

INSURANCE: CATASTROPHIC LOSS

Robert J. Rhee
Associate Professor of Law
University of Maryland School of Law

Catastrophe does not lend itself to a simple definition. The dictionary definition is an extraordinary event marked by tragedy or great loss. From a risk management perspective, catastrophe is a low frequency, high severity event. From an insurance perspective, it is an event that exceeds a threshold minimum loss (currently an event that causes \$25 million or more in insured losses and affects a significant number of policyholders). Beyond these broad descriptions, catastrophic risk is difficult to generalize.

Although catastrophe connotes an extraordinary event, most catastrophes are localized tears in the socioeconomic fabric. A disaster in one part of the country or world may be extraordinary in terms of economic loss or loss of lives, and may attract broad attention and sympathy, but most catastrophes are regional. Yet some catastrophes are not only extraordinary, connoting just an infrequent event, but also extreme in the nature of the loss. They are so severe that the exogenous shock of the event ripples throughout the broader society. The terrorist attack of September 11, 2001, was an extreme catastrophe, resulting in a large loss of life coupled with an adverse impact on the national economy, and it established a new paradigm of terrorism risk. These kinds of extreme catastrophes present special economic and political problems.

The past several decades have been an extraordinary time period in the history of extreme catastrophes. Although large natural catastrophes have always plagued human history, the recent times have seen rapid increases in both frequency and severity of natural and manmade catastrophes. The following are extraordinary recent catastrophes: Hurricane Andrew (1992), the Northridge earthquake (1994), the Kobe earthquake (1995), the September 11 terrorist attack (2001), the South Asia tsunami (2004), and Hurricane Katrina (2005). With the possible exception of the South Asia tsunami, each event caused tens of billions of dollars in property loss. September 11 and Hurricane Katrina inflicted casualties into the thousands, and the South Asia tsunami was the deadliest natural catastrophe in confirmed history. In terms of insurance, the South Asia tsunami and the Kobe earthquake were less severe than the magnitude of the events would suggest because insurance penetration was low in these regions, while Hurricane Andrew, September 11 and Hurricane Katrina were each unprecedented in terms of insurance losses. Interestingly, the catastrophes of the new century—September 11, the South Asia tsunami and Hurricane Katrina—are arguably one in one hundred year events, and perhaps they are a harbinger of a new era of extreme catastrophic events.

Economically, losses from a catastrophe can be both direct and indirect. Direct loss is fairly obvious, the losses most proximately caused by the catastrophic event, typically being losses associated with property, casualty, liability, business interruption, and injury. A catastrophe can, and usually does,

inflict indirect economic losses, and often these losses are greater than the direct losses. For example, a one billion dollar loss in a city from a natural catastrophe would be a severe blow to the region, but in all likelihood the national economy will be minimally affected. Yet the indirect harm from a terrorist attack against a national retailer, resulting in a modest one million dollar direct loss during Christmas shopping season could be devastating to the national economy. One of the key lessons of September 11 is that a loss of security can have an economic ripple effect beyond the immediate vicinity of the harm.

Before September 11, the worst manmade disasters had been industrial accidents, events that achieved iconic stature, e.g., Bhopal, the Exxon Valdez and Chernobyl. These accidents raised the public conscience on industrial safety, environmental protection, and nuclear risk. Chernobyl and Three Mile Island showed that industrial accidents could be catastrophic in both lost lives and potential economic fallout. Short of some spectacular event, however, it is difficult to imagine a manmade accident on a scale large enough to impart an exogenous shock on society and economy. Industrial accidents have thus far resulted in substantial liability for misfeasors, but they had no adverse economic impact on the greater society. Nevertheless, manmade accidental catastrophes lurk. Like a virus, risk is parasitic to human development, e.g., development of coastlines along storm paths, invention of technology like genetically modified foods, and concentration of economic resources in mega-cities.

Aside from accidents, manmade intentional catastrophes can easily match or exceed natural disasters. September 11 stands apart as the only manmade disaster that has had a deep, albeit temporary, impact on the economy. Until Hurricane Katrina, September 11 was the largest insurance loss arising from a single event. The severity of the loss triggered a paradigm shift in thinking about terrorism. Previously, terrorism was considered discrete, low intensity violence, the classic case being the killing of Israeli athletes during the 1972 Munich Olympic Games. Since then, terrorism has metastasized into acts intended to yield catastrophic loss of life and economic damage. September 11 showed that, even with the use of low technology weapons and methods, terrorists could inflict mega-catastrophes. The possibility of more technically advanced attacks using nuclear, biological, and chemical weapons, once the stuff of fiction, is now real, and such an attack could eclipse the losses from September 11 by many folds. The worst case scenario is the detonation of a nuclear bomb in a large urban area.

There are many variables of catastrophic risk. The combinations of source, frequency, severity, manageability, predictability, and dependent variables are as unique as fingerprints. Past experiences have ranged in scale from localized events to mega-catastrophes. Risks must not only be identified, but they must also be assessed for the purpose of prioritization. Assessment is shaped by empirical data and judgment. Perceptions of risk play a vital role. Faulty perceptions have led to failed assessments, and such failures have plagued many endeavors. September 11 is now the classic example of a spectacular failure by both the government and the private market to image an event that in hindsight should have been imaginable. Thus, we must understand that bounded rationality colors our perception of risk and prioritization.

References and Further Reading

Banks, Erik, *Catastrophic Risk: Analysis and Management*, West Sussex, England: John Wiley & Sons, Ltd, 2005.

Daniels, Ronald J., Kettl, Donald F. and Kunreuther, Howard (editors), *On Risk and Disaster: Lessons from Hurricane Katrina*, University of Pennsylvania Press, 2006.

Posner, Richard A., *Catastrophe: Risk and Response*, New York: Oxford University Press, 2004.

Rhee, Robert J., "Catastrophic Risks and Governance after Hurricane Katrina: A Postscript to *Terrorism Risk in a Post-9/11 Economy*," *Arizona State Law Journal*, vol. 38, no. 2 (Summer 2006): 581-615.

Rhee, Robert J., "Terrorism Risk in a Post-9/11 Economy: The Convergence of Capital Markets, Insurance and Government Action," *Arizona State Law Journal*, vol. 37, no. 2, (Summer 2005): 435-533.

INSURANCE: ALTERNATIVE RISK TRANSFER

Robert J. Rhee

Associate Professor of Law

University of Maryland School of Law

Disasters have inflicted catastrophic losses throughout the history of humankind. Traditional risk management techniques involve loss control, risk reduction, and loss financing through the insurance mechanism. Insurance is a critical risk management tool. It serves an important role in the economy because it spreads the risk of fortuitous events. It works best when fortuitous events are characterized by high frequency of occurrence and low severity of loss. High frequency allows predictable aggregate modeling. Low severity limits the portfolio risk, and thus reduces the insurer's cost of capital. Insurance becomes problematic in the area of catastrophic loss because catastrophes are low frequency, high severity events. As a result, premium pricing must incorporate a substantial risk premium, making insurance expensive and perhaps economically infeasible.

From the mid-1980s to present, we have experienced a destructive surge in catastrophic events. The 1990s saw the two most devastating natural catastrophes in terms of insurance losses. Hurricane Andrew and the Northridge earthquake created significant disruptions in the insurance market, sparking innovations in the private market. These disasters were harbingers of greater calamities of the twenty-first century. The terrorist attack of September 11 eclipsed all catastrophes, manmade and natural, in terms of insurance losses, and subsequently Hurricane Katrina exceeded the losses of September 11. Extreme catastrophic events like these pose unique challenges in risk management.

In response to the major disasters of the past several decades, the insurance and financial markets have developed alternatives to traditional risk management techniques and insurance 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 alternative risk management techniques and products. The ART market expands the supply of capital that supports catastrophic risk. Under traditional insurance, the capital base constitutes the capitalization of insurers and reinsurers, the ultimate risk-bearers being the shareholders of these companies, and the level of capital determines the amount of risk the insurance industry can underwrite. The ART market expands this capital base by directly bringing in capital market participants to underwrite risk. While the ART market has invented a number of nontraditional insurance products, the capital market based products are primarily contingent capital structures, insurance derivatives, and securitizations.

Contingent capital structures are contractual agreements to provide capital in the event of a loss event. Unlike traditional insurance, this agreement does not provide for a transfer of a loss, but instead provides for capital infusion upon the occurrence of a loss. This structure typically supplements other risk management products like traditional insurance. In the event of loss, a company or policyholder may face financial problems in addition to the fortuitous loss. For example, the

loss of capital may be difficult to replace at feasible pricing, or the company or policyholder may face a liquidity crisis. Contingent capital mitigates these risks by providing capital at prearranged, pre-loss event cost of capital. The contingent capital structure can arrange for debt or equity infusion. If debt, the arrangement can be credit facility, a contingent surplus note, a contingent loan, or a financial guarantee. If equity, the arrangement can be a loss equity put where new shares are issued upon a predefined trigger, or a put protected equity where a company or policyholder buys a put on its own stock that generates an economic gain upon a decline in the stock value after a catastrophe.

Insurance derivatives are instruments that are linked to a fortuitous, catastrophic event. A derivative is a financial contract that derives its value from some other thing, typically the value of an asset like a stock or an index or market reference. In simplest terms, a derivative is a bet on the occurrence or nonoccurrence of a future event. In an insurance derivative, that reference is a prearranged loss event, whether it is defined as a parametric event, a loss limit, or some other index or measurement. Typical instruments are futures, forwards, options, and swaps. Insurance derivatives can be exchange traded or over-the-counter. The application of derivatives is broad. They can be tailored to the specific risk transfer needs of the parties. For example, derivatives can be structured around temperature, precipitation, stream flow and wind.

Lastly, perhaps the most significant ART product is insurance securitization. The financial technique of securitization was developed in the 1970s to securitize asset classes such as mortgages and credit card receivables. The basic idea is to convert an asset that is on an issuer's balance sheet into a bond obligation. By doing this, the issuer sells the right to the receivable to the capital market, and thus in effect the capital market participants directly fund the activity giving rise to the receivable. In response to the catastrophes of the 1990s, the ART market applied this securitization technique to create catastrophe bonds, which securitize catastrophic risk. An insurance securitization is in essence a structured note providing for a collateralized reinsurance obligation. Instead of executing a standard treaty with a reinsurer, the originator of the premium (the insurer) cedes all or a portion of the premium to a special purpose reinsurance vehicle ("SPRV"). Due to regulatory and tax restrictions in the United States, SPRVs are typically established offshore in the Cayman Islands or Bermuda. The SPRV covers any liabilities from the reinsurance agreement by issuing a bond. The proceeds from the bond issue are deposited into a collateral trust, and its assets serve as a guarantee for any reinsurance obligation of the SPRV. The trust invests the assets in fixed income products via an interest rate swap that provides a rate of return fixed to LIBOR in exchange for the floating return of the trust assets. The investor's return is measured as a spread over LIBOR, and funding for the spread is provided by the ceded premium. Thus, in an insurance securitization, the bond market in effect becomes the reinsurer of the underlying catastrophic risk.

As catastrophes become more frequent and severe, they will continue to stress the traditional insurance system. In response, the ART market will continue to provide innovative products that will augment the risk transferring capabilities of the insurance and capital markets. Thus far, ART transactions are typically

limited to highly sophisticated parties, those with special risks and those who are willing to bear that risk in a structured transaction. Non-institutional parties, such as individual shareholders, can only participate in the bearing of catastrophic risk through the purchase of stock in insurers and reinsurers. Perhaps some day, the ART market may be able to provide a conduit for the participation of individuals as well as institutional risk-bearers.

References and Further Reading

Banks, Erik, *Alternative Risk Transfer: Integrated Risk Management through Insurance, Reinsurance, and the Capital Markets*, West Sussex, England: John Wiley & Sons, Ltd, 2004.

Briys, Eric and de Varenne, François, *Insurance from Underwriting to Derivatives: Asset Liability Management in Insurance Companies*, West Sussex, England: John Wiley & Sons, Ltd, 2001.

Froot, Kenneth A. (editor), *The Financing of Catastrophic Risk*, University of Chicago Press, Chicago, 1999.

Rhee, Robert J., "Terrorism Risk in a Post-9/11 Economy: The Convergence of Capital Markets, Insurance and Government Action," *Arizona State Law Journal*, vol. 37, no. 2, (Summer 2005): 435-533.

INSURANCE: TERRORISM RISK INSURANCE ACT OF 2002

Robert J. Rhee
Associate Professor of Law
University of Maryland School of Law

The unprecedented terrorist attack of September 11 caused substantial short-term economic damage on a national level. Many industries, such as hotels and airlines, were deeply affected, but the impact on the insurance industry was unique. As early as the Irish Republican Army bombing of London on April 21, 1992, a terrorist attack that caused \$671 million in insurance losses, the insurance industry was aware of the risk of catastrophic terrorism. Nevertheless, the risk was considered so small, most insurers did not exclude it or charge special premium. September 11 shattered the old insurance paradigm. It represented, at the time, the largest insurance loss from a single event in the history of insurance. Subsequently, the insurance market was perceived to be unstable in the short-term. The insurance industry quickly sought to exclude terrorism risk and, if available at all, coverage was provided at high premiums. These disturbances in the insurance market caused short-term price and capacity dislocations, adverse selection of risk, concentrated risk, credit and liquidity problems, economic slowdown, and job losses particularly in the real estate and construction sectors. The perception was that a lack of terrorism risk coverage or coverage at exorbitant prices would further disrupt the economy.

On November 26, 2002, the Terrorism Risk Insurance Act of 2002 (“TRIA”) was signed into law. Under Section 103 of TRIA, insurers must offer terrorism coverage that “does not differ materially from the terms, amounts, and other coverage limitations applicable to losses arising from events other than acts of terrorism,” though the purchase of coverage by policyholders is still voluntary. In exchange, the statute establishes a federal backstop for extreme loss arising from certified acts of terrorism. It is loosely based on Pool Re, a British insurance scheme that provides reinsurance coverage for terrorism risk. It implements a federal reinsurance program for commercial property and casualty line of insurance. By capping liability from extreme catastrophe, the federal government acts as the reinsurer to insurers and policyholders. This is a form of federal subsidy in that the government assumes extreme risk, which would have otherwise been privately apportioned between insurer and policyholder in an economically rational manner. The government enacted TRIA for two purposes: to address “market disruptions and ensure the continued 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.”

Under Section 102 of TRIA, coverage begins when the Secretary of Treasury certifies a loss caused by an “act of terrorism,” defined as an act that is dangerous to human life, property, or infrastructure, that has resulted in damage in the United States, and that was committed to coerce the civilian population of the United States or to influence the policy or affect the conduct of the United States

Government by coercion. The statutory definition of terrorism excludes acts of domestic terrorism, acts of war, acts not on American soil, and acts that do not exceed \$5 million of losses in the aggregate.

The statute creates a cost sharing program. In the event of a certified act of terrorism, insurers retain a loss deductible of 7%, 10%, and 15% of their direct earned premiums in program years 2003, 2004, and 2005, respectively. Above this deductible, the federal government bears 90% of the insured loss up to a maximum loss of \$100 billion per year while insurers bear the remaining 10% and any excess losses above the \$100 billion per year cap. Given that these years passed without a certified act of terrorism, these loss deductible rates are no longer applicable, but instead have been replaced with new deductible rates. Moreover, the statute sets the insurance industry aggregate retention rates at the lesser of \$10 million, \$12.5 million, and \$15 million in program years 2003, 2004 and 2005, or the aggregate amount of industry losses.

The statute provides a formula for a mandatory recoupment of federal share. For example, the mandatory recoupment for program year 2005 is the difference between the lesser of \$15 million and the aggregate amount of insurance industry losses, and the aggregate amount of insurance industry losses not compensated by the federal government. If the latter is greater, there is no mandatory recoupment. The statute provides for mandatory surcharges to recoup the mandatory recoupment. Moreover, to the extent that the federal assistance exceeds the mandatory recoupment amount, the government may recoup additional amounts through terrorism loss risk-spreading premiums. Given that the program years 2003, 2004 and 2005 passed without a certified act of terrorism, the deductibles and aggregate retention levels no longer apply.

The federal cost-sharing program was envisioned as a temporary market stabilization measure and had a sunset date of December 31, 2005. Before sunset, however, the Terrorism Risk Insurance Extension Act of 2005 was signed into law. The statute extends TRIA for two years, the calendar years 2006 and 2007, and materially modified some terms. Among other things, it changed the insurer loss deductible to 17.5% and 20% for these extension years; it changed the federal government share of losses in excess of the deductible to 85% of the insured loss in program year 2007; it changed the aggregate retention rates as the lesser of \$25 million and \$27.5 million for the program years 2006 and 2007, or the aggregate amount of industry losses for that year; and it changed the program trigger to \$50 million and \$100 million of aggregate industry insurance losses resulting from a certified terrorism act for program years 2006 and 2007.

In addition to these changes, the statute required the White House to create the President's Working Group on Financial Markets, which is charged with analyzing the long-term availability and affordability of insurance for terrorism risk. In September 2006, the working group, consisting of the federal agencies that regulate the financial markets (the Treasury Department, the Federal Reserve, the Securities and Exchange Commission, and the Commodity Future Trading Commission), issued the congressionally mandated report. The working group found that the availability and affordability of terrorism insurance has improved significantly since September 11; that the insurance industry has made great

strides in managing the catastrophic risk; and that the overall health of the industry has improved significantly. These findings call into question whether TRIA will continue to exist as a temporary program that ossifies into a permanent form of government cost-sharing program, or whether the statute will finally sunset at the end of 2007 per the original intent of providing protection for only a “transitional period for the private markets to stabilize.”

References and Further Reading

Joint Report of U.S. Department of Treasury, Board of Governors of the Federal Reserve System, Securities and Exchange Commission, and Commodity Future Trading Commission, *Terrorism Risk Insurance: Report of the President's Working Group on Financial Markets* (September 2006).

Rhee, Robert J., “Catastrophic Risks and Governance after Hurricane Katrina: A Postscript to *Terrorism Risk in a Post-9/11 Economy*,” *Arizona State Law Journal*, vol. 38, no. 2, (Summer 2006): 581-615.

Rhee, Robert J., “Terrorism Risk in a Post-9/11 Economy: The Convergence of Capital Markets, Insurance and Government Action,” *Arizona State Law Journal*, vol. 37, no. 2, (Summer 2005): 435-533.