



Financing Recovery from Large-Scale Natural Disasters

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Summary

Two important issues before 111th Congress are (1) securing the nation's capacity to prepare for, respond to, and recover/rebuild from natural catastrophe events, and (2) determining whether and how the federal government should intervene in catastrophe insurance markets. Since the devastating Gulf Coast hurricanes of 2004 and 2005, and a sequence of tornadoes, wildfires, earthquakes, Hurricanes Ike and Gustav, and the Midwestern floods in 2008, public attention has focused on: (1) the potential high cost of recovery and financing of natural disaster losses; (2) the supply and relatively narrow scope of private sector disaster insurance; (3) the extent to which Americans living in disaster-prone areas may be uninsured or underinsured; and (4) potential increases in federal outlays for disaster assistance.

After Hurricane Katrina in 2005, the property insurance industry revisited catastrophe exposures with the help of recalibrated catastrophe models for Atlantic tropical storms. Based on this new analysis insurers arguably face greater potential losses in severe catastrophe events than was previously appreciated. This enhanced appreciation of risk has implications for property insurance capacity, underwriting, and pricing. Many insurers responded to recent hurricanes by requesting rate increases or refusing to renew hundreds of thousands of policies sold in areas along the Atlantic and Gulf Coasts. Where insurance became either too expensive or unavailable, homeowners and small business owners who could not otherwise obtain property insurance in the private markets turned to state-operated "residual market facilities" that serve as insurers of last resort in these areas. As a result, many of these facilities have expanded. Nevertheless, there is evidence to suggest that state-operated facilities may not be fully capable of resolving the problems of insurance availability or affordability. For example, Florida's inability to issue debt (bonding capacity) during the global financial crisis in advance of the 2008 hurricane season threatened to unravel the state's property insurance system.

In the wake of financial market turmoil in 2008, one point of view contained in this report stresses the importance of bringing more transparency to the markets for innovative new risk transfer financial products. Some of these risk transfer instruments, such as credit default swaps and other derivative products, are not regulated, and regulators have no valid data upon which to perform oversight of them in the credit markets. Some economists believe that more transparency and regulation are important components of credit market reform.

Several Members of Congress have debated mechanisms to ensure adequate capacity and solvency of the insurance industry to meet customer demand. Many proposals have been introduced that would improve insurers' access to capital in the reinsurance, banking, and securities markets. They include (1) study commissions; (2) tax reform incentives; (3) flood insurance reform; (4) risk retention group reform; and (5) risk securitization and federal reinsurance and loans. Congress could also be called upon to decide whether transparency mechanisms are appropriate for resolving the broader issues presently disrupting all financial markets.

This report will be updated as events warrant.

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Introduction

Ever since eight costly hurricanes struck the East and Gulf Coasts in 2004 and 2005, large national property and casualty insurers have significantly scaled back their willingness to underwrite property insurance for homes located on or near coastlines. Hurricanes Ike and Gustav were the major storms of 2008, and they renewed fears about the economic effects of the destruction of thousands of homes, businesses, and infrastructure. Public attention is now focused on issues such as the cost of disaster relief and reconstruction in the wake of financial market turmoil and growing fiscal deficits, whether and where gaps in private insurance (and reinsurance) coverage currently exist, why insurance coverage might become expensive and unavailable, and whether new forms of private-public risk-transfer partnerships are needed to manage the financial impact of large-scale natural disasters.

Natural disasters in the U.S. have the potential to cause economic losses in the tens or even hundreds of billions of dollars. The federal government has played a large financial role in responding to (uninsured) natural disasters. During the 20-year period from FY1989 to FY2008, Congress appropriated \$250 billion dollars for disaster assistance.¹

Given the increasing frequency and severity of East and Gulf Coast hurricanes and growing disaster relief expenditures, there is an urgency in Congress to ensure the effective financing of catastrophic risks coupled with fair and efficient resolution of policyholder claims. Property value in key U.S. earthquake and hurricane zones has doubling every 10 years. Meanwhile, global insurance and reinsurance capital allocated to covering hurricane and earthquake perils is not keeping pace. Economists have observed that this fundamental shortfall between risk and capital growth represents a major public policy challenge for Congress.

In addition to federal outlays, private sector expenditures have been considerable; according to data from the Insurance Services Office's Property Claims Unit, private insurers paid \$261.9 billion in insured catastrophe losses from 1980 through 2007. Insurance companies play a key role in managing risks of catastrophic events.² Individuals and businesses usually insure against catastrophes in order to reduce financial volatility and avoid potential ruin. Insurers, in turn, will transfer a portion of that risk to a reinsurer, thereby spreading globally the burden of catastrophic risks. However, some have contended that the capacity of the traditional international reinsurance market to finance a mega-catastrophic event remains inadequate.³

New forms of innovative risk financing instruments have developed to help insurers and reinsurers increase their capacity to manage their peak catastrophic risk. Two main categories of alternative risk transfer (ART) solutions are insurance-linked securities (ILS), which are direct risk transfer instruments that provide funds to offset catastrophe losses, and contingent debt

¹ See CRS Report RL33226, *Emergency Supplemental Appropriations Legislation for Disaster Assistance: Summary Data*, by Justin Murray and Bruce R. Lindsay.

² Insurers have three major tools at their disposal to manage an increase in risk: (1) raise equity capital by selling company stock; (2) transfer risk to the reinsurance market; and (3) limit risk through the underwriting and asset management process.

³ J. David Cummins and Mary A. Weiss, "The Global Market for Reinsurance: Consolidation, Capacity, and Efficiency," *Brookings-Wharton Papers on Financial Services*, 2000.

agreements (e.g., contingent surplus notes and equity puts), which can replenish policyholders' surplus (i.e., an insurer's capital) after catastrophe losses. ART mechanisms complement traditional reinsurance by transferring risk directly to capital market participants such as hedge funds and institutional investors.

This report provides an analysis of the challenges facing property and casualty insurance and reinsurance companies in financing large-scale natural disasters, particularly during financial market turmoil. The report begins with a discussion of congressional interest in financing recovery from natural disasters, and the role and limitations of federal disaster assistance and private insurance. This is followed by an assessment of the problem of financing catastrophic risk (i.e., issues of availability and affordability of residential property insurance coverage in coastal areas), and a discussion of insurability of natural disasters given insurers' claims-paying capacity. In the final three sections, the paper examines ART mechanisms, such as ILS and contingent debt securities that complement traditional reinsurance, the effects of the financial crisis on unraveling capital structures that underlie some state property insurance systems, and possible roles for the federal government in the market for catastrophe insurance coverage as it considers policy options for resolving the broader financial market crisis.

Congressional Interest in Natural Disasters

The U.S. has always been exposed to risks of natural disaster. Large-scale natural disasters, such as wildfires, windstorms (i.e., hurricanes, tornadoes, and other wind damage), floods, and earthquakes, however, have become increasingly frequent and costly. In 2005, private insurers paid a record \$62.3 billion in insured catastrophe losses.⁴ At the same time, uninsured losses from Hurricanes Katrina, Rita, Wilma and Dennis caused an unprecedented \$130 billion in federal outlays for emergency disaster relief. Insured catastrophe losses for 2008 totaled an estimated \$25.2 billion, the fourth most costliest in a decade. Consequently, policymakers are aware that although there is a well-functioning international catastrophe insurance and reinsurance market, the federal government has increasingly been called upon to exercise its considerable authority and significant means to reallocate resources throughout the economy to compensate disaster victims.

The financial volatility of natural disasters and the resulting burden for society and the economy are important issues for Congress because of its responsibility to promote national economic growth. A mega-catastrophic event striking some region of the U.S. could impede interstate and foreign commerce and cause widespread distress and hardship adversely affecting the general welfare. Uncertainty about how often catastrophic events will occur (frequency) and the magnitude of catastrophic events (severity) continue to pose a catastrophic risk financing challenge both to society as a whole and to the federal government.

In 1995, President Clinton's National Economic Council Working Group on Disaster Insurance formulated a set of broad principles and objectives for a federal insurance program to reduce losses and cover catastrophic risks. In the aftermath of Hurricane Katrina in 2005 and Ike and

⁴ This figure comes from the Insurance Services Office's Property Claims Unit.

Gustav in 2008, these principles and objectives could set the policy framework to guide policymakers in coping with natural disasters.

The Working Group concluded that a federal insurance program should:

- reduce total societal costs of catastrophic natural disasters;
- reduce total long-term federal costs of dealing with such events;
- increase personal security in the aftermath of a disaster; and
- increase the extent to which costs of disasters are maintained in the private sector to create incentives to moderate losses from disasters.

A key question for Congress going forward is whether to proactively address the issue of managing catastrophic risks through insurance and other risk transfer mechanisms. One option is to establish an explicit public-private risk transfer partnership that would allow the federal government to leverage public funds through the use of insurance, reinsurance, and capital market instruments to accomplish the above-stated public policy objectives. This report analyzes issues and information related to building a different relationship between insurers, reinsurers, the capital markets and the federal government.

The Catastrophic Loss Financing Problem

At least two complementary approaches exist to manage the risk of large-scale natural catastrophes: (1) pre-disaster risk avoidance and mitigation that reduces physical and environmental vulnerabilities but still requires post-event funding; (2) risk transfer mechanisms that involve disaster relief, insurance, reinsurance and capital market instruments designed to compensate disaster victims and reduce exposure to financial losses. Generally, the federal natural catastrophe risk management strategy seeks to mitigate the extent of damages through land-use regulations, strengthening risk assessment and enforcing structural mitigation and vulnerability reduction measures, such as zoning and building code compliance. Remaining residual risk is then largely absorbed through a combination of federal disaster relief assistance, commercial insurance, self-insurance and tax deductions.

Role of Disaster Relief and Private Insurance

Private insurance and federal disaster relief have been relied upon for decades as complementary mechanisms to compensate disaster victims and provide for recovery after a natural disaster. Risk management theory, however, suggests at least three reasons why insurance is the more efficient mechanism of the two for allocating the risk of large catastrophic events.

- Disaster relief assistance is assumed to have negative incentives for risk mitigation because benefits are paid whether or not recipients have taken steps to reduce their loss exposures. The inefficiency results in higher social and federal costs of disasters, and is commonly referred to as “moral hazard.”
- From a welfare economics or resource allocation perspective, disaster relief is inequitable because it is funded through general tax revenue and the costs of disasters are borne by people or businesses regardless of their location in

- hazardous areas—i.e., residents and taxpayers in high-risk areas are subsidized by those in low-risk areas.
- Disaster relief is inefficient and inclined to misjudgment because property owners oftentimes do not fully understand the risks they face, make risk management decisions based on inaccurate information, and intentionally rely on disaster relief for compensation. Insurance is considered a more efficient mechanism to deal with natural catastrophes; it establishes a price on the hazard, based on actuarial information, and creates economic incentives to mitigate losses.

Insurance manages risk pooling; insurers are uniquely exposed to a variety of risks arising from their risk-bearing (underwriting) function. Insurers typically will hedge the risk they assume by directly transferring some portion of that risk to a reinsurance company or indirectly to a special purpose reinsurer set up to transfer the risk to investors in the capital markets through indemnity-based or index-based insurance-linked securities (i.e., derivative transactions).⁵

There are inherent limitations to using insurance or reinsurance as a risk transfer tool because insurance protection against a mega-catastrophic event is not always available through private sources. Also, plans, policies, and structures intended to mitigate the effects of such losses might not always fully anticipate the destructive aspects of hurricanes, earthquakes and other natural disasters.

Property Insurance Price and Capacity Problem

At the core of the problem of the availability and affordability of homeowners' insurance in hurricane-prone coastal areas is the way insurers internally raise capital, the cost of capital required to underwrite exposures in disaster-prone areas, and how insurers react to situations where their earnings or solvency are threatened. Insurers must have adequate capital to support the risks assumed and generally meet capitalization requirements. This can usually be achieved in four ways:

- earn a net profit, thereby increasing policyholders' surplus;
- sell insurance policies, which increases long-term debt capital;
- account for the value in the assets and liabilities not reported on their balance sheets (realized and unrealized capital gains); and
- reduce the amount of capital required by reducing exposure to risk.

Insurers generally limit the capital committed to underwrite property insurance in coastal disaster-prone areas largely because regulatory constraints have led to what some insurers believe are inadequate returns to attract sufficient capital. Insurers usually seek a rate of return commensurate with the risk they assume, expecting higher return from capital allocated to catastrophic risk than

⁵ Indemnity-based transactions involve settlement that is directly related to the loss experience of the company issuing the securities (e.g., catastrophe bonds and contingent capital facilities such as surplus notes). Index-based transactions involve settlements that are triggered or derived from the value of an independent index.

from, say, a stable book of automobile insurance policies where losses do not fluctuate widely from year to year. In contrast, losses from catastrophic perils are more volatile and potentially much larger. An insurer must hold significantly more equity to underwrite catastrophe exposures than it needs to underwrite non-catastrophe exposure. To remain viable, the insurer must be able to pass on its cost of capital to policyholders.

Shortages of insurance induced by capital shortages led two states, California (earthquake) and Florida (hurricanes), to establish state catastrophe funds that offer certain advantages over private sources of capital. State catastrophe funds that receive tax-exempt status can accumulate funds free of federal insurance tax and use their government authority to issue debt to pay losses, supported by future assessments against residents in the state. The states are therefore able to diversify (spread) risk over time through the debt financing mechanism within their limited jurisdictions.

Economic Factors Contributing to Price and Capacity Crisis

Property coverage became expensive and difficult to obtain following the 2004-2005 hurricane seasons. After the storms, insurers felt compelled to revise their underwriting and pricing assumptions to reduce their risk exposure and the amount of capital they needed to maintain profitability and comply with regulatory requirements. As a result, insurance coverage for residential properties in hurricane-prone coastal areas became more expensive and scarce for the average resident.

Higher residential property insurance prices and reduced availability of coverage occurred not because of a financial capacity shortage but rather because of changed industry assumptions about the frequency and intensity of North Atlantic hurricanes and uncertainty about the models, methodologies and data used for estimating natural hazard risk and losses from hurricane events. Insurers were essentially reacting to the perception, not necessarily based on historical and actuarial data, that more properties were at risk than previously thought. Residents in areas exposed to these catastrophic perils have experienced wide fluctuations in the price and availability of insurance, especially after a major disaster. Uncertainty about the probability of losses caused by natural catastrophes and concern about insolvency triggered by a series of disasters are the key reasons for fluctuations in the price and availability of property insurance in disaster-prone areas.

Increased prices for and reduced availability of insurance have been attributed to both demand and supply side factors. The next two sections examine demand and supply side effects that contributed to a scarcity of private-sector disaster insurance following the 2004 and 2005 hurricane seasons.

Demand-Side Effects

The demand for insurance coverage is a function of the growth in population and property values along the Gulf and Atlantic coasts and the perception of increased catastrophic risks. This increased demand has contributed to disruptions in the coastal wind insurance market. When demand exceeds supply, prices tend to rise.

Supply-Side Effects

Four factors were key in the development of the current scarcity of residential property insurance: (1) historic levels of insured catastrophe claims payments; (2) limited supply of catastrophe reinsurance, particularly after the devastating 2004 and 2005 hurricane losses; (3) higher capital adequacy requirements imposed on insurers by credit rating agencies; and (4) litigation surrounding wind versus flood insurance coverage disputes after Hurricane Katrina. These factors are discussed below.

First, insurers had to make historically unprecedented levels of payments to policyholders in 2004 and 2005; this has altered their view of what constitutes an “infrequent” mega-catastrophe. Consequently, the structure of reinsurance contracts has changed, forcing primary insurers to retain more risks and pay more for the expanded coverage. **Table 1** shows the ten costliest insured catastrophe loss events in recent years. Six of the 10 largest insured catastrophe losses occurred over the last five years. Hurricane Katrina alone caused private insurers approximately \$45.3 billion in insured losses, surpassing the \$23.8 billion from Hurricane Andrew and \$22.8 billion for the 9/11 terrorist attacks.

Table 1. Ten Most Costly Insured Catastrophes in the United States, 1989-2008

(billions of 2008 dollars)

Rank	Hurricane	Year	Insured Losses
1	Hurricane Katrina	2005	\$45.3
2	Hurricane Andrew	1992	23.8
3	World Trade Center Terrorist Attacks	2001	22.8
4	Northridge, CA earthquake	1994	18.2
5	Hurricane Wilma	2005	11.4
6	Hurricane Ike ^a	2008	10.7
7	Hurricane Charley	2004	8.5
8	Hurricane Ivan	2004	8.1
9	Hurricane Hugo	1989	7.3
10	Hurricane Rita	2005	6.2

Source: Insurance Services Office's Property Claims Services Unit; Insurance Information Institute.

a. Estimated.

Faced with the changed marketplace conditions after the 2005 hurricanes, primary insurers sought to reduce their exposure to catastrophe losses by decreasing the number of policies issued on properties in coastal areas. Insurers lowered their exposure by not renewing policies (coverage) for a significant number of their customers, not selling new policies, or exiting the market altogether. Although individual insurers have sought to reduce their presence in coastal areas, the property insurance industry as a whole continues to supply insurance to virtually every property in the United States. In states where the insurance market disruption was most severe (e.g., Florida, Louisiana, Mississippi, and Texas), state officials either created state-sponsored residual mechanisms or expanded existing ones to provide insurance to all those who could not purchase coverage in the voluntary market.

The *second* factor that arguably contributes to the current problem is the limited supply of catastrophe reinsurance after the devastating 2004 and 2005 hurricane losses. A critical element in the ability of private insurers to underwrite catastrophe risk is the availability of reinsurance.⁶ Insurers typically purchase reinsurance to protect themselves from the financial consequences of a single catastrophic event that causes insured loss to multiple policyholders. Reinsurance markets, however, are subject to price and availability cycles, often resulting in price increases and supply restrictions following catastrophic events.⁷ A significant portion of the insured catastrophe losses from the 2004 and 2005 hurricanes were paid by reinsurance proceeds, and, as reinsurers' capital reserves were depleted, reinsurers needed to rebuild capacity.⁸ The limited supply of residential property catastrophe reinsurance forced many primary insurers to reduce their exposure to catastrophe losses from hurricanes and to retain more risk than they would prefer. This has driven up their costs.

Third, primary insurers and reinsurers who underwrite catastrophe lines of coverage were subject to higher capital adequacy requirements imposed on them by credit rating agencies like Standard & Poor's and A.M. Best Company. This change affected the amount of catastrophe insurance that insurers were willing to sell. A strong financial rating reduces the insurer's borrowing costs and, therefore, increases its competitiveness in the marketplace.

Rating agencies were actually responding to adjustments in catastrophe modeling firms' assumptions with respect to probabilities of loss based on a presumed up-tick in frequency and severity of catastrophic events over a more immediate time horizon. The "near-term" higher expected frequency of hurricanes making landfalls and higher estimates of the amount of structural damage repair costs—both assumptions based on information provided by catastrophe modeling firms—led to higher predicted losses and ultimately to higher premiums.

After the back-to-back record-setting hurricane seasons in 2004 and 2005, rating agencies required insurers and reinsurers to plan for a catastrophic event projected to occur with a frequency of one in 50 years rather than one in 100 years. Insurers' balance sheets had to be able to withstand multiple extreme events rather than just a single event. To maintain their financial strength ratings, insurers were required to maintain a higher level of capital to demonstrate an ability to pay claims under these two new standards. The consequence of higher capital adequacy requirements was the sharp increase in demand for residential property reinsurance, which, in turn, caused the price of this reinsurance to increase dramatically in 2006 through 2008.⁹

Fourth, litigation surrounding insurance coverage disputes and litigation over the standard homeowners' insurance policy exclusions for wind and water damage created "contract uncertainty" associated with the judicial interpretation of insurance policy terms and language.¹⁰

⁶ Dwight M. Jaffee and Thomas Russell, "Catastrophe Insurance, Capital Markets, and Uninsurable Risks," *Journal of Risk and Insurance*, 1997, vol. 64, p. 205-230.

⁷ Kenneth A. Froot and Paul J.G. O'Connell, "The Pricing of U.S. Catastrophe Reinsurance," in Kenneth Froot, ed., *The Financing of Catastrophe Risks* (Chicago: The University of Chicago Press, 1999).

⁸ A.M. Best Company, "Credit Crunch Clouds Outlook of Hurricane Insurers, Cat Funds," *2008 Special Report: U.S. Hurricane—Catastrophe Review*, May 19, 2008, located at http://www3.ambest.com/DisplayBinary/DisplayBinary.aspx?TY=P&record_code=142243&URatingId=1436841.

⁹ *Ibid.*

¹⁰ CRS Report RL33892, *Post-Katrina Insurance Issues Surrounding Water Damage Exclusions in Homeowners'* (continued...)

The legal dispute concerned which portion of the loss is due to wind (covered by a standard homeowners policy) and which is from rising water, whether from storm surge or flooding. Realizing that a court's action could substantially increase insurers' risks in hurricane-prone states, some insurers decided to limit the amount of coverage sold in high-risk coastal areas.

Residual Market Mechanisms for Property Insurance

When residential property insurance becomes scarce and unaffordable, individuals and businesses who cannot otherwise secure private coverage have turned to state-sponsored residual market mechanisms.¹¹ State residual markets were created to improve the availability and affordability of property insurance primarily for residents and private businesses in coastal high-risk areas. As private insurers have withdrawn from high-risk areas, state residual markets have become the first and only choice for many homeowners. Consequently, the programs have expanded in recent years. Residual market and state catastrophe funds typically charge a lower risk premium than private insurers because they generally hold little or no capital reserves against major events. These facilities will typically impose a tax or assessment after a catastrophe in order to fund resulting claims obligations.

The 2004 and 2005 hurricane seasons demonstrated the limits of residual market facilities and catastrophe funds, with losses exceeding the facilities' claims-paying capacity. Most state residual markets face financial challenges because of the concentration of property risk underwritten by the facility, the reliance on post-event assessment and the inadequacy of rates to cover expected losses over time. There is a growing belief that traditional backstop mechanisms, such as assessments on insurers that have their own catastrophic losses to fund, are not appropriate protection against a mega-catastrophic event. Many economists have acknowledged the political necessity for these facilities but suggest that the lower prices tend to distort an otherwise efficient market by reducing incentives for individuals to mitigate their exposure; this raises the long-run disaster costs for society as a whole, including for state and federal taxpayers.

Insurability of Natural Disasters

Economic theory suggests that every risk is insurable, at a price. This, of course, assumes (1) that risk averse individuals and businesses will be able to identify their risks, and (2) there is accurate

(...continued)

Insurance Policies, by Rawle O. King.

¹¹ Five states have programs designed specifically to provide windstorm coverage (Alabama, Mississippi, North Carolina, South Carolina, and Texas), and Florida and Louisiana each have a Citizens Property Insurance Corporation. State-sponsored Beach and Windstorm Insurance Plans exist in Mississippi, South Carolina, and Texas; these plans ensure that insurance is available against damage from hurricanes and other windstorms. Fair Access to Insurance Requirement (FAIR) plans exist in the following states: California, Connecticut, Delaware, Georgia, Hawaii, Maryland, Massachusetts, Mississippi, New Jersey, New York, North Carolina, Oregon, Rhode Island, Texas, Virginia, and Washington. Additionally, three states—Georgia, Massachusetts and New York—have Fair Access to Insurance Requirement (FAIR) plans that provide wind and hail coverage for certain coastal communities. New Jersey does not have a Beach and Windstorm Plan but its WindMap was created to help homeowners in coastal areas obtain homeowners insurance. Florida and Louisiana created state-run high-risk insurance companies to offer windstorm insurance coverage to residents in coastal counties in their respective states.

pricing so that insurance companies are able to sell insurance coverage at a risk premium the firm believes is sufficient to cover the risk it has assumed. In order for the insurer to calculate the risk premium, the firm must be able to calculate expected losses and establish an appropriate price to charge for the coverage. Historical claims and exposure data collected over an extended period usually form the basis for projecting future expected costs. Inherent problems arise, however, when using historical loss data and experience to project catastrophe losses.

Insurers generally endeavor to underwrite insurance for catastrophic loss events on the basis of a handful of historical loss data points and actuarial science. When the insurer does not have confidence in the catastrophe modeling or the ability to set a price due to the infrequency or potential magnitude of losses, the firm will stop selling new policies, not renew existing policies or withdraw from the market altogether, and subsequently reallocate the capital to other lines of insurance. This situation usually creates a “hard insurance market” in catastrophe lines of coverage—prices rise and insurers limit the supply of insurance coverage in the marketplace.

From a traditional insurance perspective, natural catastrophe risk could be considered uninsurable for at least three reasons: (1) limited amount of capital (policyholders surplus) allocated to catastrophe lines of insurance; (2) uncertainty in measuring catastrophe losses and pricing catastrophe losses; (3) insurance market imperfection. The remainder of this section discusses each of these reasons why catastrophic risk may be considered uninsurable.

Insurer Claims-Paying Capacity

Although the 2005 hurricanes caused unprecedented catastrophe losses, they were not solvency-threatening to the industry, as a whole, nor did they cause a net reduction in aggregate claims-paying capacity. The property and casualty insurance industry reportedly earned unprecedented profits—net income of \$44.2 billion in 2005; \$65.8 billion in 2006; and \$61.9 billion in 2007 (see Table 2).

Table 2. Property-Casualty Insurance Industry Income, 2003-2007

	2003	2004	2005	2006	2007
Net Written Premiums	\$404.4	\$424.1	\$425.5	\$443.5	\$440.8
Percent Change	9.4%	4.9%	0.3%	4.2	(0.6)
Earned Premiums	386.3	413.8	417.6	435.5	\$439.1
Losses Incurred	\$238.7	\$247.8	\$256.5	\$231.3	246.2
Loss Adjustment Expenses Incurred	50.0	53.1	55.1	52.6	52.4
Other Underwriting Expenses	100.7	106.8	109.8	117.1	119.0
Policyholder Dividends	1.9	1.7	1.9	3.4	2.4
Underwriting Gain/Loss	(4.9)	4.3	(5.6)	31.1	19.0
Investment Income	38.6	40.0	49.7	52.3	54.6
Miscellaneous Income/Loss	0.0	(0.3)	1.0	1.2	(1.0)
Operating Income/Loss	33.8	44.0	45.1	84.6	72.7
Realized Capital Gains/Losses	6.6	9.1	9.7	3.5	9.0
Incurred Fed. Income Taxes/Credits	10.3	14.6	10.7	22.4	19.7

	2003	2004	2005	2006	2007
Net Income After Taxes	30.0	38.5	44.2	65.8	61.9
Policyholders Surplus^a	\$358.1	\$402.1	\$437.6	\$503.2	\$537.2

Sources: Insurance Services Office (ISO).

- a. Data on policyholders surplus comes from 2008 *Best's Aggregates & Averages—Property Casualty*, published by A.M. Best Company, p. 406. Figures include state funds.

The increase in natural catastrophe loss and exposure, however, has raised public policy concerns about whether there is sufficient capacity within the private catastrophe insurance and reinsurance industry to cover the nation's payout requirements for mega-catastrophic events (1-in-100 year events), and what insurance reforms would improve insurers' access to capital in order to ensure adequate capacity to meet consumer needs and solvency of the industry.¹²

Catastrophe reinsurance markets are thought to be limited in their ability to insure against a mega-catastrophe. Most observers would argue that for the very highest layers of catastrophe risk, the federal disaster relief (and consequently the taxpayer) is now, by default (due to limited private-sector capacity in the traditional reinsurance market), the insurer of last resort, particularly for uninsured property owners. National insurance markets, even backed by global catastrophe reinsurance capacity, are limited in terms of the amount of catastrophic risks that can be covered. The total catastrophe reinsurance capacity is not presently large enough to allow primary insurers to adequately hedge their catastrophe risk to meet society's emerging needs.

Several mega-catastrophic scenarios could be imagined that could overwhelm the current claims-paying capacity of both the private insurance and state residual markets. Insurance industry calculations suggest that a repeat of the 1906 San Francisco Earthquake could cause \$80 billion in insured property losses, based on total property losses approaching \$300 billion.¹³ Reinsurers appear unable to provide complete diversification of catastrophe risks both because catastrophes appear to be correlated across risks (hurricanes, floods, and earthquakes among others) and because estimates of the probable maximum loss (PML) from catastrophes have risen dramatically.¹⁴

In 2007, AIR Worldwide Corporation, a catastrophe modeling firm based in Boston, simulated estimates of potential insured catastrophe losses caused by U.S. hurricanes, earthquakes, and the fires that follow earthquakes. Loss estimates were provided for the 1%, 0.4%, and 0.2% annual occurrence probabilities, which correspond to return periods of 100, 250, and 500 years losses. **Table 3** shows that the national probable maximum losses (PML) for hurricanes and earthquakes is \$108.4 billion for the 1% return period, \$164.5 billion for the 0.4% return period, and \$217 billion for the 0.2% return period. The corresponding numbers for earthquakes and fire

¹² J.D. Cummins, M. Doherty, and A. 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, 2002, p. 557-583.

¹³ A.M. Best Company, *Best Review*, April 1, 2006, located at http://goliath.ecnext.com/coms2/gi_0199-5429124/All-shook-up-if-the.html.

¹⁴ Dwight M. Jaffee and Thomas Russell, "Can Security Markets Save the Private Catastrophe Insurance Market?" paper delivered at the Asian-Pacific Risk and Insurance Association Conference, July 19, 1998, p. 11.

(combined) losses are: \$50 billion for 1% events, \$90 billion for 0.4% events, and \$119 billion for 0.2% events.

Table 3. Estimated Insured Hurricane and Earthquake Losses for 10 States for the 1-in-100-Year, 1-in-250-Year and 1-in-500-Year Catastrophes

(\$ in millions)

Rank	Area/State	100-Year Expected Loss (1%)	250-year Expected Loss (0.4%)	500-Year Expected Loss (0.2%)
	United States	\$108,387.18	\$164,525.21	\$217,031.79
1	Florida	87,764.37	144,249.92	200,125.61
2	California	38,955.37	66,317.74	94,020.46
3	Texas	21,314.38	32,808.29	44,156.20
4	Louisiana	12,121.11	18,552.82	24,530.98
5	New York	9,331.85	24,587.73	35,829.62
6	North Carolina	9,326.91	15,343.76	21,395.14
7	South Carolina	7,706.53	14,629.53	20,559.48
8	Alabama	6,022.22	11,402.77	16,255.20
9	Massachusetts	4,968.07	9,134.62	13,793.45
10	New Jersey	4,003.32	10,699.68	17,597.08

Source: AIR Worldwide, Inc.

Table 2 shows that the capital base supporting the entire U.S. property and casualty insurance industry—both commercial and residential—is about \$537.2 billion, as of December 31, 2007. It would appear that this sizeable surplus for unexpected losses would be sufficient for the property and casualty insurance industry, as a whole, to be able to underwrite needed levels of catastrophe insurance. However, only about 20% of the industry-wide policyholder surplus, a measure of capacity, is generally considered to be allocated to catastrophe insurance lines of business. The remaining 80% is needed to support non-catastrophic risks. This means that approximately \$108 billion of policyholders' surplus is available for catastrophic property losses nationwide. When comparing total claim-paying capacity of the insurance industry to the probable maximum losses, one can conclude that the insurance industry's financial resources are insufficient to cover anything more than a 1-in-100 year loss.

In light of the concerns about the capacity of insurers to pay claims after mega-catastrophes, primary insurers have increasingly turned to private capital markets for risk-transfer capacity to complement traditional reinsurance markets. Professor Kenneth A. Froot of Harvard University has suggested that one reason for the search for alternatives to reinsurance has been the supply restrictions associated with capital market imperfections and market power exerted by traditional reinsurers.¹⁵ This situation is a matter of basic economics of supply and demand: a limited

¹⁵ Kenneth A. Froot, "The Market for Catastrophe Risk: A Clinical Examination," *Journal of Financial Economics*, May 2, 2001, pp. 529-571.

number of reinsurers with specialized knowledge and unique access to global capital markets can exert substantial control over prices and supply. Given recent historical losses and concerns with future mega-catastrophes, property catastrophe reinsurance capacity is increasingly seen as insufficient to meet societal demand, and the search for alternatives continues.

To some, this line of reasoning arguably suggests federal intervention in natural catastrophe insurance markets to address potential market failure in the range between the 0.4% to 0.2% return periods.¹⁶ Some finance experts may also be concerned about projections that catastrophic losses will likely double every 10 years and the present government insurance approach might not be adequate.¹⁷ John Seo, co-founder and Managing Principal at Fermat Capital Management, LLC, asserted during discussions with CRS in preparation for this report that a government insurance program might become challenged in its ability to cover losses for less than one generation's worth of exposure growth. As an illustration, a \$100 billion exposure becomes \$200 billion after 10 years; \$400 billion after 20 years; and \$800 billion after 30 years. Ten years ago a 1-in-100 event would have cost insurers \$55 billion. Ten years from now a 100 year event could cost \$220 billion.

Uncertainty in Measuring and Pricing Catastrophe Exposures

In general, efficiently functioning insurance markets require insurers to: (1) classify risk so that differences in risk can be observed and incorporated in insurance premiums; (2) accurately predict the total expected losses for the pool of insured properties; and (3) accurately reflect the underlying economic costs in the price of insurance coverage.

For any insurer to meet its contractual financial obligations in the event of a loss, it must first be able to estimate the expected annual loss (in order to price the coverage) and the magnitude of the extreme losses (to prevent cash-flow or liquidity problems). One difficulty is that risk-spreading-and-predicting techniques in the private insurance market generally do not work as well for low-frequency high-severity events as they do for high-frequency, low-severity risks. The lack of relevant historical data and experience on rare catastrophic events makes the forecasting of losses difficult. In addition, losses from catastrophes are correlated across exposures, making it difficult for insurers to manage such losses. In order to avoid potential insolvency, given the uncertainty surrounding catastrophe losses, insurers must charge a premium that substantially exceeds expected losses. Homeowners might perceive this catastrophic risk premium to be too high and, therefore, may be unwilling or unable to purchase coverage. The challenge for insurance

¹⁶ This analysis simplifies the complex worldwide market for catastrophe property insurance and is intended only to provide an indication of the industry's overall claims-paying capacity. This analysis, for example, does not determine the potential effect of natural catastrophes on the financial strength of insurers nor does it consider offsets from the broad spread and syndication of risk through heavy use of reinsurance, much of it foreign. A significant share of the impact on surplus associated with a mega-catastrophic event would be transferred to the insurance industry balance sheet in foreign countries like Germany, Great Britain, Switzerland, and Bermuda. In addition, the analysis does not consider the total amount of catastrophe reinsurance provided by state residual markets or state catastrophe funds that would increase the overall ability to insure catastrophic risks. As stated above, some insurers and reinsurers are able to raise new capital after a major catastrophic event.

¹⁷ *Insurance Services Office*, "Catastrophe Losses Will Double About Every 10 Years, Says Leading Catastrophe Modeling Expert at PCS Conference," located at http://www.iso.com/index.php?id=2276&option=com_content&task=view.

companies is to accurately estimate loss probabilities due to the large variance of loss around an expected occasional extreme event.¹⁸

Insurance Market Imperfections

Catastrophe reinsurance could arguably become “over-priced” and in relatively short supply due to natural market forces of supply and demand. Capital market imperfections and market power enjoyed by a relatively small number of catastrophe reinsurers can potentially also contribute to the high price and shortage of coverage.¹⁹

Economists Dwight Jaffe and Thomas Russell have argued that catastrophe insurance markets fail because primary insurers are not able to pay annual losses out of annual premiums—a situation that results from the wide variance in annual expected losses and potential magnitude of catastrophe losses.²⁰ The process of securitization of catastrophic risk, in theory, should be able to intertemporally smooth out this “timing problem” by allowing the capitalization of the stream of future premiums.

Alternative Risk Transfer Mechanisms

Securitization has traditionally been used to convert illiquid financial assets (e.g., mortgages, accounts receivable) into liquid marketable assets (securities), but since the late-1990s it is also being used to transfer catastrophic risk to investors in the capital market. There are two main categories of alternative risk transfer (ART) instruments that permit catastrophic risks to be dispersed into the capital markets: insurance-linked securities (ILS), which in effect are direct risk transfer instruments, and contingent capital securities, which reduce an insurer’s need for traditional sources of capital.

- **Insurance-linked Securities or “catastrophe bonds”**—These are risk transfer instruments that provide funds to offset catastrophe losses. Capital received is transferred to a special purpose vehicle (SPV) that then acts much like a traditional (although a fully collateralized) reinsurer. The distinguishing feature of these bonds is that the ultimate repayment of principal depends on the outcome of an insured event. The bonds pay a fixed spread over LIBOR (the London Inter-Bank Offered Rate). For investors, insurance-linked securities (ILS) are attractive as they provide an investment in a specific insurance risk with potentially low correlation with equity and credit markets and with a reduced counter-party risk because some funds can be held in trust.

¹⁸ J. David Cummins, “Should the Government Provide Insurance for Catastrophes?” *Federal Reserve Bank of St. Louis Review*, 88(4), July/August 2006, pp 342-343.

¹⁹ Kenneth A. Froot, “The Market for Catastrophe Risk: A Clinical Examination,” *Journal of Financial Economics*, vol. 60, May 2001, p. 529-571.

²⁰ Dwight M. Jaffee and Thomas Russell, “Catastrophe Insurance: Catastrophe Market and Uninsurable Risks,” *Journal of Risk and Insurance*, vol. 64, June 1997, pp. 206-230.

- **Contingent Capital Securities**—Insurers are also considering contingent capital arrangements (reinsurance sidecars, industry loss warranty, surplus notes, catastrophe options and catastrophe equity puts) that provide post-event capital that insurers can access after a catastrophic event. These arrangements allow insurers to raise cash by selling stocks and issuing debt at prearranged terms. The insurer pays a capital commitment fee to the party that agrees in advance to buy the equity or debt securities following a loss. Contingent capital arrangements do not transfer the insurer’s risk of loss to investors; the insurer only receives an inflow of capital to replenish its policyholders’ surplus after it pays for the loss. Contingent capital can be available to insurers immediately after a catastrophe, when the insurer most needs that capital, through a wide range of alternative capital sources—contingent surplus note arrangements, catastrophe equity put options, reinsurance sidebars, or industry loss warrants.

Financial Market Turmoil in 2008

In the aftermath of a series of natural disasters in the mid-1990s, insurers, reinsurers, property owners and public officials recognized that a mega-catastrophic disaster in the U.S. could create insurance price/capacity constraints in disaster-prone areas. In response, catastrophe insurers and reinsurers have increasingly turned to capital markets to strengthen their balance sheets and manage risks associated with a mega-catastrophic event.²¹ Recent evidence suggests, however, that private insurance and the ability of state governments to implement catastrophe risk management strategies could be jeopardized because of the current financial market turmoil. Florida’s inability to issue sufficient debt (bonding capacity) during the global financial market crisis in advance of the 2008 hurricane season, for example, threatened to unravel Florida’s property insurance system if a major hurricane struck in 2008. In October 2008, officials in Florida announced that the Florida Hurricane Catastrophe Fund (FHCF) would not be able to honor the entire \$28 billion in reinsurance obligations to insurers in the event of a major hurricane striking the state, and that additional funds from the federal government might be needed.²²

The financial market turmoil has been attributed to a combination of factors, including a lack of transparency, financial market complacency stemming from years of positive results, and poor or insufficient regulation.²³ In short, the credit-related sectors of the financial services industry were adversely affected by the way investment banks hedged their risk exposure. Financial engineers and investment bankers created financial instruments called credit default swaps (CDS) on structured collateralized debt obligations (CDOs) and collateralized loan obligations (CLOs), but,

²¹ The securitization of insurance risk received a boost after Hurricane Katrina in 2005 and the sharp increase in the cost of catastrophe property insurance and reinsurance.

²² See *The Florida Senate Issue Brief 2009-301*, “Status of the Florida Hurricane Catastrophe Fund,” October 2008, located at http://www.flsenate.gov/data/Publications/2009/Senate/reports/interim_reports/pdf/2009-301bi.pdf; and, *Florida Insurance Council Issues Backgrounder 2008 Cat Fund Reality*, October 22, 2008, located at http://www.flains.org/index2.php?option=com_content&do_pdf=1&id=2438

²³ See Testimony of Dr. Luigi Zingales, Professor of Economics at the University of Chicago Graduate School of Business, before the House Committee on Oversight and Government Reform, “Causes and Effects of the Lehman Brothers Bankruptcy,” October 6, 2008.

in hindsight, these financial contracts lacked sufficient transparency to easily identify, assess and clear the risks.²⁴

Credit default swaps function as insurance contracts for bond owners to protect themselves in case bond issuers default on their debt. CDS are not traded on exchanges; rather, they are privately negotiated contracts and traded on the over-the-counter market. The buyer typically pays monthly or quarterly premiums to the seller. The size of the notional value outstanding in the CDS market is estimated at \$55 trillion, compared to the entire U.S. Treasuries market of \$4.5 trillion, mortgage market of \$11 trillion, and the U.S. stock market of \$22 trillion. The \$55 trillion CDS market failed as investor appetite for these securities disappeared. Thus, the credit market crisis spread to the broader financial markets as counterparties, unable to identify and quantify precisely where losses lay, stopped lending to each other. Because the proper functioning of the world's economy is dependent on credit, public officials are working to restore confidence in the financial system.

Financial market turmoil has already led to the largest corporate bankruptcies and financial collapses in U.S. history. The credit market crisis has gone beyond mortgages to complex structured finance transactions involving residential mortgage-backed securities (RMBS), commercial mortgage-backed securities (CMBS), and CDO markets. Some of the more prominent episodes in 2008 include:

- the filing for bankruptcy by the fourth largest investment bank, Lehman Brothers;
- collapse of one of the largest U.S. investment banks (Bear Stearns);
- conversion of Goldman Sachs and Morgan Stanley, two of the largest investment banks, to bank holding companies, a classification that gives these two firms access to new, low-cost funding sources but also subjects them to more regulatory oversight;
- the U.S. government taking partial financial ownership of some of the nation's largest commercial banks, including Citibank, Bank of America, Goldman Sachs Group Inc., Morgan Stanley, J.P. Morgan Chase & Co., Bank of New York, and Mellon and State Street Corporation;
- the sale of Merrill Lynch to Bank of America;
- the failure of the largest U.S. thrift institution (Washington Mutual Bank);
- the purchase of Wachovia Bank by Wells Fargo;
- a plan to spend up to \$200 billion to shore up the mortgage finance giants Fannie Mae and Freddie Mac; and
- the Federal Reserve Board's unprecedented \$150 billion secured two-year loan to American International Group (AIG).²⁵

²⁴ Collateralized debt obligations and collateralized loan obligations were developed to repackage credit risk inherent in loans, bonds, and other types of debt instruments by creating investment-grade fixed income risk from a pool of speculative grade or mixed credit quality fixed income securities. For more information see CRS Report RS22932, *Credit Default Swaps: Frequently Asked Questions*, by Edward V. Murphy.

On October 5, 2008, President Bush signed into law the Emergency Economic Stabilization Act of 2008 (P.L. 110-343) to restore liquidity and stability to the U.S. financial system.²⁶ The law authorized the Treasury Secretary to create a Troubled Asset Relief Program (TARP) to purchase, insure, hold, and sell a wide range of financial instruments, particularly those that are based on or related to residential or commercial mortgages. The Secretary of the Treasury now has the authority to purchase up to \$700 billion of mortgage-backed or other securities from insurers, banks, thrifts, credit unions, and broker-dealers.

Under the new law, the Secretary of the Treasury is charged with developing the terms and conditions used to insure troubled assets, and collect premiums from participating financial institutions. The TARP would be operated in consultation with the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the Comptroller of the Currency, the Director of the Office of Thrift Supervision and the Secretary of Housing and Urban Development. The plan is to make money available to banks; the banks would then lend to keep the credit markets open.

Impact of Credit Market Illiquidity on Catastrophic Risk Financing

The financial market turmoil poses a serious threat to state government catastrophe risk management strategies that rely on pre-loss financing using catastrophe (re)insurance, ILS, and contingent capital to cover any cash shortfalls needed to satisfy claims obligations. As an illustration, at the beginning of the 2008 hurricane season, Florida officials could not sell bonds in the weak credit markets to fund their catastrophe risk management program. Florida officials instead agreed to pay Warren Buffett's Berkshire Hathaway \$224 million for a conditional pledge to buy \$4 billion in 30-year tax-free bonds with a 6.5% coupon, if the state fund incurs total storm-related claims of more than \$25 billion in 2008. This pre-loss (debt) financing arrangement could help fund the operations of the Florida Hurricane Catastrophe Fund (FHCF), a state-run catastrophe fund that provides insurers with cheaper reinsurance and issues tax-free bonds to pay insurers' claim losses beyond agreed caps. In a normally functioning credit market, state residual market plans raise the money they need by selling bonds, but a consequence of the current credit market turmoil is that not enough funds can be raised. According to Raymond James & Associates Inc., the FHCF's financial manager, the \$224 million fee charged by Berkshire Hathaway compared favorably to the state's alternative, which was buying reinsurance at a cost of approximately \$1.2 billion.

(...continued)

²⁵ American International Group (AIG) is a federally regulated financial holding company that owns 71 U.S.-based insurance companies and 176 other financial services companies throughout the world. The company operates banks, securities firms, and non-U.S. insurers and other related businesses such as premium finance companies. Some critics of state insurance regulation have taken the position that the failure of AIG and the \$150 billion line of credit offered by the Federal Reserve demonstrates the need for federal insurance regulation. Representatives of the National Association of Insurance Commissioners (NAIC) have responded by pointing out that the 71 U.S. based insurers are financially solvent and able to pay claims presented by policyholders and claimants. The failure of AIG, instead, stems from the company's investments in collateralized debt instruments (e.g., credit default swaps) on mortgage-backed securities that are subject to federal regulatory oversight by the Securities and Exchange Commission, not state insurance regulation.

²⁶ For more information see CRS Report RS22966, *Financial Turmoil: Comparing the Troubled Assets Relief Program to the Federal Reserve's Response*, by Marc Labonte.

Opaque Capital Markets

With excessive complexity being the enemy of transparency, regulators have expressed interest in finding a market transparency solution that is applicable across all current risk transfer categories and one that can identify in real time the interaction of multiple transactional, operational, and performance risks and provide an early warning system for systemic failure. Some have argued that the best way to resolve the financial crisis rests on the assurance of market transparency, so that information about a financial contract and its counterparties flows freely and all parties are informed about all relevant aspects of the market transaction. Transparency in the pricing and terms of securities is considered by many to be essential for financial market efficiency.

It has been argued that in the long run, greater transparency leads to more developed financial markets,²⁷ greater resiliency to shocks,²⁸ and better allocation of capital.²⁹ Transparency regulation has been presented as a way to improve the allocation of resources, which can arguably reduce financial fragility by strengthening market discipline and making financial institutions and markets more accountable to customers and taxpayers. Transparency has been defined in several ways and is often measured based on subjective perceptions of individuals. One objective definition of transparency is the accuracy and frequency of economic information released to the public.³⁰ Consideration is typically made to address the direct costs of complying with disclosure requirements and the indirect transparency costs stemming from having to protect proprietary rights.

From a public policy standpoint, the idea is for public officials and regulators to promote market transparency in order to ensure a well-functioning financial industry that is able to make new loans, offer lines of credit, and provide capital for risk transfer (i.e., insurance, reinsurance, insurance-linked securitization) services. In theory, a regulatory regime that focuses on market transparency could address issues of fairness (subsidy to investors at taxpayers' expense), ambiguity (with respect to the mission, and oversight of the newly created Troubled Asset Relief Program) and the long-term economic effects of the rescue plan.

Illuminating Opaque Credit Markets

On one level, what is proposed by the National Association of Insurance Commissioners, the Federal Reserve, and other financial sector regulatory agencies to solve the current financial market crisis can be interpreted as the replacement of individual silos of traditional business models in favor of unification of the forms and methodologies for credit risk transfer that result in financial products. According to this model, all risk transfer, whether insurance- or capital markets-related, can be allowed to compete on an open playing field. Regulation would still be

²⁷ C. Leuz and R.E. Verrecchia, "The Economic Consequences of Increased Disclosure," *Journal of Accounting Research*, vol. 38, 2000, pp. 91-124.

²⁸ Boon Johnson and E. Friedman, "Corporate Governance in the Asian Financial Crisis," *Journal of Financial Economics*, vol. 58, No. 1-2, 2000, pp. 141-186.

²⁹ J. Wurgler, "Financial Markets and the Allocation of Capital," *Journal of Financial Economics*, Vol. 58, No. 1-2, pp. 187-214.

³⁰ This is the definition used by Rachel Glannerstgern and Yongseok Shin in their article entitled, "Does Transparency Pay?" *International Monetary Fund Staff Papers*, Vol. 55, No. 2, 2008.

required to contain market excesses and occasional disruptions. Such regulation in turn requires data and analytics to keep it informed.

Michael Erlanger, an inventor and corporate executive of Marketcore, an intellectual property development company focused on the financial service and insurance industry, claims to have identified the problems in the financial markets that led to the credit and liquidity crisis, and to have devised a solution. Erlanger asserts that the crisis is caused by the absence of “real-time” data flows in the financial services industry that would allow all market participants and regulators to determine or discover appropriate transaction terms, prices, and performances. The lack of “real-time” data flows has arguably contributed to market illiquidity, inefficient risk pricing, and operational inefficiencies to the detriment of all market participants.

According to Michael Erlanger, two things are needed to address opaque capital markets: (1) a framework for disclosure and reporting of comprehensive data and analytics pertaining to all financial instruments, including loans, lines of credit, other financial products, as well as insurance, reinsurance and securitized insurance risks; and (2) a transaction platform, or other data highway, such as the Internet, in which financial products are bought and sold, and where detailed data on the composition of the assets and of the transactions are collected, stored, and displayed. These data are available, wherever possible, on a real-time basis. The activity on the transaction platform is facilitated by what Erlanger calls “Transaction Credits” as buyers and sellers redeem those credits to either do more business, or to access market and product information. The transaction credits themselves can provide a consistent tracking mechanism in which all transaction details, including underwriting standards and actual per instrument financial performance, are retained and displayed as they occur.

The Marketcore approach to transparency is to create a transaction platform where market participants as well as state and federal regulators have access to view the disclosures and the transaction details. Marketcore argues that transparent information about the transaction details would keep market participants honest, while allowing all parties a reasonable expected profit from the transaction placed through the platform. Many financial market experts agree that illuminating credit markets is an efficient way to keep market participants and market regulators informed, leading to sounder financial decisions. Effective implementation would arguably require global alignment of accounting, regulatory and due process approaches to provide a standardize framework and restore confidence in contractual performance, so all participants are able to rely on the sanctity of a contract.

Transparency in the pricing and terms of securities is considered by many to be essential for financial market efficiency. By definition, transparent financial markets provide accurate information to allow for the discovery of transaction prices, as well as terms on securities and financial instruments of all types. It is considered important that this “real time” information be readily available to everyone, encouraging market participation.

Transparency and Regulation

Arguably today's economic environment is characterized by a fundamental lack of financial market transparency that affects the insurance industry and those that regulate it along with the general economy. Regulation is usually intended to address market failures. There are many recent examples of market failures where a contributory factor has arguably been a lack of transparency. Examples include the bid-rigging and contingent commission scandal in the insurance world a few years ago and the recent financial guaranty crisis.³¹ Another market that functions less efficiently than it arguably could is the market for catastrophe bonds. If the underlying elements were made more transparent, then different decisions would arguably have been made about accepting risk at the negotiated opaque price point.

The concept of insurance regulation is relatively simple. The regulator wants to ensure that the insurers have sufficient assets to make good on the promises they have made to the public (solvency regulation) and that the insurers treat customers and claimants fairly (market regulation).

Solvency is monitored by requiring insurers to submit fairly comprehensive financial statements on an annual basis and each quarter. In addition, insurers are subject to periodic desk-audits and on-site examinations to verify the accuracy of the financial information provided to regulators. The current system, however, is considered by some to have shortcomings in that the information provided to regulators is a snapshot in time revealing the insurer's opinion of the value of financial assets relative to the ultimate settlement value of all the liabilities that the insurer has assumed. Should the underlying markets for either the specific securitizations or their component parts fail, regulatory solvency tests could become difficult to implement due to limited reliable transactional pricings. In the case of the financial guaranty insurers (bond insurers), management is accused of having underestimated the liabilities to which the insurers were exposed because of the lack of transparency regarding the collateralized debt instruments they were guaranteeing. It could arguably also have been a misestimation of the value of an asset held by the insurer such as a bond secured by subprime mortgages.

For effective market regulation, insurance regulators need information on how the market is functioning. Currently this is done through monitoring consumer complaints, reviewing rates, reviewing policy language, targeted market conduct examinations and market analysis. A majority of states are involved in a project to collect market information through a Market Conduct Annual Statement that requires insurers to answer several interrogatories and provide some market data to states. Like the financial regulatory framework, the information provided is a snapshot in time and is in large part influenced by the insurer's opinion of its performance.

The National Association of Insurance Commissioners is considering ways to strengthen solvency regulation and market regulation by harvesting financial and market performance data as well as accurate valuation of assets held by insurers directly from an electronic transaction platform system. The thinking is that if such a system is established and the appropriate information outputs are identified and captured, regulators will in theory have a better understanding of the

³¹ See Jamie Chapman, "Bid-Rigging Scandal Envelops Top Insurance Brokers in U.S.," October 29, 2004, located at <http://www.wsws.org/articles/2004/oct2004/mars-o29.shtml>.

actual financial position (e.g., accurate valuation of assets) of the insurer and greater insight into the insurer's market practices. Over time, as more transactions are captured by the system some think that the output might supersede the current annual and quarterly financial and market regulatory reports.

Federal Intervention in the Catastrophe Insurance Market

Since the mid-1990s, policymakers and insurance industry participants have come to understand that a major catastrophic event can cause an unexpected and sudden large loss of insurers' capital reserves, and there is a material risk that the price of insurance will rise and supply will fall. This situation can lead to calls for government financial intervention in catastrophe insurance markets to expand the private sector's risk-transfer capacity.

Economists believe that an argument for federal intervention in catastrophe insurance markets can be made if the following four conditions hold:

- adequate insurance is not provided by the private insurance/reinsurance industry;
- the financial consequences of a major disaster is beyond the ability of the private insurance/reinsurance industry to cover;
- local communities have adopted and enforced loss reduction measures to mitigate future natural disaster damages (even if such activities had limited impact); and
- the public insurance strategy is designed to be actuarially fair and financially sound, and avoids unfunded contingent liabilities implicit in some type of guaranty.

There is not a consensus among industry participants and experts as to whether these four conditions are present in today's catastrophe insurance market. However, if the private insurance and reinsurance markets are not willing or able to provide risk-transfer capacity for whatever reason—perhaps due to high cost and limited supply of private capital, the heightened uncertainty about the frequency and severity of future losses, or insurers' inability to charge a risk premium to ensure individual company solvency—this situation could justify federal intervention.

Property and casualty insurers and reinsurers have historically opposed federal intervention in catastrophe insurance markets, often arguing that natural disasters are insurable if the free market is allowed to work. The large-scale disruption in private markets created by Hurricane Andrew (1992), the Northridge earthquake (1994), and Hurricane Katrina (2005), however, has prompted some insurers and their trade associations to call for a more systemic approach to intervening in catastrophe insurance markets.

In response to the limited supply and high price of property insurance in coastal areas, past concerns with the rising level of federal disaster assistance, and limitations in insurers' and the state residual markets' claims-paying capacity, Congress may wish to examine the risks posed to the U.S. by natural catastrophes, and the means for both mitigating and paying for those losses, particularly in the uninsured sector of the American public. Federal financial intervention in catastrophe insurance markets could take any of several forms designed to expand the private sector's ability to provide catastrophe insurance, such as adding a high-end federal reinsurance

backstop, providing short-term government liquidity loans, or offering federal multiple peril homeowners insurance policies covering both wind and flood damages.

These approaches to government financial intervention in catastrophe insurance markets could arguably be justified on the grounds that they address the failure of private markets to offer affordable disaster insurance to meet societal demand. But while government intervention might expand the capacity of private insurance and state-sponsored insurance pools to underwrite wind insurance coverage in high-risk areas, it might also create taxpayer-financed subsidies. In theory, the subsidy could undermine the economic incentives for homeowners to adopt cost-effective mitigation measures, a problem also referred to as “moral hazard.”

Arguments For Intervention

Proponents of federal intervention argue that the government is the *de facto* insurer of last resort for mega-catastrophes, largely because the government is thought to be better positioned to bear catastrophe risk because of its broad resource base and borrowing capacity. The federal government, however, currently lacks a comprehensive approach to manage the effects of catastrophic natural disasters, relying instead on ad hoc disaster relief spending to facilitate recovery and rebuilding following a major disaster.

Federal financial intervention in the catastrophe reinsurance market, some contend, could reduce the burdens for future disaster relief expenditures, promote efficient risk management by property owners, and encourage individuals and states to take steps to reduce loss exposure which, in theory, could ultimately result in overall lower social and federal costs. An explicit *ex ante* federal government risk financing approach would arguably be the best way to assess, budget and plan for the future cost of catastrophe risks before such events occur.

Arguments Against Intervention

Opponents of federal intervention in catastrophe insurance markets insist that there is sufficient private insurance and reinsurance capacity to adequately cover catastrophic risks if the government ensures a framework that allows market mechanisms to work without local regulatory interference (i.e., regulatory price constraints that seek to keep premium rates lower than expected losses, which is usually based on computer simulation models). Federal intervention in catastrophe insurance markets, it is argued, creates unexpected side-effects, such as moral hazard, and reduces the economic disincentives for homeowners and businesses to locate in disaster-prone areas or neglect risk prevention.

Moreover, opponents of federal intervention in catastrophe insurance markets argue that private insurers, state residual markets, and state catastrophe funds already protect coastal properties, and federal government intervention would only distort the insurance market by regulating availability of coverage and level of premiums, displacing private capital deployed in insurance and reinsurance, and stifling innovative private sector solutions for managing and financing catastrophic risks. Government insurance schemes, they say, would not reflect the risk level of the activity being insured, thereby eliminating a potentially powerful economic deterrent to risky behavior. Moreover, government intervention could force the public at large to cross-subsidize the risky behavior of residents in high-risk areas.

Potential Points of Agreement

There is some consensus that the federal government has a regulatory role to play in creating incentives for private capital to flow into the property insurance market, establishing strong building codes, encouraging effective land planning techniques, and creating a state insurance regulatory environment that fosters competition and risk-based pricing. There is also some consensus that the federal government could help decrease barriers in the nascent markets for insurance-linked securities (ILS) and provide liquidity through temporary loans designed to stabilize the market after a mega-catastrophe. Other common ground topics include clarifying accounting rules for special-purpose reinsurers, granting insurance-linked securities conduit status for federal tax purposes, and changing the rules to require foreign and domestic reinsurers to meet the same collateral requirements.

Legislative Options

Several legislative options are available to Members of the 111th Congress to protect citizens and the national economy from catastrophic adversities, while arguably reducing both societal and federal costs of natural disasters. Besides the enactment of the Terrorism Risk Insurance Act of 2002, Congress has not approved any other federal disaster insurance law because of a lack of consensus that a problem exists or that specific congressional actions is desirable. There is also concern about creating moral hazard problems and the financial exposure for state and federal taxpayers.³² These proposals include:

- **Bipartisan Study Commissions.** Congress could choose to establish a bipartisan study commission to examine various proposals to improve capabilities of the insurance marketplace to adequately insure homeowners against natural disaster risk by facilitating the pooling, and spreading the risk, of catastrophic financial losses from natural disasters.
- **Tax-Policy Incentives.** Congress could choose to expand the supply of capital reserves that stand behind private insurance. This would require an amendment of the U.S. tax code to allow insurers to accumulate tax-deferred reserves for catastrophic perils.³³ Current tax provisions discourage insurers from reserving funds for unknown losses. Reserves for such contingencies can only be accumulated out of after-tax income. In contrast, reserves set aside for reported losses, or losses incurred but which have not been reported at the end of a given accounting period, are not taxed by the federal government. Allowing insurers to accumulate tax-deferred reserves for catastrophe perils could be costly to the federal government, in terms of reduced tax revenue, and may involve tax benefits that favor one type of activity over another, raising issues of efficiency.

³² U.S. Government Accountability Office, *Natural Disasters: Public Policy Option for Changing the Federal Role in Natural Catastrophe Insurance*, GAO-08-07 (Washington: November 26, 2007), located at <http://www.gao.gov/new.items/d087.pdf>.

³³ See CRS Report RL33060, *Tax Deductions for Catastrophic Risk Insurance Reserves: Explanation and Economic Analysis*, by Rawle O. King.

- Another tax policy incentive could be to allow homeowners to create tax-free catastrophic savings accounts (CSA) similar to health savings accounts that could be used to pay hurricane deductibles and costs associated with retrofitting properties.
- A third tax policy incentive could be to authorize the creation of tax-exempt (CSA) for consumers and allowing for tax-free distributions to pay expenses resulting from a presidentially declared major disaster. Economists have raised the question of whether tax incentives for homeowners would be sufficient to get people to buy disaster insurance. The cost to the government could be weighed against possible savings in ad hoc disaster relief outlays.
- **Implement a Federal Multiple Peril Insurance Program.** One policy response that Congress might consider in the context of reauthorizing the National Flood Insurance Program (NFIP) is to create a new option in the NFIP to offer coverage for both wind and flood risk in one policy.³⁴ Multiple peril insurance could eliminate the problem of uninsured property owners, but it could also create new uncertain liabilities for federal taxpayers.
- **Federal Reinsurance for Catastrophe Losses.** Congress could decide to enact legislation that would authorize the Secretary of the Treasury to sell a limited number of excess-of-loss contracts covering industry losses from natural disasters to private insurers and reinsurers, as well as to state-sponsored insurance pools. Another federal reinsurance approach would allow states with their own catastrophe funds to be eligible to purchase reinsurance from the federal government, thereby encouraging states to establish catastrophic funds to protect against natural disasters and reduce costs to homeowners. Federal reinsurance would expand the supply of catastrophe insurance in the private market and thereby increase the capacity of the industry to write primary catastrophe insurance.
- **Federal Catastrophe Loan Plan.** Congress might decide to authorize the U.S. Treasury to provide loans to state “qualified reinsurance programs” for natural disasters. The loan program could dampen swings in insurance rates and address availability deficiencies caused by inefficient capital markets.
- **Insurance-Risk Securitization.** Some mega-catastrophe exposures may be beyond the claims-paying capacity of both the private market and state catastrophe funds. In those cases, Congress might consider implementing a catastrophe insurance system able to resolve key obstacles currently impeding broader implementation of catastrophe risk management and financing with insurance-link securities (catastrophe bonds). One possibility is to authorize the creation of a public risk-transfer consortium to allow state-run residual insurance pools and funds to securitize and transfer natural catastrophe risks to investors in the capital markets.

³⁴ See CRS Report RL34367, *Side-by-Side Comparison of Flood Insurance Reform Legislation in the 110th Congress*, by Rawle O. King.

- **Risk Retention Group Coverage for Commercial Property Coverage.**
Congress could choose to amend the Liability Risk Retention Act of 1986 to expand the authority of risk retention groups (RRGs) to provide commercial property insurance to members.

Concluding Remarks

In recent decades, large-scale natural catastrophes have become increasingly frequent and costly. The rising economic cost of compensating victims of disaster and rebuilding has become a public policy issue which Congress may want to address. Some maintain that private markets will not provide catastrophic risk unless the government acts as reinsurer of the high end of the loss. Others believe the private sector could handle a mega-catastrophe event, if the government removes tax, accounting and regulatory barriers.

Several Members of Congress have focused attention on the nation's significant exposure to hurricane and earthquake risk and the claims-paying capacity of the private sector, the effectiveness of emergency federal disaster relief assistance, and whether the federal government should intervene in catastrophe insurance markets. Based on both computer simulation models and historical data analysis of catastrophe losses, economists have concluded that the average expected federal expenditure for disaster relief outlays has been about \$20 billion a year.³⁵ Importantly, researchers project that future catastrophic insured losses could exceed \$100 billion.³⁶ Given the current approach of federal disaster relief spending in response to natural catastrophes, researchers project an unfunded liability for natural disaster relief assistance over the next 75 years comparable to that of Social Security.³⁷

Due to a number of factors, including a lack of consensus on what will work and concerns about adequate provisions for mitigation and avoidance of unnecessary government intrusion into markets being served by the private sector, federal disaster insurance legislation has not been acted upon. Congressional reluctance to establish a federal disaster insurance program since the enactment of the 1968 flood insurance statute has arguably been based on the premise that such a program could conflict with economic and actuarial principles that emphasize the "true" cost of government programs and the forgone benefits of a competitive insurance marketplace.

In response to higher property insurance prices and reduced availability of homeowners insurance in several Gulf Coast and East Coast states, Members of the 111th Congress might choose to focus on:

- the current condition of, as well as the outlook for, the availability and affordability of property insurance in disaster-prone regions of the country;

³⁵ J. David Cummins, Michael Suher, and George H. Zanjani, "Federal Financial Exposure to Natural Catastrophe Risk," *Federal Reserve Bank of New York*, November 30, 2007, located at: <http://www.nber.org/chapters/c3036.pdf>.

³⁶ Ibid.

³⁷ Ibid.

- investigation of alternative risk-financing approaches to address the increased prices and reduced availability of catastrophe property insurance;
- determination of the extent to which a greater reliance on insurance could reduce federal disaster costs and reduce the likely insolvency of insurance companies in a catastrophic event;
- the ability of states-sponsored residual market mechanisms designed to provide adequate insurance coverage and increased underwriting capacity to insurers and reinsurers in constrained markets;
- the capacity of the private insurance market to cover losses inflicted by natural catastrophes;
- deciding whether it is possible to develop an actuarial basis for determining viability of a federal all-hazard insurance program; and
- finding ways to create a transparent marketplace capable of properly assessing, transacting, and clearing risk transfer in a manner that confirms free market principles.

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