debt—that offered comparable returns and risks that firm officials understood. Third, a mutual fund official said that given the small size of the catastrophe bond market, it did not make sense to hire experts in hurricanes or earthquakes to monitor the market. A mutual fund representative did say, however, if the market for catastrophe bonds expanded, the company would reconsider employing experts to better understand these securities.

Another reason mutual fund representatives said that they did not purchase catastrophe bonds was that they were illiquid. One mutual fund representative said that the company preferred investments—such as mortgage-backed securities, credit card receivables, and government debt—that had large numbers of buyers and sellers, stable prices, and

narrow bid-ask spreads.⁴⁰ A liquid market allows investors to sell securities for cash without accepting a substantial discount in price. One mutual fund representative said that catastrophe bonds “trade by appointment,” and that the fund’s policies did not allow for the purchase of such illiquid securities. Another mutual fund representative also commented that their company policies did not allow for the purchase of illiquid securities. BMA disagreed with these statements and commented that the liquidity of the catastrophe bond market is comparable to similar securities.

Securitizing Terrorism Risk Poses Significant Challenges

The general consensus of insurance and financial market participants we contacted was that insuring against terrorism risk would be difficult and that developing bonds covering potential targets against terrorism attacks in the United States was not feasible at this time. Although, several modeling firms were developing terrorism models that were being used by insurance companies to assist in their pricing of terrorism exposure, most experts we contacted said these models were too new and untested to be used in conjunction with a bond covering risks in the United States. Furthermore, potential investor concerns—such as a lack of information about issuer underwriting practices or the fear that terrorists would attack targets covered by catastrophe bonds—could make the costs associated with issuing terrorism-related securities prohibitive.

The Complexity of Forecasting Terrorist Attacks Makes Insuring against Terrorism Risk Difficult

According to insurance industry representatives, insuring against natural catastrophe risk, despite its challenges, is considered more practical than insuring against or securitizing terrorism risk. To establish their exposures and to price insurance premiums, companies need to be able to predict with some reliability the frequency and severity of insured event risks. Although difficult, risk-modeling firms and insurance companies have developed models to predict the frequency and severity of natural catastrophes such as hurricanes and earthquakes. Representatives from these firms said that there was a substantial amount of historical data on, for example, hurricane frequency and paths as well as earthquake faults and severity. Using data on natural catastrophe frequency and severity, insurers can gauge their exposures in particular areas and more accurately price their coverage. For example, an insurer could estimate the impact to

⁴⁰A bid-ask spread is the difference between the price asked for a security and the price paid.

the insurance company of a Category 5 hurricane in Miami, given the number of policies that the insurer has written in the city as well as the value of insured property.⁴¹ Within pricing constraints established by insurance regulators, the company would set premiums at a level designed to compensate it for predicted losses while allowing for a reasonable rate of return. The development of models to predict the frequency and severity of natural catastrophe risks are considered crucial to any market growth that has thus far taken place for catastrophe bonds.

In contrast, insuring against terrorism risk poses challenges because it requires the insurer to measure with some reliability the frequency and severity of terrorist acts. Experts we contacted said such analyses were extremely difficult because they involved attempts to forecast terrorist behavior, which were very difficult to quantify. The frequency of attacks would be subject to a range of factors including terrorist intentions, the ability of terrorists to enter the United States, target vulnerability, and the effectiveness of the war on terrorism. One market participant told us that even if the severity of losses at different targets given specified weapons were able to be modeled, it would be difficult to forecast losses for particular attacks given the variety of weapons that could be used by terrorists.

Recent experience illustrates the difficulties associated with insuring against terrorism risks. After the September 11, 2001, terrorist attacks, many primary insurance companies refused to renew terrorism coverage in their general property and casualty policies for commercial customers and reinsurance companies stopped providing coverage for terrorism to primary insurers.⁴² Although TRIA subsequently required primary insurance companies to offer terrorism insurance to clients, insurers set the premiums. While insurance companies did not publish data on how many of their clients accepted offers of terrorism coverage, one insurer we contacted said that the overall acceptance rate was about 25 percent.

⁴¹A Category 5 hurricane is defined by winds greater than 155 mph, storm surge generally greater than 18 feet above normal, complete roof failure on many residences and industrial buildings, and some complete building failures with small utility buildings blown over or away.

⁴²In GAO testimony before the House Subcommittee on Oversight and Investigations, Committee on Financial Services we stated that many insurers consider terrorism an uninsurable risk because it is not possible to estimate the frequency and severity of terrorist attacks. See *Terrorism Insurance: Rising Uninsured Exposure Heightens Potential Economic Vulnerabilities*. [GAO-02-472T](#). Washington, D.C.: February 27, 2002.

Terrorism Models under Development Considered by Some as Too New and Untested to Support Catastrophe Bonds

Representatives from the three major risk-modeling firms said that they have developed terrorism risk models. The models differ in the method they employ to model risk but are similar in that they rely on the ability of terrorism experts to forecast the frequency and severity of terrorist attacks. One firm uses the Delphi method, another uses game theory, and the third uses a combination of the two. The models account for subjective information such as the particular terrorist organization that is carrying out the attack and the resources available to them; the political situation; and when, where, and how the attack might occur. The Delphi method, for example, analyzes various threats posed by domestic extremists, formal international and state-sponsored terrorist organizations, and loosely affiliated extremist networks. The game theory model analyzes the potential actions of terrorists based on the actions of security forces and counter-terrorism measures.

Modeling firm officials and insurance industry representatives said that insurers, reinsurers, group life insurers, and corporations were currently using terrorism models. Some insurance companies were using the models to help them determine their exposure to terrorism and price this risk. For example, some life insurance companies were using the models to ensure that they did not have a high concentration of life insurance policies in properties that might be particularly vulnerable to terrorist attacks.

Representatives from reinsurance companies we contacted, however, said that the models were not reliable in predicting the frequency of terrorist attacks, although they provided useful information on the potential severity of attacks. Moreover, officials from ratings agencies we contacted said that they were not convinced about the reliability of the terrorism models at this point and that they would not be willing to rate a catastrophe bond covering targets in the United States based on the models. According to one of the major rating firms, for example, the estimates derived from the three models for predicting the frequency and severity of terrorist attacks could vary by 200 percent or more. Another rating firm official said that investors currently would not believe that the terrorism models adequately reflected the risk. Without acceptance of the models by major ratings agencies and investors, the officials said that the issuance of catastrophe bonds related to terrorism coverage in the United States would be highly unlikely. We note that NAIC officials commented that while developing catastrophe bonds to cover terrorism is very difficult and may not occur in the medium-term, the potential exists that such bonds will be issued.

Investor Concerns Could Impede the Development of a Market for Terrorism-Related Securities

Investor concerns about catastrophe bonds related to terrorism could also make the costs to insurers of issuing such bonds prohibitive. In the absence of well-developed and contractual business relationships with the primary insurer, investors might not believe they had sufficient information about the extent to which an insurance company offered terrorism coverage to properties that were potentially highly vulnerable to a terrorist attack or the quality of an issuer's underwriting practices and claims payment processes. Because of investors' potential lack of information about insurer practices, they might demand a significantly higher rate of return before they would purchase a security that covered terrorism risks. Some insurance companies already have decided not to issue catastrophe bonds for natural catastrophes due to their relatively high costs. Given the uncertainties associated with forecasting the frequency and severity of terrorist attacks, it is likely that the costs associated with issuing terrorism-related bonds would be even higher.

Investors might also demand high returns on terrorism-related securities because of concerns about strategic behavior by terrorists. Investors might be concerned that terrorists would learn about the conditions that would activate the provisions of a catastrophe bond, and plan attacks on the basis of that knowledge. Although it is not clear that terrorists would make attacks based on such reasoning, investors fear that they would increase the risk premium demanded of such securities.

While developing a catastrophe bond to cover terrorism risks in the United States may be difficult, we note that in August 2003 a bond was developed to cover such risks—and other risks—in Europe. The Federation Internationale de Football Association (FIFA), the world governing body of association football—called soccer in the United States—and organizer of the FIFA World Cup developed a catastrophe bond to protect its investment in the 2006 World Cup in Germany. The bond is rated investment grade and covers natural and terrorist catastrophic events that result in the cancellation of the final World Cup game. Representatives from the rating agency that rated the bond said they were able to provide an investment grade rating because the bond's provisions make it highly unlikely that

investors will lose their principal.⁴³ For example, the officials said that it would require extraordinary circumstances for the final game to be cancelled. Under the bond's provisions, FIFA also has the flexibility to reschedule the final game and, if necessary, hold the event in another country. While the rating agency official said that the firm relied on natural catastrophe models to help assign a rating to the bond, the firm did not rely on terrorism models because terrorism is impossible to predict. Instead, the rating firm used an analytical approach developed by one of the modeling firms to analyze potential terrorist threats to the 2006 World Cup.⁴⁴ It remains to be seen how well the bond is accepted by investors and whether it will result in similar issuances.

Observations

Although catastrophe bonds to date have not transferred a significant portion of insurers' natural catastrophe risk exposures to the capital markets, the bonds do play a useful role for some companies and institutional investors. For some companies, catastrophe bonds supplement traditional reinsurance and may lower the costs associated with covering low-probability, high severity events. For some institutional investors, catastrophe bonds are attractive in limited quantities because of their relatively high rate of return and usefulness in portfolio risk diversification. However, the lack of interest by other large insurance companies and institutional investors may have been factors in limiting the broader expansion of the market for catastrophe bonds. Some large insurers and state natural catastrophe authorities viewed the bonds as too expensive compared to traditional reinsurance and large institutional investors view the bonds as too risky, not worth the costs of understanding the risks, and illiquid. Whether the catastrophe bond market expands in the future beyond the useful but limited role that it currently serves would likely depend upon changing the views of additional large insurance companies and institutional investors about the bonds' utility.

⁴³The structure of the bond rated investment grade guarantees that investors will recover at least 25 percent of their principal. Other provisions in the bond do not provide such protection to investors and were not rated. The rating agency also said that investor losses were not likely because Germany is not prone to natural disasters, the World Cup tournament is spread over many venues, and German security measures are stringent.

⁴⁴The rating agency's analysis concluded that terrorism is unlikely to affect the 2006 World Cup because, among other reasons, "...there is less involvement by the U.S. and greater sympathy for football in general."

The general view of insurance industry officials and financial market participants is that the development of a bond market covering terrorism risks in the United States would be challenging at this time. Although statistical models have been developed to assist insurance companies in providing terrorism insurance, the models appear to be too new and untested to use in conjunction with a bond related to terrorism. Developing such models is considered extremely challenging due to the complexity of attempting to predict the frequency and severity of terrorist attacks. Investors' lack of complete information about issuer underwriting practices and concerns about strategic behavior by terrorists, may make insurers' costs of issuing bonds covering terrorism prohibitive.

Agency Comments and Our Evaluation

We received written comments on a draft of this report from NAIC, BMA, and RAA. We also received technical comments from these organizations, which we have incorporated into the report text where appropriate.

NAIC commented that U.S. insurance regulators should encourage the development of alternative sources of capacity, such as insurance securitizations and risk-linked securities, so long as such developments are consistent with NAIC's overriding goal of consumer protection. NAIC also made several other points in its comment letter. First, NAIC stated that SPRVs should be brought on-shore and be subject to U.S. regulation, which could lower the costs associated with catastrophe bonds. Second, NAIC stated that the removal of any uncertainty regarding the tax treatment of catastrophe bonds could encourage the use of such bonds. We note that the tax treatment of catastrophe bonds was outside the scope of our review for this report but we discussed the issue in detail in our previous report on risk-linked securities. Third, NAIC concurred with our report finding on the difficulty in securitizing terrorism risk, however, NAIC also commented that some insurers are writing terrorism risk, and if it can be priced, then it can be securitized. In addition, NAIC objected to a reference in the draft report to insurance company representatives implying that state insurance regulators set premium levels below levels that the insurer believed were necessary to cover their expected losses on natural catastrophes and operating expenses. We have revised the report text to more accurately describe the procedures for setting insurance premiums and reflected NAIC's views in the report.

BMA commented that the draft report provided a timely and helpful assessment of the progress of catastrophe bonds in transferring natural and terrorism catastrophe risk to the capital markets. However, BMA

commented that while some insurers believe that catastrophe bonds are more expensive than reinsurance, other factors—such as reinsurer credit risk—must also be considered. In particular, BMA stated that the relative attractiveness of catastrophe bonds depends upon whether the particular risk is truly a “peak peril” of the type that has typically been addressed by catastrophe bonds, which can include Japanese earthquakes, California earthquakes, and Florida hurricanes. BMA stated that reinsurance companies charge higher premiums to cover these types of perils.

As stated in the report, reinsurance companies may limit coverage or charge increasingly higher premiums for low probability and high severity events, such as hurricanes or earthquakes expected to occur no more than once every 100 to 250 years. Some insurance companies have concluded that catastrophe bonds serve as a useful risk transfer mechanism for such risks and as an effective supplement to traditional reinsurance. Some insurance company officials also stated that catastrophe bonds can serve a role in lowering the costs of insuring against such risks. Other insurance companies and state authorities we contacted do provide coverage for such events as Florida hurricanes and California earthquakes. However, officials from these organizations said that catastrophe bonds are not cost-effective as compared to reinsurance for the severity of events that they are willing to insure against. For example, some insurance companies believe that reinsurance offers more cost-effective coverage for events expected to occur more frequently than once every 100 years.

RAA commented that our draft report provided a generally fair summary of the effort to securitize natural catastrophe risks and provides a very good overview of differing views on the utility of such bonds. However, RAA took exception to our draft report’s characterization of NAIC statutory accounting requirements for reinsurance as favorable compared to NAIC accounting requirements for certain catastrophe bonds. We have changed the language in the report to more clearly distinguish between the current grant of credit for traditional reinsurance and indemnity-based catastrophe bonds and NAIC’s review of potential changes to statutory accounting standards that would grant similar accounting treatment for nonindemnity based financial instruments that hedge insurance risk (including nonindemnity based catastrophe bonds). Such changes would allow credit to instruments that effectively hedge insurance risk because they are highly correlated with the issuer’s actual losses. We note that traditional reinsurance does not need hedge accounting treatment because it already receives credit for risk transfer.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution of this report until 30 days from the report date. At that time, we will provide copies of this report to the Chairman and Ranking Minority Member, Senate Committee on Banking, Housing, and Urban Affairs and the Ranking Minority Members, House Committee on Financial Services and its Subcommittee on Capital Markets, Insurance, and Government Sponsored Enterprises. Copies will also be provided to NAIC, BMA, RAA, and other interested parties. In addition, the report will be available at no charge on GAO's home page at <http://www.gao.gov>.

If you or your staff have any questions regarding this report, please contact Mr. Wesley M. Phillips or me at (202) 512-8678. GAO staff that made major contributions to this report are listed in appendix VIII.

A handwritten signature in black ink, appearing to read "Davi M. D'Agostino". The signature is fluid and cursive, with large loops and a prominent initial "D".

Davi M. D'Agostino
Director, Financial Markets and
Community Investment

Objectives, Scope, and Methodology

You asked us to update our September 2002 report on the role of catastrophe bonds and factors affecting their use and to report on the potential for terrorism risk to be securitized. As agreed with your offices, our objectives were to (1) assess the progress of catastrophe bonds in transferring natural catastrophe risks to the capital markets; (2) assess factors that affect the issuance or sponsorship of catastrophe bonds by insurance and reinsurance companies, including a status report on accounting issues raised in our previous report; (3) assess factors that affect investment in catastrophe bonds, and (4) analyze the potential for and challenges associated with securitizing terrorism-related financial risks.

Our general methodology involved meeting with a range of private-sector and regulatory officials to obtain diverse viewpoints on the status of efforts to securitize natural catastrophe and terrorism risks. We met with (1) three large insurers or reinsurers that currently issue catastrophe bonds and two insurers who currently do not, (2) two state authorities that currently do not issue catastrophe bonds through SPRVs, (3) three institutional investors—including a large pension fund and two hedge funds—that purchase catastrophe bonds and three large mutual funds that do not purchase catastrophe bonds, (4) investment banks that underwrite catastrophe bonds and monitor the market, (5) three large ratings agencies, (6) three modeling firms, (7) two large accounting firms, (8) two firms that engage in insurance and reinsurance brokerage, (9) the National Association of Insurance Commissioners (NAIC), (10) the Bond Market Association, and (11) the Reinsurance Association of America. Because of our reporting deadlines, we selected a judgmental sample of organizations to contact. We also reviewed our previous work on catastrophe bonds and insurance (see Related GAO Products) and data and reports provided by private-sector sources.¹

Even though we did not have audit or access-to-records authority for the private-sector entities, we obtained extensive testimonial and documentary evidence from them. However, we did not verify the accuracy of the data from these entities. We note that there is no central source of information on key issues, such as the number of catastrophe bonds issued or the

¹One of the insurance companies with whom we met does not currently issue catastrophe bonds, but did issue one such bond several years ago. One of the state authorities does not issue catastrophe bonds through SPRVs, but some risks that it had transferred to a reinsurer were included in a catastrophe bond issued by that reinsurer.

amount of catastrophe bonds outstanding. In such cases, we used professional judgment to determine how to present the data and what period of time to report.

To respond to the first objective, we reviewed data on catastrophe bond issuance from 1997 through 2002 provided by a firm that specializes in these securities. We also obtained data from a large reinsurer that collects data on the size of the catastrophe bond market relative to the worldwide reinsurance market and a firm that collects data on reinsurance prices. We also obtained data from the firm on the issuance of catastrophe bonds by large insurers and reinsurers.

To respond to the second objective, we asked insurance and reinsurance companies that issue or have issued catastrophe bonds why they had done so and what role the bonds played for their companies. We also asked other large insurance companies and two state catastrophe authorities that do not currently issue catastrophe bonds the basis for that decision. In addition, we asked financial market participants that support the use of catastrophe bonds—such as an investment bank and hedge fund—for their views on the costs associated with catastrophe bonds as opposed to reinsurance contracts. To update accounting issues raised in our 2002 report, we reviewed FIN 46 and interviewed officials from accounting firms, insurers, and NAIC.

To respond to the third objective, we spoke with three institutional investors that purchased catastrophe bonds and discussed their reasons for doing so. We also contacted representatives from three large mutual funds that had not purchased catastrophe bonds to obtain their views. We also obtained data comparing the returns on catastrophe bonds to other fixed-income investments, such as high-yield bonds.

To respond to objective four, we contacted insurance and reinsurance companies, modeling firms, rating agencies, investment banks, and NAIC. We reviewed a variety of documents including academic studies, insurance company and reinsurance company articles on terrorism and terrorism insurance, modeling firm and rating firm publications, and offering circulars.

We conducted our work between March and August 2003 in New York, Massachusetts, Ohio, Illinois, Pennsylvania, Texas, and Washington, D.C.

Statutory Accounting Balance Sheet Implications of Reinsurance Contracts

Over the duration of insurance policies, premiums that an insurance company collects are expected to pay for any insured claims and operational expenses of the insurer while providing the insurance company with a profit. The amount of projected claims that a single insurance policy may incur is estimated on the basis of the law of averages. An insurance company can obtain indemnification against claims associated with the insurance policies it has issued by entering into a reinsurance contract with another insurance company, referred to as the reinsurer. The original insurer, referred to as the ceding company, pays an amount to the reinsurer, and the reinsurer agrees to reimburse the ceding company for a specified portion of the claims paid under the reinsured policy.

Reinsurance contracts can be structured in many different ways. Reinsurance transactions over the years have increased in complexity and sophistication. Reinsurance accounting practices are influenced not only by state insurance departments through the National Association of Insurance Commissioners (NAIC), but also by the Securities and Exchange Commission and the Financial Accounting Standards Board. If an insurer or reinsurer engages in international insurance, both government regulatory requirements and accounting techniques will vary widely among countries.

Statutory accounting principles promulgated by NAIC allow an insurance company that obtains reinsurance to reflect the transfer of risk for reinsurance on the financial statements that it files with state regulators under certain conditions. The regulatory requirements for allowing credit for reinsurance are designed to ensure that a true transfer of risk has occurred and any recoveries from reinsurance are collectible. By obtaining reinsurance, ceding companies are able to write more policies and obtain premium income while transferring a portion of the liability risk to the reinsurer.

To illustrate, under many reinsurance contracts, a commission is paid by the reinsurer to the ceding company to offset the ceding company's initial acquisition cost, premium taxes and fees, assessments, and general overhead. For example, if an insurer would like to receive reinsurance for \$10 million and negotiates a 20 percent ceding commission, then the insurer will be required to pay the reinsurer \$8 million (\$10 million premiums ceded, less \$2 million ceding commission income). The effect of this transaction is to reduce the ceding company's assets by the \$8 million paid for reinsurance, while reducing the company's liability for unearned

Appendix II
Statutory Accounting Balance Sheet
Implications of Reinsurance Contracts

premiums by the \$10 million in liabilities transferred to the reinsurer. The \$2 million is recorded by the ceding company as commission income.

This type of transaction results in an economic benefit for the ceding company because the ceding commission increases equity. The reinsurer has assumed a \$10 million liability and would basically report a mirror entry that would have the opposite effects on its financial statements. Figure 8 shows the effects of the reinsurance transaction on both the ceding insurance company and reinsurance company's balance sheets and is intended to show how one transaction increases and decreases assets and liabilities.

Figure 8: Effect on Ceding and Reinsurance Companies' Balance Sheets before and after a Reinsurance Transaction

Ceding company				
	Before		After	
	Assets	Liabilities/ Equity	Assets	Liabilities/ Equity
Cash	\$25,000,000		\$17,000,000	
Unearned premium reserve		\$20,000,000		\$10,000,000
Policyholders' surplus		5,000,000		7,000,000
Total	\$25,000,000	\$25,000,000	\$17,000,000	\$17,000,000
Reinsurance company				
	Before		After	
	Assets	Liabilities/ Equity	Assets	Liabilities/ Equity
Cash	\$30,000,000		\$38,000,000	
Unearned premium reserve		\$25,000,000		\$35,000,000
Policyholders' surplus		5,000,000		3,000,000
Total	\$30,000,000	\$30,000,000	\$38,000,000	\$38,000,000

Source: Insurance Accounting Systems Association.

Reinsurance contracts do not relieve the ceding insurer from its obligation to policyholders. Failure of reinsurers to honor their obligations could result in losses to the ceding insurer.

An insurer may also obtain risk reduction from a special purpose reinsurance vehicle (SPRV) that issues an indemnity-based, risk-linked security; the recovery by the insurer would be similar to a traditional reinsurance transaction. However, if an insurer chooses to obtain risk reduction from sponsoring a nonindemnity-based, risk-linked security issued through an SPRV, the recovery could differ from the recovery provided by traditional reinsurance. Even though the insurer is reducing its risk, the accounting treatment would not allow a reduction of liability for the premiums.

FASB Interpretation No. 46, *Consolidation of Variable Interest Entities*

In January 2003, the Financial Accounting Standard Board (FASB) released Interpretation No. 46 with the objective of improving financial reporting by entities involved in variable interest entities (VIE)—an entity subject to consolidation according to the provisions of the Interpretation—and not to restrict the use of VIEs.¹ The goal is to help financial statement users understand the financial statements of VIE primary beneficiaries that consolidate as well as those with a significant variable interest that do not consolidate. Interpretation No. 46 states that to faithfully represent the total assets that an enterprise controls and liabilities for which an enterprise is responsible, assets and liabilities of the VIE for which the enterprise is the primary beneficiary must be included in an enterprise's consolidated financial statements.

What is a VIE?

The interpretation explains how to identify VIEs, which are entities that, by design, have one or both of the following characteristics:

1. The total equity investment at risk is not sufficient (insufficiency is presumed if the equity investment is less than 10 percent of the equity's total assets, but this presumption may be rebutted) to permit the entity to finance its activities without additional subordinated financial support from other parties. In other words, the equity investment at risk is not greater than the expected losses of the entity. Such subordinated financial support may be provided through other interests (including ownership, contractual, or other pecuniary interests) that will absorb some or all of the expected losses of the entity.
2. The equity investors lack one or more of the following essential characteristics of a controlling financial interest:
 - The direct or indirect ability to make decisions about the entity's activities through voting rights or similar rights;
 - The obligation to absorb the expected losses of the entity if they occur, which makes it possible for the entity to finance its activities; or

¹This analysis of FIN 46 is based on existing interpretations by private-sector analysts and publications. See, for example, Michael J. Pinsel. "Impact of FIN 46 on Insurance Industry Transactions." *Insurance and Financial Services Report* (Second Quarter Issue, 2003).

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- The right to receive the expected residual returns of the entity if they occur, which is the compensation for the risk of absorbing the expected losses.

Consolidate or Not?

The interpretation also gives guidance on how an enterprise assesses its interests in a VIE to consolidate that entity. FASB says that if a business enterprise has a controlling financial interest in a VIE, the assets, liabilities, and results of the activities of the VIE should be included in consolidated financial statements of the business enterprise. A direct or indirect ability to make decisions that significantly affect the results of the activities of a VIE is a strong indication that an enterprise has one or both of the characteristics that would require consolidation of the variable interest entity.

Primary Beneficiaries Must Consolidate

The interpretation requires existing unconsolidated VIEs to be consolidated by their primary beneficiaries if the entities do not effectively disperse risks among parties involved. A primary beneficiary is the party that absorbs a majority of the VIE's expected losses if they occur, receives a majority of its expected residual returns if they occur, or both. The primary beneficiary of the VIE is required to disclose (1) the nature, purpose, and size of the VIE; (2) the carrying amount and classification of consolidated assets that are collateral; and (3) any lack of recourse by creditors.

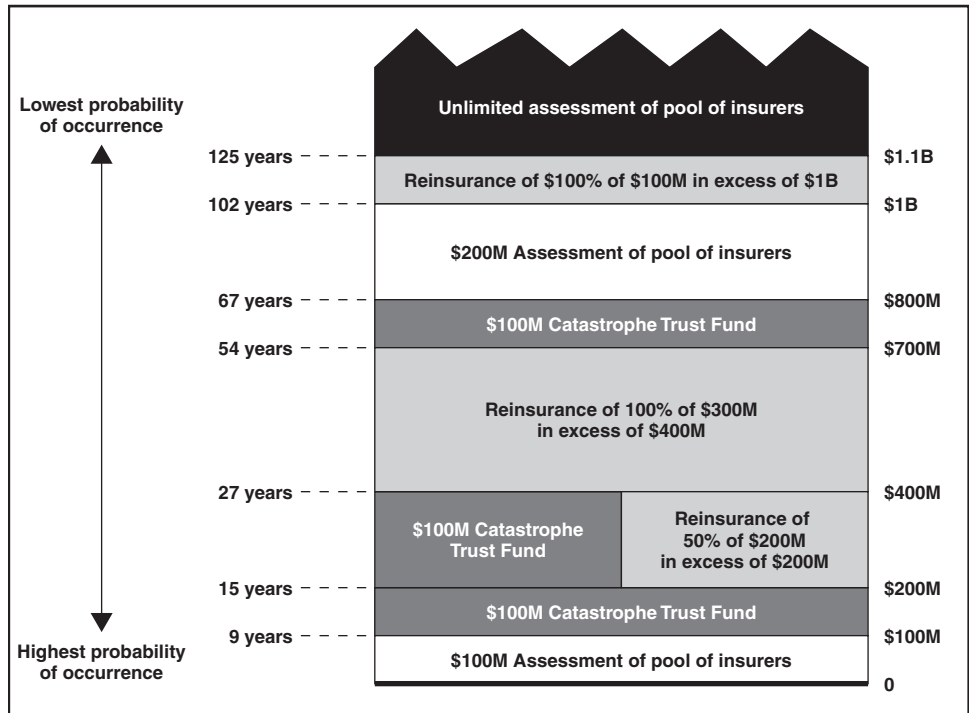
Texas Windstorm Insurance Association

In 1971, the Texas Legislature established the Texas Windstorm Insurance Association (TWIA) as a mechanism to provide wind and hail coverage to residents of 14 counties along the coast and portions of 1 additional county who are unable to obtain insurance in the voluntary market. The legislature's action was in response to insurance market constrictions along the Texas Gulf Coast after several hurricanes in the late 1960s and Hurricane Celia, which struck Corpus Christi in August 1970. TWIA is a pool of property and casualty insurance companies authorized to write coverage in Texas. Since its inception, the legislature has made it clear that TWIA was to write limited coverage for wind and hail in order to provide for the "orderly economic growth of the Coastal counties."

Residential and commercial rates for the TWIA are controlled by statute. The average residential policy costs more than \$500. There is an annual rate increase or decrease cap on both residential and commercial rates of 10 percent, except under unusual circumstances following a catastrophe or series of catastrophes, when the Commissioner of Insurance—after a public hearing—has the authority to lift the cap. Currently, it is estimated that TWIA provides 20 percent of the residential coverage for wind and hail and 50 percent of the seaward coverage in Texas.

As of June 30, 2003, TWIA had more than 89,000 residential and commercial policies and a claims paying capacity of more than \$1.1 billion. TWIA's total liability on these residential and commercial policies was more than \$17 billion. The organization's claims paying capacity consists of layers of assessment of their pool of insurers, the Catastrophe Trust Fund, and reinsurance. As shown in figure 9, for the bottom level of financing (\$0 to \$100 million) and the highest probability of occurrence (one in every 9 years), TWIA has coverage through its pool of insurers. For the next level of financing (\$100 to \$200 million) and probability of occurrence of once every 9 to 15 years, coverage comes from the Catastrophe Trust Fund.

Figure 9: Texas Windstorm Insurance Authority Financing



Source: TWIA.

The Catastrophe Trust Fund consists of funds originally provided by cancellation of a multiyear reinsurance contract. Coverage comes from the Catastrophe Trust Fund and reinsurance for the next layer of financing at (\$200 to \$400 million) and with a probability of occurrence of once every 15 to 27 years. The Catastrophe Trust Fund covers \$100 million of this layer while reinsurance covers an additional \$100 million. The next layer of financing is \$300 million of reinsurance and covers events occurring once every 27 to 54 years. The next layer of financing is \$100 million in coverage from the Catastrophe Trust Fund and covers events that occur once every 54 to 67 years. The next layer up of financing is a \$200 million assessment of its pool of insurers and covers events occurring once every 67 to 102 years. The next level of financing comes from \$100 million in reinsurance coverage. For any losses above this point, there is an unlimited assessment of TWIA's pool of insurers.

Comments from the National Association of Insurance Commissioners

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



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Ms. Davi M. D'Agostino
Director, Financial Institutions and Community Investment
United States General Accounting Office
Washington, DC 20548

September 5, 2003

Dear Ms. D'Agostino:

Thank you for giving the NAIC the opportunity to comment on the report "Catastrophe Insurance Risks: Status of Efforts to Securitize Natural Catastrophe and Terrorism Risk".

The National Association of Insurance Commissioners (NAIC) is a voluntary organization of the chief insurance regulatory officials of the 50 states, the District of Columbia and four U.S. territories. The association's overriding objective is to assist state insurance regulators in protecting consumers and helping maintain the financial stability of the insurance industry by offering financial, actuarial, legal, computer, research, market conduct and economic expertise.

As we mentioned in our comment letter to the previous GAO report, "Catastrophe Insurance Risks: The Role of Risk-Linked Securities and Factors Affecting Their Use", the NAIC formed a working group on Insurance Securitization in 1998 to "investigate whether there needs to be a regulatory response to continuing developments in insurance securitization, including the use of non-U.S. special purpose vehicles and to prepare educational material for regulators." As a result of its deliberations, the NAIC has taken the position that U.S. insurance regulators should encourage the development of alternative sources of capacity such as insurance securitizations and risk linked securities as long as such developments are commensurate with the overriding goal of the NAIC membership of consumer protection.

The NAIC continues to believe that one goal should be to encourage and facilitate securitizations within the United States. If transactions that are currently performed offshore were brought back to the United States, they would be subject to on-shore supervision by U.S. regulators. At present, offshore insurance securitizations are not subject to U.S. regulation, and the NAIC members are concerned about the appropriate use of Special Purpose Vehicles. The NAIC membership believes that, properly used and structured, Special Purpose Reinsurance Vehicles may provide extra capacity, more competition,

Appendix V
Comments from the National Association of
Insurance Commissioners

Ms. Davi M. D'Agostino
United States General Accounting Office

September 5, 2003
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and may reduce the overall costs of insurance for the public. The NAIC membership therefore believes that on-shore SPRVs, regulated by U.S. insurance regulators, would be preferable to the current situation where most securitizations are conducted offshore. In particular, the report mentions that certain commentators regard the costs of catastrophe bonds as too high and the market too illiquid: NAIC members hope that the creation of a domestic on-shore market for securitizations would expand the market and reduce overall costs, while increasing its liquidity.

It would appear that at least one major stumbling block to the wider use of risk linked securities remains the uncertainty regarding their tax treatment. While the NAIC membership takes no position on Federal Taxation issues, we would encourage the removal of the uncertainty one-way or the other.

The report at times reflects the flavor of an either/or argument regarding reinsurance and catastrophe bonds. The NAIC membership takes no position on whether catastrophe bonds are better or worse than reinsurance. The membership feels that consumers are best protected in the long term when there are alternative markets to provide protection.

We suspect that, were investors to be required to consolidate SPRVs, this would be detrimental to the development of the market. However, it would appear that such a requirement would probably only exist when one investor owns more than 50% of a bond issuance, and this would likely be a rare occurrence.

We concur with the conclusion that terrorism risk would likely be very difficult to securitize, but believe that efforts are being made to model the risk. Additionally, some insurers are writing terrorism risk, and if it can be priced, then it can be securitized. However, the current practical difficulties pointed out in the report would likely prevent this occurring in the medium term.

We object to the reference to the insurance company representative implying that "state insurance regulators set premium levels below levels that the insurer believed were necessary to cover their expected losses on natural catastrophes and operating expenses." It is not within the purview of state insurance regulators to establish rate levels for insurers. The statutory framework requires that the insurer develop rates and, in some jurisdictions, file these resulting rate levels with insurance regulators. In some cases the regulator has approval authority over the rates charged, however, often the statutory language places limitations on that authority.

Further, ratemaking is an art rather than a science. Reasonable people can disagree on the proper rate to charge for a specific insurance product. Rates are made on a prospective basis and any two actuaries can make different assessments regarding factors that influence the price of a product in the future. They might disagree on the rate of inflation or trend factors that are used to

See comment 1.

See comment 2.

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estimate the future losses. Thus, it is incorrect to assume that any time a regulatory actuary and an industry actuary disagree on "the price" that the regulatory actuary is always wrong and engaging in rate suppression. This person is not complaining about the price of reinsurance or of catastrophe bonds – he is simply saying that his actuary and a regulatory actuary disagree on "the price" and clearly he believes that his actuary was correct and the regulatory actuary was wrong. It should also be noted that it is rare for insurance companies to complain that approved insurance rates are too high.

Again, we thank you for the opportunity to review and comment on the report.

Sincerely,



Ernst N. Csiszar
Vice President, NAIC
Director of Insurance, State of South Carolina

Appendix V
Comments from the National Association of
Insurance Commissioners

The following are GAO's comments on the National Association of Insurance Commissioner's letter dated September 5, 2003.

GAO Comments

1. We have reflected NAIC's views in the report.
2. We have revised the text and reflected NAIC's views in the report.

Comments from the Bond Market Association

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

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September 5, 2003



Ms. Davi M. D'Agostino
Director, Financial Markets and Community Investment
United States General Accounting Office
Washington, D.C. 20548

Re: **Comments on Draft GAO Report, "Status of Efforts to Securitize Natural Catastrophe and Terrorism Risk" (GAO-03-1033)**

Dear Ms. D'Agostino:

The Bond Market Association (the "Association")¹ is pleased to respond to GAO's request for comments on the above-referenced draft report (the "Report").

We believe that the Report offers a timely and helpful assessment of the progress of catastrophe bonds in transferring natural catastrophe risk to the capital markets, several key business, economic, and regulatory factors that may affect the issuance of and investment in catastrophe bonds, and the potential for securitizing terrorism-related financial risks.

We have divided our comments on the Report into two principal sections. The first section of this letter offers several general comments and observations that relate to certain broader themes and policy issues raised in the Report. The second section provides input on a number of specific, technical issues throughout the document. Our general and specific comments follow.

I. Broader/General Comments

A. The Comparable Costs of Catastrophe Bonds and Traditional Reinsurance

The Report correctly notes that some insurers believe that the total costs of catastrophe bonds—including relatively higher rates of return to investors and administrative costs—significantly exceed the costs associated with purchasing reinsurance coverage. However, as further noted in the Report, some financial market participants believe that insurers' comparisons of the costs of catastrophe

¹ The Association represents securities firms and banks that underwrite, distribute, and trade fixed income securities, both domestically and internationally. Our members are actively involved in the primary issuance and secondary trading markets for risk-linked securities. This letter was prepared based upon input provided by members of the Association's Risk-Linked Securities Committee, which includes senior business and legal professionals from Association member firms. Additional information about the Association, its members, and activities may be obtained via the Internet at www.bondmarkets.com.

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bonds and traditional reinsurance fail adequately to account for several important factors that can materially influence this analysis, such as the credit quality and stability of reinsurers. In addition to the elimination of counterparty credit risk, we believe there are several other important factors to consider when analyzing cost difference between catastrophe bonds and traditional reinsurance.

First, we believe that the relative attractiveness of catastrophe bonds depends on whether the particular risk is truly a "peak" peril of a type that has customarily been addressed via catastrophe bonds—perils where the potential industry aggregate insured losses are the greatest. Insurers incur greater costs and credit risk in connection with traditional reinsurance for these types of perils, which may make the relative costs and credit quality of catastrophe bonds more attractive. Examples of peak perils would include Japanese earthquake, California earthquake, and Florida hurricane exposures. Reinsurers need to hold more capital in reserve for peak peril catastrophes than for non-peak perils and, therefore, need to charge greater premiums to cover the cost of this additional capital. In addition, from an insurer's perspective, peak industry risks magnify counterparty concerns already present in traditional reinsurance. In other words, a single reinsurer is more likely to become insolvent following a San Francisco earthquake than following a Galveston hurricane.

See comment 1.

Page 24 of the Report states that insurers that are considering issuing catastrophe bonds likely must pay substantial interest costs in order to attract investors, and that at least one large insurer and state catastrophe fund reported that quotes they received from investment banks on the interest costs associated with catastrophe bonds exceeded the costs of comparable reinsurance. We believe that this specific example likely involved a non-peak peril, resulting in reinsurance rates that are considerably lower than a peak-peril risk, thus making catastrophe bonds a less relevant choice in that circumstance.

See comment 2.

We believe a second important factor to consider when comparing costs of catastrophe bonds and traditional reinsurance is that catastrophe bonds offer multi-year fixed pricing, thereby protecting the insurer against reinsurance price volatility and allowing the purchaser to hedge against future increases in reinsurance rates. This is particularly important for a primary insurer subject to rate regulation where such regulation limits the insurer's ability to fully pass through reinsurance rate increases to their policyholders in a single year. In comparing costs, in addition to considering the peak peril/non-peak peril distinction discussed above, additional adjustments are appropriate for the value of multi-year fixed pricing.

See comment 3.

Finally, the Report also notes that some insurance company officials and state catastrophe fund representatives cited administrative and transaction costs as one of the reasons for the relatively high costs associated with catastrophe bonds, and that the transaction costs alone could represent 2 percent of the coverage provided. We believe it is important to note that catastrophe bond transaction costs decline as a

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percentage of limit provided when the deal size and bond maturity increase. It should also be noted that most catastrophe bond transactions are 3-5 years in term and the cost is amortized over the life of the bond. Therefore, on an annualized basis, transaction costs related to catastrophe bond issuance are more comparable to traditional reinsurance. These costs also represent a one-time administrative cost rather than the ongoing costs generated by continuous price and credit monitoring and negotiations with the reinsurance market. We also note that in order to address superfluous transaction costs associated with the need to structure catastrophe bonds through off-shore special purpose reinsurance vehicles (SPRVs), the Association has urged changes to the Internal Revenue Code which would allow on-shore catastrophe bond transactions. This change would reduce transaction costs and expand the potential investor base for catastrophe bonds at little or no cost to the federal treasury.

We believe that substantial support can be found for the above views among senior credit rating agency personnel who are responsible for evaluating insurers' financial strength. To the extent time and resources permit, speaking with these individuals may be a valuable opportunity for additional GAO follow up.

B. Accounting Issues Affecting Insurers

In its discussion of the accounting issues raised by FASB's Interpretation No. 46, *Consolidation of Variable Interest Entities* (FIN 46), the Report states that if an insurer were required to consolidate the assets and liabilities of an SPRV under FIN 46, the insurer would lose part of the benefit of the reinsurance contract that it enters into with the SPRV. In other words, the risks that the insurer had transferred from its books through the issuance of catastrophe bonds would be "returned" to the insurer. We believe that this is not an entirely accurate description of the result. If a catastrophe bond SPRV is required to be consolidated by the transaction sponsor, and the bond is triggered to exhaustion (a complete loss), the consolidating transaction sponsor would receive a payment from the SPRV and the insurer's assets would remain the same (assets in the SPRV which the insurer did not control are converted to cash which it owns); however, the liability for debts it did not owe is reduced to zero.

We further note that such consolidation under FIN 46 would also limit the appeal of catastrophe bonds because the proceeds of the bond offering would appear as additional leverage on the insurer's balance sheet although these proceeds are dedicated for a specific purpose.

Finally, the Report states that the National Association of Insurance Commissioners (NAIC) is still considering a statutory accounting issue, discussed in the GAO's 2002 Report, concerning insurers' current inability to obtain statutory accounting treatment for certain catastrophe bonds that is similar to the regulatory accounting treatment they receive for purchasing reinsurance. We believe it is important to note that NAIC

See comment 4.

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accounting treatment is only important for certain primary insurance companies. For most potential transaction sponsors, NAIC accounting treatment is not an applicable or relevant consideration.

C. Factors Affecting Investment

Several sections of the Report include statements to the effect that some institutional investors reported they were not willing to purchase catastrophe bonds because of their relative illiquidity when compared with traditional bonds and equities. The Association disagrees with this assertion of relative illiquidity. Most catastrophe bonds are issued at a BBB or BB rated level. Catastrophe bonds in fact enjoy similar or better liquidity relative to similarly rated bonds. Bid/ask spreads are in fact tighter than for comparably rated bonds. Admittedly, AAA credit card ABS paper trades on a more liquid basis, but this is not a relevant comparison.

The top of page 36 of the Report quotes a mutual fund representative as saying that catastrophe bonds "trade by appointment," and that his fund's policies did not allow for the purchase of such illiquid securities. We believe that these types of mutual funds do not invest in high-yield bonds, BB-rated ABS paper, or other similarly rated bonds.

The top of page 35 of the Report states that one mutual fund official reported that if a natural catastrophe occurred and the provisions of catastrophe bonds were activated, creditors would have no opportunities to minimize their losses, as occurs when companies go into bankruptcy. We believe this is not entirely accurate. While an initial loss might wipe out a catastrophe bond, it is not an inevitable result that if the bond is triggered, the bond defaults entirely. Further, with respect to hurricanes, the storms develop over several days offering trading opportunities. Also, a number of second and subsequent event catastrophe bonds exist, offering still further opportunities to trade away the bonds as they become riskier.

II. Specific/Technical Comments

For ease of reference, the following technical comments are keyed to specific page numbers of the Report:

Page 4: At the bottom of this page and the top of page 5, please note that Swiss Re Capital Markets provided the data on the amount of catastrophe bonds outstanding at the end of 2002, and Swiss Reinsurance Company provided the data on outstanding catastrophe bonds as a percentage of the worldwide catastrophe reinsurance coverage in 2002.

See comment 5.

See comment 6.

See comment 7.

See comment 8.

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See comment 9.

Page 13: The footnote on this page states that “[m]ost SPRVs are based off-shore for tax purposes.” We believe an important reason for setting up SPRVs in the Cayman Islands and Bermuda is the excellent support infrastructure for efficiently operating the entities.

See comment 10.

Page 14: We believe that several minor changes to Figure 3 would more precisely depict the components of actual cash flows in a typical catastrophe bond. Specifically, the arrow depicting the flow of “principal plus interest” from the SPRV to investors should indicate that the SPRV pays to investors interest from the assets invested in the trust, plus the amount of premium that is conveyed by the insurer/reinsurer to the SPRV (which premium constitutes the principal assets of the trust). The arrow depicting the flow of “principal and premium” from the SPRV to the trust should indicate that the SPRV conveys principal, only (i.e., the amount of premium referred to above) to the trust.

See comment 11.

Page 15: This section of the Report states that one of the characteristics of catastrophe bonds is a relatively high return to investors, exceeding the returns on comparable fixed-rate investments, such as high-yield corporate debt. We believe that historical return is not the only way to look at pricing as it takes into account appreciation and depreciation in the positions. Another approach is to look at yields. From this perspective, BB catastrophe bond yields are comparable to yields on BB corporate bonds (and BB CMBS) rather than wider.

See comment 12.

Page 16, Page 28: These sections of the Report include statements to the effect that catastrophe bonds typically cover risks that are considered the lowest probability and highest severity (those expected to occur no more than once every 100 to 250 years), and that they do not typically provide coverage for events expected to occur more frequently than once every 100 years. While historically this has been true, in recent times a significantly greater percentage of bonds have covered events occurring more frequently than 100 years. We expect this trend to continue.

See comment 13.

Page 16: Paragraph (5) on this page states that catastrophe bonds are typically nonindemnity rather than indemnity-based. While it is true that there is a market trend toward nonindemnity-based bonds, indemnity-based transactions do continue to be executed.

See comment 14.

Page 21: Residential Re 2003 has been completed since the GAO conducted its field research for the report. Attached as Exhibit I to this letter is a one page case study of the Residential Re 2003 transaction. We submit that GAO may want to replace its description of the 2002 Residential Re transaction with the newer one, which would reflect that the investors are willing to take much more complex, multi-year, multi-peril indemnity risk.

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See comment 15.

Page 26: A statement appears on this page indicating that insurers' preference for traditional reinsurance may be explained in part by "their long-standing business relationships with reinsurance companies." While the quality and duration of such relationships are important factors in the insurance and reinsurance business, our members' experience strongly suggests that the existence of such relationships has not inhibited insurers from pursuing better and more efficient ways of achieving their business goals.

See comment 16.

Page 28: At the bottom of this page, insurance company officials indicate that catastrophe bonds are typically only available in coverage denominations of \$100 million or more. Although there are significant economies of scale in catastrophe bond issuances, such bonds can and have been issued in coverage denominations of less than this amount.

See comment 17.

Page 35: At the bottom of this page, the Report cites a publication from Fitch which indicated that the secondary market for catastrophe bonds is limited and investors should be willing to hold them until they mature. This Fitch report is out of date and no longer accurate.

III. Conclusion

Again, the Association greatly appreciates the opportunity to comment on the Report. We commend the GAO for producing a useful and illuminating document, which should inform future legislative, regulatory, and broader policy discussions concerning the status of efforts to securitize natural catastrophe and terrorism risk.

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We would be pleased to assist you in any further research you may conduct in connection with this topic. Should you have questions or desire additional information concerning any of the matters addressed in the foregoing comments, please do not hesitate to contact either of the undersigned at (646) 637-9200.

Sincerely,



George P. Miller
Senior Vice President and Deputy General Counsel
The Bond Market Association



Michele C. David
Vice President and Assistant General Counsel
The Bond Market Association

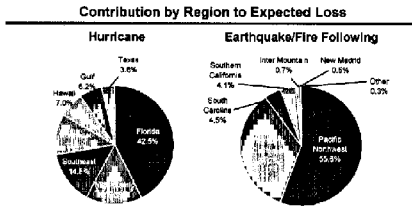


Case Study: Residential Reinsurance 2003 Limited

\$160 Million US Hurricane and Earthquake Securitization Providing Reinsurance to USAA

Key Terms	
Issuer:	Residential Reinsurance 2003 Limited
Risk Capital:	\$160 million
Scheduled Maturity:	June 8, 2008, extendible in 3-month intervals up to December 8, 2007
Covered Perils:	US Hurricanes and Earthquakes (including Fire Following)
Annual Modeled Trigger Probability:	1.10%
Annual Modeled Expected Loss:	0.48%
Reset:	Annual reset will be performed to maintain constant trigger and expected loss probabilities
Initial Modeling and Reset Agent:	AIR Worldwide Corporation
Ratings:	BB+/Ba2 (S&P/Moody's)
Coupon:	3-Month USD LIBOR + 4.95%
Initial Purchasers:	Goldman Sachs – Bookrunner and Lead Manager BNP Paribas – Co-manager

Contribution by Peril to Expected Loss	
Hurricane	58%
Earthquake/Fire Following	42%



- Transaction Highlights**
- Seventh consecutive placement by Residential Reinsurance of catastrophic risk into the capital markets for the benefit of USAA
 - Over the past seven years, USAA has purchased nearly \$1.7 billion of reinsurance via the capital markets
 - First Residential Reinsurance transaction to provide USAA with aggregate coverage for losses resulting from hurricanes and earthquakes/fire following
 - First transaction in the market to include Alaska and Hawaii earthquake risk

Transaction Comparison

Res Re	Size (\$MM)	Spread (bps)	Attachment Probability ¹	Expected Loss ²	Ratings (S&P/Moody's)
2003	\$180	495	1.10%	0.48%	BB+/Ba2
2002	125	490	1.12	0.67	BB+/Ba3
2001	150	499	1.12	0.68	BB+/Ba2
2000	200	410	0.95	0.54	BB+/Ba2
1999	200	366	0.76	0.45	BB/Ba2
1998	450	400 ²	0.87	0.58	BB/Ba2
1997	400	576	1.00	n/a	BB/Ba2

¹ As modeled by AIR Worldwide Corporation at time of transaction – model's updated between transactions for 1997-2003 transactions.
² \$165p for 50 weeks.

The following are GAO's comments on the Bond Marketing Association's (BMA) letter dated September 5, 2003.

GAO Comments

1. The two insurance companies that we discussed in this section of the report as well as one state authority cover Florida hurricanes or California earthquakes ("peak perils" as defined by BMA). Officials from each of these organizations said that they have compared the costs associated with catastrophe bonds to traditional reinsurance and did not consider catastrophe bonds cost-effective for their catastrophe reinsurance needs for the level of risks that they insure against (although they may have other reasons for not using catastrophe bonds including the fact that most SPRVs are based offshore). The other state authority does not cover either Florida hurricanes or California earthquakes but considers catastrophe bonds as not cost-effective compared with traditional reinsurance for its business.
2. While multi-year fixed pricing may be a factor in catastrophe bonds' favor, none of the insurers or state authorities we contacted who currently do not issue catastrophe bonds cited it in our discussions.
3. The BMA is correct in its statement that catastrophe bond transaction costs decline as a percentage of the (coverage) limit provided as deal size and bond maturity increase. However, some insurance company and state authority representatives said that it was not cost-effective for them to issue catastrophe bonds in amounts large enough to offset the transaction costs.
4. We have clarified the language in the report with respect to the potential effects that consolidation would have for potential catastrophe bond issuers.
5. We have reflected BMA's position in the report. We note that BMA's position differs from that of several large mutual fund companies we contacted who said that catastrophe bonds are illiquid.
6. The mutual fund companies that we contacted offer high-yield bond funds to their investors.
7. We have clarified language in the report stating that investors do not always face total losses if catastrophe bond provisions are triggered.

8. We have clarified the language in the report.
9. We have added language to the report that provides additional reasons that most SPRVs are based offshore.
10. We have made revisions to the figure.
11. We agree that there are different approaches to comparing the returns on different types of financial instruments and have clarified language in the report. The data we obtained suggest that catastrophe bonds have had a higher return than high-yield corporate debt in 2002. The scope of our work did not involve identifying or assessing other measures, although we note that BMA believes that catastrophe bonds yields are comparable to high-yield corporate debt.
12. As discussed in this report, many catastrophe bonds have covered events expected to take place no more than once every 100 to 250 years. It remains to be seen whether a greater number of catastrophe bonds covering events expected to take place more frequently than once every 100 years will occur.
13. As noted in the report, some insurers issue or have issued indemnity-based catastrophe bonds.
14. We have revised the figure in the report.
15. We agree that some insurers find that catastrophe bonds serve as an important supplement to traditional means of managing risk, such as reinsurance or limiting coverage in high-risk areas.
16. We have reflected BMA's position in the report.
17. A Fitch representative we contacted said that the report cited in the draft report had not been updated since 2001. We revised the text and stated BMA's position.

Comments from the Reinsurance Association of America

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

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September 3, 2003

Ms. Davi M. D'Agostino
Director of Financial Markets and
Community Investment
United States General Accounting Office
441 G Street, N.W.
Washington, DC 20508

Dear Ms. D'Agostino:

The Reinsurance Association of America (RAA) appreciates this opportunity to comment on the GAO's draft report entitled "Catastrophe Insurance Risks: Status of Efforts to Securitize Natural Catastrophe and Terrorism Risk."

The RAA is a national trade association representing property and casualty organizations that specialize in reinsurance. The RAA membership is diverse, including large and small, broker and direct, U.S. companies and subsidiaries of foreign companies. Together RAA members write more than two-thirds of the reinsurance written by U.S. property casualty reinsurers.

We believe that this report provides a generally fair summary of this issue and is a valuable follow-up to your first report on this topic entitled "Catastrophe Insurance Risks: The Role of Risk Linked Securities and Factors Affecting Their Use." However, we also believe that the report contains errors with respect to the characterization that current NAIC accounting guidance favors indemnity reinsurance as compared to certain types of catastrophe bonds. The discussion of the accounting environment fails to adequately differentiate between indemnity reinsurance contracts and financial instruments such as index-linked catastrophe bonds that are intended to hedge insurance risks.

The report provides a very good overview of the insurance industry's and capital markets' perspectives on the relative advantages of reinsurance and catastrophe bonds. While we take issue with some of the comments attributed to financial markets participants in the report, we found this information enlightening. We agree with the conclusion in the report that securitization of terrorism risk poses significant challenges. We agree that transactions intended to transfer or hedge terrorism risk via risk-linked bonds are unlikely to occur in the near future.

See comment 1.

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Current NAIC Accounting Requirements for Reinsurance and Catastrophe Bonds are Consistent

There are numerous references in the report, which indicate that current NAIC accounting rules favor traditional reinsurance contracts over certain types of catastrophe bonds. We believe these statements are in error and may cause a fundamental misunderstanding of the current NAIC and GAAP guidance for indemnity (re)insurance and hedging transactions. Traditional reinsurance transactions and indemnity-based catastrophe bonds both provide reinsurance credit to the cedant. Similarly, reinsurance accounting credit is not granted for either non-indemnity-based reinsurance or for non-indemnity catastrophe bonds. The reinsurance cover provided by the SPRV to the cedant and illustrated in Figure 3 of the report is treated the same way as a reinsurance cover provided by a reinsurer directly. Moreover, the NAIC Special Purpose Reinsurance Vehicle Model Act requires that SPRV's follow the same requirements of the Credit For Reinsurance Model Law and Regulation applicable to reinsurance transactions.

The pending accounting change under consideration by the NAIC relates to the accounting requirements for index-based insurance-linked derivatives. If and when this guidance is adopted, it could be applied to non-indemnity (index-based) triggers in a catastrophe bond transaction. If that occurs, index-based catastrophe bonds may be granted financial statement credit similar to reinsurance if the transaction effectively hedges the insurance risk. Traditional reinsurance transactions are not eligible for this favorable hedge accounting because they are subject to SSAP No. 62 and SFAS No. 113. Thus if the NAIC adopts this guidance, SPRV's would receive hedge accounting treatment that is not granted to traditional reinsurance.

There is a fundamental difference between the indemnification provided by a traditional reinsurance contract (or an indemnity-based SPRV reinsurance contract) and a financial instrument that hedges insurance risk. That difference is the existence of true risk transfer. NAIC SSAP No 62 *Property Casualty Reinsurance* states that:

"The essential ingredient of a reinsurance contract is the transfer of risk. The essential element of every true reinsurance agreement is the undertaking by the reinsurer to indemnify the ceding entity, i.e., reinsured entity, not only in form but in fact, against loss or liability by reason of the original insurance. Unless the agreement contains this essential element of risk transfer no (accounting) credit shall be recorded."

An index-based catastrophe bond (or a non-indemnity-based reinsurance contract) does not indemnify the cedant and transfer insurance risk under this definition. The intent of the proposed NAIC guidance for index-based insurance-linked derivatives is to create a favorable exception for financial instruments that effectively hedge insurance risk and therefore are expected to be highly correlated with the cedant's actual losses. The key to this exception is the determination that the derivative is a highly effective hedge of the cedant's insurance risk. This measure of effectiveness is intended to be comparable to the

See comment 2.

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risk transfer thresholds necessary for traditional reinsurance contracts under SSAP No. 62 and FASB No. 113.

In summary, NAIC accounting guidance currently treats traditional reinsurance and indemnity catastrophe bonds identically because both transfer risk in accordance with SSAP No. 62. If adopted, the proposed NAIC guidance for index-based insurance-linked derivatives will establish reinsurance-like accounting for highly effective hedges of insurance risk, including non-indemnity catastrophe bonds. This proposed reinsurance-like treatment will not be available to reinsurance transactions, which are subject to SSAP No. 62 and FASB No. 113.

Insurance Indemnification and Financial Instrument Hedges are Different

A related problem in the draft report is the use of hedging and indemnity reinsurance terminology as if they were interchangeable. As noted above, there are fundamental differences between indemnity-based (re)insurance and hedging risks using financial instruments. These differences are recognized in the U.S. tax code, which provides unique rules for deduction of indemnity-based insurance reserves and in GAAP guidance in the U.S. and around the world. In fact, one of the major problems with the International Accounting Standards Board's project on insurance contracts is rooted in their efforts to treat insurance contracts as if they were equivalent to other financial instruments.

Because of these differences, the NAIC proposal on insurance-linked derivatives does not grant reinsurance accounting to these transactions. Instead, the NAIC proposal creates "reinsurance-like" accounting that is reported separately from reinsurance on the financial statements. The proposed guidance also includes separate and comprehensive disclosure of insurance hedging transactions to recognize these differences. Indemnification is unique to (re)insurance contracts and it should not be confused with financial instrument hedging transactions.

Characterization of Reinsurance Costs by Investment Banks

The draft report states that some investment banks question insurers' analysis of cost differences between catastrophe bonds and traditional reinsurance. These comments focused on credit deterioration of some reinsurers and the assertion that reinsurance contracts frequently involve litigation. We believe that insurers are better positioned to evaluate these costs and agree with the insurers' comments that they have adequate policies to continually monitor reinsurance credit risk.

While many reinsurers have experienced credit deterioration recently, this has been due to unusually large losses relating to September 11, adverse loss development relating to certain mass tort risks such as asbestos and to declines in investment income. With regard to investment income, investment losses have been much more severe for reinsurers domiciled in non-U.S. jurisdictions where equity security losses have not been mitigated by the more stringent investment limitations required of U.S. reinsurers.

See comment 3.

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Though not perfect by any means, the U.S. regulatory system addresses reinsurance exposure for major catastrophe and tort losses as well. U.S. insurers and reinsurers are subject to limits with respect to the amount of exposure to a single risk or reinsurance contract. U.S. (re)insurers are subject to comprehensive regulation and to comprehensive reporting in the NAIC Annual and Quarterly Statement filings. U.S. reinsurers are subject to annual independent audits and to very stringent annual actuarial opinions. To receive reinsurance credit, a cedant's reinsurance must be with an authorized (U.S. regulated) reinsurer or be subject to collateral requirements. All of these factors, plus the cedant's ongoing credit analysis of its reinsurance exposure substantially mitigate reinsurance credit risk.

See comment 4.

We strongly disagree with the comment that reinsurance contracts frequently involve litigation over whether insurer claims should be paid. First, virtually every reinsurance contract contains an arbitration clause. Disputes that arise are rarely litigated. Instead disputes are subject to arbitration by industry experts that generally result in a more swift and fair resolution than would litigation. Second, if reinsurance contracts frequently resulted in litigation, surely there would be much less use of these contracts. A certain percentage of contracts in any type of business or industry give rise to disputes between the parties. Reinsurance contracts are no exception. However, one must bear in mind that the number of these contracts entered into each year are in the hundreds of thousands. The fact is that the vast majority of reinsurance claims are paid in the normal course of business.

See comment 5.

Finally, and as noted in our comments on the first GAO report on securitization, it is important to recognize that not one catastrophe bond contract has ever been triggered by an actual event. Therefore not one securitization has yet to go through the process of paying out claims. Despite the fact that the catastrophe bond proceeds are maintained in a trust, this does not immunize these transactions from litigation risk if the capital market investors believe that they were not apprised of all of the facts and risks of the transaction.

Technical Comments

Reinsurance Does Not Receive More Favorable Accounting Treatment:

See comment 6.

- First full paragraph on page 6 is incorrect. Reinsurance and catastrophe bonds receive identical accounting treatment as described in the body of our comments above.

See comment 7.

- Footnote 13 on page 6 is incorrect. Current NAIC guidance does provide risk transfer treatment for catastrophe bond reinsurance transactions that are indemnity based. Currently, neither index-based catastrophe bonds nor index-based reinsurance transactions receive risk transfer treatment. If the NAIC proposal is adopted index-based catastrophe bonds will receive reinsurance-like accounting that is not available to reinsurance transactions.

See comment 8.

- Last sentence of first full paragraph on page 26 is incorrect. "Also as described below, current accounting rules favor traditional reinsurance contracts as compared

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See comment 9.

See comment 10.

See comment 11.

See comment 12.

See comment 13.

See comment 14.

to certain types of catastrophe bond issuances.” This statement is incorrect as described above.

- Page 29 discussion of NAIC accounting requirements. Except for the comments below, this is an accurate description of the accounting issues pending at the NAIC. However, the conclusion drawn is incorrect. Because the NAIC has not granted special, reinsurance-like accounting treatment for non-indemnity catastrophe bonds, it does not follow that traditional reinsurance currently enjoys more favorable treatment. This issue is discussed in detail elsewhere in this letter.
- The sentence in the middle of page 29 should be amended as follows: “However, statutory accounting rules currently do not allow insurance companies to obtain a similar credit for non-indemnity-based insurance hedging transactions – which can include certain catastrophe bond structures – and may therefore limit the appeal of catastrophe bonds to potential ~~issuers~~ investors. As described elsewhere in this document non-indemnity-based insurance is a misnomer and the appeal is primarily for investors not issuers.
- Page 30 penultimate sentence should be amended as follows: “if NAIC were to ultimately approve a reinsurance-like credit for non-indemnity-based ~~insurance~~ hedging transactions, it could take about one year for the new standards to be implemented. See comments above and below.

Indemnity Versus Hedging:

- Modify first sentence on page 10 as follows: “In order to transfer hedge some of this risk, primary insurers purchase coverage from an insurance company.” By definition, reinsurance indemnifies the cedant and provides risk transfer, while financial instruments are used for hedging transactions.
- Last two sentences on page 22. This language muddles the risk transfer vs. hedging issue. The report states “[insurance] Company officials said that while reinsurance accounted for most *risk transfer needs*, catastrophe bonds help *hedge* some of the company’s natural catastrophe risks. Representatives from a reinsurance company said that catastrophe bonds allowed them to *transfer* a portion of their natural catastrophe exposures to the capital markets rather than retaining the exposure on their books or retroceding the risks to other reinsurers” (emphasis added).
In one case the insurer is hedging risk with catastrophe bonds and in the other the reinsurer is transferring risk with catastrophe bonds. This is correct only if the insurer is using non-indemnity (index based) cat bonds and the reinsurer used indemnity-based bonds.
- Footnote 29 page 29. The second sentence should be amended as follows: “However, NAIC is currently considering the appropriate accounting treatment for non-indemnity-based ~~insurance~~ hedging transactions which could include certain catastrophe bonds.” Non-indemnity-based insurance does not exist for reinsurance contracts as discussed above. The remainder of this footnote includes an accurate discussion of basis risk, correlation in hedging transactions and the potential granting of credit that is *similar* to reinsurance. See also comments in accounting section regarding pages 29 and 30.

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See comment 15.

Statement that Reinsurance Contracts Frequently Involve Litigation is Incorrect and Not Supported

- Last Sentence of first paragraph on page 27. In a comment attributed to financial markets participants, the report states that "reinsurance contracts frequently involved litigation over whether insurer claims should be paid." As described above, we do not believe the facts support this statement. The report should either provide the insurance and reinsurance industry's view of this issue or better still, provide statistics on reinsurance paid claims volume versus disputed claims volume.

See comment 16.

Factors Contributing to Reinsurance Price Increases:

- Modify last sentence on page 12 as follows: "We note that after declining in the mid-to-late-1990's, reinsurance prices increased from 1999 to 2002 due to several factors including losses associated with hurricanes, adverse loss development on business written in 1997 through 2000, adverse loss development relating to asbestos, declining credit quality of some European reinsurers due to declining stock prices, declining investment income due to decreased interest rates, and costs associated with the September 11, 2001, terrorist attacks."

See comment 17.

Insurers' Preference for Traditional Reinsurance:

- Page 26 and other sections of the report discuss the reasons for insurers' preference for traditional reinsurance. A key element missing from these discussions is the basis risk associated with non-indemnity (index-based) catastrophe bonds. Basis risk is defined as the "Risk that there may be a difference, (either positive or negative) between the performance of the insurance derivative instrument and the losses sustained from the indemnified direct or assumed exposure being hedged" (*Index-Based Insurance Derivatives - Interested Parties of the Insurance Securitization Working Group*).

Since indemnity-based reinsurance and catastrophe bond transactions do not have basis risk, insurance company risk managers can be sure that actual losses will be offset through actual risk transfer to the reinsurer. There is no need to worry that the basis risk in an index-based transaction will result in failure to collect on a hedging transaction intended to offset actual insurance losses of the cedant. Index-based transactions primarily benefit the capital markets investors since they desire a payoff based solely on the performance of the index, which eliminates moral hazard and the risk that the cedant's actual losses will exceed the index.

See comment 18.

- Page 26. A related issue to basis risk is the issue of tail risk. We suggest that text addressing tail risk be added to the section on catastrophe bonds being less attractive to insurers than traditional reinsurance. We suggest the following language: "Investors in bonds expect and securitization contracts usually require that after the natural disaster event occurs, that the losses are fairly quickly tallied and the claims paid. As a result, the open period for settling claims and paying out the bond proceeds will take place fairly quickly. Reinsurance, by contrast, would remain an "open account" with claims being settled and paid as they come due and thus provides more relative protection for tail risk."

Appendix VII
Comments from the Reinsurance Association
of America

Ms. D'Agostino
September 3, 2003
Page 7

For example, the tail on settling claims for the Northridge earthquake is now approaching 10 years. Reinsurance remains open to pay those claims as long as coverage limits are still available. If a cat bond had been used instead of reinsurance, this long tail likely would have been cutoff, probably at two years with the resulting adverse claims development thus remaining with the original insurer.

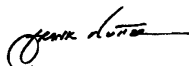
- Page 29 and Footnote 29. The text and footnote state that if non-indemnity-based catastrophe bonds are accepted by the NAIC that they could become more attractive to potential issuers. We believe that this will make the transactions more attractive to investors not issuers. If they become more attractive to issuers it would only be because the cost to the cedant/issuer might be lower since they would be retaining the basis risk in the hedging transaction.

Characterization of the Texas Windstorm Insurance Association (TWIA)

- Page 11. We believe it is incorrect to categorize the TWIA with the California and Florida catastrophe funding programs. The TWIA is a fairly common residual market mechanism that nearly every coastal state has in place. We believe the following language would be more accurate: "Several states - including Florida and California-- have established authorities that transfer certain catastrophic natural disaster risk in a unique manner. California relies on a combination of funding resources: capital contributions from insurers, policyholder assessments, bond debt and reinsurance; Florida relies on reinsurance premiums and bond debt with policyholder assessments. Nearly all coastal states from Massachusetts to Texas have established residual market pools that ensure that coastal property owners can obtain property insurance. These facilities typically require insurers to make coverage available, require that the losses from such coverage be paid by insurance companies which are then later recouped through assessments against policyholders."
- Footnote 18 page 11. The name of the Florida Reinsurance Agency should be corrected to the Florida Hurricane Catastrophe Fund.

Thank you for the opportunity to provide comments on your second report on risk-linked securities. We trust that as in the past, our letter will be included as an appendix to the GAO's final report. Should you have questions please contact me at 202-638-3690.

Sincerely,



Franklin W. Nutter
President

See comment 19.

See comment 20.

See comment 21.

The following are GAO's comments on the Reinsurance Association of America's (RAA) letter dated September 3, 2003.

GAO Comments

1. In this report, we have revised the text to clarify that current statutory accounting standards differ for traditional indemnity reinsurance contracts—including indemnity based catastrophe bonds—and nonindemnity based instruments that hedge insurance risk, such as nonindemnity catastrophe bonds. Where appropriate, we have also revised the text to make clear why the accounting standards differ. That is, traditional reinsurance results in risk transfer while nonindemnity based instruments have not been viewed as providing a comparable risk transfer. We note that NAIC is considering a proposal that would allow similar accounting treatment for nonindemnity based instruments that effectively hedge insurance company risks.
2. See comment 1. We note that traditional reinsurance does not need hedge accounting treatment afforded an effective hedge because it already receives credit for risk transfer.
3. See comment 1.
4. We have altered the report text to indicate that reinsurance contracts may involve litigation over whether insurer claims should be paid. We also state RAA's position in the report.
5. We have added language to the report stating RAA's positions.
6. We agree that reinsurance and indemnity based catastrophe bonds receive identical accounting treatment and have revised the text to make this point clear. However, we note that this statutory accounting treatment differs from the accounting treatment that applies to nonindemnity based instruments, such as nonindemnity catastrophe bonds, and this point has also been clarified in the text.
7. See comment 1.
8. See comment 1.
9. See comment 1.

10. See comment 1. We think that insurance statutory accounting rules are primarily the concern of issuers and not investors—who would not be subject to such rules.
11. We have revised the report text.
12. We have revised the report text.
13. We have revised the text to avoid confusion with other discussions in this report.
14. We have revised the report text.
15. We have changed the text so that "frequently" is replaced by "may." We have also added RAA's views on the prevalence of insurance litigation.
16. We have added language to the report as suggested by RAA concerning additional reasons reinsurance prices increased during the 1999-2002 period.
17. We have added language to the report on the issue of basis risk presented by nonindemnity based catastrophe bonds.
18. We have added the text on tail risk suggested by RAA stating that reinsurance contracts may continue to address tail risk while catastrophe bonds may not allow claims after several years.
19. See comment 10.
20. We have made some revisions to the report text.
21. We have revised the report language so that the Florida Hurricane Catastrophe Fund is properly identified.

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Related GAO Products

Insurance Regulation: Preliminary Views on States' Oversight of Insurers' Market Behavior. [GAO-03-738T](#). Washington, D.C.: May 6, 2003.

Catastrophe Insurance Risks: The Role of Risk-Linked Securities. [GAO-03-195T](#). Washington, D.C.: October 8, 2002.

Catastrophe Insurance Risks: The Role of Risk-Linked Securities and Factors Affecting Their Use. [GAO-02-941](#). Washington, D.C.: September 24, 2002.

Terrorism Insurance: Rising Uninsured Exposure to Attacks Heightens Potential Economic Vulnerabilities. [GAO-02-472T](#). Washington, D.C.: February 27, 2002.

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FCIC: Catastrophic Risk Protection Endorsement and Federal Crop Insurance Reform, Insurance Implementation. [OGC-98-69](#). Washington, D.C.: August 17, 1998.

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