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Hurricanes and Disaster Risk Financing Through Insurance: Challenges and Policy Options

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Summary

The U.S. Atlantic and Gulf of Mexico coastal states, Hawaii, Puerto Rico, and the U.S. Virgin Island are exposed to relatively high levels of risk from hurricanes and tropical storms. The rapid expansion of the U.S. population into areas that are susceptible to hurricanes has placed millions of people and new areas of economic activity in harm's way. To address the financial and economic effects of such risks, households and businesses have relied on private insurance, state-sponsored insurance pools, and/or federal emergency disaster assistance to manage their natural hazard risk.

In the aftermath of four major hurricanes in 2004 — Charley, Ivan, Frances, and Jeanne — that resulted in tens of billions of dollars in insured and uninsured property losses, the 109th Congress might focus attention on the long-term budgetary implications of disaster recovery expenses incurred by the federal government, and finding ways to expand private-sector capacity for insuring disaster losses. Previous Congresses responded to insurers' concerns by considering legislation to create a federal catastrophe reinsurance program for residential property.

Given that actual and threatened catastrophe losses to property in hurricane-prone states have caused insurers to be unwilling or unable to provide property insurance coverage to the extent sought and needed, the federal government has created a federal flood insurance program and the states have created short-term risk financing solutions for the small-to-moderate sized hurricane. Most economists would agree that it is in the interest of both the federal and state governments to assure that property is insured so as to facilitate the remediation, reconstruction, and replacement of damaged or destroyed property in order to reduce or avoid the negative effects to the national and state economies, and to the revenues of the state and local governments needed to provide for the public welfare.

Insurers, legislators and policymakers learned a great deal from Hurricane Andrew in 1992 and took specific actions that had the effect of minimizing the impact of last season's devastating hurricanes that made landfall. One outcome of these changes was that states have shifted the burden of hurricane losses to households through hurricane deductibles, policyholder assessments to repay revenue bond debt, and other insurance underwriting requirements.

This report examines the role of insurance in financing disaster risk and the changes implemented by insurers and legislators that helped to minimize market disruptions following the 2004 hurricane season. After reviewing the congressional interest in financing catastrophe risk and summarizing the results of the 2004 hurricane season, the report describes lessons learned, the insurance market's response to hurricanes, and existing mechanisms for insuring hurricane losses. The concluding two sections analyze issue and policy options as well as future challenges that policymakers in the 109th Congress face.

This report will be updated as events warrant.

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Introduction

The eighteen states along the U.S. Gulf and Atlantic coast,[1] extending from Texas to Maine, along with Hawaii, Puerto Rico and the U.S. Virgin Islands, are at relatively high risk from hurricanes and tropical storms.[2] Hurricanes and tropical storms typically produce violent winds, heavy rains, and storm surges that result in flooding, coastal erosion, and ecological damage. When they strike in populated, commercial, or industrial areas, hurricanes and tropical storms can cause dozens of deaths and billions of dollars in both direct costs (e.g., loss of capital stock and investments) and indirect costs (e.g., disruption of economic activity, including loss of income, employment and services).[3]

Hurricanes are normally described as being in one of five categories, depending on their wind velocity. Category one hurricanes have winds of 74 to 95 miles per hour, category two hurricanes have winds of 96 to 110 miles per hour, category three hurricanes have winds of 111 to 130 miles per hour, category four hurricanes have winds of 131 to 155 miles per hour, and category five hurricanes have winds greater than 155 miles per hour.

Lessons learned from the four major hurricanes in 2004 — Charley (category 4 at its peak) , Ivan (Category 5 at its peak), Frances (category 4 at its peak) and Jeanne (category 3 at its peak) — might lead the 109th Congress to focus attention on the mounting cost of federal outlays for disaster assistance involving hurricanes, and deciding whether and how the federal government could improve the nation's ability to finance the losses created by these events. Insurers, legislators and policymakers learned a great deal from the devastation caused by Hurricane Andrew in 1992, especially in the areas of pre-disaster mitigation and the financing of catastrophic

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[1] These 18 states are: Alabama, Connecticut, Delaware, Florida, Georgia, Louisiana, Maryland, Massachusetts, Mississippi, Maine, New Hampshire, New Jersey, New York, North Carolina, South Carolina, Texas, Vermont, Virginia.

[2] Hurricanes are formed in the North Atlantic, Caribbean Ocean, Gulf of Mexico, and the Pacific Coast of Mexico. The greatest likelihood of a hurricane striking land areas is along the Gulf Coast and the Southeastern Seaboard, as well as Hawaii. Some hurricanes have struck central Pennsylvania and the coast of New Jersey, New York, Maryland, and New England.

[3] Rachel A. Davidson, and Kelly B. Lambert, "Comparing the Hurricane Disaster Risk of U.S. Coastal Counties," *Natural Hazards Review*, August 2001, p. 132.

risk, and actions they took served to minimize market disruption following the devastating 2004 hurricane season. However, the short-term insurance solutions designed to finance loss caused by a small (category one) or moderate hurricane (category two, three or four) will not work for a catastrophic hurricane (category five) because state pools lack the financial capacity for financing events of such magnitude.

Prior to the beginning of the 109th Congress, some Members of Congress had begun to rethink federal disaster policy, particularly with respect to the financing of catastrophic risk and the unwillingness or inability of insurers to provide property insurance coverage to the extent sought and needed. An important issue these Members grappled with was deciding how to reconcile the possible roles for the public and private sectors in disaster risk financing and risk reduction. Several questions arose: What has been the experience of using financial tools, such as insurance and other financial services, to reduce disaster risk? What challenges and opportunities exist for disaster risk transfer and risk reduction schemes? And lastly, what concrete steps must be taken, and by whom, to form partnerships between the public and private sectors to use insurance and other financial services for disaster risk reduction?

In preparation for debate on financing disaster risks in the 109th Congress, this report examines the role of insurance in financing disaster risk and the changes implemented by insurers and state legislators that helped to minimize market disruptions following the 2004 hurricane season. After reviewing the congressional interest in financing catastrophe risk and summarizing the results of the 2004 hurricane season, the next three sections describe lessons learned, insurance market's response to hurricanes, and existing mechanisms for insuring hurricane losses. The concluding sections analyze issues and policy options as well as future challenges that policymakers in the 109th Congress face.

Catastrophic Risk Financing With Insurance

Individuals and policymakers have two options to reduce losses from disasters: pre-disaster mitigation that reduces physical /environmental vulnerabilities and risk financing designed to reduce financial vulnerabilities. The first step in the disaster management framework is to mitigate damages from disasters. The residual economic risk can then be managed with risk financing strategies. Financing is thus an integral part of managing disaster risk; it would not be feasible to quickly reconstruct the damaged property and infrastructure, and also to restore the livelihood of the affected persons without adequate financial arrangements.

Insurance is the primary method of financing natural disaster risk in the U.S.. Risk financing with insurance avoids the time lag that is associated with post-disaster assistance or financing. Insurers are able to assess damages and reimburse losses immediately. In providing insurance coverage, an insurer will agree to assume a portion of the policyholder's disaster risk exposure in exchange for a premium. From this premium payment, the insurer sets aside loss reserves to pay expected claims and build up capital reserves to "buffer" against the risk of insurer insolvency from low-probability, high-cost events. Insurance companies supplement this arrangement by

purchasing reinsurance from a reinsurance company so that losses from a catastrophic event are spread worldwide.[4]

Most insurance experts agree that although insurers and traditional reinsurers could absorb the loss shock from a moderate (category two, three and four) hurricane (e.g., less than $50 billion in insured losses), their financial capacity may not be adequate to cope with a catastrophic (category five) hurricane. Estimates of the probable maximum losses (PMLs) from a catastrophic hurricane striking the U.S. range up to $100 billion, and this figure could be even higher depending on the location, time and intensity of the event. The PML loss from a Category 5 hurricane directly hitting a densely populated area along the Gulf and Atlantic Coast (e.g., the Miami-Ft. Lauderdale area) could exceed the total capacity (policyholder surplus) of the U.S. insurance industry.[5] The policyholders surplus of the entire property and casualty insurance industry stood at about $370 billion at the end of 2004.[6] Only a fraction of this industry-wide total surplus amount would be available to compensate victims of a hurricane. Insurers must rely on this same limited pool of capital to pay for other potentially catastrophic and unpredictable risks, such as terrorism, mold, and medical malpractice and asbestos liability claims. Insurers may have to liquidate bonds and other financial assets in order to pay claims, triggering an adverse impact on U.S. financial markets.[7]

Congressional Interest In Financing Catastrophic Risk

America's coastal areas are under increasing pressure from population growth and property development in areas that are inherently susceptible to hurricane hazards. The nation realizes this risk when hurricanes strike and communities suffer, while American taxpayers, through the federal government, bear the costs associated with indemnifying uninsured victims of natural disasters and rebuilding critical infrastructure.

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[4] Reinsurance is a form of insurance for an insurance company that provides considerable protection to the primary insurer by: (1) limiting that insurer's loss exposure to levels commensurate with their net assets; (2) reducing the wide swings in profit and loss margins inherent to the insurance business; (3) protecting against catastrophic loss; and (4) increasing capacity or the dollar amount of risk an insurer can prudently assume, based on its surplus and the nature of the business written.

[5] David J. Cummins, Neil A. Doherty and Anita Lo, "Can Insurers Pay for the 'Big One'? Measuring the Capacity of an Insurance Market to Respond to Catastrophic Losses," *Journal of Banking and Finance*, vol. 26, no. 2, p. 557.

[6] Policyholders surplus refers to "net worth" or "owners' equity" in other industries. It is a measure of the capacity of insurers to underwrite policies, and it must increase to meet the demands of a growing U.S. economy and claims resulting from hurricanes and other natural hazards.

[7] Ross J. Davidson Jr., "Working Toward a Comprehensive National Strategy for Funding Catastrophe Exposures," *Journal of Insurance Regulation*, vol. 7, no. 2, Winter 1998, p. 134.

Table 1 shows that while the frequency of catastrophic events in the last few years is less compared with earlier years, insured losses have increased significantly. The increasing magnitude of both insured and uninsured losses from natural disasters represent an ongoing challenge for governments and the private sector. Catastrophes result in large government outlays for disaster assistance and they place a financial strain on private disaster insurance markets. The federal government alone, facing fiscal constraints to cover the losses to the private sector, will find it challenging to meet long-term disaster-related spending. Further, insurers have been and will continue to be reluctant to cover properties in high-risk areas because of high long-run costs (which translates into high prices for disaster insurance) and low demand for disaster insurance.[8] To make insurance available and affordable, state governments have created state pools to provide catastrophe insurance or reinsurance coverage at subsidized rates.

Table 1. Total U.S. Insured Losses and Federal Outlays for Uninsured Losses from Major Disasters: 1995-2004[a]

($ millions)

Year	Insured Losses				Uninsured Losses	
	Number of Events	Number of Claims (Millions)	Dollars When Occurred	Insured Losses in 2003 Dollars	Total [b] Appropriations (available funds)	Federal Outlays[c]
1995	34	2.7	$8,310	$10,033	$4,235	$2,492
1996	41	3.9	7,375	8,649	4,042	2,581
1997	25	1.6	2,600	2,981	5,248	2,898
1998	37	3.5	10,070	11,367	2,155	2,242
1999	27	3.3	8,321	9,190	2,597	4,149
2000	24	1.4	4,600	4,915	3,019	2,853
2001	20	1.6	26,548	27,582	6,249	3,413
2002	25	1.8	5,850	5,932	12,677	4,114
2003	21	2.6	12,885	12,885	2,255	8,761
2004	22	3.4	27,275	NA	2,068	3,082

Source: Insurance Services Office, Inc., Jersey City, New Jersey

a. The definition of a catastrophe changed in 1996. Beginning in 1997 the catastrophe definition was raised from $5 million to $25 million in insured damage. This change might explain why the number of recorded catastrophes and the aggregate losses attributed to catastrophes on average is lower than in earlier years. The figures for appropriations and outlays in the last two columns are different because Congress appropriates funds to make it available, but the actual amounts spent could be different.

b. Total appropriations into the Disaster Relief Fund. Figures are in 2002 constant dollars. The data in this column comes from: CRS Report RL32242, *Emergency Management Funding for the Department of Homeland Security: Information and Issues for FY 2005*, by Keith Bea, p. 8.

[8] The high long-run costs and low demand for disaster insurance results from insurers having to hold huge amounts of capital to pay claims resulting from rare but potentially large catastrophe losses, and the limited willingness of many consumers to pay risk-based premiums for disaster insurance, respectively.

[C.] These figures, which are in 2002 constant dollars, come from: CRS Report RL32242, *Emergency Management Funding for the Department of Homeland Security: Information and Issues for FY 2005*, by Keith Bea, p. 8.

The last two columns in **Table 1** show total appropriations into and outlays from the Disaster Relief Fund (DRF) for federal disaster assistance to help individuals, families, state an d local governments, and certain nonprofit organizations affected by severe disasters. Average annual federal outlays exceeded $3.6 billion since 1995 because of significant hurricanes (Andrew and Inniki FY1992), earthquakes (Northridge in FY1994), floods (Midwest floods of 1993, Red River Floods of 1995) the terrorists attacks of September 11, 2001, and the sequence of four major hurricanes in 2004.[9] For purposes of illustration, prior to FY1989, outlays from the DRF averaged $568 million, and on only two occasions exceeded $1 billion.[10]

In this environment of rising cost of federal disaster assistance, the 109th Congress might focus attention on the long-term budgetary implications of disaster recovery expenses incurred by the federal government. The last time Congress took a critical examination of the federal disaster policy was in 1998.[11] This is likely to occur at the same time that the property insurance industry seeks some type of federal assistance in reducing their catastrophe exposure. Ironically, the insurance industry has historically opposed federal intervention in the insurance marketplace. But, faced with new terrorism risk following the September 11, 2001 terrorists attacks, and the recognition of a possible catastrophic hurricane far more devastating than Hurricane Andrew in 1992, members of the insurance industry have begun to rethink federal involvement in disaster insurance markets.

Previous Congresses responded to insurer's concerns about their hazard risk exposure by considering legislation to create a federal catastrophe reinsurance program for residential property.[12] The first of these proposals — H.R. 4480 and H.R. 4462 introduced in the 101st Congress — sought to address only the earthquake hazard. Later bills, such as H.R. 21 in the 106th Congress and H.R. 1552 in the 108th Congress, followed an "all-hazard" approach to covering most natural hazards, including hurricanes and earthquakes. Both H.R. 21 and H.R. 1552 would have established a federal program to provide reinsurance to improve the availability of homeowners' insurance. However, the two bills took slightly different approaches. Whereas H.R. 21 would have provided reinsurance for state disaster insurance programs, H.R. 1552 would have authorized the Secretary of Treasury to establish a program to make reinsurance coverage available through the auctioning of contracts for reinsurance coverage. Other bills, such as H.R. 4186 in the 108th Congress,

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[9] CRS Report RL32242, *Emergency Management Funding for the Department of Homeland Security: Information and Issues for FY 2005*, by Keith Bea, p. 8.

[10] Ibid, p. 7.

[11] See U.S. Congress, House Committee on the Budget, Task Force on Budget Process, Budgetary Treatment of Emergencies, hearing, 105th Cong., 2nd sess., June 23, 1998 Washington: GPO,

[12] Elliott Mitter, "Alternative National Earthquake Insurance Programs," *Earthquake Spectrum*, August 1991, vol. 7, no. 3, p. 757.

would have amended the Internal Revenue Code of 1986 to allow insurers to create tax-deferred reserves to fund future catastrophe losses from natural disasters.

Despite broad bipartisan support for addressing America's exposure to natural disasters, the full Congress did not approve the creation of a federal reinsurance program until the enactment of the Terrorism Risk Insurance Act (TRIA) of 2002.[13] TRIA provides a temporary federal reinsurance backstop once a high insurance industry loss is sustained. The law is scheduled to expire on December 31, 2005. Two bills — H.R. 1153 and S. 467 — have been introduced in the 109th Congress to extend the terrorism insurance program. The insurance industry is seeking to have TRIA extended for at least two years while the industry continues to work to expand the private market for terrorism coverage.[14]

All federal disaster insurance bills, including TRIA, have one thing in common: they seek to improve the nation's ability to finance catastrophe risk through insurance as opposed to increased direct spending for federal disaster assistance. Their justification is based on the argument that such initiatives will: (1) enhance the current catastrophe funding system; (2) make property insurance more available and affordable in high-risk areas; (3) promote the funding of research studies (i.e., earthquake science, actuarial science, economics, and finance) on disaster insurance issues; and (4) expand our knowledge and understanding of the scientific and financial aspects of natural hazards. Professor Howard Kunreuther at the University of Pennsylvania has suggested that improvements in the scientific and financial areas are thought to be important because of the urgency in finding ways to predict the probability and magnitude of future natural hazards, plan for the necessary funding for disaster recovery, and devise the optimum allocation of resources after the event in order to promote speedy economic recovery of the affected region and the rebuilding of the damaged residential, commercial, and public structures.[15]

Opponents of federal disaster insurance, however, say such measures conflict with long-established sociological, economic, and actuarial principles that focus on the "true"cost of government programs (the opportunity cost of the funds), the foregone benefits of a competitive insurance marketplace (e.g., cost efficiency and rate competition), and the absence of consumer choice (the ability to decide whether to purchase coverage).[16] Citing the development of new financial instruments to fund catastrophe coverage and expanded reinsurance capacity, critics of public insurance systems say there is no need for a federal insurance program at this time. They insist that such programs shield the private sector from loss while creating sizable taxpayer-financed subsidies that undermine private-sector incentives for efficient risk management. Further, it has been argued that these programs encourage population growth and development in high-risk, hurricane-prone areas that should not be

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[13] P.L. 107, 297.

[14] CRS Report RS21979, *Terrorism Risk Insurance: An Overvie*w, by Baird Webel.

[15] Howard Kunreuther and Richard J. Roth, Sr., *Paying the Price: The Status and Role of Insurance Against Natural Disasters in the United States* (Washington: Joseph Henry Press, 1998), p. 92

[16] Kunreuther, p. 93.

developed, and would allow insurers to "cherry pick" the best risks and send the federal government the poor risks. Rather than providing insurance protection for natural hazard losses, critics argue, the federal government should take actions to expand private-sector capacity for insuring disaster losses.

Proponents of federal disaster insurance argued that such a scheme would reduce dependence on "free" disaster assistance and support efficient risk management by households and businesses.

Atlantic Hurricane Season 2004

According to the National Oceanic and Atmospheric Administration (NOAA), there were 12 named storms during the 2004 hurricane season, of which nine affected the United States: three as tropical storms (Bonnie, Hermine and Matthew) and six as hurricanes (Alex, Charley, Frances, Gaston, Ivan and Jeanne). Four of the hurricanes (Charley, Ivan, Frances and Jeanne) made landfall as "major" or Category 3 or higher events on the Saffir-Simpson Hurricane Scale. Three other hurricanes (Danielle, Karl, and Lisa) did not make landfall.[17] The nine named storms that affected the United States resulted in 21 Presidential declarations of major disaster covering 12 states, Puerto Rico and the U.S. Virgin Islands.[18] Florida was affected the most by the four hurricanes followed by Alabama, Georgia, Pennsylvania, and North Carolina.[19]

The 12 named storms during the 2004 hurricane season surpassed the national average over the past five decades. According to researchers at Tillinghast-Towers Perrin, a global actuarial, management, and financial services consulting firm, over the past 50 years, there have been, on average, 9.8 named storms, 5.8 hurricanes, and 2.3 intense hurricanes. Not all of these storms made landfall. The corresponding figures for 2003 were 16, 7, and 3, respectively. Some catastrophe risk modeling firms contend that while the 2004 hurricane season was above normal, it was not so unusual. According to their hurricane models, insurers should expect to see four hurricanes making landfall in the United States approximately once every 12 years and this is within the range to which most insurers manage their catastrophe risk.

Tables 2 and 3 show that four of the 2004 major hurricanes — Charley, Jeanne, Frances, and Ivan — rank among the top ten for both the costliest U.S. hurricanes and insured loss events in U.S. history. For the first time since 1886, three

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[17] The National Oceanic and Atmospheric Administration (NOAA) also reported that there was subtropical storm Nicole and ten tropical depressions.

[18] These 12 states are: Alabama, Delaware, Florida, Georgia, Louisiana, Mississippi, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, and Virginia.

[19] For more information on the impact of the four hurricanes on Florida see Insurance Services Office, Inc., Press Release, "AIR Analysis Concludes 2004 Hurricane Season Is Not As Unusual," available at [http://www.iso.com/press_releases/2004/11_03_04.html], visited on March 21, 2005.

hurricanes — Charley, Frances, and Jeanne — made landfall in the same state — Florida; Ivan made landfall in Alabama, but continued its path across Florida.[20]

Table 2. Ten Most Costly Hurricanes

($ billions)

			Estimated Insured Losses	
Rank	Year	Hurricane	Dollars when occurred	In 2003 dollars
1	1992	Andrew	$15.5	$20.3
2	2004	Charley	7.4	7.4
3	2004	Ivan	6.0	6.0
4	2004	Frances	4.4	4.4
5	1989	Hugo	4.2	6.2
6	2004	Jeanne	3.2	3.2
7	1998	Georges	2.9	3.3
8	1995	Opal	2.1	2.5
9	1999	Floyd	2.0	2.2
10	1992	Iniki	1.6	2.1

Source: Insurance Information Institute, New York, NY.

Table 3. Ten Most Costly U.S. Insurance Catastrophe Losses

($ billions)

			Insured Loss	
Rank	Date	Peril	Dollars When Occurred	In 2003 Dollars
1	Aug. 1992	Hurricane Andrew	$15.5	$20.3
2	Sep. 2001	World Trade Center Terrorist Attack	18.8	19.5
3	Jan. 1994	Northridge, CA Earthquake	12.5	15.5
4	Aug. 2004	Hurricane Charley	6.8	6.8
5	Sep. 1989	Hurricane Ivan	7.1	7.1
6	Sep. 2004	Hurricane Hugo	4.2	6.2
7	Sep. 2004	Hurricane Frances	4.4	4.4
8	Sep. 2004	Hurricane Jeanne	4.6	4.6
9	Sep. 1998	Hurricane Georges	2.9	3.3
10	Jun. 2001	Tropical Storm Allison	2.5	2.6

(1) Adjusted to 2003 dollars by the Insurance Information Institute
(2) Property coverage only.
(3)ISO preliminary estimate, expressed in 2004 dollars
Source: Insurance Services Office, Inc., Jersey City, NJ; Insurance Information Institute, New York, NY.

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[20] Matt Brady, "Insurers Post Record First-Half Profits," *National Underwriter: Property and Casualty*, Oct. 25, 2004, p. 32.

Meteorological forecasters had correctly predicted above-normal activity during the 2004 hurricane season,[21] based on a trend of above-average activity during seven of the last nine seasons. Insurers therefore had knowledge of and presumably were prepared for these events. According to climatologists, the level of activities for 2004 was similar to that of 2003, but consumers and insurers were spared huge losses in 2003 because very few of the tropical storms and hurricanes made landfall in the United States.[22] Thus, insurers faced limited losses from the 2003 hurricane season in terms of damages relative to their activity, but that was not the case in 2004 when four major hurricanes made landfall in August and September.

The Insurance Information Institute in New York estimates that the four major hurricanes that struck Florida and other Gulf and Atlantic Coast states in 2004 caused $20.5 billion in wind-related insured losses, and total claims filed of 2.2 million.[23] Early estimates suggest that the hurricane will have a total economic price tag of over $56 billion.[24] The four major hurricane, as a whole, exceed the property damages from the 9/11 terrorist attacks ($19.5 billion) and Hurricane Andrew ($20.3 billion). In addition to insurance pay-outs, Congress passed two emergency supplemental appropriations statutes that provided a total of $16.475 billion to hurricane victims.[25]

Unlike Hurricane Andrew that led to 11 insurer insolvencies and 63 insurers announcing plans to withdraw from the Florida market or significantly curtailing of new business, only one small insurer — American Superior Insurance Company — became insolvent as a direct result of last year's hurricanes. The 11 insolvencies were the largest number of hurricane-related insolvencies in U.S. history.[26] Several insurers did have their financial strength rating downgraded by various rating agencies, and at least four insurers have started canceling insurance policies in

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[21] Forecasters attribute the recent rise in Atlantic basin hurricane activity on long-term climate patterns, including continuation of warmer-than-normal ocean temperatures across the tropical Atlantic. The warmer waters are associated with circulation patterns that form an above-average hurricane season.

[22] "Dangerous Planet: Living on Borrowed Time," *Reaction*, July 2004, p. 18.

[23] Robert P. Hartwig, *Catastrophes: Insurance Issues* (Insurance Information Institute: February 2005), available at [http://www.iii.org/media/hottopics/insurance/xxx], visited on Feb. 15, 2004.

[24] Swiss Re, 2004. Excerpts from pre-publication of Swiss Re's Sigma study, "Natural and Man-Made Catastrophe 2004," to be published in Spring 2005. Data can be found at [http://Swissre.com], visited on March 16, 2005.

[25] See CRS Report RL32581, *Assistance After Hurricanes and Other Disasters: FY2004 and FY2005 Supplemental Appropriations*, by Keith Bea and Ralph M. Chite.

[26] The number of property/casualty insolvencies in any given year differ based on an organization's specific criteria for including a company in the insolvency count. The National Association of Insurance Commissioners, for example, list an insurer as insolvent when a company triggers some formal regulatory action in the calendar year because of significant financial impairment. Other organizations like A.M. Best list an insurer as insolvent when they meet the same criteria, but they count each company in a group.

Florida.[27] In addition, several insurers have announced that they will no longer seek new business in the state.

American Superior Insurance Company wrote homeowners insurance coverage for nearly 60,000 Floridians and had a premium volume of $34 million, representing less than 1 percent of total homeowners insurance premiums collected in Florida.[28] The company voluntarily consented to be placed into rehabilitation by the Florida Department of Financial Services, Division of Rehabilitation and Liquidation. Under a plan of receivership, a state-appointed official takes over the company's operations and, in the event the insurer cannot be rehabilitated, could liquidate its assets to pay policyholder's claims. If the liquidated assets cannot pay all claims the Florida Property and Casualty Insurance Guaranty Fund will pay the shortfall in claims up to $300,000, and impose an assessment on all property insurers operating in Florida to pay claims on behalf of the insolvent insurer. Insurers, in turn, can write off the guaranty fund assessments against their state income taxes, thereby shifting some of the cost of the insolvency to all taxpayers in the state.

Florida's Hurricane Deductibles for Residential Insurance Policies

The requirement that Florida homeowners pay a per-occurrence versus a seasonal (aggregate) windstorm deductible emerged as an important state legislative issue following the 2004 hurricane season.[29] Some108,000 homeowners were struck by two or more hurricanes, and approximately 36,000 policies had multiple deductibles applied and the cost to policyholders of second and subsequent deductibles may total about $70 million.[30] Residential hurricane deductibles are typically 2% of policy limits and may be as high as 5% of policy limits, or even higher for certain policies.[31] For this reason, the multiple deductible can result in significant out-of-pocket expense for many policyholders.

On December 16, 2004, the Florida Legislature passed legislation — Hurricane Deductibles for Residential Insurance Policies (HB 9-A) — that established a program to reimburse policyholders for financial hardships suffered due to multiple hurricane deductibles being applied to their insured losses in 2004. Under HB 9-A, policyholders of residential property insurance policies who paid two deductibles in 2004 would be eligible for reimbursement from the Department of Financial Services

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[27] Paige St. John, "Florida Insurers Start Pulling Out of State," *The Ft. Myers News-Press*, Jan. 7, 2005, p. A1.

[28] Theo Francis, "Hurricanes Claim Their First Victim in Insurance Field," *Wall Street Journal*, September 30, 2004, p. B2.

[29] Aaron DeSlatte, "Catastrophe Fund Stirs Debate," *The Florida Today*, December 9, 2004, p. 1.

[30] For more information see, Office of the Florida State Senate Secretary, "Summary of Legislation Passed: 2004-A Special Session," available at [http://www.flsenate.gov], visited on February 16, 2005.

[31] It should be noted that $500 hurricane deductibles are still prevalent for homes and mobile homes valued under $100,000.

up to $10,000 per storm, per policy, per structure, and up to $20,000 if they paid three or more deductibles. The law also requires seasonable hurricane deductibles for all residential policies, effective May 1, 2005.

The Multiple Deductible Reimbursement Program is funded with $150 million borrowed from the Florida Hurricane Catastrophe Fund (Cat Fund) to reimburse residential property insurance policyholders .[32] The borrowed funds would be repaid over five years starting in 2006. The Cat Fund estimates that there will be a statewide average increase of 0.5% in homeowner rates to cover the payments.[33]

While insurers were generally pleased with the new law because they will not have to reopen thousands of already settled claims, they had lobbied to make it easier for insurers to be reimbursed by the Cat Fund. Currently, there is a $4.5 billion threshold trigger before insurers can be reimbursed for losses under the Cat Fund's reinsurance agreement. Florida's Chief Financial Officer, Tom Gallagher, had recommended a plan to the Legislature's Joint Select Committee on Hurricane Insurance to reduce the Cat Fund retention to $4 billion for each of the two hurricanes and $1 billion for the third and subsequent events in a season.[34]

Rate Increases After 2004 Hurricane Season

Some 35 insurers in Florida requested a statewide rate hike following the 2004 hurricane season. However, Florida's Insurance Commissioner Kevin McCarty requested that they hold off on homeowners rate hikes until after the 2005 legislative session, which began on March 8, 2005.[35] According to media reports, property owners in Florida and other Gulf and Atlantic coast states will likely have to pay 15% to 20% more for homeowners and business insurance in 2005.[36] Florida's two largest property insurers — State Farm and Citizens — received approvals to increase rates by 5% and 19.3%, respectively.

The key factor in determining how much rates may rise will be the actions of reinsurance companies. A key question is whether the losses may have reduced the capacity of the reinsurance industry to supply coverage. So far, U.S.-property-catastrophe reinsurance renewals from accounts affected by Florida hurricane losses

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[32] For a summary of legislation passed by the Florida Legislature during the 2004-A Special Session, see: [http://flsenate.gov/Publications/2004A/Senate/reports/summaries/pdf/sessum04A.pdf], visited on February 17, 2005.

[33] Frank Matso Lysiak, "Bill Frees Catastrophe Fund to Reimburse Florida Deductibles," *Best's Review,* Jan. 2005, vol. 105, p. 10.

[34] NAMIC Online, "Florida: Senators Hear Testimony on How Hurricane Affected the Industry, [http://www.namic.org/PrintPage.asp?ArticleID=7510], visited on Dec. 10, 2004.

[35] David Sedore, "Clean Up List for Insurance Headed for a Legislative Committee Vote," *Palm Beach Post*, February 17, 2005, p. 1.

[36] Joseph Treaster, "Rises Seen in Florida Insurance Premiums," *The New York Times*, September 28, 2004, p. C2.

have seen rates go up by as much as 20%.[37] The storms may also result in some insurers reducing their exposure in areas of severe losses; this could presumably be accomplished by cutting the amount of coverage offered or increasing deductibles, possibly forcing the state-sponsored insurance programs to provide coverage in these areas.

Insurance Lessons Learned from Hurricane Andrew

There is little doubt that property insured losses from the 2004 hurricane season would have been even higher were it not for actions taken by insurers, regulators, and state legislators to both protect the industry's balance sheets and stabilize the property insurance markets in the aftermath of Hurricane Andrew in 1992.[38] After Andrew, Florida faced a "capacity gap" — the difference between the amount of capital (insurance) available and the demand for coverage — and a sudden shortage of reinsurance for hurricanes. This situation meant major primary insurers operating in Florida and other Gulf and Atlantic Coast states could not adequately spread their catastrophe risks, which, in turn, forced many of them to stop writing new policies in hurricane-exposed states or to shut down operations altogether for fear of over-exposure, financial impairment, or even insolvency.

Insurers were caught off-guard by the large losses associated with Hurricane Andrew because of significant errors in actuarial estimates of potential hurricane-related losses. Prior to Hurricane Hugo in 1989, the insurance industry never suffered any loss over $1 billion from a single hurricane. Further, most insurance industry experts estimated the probable maximum loss (PML) for a single hurricane in the United States at between $8 and $10 billion, and that such an event would occur only once in a century. Hurricane Andrew took insurers and forecasters by total surprise. In hindsight, because of the lull in hurricane activity during the 1970s and 1980s, insurance policies were underpriced and insurers accepted far more hurricane exposure than could be supported by their capital resources (including reinsurance). Also, there were deficiencies in the storm-resistant capabilities of homes in Florida as well as poor enforcement of building codes in the region.

In response to post-Andrew insurance market disruption, state insurance regulators undertook several steps to restrict insurers' products, pricing, underwriting decision and claims settlement practices for disaster coverage.[39] In addition, the

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[37] Michael Ha, "Reinsurance Rates Flat-to-Down Despite Reinsurance Catastrophe Losses," *National Underwriter: Property and Casualty Edition*, February 7, 2005, p. 12.

[38] Theo Francis, "This Year's Storms Fail to Blow Down Insurers," *The Wall Street Journal*, September 28, 2004, p. C3.

[39] For example, regulators sought to: (1) issue moratoriums disallowing cancellations and non-renewals of homeowners insurance policies; (2) suppress homeowners insurance rates in response to political pressure, but later approved rate hikes and special hurricane or "wind" deductibles; and (3) open up the market to excess and surplus lines insurers and

(continued...)

South Florida Building Codes were extended statewide and the state legislature established the Florida Commission on Hurricane Loss Projection Methodology to review hurricane catastrophe models used for rate filings. These two major changes were instrumental in defining how insurers process and analyze hurricane risk.

Insurers prospectively evaluated their catastrophe exposures in coastal areas for the first time and discovered that the magnitude of risk was both unexpectedly high and unacceptable, given the risk tolerances of management and the expected long-term return on the business written in hurricane-prone areas in coastal states.[40] The concern was that insurers with excessive catastrophe exposures would have difficulty achieving or maintaining profitability and balance-sheet strength, and this could lead to rating downgrades, insurer insolvencies, and insurance availability problems.[41]

One major outcome of insurers' assessment of catastrophe risk exposure was that large national property insurers began forming single-state affiliate insurers to protect the capital of the holding company. Also, with the approval of state regulators, insurers began shifting the risk of windstorm losses away from overexposed insurers to all property owners and other consumers (through assessments from state-sponsored pools). This decision allowed consumers and insurers to withstand hurricane-related losses in 2004 with limited market disruption in terms of policy cancellations, non-renewals and insurer insolvencies.[42]

The economic rationale for shifting the risk of windstorm loss to property owners through state-sponsored insurance and reinsurance pools was that these pools have a cost of capital advantage over private insurers. State-sponsored insurance pools can offer coverage at a price below what the risk would normally require a private insurer to charge. The pooling arrangement works because state insurance pools can largely avoid the accounting and tax rules governing the private sector. A state-sponsored insurance facility is able to defer part of the cost of capital to the future by virtue of the government's authority to issue public sector debt to pay losses, and favorable tax treatment. But, as economists and financial analysts note, there are limits to the ability of states to fund/capitalize insurance pools in advance of catastrophe losses. That is, many consumers could face unpaid claims.

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[39] (...continued)
state-sponsored insurance.

[40] Rude Musulin, "Property Insurance Market Crisis," *Presentation before the Institute for International Research*, May 14, 1996, New York, NY.

[41] Jeanne H. Dunleavy, Daniel, L. Ryan, and C. Brett Lawless, "Catastrophes: A Major Paradigm Shift for P/C Insurers," *Best Week Property/Casualty Supplement: A Special Report*, March 25, 1996, p. 1

[42] On August 18, 2004, Florida implemented a moratorium prohibiting insurance companies from non-renewing or cancelling the policies of homeowners hit by this year's hurricanes. Under the moratorium, residential insurers have been kept from dropping any policies, even in cases involving nonpayment of premiums. Florida Treasurer Tom Gallagher announced on November 16, 2004, that he wanted to extend the order beyond the end of November because thousands of homeowners waiting on insurance checks would not be able to complete repairs by that time and therefore not be able to get coverage elsewhere until the repairs are finished.

Insurance Market Response to Past Hurricanes

Insurers responded to Hurricane Andrew in 1992 by taking action in four areas: hurricane insurance deductibles, a capital market for catastrophe securities, building code regulation and construction standards, and catastrophe modeling and forecasting tools. Collectively, these four marketplace changes allowed private insurers, reinsurers and state-sponsored insurance pools to withstand significant losses from the 2004 hurricane season, and to continue operating in disaster-prone states.

Hurricane Insurance Deductibles

Seventeen states and the District of Columbia now require property owners to pay hurricane or windstorm deductibles from 1% to 15% of the insured value of the property, depending on the type of home (e.g., mobile homes carry a higher percentage deductible) and where the property is located, rather than traditional dollar deductibles used for other types of claims, such as fire damage and theft.[43] According to the Insurance Information Institute, the hurricane insurance deductibles have had the beneficial effects of making insurance coverage more available in high risk areas, and getting customers more motivated to invest in disaster mitigation, such as hurricane shutters, damage resistant windows, and homes fortified to withstand severe storms.[44] By imposing a higher deductible for windstorm-related losses, property owners assume a greater share of the risks associated with living in high risk areas, and, therefore, they presumably take steps to mitigate potential losses.

Capital Market for Catastrophe Securities

Insurers have traditionally used reinsurance to manage a portion of their catastrophe risk exposures. Insurers, reinsurers and an increasing number of corporations came to the realization beginning in the late-1980s that the traditional reinsurance mechanisms were limited in their ability to provide coverage for catastrophic disasters.[45] Recognizing the limits of their ability to finance catastrophe risk, the high cost of reinsurance and the sheer size of the capital markets, insurers and investment banks became more active in offering catastrophe securities which transfer disaster risk to the capital markets. Investors are attracted to catastrophe securities for several reasons, including their above-average risk-adjusted rate of return versus the typical fixed income instruments and the fact that the rate of return is not correlated with the returns associated with stock and bond portfolios.

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[43] These 17 states are: Alabama, Connecticut, Florida, Georgia, Hawaii, Louisiana, Maine, Maryland, Massachusetts, Mississippi, New Jersey, New York, North Carolina, Rhode Island, South Carolina, Texas, and Virginia.

[44] For more information on windstorm deductibles see New York-based Insurance Information Institute's press release, dated September 20, 2004, "Insurance Deductibles Apply for Each Claim," available at [http://www.iii.org/media/updates/press.737890/], visited on March 21, 2005.

[45] Paul R. Kleindorfer and Howard Kunreuther, "Challenges Facing the Insurance Industry in Managing Catastrophe Risks", In *The Financing of Catastrophe Risk*, ed., Kenneth A. Front (Chicago, University of Chicago Press, 1999), p. 149.

It was not until 1997 that insurance-linked securities (ILS) gained some acceptance as catastrophe risk financing alternatives. As a result, investors in catastrophe securities continue to demand a high-risk premium because of their lack of familiarity with catastrophe risk and uncertainty about the likelihood that these instruments will be triggered.[46] The full acceptance of this new asset class for securitization has been limited by: (1) the tax, cost and regulatory treatment of the financial instruments — the so-called "special purpose reinsurance vehicles" (SPRVs) — underlying the securitization; (2) the lack of standardization in risk measurements; (3) lack of a generally-accepted index on which to base payouts; and (4) high transaction costs relative to traditional reinsurance coverage.

Building Codes and Construction Standards

Disaster risk reduction requires effective enforcement of building codes, land-use planning, environment risk and human vulnerability monitoring and safety standards. In hurricane-prone coastal states like Florida, homeowners insurance rates are now based on new building code standards and the structure's ability to withstand damage by high winds. In the 1980s, the insurance industry came to the realization that the level of building code enforcement affected the cost of claims. It was not until Hurricane Andrew in 1992, however, that a new organization, the Insurance Institute for Property Loss Reduction (IIPLR), launched a study to develop better wind and seismic building codes so structures could better withstand the force of storms and earthquakes. The work of the IIPLR led to the development by Insurance Service Office (ISO) of a building code compliance rating system. The ISO Building Code Effectiveness Grading Schedule (BCEGS) assesses the building codes in effect in a particular community and the community enforcement of these codes. The BCEGS takes into account factors such as the size of the community's building code enforcement budget relative to the amount of building activity, the professional qualifications of building inspectors, and past code enforcement levels. By incorporating the BCEGS into the underwriting and pricing process, communities now have the incentive to undertake mitigation activities such as requiring property owners to use certain roofing material, the installation of hurricane shutters, and the identification of appropriate load combinations for buildings.

With the availability of BCEGS, insurers and state insurance regulators combined forces under the auspices of the National Association of Insurance Commissioners (NAIC) to develop and encourage states to adopt model insurance laws, regulations and guidelines that link insurance practices to building codes. The Florida legislature requires insurers to reflect BCEGS in their rates. Insurers now offer discounts on property insurance premiums to property owners and businesses located in communities with enforced, up-to-date building codes that conform to BCEGS standards. Communities with a BCEGS grade of 1 (reflecting exemplary commitment to building-code enforcement), for example, can demonstrate better loss experience, resulting in lower insurance premiums. Insurers may also impose surcharges in communities where enforcement is lax. The BCEGS program was

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[46] Martin Grace, Robert W. Klein, and Richard D. Phillips, "An Economic Appraisal of Securitizing Insurance Risk Via Onshore Special Purpose Vehicles," *Risk Management and Insurance Review*, 2002, vol 4, p. 33.

initially implemented in states with high exposure to wind (hurricane) and seismic exposure, but now is available throughout the rest of the country.

Catastrophe Modeling and Insurance Underwriting

Before Hurricane Andrew in 1992, most insurers had not used electronic information processing systems to keep track of their potential hurricane loss exposure and to help them make informed insurance underwriting decisions.[47] After the Andrew disaster there was a widespread use of catastrophe simulation modeling — a type of modeling that allows insurers and regulators to better predict future windstorm losses on the basis of current demographics and construction techniques, rather than historical loss experience. Actuaries had gained access to sophisticated statistical databases and computer modeling techniques that could integrate long-term weather data, engineering studies of storm loss potential, and population trends.[48] By combining mathematical representations of the natural occurrence patterns and characteristics of hurricanes, tornadoes, severe winter storms, earthquakes, and other catastrophes, with information on property values, construction types, and occupancy classes, these computer simulation models provide information concerning the potential for large disaster losses before they occur.

There are significant limitations to these types of computer modeling techniques. For example, loss models work best when they are used to develop a relative understanding of potential damage rates rather than absolute losses. Despite the comparative wealth of data and knowledge about hurricanes and the sophistication of insured loss models for these events, some experts believe that these models are often wrong by an order of three, even if all the important event characteristics are known. Thus, a model may predict that a given storm will produce $300 million of insured losses, but the actual insured losses would vary from $100 million to $900 million.

Transferring Risk Through Insurance

Most existing structures in hurricane-prone areas are susceptible to hazard risks, such as strong winds, storm surges, heavy rains, and flooding. Insurance as a risk transfer mechanism can play a key role in helping to minimize disaster losses and reduce the financial and economic impacts of disasters. The problem is that multiple-peril insurance policies held by homeowners exclude damages caused by wind and water damage. To fill this gap in coverage, state catastrophe funds, such as the California Earthquake Authority and the Florida Hurricane Catastrophe Fund, provide coverage for windstorm and earthquake hazards. In a similar fashion, flood-

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[47] Tom O'Brien, "Catastrophe Modeling for Corporate Risk Managers," *Risk Management Magazine*, May 2004, p. 18.

[48] Michael Ha, "Catastrophe Modeling, Forecasting Tools More Sophisticated," *National Underwriter: Property & Casualty/Risk & Benefits Management Edition*, September 23, 2004, p. 17.

related damages associated with hurricanes may be insured through a separate policy offered by the federal National Flood Insurance Program (NFIP).

Federal Flood Insurance Program

Property damage from all flooding, not just water damage linked to hurricanes, totals over $5 billion in the United States each year.[49] Insurance against flood hazard is generally not available in the private insurance market because only people living in flood zones could be expected to purchase flood insurance (adverse selection), and these people would have frequent claims, thus making the coverage prohibitively expensive.[50] Also, insurers generally lack the ability to spread risk sufficiently to safeguard their assets against catastrophic flood losses. Therefore, as part of the National Flood Insurance Act of 1968, Congress authorized the National Flood Insurance Program (NFIP) to serve as an insurance alternative to disaster relief and to meet the escalating costs of damage to buildings and their contents.[51]

Prior to 1968, the federal government responded to flooding on a national scale through the building of flood control structures that restricted the flow of waters (e.g., dams, levees, and dikes) and providing disaster relief to flood victims. After decades of federal expenditures for structural flood works and expanded disaster relief, the focus shifted to flood insurance as a policy tool for reducing loss and for spreading the risk of loss among individuals and businesses. It was expected that homeowners and businesses would pre-fund their own losses by purchasing federal flood insurance. At the same time, the program would encourage preventive and protective measures to reduce future losses. A key mechanism for doing so was the development of flood plain maps and the requirement that local communities restrict development in areas most subject to flooding.

The NFIP provides subsidized, low-cost flood insurance to homeowners and small businesses in flood-prone communities that have agreed to adopt and enforce floodplain management and building code standards. Federal flood insurance is available in each of the 50 States, the Virgin Islands, Puerto Rico, Guam, the District of Columbia, and American Samoa to meet the escalating costs of repairing damage caused by flood to buildings and contents. In FY2003, there were 4,543,952 flood insurance policies in force, representing $681 billion in insurance coverage in more than 19,000 communities.[52]

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[49] For more information and facts on flooding and how federal agencies work together to reduce the flood peril, see "Congressional Natural Hazards Caucus Fact Sheet," available at [http://www.agiweb.org/workgroup/floods0701.pdf], visited Feb. 15, 2005.

[50] Some insurers provide coverage under homeowners insurance policies for backup of sewers and drains. Coverage may also be provided for flood damage under the comprehensive section of standard auto insurance policies and some coverage is available under special commercial insurance policies.

[51] Pub. L. 90-448; 83 Stat. 476.

[52] For more statistics and information on flood insurance sold by the Federal Emergency Management Agency (FEMA) under the National Flood Insurance Program, see FEMA's (continued...)

The NFIP operates under a statutory mandate that premium charges for Pre-FIRM risks — i.e., structures built before the issuance of a Flood Insurance Rate Map (FIRM) or before 1975, whichever is later — must be reasonable. The subsidy is provided by charging premium rates discounted from full risk rates. In order to make up the premium shortfall from subsidizing premiums, the NFIP establishes a target level of premium income for the program as a whole that accommodates the combined effect of the portion of NFIP business paying less than full risk premiums and the portion of the business paying full risk premiums.

Faced with the growing costs of federal expenditures on flood-related disaster relief assistance, including insurance claim payments, and the cumulative impact of low-intensity hurricanes on local economies (in terms of property damage and subsequent reconstruction activity) Congress has continuously sought to strengthen the operational and financial aspects of the NFIP.[53] Most recently, on June 30, 2004, President Bush signed legislation to reauthorize the NFIP until September 2008 and to provide states and local communities with an additional $40 million a year for mitigating (i.e., buyouts, elevation or move the home) severe repetitive loss properties (SRLPs).[54]

In the absence of federal government intervention into the disaster insurance market, several states — Florida, California, Hawaii, Louisiana — have had to address the issue of "uninsurable risks," meaning risk that cannot get coverage from private insurers in the "voluntary market." States with a high risk of natural disasters have created catastrophe funds or residual markets to deal with the unavailability and unaffordability of property insurance. The residual market initiatives take on various forms, such as: (1) Fair Access to Insurance Requirement (FAIR) Plans that are used to cover "hard to insure" exposures; (2) Beach & Windstorm Plans that operate by spreading the risks among insurers operating in the state; (3) Marketing Assistance Plans (MAP) that address short-term insurance availability and affordability problems in a state; and (4) provision for the operation of surplus lines. Both the property insurance residual markets and catastrophe funds as state-sponsored loss-sharing mechanisms will be discussed in the next section.

State-Sponsored Lost-Sharing Mechanisms

In states where insurers in the private market have reached the limits of their willingness or ability to provide coverage for homes and businesses in high risk areas, the state has created catastrophe funds and property residual insurance markets (i.e., Fair Plan and Beach & Windstorm Plans), marketing assistance plans, and provisions for surplus line operations that serve to stabilize the property insurance market — without the involvement of the federal government. Following is a brief discussion of these state residual insurance markets.

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[52] (...continued)
website, available at [http://www.fema.gov/nfip/fy03pif.shtm], visited on March 21, 2005.

[53] Robert T. Burris *et al*, "Impact of Low-Intensity Hurricanes on Regional Economic Activity," *Natural Hazards Review*, August 2002, p. 118.

[54] P.L 108-264.

Fair Plans. The District of Columbia and 34 states have Fair Access to Insurance Requirement (FAIR) plans that make property insurance available to applicants on eligible property located in coastal areas who have been unable to secure such insurance in the normal insurance market. FAIR Plans are syndicated associations of property insurers doing business under the auspices of the state insurance regulator. Although the FAIR Plans act as a single insurer, participating companies actually share on a pro rata basis all of the premiums as well as the profits or losses and expenses incurred.

The concept for FAIR Plans emerged in response to urban riots and civil disorder in the 1960s and the withdrawal of insurers from the property insurance market in communities with a high potential for loss. Congress enacted the Housing and Urban Development Act of 1968[55] which sought to ensure the availability and affordability of fire, crime, and other property insurance in high-risk urban areas by offering federal riot reinsurance to property insurance companies operating in states that voluntarily adopted a FAIR Plan.[56]

Beach and Windstorm Insurance Plans. In 1969, following Hurricane Camille, the first Coastal or "Beach" Pool was created to address the shortage of windstorm insurance in areas vulnerable to hurricane losses. Today, nine states have formed Beach and Windstorm Plans which provide coverage for the wind peril alone in designated risk-prone coastal areas.[57] In some states the FAIR Plan serves as the windstorm plan. Under a state-sponsored windstorm pool, the wind coverage is isolated, and a separate policy is issued for this peril by the private insurer. Windstorm pools typically purchase reinsurance to cover future losses.

Florida's Citizens Property Insurance Corporation. On July 1, 2002, the Florida Legislature passed a law that created the Citizens Property Insurance Corporation (Citizens) as a market of last resort for residential and commercial residential[58] coverages in high-risk areas where the property owner is unable to procure insurance in the open, private insurance market.[59] Citizens was created with the merger of the two existing property residual markets: Florida Residential Property and Casualty Joint Underwriting Association (FRPCJUA) and the Florida Windstorm Underwriting Association (FWUA).

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[55] P.L. 90-448, 12 U.S.C. 1749bbbb-3.

[56] The Federal Riot Reinsurance Program was terminated on September 30, 1984, due to the small number of insurers buying the reinsurance.

[57] These nine states are: Alabama, Georgia, Florida, Hawaii, Louisiana, Mississippi, North Carolina, South Carolina, and Texas.

[58] Commercial residential simply refers to small business located in areas primarily zoned residential.

[59] Residential coverage includes both personal lines residential coverage (which consists of the type of coverage provided by homeowner's, mobile home owner's, dwelling, tenant's, condominium unit owner's, and similar policies) and commercial lines residential coverage (which consists of the type of coverage provided by condominium association, apartment building, and similar policies).

Citizens operates under the authority of a seven-member Board of Governors, approved by the State Treasurer. The State Treasurer also appoints a technical advisory Board of Governors to provide information and advice to the seven-member Board of Governors. All revenues, assets, liabilities, losses, and expenses of Citizens are divided into three separate accounts: (1) a personal lines account for personal residential polices issued by Citizens or the FRPCJUA, and renewed by Citizens ,that provides comprehensive, multi-peril coverage on risks which are not located in areas eligible for coverage in the FWUA (and for such policies that do not provide coverage for the peril of wind); (2) a commercial lines account for commercial residential policies; and (3) a high-risk account for personal residential policies and commercial residential and commercial non-residential property policies.

Citizens is authorized by statute to issue bonds and impose emergency assessments on all licensed property insurers in the state. For the most part, these assessments are eventually passed onto consumers. In order to maximize the financial resources to pay claims following a catastrophic hurricane, Citizen's income and the interest on the debt obligations issued by the corporation are exempt from federal income taxation.

Although the presence of Citizens in the market has stabilized the availability and pricing of insurance in coastal areas of Florida, legislators and regulators have concerns about the growth in the number of policies issued during the past few years as well as the fact that all insurance customers statewide are responsible for a significant deficit.[60]

Florida's insurance commissioner placed Citizens on a "watch list" during the 2004 hurricane season in an effort to ensure the insurer had sufficient reserves to pay claims. According to preliminary reports released by Citizens, and filed with the Florida Senate Banking and Insurance Committee, the insurer is projected to have a $393.1 million deficit in its "high-risk" account, which covers only wind damage. This shortfall could cost the state's homeowners an additional $50 to $55 per $1,000 of premium.[61] In addition, although Citizens buys reinsurance protection from the Florida Hurricane Catastrophe Fund to cover some of its losses, given the current structure of the Cat Fund the insurer could not be reimbursed until losses from a single storm surpasses $1 billion. None of Citizen's wind-damage losses from any of the four hurricanes in 2004 exceeded that level. Overall, Citizens had a $1.8 billion surplus in its three separate accounts when the 2004 hurricane season began. The High Risk Account, which is not in deficit, began the hurricane season with

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[60] David Sedore, "Citizen may Bill $60 for Deficit," *Palm Beach Post*, February 16, 2005, p. C1.

[61] Beatrice E. Garcia, "Citizens Surcharge Expected," *The Miami Herald*, February 16, 2005, p. C1.

projected reserves of $1.1 billion.[62] The Personal and Commercial Line Accounts currently have sufficient surplus: $600 million and $100 million, respectively.[63]

Florida Hurricane Catastrophe Fund. In 1993, the Florida Legislature created the Florida Hurricane Catastrophe Fund — "Cat Fund" — in response to insurers' concerns about actual and threatened catastrophic losses to property in the state from hurricanes, and their unwillingness or inability to provide property insurance coverage to the extent sought and needed. The Cat Fund was therefore established as a tax-exempt source of reimbursement to property insurers for a selected percentage of hurricane losses above the insurer's retention (deductible).

The reinsurance provided by the Cat Fund is designed to stabilize the residential property insurance market in the event of a major hurricane by offering relatively inexpensive reinsurance to property insurers and the state's insurers of last resort — Citizens. The cost of this reinsurance is below what the private reinsurance market charges because the Cat Fund is not only exempt from federal income tax, but also the state's income tax and premium tax. The Cat Fund was the first program in the United States in which a state provided for tax-exempt accumulation of private cash to pay for major disasters. The relatively inexpensive reinsurance sold by the Cat Fund to Citizens (and other residential property insurers) allows them to write more residential property insurance in the state — than otherwise would be the case — and also acts to lower premiums for consumers.

On June 1, 2004, the Florida Legislature expanded the overall claims paying capacity of the Cat Fund from $11 billion to $15 billion. The $15 billion amount is financed primarily through reinsurance premiums paid by primary insurers (based on their exposure to hurricane losses) and investment income.[64] Retained earnings are held in a reserve fund account that accumulates, along with investment earnings, on a tax-free basis. In the event cash reserves are insufficient to pay claims, the Cat Fund could issue state government revenue bonds or other debt instruments to raise billion of dollars for claims payout.

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[62] National Association of Mutual Insurance Companies, "Key Facts From Florida's 2004 Hurricane Season," available at [http://www.NAMIC.org/PrintPage.asp?ArticleID=7453], visited on March 21, 2005.

[63] For more information see, *Florida Trend*, an online newsletter, "Insurance: Damage Control Report — The State's Insurance System Withstood This Summer's Tag-Team Hurricanes, But Big Challenges Remain," available at [http://www.floridatrend.com/issue/default.asp?a=5359&s=1&d=10/1/2004], visited on March 21, 2005.

[64] This debt may be serviced with future reinsurance premiums collected by the Cat Fund and/or post-hurricane assessments levied on all property and casualty insurers and, hence reflected in future property and casualty insurance premiums. In the event that premiums and proceeds that can be raised through the issuance of tax-exempt revenue bonds are insufficient to address a catastrophic loss, claims submitted by insurers to the Cat Fund are paid on a pro-rata basis. Because the annual post-hurricane assessments are subject to a cap, losses generated by a major catastrophe could be paid over a number of years following the event. The Cat Fund is never obligated to pay more than its assets and borrowing capacity permit. The state is not liable for unpaid claims.

Under the Cat Fund's reinsurance arrangement, private insurers and Citizens are reimbursed for as much as 90 percent of insured hurricane losses in excess of a $4.5 billion per storm deductible, up to a total of $15 billion each year. Insurers can choose from three reimbursement coverage options — 45 percent of losses over the retention, 75 percent or 90 percent — depending on their risk tolerance levels and how much they want to pay for reinsurance. The $4.5 billion is an industry deductible. Each insurer has an individual deductible, which is its proportionate share of the $4.5 billion industry aggregate. This individual insurer deductible allows smaller insurers that suffer unusually heavy losses to qualify for reimbursement, while the industry overall might not. Insurers also have an individual maximum coverage which is their individual share of the $15 billion maximum industry aggregate collected by the Cat Fund. Insured losses above $15 billion would be covered by the insurer's high layer reinsurance and their surplus or reserves.

The Cat Fund had a cash balance of $5.6 billion before the 2004 hurricane season, and is currently at $6.15 billion in cash reserves. As indicated above, if it were necessary, the difference between the $6.15 billion and the $15 billion (or $8.85 billion) aggregate claims-paying capacity will be financed through revenue bonds or other debt from the major financial markets. The bonds will be financed with assessments on all property and casualty premiums throughout the state, except workers' compensation and medical malpractice insurance premiums. Because the Cat Fund will have an estimated $6.15 billion in claims paying capacity at the end of the year against $2 billion in projected payouts from the 2004 hurricane season, there will not be bonding and statewide assessment.[65] The Cat Fund has been activated only twice, each time in 1995. It paid $13.1 million for Hurricane Opal and $47,672 for Hurricane Erin. The largest participants in the Cat Fund are Citizens, State Farm, Allstate, USAA, Nationwide and Chubb.

Louisiana Citizens Property Insurance Corporation. On January 1, 2004, the Louisiana legislature merged the Louisiana Joint Reinsurance Plan (FAIR Plan) and the Louisiana Insurance Underwriting Plan (Beach and Windstorm Plan) to create the Louisiana Citizens Property Insurance Corporation as an insurer of last resort for property owners unable to obtain insurance in the state. Policies in force at the time of the merger were to be handled by their respective plans. New insurance business is being placed with Louisiana's Citizen. This new entity can build up reserve funds on a tax-free basis to pay claims after a natural disaster. In the event the fund falls short, the state can issue revenue bonds to pay claims. Private insurers are responsible for retiring the bonds, but can pass on the costs to policyholders in the form of a surcharge.

Hawaii Hurricane Relief Fund. After Hurricane Iniki struck in 1992, the Hawaii legislature created a Hawaii Hurricane Relief Fund (HHRF) to provide windstorm coverage for residential properties in Hawaii. Under the state-sponsored insurance scheme, insurers are allowed to sell homeowners insurance with a hurricane exclusion. Each participating insurer in the state then acts as a servicing

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[65] Florida Insurance Council, "Key Facts from Florida's 2004 Hurricane Season,"available at [http://www.flains.org/public/files/pr041104.pdf], visited on March 21, 2005.

insurer for the HHRF, issuing the insured a separate hurricane policy and collecting a separate premium that is then forwarded to the HHRF.

The HHRF receives ongoing revenue from hurricane premiums, and insurance companies post-hurricane assessments on property business and mortgage recording fees. The plan provides coverage for losses up to approximately $2 billion in residential damages from hurricanes. Homeowners are responsible for the first 10% in losses from a major hurricane. Private insurers participating in the HHRF would be responsible for the next loss layer after the insured's deductible. The Fund uses some of the hurricane premium revenues to buy reinsurance, which covers the third loss layer. The last layer of coverage comes from lines of credit, which are secured by future surcharges on all property and casualty premiums. If losses exceed the total coverage amounts, claims are paid on a pro-rata basis.

Market Assistance Plans (MAP). Four states — Florida, New York, New Jersey, and Texas — have established Marketing Assistance Plans (MAPs) as service organizations designed to assist consumers in obtaining property and casualty insurance coverage from authorized insurers in the private market. These organizations are voluntary mechanisms coordinated by private insures and agent groups in cooperation with the state insurance regulators to provide insurance when there is a "temporary" market failure. The MAPS collect and maintain information on agents and insurers writing certain coverages.

MAPS are typically administered by insurance agents' associations that will assign insurance applicants who are declined coverage in the voluntary market to participating insurers that agree to accept applicants on a proportional market-share basis. Some states have created "Property Protection Programs" in conjunction with MAPs to provide insurers with financial incentives (e.g., state premium tax credits) to underwrite basic residential insurance coverages which can be tailored to fit the specific needs of residents in a particular community exposed to catastrophe risk.

Surplus Lines Insurance

Any risk for which insurance is not available through a company licensed in the applicant's state (an "admitted" insurer) may be covered by a surplus lines insurer. The business is placed with a "non-admitted" insurer in accordance with surplus or excess lines provision of state insurance laws. Regulators allow catastrophe insurance or "hard-to-place" coverage such as insurance for antique cars to be sold in a less regulated environment on a surplus lines basis because of the unusual nature of the risks, and the need for greater flexibility in policy terms and pricing. Also, coverage may be offered on a surplus lines basis if the voluntary or involuntary markets will not write expensive homes in a high-risk community.

Challenges for the 109th Congress and Beyond

In 2005, despite the ability to better predict and manage individual insurance company hurricane exposures, the property insurance industry, as a whole, still faces the long-term challenge of maintaining viable insurance markets after a catastrophic

hurricane strikes. Complicating this challenge is the recognition that America is increasingly vulnerable to hurricane damages as a result of three major ongoing developments: (1) rapid expansion of the U.S. population into areas that are susceptible to natural disasters; (2) rising property values in coastal areas; and (3) climatological and environmental changes.

Population Growth and Coastal Development

With a significant percentage of our population now living in hurricane-exposed areas, even larger insured property losses from hurricanes are possible.[66] The American population is migrating toward the coasts at a rapid rate, placing people and property investments at risk of loss. In the last three decades, the nation's shorelines have come under increasing pressure from population growth and development, and this has profound consequences for the insurance industry (through higher losses) and the federal budget (through emergency supplemental appropriations). As an illustration, according to the 2000 U.S. Census data, 55% of the U.S. population live within 50 miles of a coastline (including Great Lakes shorelines). The National Oceanic and Atmospheric Administration (NOAA) reports that the population density per square mile in hurricane-prone Southeast coastal areas increased 129%, versus 38% in the total U.S., during the 30-year period from 1960 to 1990.[67] The Insurance Services Office (ISO) found that from 1970 to 1990, the Southeast Atlantic Coast had a nearly 75% increase in population density, far surpassing the countrywide increase of more than 20%.[68]

Given this trend in population growth and coastal development, policymakers have become increasingly aware of the erosion risks facing homeowners and communities due to high intensity storms and coastal flooding.[69] It is not uncommon, for example, for a hurricane or severe coastal storm to cause the coast to erode 100 feet or more in a single day. This situation has led to debate over the economic consequences of erosion and the use of federal programs, such as the National Flood Insurance Program (NFIP), to address the coastal erosion problem. The principal concern is that while the NFIP covers erosion damage that occurs in connection with floods, it does not account for erosion in setting flood insurance rates in coastal areas.

The insurance industry and FEMA have both taken steps to address coastal erosion. Insurers responded to coastal erosion risk by making policyholders vulnerable to windstorms pay more of the cost of living in hurricane prone areas. For

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[66] Rude T. Musulin, "Would a Federal Role in Disaster Protection Be a Catastrophe?" *Contingencies,* November 29, 2003, p. 28.

[67] Conning & Company, *Lighting Candles in the Wind: Industry Response to the Catastrophe Problem.* Hartford, Connecticut. November 1994, p. 27.

[68] Ibid.

[69] The National Flood Insurance Reform Act of 1994 required that FEMA submit a report evaluating the economic impact of erosion on coastal communities and the NFIP. The study, which was written by the Heinz Center, recommended that FEMA develop maps that identify coastal erosion hazard areas and include the cost of expected erosion losses when setting flood insurance rates for coastal areas.

example, insurers now impose hurricane deductibles equal to a percentage of the structure's insured value and establish rates for windstorm coverage based on the structure's ability to withstand damage from high wind. FEMA has begun to prepare and disseminate maps showing areas subject to erosion, created and imposed a mandatory surcharge for erosion on flood insurance in Coastal High Hazard Zones, and, with the passage of the Flood Insurance Reform Act of 2004, provided relocation assistance and/or buyouts.[70]

The National Coastal Zone Management Program (CZMP) is a federal-state partnership authorized by the Coastal Zone Management Act[71] to encourage coastal states to develop and implement coastal zone management plans. Some 34 states and territories participate in the CZMP.[72] The CZMP is designed to encourage the states to work with the federal government in finding a balance between protecting the coast and preserving the human uses that depend on the environment. The CZMP supports states through financial assistance and technical services and information. In addition, the NFIP is managed in a manner that is consistent with the criteria and standards established for the federally approved state coastal zone management plans.

Rising Property Values in Coastal Areas

Along with rising coastal population growth, there has been a tendency for coastal development to consist of relatively more expensive properties.[73] According to Dean John Dutton of Pennsylvania State University and the National Oceanic Administration Agency (NOAA), up to $2.2 trillion of the U.S. economy are believed to be affected annually by weather and climate events.[74] Whether provided by an insurer's surplus, reinsurance agreements, or securitized insurance instruments, capital is needed to underwrite property insurance covering potential losses from weather and climate events.

After Andrew, it became obvious that exposures in disaster-prone areas were far beyond the capital that was available from existing sources before the event. Insurers have responded to this situation with reforms of insurance systems. They have also played an active role in encouraging the development of better wind and seismic building codes so future construction could better withstand the force of hurricanes and earthquakes. It takes time, however, to implement and realize the results of construction standards nationwide. Because most of the building in coastal

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[70] Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, P.L 108-264.

[71] Coastal Zone Management Act of 1972, 16 USC 1451-1464, Chapter 33; P.L 92-583, October 27, 1972; 86 Stat. 1280.

[72] For more information on Coastal Zone Management, see National Ocean Administration Agency's Office of Ocean and Coastal Resources Management, "Celebrating 30 Years of Coastal Zone Management Act," available at [http://www.ocrm.nos.noaa.gov/czm], visited on March 21, 2005.

[73] Musulin, p. 30.

[74] For more information on the impact of climate on the economy see *NOAA Magazine*, "Weather Impact on the USA Economy," available at [http://www.magazine.noaa.gov/stories/mag4.htm], visited March 21, 2005 .

areas were constructed in the 1970 through 1990 period, when these building standards did not apply, most homes remain vulnerable to damages from natural disasters. In addition, insurers have shifted more responsibility for catastrophe damages to the property owners. They have accomplished this by requiring higher deductibles and employing computer-generated rates — rates which are based on a simulation of various scenarios involving a structure's ability to withstand damage by high winds and from water damage.

Climatological and Environmental Changes

There is a growing body of scientific evidence suggesting that the global climate may be changing (i.e. global warming), with more frequent extreme weather events occurring, thereby increasing the incidence and severity of natural disasters such as hurricanes and floods.[75] At the core of the global warming debate is the belief that human-derived so-called "greenhouse gases" emissions have risen in recent decades, resulting in a dramatic rise in both the temperature at the earth's surface and the frequency and severity of hurricanes, windstorms and floods.

The basic assumptions underpinning the pricing of insurance against hurricanes does not take into account changes in the global climate. Moreover, insurers traditionally assume that the average insured losses over a recent historical period accurately reflect future losses over some arbitrary future period. This assumption works well with automobile insurance and other widely distributed, independent risk, but is less appropriate for low-frequency/high consequence events like hurricanes. In other words, the average activity in any arbitrary period of the past is not necessarily a good predictor of future activity. The inability to predict future disasters will impact the capacity for disaster financing as part of a comprehensive disaster management approach.

Issues and Policy Options

A central issue that faces Members of the 109th Congress is determining whether there is a need to improve the nation's ability to finance catastrophe risk and, if so, how. In other words, more specifically, Congress may wish to determine what are the appropriate roles and policies of the public and private sectors to address hurricane risk, how they affect hurricane risk, and how they might be restructured to better achieve social objectives.

Three points of view usually emerge when debating the catastrophe funding problem. One view is that catastrophes (e.g., hurricanes) are "uninsurable" in the private sector and the federal government should directly take over underwriting insurance. This view is not widely supported because the private sector has access to capital market resources that can be used to fund the cost of a catastrophic hurricane.

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[75] Kelly Quirke, "Global Warming and Increasing Catastrophe Losses," *Journal of Insurance Regulation*, Summer 1994, p. 451.

A second point of view argues that some form of federal involvement is needed before a really "big" event occurs.[76] A consensus among insurance and public policy experts seems to have emerged that a public-private partnership in financing a mega-catastrophe might eventually be needed. Such a partnership would leave the private sector responsible for underwriting property insurance, and the federal government responsible for providing capital only where consumers and the private insurance and capital markets are unable to do so. The government could facilitate more effective risk-spreading, which can be achieved by more effective pooling of losses over time and broader pooling of losses among risks. A more effective pooling of losses over time could be achieved by borrowing mechanisms and tax deferral of loss reserves for natural disasters. Broader pooling of losses among risks could be facilitated by requiring property owners to purchase insurance against natural hazards. Economists note, however, that any scheme that imposes a mandatory insurance requirement for all property owners could create economic distortions, such as cross subsidization of risks, where low risk individuals subsidize high risk individuals.

A third point of view presupposes that the financial resources available in the private sector are sufficient to make federal involvement unnecessary at this time.

Members of the 109th Congress could pursue any one or all of the following policy options if it could be shown that potential losses from hurricane hazards are beyond the capacity of private markets to diversify disaster risks.

- establish an emergency reserve fund to provide timely financial assistance in response to domestic disasters and emergencies, the approach advocated in S. 24, Emergency Reserve Fund of 2005, introduced on January 24, 2005, in the 109th Congress;

- provide financial backstop or guarantees to innovative financial instruments and activities involving insurance interstate compacts between states set up to address regional exposure to catastrophic losses involving hurricanes in the Gulf and Atlantic coast states, and earthquakes in the Pacific northwest states and other areas exposed to similar hazard risks;

- develop a large regional pool for hurricane insurance with potential benefits of spreading the risks across impacted states. Currently, each state relies on its own financial resources to develop a substantial pool of funds for insurance. Some supporters of this policy option have even suggested pooling risks with the same characteristics as hurricanes, such as earthquakes, volcanos, and tsunamis, into a single national hazard insurance program designed to solve the catastrophe funding problem;

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[76] For more information on this argument, see; James E. Rutrough, "Funding Major Disasters with Traditional Insurance," in *Financial Risk Management for Natural Catastrophes: Proceedings of a Conference Sponsored by Aon Group Australia Limited*, Neil R. Briton and John Oliver, ed., (Brisbane, Australia: Griffith Uni Print, 2002), p. 1

- establish a federal hurricane program to provide reinsurance to state-sponsored insurance programs;
- establish an explicit federal windstorm insurance program, similar to the National Flood Insurance Program;
- focus on tax policy to allow insurers to create tax-deferred reserves to fund future catastrophe losses from natural disasters;
- encourage innovative new financing mechanisms of insurance, reinsurance and capital markets to mitigate and diversify disaster risk;
- establish effective warning systems similar to that offered in S. 50, Tsunami Preparedness Act of 2005, introduced on January 24, 2005, in the 109th Congress;
- implement a comprehensive national disaster mitigation policy strategy for reducing future losses.

These approaches have been debated in previous Congresses and some have enjoyed bipartisan support; however, no consensus emerged, largely because of concerns that such approaches would: (1) encourage home construction in high-risk areas; (2) serve as a tax giveaway to rich insurers; (3) expose the federal treasury to large contingent costs at a time of budgetary deficits; or (4) give a competitive advantage to certain segments of the insurance industry.

Conclusion

The four major hurricanes that made landfall in 2004 illustrate both the destructive nature of hurricanes, and the importance of insurance as a major financial source for post-disaster economic recovery. Although insurers are expected to easily cover the $20.5 billion in insured losses from the 2004 hurricanes, many questions have been raised about their continued willingness and ability to sell property insurance coverage in hurricane-prone states. The reason for these questions is that, as development increased in coastal areas, a catastrophic hurricane could result in huge government outlays for disaster assistance and present insurers with significant financial hazards, such as the risk of insolvency, a rapid reduction of earnings and statutory surplus, forced asset liquidation to meet cash needs, and ratings downgrade.

To the extent property insurance markets fail to offer adequate levels of coverage after a catastrophic hurricane, and the federal government avoids the disaster insurance market (with the exception of terrorism risk insurance), the states will likely continue to offer various, loss-sharing mechanisms that provide catastrophe insurance or reinsurance coverage at subsidized rates. In a similar manner, the federal government will continue to offer flood insurance under the National Flood Insurance Program (NFIP) to offset repair and rebuilding costs in flood-prone regions.

Members of the 109th Congress will likely be called upon to determine whether there is a need to improve the nation's ability to finance catastrophe risk and, if so, how. Previous Congresses responded to similar concerns by considering legislation to create a federal catastrophe reinsurance program for residential property. But, despite broad support for several bills over the past few Congresses, the full Congress did not authorize a federal reinsurance program until the enactment of the Terrorism Risk Insurance Act of 2002.

Finally, most observers would agree that for the very highest layers of catastrophe risk, the government (and consequently the taxpayer) is now, by default, the insurer of last resort. In the 109th Congress, any one of a number of policy options could be pursued, but passage will likely be based on whether it can be shown that potential losses from hurricane hazards are beyond the capacity of private markets to diversify natural hazard risks. Members will likely be grappling with several policy questions. For example, will reinsurance and securitization be enough to maintain insurance solvency after a catastrophic hurricane? How can the various funding sources available for catastrophe insurance be expanded and refined to cope with a catastrophic hurricane? And lastly, what role, if any, should the federal government play in catastrophe insurance?