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General Government Division

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The Honorable Ed Royce
House of Representatives

The Honorable Paul E. Kanjorski
House of Representatives

The Honorable Rick Hill
House of Representatives

Subject: Insurers' Ability to Pay Catastrophe Claims

The Homeowners' Insurance Availability Act of 1999 (H.R. 21) would establish a federal program to sell reinsurance[1] (1) to state government programs and (2) at auction to cover some insured losses associated with certain natural disasters. The bill requires that the federal program not displace or compete with the private insurance or reinsurance markets, or compete in the capital markets. However, conflicting claims have been made concerning private insurers' capacity to handle such disasters.

You asked us to evaluate current industry capacity to pay natural catastrophe[2] claims. To address this issue, we (1) compared available data on industry[3] financial resources to estimates of potential insured losses that would result from natural catastrophes of various magnitudes, (2) considered two recent studies of capacity,[4] and (3) evaluated factors that may affect the stability of insurer capacity over time.

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[1]Reinsurance is insurance for insurance firms. Under a reinsurance contract, in return for a share of the premium it collects, an insurer is able to transfer a portion of its risk to a reinsurance entity, which, in turn, is obligated to reimburse the insurance company for an agreed-upon share of covered losses.

[2]The Insurance Services Office, Inc., a company that provides information on the insurance industry, defines a catastrophe as an event that causes at least $25 million in insured property losses and affects a significant number of property and casualty insurers and policyholders. Although some catastrophes are not nature-related (e.g., riots), this report focuses on natural catastrophes.

[3]The U.S. insurance industry can be divided into (1) an accident, life, and health insurance industry and (2) a property and casualty (liability) insurance industry. This report deals with the property and casualty insurance industry only.

[4]The studies are (1) Can Insurers Pay for the "Big One?" Measuring the Capacity of the Insurance Market to Respond to Catastrophic Losses (Wharton School, University of Pennsylvania), July 14, 1999; and (2) P&C RAROC: A Catalyst for Improved Capital Management in the Property and Casualty Industry (Risk Management Solutions, Inc., and Oliver, Wyman, and Company), Fall 1999.

Results in Brief

The industry's financial resources have grown substantially since 1990 and currently are large relative to the natural catastrophe claims estimated to arise from a single major disaster. However, not all of those resources would be available to pay claims from any single catastrophe because individual insurance companies, not the industry as a whole, pay disaster claims. Because any analysis of insurers' capacity requires making assumptions about both the level of their available resources and the timing, location, and size of catastrophes, any estimate is subject to potentially serious limitations. Nevertheless, to estimate how insurers might be affected by a particular catastrophe, we compared estimates made by a catastrophe modeling firm of potential losses from a major catastrophe (one that would cause a "1-in-100-year" loss[5]) in the 10 states that the firm estimated would face the largest losses in such a catastrophe to the net worth of insurers that operate in each of those states.

The results of our analysis suggest that some insurers might lose a significant share of their assets to a major catastrophe. However, among other limitations, our analysis did not take into account reinsurance or capital market products that might be available to insurers to pay catastrophe claims. We also did not assess the extent to which a major catastrophe could have long-term effects on insurers and consumers of insurance. Catastrophes can disrupt insurance markets and harm insurance companies and consumers even in cases where all claims are paid. Therefore, determining whether insurance companies have resources to pay all claims arising from a given natural catastrophe may ignore other important aspects of insurer capacity.

The two recent studies of capacity that we reviewed found that the insurance industry as a whole, implicitly including reinsurance, possesses the financial resources needed to support its natural catastrophe risk. Still, one study found that the catastrophes it modeled (a $100-billion catastrophe and a $20-billion Florida hurricane) would cause a number of insurer insolvencies. The other study noted that it could not account for differences in individual insurers' capital adequacy. Neither study evaluated in detail the degree of insurance market disruption that a major catastrophe might cause.

Although it appears that the insurance industry today as a whole may be able to pay for most or all claims arising from a 1-in-100-year catastrophe loss, the current level of insurer resources to pay catastrophe claims is unlikely to be stable over time. A catastrophe loss greater than a 1-in-100-year loss or a closely spaced series of smaller disasters could temporarily deplete insurer resources, including the supply of reinsurance. Such disasters could lead to a larger number of insurer insolvencies than would result from a 1-in-100-year loss, or reduce the availability of insurance in catastrophe-prone areas of the country. Other developments also could shrink insurer capacity. For example, after adjusting for taxes on realized capital gains on insurers' stock and bond holdings, more than three-quarters of the

[5]A 1-in-100-year loss is the most costly natural disaster expected to occur in a century. Stated another way, a catastrophe that would generate a 1-in-100-year loss has a 1-percent annual probability of occurring. A 1-in-100-year catastrophe loss could occur more or less than once in a century but would be expected to occur on average only once during such a period.

growth in the insurance industry's financial capital (known as surplus) since 1995 was from capital gains. As a result, insurer resources could change with major changes in equities prices or interest rates.

Background

Measuring an insurer's ability to pay catastrophic losses requires information about the financial resources the company has available to pay claims as well as the potential losses it may face. Some information on an insurer's resources is available from the regulatory financial reports prepared annually by each insurer. For example, the annual financial statements reveal an insurer's surplus at a particular point in time but not the value of the reinsurance that would be recoverable in any particular catastrophe.

Measuring potential losses also requires a great deal of information, both about the individual insurer as well as about future catastrophes. Determining an insurer's exposure to catastrophes requires detailed information about the insurance that it has sold in catastrophe-prone areas. Some of this information is proprietary, that is, known only to the specific insurance company.

Predicting catastrophes is both difficult and imprecise. However, to understand losses that would result from a catastrophe, one would need to predict precisely the timing, the severity, and the exact location of future catastrophic events. Since this is impossible, a common strategy has been to evaluate the industry's current ability to pay the losses that would occur if an historical catastrophic event were to happen today. In the past few years, another strategy has been developed. Using sophisticated computers, advanced mathematical modeling techniques, and very large databases containing information on past catastrophes, population densities, construction techniques, and other relevant information, catastrophe modeling firms run thousands of scenarios to predict the probable financial effects of catastrophes. Although this science is still in its infancy, it has the potential to be a significant improvement over previous approaches.

Estimating the "capacity" of the insurance industry to pay future catastrophic losses thus requires collecting and aggregating information from several sources as well as using assumptions to estimate elements of both total insurer resources available and total potential losses. Because of this, all estimates are approximations.

Moreover, comparing the total available resources of the insurance industry to total potential catastrophe losses may, itself, not be the best way to measure capacity. A more thorough evaluation of the insurance industry's catastrophe capacity would also take account of the extent to which hypothetical disasters would erode the financial health of insurance companies and the degree to which individual insurers would react to those losses by restricting the supply of insurance after the event occurs. Historically, large natural catastrophes have disrupted insurance markets and harmed insurers and consumers. For example, in 1992, Hurricane Andrew caused more insured losses than any other catastrophe in U.S. history. Even though more than $15 billion in claims eventually were paid and few insurers became insolvent, insurance companies then restricted the supply of certain types of insurance—notably homeowners' insurance—in catastrophe-prone areas. Some state

government insurance and reinsurance programs were created to (1) replace reduced private-sector supply in catastrophe-prone areas or (2) help to maintain that supply.

Catastrophes can affect the supply of insurance because, in the wake of a catastrophe loss, some insurance companies' managers may decide to reevaluate the catastrophe risk that their firms face or should face and may stop renewing or selling new policies in areas they perceive as prone to catastrophes. In some cases, a firm may lose so much of its capital to a major catastrophe that its state regulators may require it to reduce the amount of insurance it sells to continue to meet minimum risk-based capital levels.[6]

Therefore, the insurance industry's capacity to handle natural disasters might be defined as insurers' ability to pay catastrophe claims before unduly harming the health of the insurance industry or consumer interests. Defining "unduly" is challenging, of course, in part because public policy decisions are involved, such as the weighing of insurer versus consumer interests when insurers request rate increases in the wake of a disaster. In general, however, catastrophe losses that result in a greater than 20-percent reduction in surplus are significant. Officials from A.M. Best Company, a firm that rates the financial health of insurance companies, told us that a single, unanticipated catastrophe loss of that magnitude likely would trigger a review by Best of an insurer's financial rating, which might result in a rating downgrade—meaning that there had been a significant increase in the probability of failure.

Scope and Methodology

To estimate the property and casualty industry's current ability to pay claims from major natural catastrophes, we compared data on the net assets of all property and casualty insurance companies that operate in 10 catastrophe-prone states to estimates of potential catastrophe losses as determined by an independent, private, catastrophe modeling company. We generally defined a major natural catastrophe as one that would generate a 1-in-100-year loss. However, the approach we used had important limitations. For example, it did not factor in any reinsurance that insurance companies might have held because we were not able to obtain such information. Omitting reinsurance might lead us to underestimate capacity. On the other hand, our analysis may have overestimated capacity because it included the surpluses of some firms that either were in the same corporate family[7] or that do not sell property insurance.

We reviewed the two studies of capacity to determine their methodologies, key assumptions used, and limitations. To evaluate the factors that may affect the stability of insurer capacity over time, we reviewed insurance industry financial data and studies of the industry.

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[6]Under risk-based capital, an insurance company must maintain a minimum level of capital to support all of the risks it assumes, including any catastrophe risk. In most cases, insurers voluntarily maintain higher capital levels than required. However, when an insurer's capital approaches its minimum risk-based capital level, state insurance regulators have the authority to intervene in the company's operations to ensure that adequate capital is maintained. Regulatory action may be required even if an insurer is solvent from an accounting perspective.

[7]The assets of an insurance firm include the value of all of its subsidiaries, including any other insurers that it owns. Because the data we used did not consolidate surplus data to take into account the surpluses of separate insurers that are part of the same corporate family, some double-counting of surpluses is likely to have occurred.

We shared a draft of this letter with organizations that supplied us with data. These organizations confirmed that we had accurately presented their information. They and the U.S. Department of the Treasury also provided us with technical suggestions that we incorporated where appropriate.

We did our work from October 1999 to January 2000 in accordance with generally accepted government auditing standards.

Insurance Industry Resources Appear to Exceed Potential Claims From a Single Major Catastrophe

The resources available to insurance companies to pay claims have grown substantially since 1990. Our comparison of insurers' financial capital to catastrophe loss estimates suggests that they probably would be able to pay all or most claims arising from a single 1-in-100-year catastrophe loss that strikes 1 of the 10 states we studied. However, important limitations reduce the usefulness of the results.

Industry Resources Have Grown Substantially in the 1990s

The resources that the insurance industry has available to pay claims arising from natural catastrophes clearly have grown substantially in the last 10 years. They consist of insurance companies' surpluses as well as reinsurance and capital market products to the extent that insurance companies have transferred some of their natural catastrophe risk to those sources. Industry surplus has more than doubled in the 1990s, and the amount of reinsurance that insurers buy has grown since the mid-1990s.

Insurer Surplus

The combined surplus of all U.S. insurance companies has grown substantially in the 1990s. According to the National Association of Insurance Commissioners (NAIC)[8] and the Insurance Services Office, Inc. (ISO), between 1990 and 1998, total industry surplus grew by about 140 percent in current dollars and about 93 percent in inflation-adjusted dollars. According to NAIC, the nominal increase was from about $177 billion in 1990 to about $427 billion in 1998, with almost all of the growth due to an increase in the capital of existing insurance companies, rather than from the formation of new companies. ISO cited a smaller total industry surplus than NAIC because ISO used information provided by A.M. Best, a private company that rates insurance companies. A.M. Best consolidates surplus data to avoid double counting the surpluses of separate insurers that are part of the same insurance group, and Best does not collect data on every insurance company in the industry. According to ISO, between 1990 and 1998, the total consolidated industry surplus grew in nominal terms from $138.4 billion to $333.5 billion.

[8]NAIC is a membership organization of state insurance commissioners.

In our view, growth in the entire insurance industry's surplus is a fairly crude measure of its natural catastrophe claims-paying capacity because the insurance industry as a whole does not pay catastrophe insurance claims. Instead, individual insurance companies pay claims on the basis of the damage that particular catastrophes inflict on the properties they insure. For any given catastrophe, only a portion of the industry's surplus (and its other resources, such as catastrophe reinsurance) is available to pay disaster claims.

To get a better idea of the surplus available to insurance companies to pay natural catastrophe claims, we obtained data from NAIC on the surpluses of property and casualty insurers that operated in 10 catastrophe-prone U.S. states during 1990-98. We found that the surpluses of the insurers that operated in each of those 10 states more than doubled during this period in nominal terms, and that insurers operating in 6 states experienced an increase of 150 percent or more.[9]

The state-by-state surplus figures cannot be added together because doing so would at least partially double count insurer surpluses since many insurers—including those with the largest surpluses—operate in more than one state. Also, once an insurer uses a portion of its surplus to pay claims from one catastrophe, those resources are no longer available to pay subsequent insurance claims in the same state or other states where the firm insures property.

Reinsurance

Another resource that insurance companies can use to pay natural catastrophe claims is reinsurance. Recent estimates of reinsurance available to finance catastrophic losses indicate that reinsurance coverage has increased significantly since the mid-1990s. Two leading reinsurance firms estimated that about $13 billion to $15 billion of catastrophe, excess-of-loss[10] reinsurance is in force in the United States per region (Northeast, Southeast, Gulf states and Texas, California, and the Midwest New Madrid fault-line states), per type of catastrophic event. These estimates are about twice the amount of reinsurance that they estimated was available in 1994. In addition, these two leading reinsurance firms estimated that an additional $5 billion to $6 billion of reinsurance capacity is available from other forms of reinsurance[11] that were not included in the estimates. The estimates were prepared for the

[9]The states are Florida (152 percent), California (145 percent), Texas (156 percent), New York (157 percent), Louisiana (147 percent), Massachusetts (155 percent), North Carolina (157 percent), South Carolina (150 percent), Mississippi (128 percent), and New Jersey (141 percent).

[10]Under an excess-of-loss reinsurance contract, the insurer pays the amount of each claim for each risk up to a limit determined in advance, and the reinsurer pays the amount of the claim above the limit to a specific sum.

[11]Other forms of reinsurance include facultative, proportional, and treaty. Facultative reinsurance involves the reinsurance of all or part of an individual risk. Under proportional reinsurance, the reinsurer shares losses in the same proportion as it shares premium and policy amounts with the insurer. Treaty reinsurance is an agreement between an insurer and reinsurer that covers a class or classes of business.

Reinsurance Association of America and submitted for the record by the Association at a hearing of the House Banking and Financial Services Committee in July 1999.[12]

We could not independently verify these estimates of reinsurance capacity because the data on which the estimates were based are not publicly reported and are proprietary in nature. Still, these estimates have certain limitations that must be understood so that their meanings are not misconstrued. First, regional figures should not be added together to obtain multiregional or national totals. This is because insurance companies tend to buy reinsurance to cover some share of their catastrophe exposure regardless of where the catastrophes occur. Therefore, a catastrophe in any one region would reduce the amount of reinsurance available to pay for additional catastrophes in that region or other regions.

Second, these estimates are for the value of the reinsurance purchased by insurers, not the surpluses of the reinsurance companies supplying the reinsurance; that is, not for the resources that back up the reinsurance contracts. An ISO official said that, in a major catastrophe, some reinsurance companies might become insolvent before they fully honor their reinsurance commitments. Therefore, the actual amount of reinsurance that would be used to cover insurer losses in a major catastrophe could be less than the estimates provided by the two reinsurance companies. Finally, these estimates are for a particular point in time. The price and availability of reinsurance have varied widely during the last 10 years. Nevertheless, as of January 2000 when we completed our review, it was generally agreed that reinsurance was widely available and that prices were low relative to historical levels.

Capital Market Products

A third financial resource—but by far the smallest—that insurance companies can use to transfer catastrophe risk is capital market products. These specialized products transfer some of insurers' catastrophe risk to investors. Some sources with whom we talked told us that the potential for using capital market products may be great, but actual use of these products by the insurance and reinsurance industries has been very modest to date. For example, a few insurers have used catastrophe bonds, which are similar to corporate bonds except that, in the event of a catastrophe, payments of all interest or principle can be canceled or deferred if actual catastrophe losses pass a specified amount.

According to ISO, about $2.6 billion in catastrophe bonds have been issued since 1994, compared to industry catastrophe exposures in the hundreds of billions of dollars. This $2.6 billion figure somewhat overstates the amount of catastrophe risk transferred to the capital markets because most bonds are not multiyear bonds. Therefore, this 6-year figure does not show the current amount of securitized catastrophe risk. In addition, the total face value of the bonds somewhat overstates the total amount of catastrophe risk laid-off to the bond market because, depending on the individual terms of the bonds, not all of the bonds' principal may be at risk.

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[12]"Statement," Franklin W. Nutter, Reinsurance Association of America, before the Committee on Banking and Financial Services, U. S. House of Representatives, July 30, 1999.

Enclosure I provides more information on the insurance industry's past use of capital market products to transfer natural catastrophe risk and their future potential.

We Estimated Insurers' Ability to Pay Catastrophe Claims in 10 States

We obtained data on insurer resources from NAIC and compared these data to estimates of potential catastrophe losses in those states provided by a private catastrophe modeling company. The results of our analysis suggest that insurers likely could pay most or all claims from a single 1-in-100-year catastrophe loss that strikes a single state. However, some insurers might lose a substantial share of their assets to such a disaster.

Loss Estimates

We obtained catastrophe loss estimates from two firms: EQE International (EQE)[13] and Applied Insurance Research, Inc. (AIR).[14] EQE provided estimates of expected insured property losses for the 50 states, the District of Columbia, and Puerto Rico for 1-in-100-year, 1-in-250-year, 1-in-500-year, and 1-in-1,000-year losses. EQE's catastrophe model includes earthquakes, fire following earthquakes, and windstorms with sustained speeds of greater than 74 miles per hour. Table 1 shows EQE's estimates of the 1-in-100-year and 1-in-250-year catastrophe losses for the 10 states that EQE estimated face the largest 1-in-100-year losses.

Table 1: Estimated Insured Losses for 10 States for the 1-in-100-Year and 1-in-250-Year Catastrophic Losses

Dollars in billions

Ranking among the 50 states[a]	State	1-in-100-year expected loss	1-in-250-year expected loss
1	Florida	$42.8	$71.5
2	California	20.3	30.2
3	Texas	11.6	19.1
4	New York	9.8	19.1
5	Louisiana	6.8	10.5
6	Massachusetts	4.8	8.1
7	North Carolina	3.4	5.5
8	South Carolina	3.0	4.5
9	New Jersey	2.8	5.2
10	Mississippi	2.6	4.3

Notes:

(1) These estimates are for insured losses, that is, losses paid or reimbursed by an insurance company. Other losses may include those paid by the federal, state, or local governments or losses retained by home or business owners through insurance policy terms such as deductibles.

(2) State totals cannot be added.

[a]Puerto Rico would rank second with expected insured losses of $27.1 billion and $44.1 billion for the 1-in-100-year and 1-in-250-year losses, respectively.

Source: EQE International.

[13]The Internet address for EQE is as follows: http://www.eqe.com.

[14]The Internet address for AIR is as follows: http://www.air-boston.com.

AIR's loss estimates, which were on a regional, rather than a state-by-state basis, are in enclosure II.

Comparing Potential Losses to Insurer Resources

To estimate the insurance industry's capacity to pay claims from a major natural catastrophe, we compared EQE's estimates of potential losses in each of the 10 states that EQE estimated to have the largest 1-in-100-year catastrophe losses to the surpluses of the individual insurers that operated in each of those states. We obtained, from NAIC, data on the market share held by each insurance company in each of the 10 states, then we estimated how much surplus each firm might lose to 1-in-100-year statewide loss by assuming that each insurer would have to pay a proportion of those catastrophe losses that was equal to its market share. For example, if a company wrote 10 percent of the insurance premiums in a state in 1998, we assumed that the company would have to pay 10 percent of any 1-in-100-year disaster loss that occurred anywhere within that state that year. This method allowed us to estimate roughly the financial "bite" that a major catastrophe might have on each insurer in a state.

The results of our analysis suggest that some insurers' claims from a single major catastrophe in a single state could be large relative to their surplus. As table 2 indicates, in four states (Florida, California, Texas, and New York) more than 20 percent of insurance companies might have claims that exceed 20 percent of their surpluses, the level of surplus loss from a catastrophe that could trigger a rating review by A.M. Best Co.

Table 2: Proportion of Insurers in 10 States Whose Claims Might Exceed 20 Percent of Their Surpluses in a 1-in-100-Year Catastrophe Loss, Excluding Reinsurance

State	Percentage of insurers whose claims might exceed 20 percent of their surplus	Percentage of 1998 statewide market share of firms with claims exceeding 20 percent of surplus
Florida	45.0%	61.8%
California[a]	30.5	61.9
Texas	22.7	48.8
New York	20.8	39.3
Louisiana	15.0	37.1
Massachusetts	11.5	46.5
North Carolina	1.1	3.2
South Carolina	4.0	27.8
New Jersey	8.0	24.3
Mississippi	7.7	32.1

Notes:

(1) Assumes that firms would incur losses in proportion to their statewide market share of insurance premiums written in 1998. In reality, the effect any catastrophe would have on an insurer would depend on the affect of that disaster on the specific properties insured by the firm.

(2) The 10 states are those that EQE estimated would face the largest 1-in-100-year catastrophe losses among the 50 states.

[a]Excludes most earthquake insurance sold in California. Most such insurance is provided by the California Earthquake Authority. See enclosure III for more details on this organization.

Source: GAO calculations using EQE International loss estimate data and NAIC surplus and premium data.

To the extent that these losses were not replaced, for example, by reinsurance payments, some of these companies could face serious financial difficulty. Moreover, the insurance

markets in these states could also be disrupted if insurers reduced the number of policies they issued after the event, as happened in the aftermath of Hurricane Andrew in 1992 and other past major catastrophes.

Table 2 also shows the statewide market shares of the insurance companies whose claims might exceed 20 percent of their surpluses in one major catastrophe. As the table indicates, in some cases, these insurers had insured a substantial share of all the insured property in the state—more than 60 percent in Florida and California. It would seem likely that most of these companies would offset a portion—possibly a major portion—of those losses through reinsurance agreements. However, if firms holding a significant market share were impaired to this degree, then insurance markets might be significantly disrupted in the aftermath of such an event. Historically, many insurance companies have sought regulators' permission to charge higher insurance rates and/or reduce the supply of insurance they offered in the state where a major disaster occurred.

Our Analysis Has Substantial Limitations

The above analysis suggests that, in the 10 states we studied, most insurance companies should be able to handle a major catastrophe, but that some firms could incur significant financial harm in paying their claims. However, this analysis has important limitations. In reality, the effect any catastrophe would have on an insurer would depend on the affect of that disaster on the specific properties insured by the firm. Some insurers might incur large losses, while others might not incur any losses. Our market share approach assumed that each insurer in a state had (1) sold policies with the same geographic distribution as every other insurer in the state; (2) insured properties of the same value, construction, and other characteristics as every other insurer; (3) sold policies with the same deductible and other features as every other insurers' policies; and (4) priced the policies it had sold identically to every other insurer. Because these assumptions are likely to be inconsistent with actual experience, our analysis cannot predict which specific insurers, if any, would have trouble paying their claims after a catastrophe.

Our analysis has other limitations as well. Two of these limitations may have led us to underestimate and two to overestimate insurance companies' capacity to pay catastrophe claims.

We Excluded Reinsurance From Our Analysis

We were unable to obtain data on individual companies' reinsurance and, thus, could not estimate the degree to which reinsurance companies would cover the losses that the insurance companies would incur in a 1-in-100-year catastrophe loss. All recoveries would increase insurers' capacity to pay claims. As previously mentioned, we also could not determine the total amount of catastrophe reinsurance available to the entire insurance industry. However, two leading reinsurance firms estimated that about $13 billion to $15 billion of catastrophe excess-of-loss reinsurance is in force in the United States for each region and type of catastrophic event.

We Excluded State Government Insurance Programs From Our Analysis

In the time we had to do our work, we were unable to take into account that state government-supported insurance or reinsurance programs exist in two of the 10 states.[15] These programs increase the private sector's ability to handle natural disasters because they would absorb some catastrophe losses that private insurers or reinsurers otherwise might have to incur. A Florida government fund provides catastrophe reinsurance to insurance companies. In California, the California Earthquake Authority directly provides most of the residential earthquake insurance sold in the state. Enclosure III provides more information on the Earthquake Authority's role in California insurance markets.

We Analyzed the Effects of One, Single-state Catastrophe

Our analysis only considered the impact that a single catastrophe that strikes a single state would have on insurer surpluses. In reality, insurance companies often must deal with catastrophes that cause damage in more than one state or that occur within a short span of time. To the extent this happens, our analysis overestimated capacity. In fact, EQE estimated that the 1-in-100-year catastrophe loss for the entire United States is $154.6 billion; that is, each year there is a 1-percent chance that all of the catastrophes that EQE models (earthquakes, fire following earthquakes, and windstorms with sustained speeds of greater than 74 miles per hour) will inflict insured losses of this magnitude in the United States.

We Included Some Insurer Surpluses That May Not Be Available to Pay Catastrophe Claims

The assets of an insurance firm include the value of all of its subsidiaries, including any other insurers that it owns. The NAIC data we used did not consolidate insurer surplus data to take into account the surpluses of separate insurers that are part of the same corporate family. Therefore, some double-counting of surpluses probably occurred. Also, we did not obtain data that distinguished firms that sell property insurance from those that provide solely casualty insurance. According to an ISO official, a company that provides mainly or exclusively casualty insurance is unlikely to incur significant losses in a catastrophe because those policies are not affected by a catastrophe.

Two Recent Studies Concluded That Insurers Have Sufficient Resources to Support Their Catastrophe Exposure

The findings of two recent analyses of the U.S. property and casualty insurance industry indicate that the industry currently possesses the resources to pay all or most claims from a single, major catastrophe. However, neither study estimated the potential harm that a major disaster could inflict on the financial health of the insurance industry and consumers. The two studies used different approaches to estimate capacity. A July 1999 study by the Risk and

[15]These states are Florida and California. Also, Hawaii has a state government fund to pay hurricane claims of residential policyholders.

Decision Process Center of the University of Pennsylvania's Wharton School,[16] measured the insurance industry's capacity to finance major catastrophe property losses at 1991 and 1997 capitalization levels for both the industry as a whole and for those insurers that did business in Florida to assess the capacity of the industry to handle a Florida hurricane.[17]

The Wharton study estimated that in 1997, the insurance industry as a whole had more than adequate capacity to pay for the catastrophes that it studied and that capacity increased dramatically between 1991 and 1997. However, the study also concluded that a significant number of insolvencies would result. According to the study, the insurance industry as a whole in 1997 could have paid at least 99 percent of a $20 billion natural catastrophe and at least 93 percent of a $100 billion catastrophe, while the 1997 industry capacity on the basis of 1991 capitalization levels would have been only 95 percent and 80 percent, respectively. The insurance companies that operated in Florida in 1997 could have paid at least 99 percent of a $20 billion Florida hurricane or at least 90 percent of a $100 billion Florida hurricane, compared to 94 percent and 72 percent at 1991 capitalization levels. The Wharton study did not specify how likely catastrophe losses of these magnitudes were to occur. However, by way of comparison, EQE estimated that catastrophe losses with a 1-percent probability of occurring for the entire United States and Florida are $154.6 billion and $42.8 billion, respectively. The Wharton study implicitly took into account the effect that reinsurance would have on companies' ability to pay disaster claims because the company-by-company loss data it used to construct its model were net of reinsurance.

The Wharton analysis also found that, even if the insurance industry as a whole could pay all or most claims arising from catastrophes of these magnitudes, a significant number of insolvencies would result. For example, Wharton estimated that (1) a $100 billion catastrophe would cause either 30 corporate family or 136 individual insurance company insolvencies nationwide (depending on the assumptions used) and (2) a $100 billion Florida hurricane would cause either 10 corporate family or 34 individual insurer insolvencies. The Wharton study concluded that these insolvencies would disrupt the normal functioning of the insurance market, not only for property insurance but also for other types of insurance. However, Wharton did not discuss in detail how such catastrophes would affect the financial health of the remaining solvent portion of the insurance industry nor the effect on the public of a reduced supply of insurance coverage that could occur after the catastrophe.

Moreover, the Wharton study's model may overstate insurance industry capacity for two reasons. First, as our analysis did, the study assumed that the total resources of all property and casualty insurers in the respective samples would be available to pay catastrophic loss claims, even though some of those companies do not write policies that likely would be triggered by a catastrophe (such as firms that write only liability insurance). Second, according to the Wharton study, most catastrophes that are currently being projected by

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[16]Can Insurers Pay for the "Big One?" Measuring the Capacity of the Insurance Market to Respond to Catastrophic Losses (Wharton School, University of Pennsylvania), July 14, 1999. A copy of the study may be found at http://fic.wharton.upenn.edu/fic/wfic/riskinfo.html.

[17]Insurers doing business in Florida represent almost 80 percent of the total industry equity, according to the Wharton study. Therefore, the capacity of the Florida sample to withstand Florida hurricanes is close to the entire industry's capacity to do so.

insurers and modeling firms are localized in one or a few states and only a subset of insurers are licensed in any given state. Thus, the actual amount of money that would be forthcoming from the insurance industry to fund any given catastrophic loss would be smaller than that projected by the Wharton analysis.

A second 1999 study[18] by a catastrophe modeling firm and a financial company also found that the insurance industry currently has sufficient capital to support its catastrophe risk. The study used a different methodology for estimating capacity, however, and considered resources other than firms' surpluses to be available to support catastrophe risk. This "economic capital" was comprised of a company's surplus and other sources of capital, such as unrealized gains on bond holdings and real estate appreciation. The catastrophe model the study used also accounted for reinsurance. The study employed a "value-at-risk approach" in which a company's value at risk is the amount of money it could lose under extremely adverse circumstances. The difference between the value at risk and the total economic capital that an insurer (and the industry) actually possesses determines an insurer's (and industry's) capacity.

This study found that the one-third of the insurance industry's economic capital that is devoted to catastrophe risk is more than sufficient to support that risk. In fact, the study concluded that the largest risk that the industry as a whole faces is investment risk, not catastrophe risk.[19] The study noted, however, that these observations relate to the average industry capitalization level, and that the capital adequacy of individual insurance companies in relation to their catastrophe and other risks varies from firm to firm.

The Ability of Insurers to Pay Catastrophe Claims Is Unlikely to Be Stable Over Time

Although it appears that insurance companies today may be able to pay for most or all claims arising from a 1-in-100-year catastrophe, insurers' current capacity may not be stable over time. Insurance companies remain heavily exposed to catastrophe losses despite efforts to reduce their potential losses. A single, very large catastrophe or a series of smaller but still costly catastrophes could temporarily decrease insurer resources, including reinsurance. Other events that could affect insurers' surpluses, notably a large stock market correction or rise in interest rates, also could reduce insurers' ability to pay catastrophe claims.

Insurers Remain Exposed to Catastrophes

The U.S. property and casualty insurance industry continues to be vulnerable to natural catastrophe losses, despite efforts to contain potential losses since the early 1990s. According

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[18]P&C RAROC: A Catalyst for Improved Capital Management in the Property and Casualty Industry (Risk Management Solutions, Inc., and Oliver, Wyman, and Company), Fall 1999. A copy of the study may be found at http://www.riskinc.com/rms/products/consulting/pcraroc/.

[19]Investment risk is the variability in the value of an insurer's assets due to changes in the market price of securities or changes in interest rates that would affect the value of an insurer's bond holdings and thus its capital.

to the Insurance Information Institute, insurers in many states now use percentage deductibles, rather than dollar deductibles, to limit their exposure to catastrophic losses from natural disasters. In addition, many insurers (1) are limiting their homeowners insurance business in windstorm vulnerable areas of East and Gulf coast states to reduce their maximum loss from a major storm, and (2) have substantially increased premiums. The Institute said that these actions have reduced some insurers' exposure to catastrophe losses.

However, other factors have worked against these efforts to contain insurer costs. According to ISO, the U.S. property and casualty insurance industry incurred $99.5 billion in catastrophe losses in 1998 dollars during the 10 years from 1989 to 1998, more than twice the $48.8 billion in 1998-dollar catastrophe losses during the 39 years from 1950 to 1988. Population growth and the increase in the number and value of insured properties in areas exposed to catastrophes have contributed to this rise in catastrophe losses. The coastal populations of the four southeastern states that, according to ISO, are at highest risk—Florida, Georgia, and North and South Carolina—increased by 36 percent from 9 million in 1980 to more than 12.2 million in 1993. Demographic projections indicate that this growth will continue. A study by the Insurance Research Council found that insured residential property values along the Gulf and Atlantic states had increased by 166 percent from 1988 to 1993, and that insured commercial values had risen by 193 percent during the same period.

Insurers' Ability to Pay Catastrophe Losses Depends on the Size and Number of Previous Losses

Insurance companies' capacity to pay catastrophe claims can be affected by the occurrence of past catastrophes. In the event of a very large natural disaster or of multiple major disasters, insurer resources, including reinsurance, could be temporarily depleted. This occurred in the mid-1990s after Hurricane Andrew and the Northridge, CA, earthquake. Hurricane Andrew accounted for $15.5 billion in catastrophe losses in 1992 and Northridge for $12.5 billion in 1994, the two most costly years for catastrophes. After these events, reinsurance availability was both restricted and expensive. Consumer access to insurance, particularly homeowners insurance, was affected by these catastrophes and could again be affected by other major disasters. Homeowners may experience difficulty in obtaining insurance or may have to accept insurance with reduced policy coverages and increased premiums.

Moreover, historically, the property and casualty insurance business has been cyclical in nature. That is, the industry has experienced periods of low profitability followed by periods of improved operating results. A major catastrophe or series of catastrophes could occur near the peak of a cycle, when both demand for insurance and insurance premiums were high by historical standards. According to an ISO official, in such a case, consumers could be harmed more than if the catastrophe were to occur during a period when insurance was readily available and prices were low.

Insurer Capacity Is Vulnerable to Events Other Than Catastrophes

Factors other than large catastrophes could affect insurers' capacity to handle catastrophe losses. About 53 percent of the growth in the insurance industry's surplus in the last 4 years was from unrealized capital gains on insurers' bond and stock portfolios.[20] After adjusting for taxes on realized capital gains, almost 78 percent of the growth in surplus since 1995 was from capital gains. Much of this growth has come from the industry's holdings of common stock, which appreciated at a compound annual rate of 20.1 percent during 1995-98. These facts suggest that major downward changes in equities prices could decrease the resources insurers have to pay catastrophe losses. Rising interest rates could also affect insurer resources adversely, since two-thirds of the industry's cash and invested assets are in bonds and a rise in interest rates reduces the bonds' value.[21]

While other indicators suggest that the insurance industry's financial condition has improved in recent years, industry analysts caution about the interpretation of these indicators. According to ISO, two commonly used ratios to measure the insurance industry's financial strength and stability, the ratio of premiums written to surplus and the ratio of loss and loss adjustment expense[22] reserves to surplus, have steadily declined in recent years. Both of these ratios would have a tendency to fall as surplus increased. Other things being equal, the lower the ratios, the more sound insurers may be. However, ISO cautioned that the ratios also could be an indication of inadequate premium volume or inadequate loss reserves, rather than solely financial strength. Declines in the industry's premium to surplus ratio may reflect increased competition and depressed premium growth or, on the other hand, positive operating results and growing capital. Similarly, deterioration in the adequacy of the industry's loss reserves may have contributed to declines in the ratio of loss and loss adjustment expense reserves to surplus.

Conclusions

Both the surplus of insurance companies and the amount of reinsurance they purchase have increased substantially during recent years. However, only a portion of these resources would be available to pay claims from any single catastrophe. Our analysis of insurance industry data suggested that the surpluses of insurance companies that operated in 1998 in each of the 10 states in our review exceeded likely losses they would incur from a single 1-in-100-year natural catastrophe. However, a simple comparison of the industry's total resources available to pay catastrophe claims with the estimated losses that could result from a large catastrophe ignores the importance of maintaining functioning insurance markets in the aftermath.

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[20]Unrealized capital gains are the appreciation in the value of unsold assets plus an offset for the capital gains realized on assets sold during the period.

[21]Even recent increases in interest rates have had some effect on the value of insurers' assets and surplus. Sharper increases could potentially have major consequences.

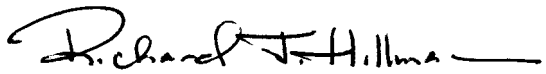
[22]Loss adjustment expense is the cost involved in an insurance company's adjustment of losses under a policy. That is, they are additional expenses related to the claim settlement process, including the fees paid for defending insureds against third-party claims.

Two recent studies we reviewed found that the insurance industry as a whole possesses the financial resources needed to support its natural catastrophe risk. Both studies implicitly factored in reinsurance. However, neither study evaluated in detail the degree of insurance market disruption that major disasters might cause, although one study found that a major catastrophe would cause a number of insurer insolvencies.

The insurance industry's current capacity to pay disaster claims is not likely to be stable over time. A major catastrophe loss or a series of smaller disasters could temporarily deplete insurer resources, including the supply of reinsurance, as happened in the mid-1990s after large catastrophes occurred in Florida and California. Other developments also could shrink insurer capacity, such as a major change in equities prices or interest rates that would reduce the value of insurers' stock and bond holdings.

As agreed with your offices, we plan no further distribution of this report until 10 days from the date of this letter unless you publicly release its contents earlier. We will then send copies to the Honorable Lawrence Summers, the Secretary of the Treasury; the Honorable Jim Leach and the Honorable John J. LaFalce, Chairman and Ranking Minority Member of the House Committee on Banking and Financial Services; the Honorable Rick A. Lazio and the Honorable Barney Frank, Chairman and Ranking Minority Member of the Housing and Community Opportunity Subcommittee of the House Committee on Banking and Financial Services; and George Nichols, III, President of NAIC. We will also make copies available to others upon request.

Please contact me or Lawrence D. Cluff on (202) 512-8678 if you or your staff have any questions. Key contributors to this report are acknowledged in enclosure IV.



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Associate Director, Financial Institutions
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The Insurance Industry's Use of Capital Market Products to Manage Catastrophe Risk

Since the early 1990s, the insurance industry has to a limited extent increased its capacity to pay natural disaster claims by using new, specialized products that transfer some of insurers' natural catastrophe risk to the capital markets. Use of these products—catastrophe bonds, swaps, options, and contingent surplus notes—has been limited for a variety of reasons. One reason has been that the price of reinsurance, which is the main alternative to these capital market products, has dropped substantially since it peaked in 1993. Some experts believe that, eventually, use of capital market insurance products will take off and substantially increase the insurance industry's capacity to handle large natural disasters. However, it is unclear how quickly the many perceived cost, legal, regulatory, and other barriers to increased use of these instruments will be overcome.

Efforts to Develop an Alternative to Catastrophe Reinsurance

In the aftermath of Hurricane Andrew in 1992, the price of traditional catastrophe reinsurance increased substantially, and its supply contracted sharply, which led the insurance industry to search for alternatives to the traditional reinsurance of catastrophe risk. The price of reinsurance has been falling since its peak in 1993, as a result of several factors, including increased retention (i.e., deductible) levels, reduced exposure, and competition. However, one analyst estimated that the price of catastrophe reinsurance, adjusted for changes in retention and exposure, is still above pre-Hurricane Andrew levels.

The search for new capacity has led to the creation of new financial products to transfer insurance risks. These new products include securities and derivatives. Insurance securities, such as catastrophe-linked bonds, are created by the process of securitization. This process creates tradable securities that are collateralized by a pool of assets that are not, in and of themselves, readily tradable. An emerging insurance derivatives[1] market has accompanied the insurance securitization market. This market comprises swap transactions and the catastrophe options traded on exchanges, such as the Chicago Board of Trade (CBOT). These new financial products have the effect of turning insurance risks into securities and derivatives that investors can include in an investment portfolio with traditional assets, such as stocks and bonds.

[1] Derivatives are financial products whose value is determined from an underlying reference (interest rates, foreign currency exchange rates); index (reflects the collective value of various financial products); or asset (stocks, bonds, or commodities). Derivatives can be (1) traded through central locations, called exchanges, where buyers and sellers, or their representatives, meet to determine prices or (2) privately negotiated by the parties off the exchanges or over the counter.

Catastrophe Bonds

Catastrophe bonds are similar to corporate bonds except that when a catastrophe occurs, there can be a cancellation or deferment of some or all payments of interest or principal if catastrophe losses surpass a specified amount, or trigger level. When that happens, the insurer or reinsurer can pay claims with the funds that would otherwise have gone to the bondholders. The assets backing a catastrophe bond issue consist of a pool of one or more reinsurance contracts and any contract collateral. However, in the event of large underwriting losses to the reinsurance contracts in the pool, bondholders are exposed to the loss of some or all of their investment, depending on the structure of the pool.

Although a primary insurer can issue catastrophe bonds directly to investors, many catastrophe bonds are issued by a separate company, known as a special purpose vehicle. The primary insurer places reinsurance contracts or pools of contracts with this special purpose vehicle, which is established in a convenient domicile for the specific purpose of writing the contracts and lasting until they expire. The special purpose vehicle then issues catastrophe bonds to investors and, in turn, sells reinsurance to the originating insurers. This structure has several advantages for the primary insurer. For example, the credit risk underlying the bond is independent from that of the insurer. This independence can increase the bond's marketability. In addition, the primary insurer can account for the bond obligation as traditional reinsurance, thereby removing risk from its balance sheet. Many special purpose vehicles are incorporated in the Cayman Islands and Bermuda to obtain optimal tax benefits.

In 1994, insurance companies began issuing catastrophe bonds; however, most issues were not very successful due to the lack of time to fully educate investors about how to price the underlying risk. In 1997, when rating agencies began rating the bonds, the United Service Automotive Association, a Texas-based insurer, issued catastrophe bonds totaling $477 million, the largest single securitized risk transfer to date. The offer was oversubscribed in the market primarily because the bonds were rated. By rating catastrophe bonds, the rating agencies have assisted investors in evaluating the underlying risk and comparing this risk with other noncatastrophe bond offerings. Investment banks now consider a rating essential for large bond transactions. From 1994, through December 1999, about $2.6 billion in catastrophe bonds have been issued. However, this figure somewhat overstates the amount of catastrophe risk transferred to the capital markets because most bonds are not multiyear bonds. Therefore, this 6-year figure does not show the current amount of securitized catastrophe risk. In addition, the total face value of the bonds

somewhat overstates the total amount of catastrophe risk laid-off to the bond market because, depending on the individual terms of the bond, not all of the bond's principal may be at risk.

Over-the-counter Catastrophe Swaps

Swaps are a financial contract used to transfer risks between two parties. In a catastrophe insurance swap insurers may exchange policies from one region of the country for policies in another region. Each swap is a reciprocal agreement between the two insuring entities. Swapping policies allows insurers to diversify their portfolios. If an insurer has a concentrated book of business in a catastrophe-prone area, it can swap a portion of that business for a book of business in an area where it is less exposed to the same risk. In an alternative swap approach, an insurance company can exchange a series of fixed predefined payments for a series of floating payments whose values depend on the occurrence of an insured catastrophic event. That is, if a catastrophic event occurs, the insurance company receives a higher cash flow from the floating payment stream, which helps pay the claim settlements. Swap instruments offer several price advantages over catastrophe bonds and generally are easier to conduct.

Exchange-traded Catastrophe Instruments

Catastrophe index options contracts have been trading at the CBOT since 1992. Exchange-traded options allow insurers to tailor their risk exposure using the capital markets, without the issuance of securities. Catastrophe options track the industry catastrophic loss results during a specified time period and allow companies to insure themselves against a self-determined level of loss. To facilitate trading, these contracts are standardized in terms of the regions and states covered and in the period during which the losses must occur. Insurers can adjust their risk exposures in different regions by buying contracts covering risk in a region where they prefer to reduce exposure and investing in contracts covering risk in regions where they prefer to increase exposure. Generally, exchange-traded catastrophe options differ from reinsurance and cash-flow swaps in that they are more standardized and backed by the credit of the exchange, rather than the credit of the reinsurer or swap counterparty. The value of these options is determined on the trading floor. Trading in CBOT options has been slow.

Another initiative includes the Catastrophe Risk Exchange (CATEX), which began operation as a reinsurance intermediary in 1996. CATEX is essentially an electronic bulletin board on which insurance companies (CATEX subscribers) can list risks that they want to cede or to swap against other risks. However, in contrast to the trading with insurance derivatives on the CBOT, there is no direct flow of additional capacity from the financial markets into the insurance industry through the CATEX

exchange. There is an increase in the surplus available to pay claims from a catastrophe because more insurance companies bear the risk. Increased risk diversification occurs through the swap so the insurance industry's risk capital is used more efficiently.

By April 1998, use of CATEX catastrophe options contracts by the insurance industry was negligible. One disadvantage of catastrophe options compared with traditional reinsurance is the difference in tax deductibility. Insurers can deduct reinsurance premiums from their taxable income, immediately lowering their income tax bills.[2] However, insurers cannot deduct the cost of buying standardized catastrophe options until they calculate their capital gains or losses when the options settle.

Contingent Surplus Notes

Contingent surplus notes are instruments that give the insurer the right to issue notes in the future at preset terms to investors in exchange for cash or liquid assets. The contingent part of the surplus note is that the investors agree to accept the surplus notes not when the deal is struck, but when a particular event, such as a catastrophic event, occurs. Under Statutory Accounting Practices, surplus notes are added to an insurer's net worth or surplus. In general, an insurer needs a regulator's approval to issue surplus notes and to make related payments of interest and principal. Insurers can use the proceeds from issuing surplus notes to pay catastrophe losses or for any other purpose. Surplus notes generally oblige the issuer to repay the funds on a fixed schedule. As a result, these transactions do not transfer risk since catastrophe event losses are still borne by the company and its equity holders. Contingent surplus notes are basically debt instruments that for regulatory purposes may be treated as capital.[3] Only a few companies have issued contingent surplus notes.

Future Trends in Insurance Securitization

Research on future trends in the use of insurance securitization and derivative products has been minimal, and the results are often conflicting. For example, in 1996, on the basis of calculations in a portfolio optimization model and a survey of investment banks and potential investors, a large reinsurer (Swiss Re) estimated that in the long term, capital markets would provide $30 billion to $40 billion in additional

[2] Financing Catastrophe Risk: Capital Market Solutions, Insurance Services Office, Inc., January 1999, p. 5.

[3] The Evolving Market for Catastrophic Event Risk, Marsh & McLennan Securities Corp., August 1998, p. 13.

capacity to cover catastrophe risks.[4] The study emphasized that success in the short term will require that potential investors have a clear understanding of the pricing process. In contrast, 86 percent of insurance executives polled in 1997 by New York's Insurance Information Institute, a trade group, said that selling insurance risks to investors in the financial markets would prove to be a fad. In addition, a Harvard University business school professor suggested that there are structural shortcomings slowing the entry of capital markets into the insurance business, such as the need to standardize and package investor risk so it does not have to be analyzed repeatedly.[5]

Several factors that may influence the future use of insurance securitization include:

- A principal barrier to increased insurance securitization is the cost of catastrophe reinsurance, currently low by historical standards. This situation could change rapidly, however, since pricing in the reinsurance market is extremely cyclical—premiums for the same risks can vary substantially as has occurred over the past several years.

- Insurers issuing catastrophe bonds faced high transaction costs because of the complexity of a securitization transaction and the need to provide significant amounts of information to multiple investors. Transaction costs, however, are declining. For the initial issuances of catastrophe bonds, investment bankers were charging fees of up to 75-basis points[6] and legal expenses of up to $1 million. Banking fees for recent securitizations have dropped to about 25 basis points, and legal expenses are at or below $100,000 per issue.[7]

- Some investors are not confident that they understand how to analyze and price insurance and reinsurance risk. Since 1997, rating agencies have begun to rate insurance risk securities. By translating the scale of insurance risks into their bond market equivalent, the rating agencies have played a crucial part in helping investment banks and other arrangers open up a substantial investor base. However, even with

[4] "Insurance Derivatives and Securitization: New Hedging Perspectives for the U.S. Catastrophe Insurance Market?", Swiss Re, Sigma No. 5/1996, p. 3.

[5] Cited in reprinted article from National Underwriter: Property & Casualty/Risk & Benefits Management Edition, January 20, 1997.

[6] A basis point is 1/100th of a percentage point.

[7] "Beyond Catastrophes," Best's Review: Property & Casualty, April 1999, p. 76.

comparable ratings, investors still require higher yields on catastrophe bonds than on noncatastrophe bonds. According to a 1997 report, the yields on catastrophe bonds have been 3 to 4 percentage points more than on comparably rated noncatastrophe bonds. However, as investors have become more confident in evaluating catastrophe bond risk, the spread between yields on catastrophe bonds and other comparably risky noncatastrophe bonds has narrowed.

- The development of computer modeling of natural catastrophes and the growing understanding of catastrophe risk among institutional investors are increasing market capacity.

- Catastrophe bonds permit portfolio diversification across all financial assets, since the occurrence of a catastrophe is independent of economic conditions.

- Perceived regulatory, accounting, and tax barriers may deprive many potential users of the benefits of insurance securitization. For example, only three states have expressly addressed an insurance company's authority to engage directly in exchange-traded insurance derivatives.[8] In each of these jurisdictions, such authority has been limited to hedging transactions. Furthermore, the National Association of Insurance Commissioners (NAIC) does not treat catastrophe contracts like reinsurance for accounting purposes. To alleviate some of these regulatory and accounting barriers and gain certain tax advantages, many insurers have used offshore special purpose vehicle reinsurers for insurance securitization. In response, and to encourage more onshore insurance securitization, NAIC has adopted a Special Purpose Vehicle Model Act that would allow insurers to create protected cells that function semiautonomously within a company to retain favorable tax and accounting advantages while protecting investors from losses incurred by the parent company. The Model Act would serve as a model for laws that individual states could enact to allow creation of protected cells by insurers.

In the long run, the growth momentum of insurance derivatives and securitized catastrophe risks will not evolve independently from future catastrophe events and the general investment environment. Securitizing catastrophe risk will succeed only if the transactions give insurers a more cost-effective means of financing catastrophe risk while enhancing the performance of investors' portfolios.

[8] Statement of Sylvia Bouraux, Chicago Board of Trade, House Banking Committee, April 23, 1998, p. 4.

Regional Catastrophe Loss Estimates by Applied Insurance Research, Inc.

We asked Applied Insurance Research, Inc. (AIR), a catastrophe modeling company, to provided estimates of insured losses that would result from natural catastrophes of various types and magnitudes in six U.S. regions (Alaska was excluded). The estimates are shown in table II.1. The types of disasters included in the estimates are combined losses from earthquake, fire following earthquake, hurricanes, hailstorms, tornadoes, and straight-line wind. The magnitudes are expressed in terms of loss-return periods, which are the time spans within which a single catastrophe loss of a given size is expected to occur.

As the table shows, expected catastrophe losses for the 1-in-100-year return period range from $2.8 billion in the 13-state Great Plains region, to $35.2 billion for the 5-state Gulf region that includes both Florida and Texas. The West region, which includes California, had a $31.2 billion 1-in-100-year expected loss.

Table II.1: Estimated Insured Losses for Different Return Periods for Six U.S. Regions

Dollars in billions

Rank among the six U.S. regions[a]	Region	States comprising region	1-in-100-year expected loss	1-in-250-year expected loss
1	Gulf	AL, FL, LA, MS, TX	$35.2	$47.3
2	West	AZ, CA, HI, ID, NV, OR, UT, WA	31.2	44.6
3	Northeast	CT, DE, MD, ME, MA, NH, NJ, NY, PA, RI, VT, Washington, D.C.	12.0	21.6
4	Southeast	GA, NC, SC, VA, WV	7.3	9.4
5	New Madrid	AR, IL, IN, KY, MO, OH, TN	4.8	13.3
6	Great Plains	CO, IA, KS, MI, MN, MT, NE, NM, ND, OK, SD, WI, WY	2.8	3.6

Notes

(1) Regions are ranked according to losses expected for a 1-in-100-year catastrophe loss.

(2) Includes losses from earthquake, fire following earthquake, and windstorms.

(3) These estimates are for insured losses; that is, losses paid or reimbursed by an insurance company. Other losses may include those paid by federal, state, or local governments or losses retained by home or business owners through policy terms, such as deductibles.

(4) Alaska is not included in any of the regions because none of the perils are modeled for Alaska. The estimate for Hawaii does not include earthquakes.

(5) Region totals cannot be added to generate a countrywide number.

[a]A Caribbean region comprising Puerto Rico and the U.S. Virgin Islands would rank fourth among U.S. regions with estimated 1-in-100-year and 1-in-250-year insured losses of $8.6 billion and $12.8 billion, respectively.

Source: Applied Insurance Research, Inc.

AIR also provided estimates for the 1-in-500-year and 1-in-1,000-year return period, and the largest possible loss that the company modeled. AIR estimated that 1-in-500-year losses ranged from $4.6 billion for the Great Plains region to $57.9 billion for the West region. Expected losses for the 1-in-1,000-year loss ranged from $5.2 billion for the Great Plains region to $84.4 billion for the West region. The largest single natural catastrophe loss modeled by AIR was a $227.9 billion loss in the West region. Finally, AIR provided countrywide estimates for the perils modeled. The countrywide estimates were $47.3 billion for the 1-in-100-year loss and $70.8 billion for the 1-in-1,000-year loss.

An NAIC official told us that loss estimates made by catastrophe modeling firms sometimes vary widely. The estimates provided to us by AIR and another catastrophe modeling firm, EQE International (EQE), show some variation. Notably, EQE's estimate of $42.8 billion for the 1-in-100-year loss for Florida exceeds AIR's estimate of $35.2 billion for the 1-in-100-year loss for the entire Gulf region, which includes Florida and four other states. Part of this variation is due to differences in the types of catastrophes the two firms model.

California Earthquake Authority

After paying a large number of claims that resulted from the 1994 Northridge, CA, earthquake, many insurance companies stopped selling homeowners' insurance or notified existing policyholders that their insurance would not be renewed. The California Earthquake Authority (CEA) was established by law in 1996 to address the homeowners' insurance availability crisis following the earthquake by offering residential-only earthquake insurance policies through insurers that joined the CEA program. The legislation also capped potential liability for losses under the program for those companies that elected to participate in the program.

A governing board comprising elected officials or their designees administers the CEA. No public funds are available to pay for losses incurred by CEA policyholders, although the Authority, according to the CEA's Chief Executive Officer, has tax-exempt status on both the state and federal levels. The funds available to pay claims come from premiums, contributions from participating insurance companies, and reinsurance purchased by the CEA. The CEA's insurance coverage is significantly less than the insurance coverage that was available in the California market before the Northridge earthquake—the basic policy includes higher deductibles, reduced coverage, and higher premiums. As a result, policyholders will be responsible for more of the costs associated with earthquake damage. In addition, some costs may be transferred to the federal government through the tax exemption and federal disaster relief.

The CEA's enabling legislation required that insurers representing at least 70 percent of the state's homeowners' earthquake insurance market agree to participate in the CEA program. Insurers representing approximately 72 percent of the market initially joined in the program by January 1997. The participating insurers were required to make an initial capital contribution totaling approximately $717 million that was based on their individual shares of the residential earthquake insurance market. The insurers are also subject to two additional, one-time assessments that cap their maximum contingent liability for CEA claims payments at about $3.6 billion. According to information provided by CEA representatives, the Authority's claim-paying capacity consists of several sources of funding.

- Working capital. This layer consists of the initial insurance companies' contributions, policyholder premiums, and income from investments. By law, the working capital must be maintained at no less than $350 million.

- Assessment on participating insurers. The first assessment on insurers would be made in the event that CEA's available capital falls below the $350 million minimum level. This assessment is limited to $2.15 billion, and CEA's authority to make the assessment is to be eliminated after 12 years.

- Reinsurance. CEA has obtained reinsurance providing for $1.433 billion coverage in excess of the working capital and the first assessment on participating insurers.

- Debt financing. This layer provides for $717 million in additional funding in the event that the previous levels were exhausted.

- Reinsurance. A second layer of reinsurance provides an additional $1.075 billion in claims-paying capacity.

- Finally, in the event all previous funding layers are expended, the CEA can assess participating insurers up to $1.434 billion to pay outstanding claims and/or return the CEA's capital to the $350 million minimum. The amount of this assessment is to be gradually reduced if the CEA's available working capital exceeds $6 billion. In the event that loss claims exceed all layers of available funding, outstanding claims payments would be prorated.

The CEA, as a state-run catastrophe insurance program, would have access to the reinsurance contracts that would be available under H.R. 21. CEA representatives told us that while the Authority has not taken a formal position on the bill, any federal involvement in providing catastrophe reinsurance should not interfere with the private sector's ability to handle catastrophes. In this respect, these officials said that the trigger points of such a reinsurance program should be set high enough (perhaps at a 1-in-250-year rather than at the 1-in-100-year loss) to prevent this. The representatives said the CEA has been successful in obtaining the reinsurance coverage that it needs. The initial reinsurance placement of $2 billion was purchased at a rate that was somewhat less than initially estimated. Since then, CEA has renewed coverage at substantially reduced rates primarily because both it and the reinsurance industry have been profitable in recent years. Moreover, indicative of the current excess capacity in the catastrophe reinsurance market, CEA, in 1999, received offers for more reinsurance coverage than it required.

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