Managing and Financing Extreme Events

A Research Project of the Wharton Risk Management and Decision Processes Center

With several trillion dollars of insured value in U.S. coastal areas, the recent upsurge in hurricanes poses a threat to homeowners and businesses, and a challenge to our nation as to how best to reduce the risk from future disasters and to provide funds for recovery to victims.

The Center’s initiative, Managing Large-Scale Risks in a New Era of Catastrophes, was launched in 2005, several months after Hurricane Katrina made landfall. Focusing on mitigating the hurricane risk and flood hazard and on providing protection to homeowners, this initiative brings together as partners leading companies and trade associations in the insurance, reinsurance, banking and defense industries. The project team has also been in close contact with organizations in the private and public sectors in developing innovative strategies for managing future catastrophic risks. The resulting comprehensive 430-page report provides a series of in-depth analyses of the efficiency and equity of current disaster insurance and mitigation programs in the U.S., the impact of state-based regulations on insurance protection and the loss distributions among different stakeholders.

Managing Large-Scale Risks in a New Era of Catastrophes has been distributed to nearly 400 recipients in the U.S. and internationally, reaching domestic policy and business leaders; insurance/reinsurance/Regulators/rating industries; U.S. government organizations and NGOs; and international leadership organizations. Results of the study have been presented at symposiums, conferences and workshops in the U.S. and worldwide including meetings with representatives from the White House and the U.S. Department of Homeland Security, both at the Wharton School and in Washington DC.

The report, under the title At War with the Weather (MIT Press, 2009), incorporates data updated through 2008.

Strategies for reducing losses from future natural disasters and aiding the recovery process have been addressed in several papers by the Risk Center: “Reducing Losses from Catastrophic Risks Through Long-Term Insurance and Mitigation,” Social Research (2008), examines the role that insurance and mitigation can play in reducing losses from natural disasters. “Toward A New Risk Architecture: The Question of Catastrophe Risk Calculus” in Social Research (2008) highlights the key features of more effective strategies for dealing with global interdependent risks.

These initiatives are also represented in the Risk Center’s collaborations with the Organization for Economic Cooperation and Development (OECD), the World Bank, and the World Economic Forum.
Extreme Events Project Sponsors, 2008

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Selected Publications

Enhancing Implementation of Mitigation Measures

Reducing Losses from Catastrophic Risks Through Long-term Insurance and Mitigation
Howard Kunreuther
Social Research Vol. 75, No. 3

This paper examines the role that insurance and mitigation can play in reducing losses from natural disasters using data collected as part of a large-scale study on catastrophic risk jointly undertaken by the Wharton Risk Management Center in conjunction with Georgia State University and the Insurance Information Institute.

The paper graphically demonstrates why disaster losses have increased in the past twenty-five years and the magnitude of the problem today. It then shows how mitigation measures can reduce future losses using data on residential homes from four states facing severe risks from hurricanes. Insurance premiums can be used to incentivize homeowners to invest in protective measures if disaster coverage programs adhere to a set of guiding principles.

Long Term Insurance (LTI) for Addressing Catastrophe Risk
Dwight Jaffee, Howard Kunreuther, and Erwann Michel-Kerjan
National Bureau of Economic Research (NBER) #w14210 August 2008

This paper proposes long-term insurance (LTI) as an alternative to the standard annual homeowners policy using lessons from the mortgage market as a benchmark. LTI has the potential to significantly increase social welfare by reducing insurers’ administrative costs, lowering search costs and uncertainty for consumers and providing incentives for long-term investment in mitigation measures to protect property. A two-period model illustrates situations that would make a long-term contract attractive to both insurers and consumers undercompetitive market conditions.

Towards a New Risk Architecture:
The Question of Catastrophe Risk Calculus
Erwann Michel-Kerjan
Social Research Vol. 75, No. 3

In many ways, the catastrophe risk management field is at a crossroads today, as we are faced with disasters on a totally new nature and scale. Not very long ago, disasters were considered to be low probability events because they did not occur often.

But in the first few years of the 21st century, the world has faced a string of catastrophes of a totally new dimension: the September 11, 2001 (9/11) terrorist attacks; a major blackout in August 2003 that deprived electricity to over 50 million North Americans in just a few seconds; and seven hurricanes that hit the U.S. within a 15 month period, to name a few just in the United States. And catastrophes are often even more destructive when they occur in poor or even developing countries; the Indian Ocean tsunami in December 2004, or the major earthquake in the Sichuan province in China in May 2008 killed nearly 50,000, just a few weeks after a major cyclone killed over 100,000 in Myanmar.

In fact, there has not been a 6-month period in the past few years without a major crisis that simultaneously affected several countries or industry sectors.

Are these events somehow related in the sense that they define a new pattern? If so, isn’t there a need for a new risk management architecture?
Interdependent Security

Self-Protection and Insurance with Interdependencies
Alexander Muermann and Howard Kunreuther
Journal of Risk and Uncertainty
2008 36:103-123

What is the optimal investment in self-protection of insured individuals when they face interdependencies in the form of potential contamination from others? If individuals cannot coordinate their actions, then the positive externality of investing in self-protection implies that, in equilibrium, individuals underinvest in self-protection. Limiting insurance coverage through deductibles or selling “at-fault” insurance can partially internalize this externality and thereby improve individual and social welfare.

The Weakest Link: Risk Management Strategies for Dealing with Interdependencies
Howard Kunreuther
in The Network Challenge: New Competencies and Strategies for an Interlinked World

Networks increase interdependencies and this creates challenges for managing risks. This is especially apparent in areas such as security and enterprise risk management where the actions of a single player in an interconnected network can wreak havoc on everyone in the network. The network, in this case, is only as strong as its weakest link. There are related problems in encouraging investments for prevention and protection, since the expected payoffs from such measures by one player are affected by the actions of other players in the network. This paper examines the challenges of interdependent security (IDS) and strategies for addressing these, including coordination with broader networks such as industry organizations and government.

Joint Initiatives with International Organizations

Understanding Behavioral Biases of Decisions Makers
Global Risk Report 2009
Howard Kunreuther and Erwann O. Michel-Kerjan

Many decision makers do not undertake protective measures prior to a disaster even though they knew beforehand that they were exposed to a serious risk. Property owners residing in hazard-prone areas often do not invest in cost-effective loss reduction measures. Directors of investment banks and financial institutions ignore worst case scenarios regarding the potential declines in housing prices or drops in the exchange rate of a foreign currency. Governmental agencies often do not invest in infrastructure or enforce regulations designed to reduce the likelihood and consequences of catastrophic accidents and disasters. It is only after the event occurs that affected parties take action.

Reducing the Impact of Natural Disasters: The Insurance and Mitigation Challenge
Organization for Economic Cooperation and Development (OECD)
Howard Kunreuther and Erwann O. Michel-Kerjan

This chapter focuses on the recent new scale in destruction due to natural disasters and its impact on disaster insurance. It discusses cost-benefit analysis in the context of mitigation and analyses in more details cost-effective mitigation measures for reducing the consequences of specific types of catastrophes (wind, flood, and earthquake). It also discusses whether mitigation plays an important role or not in several insurance programs to cover against extreme events. The decision process dimension is also scrutinized by focusing on why people do not invest in mitigation the way they should. It also suggests ways to develop innovative mitigation strategies to effectively reduce in a sustainable fashion the potential economic and human losses of large-scale disasters, providing conclusions and suggestions for future research.
Natural Disasters

Aid, Catastrophes and the Samaritan's Dilemma
Paul A. Raschky and Manijeh Schwindt
April 15, 2008
Risk Center Working Paper # 2008-04-15

This paper discusses the impact of expected foreign aid in case of catastrophic events on the level of mitigative activities in aid-receiving countries. The theoretical model shows that the anticipation of foreign aid partly crowds out preventive collective action. The crowding-out effect can result in both a lower probability of surviving a disaster and an increase in an event's proportion. In order to test the theoretical propositions we analyse the effect of foreign aid dependence on a) ex ante risk-management activity proxied by the death toll from 317 major earthquakes occurring worldwide between 1980 and 2002 and b) the likelihood of cholera epidemics between 1980 and 2001. Our estimates suggest that foreign aid in previous years is crowding out ex-ante risk management activities in recipient countries. The paper concludes with propositions on the deployment of foreign aid.

Analyzing Risk Response Dynamics on the Web: the Case of Hurricane Katrina
Ka Lok Lee, Robert J. Meyer, Eric T. Bradlow
December 2008
Risk Center Working Paper # 2008-09-15

Using a unique dataset that documented the hourly web-surfing behavior of over 140,000 Internet users in five southeastern states in August of 2005, we explore the dynamics of information gathering as Hurricane Katrina developed and then hit South Florida and the Northern Gulf Coast. Using both elementary statistical methods and advanced techniques from functional data analysis, we examine both how storm events (such as the posting of warnings) affected traffic to weather-related web sites, and how this traffic varied across locations and by characteristics of the web user.

Climate Change

Climate Science, Insurance and Anticipating Disaster
Antonio Busalacchi, Steven Halperin, Howard Kunreuther, Erwann Michel-Kerjan, Richard Thomas
November 2008

How will climate change affect the frequency, severity and location of future disasters? At present, we lack the tools to answer that question in ways that will be helpful to the insurance industry. But one thing is certain: If insurers cannot quantify climate-related risks in even approximate terms, they will eventually be unable to provide coverage at any price, leaving tens of trillions of dollars in assets unprotected. Today there is no comprehensive, science-based initiative underway to provide the kind of multi-year forecasts that could reduce uncertainty and enable insurers to price risk rationally. Nor is there an adequate nationwide effort to adapt climate research and information to the practical needs of government policymakers and regulators or to decision-makers in the private sector.

Economics of Climate Change
Geoffrey Heal
Bottom Line, 2008

Should the U.S. join the Kyoto Protocol, or at least play a positive role in the search for a successor? Or is this too costly, or otherwise “fatally flawed,” as our President has suggested?

Humanity as a whole needs to address climate change: it has the potential to alter the world around us dramatically and for the worse. Preventing or at least minimizing climate change will not be cheap, but it will still be a good buy.
Insurance Purchasing Behavior

Come Rain or Shine: Evidence on Flood Insurance Purchases in Florida
Erwann Michel-Kerjan and Carolyn Kousky
February 29, 2008
Risk Center Working Paper # 2008-02-29

This paper provides a detailed analysis of the 40-year old public-private flood insurance market in the U.S. It studies the individual choices of all of those who purchased such coverage in Florida between 2000 and 2005: (1) What are the buyers’ characteristics? (2) What contracts (deductible, limit) do they purchase? (3) Where and when are claims paid? (4) How much does flood insurance cost Floridians, and what changed after the four hurricanes that hit Florida in 2004? This examination covers 7.5 million flood insurance policies, the largest policy-level sample ever studied.

Looking at Optimal Risk-Sharing in a Kaleidoscope: The (Market Power, Information) Rotational Symmetry
Dominique Henriet and Erwann Michel-Kerjan,
January 21, 2008
Risk Center Working Paper #2008-01-21

Recent empirical analyses of insurance markets have raised a puzzle: while some markets confirm theoretical predictions of adverse selection, others reveal advantageous selection (low risks are better covered than high risks).

This paper presents an innovative way to study this puzzle by comparing four symmetrical cases of risk-sharing between two risk-averse parties.

We find that the optimal risk-sharing at the equilibrium in these four cases mirror each other—thus the kaleidoscope reference.

Group Decision Making

Group Cooperation under Uncertainty
Mín Gong, Jonathan Baron and Howard Kunreuther
November 2008

Previous research has shown an ‘interindividual-intergroup discontinuity effect’: intergroup interactions generally lead to less cooperative outcomes than interindividual interactions. We replicated the discontinuity effect in the deterministic prisoner’s dilemma, but we found that groups were more cooperative than individuals in a stochastic version of the game. Three major factors, greed, fear, and persuasion power that underlie the usual discontinuity effect, were reduced in the stochastic environment. Two group mechanisms were responsible for the reversed discontinuity effect: the motivation to avoid guilt and blame when making decisions that affect other’s welfare, and the social pressure to conform to certain norms when one is in a group setting.

Fairness, Feelings, and Ethical Decision-Making: Consequences of Violating Community Standards of Fairness
Maurice E. Schweitzer and Donald E. Gibson

This article describes the influence of violations of community standards of fairness on subsequent ethical decision-making and emotions. Across two studies, we manipulated explanations for a common action, and we find that explanations that violate community standards of fairness (e.g., by taking advantage of an increase in market power) lead to greater intentions to behave unethically than explanations that are consistent with community standards of fairness (e.g., by passing along a price increase). We find that perceptions of justifiability mediate this relationship. We also find that individuals derive significant psychological benefits (greater satisfaction, greater happiness, and reduced anger) from engaging in unethical behavior following perceived violations of fairness.
Other Publications – 2008

BOOKS AND MONOGRAPHS

At War with the Weather: Managing Large-Scale Risks in a New Era of Catastrophes

FOR THE MEDIA

Anticipating risks, averting the worst.
Howard Kunreuther and Mike Useem
The Philadelphia Inquirer, December 16, 2008

How disasters help
Boston Globe, July 6, 2008

Boaters, Lend a Hand in Name of National Security
Stephen E. Flynn
Newsday, June 18, 2008

Clearing the Air: How Companies Operate in a Climate-Conscious Era
Paul Kleindorfer, Eric Orts, Howard Kunreuther
Knowledge@Wharton, June 11, 2008

'No Place to Hide': The Pressure on Companies to Address Global Warming Heats Up
Paul Kleindorfer and Eric Orts
Knowledge@Wharton, April 30, 2008

America the Resilient: Defying Terrorism and Mitigating Natural Disasters
Stephen E. Flynn
Foreign Affairs, Volume 87 No. 2, March 4, 2008

Winning by a Landslide
Newsweek, February 29, 2008

Flirting With Disaster
Howard Kunreuther
Forbes, February 11, 2008

PUBLISHED PAPERS AND BOOK CHAPTERS

On the Role of Insurance Brokers in Resolving the Known, the Unknown and the Unknowable
Neil Doherty and Alexander Muermann
in The Known, the Unknown and the Unknowable in Financial Risk Management

Managing Large-Scale Risks in a New Era of Catastrophes
Howard C. Kunreuther and Erwann O. Michel-Kerjan
Journal of Reinsurance, Summer 2008, Vol. 15 No. 3

Reducing Human and Financial Vulnerability to Large-Scale Disasters: Is Risk Awareness (Really) Enough?-- The Individual Behavior Puzzle
Erwann Michel-Kerjan

Lessons from the Earthquake Lab: An Experimental Analysis of Learning from Experience about Natural-Hazards
Robert Meyer

Reducing Losses from Catastrophic Risks Through Long-term Insurance and Mitigation
Howard Kunreuther
Social Research, Vol. 75, No. 3 2008

Towards a New Risk Architecture: The Question of Catastrophe Risk Calculus
Erwann Michel-Kerjan
Social Research, Vol. 75, No. 3 2008

Integrating Physical and Financial Risk Management in Supply Management
Paul R. Kleindorfer
RISK MANAGEMENT STRATEGIES FOR DEALING WITH INTERDEPENDENCIES
Howard Kunreuther
in Network-Based Strategies And Competencies
P. Kleindorfer and Y. Wind, eds.
Wharton Publishing (forthcoming)

CHALLENGES FOR THE US AND ASIA
Howard Kunreuther
in Asian Catastrophe Insurance
C. Scawthorn and K. Kobayashi, eds. May 2008

WEIGHING THE NON-MISSILE THREAT TO THE U.S.
HOOMLAND
Stephen E. Flynn
Hearing on Oversight of Ballistic Missile Defense: Threats, Realities, and Tradeoffs, Written Testimony before the U.S. House of Representatives National Security and Foreign Affairs Subcommittee
March 5, 2008

SELF-PROTECTION AND INSURANCE WITH
INTERDEPENDENCIES
Alexander Muermann and Howard Kunreuther
Journal of Risk and Uncertainty, 2008 36:103-123

EXTREME EVENTS, GLOBAL WARMING, AND INSURANCE-LINKED SECURITIES: HOW TO TRIGGER THE 'TIPPING POINT'
Erwann Michel-Kerjan and Frederic Morlaye
The Geneva Papers on Risk and Insurance, 2008 (33) p153-176

THE RHETORIC AND REALITY OF REGULATORY REFORM
Cary Coglianese
Yale Journal on Regulation 25 85 (2008)

MARKET PRICE OF INSURANCE RISK IMPLIED BY
CATASTROPHE DERIVATIVES
Alexander Muermann
North American Actuarial Journal, forthcoming

A THEORETICAL FRAMEWORK FOR GOAL-BASED CHOICE
AND FOR PRESCRIPTIVE ANALYSIS
Howard Kunreuther, Kurt Carlson, et al.

WORKING PAPERS
HAVEN'T YOU SWITCHED TO RISK MANAGEMENT 2.0 YET?
Erwann Michel-Kerjan
Submitted to the World Economic Forum for publication Davos, January 2009

LONG TERM INSURANCE (LTI) FOR ADDRESSING
CATASTROPHE RISK
Dwight Jaffee, Howard Kunreuther, and
Erwann Michel-Kerjan
National Bureau of Economic Research (NBER) #w14210 August 2008

AID, CATASTROPHES AND THE SAMARITAN'S DILEMMA
Paul A. Raschky and Manijeh Schwindt
Risk Center Working Paper # 2008-04-15,
April 15, 2008

PRODUCTIVE DISASTERS? – EVIDENCE FROM EUROPEAN
FIRM LEVEL DATA
A.M. Leiter, H. Oberhofer, P.A. Raschky
Risk Center Working Paper, April 14, 2008

COME RAIN OR SHINE: EVIDENCE ON FLOOD INSURANCE
PURCHASES IN FLORIDA
Erwann Michel-Kerjan and Carolyn Kousky
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February 29, 2008

RISK-BASED PRICING AND RISK-REDUCING EFFORT:
DOES THE PRIVATE INSURANCE MARKET REDUCE
ENVIRONMENTAL ACCIDENTS?
Haitao Yin, Howard Kunreuther, Matthew White
Risk Center Working Paper # 2008-01-31,
January 31, 2008

LOOKING AT OPTIMAL RISK-SHARING IN A
KALEIDOSCOPE: THE (MARKET POWER, INFORMATION)
ROTATIONAL SYMMETRY
Dominique Henriet and Erwann Michel-Kerjan
Risk Center Working Paper #2008-01-21
January 21, 2008

ENHANCING THEATER SECURITY COOPERATION IN THE
21ST CENTURY: HOW THE U.S. NAVY CAN HELP
Michael Budney, John Dzimirnowicz, Erwann Michel-Kerjan
Risk Center Working Paper, January 2008
Invited Presentations - 2008

European Union – Conference on Climate Change and Catastrophic Risks, Paris, November 27, 2008

University of Rhode Island, Department of Natural Resources Science, Coastal Institute “Managing Large-Scale Risks in a New Era of Catastrophes”, November 21, 2008


University of Maryland/Wharton School Climate Change and Insurance Workshop, University of Maryland, October 30-31, 2008


Association of Flood Plain Managers Regional Meeting, Cherry Hill, NJ, October 21, 2008


The Economics of Natural and Unnatural Disasters, Western Michigan University, October 1, 2008

OECD/UNISDR Senior Symposium on Disaster Preparedness and Financing, Beijing, China. September 27-28, 2008


American Risk and Insurance Association (ARIA), Portland, Oregon, August 4, 2008

Northeast Hurricane Mitigation Leadership Forum, Newport, RI, July 2008

National Science Foundation: National Hazard Vulnerability and Resiliency Observatory Network Workshop, Texas, June 13, 2008

Society for Risk Analysis World Conference, Guadalajara, MX, June 2008


Association for State Flood Plain Managers National Conference, Reno, NV, May 20 2008

Conference on Terrorism and Policy., University of Texas at Dallas, Dallas, TX. May 15, 2008.

Climate Decision Making Center Annual Meeting, Carnegie Mellon University, Pittsburgh, PA, May 19, 2008


Florida Catastrophic Storm Risk Management Center, 2008 Speaker Series, Florida State University, March 6, 2008.


Anticipating risks, averting the worst
3 steps for natural disaster or corporate calamity

Howard Kunreuther and Michael Useem
reprinted from *The Philadelphia Inquirer*

December 16, 2008
http://www.philly.com/inquirer/opinion/36217444.html

With Congress balking at a bailout, General Motors soon could be driven into the dustbin of history. How did an icon of American business reach such a disastrous state?

For an answer, it's instructive to consider natural disasters - which, like corporate calamities, have been particularly devastating to the country in recent years.

Hurricane Katrina killed 1,300 people and forced 1.5 million from their homes. If GM declares bankruptcy, hundreds of thousands will lose their jobs, and many of them could lose their homes, too. Whether the risk at hand is a natural calamity or a corporate disaster, we see parallel lessons for those most responsible for avoiding the worst.

One problem is that executives rarely seek out probability estimates when making decisions that involve risk. One study found that less than a quarter of managers asked for likelihood estimates when undertaking risky decisions. When another group of managers was informed of the odds, less than 20 percent used the information.

Most executives tend to avoid thinking about low-probability events until after they occur. They fall into a trap of believing such events will not take place - at least, not on their watch. The implicit principle is "NIMTOF": Not in My Term of Office.

Most auto executives could hardly conceive of - let alone prepare for - a world in which oil was priced at $140 a barrel and auto sales plummeted 40 percent. Even if such shocking possibilities were considered, preparing for them would be left to future leaders - not today's executives, who feel daily pressure from short-term investors.

Myopia and its consequences have a long history in business. Prior to the 1984 Bhopal catastrophe in India, executives in the chemical industry deemed the chances of such an accident to be essentially zero.

And even after the first terrorist attack on the World Trade Center, in 1993, insurers continued to include terrorism as an unnamed peril covered by their policies. That made insurers fully liable for the 2001 attack even though they hadn't received an extra penny for the coverage.
Individuals fall into the same traps of short-term thinking. Few residents of hazard-prone areas voluntarily purchase flood or earthquake insurance before a disaster. Only after a catastrophe do homeowners buy coverage. And they are likely to cancel their policies several years later if they don’t experience another loss.

What steps can be taken to avoid such mistakes? The art of leadership is anticipating the unpredictable. Three ways of doing that apply to both natural and corporate catastrophes.

The first is mitigation. There would have been far less devastation in New Orleans if it had well-maintained levees and evacuation plans, if its hazard-prone areas had land-use management programs and well-enforced building codes, and if insurers were allowed to charge premiums that reflected risk. But short-term concerns ended up trumping long-term safeguards.

Likewise, if General Motors had trimmed its product lines, heightened fuel efficiency, and restored some of its reputation for quality before the bottom fell out of the market, we might be talking triage rather than bankruptcy for the company. But short-term greed trumped long-term gain.

The second remedy is management. Mindful of those abandoned in New Orleans after Katrina, officials in Houston and Galveston required residents to evacuate in advance of Hurricane Ike in September.

Mindful of GM's sharp descent from more than 45 percent to less than 25 percent of the American market, a new generation of executives might have restructured the company - much as Louis Gerstner remade IBM when its mainframe sales were in precipitous decline.

Third, consider governance. Good governance implies appointing forward-thinking directors with long-term perspective, who will guard against low-probability, high-consequence events.

The White House failed in its oversight of the pre-Katrina Federal Emergency Management Agency. The board of directors failed in its oversight of pre-crisis GM. It was up to the overseers in both cases to ensure that the executives they put in charge were savvy about the risks they faced and ready to respond.

Hurricane Katrina and General Motors remind us that we are likely to underpredict the next catastrophe, whether natural or man-made. We need to act now to anticipate such events, instead of just waiting for them to happen. And, above all, we need to remember that low risk is not the same as no risk.

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Established in 1984, the mission of the Wharton Risk Management and Decision Processes Center has been to carry out a program of basic and applied research to promote effective corporate and public policies for low-probability events with potentially catastrophic consequences. The Risk Center has focused on natural and technological hazards through the integration of risk assessment and risk perception with risk management strategies. After 9/11, research activities have extended to include national security issues (e.g., terrorism risk insurance, protection of critical infrastructure).

Building on the disciplines of economics, finance, insurance, marketing, psychology and decision sciences, the Center's research program is oriented around descriptive and prescriptive analyses. Descriptive research focuses on how individuals and organizations interact and make decisions regarding the management of risk under existing institutional arrangements. Prescriptive analyses propose ways that individuals and organizations, both private and governmental, can make better decisions regarding risk. The Center supports and undertakes field and experimental studies of risk and uncertainty to better understand the linkage between descriptive and prescriptive approaches under various regulatory and market conditions. In the past two years, the Center has significantly increased its size so that it can undertake large-scale initiatives.

Providing expertise and a neutral environment for discussion, Risk Center research investigates the effectiveness of strategies such as incentive systems, risk communication, insurance and regulation in the context of extreme events. The Center is also concerned with training decision makers and promoting a dialogue among industry, government, interest groups and academics through its research and policy publications and through sponsored seminars, roundtables and forums. Our Newsletter and Project Snapshots provide updates of Center activities and publications.