PARTICIPATION AND DISINTERMEDIATION IN A RISK SOCIETY

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Humanity has always lived in the shadow of catastrophic risk. The common definition of catastrophe is "a momentous tragic event ranging from extreme misfortune to utter overthrow or ruin."[1] A catastrophe connotes a large, broadly distributed loss. Frequency of event and severity of loss are inversely correlated. Severe losses are infrequent, but they may still be within the range of expectation. Highly destructive terrorist attacks, hurricanes, and earthquakes are certainly foreseeable. Most catastrophes are also localized events. Despite great misfortune, they do not significantly affect the broader society, economy or even the insurance industry. But there is a category of catastrophes that surpass ordinary expectations. An extreme catastrophe (mega-catastrophe) is an event so severe that the exogenous shock ripples out from the immediate locus of loss to the greater society. These events test the traditional network of compensation and insurance schemes.

The problem is one of distributing risk and loss. Important questions are raised. Who should bear the risk? How should compensation be conceived? What should be the mechanism for risk distribution? The answers depend, in large part, on the number of participants in the distribution scheme and the cost associated with risk spreading.[2] In the case of extreme catastrophes, the major participants are victims, insurers, and government.[3] The availability of private insurance is limited by the capital held and the degree to which parties have contracted for risk transfer. When capital cannot support the risk or when insurance penetration is insufficient, government compensation fills the void and provides disaster relief,

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[1] WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 214 (1983). The insurance definition is a loss of $25 million or more. *See* http://www.iso.com/products/2800/prod2802.html (definition by ISO, a leading insurance information and services firm). *See generally* ERIK BANKS, CATASTROPHIC RISK: ANALYSIS AND MANAGEMENT (2005).

[2] *See* KENNETH S. ABRAHAM, DISTRIBUTING RISK: INSURANCE, LEGAL THEORY, AND PUBLIC POLICY 14-31 (1986).

[3] This does not include charity, which is not an insignificant participant in the delivery of compensation. In the broader scheme, charity typically constitutes a fraction of the compensation provided. For example, in the case of 9/11, victims received on average $3.1 million, with 69% coming from the September 11th Victim Compensation Fund, 23% from insurance, and 8% from charity. Lloyd Dixon & Rachel Kaganoff Stern, RAND Institute for Civil Justice, *Compensation for Losses from the 9/11 Attacks* xxiii (2004).

either through ex ante insurance or ex post compensation. Without public relief, the residual risk bearer is always the victim.

In most cases of loss or accident, the mix of cost internalization and compensation through the network of traditional insurance, tort action, government relief, social and familial institutions works fairly well. This scheme, however, is stressed when losses become extreme: cost internalization may be deemed too much for a large class of victims; traditional insurance may not have sufficient capacity to absorb the loss; the tort system may be too slow and costly and may increase the secondary costs of dislocation; ordinary government services, social and familial institutions may become overwhelmed. The standard model of compensation was tested by two of the most devastating catastrophes to strike the United States in modern history—9/11 and Hurricane Katrina. These catastrophes raise important questions about the adequacy of participation in a risk society and the role of the government. Is there a right mix of risk spreading among participants? Is there an efficient matching of those exposed to risk with those who are willing to bear the cost? What are the costs of risk spreading? Poorly managed risk can not only amplify the consequences of catastrophes, but can also cause derivative manmade catastrophes.[4] Thus, these questions touch not only economic choices, but their moral consequences.

The problem of insurance and risk distribution is both a private activity and a public function.[5] In specific areas, such as flooding and terrorism, the government provides insurance and compensation.[6] A public role is necessary because, it is believed, private insurance alone cannot bear the risk of extreme loss. The collection of tax revenue is broad and indiscriminant as to one's risk exposure and appetite to bear it, and the distribution of public funds is subject to a complex mix of perceived need, sympathy, and politics that is neither entirely consistent nor predictable. The democratization of risk distribution is a prominent aspect of catastrophic risk and loss management.

This chapter explores the limitations of the private and public risk distribution and compensation schemes. The experiences of 9/11 and Katrina provide the context for the discussion of this theme. This chapter argues that traditional insurance and government compensation are often inadequate, and that an alternative mechanism of private risk distribution is needed. An alternative scheme may mean the disintermediation of the traditional insurance and government functions, and a move towards more direct market transactions between those who are exposed to risk and those participants who are willing to bear it. Disintermediation may better spread risk, reduce the secondary cost of

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4 *See* Robert J. Rhee, *Catastrophic Risk and Governance after Hurricane Katrina: A Postscript to* Terrorism Risk in a Post-9/11 Economy, 38 ARIZ. ST. L.J. 581, 593-602 (2006).

5 *See* INSURANCE, GOVERNMENT, AND SOCIAL POLICY (Spencer L. Kimball & Herbert S. Denenberg, eds., 1969).

6 *See* National Flood Insurance Act of 1968, Pub. L. No. 90-448, 82 Stat. 572 (2000); Terrorism Risk Insurance Act of 2002, Pub. L. No. 107-297, § 101(a)-(b), 116 Stat. 2322, 2322–23 (2002); Terrorism Risk Insurance Extension Act of 2005, Pub. L. No. 109-144, 119 Stat. 2660 (2005).

dislocation, and incentivize proper mitigation measures. The result would not only be more efficient from an economic point of view but also be more just and fair.

Era of Mega-Catastrophes

Throughout much of human history, catastrophes have been blamed on bad luck or the distemper of gods. But catastrophes are not simply a matter of fortune's winds. Human choices play a significant role in the causality and consequence of catastrophes. The most obvious example of a frequently recurring manmade catastrophe is war. Beyond this, society lives and builds in the path of hurricanes, on coastlines and geological faults. Whereas the ancients lacked the knowledge to understand the risk around them,[7] modern society has a deep appreciation of the dangers associated with many of its activities.

In the twilight of the twentieth century, the frequency and severity of catastrophes surged. In 1992, Hurricane Andrew struck the Florida coast and caused insured losses of approximately $21 billion.[8] At the time, it was the largest loss from a single event in insurance history. In the same year, the Irish Republic Army bombed central London and caused $671 million in insurance losses, foreshadowing a more virulent form of terrorism.[9] In 1994, the Northridge earthquake inflicted insured losses of approximately $17 billion,[10] and $43 billion in economic losses.[11] In 1995, the Kobe earthquake caused $147 billion in economic losses,[12] at the time perhaps the most costly natural catastrophe in modern history.[13] Since insurance penetration in Kobe was shallow, only $4 billion was insured loss.[14]

The unprecedented catastrophes of the 1990s portended a new century of mega-catastrophes. On September 11, 2001, the terrorists attack caused about $80 billion in direct economic loss,[15] of which about $34 billion was insured.[16] The event was the largest insurance loss from a single event. On December 26, 2004, the South Asia tsunami killed approximately 280,000, becoming one of the

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7 The intellectual understanding of risk is a relatively modern science. *See* PETER L. BERNSTEIN, AGAINST THE GODS: THE REMARKABLE STORY OF RISK (1996).

8 Auriela Zanetti et al., Swiss Re, Sigma No. 1/2004, *Natural Catastrophes and Man-Made Disasters in 2003*, at 38 & tbl.10 (2004) (giving data indexed to 2003 value; property damage and business interruption loss).

9 Swiss Re, *Terrorism and Insurance* 3 (1993).

10 Sigma No. 1/2004, *supra* note 8, at 38 & tbl.10.

11 Dan L. Crippen, Cong. Budget Office, *A CBO Study: Federal Reinsurance For Disasters* 9-10 (2002).

12 Davi M. D'Agostino, U.S. House of Representatives, Comm. on Fin. Servs., U.S. Gov't Accounting Office Report to the Chairman, *Catastrophe Insurance Risks: The Role of Risk-Linked Securities and Factors Affecting Their Use* 12 fig.2 (2002).

13 Saul Levmore & Kyle D. Logue, *Insuring Against Terrorism—and Crime*, 102 MICH. L. REV. 268, 270 (2003).

14 D'Agostino, *supra* note 12, at 12 fig.2.

15 U.S. Gen. Accounting Office, *Catastrophic Insurance Risks: Status of Efforts to Securitize Natural Catastrophe and Terrorism Risk* 1 (2003).

16 Dixon & Stern, *supra* note 3, at 15, 103.

deadliest natural catastrophes in the modern era. On August, 29, 2005, Katrina inflicted about $200 billion in damages and 1700 deaths.[17] Currently insurance litigation is working through the legal system, but the private insurance loss (not including insurance loss from the National Flood Insurance Program) is estimated to be over $40 billion, which would surpass that of 9/11.[18] Both 9/11 and Katrina were 1/100 year events. The 1906 San Francisco earthquake and fire is the closest comparable: Katrina because of the scale of destruction to a major American city, and 9/11 because of the impact on the insurance industry from a single event.[19]

What has accounted for this destructive surge? Bad luck cannot be discounted. It was bad luck that Katrina was a direct blow to New Orleans rather than a glancing one, and that the intelligence and law enforcement agencies failed to foil the terrorist plot. But bad luck is simply a matter of timing, just as the "Big One" will eventually strike the West Coast. A part of the answer is that catastrophes are more severe because tropical storms have become more frequent and severe. Also, severity of catastrophe is a function of value at risk. In this regard, economic asset values have increased. There is a continuing concentration of population and economic assets in large urban and coastal areas.[20] And after a century of catastrophic wars and the apocalyptic possibilities of the Cold War, the lesson learned is that human life and welfare are most precious. There is more value at risk, making the same catastrophe more severe.

Human hands can not only unleash enormous catastrophes such as the worst case scenarios of global warming or nuclear detonation, but they can amplify the consequences of natural risks. Even when causality cannot be influenced, human choices can magnify or mitigate the destructive pulses of fortune.[21] Consider the fact that natural disasters with the greatest fatalities tend to be in less developed countries whose political economy may be incapable of adequately mitigating risk.[22] While the occurrence of a natural catastrophe may be fortuitous, risk spreading and mitigation are uniquely human activities.

Katrina provides a good case study. The hurricane was an independent event, but the catastrophe occurred as a result of the consequences of a long chain of human decisions. Since the earliest settlement in New Orleans, residents knew that the land mass was subject to flooding. In 1965, Congress authorized the construction of the levee system.[23] The government could have built the levees to withstand a category 5 hurricane. But ultimately the system was built to withstand

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17 Rawle King, *National Flood Insurance Program: Treasury Borrowing in the Aftermath of Hurricane Katrina*, Congressional Research Service for Congress at 2 (June 6, 2006).

18 *See* Patricia L. Guinn, *Hurricane Katrina: Analysis of the Impact on the Insurance Industry*, Towers Perrin at 3 (Oct. 2005).

19 *See See* Robert J. Rhee, *Terrorism Risk in a Post-9/11 Economy: The Convergence of Capital Markets, Insurance, and Government Action*, 37 ARIZ. ST. L.J. 435, 443 n.32 (2005).

20 Christopher M. Lewis & Kevin C. Murdock, *Alternative Means of Redistributing Catastrophic Risk in a National Risk-Management System*, in THE FINANCING OF CATASTROPHIC RISK at 52 (Kenneth A. Froot, ed., 1999).

21 *See generally* THE SOCIAL AMPLIFICATION OF RISK (Nick Pidgeon et al., eds., 2003).

22 Rhee, *Terrorism Risk*, *supra* note 19, at 532 tbl. 4 & n.450.

23 Pub. L. No. 89-298, § 204, 79 Stat. 1073 (1965).

a storm approximately equivalent to a fast-moving category 3 hurricane.[24] It was believed that such a storm strikes coastal Louisiana once every 200 years.[25] With the clarity of hindsight and the realization of global warming, this estimate has proven to be erroneous. Since the 1970s the frequency of category 4 and 5 hurricanes and the destructiveness of tropical storms have doubled.[26] This experience suggests that the original probability estimate was wrong. Of course this is hindsight bias, and the point is not that the original assumption was wrong since no one can predict weather patterns 40 years into the future. Rather, no allowance was made for the possibility of error. The 1/200 year assessment reflected the best guess probability, suggesting that the government accepted the risk that in any given year the city had a 0.5 percent chance of a catastrophic breach. In light of the difficulty of longterm weather prediction, the possibility of error, and the magnitude of harm from error, the decision to set the engineering standard at a 1/200 year event was fatally shortsighted. Katrina need not have killed thousands of Americans; it need not have destroyed billions of dollars of assets; it need not have flooded a major American city. Arguably, the "original sin" (so to speak) dates back to the decision to settle in a flood prone land, but recent government decisions on risk management dating back to 1965 are the most direct proximate cause of the mega-catastrophe. Katrina, the hurricane, was a natural event, but Katrina, the disaster, was certainly manmade.

Katrina illustrates the paradox of modern society. The understanding of risk in the modern era has rapidly developed: the geological and meteorological dynamics that trigger natural catastrophes, the laws of probability and risk, the underwriting of fortuitous risk, and the risk of markets and political economy. Advances in technology, awareness of risks, regulation and tort law, and greater sensitivity to loss have reduced many of the ordinary risks of living life in a complex world: transportation and consumer products are safer, healthcare is better, diseases have been neutralized, and workplace accidents are less frequent. Despite these advances, the frequency and severity of catastrophes have increased. Technology promotes welfare, but also harbors potentially dangerous risks. Industrialization provides cheap goods, but pollutes the environment. Nuclear power provides cleaner energy, but also poses a source of accidents or abuse. Genetically modified foods and nanotechnology better our lives, but may also pose hidden dangers. More innovations, yet unheard of or presently fantastical in concept, will rapidly follow as the growth of technology is geometric. Greater complexity begets greater means of breakdown.[27] Mega-catastrophic terrorism is

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[24] U.S. Gov't Accountability Office, *Hurricane Protection: Statutory and Regulatory Framework for Levee Maintenance and Emergency Response for the Lake Pontchartrain Project* 4 (2005).

[25] *Id.* at 4.

[26] Harvard Medical School, The Center for Health and the Global Environment, *Climate Change Futures: Health, Ecological and Economic Dimensions* 4 (Paul R. Epstein & Evan Mills eds., Nov. 2005).

[27] In addition to natural disasters and special manmade disasters like terrorism, we have also begun to see economic catastrophes arising from ordinarily activities. For example, the 2001 power failures in California caused a productivity loss of $21.8 billion, income loss of $4.5 billion,

real. Global warming, debatable only a few years ago, is a generally accepted phenomenon with uncertain consequences in the future. Rapid increase in human population stresses biodiversity. Population and economic assets continue to concentrate in mega-cities, many of which are in the path of natural catastrophes and prey to terrorism. The possibility of a technological mishap cannot be discounted. No one can foretell whether any of these risks will manifest into future mega-catastrophes.[28] It is also doubtful whether these risks are somehow quantifiable for the purposes of the all ubiquitous cost-benefit analysis.[29]

Ultimately, Katrina and 9/11 may well be once-in-a-lifetime disasters, iconic in stature and thus unique in the annals of history. This is the sanguine perspective. A more realistic view is that Katrina and 9/11 are harbingers of a new era of mega-catastrophes. Although all the factors of causality and consequence are not subject to control, the task at hand is to properly manage risk. The goals are three: mitigate risk, which entails the deterrence of costly behavior; spread risk so that the secondary costs of economic dislocation are reduced; minimize the transaction cost of risk spreading and compensation delivery.[30]

Sources of Compensation

Tort System. — In times of mega-catastrophes, compensation through the tort system is infeasible and undesirable. It is true that mass torts, typically arising from the occurrence of a large single accident or the release of a defective product into the marketplace, are frequently litigated. Despite the limitations of litigation, primarily the time delay and the costs of resolution,[31] the tort system adequately administers most disputes arising from accidents. Tort law works best when there is a clear transaction between the parties, blameworthiness is within the realm of reasonable debate, causation is clear, and credit risk is low. Although there are delays in compensation and high transaction costs relative to insurance or an ex post compensation fund, these costs constitute the price of accessing the civil

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and 135,000 jobs; and the power failure that blacked out the northeast United States on August 14, 2003 caused a $75–$100 million loss from food spoilage alone. Christian Brauner, Swiss Re, *The Risk Landscape of the Future* 15 (2004).

[28] *See* RICHARD A. POSNER, CATASTROPHE: RISK AND RESPONSE 21-91 (2004) (discussing various scenarios in which mega-catastrophes can occur).

[29] *See* Rhee, *Catastrophic Risk and Governance*, *supra* note 4, at 585 n.27; *but see* POSNER, *supra* note 28, at 167-70 (calculating the value of human civilization as $600 trillion to conduct a cost-benefit analysis in catastrophe prevention program).

[30] *See* GUIDO CALABRESI, THE COSTS OF ACCIDENTS: A LEGAL AND ECONOMIC ANALYSIS (1970).

[31] Much criticism has been levied against the cost of the litigation system. The cost, however, is not equally assumed. During the litigation process, each party discounts the value of a lawsuit based on the perceived risk and their economic bargaining positions. *See* Robert J. Rhee, *A Price Theory of Legal Bargaining: An Inquiry into the Selection of Settlement and Litigation under Uncertainty*, 56 EMORY L.J. 619 (2006); Robert J. Rhee, *The Effect of Risk on Legal Valuation*, 78 U. COLO. L. REV. 193 (2007). This process results in a systematic discount of tort claims during the dispute resolution process. *See* Robert J. Rhee, *Tort Arbitrage*, 60 FLA. L. REV. ___ (forthcoming 2008). Thus, the civil litigation system assures that the plaintiff internalizes some of the cost of accident.

dispute resolution system. Mass torts may raise public policy considerations, such as concerns for public safety and financial distress to industry, but they are in essence private disputes of right and wrong to be resolved among the parties.

In the case of a mega-catastrophe, these considerations typically do not hold. The concepts of fault and liability lose much of their plausibility. By definition, extreme catastrophes are extremely unlikely events. They may be foreseeable just as an asteroid strike or a global pandemic are foreseeable, but such foresight may not suffice for liability. Often, catastrophes are simply a matter of bad luck and perfection of precaution against all perils has never been the standard of care in the fault system.[32] Even with a plausible case for liability, most private defendants would be judgment proof. It is a limitation of tort law that as damage assessment against a defendant reaches a threshold, the well of remedy begins to run dry, either because of the limited resources of the defendant or because the law refuses to impose liability that may cripple a socially necessary asset.[33] The extreme form of this problem is terrorism by stateless organizations. In the case of a judgment proof defendant, victims must find an alternative source of blame and deep pockets, which ironically may make a case for liability less plausible. From the perspective of a mass class of victims, the most credit-worthy defendant is a public entity. Federal and state governments, however, may have vigorous defenses, making compensation highly uncertain.

In most extreme catastrophes, the identity of the wrongdoer and the question of negligence are often speculative. Consider the case of 9/11. There would have been no recourse against the terrorists. Victims would have had to look to other defendants—perhaps the airlines, the landlords, and the government—but obviously the question of negligence would have been far from clear, resulting in uncertainty that would have required years of litigation.[34] Questions of duty, breach of care, and causation would have been substantial. Consider also the case of Katrina. The hurricane was a fortuitous event, but the government's negligence in managing the crisis caused substantial injuries.[35] Any claim of negligence, however, face substantial constitutional, statutory and common law tort barriers to

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[32] While strict liability may be applicable in industrial accidents, it is difficult to see how the doctrine would apply in most other cases of catastrophe.

[33] *See, e.g.*, Strauss v. Belle Realty Co., 482 N.E.2d 34 (N.Y. 1985) (precluding tort liability against utility for negligent blackout); H.R. Moch Co. v. Rensselaer Water Co., 159 N.E. 896 (N.Y. 1928) (precluding tort liability against water company for the failure to provide water during fire).

[34] Most tort actions were waived through voluntary participation in the September 11 Victim Compensation Fund, which required waivers of tort actions. Air Transportation Safety and System Stabilization Act, 49 U.S.C. § 40101 (2003). In the end, 2879 claims out of 2976 deaths, about 97%, were made under the fund. Dixon & Stern, *supra* note 3, at 24–25.

[35] *See generally* U.S. House of Representatives, *A Failure of Initiative: Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina* (2006); DOUGLAS BRINKLEY, THE GREAT DELUGE: HURRICANE KATRINA, NEW ORLEANS, AND THE MISSISSIPPI GULF COAST (2006).

recovery.[36] Compensation through the tort system is highly uncertain, unpredictable, and costly, and the tort system is typically the least efficient means of compensation.[37] The uncertainty and delay may exacerbate economic dislocation and increase secondary cost. In sum, the tort system is not ideal when liability is potentially remote, source of remedy is limited, and social cost of delay is high.[38]

Private Insurance. — Without the tort system, the old triumvirate of insurance, victim, and government bears the brunt of the losses. The availability of private insurance is subject to several limitations. It is, of course, a creature of contract, and thus an ex ante agreement is a predicate to compensation. The voluntary nature of contract influences the demand side of the insurance equation. Insurance penetration may be too shallow to provide adequate compensation. Homeowner's policies routinely exclude flood and earthquake insurance, and coverage for these hazards must be bought separately. Even in the area of life and health insurance, demand is not universal. Insurance penetration is a function of wealth as, outside of mandatory coverage, insurance is a discretionary spending item. The experience of 9/11 showed that a compensation fund was deemed necessary to substantially augment life insurance, even for a large segment of the population who worked in the lucrative field of financial services;[39] and the experience of Katrina showed that the penetration of flood insurance was not pervasive, even for a city whose land mass was below sea level. Moreover, the impact of a catastrophe is not shared equally. In times of crisis, the class of people most affected is the poor because they tend to be underinsured. The experience of the South Asia tsunami tragically illustrates this disparate effect: the disaster was one of the worst natural catastrophes in history, and yet the insurance losses were rather minimal in relation to the scale of the calamity.[40]

On the supply side, the capital supporting the property and casualty market is limited.[41] The insurance industry can bear up to the region of $100 billion loss from a single event without a systemic failure.[42] Coverage for large scale

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[36] *See, e.g.*, Federal Tort Claims Act, 28 U.S.C. § 2680(h); In re Katrina Canal Breaches Consolidated Litigation, Order Denying Motion to Dismiss, Civil Action 05-4182-SRD-JCW (E.D. La., Feb. 2, 2007).

[37] *See* Rhee, *Terrorism Risk*, *supra* note 19, at 440.

[38] *See* MARSHALL S. SHAPO, COMPENSATION FOR VICTIMS OF TERRORISM 44-88 (2005) (discussing the problematic issues related to tort actions).

[39] *See supra* note 3.

[40] *See* Rhee, *Catastrophic Risk and Governance*, *supra* note 4, at 590.

[41] *See* Am. Acad. of Actuaries, Public Policy Monograph, *P/C Terrorism Insurance Coverage: Where Do We Go Post-Terrorism Risk Insurance Act?* 12 (2004) ("The U.S. P/C industry's surplus stood at $347 billion at year-end 2003."); R. Glenn Hubbard & Bruce Deal, *The Economic Effects of Federal Participation in Terrorism Risk* 34 (2004) (noting that $199 billion of $347 billion of surplus in the U.S. P/C sector was devoted to commercial lines).

[42] *See Insurance and Terrorism: Hearing Before the Subcommittee on Capital Markets, Insurance, and Government Sponsored Activities* (Oct. 24, 2001), *available at* 2001 WL 26187518 (statement of Professor David Cummins, The Wharton School, University of Pennsylvania: "A study I recently conducted indicates that the insurance industry could survive an event of that magnitude [$100 billion loss] but that markets would be disrupted by numerous insurer

catastrophes such as terrorism, earthquake, flooding, and hurricanes are limited in the private insurance market, and such coverage is frequently supplemented by government funds. In its current configuration the private market has difficulty with underwriting extreme risks.[43] The reasons are complex, but they can be summarized as follows: catastrophic risk is difficult to model and thus insurers incorporate an appropriate risk premium into the price; American tax laws are unfavorable to the accumulation of an adequate reserve against an infrequent extreme event; and the small possibility of a large event requires an insurer to hold sufficient capital to protect against insolvency in any given year, and the capital held must generate a sufficient investment return such that capital costs drive premiums towards economic infeasibility.[44]

Lastly, the pricing of insurance is most cost efficient when the risk is characterized by high frequency of event and low severity of loss, such as automobile accidents and ordinary liability insurance. When the risk is low frequency and high severity, the typical profile of a catastrophe, or when other factors militate against insurability, such as flooding and nuclear accident, traditional insurance is often unavailable or expensive. The unpredictability of the aggregate risk pool requires a large risk premium that is commensurate with the capital that must be held to ensure solvency, and this risk premium may result in economic infeasibility of premiums, which would further drive down the demand for insurance.

Collectively, these economic dynamics and financial limitations suggest that tradition insurance leaves large gaps in the provision of compensation in times of extraordinary loss. It is only a partial solution to the problem.

Public Insurance. — Private insurance and the tort system are limited, and victims cannot internalize the entirety of the loss without injustice and substantial secondary costs. Accordingly, government compensation is important. It can be delivered through an ex ante subsidized insurance program, such as the Terrorism Risk Insurance Act of 2002 (TRIA) and the National Flood Insurance Act of 1968, or through an ex post compensation scheme, such as the September 11 Victim Compensation Fund. Although government must always be involved in times of national or regional crisis, public distribution of risk and loss has been problematic in both ex ante and ex post programs.

First consider public insurance programs. These programs are not influenced by ordinary market dynamics. One result is that public insurance tends to crowd out private insurance or anesthetize market developments.[45] The TRIA is a good example. It is a temporary cost-sharing program that provides the insurance industry a federal backstop for extreme losses from terrorism. It was enacted with two stated purposes: to address "market disruptions and ensure the continued

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insolvencies as well as market price and availability problems."). Given that the industry holds more capital than it did in 2001, this threshold is probably higher now.

43 *See* Paul R. Kleindorfer & Howard C. Kunreuther, *Challenges Facing the Insurance Industry in Managing Catastrophic Risks*, FINANCING OF CATASTROPHIC RISK, supra note 20, at 149-94.

44 *See* Rhee, *Terrorism Risk*, *supra* note 19, at 464-78.

45 *See id.* at 491.

widespread availability and affordability" of insurance, and to "allow for a transitional period for the private markets to stabilize, resume pricing of such insurance, and build capacity to absorb any future losses."[46] Because the program was envisioned as a temporary price stabilization measure, it was enacted with a legislative life of three years. In the three years of the program, the insurance market stabilized; insurers raised more capital to replace the capital lost from the attacks; terrorism risk insurance became widely available with stabilized premiums and an increasing competitive market; and the general economy recovered from the initial shock.[47] These are good developments, but it is questionable whether the TRIA influenced them in any meaningful way.[48] Worse, the TRIA could have done more harm than good. The major problem is that "there has been little development or movement among insurers or reinsurers toward developing a private-sector mechanism that could provide capacity, without government involvement, to absorb losses from terrorist events."[49] Instead, the insurance industry's view of a permanent solution appears to "a long-term, public-private partnership,"[50] meaning a longterm extension of a federal cost-sharing program. Thus far, the industry lobby has been successful. Despite price and economic stability, the government enacted the Terrorism Risk Insurance Extension Act of 2005, which modified and extended TRIA for another two years. Government insurance has created an expectation of corporate entitlement, which anesthetizes the need for a private insurance solution.[51] Unless the program is allowed to expire at the end of 2007, a federal backstop may well be on its way to becoming a permanent public insurance fixture, though that clearly was not the government's original intent.[52]

Government insurance programs are also susceptible to bad management. A single department within an agency typically manages an insurance program. "These micro-agencies, subject only to bureaucratic oversight, cannot compete with the private market, which is subject to the collective forces of supply and demand, innovation and strategy, and incentives and disincentives."[53] The

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[46] TRIA § 101(b).

[47] *See Terrorism Risk Insurance: Report of the President's Working Group on Financial Markets*, Joint Report of U.S. Treasury Department, Board of Governors of the Federal Reserve, Securities and Exchange Commission, and the Commodity Futures Trading Commission (September 2006). The conclusions of this report were predicted by scholars. *See, e.g.,* Rhee, *Terrorism Risk*, *supra* note 19, at 480 ("With that said, betting against a powerful insurance lobby is always a perilous venture.").

[48] *See* Rhee, *Terrorism Risk*, *supra* note 19, at 458-59; Rhee, *Catastrophic Risk and Governance*, *supra* note 4, at 601.

[49] U.S. Gen. Accounting Office, *Terrorism Insurance: Implementation of the Terrorism Risk Insurance Act of 2002* at 28 (2004).

[50] *Ensuring Economic Security in the Face of Terrorism: A Public-Private Partnership*, Am. Ins. Ass'n Advocate, Mar. 3, 2005, at 3.

[51] *See* James G. Bohn & Brian J. Hall, *The Moral Hazard of Insuring the Insurers*, FINANCING OF CATASTROPHIC RISK, supra note 20, at 363-83.

[52] The goal of the insurance and business lobbies is to make permanent a federal cost-sharing program. *See* Rhee, *Catastrophic Risk and Governance*, *supra* note 4, at 600; Rhee, *Terrorism Risk*, *supra* note 19, at 491.

[53] *Id.* at 492.

National Flood Insurance Program (NFIP) is a good example. The problem begins with underwriting. Flooding constitutes 90% of all natural disasters in the US.[54] Like a nuclear accident, flooding is such a highly correlative risk that private insurers exclude coverage, leaving property owners three choices: internalize the loss, eliminate the risk by vacating or selling the property, or take mitigation measures.[55] In 1968, Congress changed this dynamic when it enacted the program. Flood insurance has proven to be a poorly executed, bad idea.[56] The problem starts with subsidization: "The program, by design, is not actuarially sound because Congress authorized subsidized insurance rates to be made available for policies covering some properties to encourage communities to join the program."[57] Premiums represent about 35% to 40% of the actuarial risk, resulting in a program that is not financially independent and that largely subsidizes actual risk.[58] This is not surprising as public insurance programs have tended to be ex ante disaster relief cloaked in insurance terms.[59]

The cost-benefit analysis is not encouraging. The government saves one dollar in ex post disaster relief for every three dollars of flood insurance claims paid.[60] Why sustain an ex ante insurance program when an ex post compensation plan is available? The government's answer is that through its risk management and mitigation efforts the program saves about one billion dollars in flood damage each year.[61] But this figure is misleading because it is unknown whether the projected losses would have occurred without the program. Losses are influenced by the existence of subsidized flood insurance; without it, economic forces and rational incentives would have driven out many owners of high risk properties. A true cost-benefit analysis can be done only if these factors are decoupled. Thus, some of the claimed "savings" must surely be costs in disguise.

Underwriting aside, the management of the program has been problematic. Only about 40 employees and 170 contractors the Federal Emergency Management Agency manage the entire flood insurance program.[62] The program has 4.6 million policyholders in about 20,000 communities, and it has paid about

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54 U.S. Gov't Accountability Office, *Federal Emergency Management Agency: Improvements Needed to Enhance Oversight and Management of the National Flood Insurance Program* 1 (2005).

55 *See* Adam F. Scales, *A Nation of Policyholders: Governmental and Market Failure in Flood Insurance*, 26 MISS. C. L. REV. 3 (2007) (discussing the failure of public and private flood insurance from the perspective of insurance law).

56 *See* Rhee, *Terrorism Risk*, *supra* note 19, at 492–93 & nn.288–90.

57 U.S. Gov't Accountability Office, *Federal Emergency Management Agency: Challenges Facing the National Flood Insurance Program* 5 (2005).

58 *Id.* at 4.

59 *See* Rhee, *Catastrophic Risk and Governance*, *supra* note 4, at 611 ("the flood insurance program is really a welfare distribution scheme cloaked in insurance terms"); Rhee, *Terrorism Risk*, *supra* note 19, at 493 (government insurance programs typically are wealth distribution schemes "under an insurance guise").

60 *Challenges Facing the NFIP*, *supra* note 57, at 2.

61 *Id.*

62 *Improvements Needed in NFIP*, *supra* note 54, at 15.

$14.6 billion in claims as of August 2005.[63] Hurricanes Katrina and Rita added another $15 to $25 billion in claims.[64] Obviously, the program is vast and the financials suggest that the entire program could constitute a major business component of a publicly traded insurance company. Absent substantially more resources, the program cannot be effectively managed. The agency outsources the day-to-day management responsibilities to the private sector. About 95% of in force policies are written by private insurance agents representing about 95 private insurance companies that issue policies and adjust claims.[65] These insurers, called "write-your-own companies," receive about a third of the premium income and remit the remainder to the government.[66] They also receive about 3.3% of the incurred losses as compensation for claims adjustment services.[67] Thus private insurers, which bear no underwritten risk, profit more from the program if they issue more policies and incur more losses. As one would expect, the program suffers from adverse selection problems. Repetitive loss properties, which account for only 1% of insured properties, comprise 25% to 30% of claims.[68] Repetitive loss is indicative of adverse selection, and the root cause is grounded in a policy requiring only high risk properties to obtain insurance.[69] FEMA is charged with assuring a minimum level of quality control in the program, but the oversight of private insurers has been problematic.[70] The agency's quality control methods have been found to lack "statistical validity," meaning that in conducting its insurance function the agency does not have the information needed "to have reasonable assurance that program objectives are being achieved."[71] Thus, the process of information acquisition and analysis—the most vital function of a well-run insurance company—is unreliable, suggesting that the government agency is a rather poor assessor of risk.

If the problem with government insurance is just a matter of wealth transfer, the issue is simply a policy question on the appropriate use of public funds. One can argue that public funds should be used precisely to protect people who have been subject to a tragedy. But the calculus is not so simple. By creating moral hazards and incentive, government programs may amplify risk. Consider this curious fact: although the mortality rate from natural catastrophes has been declining in the twentieth century, deaths from floods have actually increased in the latter half of the twentieth century.[72] Katrina is consistent with this deadly trend. The increased death toll coincides with substantial efforts by the

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63 *Id.* at 2.

64 U.S. Gov't Accountability Office, *Federal Emergency Management Agency: Oversight and Management of the National Flood Insurance Program* 2 (2005).

65 *Improvements Needed in NFIP*, *supra* note 54, at 13.

66 *Id.*

67 *Id.*

68 *Id.* at 6.

69 42 U.S.C. §§ 4012(b), 4012a(a), 4013(b)(2) (2000).

70 *See* GAO, Improvements Needed in NFIP, *supra* note 54, at 22.

71 *Id.* at 28.

72 *See* TED STEINBERG, ACTS OF GOD: THE UNNATURAL HISTORY OF NATURAL DISASTER IN AMERICA 73–74 (2000).

government to manage flood risk, which includes the NFIP and the New Orleans levee construction project. The suggestion is not that there is direct causation between increased deaths and government action, but putting more people in the path of floods, even when the risks are said to be mitigated, must be an influencing factor.[73] These dynamics have disparate effects along socioeconomic divisions. Because the poor have little economic choice in habitation, they bear the brunt of the costs associated with the destructive cycle of habitation, flooding and rehabitation.[74] The intended risk mitigation has not come to pass; quite the opposite, the government flood program has incentivized the habitation and building in hazardous areas, putting more lives and assets at risk and raising the cost of ex post disaster assistance.

Public Compensation. — Bad incentives are also created by ex post government compensation schemes. The problem of the "Samaritan's Dilemma" is well known.[75] When there is a history of public compensation in response to a catastrophe, the precedent sets rational expectation. This expectation changes behavior—people may assume more risk than they would ordinarily take, not purchase insurance, or otherwise not mitigate risks as they would if they had to internalize the loss. Consider the case of 9/11. The government provided substantial compensation to victims. Individual victims were not the only beneficiaries of public funds. Businesses, large and small, too received substantial financial assistance, including protection from tort liability. Collectively, these benefits have set expectations and influenced risk-taking behavior. This has been confirmed by a congressionally mandated report, which concluded that the purchase of terrorism insurance has remained low due in part to the expectation that the government would bail out hard hit businesses.[76]

In addition to the moral hazard problem, the provision and amount of government relief are difficult to predict. Government action is often subject to a mix of political motivations, public sentiment, and the perceived need for economic stabilization, which may or may not be accurate.[77] This is illustrated by

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[73] *Id.* at 97 ("[F]ederal flood insurance encouraged people to rebuild where they were destined to meet ruin again and again, a fact borne out by . . . repetitive claims.").

[74] *See id.* at 105 (stating that flood insurance has "subsidized the poor in a place where real estate capitalism had forced them to live—on the margins, in the cheapest, riskiest and most flood-prone land").

[75] James M. Buchanan, *The Samaritan's Dilemma*, ALTRUISM, MORALITY, AND ECONOMIC THEORY (Edmund S. Phelps ed., 1975). *See* Saul Levmore, *Coalitions and Quakes: Disaster Relief and Its Prevention*, 3 U. CHI. L. SCH. ROUNDTABLE 1, 20 (1996) ("As already suggested, individuals might purchase less insurance the more they expect widespread losses and then relief.").

[76] "Take-up [of terrorism insurance] could also be affected by expectations that the Federal government would provide Federal disaster assistance following a catastrophic CNBR event." *Report of the President's Working Group*, supra note 47, at 79 n.242, *citing* Rhee, *Terrorism Risk*, *supra* note 19.

[77] Levmore identifies several factors in the calculus of public compensation: a well organized interest group, geographic concentration of victims, general public's ability to identify with the victims, moral hazard considerations, and the level of insurance coverage. Levmore, *supra* note 75, at 3–8, 18.

a comparison of 9/11 and Katrina. In the case of 9/11 victims, the September 11th Victim Compensation Fund was established within a matter of days. The fund paid out on average $2.08 million per claim, and a total payout of about $5.13 billion.[78] The scale of this scheme is unprecedented. The Katrina victims, however, received no comparable benefit. The reason for the difference in treatment is a complex brew.[79] In the case of 9/11, there were viable tort actions against the airlines, and a political compromise to shield the industry may have motivated the creation of the fund. The terrorist attack was a war-like incursion into American soil, and patriotism and broad sympathy for the national sacrifice influenced the political decision. On the other hand, despite the gross negligence of the government in handling the crisis, Katrina was a natural event, and thus sympathy for the victims did not encompass the notion that the victims were sacrificed in the course of some larger struggle. No private industry is at systemic risk from tort liability, and tort recourse against the government would be extremely difficult. Lastly, the socioeconomic statuses of the victims are different. Many of the 9/11 victims worked in Wall Street, arguably the most important American industry, and were by in large in the upper stratum of American society. Katrina victims, on the other hand, were largely the poor, as is the case in most flooding deaths. The disparities in socioeconomic status and political clout and the resulting political action cannot be discounted. Thus, both 9/11 and Katrina killed thousands of victims, and yet the approaches to ex post compensation are markedly different.

Government compensation is problematic because politics is at its core. The perception of catastrophe is relative. For the victim, the scale and nature of the catastrophe matters not. For society, they matter in triggering the collective sense of sympathy and social obligation. For government, they matter for reasons of politics and economics. The shifting sands of public compensation raise the issue of arbitrariness and fairness. Why is compensation subject to the perception and sentiment of the collective whole? For victims, at least, there is not a satisfactory answer to this question other than it is the nature of the political process, which is not always rational or efficient.

Government compensation as a form of political action can be good or bad or both. It is difficult to be more precise than this generic, perhaps trite, statement for the assessment of the quality of the action is situational and each disaster may pose unique challenges. Furthermore, it is difficult to expect a purely principled approach to political action when its essence is one of collective compromise subject to the sometimes unpredictable interactions of various interest groups and conflicting principles. There is always the danger of unintended consequences, and relief cannot always be expected in times of crisis. In spite of these concerns, it is inappropriate to categorically reject ex post government action for the use of public funds is a vital component of compensation in times of national crisis. To

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[78] Dixon & Stern, *supra* note 3, at 25.

[79] *See* Anthony J. Sebok, *The Response to the Disaster In New Orleans: Will There Be a Compensation Program Similar to the 9/11 Victims' Fund?* (Sept. 5, 2005), found at http://writ.news.findlaw.com/sebok/20050905.html.

argue against this process is impractical and, one could argue, ignores the democratic process inherent in the distribution of wealth per public grace. Thus, there should always be a government option to intervene.

Participation and Disintermediation

An effective risk distribution scheme requires two predicates. First is broad participation, and the second is minimization of cost. With respect to the first predicate, the participation of private insurance and government suggests that the risk is widely distributed to shareholders and taxpayers. The insurance industry is large in absolute dollar value, constituting approximately 8% of the global GDP.[80] Nevertheless, the amount of capital supporting catastrophic loss is limited in comparison to the potential loss. A loss of $100 billion, for example, would greatly stress the entire system, and yet a single event surpassing such a benchmark is easily foreseeable.

Traditional insurance is not only limited in scale, but surprising limited in scope. In addition to the burden of catastrophic fortuitous risk, individuals and families also bear most longterm economic risks.[81] Economic risks such as devaluation of one's home and profession, major risks in daily life, are not insurable in the market today.[82] Fortuitous risk is only a small segment of the potential risk, and only a fraction of our wealth, those being interest in corporations, are commoditized and traded.[83] The participatory limitation of traditional insurance has prompted Robert Shiller to propose a radical reconfiguration of the financial and insurance markets wherein information markets are developed and new products quantify and package various economics risks to be traded and spread among a global risk pool. Although Shiller addressed only economic risks, the concern over the limitation of participation applies equally to catastrophic risk as well.

In contrast to the insurance market, the tax base is far broader in terms of participation. The scale and scope of participation is limited only by the tax base and public borrowing. Whenever there is public compensation, the public shares the financial burden of catastrophes. In this sense, the risk and cost are broadly distributed through the political mechanism, which is the default intermediary for the distribution of funds. As catastrophes become more frequent and severe, one would expect that private insurance, at least in its traditional form, would retreat and that government compensation, supported by broad political participation, would fill the void, absent some fundamental reconfiguration of the private insurance market or government's role in the management of catastrophic risk.

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80 Ulrike Birkmaier & Camille Codoni, Swiss Re, Sigma No. 3/2004, *World Insurance in 2003: Insurance Industry on the Road to Recovery*, 33 (2004) (insurance premium volume was about $3 trillion, constituting 8% of the global GDP, $470 per capita).

81 ROBERT J. SHILLER, THE NEW FINANCIAL ORDER: RISK IN THE 21ST CENTURY 7 (2003).

82 *Id.* at 4-5.

83 *Id.* at 8.

The second predicate requires that transaction cost be minimized. Cost has multiple facets. There is, of course, the cost of executing the risk transfer, which in the case the traditional insurance policy is the expense and profit of the insurer. Because capital is limited, the resulting risk premium often makes catastrophic insurance coverage expensive or economically infeasible. This is a cost of financing. Additionally, there is the cost incurred from the failure to mitigate or avoid risk. A major concern here is the problem of freeriders and the resulting expectation of bailout. A risk pool works well if all participants are susceptible to varying degree to the same risk; thus each participant agrees to underwrite the risk of others in consideration for the same. If, however, one is not susceptible to the same risk but made to pay, he subsidizes the cost of the risk. The freerider problem is apparent in the area of catastrophic risk. The most obvious risks of extreme catastrophes—earthquakes, hurricanes, and terrorism—are not evenly distributed or commonly shared. Large segments of the society are simply not exposed to one or more of these risks.[84] Thus, the Samaritan's Dilemma and government induced distortions in behavior towards risk mitigation and avoidance are problematic.

In the ideal world, private parties would contract to distribution risk among themselves, leaving the allocation of cost to the discipline of market pricing. In a smoothly operating market with adequate supply of capital, moral hazards are minimized and parties are properly incentivized to efficiently mitigate risk. This ideal is advanced if the number of participants in the private sector is increased, thus increasing capacity, and if the cost of transfer is reduced, thus allowing greater participation. Both the private market and the government can play vital roles in expanding the capital base that would allow more effective distribution of risk. Obviously the problem is complex and there are many plausible strategies. The discussion here is limited to alternative risk transfer, disintermediation of risk agency, and catastrophe tax policy.

As a result of the surge in catastrophes, the insurance and financial markets have developed alternatives to traditional risk management techniques as a way to expand insurance capacity and make the pricing of catastrophic risk more efficient. The alternative risk transfer (ART) market integrates the insurance and financial markets to provide capital markets based solutions.[85] The market allows capital market participants to directly participate in the underlying risk. The most significant ART product is insurance securitization, which is in essence a

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[84] It is a popular conception that terrorism can strike at any time, any place, but in actuality the risk to some is trivially small. The average Kansan need not fear terrorists so much as the negligent driver. Indeed, the belief that catastrophic terrorism is unpredictable, a popular mantra of many, is not really correct. In the past several decades, catastrophic terrorism has struck the airlines, London and New York. *See* Rhee, *Terrorism Risk*, *supra* note 19, at 470-71.

[85] *See generally* ERIK BANKS, ALTERNATIVE RISK TRANSFER: INTEGRATING RISK MANAGEMENT THROUGH INSURANCE, REINSURANCE AND THE CAPITAL MARKETS (2004). In addition to securitization, other products are contingent capital agreements and insurance derivatives. Contingent capital structures are contractual agreements to provide capital in the event of a loss event. Insurance derivatives are instruments that are linked to a fortuitous, catastrophic event. *Id.*

collateralized reinsurance obligation in the form of a structured note.[86] Instead of executing a standard treaty with a reinsurer, the insurer cedes all or a portion of the premium to a special purpose reinsurance vehicle (SPRV). The SPRV then issues a bond, which covers any liabilities from the reinsurance agreement. The bond proceeds are deposited into a collateral trust, and its assets serve as a guarantee for the SPRV's reinsurance obligation. The bond investor's return is measured as a spread over the risk-free rate, and ceded premium funds this spread. Thus, in an insurance securitization, the bond market becomes the reinsurer of the underlying risk.

There is growing interest in Cat bonds. The reasons are several: hardening prices in the reinsurance market; a demand for fully collateralized protection to minimize counterparty credit risk; growing interest by hedge funds devoted to alternative investments; the need for additional capital; and the need of institutional investors to diversify their portfolios. In an era of global warming and more volatile weather patterns, securitization may take a broader role in spreading risk. Thus far, however, Cat bonds constitute a fraction of the available capital.[87] Since their inception in the mid-1990s, they were slow to develop. The reinsurance market was in a soft price cycle for much of the 1990s and thus traditional reinsurance was cheaper than securitization. The cyclical nature of reinsurance alone does not explain the slow growth. The stunted growth is also attributable to regulatory problems: uncertainties of the accounting treatment of SPRVs and regulatory framework, a lack of a "pass through" tax treatment, and an underdeveloped information market on natural catastrophes that limit the size of the investment community.[88] These limitations have driven the Cat bond market offshore, where few regulatory burdens exist, favorable tax treatment is given, and a pool of sophisticated investors are willing to undertake catastrophe risk for superior returns. For insurance securitization to grow, these regulatory uncertainties and tax policy impediments must be removed.[89]

The thrust of the ART market is to expand the number of participants in the distribution of risk. By doing this, the market increases the supply of insurance. Securitization disintermediates the insurer and directly connects policyholder to capital provider.[90] No longer is the risk transfer from policyholder to insurer, but

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86 The transaction structure is similar to traditional securitization, but with some important differences. *See* Tamar Frankel & Joseph W. LaPlume, *Securitizing Insurance Risk*, 19 ANN. REV. BANKING L. 203, 205 (2000).

87 *See* U.S. Gen. Accounting Office, *Catastrophic Insurance Risks: Status of Efforts to Securitize Natural Catastrophe and Terrorism Risk* 14 (2003) ("[O]utstanding catastrophe bonds accounted for only 2.5% to 3.0% of worldwide catastrophe reinsurance coverage."); Rainer Helfenstein & Thomas Holzheu, Swiss Re, Sigma No.7/2006, *Securitization—New Opportunities for Insurers and Investors*, at 24 (2006) (total outstanding volume of Cat bonds is about $23 billion).

88 *See* Rhee, *Terrorism Risk*, *supra* note 19, at 500-05.

89 *See id.* at 511-22.

90 The disintermediation is not complete for insurers are still required to originate the policies and service them. Moreover, most bonds are underwritten on a nonindemnity basis, meaning that liability is triggered by an agreed index rather than the actual loss. Thus the primary

risk is directly transferred to capital providers. Importantly, the participants in the ART market, like insurance companies, are sophisticated institutions only. Cat bonds are privately placed, not publicly issued. The risk is perceived to be so exotic that only institutional investors have a sophistication to undertake it. Thus, the market is limited.

The concept of disintermediation in the private insurance market also raises the possibility of its application to the public sector. The government is the agent through which the public participates in catastrophic risk distribution. Like the way an insurer allocates the capital of its shareholders, the government allocates public funds. Unlike an insurer, however, it is a poor assessor of risk and its actions sometimes creates more costs than benefits. It is not subject to market forces, and has less incentive to develop information necessary to assess risk and to properly distribute it. Similar to the process of securitization, a scheme that disintermediates the government should be a part of the public debate. One can imagine a scheme that would allow individuals to invest capital directly in insurable assets within some form of a public framework.

Why does catastrophic risk distribution require the insurer or the government as intermediaries? The simple answer is that both are aggregators of capital. The insurance industry is justified by efficiently aggregating capital and thereby diversifying risk. This is consistent with the prevailing theory of the firm, which says that the firm reduces the transaction cost associated with conducting business.[91] The theory holds in virtually all complex enterprises. Where transaction costs can be reduced, the market has found ways to exploit efficiencies. The economic rationale of securitization is that it provides a lower cost of fund for the underlying transaction generating the securitized asset than a firm's cost of capital.[92] In other words, the bond investor requires less return on capital than the investor in the firm that would otherwise originate and hold the securitized asset. Thus, securitization exists because the aggregation of capital in the firm is less efficient than a direct transaction with capital providers.

Likewise, the government is the intermediary only because it is the default aggregator of public capital and thus has a monopoly on the distribution of public funds. Public insurance and compensation programs are costly to taxpayers and impose secondary costs arising from the distortions they impart on the market and individual behavior. The ideal public risk distribution scheme would entail not only broader participation, but also more direct participation in the risk pool. Direct participation would acquire more attributes of market transactions. Those exposed to catastrophic risk, which is to say a large segment of the population, pay a premium to transfer the risk to the pool, and thus the compensation scheme becomes more like private insurance and less like ex post public compensation.

What would public disintermediation look like? Some speculation is required, of course, since no such scheme exists. The following is one possible

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insurer and reinsurer may still be exposed to basis risk. *See* Rhee, *Terrorism Risk*, *supra* note 19, at 503.

91 *See* Ronald H. Coase, *The Nature of the Firm*, 4 ECONOMICA 386 (1937).

92 *See* Rhee, *Terrorism Risk*, *supra* note 19, at 497-98 & n.307.

structure. With the help of the insurance industry, insurable assets subject to catastrophic risk are aggregated into diversified pools of assets. As a simple example, consider a pool of residential homes or commercial real estate from different parts of the country. The important concept here is diversification of assets at risk so that no single event can inflict a highly correlative loss on a limited number of risk bearers. Reinsurance achieves some diversification, but the insurance industry would underwrite the assets with the view of transferring a substantial quantity of risk to a public bond market. Participating insurers and reinsurers, however, would be required to retain a portion of the risk to avoid moral hazard problems. Individual and institutional investors may invest in the bonds, similar to an investment in Treasury bonds, subject to limitations of investment amount and credit quality of the bonds for individuals. Even with broader participation on the demand side of capital, there may still be an insufficient supply of capital. There may still be a large spread between market price and actuarial risk. Any shortfall in yield to investors can be made up with public funds added as a "sweetener." These sweeteners can be in the form of a tax exemption or a direct contribution to investment return. Thus, a hybrid public-private risk market is created.

The power of the purse is the power to change behavior. If the above process results in more affordable insurance, it is possible to incentivize people to participate through the tax system. Thus far, there has not been a concerted effort to combine tax policy and catastrophe management into a scheme to distribute, manage and mitigate risk. The most basic tax policy is based on the principle that income is taxed, and not risk exposure. The tax system, however, can be used to collect revenue based on projected costs of compensation per region and recoupment of monies spent. The concern here is one of fairness and efficiency. The allocation of public funds to provide compensation such as flood insurance or losses from terrorism is disproportionate. A better matching of source and use of funds is not only fairer, but also reduces the problem of subsidization. The suggestion is not individualized assessment as is the case in taxation of individual income, but rather a more specific assessment that may be characterized by geography or risk profile.

Tax policy can also be used to provide credits to those who have sufficient insurance or penalties for those who do not. A more benign perspective is that tax policy can incentivize investment. The primary example that comes to mind is the mortgage interest deduction. Home ownership is deemed a good thing, and likewise protection of the home from fortuitous risk is a good investment. In this regard, there are two basic questions: Is there a sufficient supply of economically feasible insurance? If so, are those exposed to catastrophic risk adequately participating? Tax policy can affect the answers to both questions. If there is an adequate supply—a prerequisite for moving away from ad hoc compensation and towards true insurance—tax policy can be more than a means of collecting revenue based on income. The tax system can be an effective tool in promoting risk distributive behavior through a system of insurance credits and penalties.

The concept of disintermediation, both in the private market and public finance, has the potential to change the risk landscape. The private market has

been forced to innovate as a result of the trend towards more frequent and severe catastrophes and the stress placed on the traditional insurance system. These same forces are also placing a strain on the public compensation system. What would be the outcome if a category 5 hurricane hit Miami and a magnitude 8.0 earthquake hit San Francisco, resulting in economic losses of half a trillion dollars in the same year? How will the government handle such a calamity? One would expect massive infusion of public funds to pay victims and to rebuild the cities. This action would be appropriate and just, but if the vast majority of victims had been underinsured for flooding and earthquake one would surely question whether a more effective and just system could have delivered compensation. In the ideal world, those who are exposed to catastrophic risk ought to have paid into a risk pool an amount commensurate with the risk. This assumes that insurance was available and affordable, and the predicates are broad participation and reduced transaction cost. Such a reconfigured insurance system, based on a hybrid public-private infrastructure, would instill the proper incentives and avoid the freerider and expectation problems. Thus, the question of fairness and efficiency in public compensation and private insurance are inextricably linked.

Conclusion

One would be hardly alone in predicting that catastrophes in the future will be more frequent and severe. With the experience of the 1990s and the first decade of the new century, the insurance industry has already accepted this premise as an operating condition. Increasing volatility of human and economic losses will continue to strain the current compensation schemes. A more effective participation in a risk society is needed. Two important conditions are the need to increase the pool of participants and to decrease the cost of participation. The financial and insurance markets have adapted to rapid changes in the risk landscape and have invented alternative risk transfer techniques to deal with the special problems. These techniques are relatively new, but growing. Regulations and tax policies can be reformed to further facilitate the growth.

The government's role in catastrophe management should not stop there. Policy should work from the principle that distortions in incentives should be limited. This calls for a reexamination of the approaches to ex ante and ex post compensation. In the longterm, the government can explore ways to facilitate a disintermediation of the insurer and the government. The suggestion is not that they are or should be made superfluous. Far from it, they are vital to the overall scheme of risk mitigation and distribution. Rather, the suggestion is the modest proposition that every member of society can and should be an active participant in a risk pool, and that more direct participation would reduce the cost of risk transfer. This is the promise of disintermediation. In the private market, it has been realized by the tremendous growth of the asset securitization market, of which the growing market for insurance securitization is just a tiny fraction. In the arena of public finance, the government still remains the default aggregator of capital. The goal, then, is to construct a scheme that allows these market-based transactions to occur within the framework of insurance and government.