

INSIDE THIS ISSUE:

Travelers/Wharton Partnership: Effective Practices in Risk Management	1
'Not in my term of office'	3
Sustainable Reform of the NFIP	4
Hurricanes: The Bad News About the Good News	6
Adaptation to Climate Change	9
Creating an Earthquake Insurance Program for China	10
Disaster Micro-Insurance in Senegal	12
World Economic Forum: <i>Global Risks Report 2010</i>	14
Terrorism Risk	14
Cost of Financial Capital	15
Russell Ackoff Doctoral Student Fellowships	16
Publications	18
Risk Center Faculty in the News	21
Risk Regulation Seminar Series	22
Research Sponsors and Corporate Associates	23

Risk Management REVIEW



Wharton School Announces \$1.25 Million Gift from The Travelers Companies, Inc. to Establish the Travelers/Wharton Partnership for Risk Management and Leadership Fund

The breadth of disasters and crises that have plagued the world since the start of the twenty-first century have put the problem of catastrophic risk management high on the agenda of many organizations in the private and public sectors.

To meet growing demand for high-level research in this area, longtime Risk Center corporate partner, **Travelers Companies, Inc.** has made a multi-year commitment of \$1.25 million to the Wharton School to create the **Travelers/Wharton Partnership for Risk Management and Leadership Fund**, an initiative that will support research and outreach in the areas of risk management and leadership.

The funding will be used to support new multi-year projects at the Risk Center that explore basic and applied research in risk assessment and risk perception, leadership models for risk management, and catastrophic risk financing.

One of the initial projects to emerge from the partner-

ship is a study exploring effective risk management practices in organizational leadership and governance. This project will be a joint venture between the Wharton Risk Management and Decision Processes Center and the **Wharton Center for Leadership and Change Management**.

The study's central focus will be on identifying the leadership and governance practices that are particularly effective in detecting and preparing for exceptionally adverse events prior to their occurrence. This multi-year project will identify twenty-five large American companies or international corporations with a large operation in the United States that are considered to have well-developed leadership and successful governance practices for addressing issues of catastrophic risk. It will study the roles that their executives and directors play in building and sustaining those practices. The project's outcomes will include both basic

research analysis and practical policy guidelines for leading and governing large companies facing extreme hazards.

Entitled ***Effective Practices in Risk Management and Leadership Governance***, the project will be guided by an advisory panel well-steeped in the practices of company preparation for low-probability high-consequence events, with **Travelers' CEO Jay Fishman** serving as Chair. The project will benefit from the expected involvement of select other highly regarded and like-minded firms, which could include financial institutions, information technology firms, health care sector representatives, rating agencies and experts from academia.

The multi-year research project is under the direction of Howard Kunreuther, Cecilia Yen Koo Professor and co-director of the Risk Center, and Michael Useem, William and Jacalyn Egan Professor, and director, Center for Lead-

(Continued on page 2)

Catastrophic risks as defined by the Travelers/Wharton project on “*Effective Practices in Risk Management and Leadership Governance*” include both natural hazards and created threats, such as financial risks, disease pandemics, flawed governance, and disruptive technologies.

The private sector has a vital role to play in preparing for catastrophic risks. While the Department of Homeland Security is concerned with protecting U.S. infrastructure, some 85 percent of the country’s infrastructure is owned and maintained by the private sector.

The research project is intended to help identify and understand effective company governance and executive practices in the private sector for preparing for catastrophic risks and responding to large-scale disasters. The study will:

- Develop strategies to enable decision-makers to think strategically and plan for the long term
- Create protocols for effective preparedness of company leadership
- Fashion standards for enterprise risk management
- Fashion standards for the role of the company’s chief risk officer
- Identify steps for engaging the board of directors in catastrophic risk preparation
- Draw out the implications for government policies and regulations of companies

Funding from the **Travelers/Wharton Partnership** will provide support for a post-doctoral fellow (*Travelers Foundation Post-Doctoral Fellow*) to collaborate with Wharton and Penn faculty in catastrophic risk management. The fund will enable research projects on a variety of risk and leadership topics likely to include:

The psychology of protective-decision making. A pre-requisite to designing effective strategies for loss reduction is to develop a better understanding of how individuals perceive risk, and how these perceptions drive decisions to invest in protective actions. This program will seek to advance our understanding of the cognitive, social, and emotional factors that drive decisions to invest in protective measures against potential hazards, and explore how this knowledge can be used to develop effective strategies for encouraging voluntary mitigation by individuals and communities.

Strategies for adaptation and mitigation of risks in the face of global climate change. This project will attempt to identify optimal methods for adapting to and mitigating such long-term threats as changing precipitation and temperature patterns, rises in sea levels, and possible increases in tropical storm threats. Central to such work will be the exploration of methods for encouraging long-term thinking and investments by individuals, businesses, and governments.

Long-term strategies for mitigating insurance flood risks. This study will examine the opportunity to reduce the losses from future floods in the context of the National Flood Insurance Program (NFIP). We will examine the impact of climate change on the risks of flooding with and without mitigation measures in place.

(Continued from page 1)

ership and Change Management, working with Robert Meyer, Gayfryd Steinberg Professor and Risk Center co-director, Erwann Michel-Kerjan of the Risk Center, and Preston Cline and Jeff Klein of the Leadership Center.

The Wharton Risk Center and the Wharton School thank Travelers’ leadership, **Jay Fishman, W’74, WG’74** (Chairman and CEO), **Alan Schnitzer, W’88** (Vice Chairman), **Marlene Ibsen** (President and CEO, Travelers Foundation) and **Joan Woodward** (Executive Vice President for Public Policy, Travelers Institute), for their stewardship and commitment to the success of the project.

The Travelers Companies, Inc. is a leading provider of property casualty insurance for auto, home and business, and has a long-standing interest in community support and education, as evidenced by the work of the [Travelers Foundation](#) and the [Travelers Institute](#).

Travelers Institute

The Travelers Institute engages in discussion and analysis of public policy topics of importance to the insurance marketplace and the financial services industry. The Travelers Institute draws upon the industry expertise of Travelers’ senior management and the technical expertise of many of Travelers’ underwriters, risk managers and other experts to provide information and analysis to public policy makers and regulators.

Travelers Foundation

Travelers provides support for charitable organizations through the Travelers Foundation and with corporate funding. The foundation is primarily focused on improving academic and career success for underrepresented youth. The Travelers Foundation also supports targeted local needs in the areas of community development and the arts.

“Not in my term of office”

by Michael Useem and Howard Kunreuther

*The nuclear summit of April 2010 presented a difficult leadership challenge: focusing attention and resources on a low-probability problem that would be disastrous if it occurred. Global warming, 100-year floods, financial meltdowns are other examples. **How can a leader fight the natural tendency among followers to put off dealing with abstract and complicated threats?***

"Not in my term of office" – NIMTOF – is one of those predictable human tendencies, and one that unfortunately is as widespread as it is pernicious. Its first cousins are common as well: If we perceive the likelihood of a disaster to be below some arbitrary threshold level of concern, we assume, "It won't happen to me – at least not on my watch."

We seek confirming evidence and ignore conflicting data. We focus on a disaster only after it occurs – but not long afterwards – and we avoid preparing for or preventing future catastrophes because the event is not salient to us anymore.

Many homeowners, for example, purchase flood insurance only *after* suffering damage in a flood and then cancel their annual policies when several years pass without flood damage. Consider one such flooding event in northern Vermont in 1998. Of the more than 1,500 victims of the disaster, FEMA found that 84 percent of the homeowners in flood-hazard areas did not have insurance – even though 45 percent were required to purchase such coverage.

The art of leadership includes preparing for the unexpected, and the value of leadership

thus becomes more important when the world becomes more unpredictable. Leaders face special challenges with respect to low-probability, high-consequence events: By definition, they occur rarely and are especially difficult to predict.

Preparing leaders in advance of catastrophes is an essential step for prevailing over them. One of the first obligations of leadership is to recognize our behavioral shortcomings and create means of reducing the impact of the worst of them. One way of doing this is to transform dry statistics into graphic dangers. The chance of a 100-year flood occurring over the next year is just one percent. But the chance that such a flood could severely damage a home over the life of the home ownership – say 25 years – is greater than one in five. People will pay more attention to an event that is presented in terms that make it appear to be more likely to occur.

In normal times, our natural shortcomings are worrisome and grating but usually not perilous; in catastrophic times, such flaws can become magnified and dangerous, as evident in the avoidable loss

of life and damage in the 2005 landfall of Hurricane Katrina and the preventable failure of American International Group in the 2008 financial crisis.

Taking steps to anticipate and transcend human shortcomings is one of the responsibilities of anybody in a leadership position. The calling of President Barack Obama and other leaders at the nuclear summit is to graphically, tangibly, and starkly persuade all of us that the threat of a nuclear night – the mother of all catastrophes – is low, but the consequences of such an event are so enormous that NIMTOF and our other behavioral shortcomings must be recognized and overcome now.

Howard Kunreuther is Cecilia Yen Koo Professor of Decision Sciences and Public Policy, and Co-Director of the Risk Management and Decision Processes Center at the Wharton School.

Email kunreuther@wharton.upenn.edu.

Michael Useem is William and Jacalyn Egan Professor of Management, and Director of the Center for Leadership and Change Management at the Wharton School. Email useem@wharton.upenn.edu.

Reprinted with permission of the *Washington Post*, "On Leadership" <http://views.washingtonpost.com/leadership/panelists/2010/04/not-in-my-term-of-office.html>

Whenever							
F	A	R	A	W	A	Y	
L	A	T	E	R	L	A	
T	E	R	L	A	T	E	
R	L	A	T	E	R	L	
A	T	E	R	L	A	T	
E	R	L	A	T	E	R	

For a Sustainable Reform of the U.S. National Flood Insurance Program

by Erwann Michel-Kerjan, Managing Director, Wharton Risk Management Center

ErwannMK@wharton.upenn.edu

Five years ago, the United States was reeling from the destruction caused by Hurricanes Katrina, Rita and Wilma, and by the four other hurricanes that made landfall the year before. These extreme events caused historic human and economic losses. Developing America's resiliency to natural catastrophes promised to become national priority.

But other crises occurred on U.S. soil, from a pandemic to the financial turmoil, then a major oil leak. As a result, our attention to weather-related-disasters has faded, putting us in jeopardy when the next hurricane strikes the United States. When it happens, it will result in major flooding as well. Can we afford another Katrina-type catastrophe inflicting \$150 billion in losses, or even more? Who will pay?

National Flood Insurance Program
Flood risk in the United States has mainly been covered by the federally-run National Flood Insurance Program (NFIP) since 1968. It is one of the longest standing government-run disaster insurance programs in the world.

The program made headlines in the aftermath of Hurricane Katrina because it did not have the financial reserves needed to pay all the claims and had to borrow nearly \$18 billion from the U.S. Treasury (as authorized by law). Many blamed the government for failing to charge adequate rates to account for truly catastrophic risks.

To date, there has been relatively little research on the

NFIP to better understand how it actually operates, the demand (or lack of demand) for flood insurance, and the key challenges the program faces in the post-Katrina era.

Answers to these questions – and ways these challenges might be overcome – are critical because the program continues to grow significantly due to the increasing population of coastal states which are typically risk-prone. Today, the NFIP covers \$1.25 trillion in assets.

New findings

To address these issues, and having obtained unique access to the entire portfolio of the NFIP for research purposes, I am currently undertaking several studies on flood insurance, along with colleagues Carolyn Kousky (Resources for the Future), Howard Kunreuther (Wharton), Sabine Lemoyne de Forges (École Polytechnique), Robert Meyer (Wharton), Pierre Picard (École Polytechnique), Jean Pinquet (École Polytechnique) and Paul Raschky (Monash University, Australia).

Preliminary findings are surprising. For example, on average, homeowners hold their flood insurance policies only two to four years. This finding is stable across levels of risk exposure, states, and over time. Another finding is that a large majority of homeowners select the lowest available deducti-

ble even though higher deductibles (associated with lower premiums) are often the more rational choice from an economic perspective.

Further research will answer other questions on individual decision-making (for example whether federal post-disaster relief significantly affects insurance demand), and on the operation of the NFIP itself (for example, what can be done to make the program more financially sustainable in the future; and if

there is an opportunity for private insurers to reenter this market as is the case in several western European countries).

**On average,
homeowners hold
their flood insur-
ance policies only
two to four years.**

Reforming the NFIP?

Those who have been following activities on the Hill know that the NFIP has been renewed “as is” in recent years and typically for short periods of time (as little as one month).

As I argued this Spring in an op-ed in the *Huffington Post* (see box on facing page), what the NFIP needs is not “as is” renewing – it needs a well thought-out reform based on sound empirical analyses.

The objective is clear: reform the NFIP into a more effective, equitable and sustainable program for years to come.

I have suggested that a national commission be established and be given 12 to 15 months to report to Congress and the President on key modifications.

At a minimum, to improve the operation of the NFIP and to ensure better coverage against flooding disasters in the United States, these changes should be considered:

- Update and improve flood-hazard maps and risk communication.
- Develop the right incentives and insurance contracts to ensure those who should have flood insurance do have it – and keep it. One way to do this would be through the development of multi-year flood insurance attached to the property, not the individual, as Howard Kunreuther and I have proposed.
- Provide new economic incentives to invest in risk-reduction measures (e.g., elevating houses in flood-prone areas) and better land use.
- Reduce the subsidies to repetitive losses.
- Reestablish the financial balance of the program. One innovative solution would be the issuance of flood catastrophe bonds similar to bonds issued recently by the Government of Mexico for hurricanes and earthquake risks.

Five years have passed since the historic devastation from Hurricane Katrina. Another large-scale disaster might very well happen this year. Are we ready? Hardly. Let's not wait for the next crisis to react with regret and confusion.

In the past two years, the NFIP has been renewed multiple times, but always with very limited changes. Between September 2008 and July 2010, there were eight short-term extensions.

“The problem is that these renewals merely serve to postpone again and again a much-needed national debate about what this program should do (and not do). What the NFIP needs is not “as is” renewing — it needs well thought-out reform.”

— Erwann Michel-Kerjan, in
The Huffington Post, April 28, 2010
[Reform of the National Flood Insurance Program:
Introducing Long-Term Flood Insurance](#)

The concept of long-term flood insurance is gaining traction.

Over the past year, the Risk Center faculty have made presentations at numerous academic conferences, workshops, and briefings, and have held meetings with the **Federal Emergency Management Agency (FEMA) Mitigation Directorate**, the **Association of State Flood Plain Managers**, the **Reinsurance Association of America**, and the **U.S. Army Corp of Engineers, Institute of Water Resources** on the issue of guiding principles for long-term flood insurance.

The issue is of interest to members of Congress as well. Howard Kunreuther and Erwann Michel-Kerjan presented their proposal for long-term flood insurance at a forum round table in Gulfport, MS, April 8, 2010. The forum was organized and hosted by **U.S. Senator Roger Wicker (R-MS)** to present ideas for an overhaul of the National Flood Insurance Program.

Other participants at the round-table discussion were **Dr. Willis Lott (Mississippi Gulf Coast Community College)**; **Dr. Lloyd Dixon (RAND)**; **Greg Toczydlowski (Travelers, Inc.)**; and **U.S. Representative Gene Taylor (D-MS4)**.

The forum was open to the public and was covered in the general media, *SunHerald.com*, [“Wicker prods Dodd to work on insurance.”](#)

Hurricanes and Climate Change... the Bad News about the Good News

by Robert Meyer, Co-Director, Wharton Risk Center

meyerr@wharton.upenn.edu

Last February, the journal *Nature Geoscience* published an article that drew widespread interest among those interested in how global warming may affect future worldwide hurricane risks. The article, written by a team of the world's pre-eminent tropical climatologists led by Thomas Knutson (Knutson et al. 2010), reported the results of a multi-year program of work designed to explore the predictions that various global climate models would make as to how increases in global temperatures would affect the number and intensity of tropical cyclones.

The results took some by surprise, and, at first glance, would seem to offer good news. If the *Intergovernmental Panel on Climate Change* (IPCC)'s prediction that the world will warm by at least 1 degree Celsius over the next century proves true, we should expect to see a slight decrease in the worldwide frequency in tropical storms and hurricanes. This is because what matters in the formation of tropical cyclones is not just the temperature of the oceans and atmosphere (as had long been thought), but also the *contrast* in temperatures across the various oceanic basins in the world. In essence, tropical cyclones act as one of a number of means by which the atmosphere works to restore energy imbalances in the tropics and subtropics. One of the major predictions of global climate models is that not only will the world become warmer in the mean, but also climatologically more balanced. As such, the

atmosphere would provide fewer "triggers" for the formation of tropical cyclones. Indeed, some have argued that we have already begun to see such an effect; the 2005 hurricane season aside, since the mid 1990s we have witnessed a gradual decrease in *worldwide* tropical cyclone activity, as measured by an energy index that captures both number and strength (<http://www.coaps.fsu.edu/~maue/tropical/>).

Fewer, but more powerful hurricanes

Should we rejoice and start building vacation homes on the coast? The answer, unfortunately, is a clear "No." This same paper also carries with it a more important, and potentially disturbing, message: while the number of storms is predicted to decrease, those that *do* form are also predicted to become more intense. Hence, we will see a shift in the *conditional distribution* of hurricanes in favor of a greater number of more intense varieties. The reason is that while global temperature variability may curtail storm formation, the key factor that transforms garden-variety category 2 storms into category 5 monsters is increased sea-surface temperatures — another fundamental predicted consequence of global warming.

How would such a change in the distribution of storms affect potential property losses from hurricanes? It is just that question that the Wharton Risk Center is currently exploring in collaboration with policy

experts and climate scientists from the **London School of Economics, MIT, NOAA, and the National Center for Atmospheric Research.** While the findings of that study are still some time off, in the short term we can nevertheless offer some well-grounded speculations on how such a climatic change will affect the *psychology* of how residents think about hurricane risks — a critical basic factor in determining loss potential.

The message is not a good one: by and large, a world marked by fewer but more intense hurricanes could be argued to be a more dangerous one. The reason is *not* that storms will hit more areas, or that the storms that do hit will be capable of significantly more damage than the most intense storms that we see today (none of the models anticipate that there will someday be a "category 6" storm). Rather, the reason lies in the danger that future populations will see less of a need to prepare for these events; such a change in storm patterns may exacerbate the psychological biases that currently cause homeowners and communities to under-invest in mitigation.

To understand why, note that a shift in the distribution of storms to a greater conditional likelihood of strong storms will not *necessarily* increase the potential *total damage* of storms. After all, while there will be more intense storms, there will also be fewer weaker ones, which themselves are often capable of considerable amounts of damage. But what this change *will* do is increase the spatial-temporal *variance* in damage. The reasoning goes like this: by and large, the most intense hurricanes are often *not* the most destructive,

Should we rejoice and start building vacation homes on the coast? The answer, unfortunately, is a clear "No."

for the simple reason that they tend—almost by definition—to concentrate their destructive energies over relatively small geographic areas. In the same way that skaters manage to spin faster by drawing their arms in toward their bodies, extreme hurricanes typically get that way by concentrating their energies in small areas near their centers.

The three hurricanes known to make landfall in the U.S. as category 5 hurricanes—the Labor Day Hurricane of 1935, Camille in 1969, and Andrew in 1992—were all small storms that caused horrific damage—but only over relatively confined geographic areas. Hence, a world where there are more Andrew-like storms but fewer Ikes (large storms of moderate intensity) might pose the same aggregate damage risk that we face now, but it will be characterized by a different distribution, one with a larger number of extreme events that impose extreme damage on a fewer number of residents.

Punishment schedules affect learning

And it is this increase in spatial-temporal variance where the danger brews. While there is no work that directly speaks to how such a change in hurricane patterns might affect the willingness of individuals and communities to invest in protection, for several decades, psychologists have studied the related problem of how changes in reinforcement and/or punishment schedules affect learning. The message from this work is clear: the more variable the size and the timing of the reinforcement or

punishment, the harder it is for people to learn optimal response patterns. In short, there is ample reason to worry that the tendencies for forgetfulness and myopia that currently limit people's willingness to

invest in mitigation would only be exacerbated in a world marked by fewer—but more intense—hurricanes. The specific psychological mechanisms that would work to impede learning in this case would be twofold. The first is a possible amplification of what I call the “false experience effect.” When Hurricane Andrew hit south Florida in 1992 it was widely described in the media as a category 4—and later, category 5—storm, based on the strength of the maximum winds near the eye at landfall. Yet, because of its small size,

the vast majority of residents living in Miami-Dade and Broward counties experienced nothing like category 4 or 5 conditions. For them, the effects of Andrew were more like those associated with a category 1 hurricane or even a strong tropical storm.

This meteorological detail, however, was understandably lost on many. Hence, when Hurricane Wilma passed through the area as a large borderline 1-2 hurricane in 2005 many were taken aback at the damage it caused. The headline of the *Miami Herald* after the storm passed summed up the disbelief felt by many

While the number of storms is predicted to decrease, those that do form are also predicted to become more intense.

invest in mitigation would only be exacerbated in a world marked by fewer—but more intense—hurricanes. The specific psychological mechanisms that would work to im-

Such a change in storm patterns may exacerbate the psychological biases that currently cause homeowners and communities to underinvest in mitigation.

pede learning in this case would be twofold. The first is a possible amplification of what I call the “false experience effect.” When Hurricane Andrew hit south Florida in 1992 it was widely described in the media as a category 4—and later, category 5—storm, based on the strength of the maximum winds near the eye at landfall. Yet, because of its small size, residents when it battered, “A Category 1 Did This?” What Andrew had apparently taught many residents from central Miami northward is that one only needs to seriously worry about hurricanes when they are category 4 or more—the event they (falsely) believed they experienced in Andrew. A world that breeds more Andrew-like storms might thus also breed more false beliefs about the survivability of extreme events.

The second mechanism is that residents may be more prone to forget the destructiveness of storms as the time between landfall events increases—a natural by-product of the predicted lower overall frequencies. In the same way that the percentage of Californians carrying earthquake insurance has steadily decreased in the years since the 1994 Northridge Quake, so, too, we might expect a decrease in investments in hurricane preparedness as the inter-

event period for hurricanes grows. This bias, in turn, would act to magnify the damage they cause when they do arise. While individuals might come to associate future “typical” hurricanes as causing far more damage than typical hurricanes today, the encouraging effect of this knowledge would be offset by the discouraging belief that such events are things experienced by others—at a different time, at a different place.

In short, it is much easier to learn how to prepare for damaging events that are frequent and moderate, than those which are rare and severe.

(Continued on page 8)

(Continued from page 7)

Replace Saffir-Simpson?

So how might we encourage mitigation in a rarer-but-more extreme world? Of the two impeding mechanisms described above, the first—the problem of residents having poor experiential knowledge about the damage potential of storms—could at least be partially remedied by following the call that many have made: to replace the current 1970s-era storm classification system with one that more accurately characterizes the effects that residents actually experience from storms (e.g., Senkbeil & Sheridan 2006; http://allenpress.com/pdf/coas_22_518_1025_1034.pdf).

The central argument is that the Saffir-Simpson scale, even after the modifications made entering the 2010 storm season, is too coarse of an index either for sufficiently preparing residents for storms before the fact and—most critically for this discussion—educating them about what they experienced after the fact.

As an example, both Hurricane Katrina and Hurricane Dennis were officially classified as category 3 hurricanes when they made landfall a month apart along the northern Gulf Coast in 2005. Yet, their

meteorological characteristics and impacts could not have been more different: Dennis was a small storm that did comparatively little damage, and Katrina was the costliest natural disaster in U.S. history. For most residents, the 5-point scale is thus an overly simplistic, and at the same time, inaccurate instrument from which to learn about storm risks. In a world where there is an increased risk of rare extreme events, it is all the more critical that residents do not misinterpret periodic encounters with the fringes of a storm (which will be the most common experience) as an encounter with the worst of it.

Overcoming forgetfulness

The challenge of decreased return periods is a harder nut to crack. As Howard Kunreuther, Erwann Michel-Kerjan and I recently argued in a Wharton Risk Center Issue Brief on the [Psychology of Natural Hazards](#), the inability of people to engage in long-term thinking is one of the foremost reasons that individuals fail to see the value in investments in mitigation. Moreover, there is little evidence that this bias can be effectively overcome simply through improved communication or education policies. If temporal variation in catastrophic hurricane events increases, this bias is likely to be amplified.

A workable solution would be to transfer the decision making responsibility for mitigation to institutions (for example, governments) through improved building codes, and through improved insurance (and/or tax) mechanisms that provide monetary incentives for residents in high-risk areas to undertake long-term mitigation to reduce those risks.

No clear consensus

Finally, I should emphasize that while the headlines produced by the *Nature Geoscience* article focused on the summaries it provided about the current best thinking about how climate change will affect hurricane risks, the article also carries with it a message that is no less important: the fact that work in this area is still in its (comparatively) early stages. Symptomatic of this is that different models often yield quite different predictions about how global warming will affect storms. Likewise, because of the brevity of the empirical record of tropical cyclones (complete records began only in the late 1970s with the onset of global satellite coverage), it is currently impossible to reliably test the different models using data. As such, current research on tropical cyclones has yet to reach a clear consensus on how climate change might affect the two factors that will be most critical in driving damage potential: storm size and geographic distribution. If warmer oceans in the future support cyclones that are both stronger *and* larger (like Katrina when she was at her peak in 2005), we would face future hurricane risks that are clearly much larger than those imagined here.

References

Knutson, Thomas R., John L. McBride, Johnny Chan, Kerry Emanuel, Greg Holland, Chris Landsea, Isaac Held, James P. Kossin, A. K. Srivastava & Masato Sugi (2010), "Tropical Cyclones and Climate Change," *Nature Geoscience* 3, 157–163.

Senkbeil, Jason Carl & Scott Christopher Sheridan (2006), "A Post-Landfall Classification System for the United States," *Journal of Coastal Research*, 22(5), 1025–1034.

SAFFIR/SIMPSON SCALE

Category	Sustained Winds (MPH)	Storm Surge
1	74-95	4-5 feet
2	96-110	6-8 feet
3	111-130	9-12 feet
4	131-155	13-18 feet
5	More than 155	Greater than 18 feet

Dealing with Climate Change

Researchers from the Wharton Risk Center and the **London School of Economics (LSE)** are undertaking a project to simulate various climate change scenarios and evaluate alternative programs for reducing hurricane losses with and without climate change.

The project team includes Howard Kunreuther (with appointments at Wharton and LSE), Robert Meyer (Wharton), Erwann Michel-Kerjan (Wharton), Chieh Ou-Yang (Wharton), Falk Niehoerster (LSE), and Nicola Ranger (LSE). The team will incorporate data on climate change to be used in simulations of alternative scenarios for Florida/Miami and the Caribbean island of St. Lucia. Study questions include:

- How many major hurricanes are estimated to form in the Atlantic Ocean in the next six to 18 months? In the next 10 to 30 years?
- How much will sea level rise over the next half-century in five-year intervals in specific coastal areas? What effect will these changes have on flooding and storm surges from hurricanes?
- Do today's topological maps accurately reflect risk of inundation?
- How would insurers deal with significant changes in risk estimates over time?
- What can be done to make long-term insurance a viable option for insurers and stakeholders in high-risk areas?
- What role would the public sector play in providing protection against catastrophic losses?

This work compliments joint NSF-funded studies with the **Climate Decision Making Center**, located in the Department of Engineering and Public Policy by cooperative agreement between the **National Science Foundation** (SES-0345798) and **Carnegie Mellon University**, and the Managing and Financing Extreme Events Project of the Wharton Risk Management Center.

The Risk Center is partnering on related studies with **Columbia University's Center for Research on Environmental Decisions (CRED)**, and the **International Institute for Applied Systems Analysis (IIASA)**.

America's Climate Choices

As part of its most comprehensive study of climate change to date, the **National Research Council**, the operating arm of the **National Academy of Sciences** and **National Academy of Engineering**, has issued its reports on *America's Climate Choices*. Convened in response to a request from Congress, *America's Climate Choices* is a suite of five coordinated activities designed to study the issues associated with global climate change, and provide advice on the most promising strategies.

Three reports were issued in May 2010: [Advancing the Science of Climate Change](#), [Limiting the Magnitude of Future Climate Change](#), and [Adapting to the Impacts of Climate Change](#). The reports emphasize that the U.S. should act now to reduce greenhouse gas emissions and develop a national strategy to adapt to the inevitable impacts of climate change. Moreover, research, mitigation efforts, and adaptation strategies should be designed to be flexible and responsive to new information and conditions in the coming decades. Two additional reports will be released later this year: [Informing Effective Decisions and Actions Related to Climate Change](#) will examine how to best provide decision makers information on climate change. A final overarching report, [America's Climate Choices](#), will build on each of the previous reports to offer a scientific framework for shaping the policy choices underlying the nation's efforts to confront climate change.

Current adaptation efforts are hampered by a lack of solid information about the benefits, costs, and effectiveness of various adaptation options; by uncertainty about future climate impacts at a scale necessary for decision-making; and by a lack of coordination.

The report [Adapting to the Impacts of Climate Change](#) calls for a national adaptation strategy which includes action by the federal government to provide technical and scientific resources that are currently lacking at the local or regional level, incentives for local and state authorities to begin adaptation planning, guidance across jurisdictions, shared lessons learned, and support of scientific research to expand knowledge of impacts and adaptation.

Howard Kunreuther (Wharton Risk Management Center) served on the panel *Adapting to the Impacts of Climate Change*, which was chaired by **Katharine Jacobs** (University of Arizona) and **Thomas Wilbanks** (Oak Ridge National Laboratory).

For further information on these reports, please go to <http://americasclimatechoices.org>.

Creating a Viable Earthquake Insurance Program for China that Appeals to All Stakeholders

by Lawrence Gu, WH '12: Finance and OPIM

A team of Wharton undergrads tackles one of China's most timely and pressing issues

Chinese natural disasters affect an average of more than 200 million people per year and have become an important restricting factor in China's economic and social development. Recent catastrophic events such as the 7.1 magnitude Yushu earthquake in Qinghai on April 14, 2010 and the 7.9 magnitude Wenchuan earthquake in Sichuan on May 12, 2008 are grim reminders of the need for more efficient public awareness, risk transfer, and risk mitigation systems.

Of all major natural disasters that China faces, earthquakes and floods are most damaging both in property and life. In conjunction with the Wharton Risk Management and Decision Processes Center and the **Hazard and Risk Science Base at Beijing Normal University**, three Wharton undergraduates (**Jenny Fan, Lawrence Gu** and **Xiaochun Ni**) have spent the past two years assessing China's current residential earthquake insurance framework and prescribing alternatives for a stronger future that logistically fits into China's current legal and economic scope.

During a month-long stay in Beijing, the team attended the **2009 Summer Institute for Advanced Study of Disaster and Risk** with leading scholars of the field. As one of the major takeaways from the program, the team fully understood a common fallacy of policy making when major advantages of separate international programs are pieced together to integrate into another country. Instead, a thorough analysis of the current framework at hand is

necessary to institute realistic policy making.

For example, many countries that have developed capital markets and regulation agencies to brace their catastrophic risk management depend on these entities to facilitate risk transfer from homeowners in impacted regions to other areas. China, on the other hand, heavily relies on its top-down government structure to implement timely and effective risk governance, as seen in the post-Wenchuan earthquake relief.

A clear trend exists in developed countries to move from excessive risk management (excess burden upon insurers, often leaving citizens stranded and without immediate aid from governmental institutions that become caught within the inflexibility of bureaucracy) to efficient risk governance. In developing countries, especially China, an inverse trend exists to move from excessive risk governance (excess burden upon a government to provide immediate and post-construction relief) to efficient risk management.

But the "right" balance between risk governance and risk management is based on the forces that

interplay within its system, one which cannot be simply solved by copycat policy making. These are forces such as the culture and education of a country's people pertaining to insurance products, the power structure of its governmental institutions, and the capability to set premium rates that reflect actual risk, given the availability and transparency of data.

For example, several key studies within the recent two decades (e.g., Keown 1989; Zhang 1993; Xie, Wang, Xu 2003) have shown that the Chinese culture and the general familiarity in Chinese people to insurance concepts have influenced their way of risk perception. These studies have consistently pointed out that in general, the Chinese compared to Western counterparts view environmental hazards (e.g., earthquakes, floods, desertification, pesticides, etc.) as less observable, more catastrophic, and less voluntary ("less voluntary" in the sense that the damage associated with earthquakes is more an effect of the "shaking" than poor risk mitigation efforts). Furthermore, the studies have shown that the Mainland Chinese in

Building on the Risk Center's publication "*At War with the Weather: Managing Large-Scale Risks in a New Era of Catastrophes*" (MIT Press, 2009), the study team has four major objectives:

- to gain an understanding of the public and private mechanisms behind mitigating risk caused by earthquakes in the People's Republic of China
- to evaluate current measures, their results and impacts, and offer suggestions for improvement in the near future
- to produce a prescriptive report that has applicable policy suggestions for the government, private insurers, households, and other interested parties
- to improve the insurance and risk management situation in China

general do not want to spend the time and effort on thinking of those potential risks, rather leaving these problems to the government and experts.

Through these individual studies, the team has singled out three major cultural forces – concepts on fate, network, and personal financial planning – that have ultimately changed the course on how insurance products have entered and fared in the Chinese market.

The Western concept of life insurance, for example, had many conflicts with Chinese philosophy. To many Chinese in the early era of life insurance, the discussion of death was a taboo subject, especially unforeseen, accidental and premature death. Chinese individuals mostly eschew contemplating such misfortune, believing “it will not happen to me.” The first firms to successfully enter the individual insurance market (specifically life insurance) in China in 1993-1995 were able to combine the financial benefits of life insurance and money management (i.e., whole life policy), bringing in the familiar “savings” component to stress insurance as investment rather than protective vehicles.

Many individuals who were exposed to early concepts of Chinese life insurance – a fusion of traditional life insurance and money management – were willing to pay an increased premium in return for partial “refunds” during the time period that the event (i.e., death) did not occur. This type of marketing, which was successful in creating demand for life insurance, is difficult to apply to residential earthquake insurance. One reason is that it is more difficult to calculate actuarially fair premiums (and thus, premium refunds), due to insufficient loss data. Although there have been



Jenny Fan and Xiaochun Ni with Dr. Wang Ming during the 2009 Summer Institute for Advanced Study of Disaster and Risk. Dr. Ming is a professor at Beijing Normal University, a leading research institution in China, who advised the study team. Funding was provided by Wharton Risk Center and Beijing Normal University.

several large earthquakes in China recently which resulted in in-depth research on aggregate losses, specific per region loss data, especially in rural regions, is still limited. The lack of distribution channels and an extreme reliance on post-disaster government aid are among other reasons why residential earthquake insurance in China hasn't been successful.

These are just a few of the many forces that ultimately shape China's burden distribution, which the Wharton team defines as the ratio and methodology of payout that each party within a governmental system or body must be responsible for post- and pre-disaster financing. A detailed analysis on the forces that have formed in China's insurance industry is therefore mandatory to determine policies that are sustainable and

applicable for China, and crucial for the team's ongoing research.

References:

- Keown, C. F. (1989). Risk perception of Hong Kongese vs Americans. *Risk Analysis*, 9, 401-405
- Zhang, Jianguang (1993). Environmental hazards in the Chinese public's eyes. *Risk Analysis* 13(5): 509-513
- Xie, Xiaofei; Wang, Mei; and Xu, Liancang. (2003). What Risks are Chinese People Concerned About? *Risk Analysis* 2003 23(4): 685-695

Lawrence Gu is a junior at the Wharton School. He began his research on Chinese earthquake insurance as a member of the University Scholars Program under the guidance of Prof. Howard Kunreuther. Lawrence's project interests lie in the design of alternative risk transfer instruments (ARTs) for private and public use. Contact lawgu@wharton.upenn.edu.

Disaster micro-insurance in Senegal

by Laura Boudreau, WH'10

The six months I spent in Senegal in the spring of 2009 taught me about some of the challenges associated with catastrophic risk management in Senegal and other developing countries. Most of the population in these countries cannot afford financial products such as insurance. Although their high exposure to weather, health, and other risks makes these populations difficult to insure, it also means that they could benefit most from insurance products. In particular, weather insurance products could greatly benefit the weak, underproductive agricultural sector in Senegal and reduce Senegalese farmers' vulnerability to natural catastrophes.

There are many differences between traditional agricultural insurance and agricultural insurance that is suitable and sustainable in a developing country such as Senegal. A primary difference is the size of the contracts sold: in Senegal, smallholder farmers dominate agriculture whereas in the United States, for example, large, commercial farmers are dominant. This



Senegal is located at the convergence of the Sahara Desert, the Sahel, and the tropical belt of Africa. The rainy season is longer and more substantial in the Kolda region in the southern part of the country.

size differential means that traditional multiple peril crop insurance (MPCI) products that dominate developed markets (and are usually subsidized by governments) are very costly to administer in developing countries. The semi-arid Senegalese climate also leaves these products highly exposed to catastrophic drought losses.

These and other challenges to establishing traditional agricultural insurance products in developing countries have led to the exploration of index-based products. An index-based insurance product is based on a measurable parameter (e.g. rainfall, yield, etc.); farmers receive a payout if the index reaches a certain trigger, regardless of actual losses incurred in their fields. This type of insurance is easy to administer and carries benefits such as transparency and the elimination of adverse selection and moral hazard; it suffers, however, from basis risk because payouts may not fully reflect individual growers' losses.

Over the past ten years, there have been several index-based insurance pilots in developing countries (e.g. Ethiopia, Malawi, and Mali), and the international community is eager to establish programs that will influence future agricultural policy in Senegal and other emerging economies. Many of these pilots have been lauded for their success; the Malawi scheme in particular indicated that there is much potential for these products.

Most Senegalese farmers are small subsistence farmers that grow a variety of crops, such as millet, peanuts, sorghum, cotton, and cassava. This farmer and his daughter are planting corn on their farm in the Kolda region.



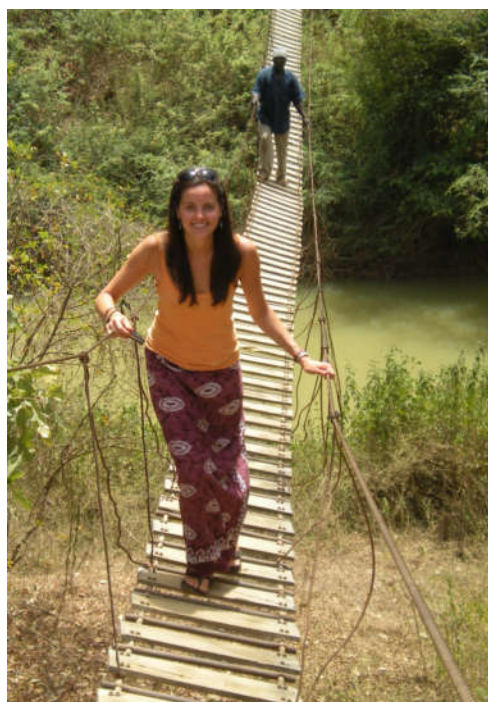
It is equally clear, however, that they are not panacea and must be developed in conjunction with other strategies that will improve farmers' crop yields and resilience to natural catastrophes. The development of agricultural insurance is one component of a comprehensive, long-term strategy to protect Senegalese farmers from cyclical poverty linked to natural catastrophes, to improve their use of inputs (e.g., seeds, fertilizers, pesticides, etc.) and farming techniques, to facilitate adaptation to climate change, and to contribute to the modernization of the Senegalese agricultural sector.

This approach places high demands on many organizations in Senegal, such as the Senegalese government, international organizations, insurers, and farming organizations. Meetings with many of the aforementioned during my January 2010 research visit to Senegal, however, indicated that these stakeholders are cognizant of the

imperative to adopt strategies that will fulfill the needs highlighted above.

Furthermore, programs and structures already in place in Senegal can be incorporated into a systematic approach that meets the following criteria: location-specific, integrative, goal-oriented, and long-term but flexible. Strategies include the introduction of agricultural insurance in conjunction with access to agricultural credit and educational programming as well as longer-term product development.

Beyond Senegal, these strategies have broad implications for the establishment of agricultural insurance programs in other developing countries with weak agricultural sectors.



The author on a visit to the Parc National de Niokolo-Koba, a UNESCO World Heritage Site and natural protected area in southeastern Senegal.

Laura Boudreau, a Rhodes Scholar Finalist in 2009, has been working on this research with her advisors, Howard Kunreuther and Erwann Michel-Kerjan, through the Wharton Research Scholars Program. Contact boudreau.laura@gmail.com.

Alternative Risk Reducing Measures for Structures, Crops and Infrastructure in Hazard-Prone Areas

Analysis of alternative risk reducing measures is part of an ongoing study the Risk Center is undertaking as part of a new cooperative agreement with the **World Bank**.

The project focuses on adaptation measures against natural hazards, principally tropical cyclone wind, flood, earthquake and drought. In addition to structural measures, the project also looks at the role of micro-insurance in protecting farmers against losses from floods and drought.

The most recent research under this project are a study by Laura Boudreau “*Promoting Food Security in a Volatile Climate: Agricultural Insurance for Senegalese Farmers*” (facing page) and a study on “*International Weather Index Insurance Pilots and Their Implications for China*” by Jenny Fan, Lawrence Gu, Xiaochun Ni that is currently being undertaken in China (page 10).

Wharton Risk Center co-director Howard Kunreuther delivered the keynote address at the **2010 China International Conference on Insurance and Risk Management (CICIRM)** sponsored by **Tsinghua University’s China Center for Insurance and Risk Management**, and **Qinghuai University’s School of Finance and Economics**, in Xining, Qinghuai (a western province) in July, 2010.

The 2010 CICIRM will initiate an annual forum in China for international communication and cooperation in the studies of insurance, risk management, and actuarial science. Conference participants will have the opportunity to present recent academic and practical research in concurrent sessions, and exchange ideas with leading international researchers.

World Economic Forum's Global Risks Report 2010

The events of the past year have revealed a fundamental need to change our thinking on global risks and how they are managed. With unprecedented levels of interconnectedness between all areas of risk, the need to combat governance gaps globally is greater than ever. Decision makers can address these only with improved coordination and supervision.

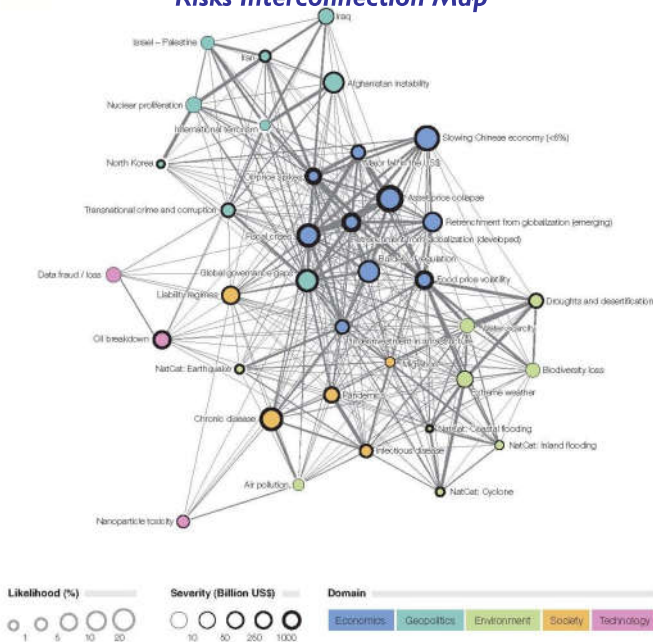
The World Economic Forum's [Global Risks 2010](#) identifies a number of underlying risks that contributed to and were exacerbated by the financial crisis and global economic downturn.

Fiscal crises and unemployment, underinvestment in infrastructure – especially in energy and agriculture – and chronic disease are identified as the pivotal areas of risk over the next years.

Other risks identified as equally systemic in nature, and requiring better global governance, are transnational crime and corruption, biodiversity loss and cyber-vulnerability. For more information, visit <http://www.weforum.org/pdf/globalrisk/globalrisks2010.pdf>.

The Wharton Risk Center has been the academic partner of the World Economic Forum since 2005.

World Economic Forum's Global Risks 2010 Risks Interconnection Map



Source: World Economic Forum, 2010

An interactive version of the Risks Interconnection Map is available at <http://www.weforum.org/documents/riskbrowser2010/risks/>

TERRORISM INSURANCE IN 2010: WHERE DO WE STAND?

Several recent near-miss terrorist incidents are a reminder that terrorism continues to be of concern. Indeed, many terrorist attempts over the last few years — not all disclosed to the public — were averted by intelligence and security services.

Ensuring that our economies remain terror-proof was the subject of a high-level conference convened at the OECD headquarters in Paris, June 2010. Organized jointly by the **OECD Secretary-General High Level Advisory Board** (on which the Wharton Risk Center's Erwann Michel-Kerjan serves as Board Chairman) and by the **Australian Reinsurance Pool Corporation**, the invitation-only conference convened top decision makers to interact on the current status of terrorism risk insurance markets and governments' role in different countries, to brainstorm on open questions for the future, and to learn from best practices.

Attendance by over 100 government and industry decision makers from 29 countries — including the heads of the eleven national terrorism insurance programs established in OECD member countries — made this one of the most important gatherings ever on the issue of terrorism insurance.

This is the second OECD-organized conference on terrorism risk financing. The first such gathering in 2004 resulted in the widely disseminated report, "**Terrorism Insurance in OECD Countries**" which was published a few days before the London bombing in 2005. Five years later, however, there is very little regulatory and market information available, impeding countries from comparing national schemes and identifying best practices. To overcome this limitation, the heads of national terrorism insurance programs have newly established a permanent international information-sharing platform on the financial coverage of terrorism risk to monitor the evolution of national terrorism insurance programs, provide more detailed analyses of private insurance and reinsurance market trends and allow closer collaboration on economic responses to terrorism.

While insurance coverage will not prevent the next large-scale terrorist attack, it will provide the necessary financial safety net for people and corporations to get back to their feet as quickly as possible right after it, providing some economic stability in an already turbulent world.



INTERNATIONAL NET-
OCDE
WORK ON THE FINAN-
CIAL
MANAGEMENT OF LARGE-SCALE CATASTROPHES

New Series: Wharton Risk Center Issue Briefs

The Wharton Risk Center has launched a new publication series: **INFORMED DECISIONS ON CATASTROPHE RISK ISSUE BRIEFS**. The non-technical 3-page briefs present empirical research findings together with the Risk Center research team's best thinking on how the findings and concepts can be applied to the management of catastrophic risk.

The 2010-2011 series covers topics such as behavioral aspects of risk mitigation, insurance regulation, cost of financial capital, and analysis of flood insurance data including how risk-reduction measures affect flood claims, and the length of time that homeowners keep their flood insurance.

The briefs can be accessed on the Risk Center's website at <http://opim.wharton.upenn.edu/risk/issuebriefs.php>. To request hard copies, please contact Carol Heller at the Risk Center, hellerc@wharton.upenn.edu.



Why do few people in catastrophe-prone areas invest in risk reduction measures?



Can property insurance companies in hurricane-prone areas sustain their operations?

Better Understanding the Importance of Financial Capital

An Industry Survey by the Wharton Risk Management and Decision Processes Center and Oliver Wyman

Financial capital is an expensive – but little understood – element of insurance pricing.

Several factors unique to the insurance industry make financial capital particularly expensive. These factors include corporate income taxes, illiquidity associated with the complexity of insurance operations, and the costs associated with delegated investment management.

The costs associated with financial capital are particularly high for lines of business exposed to catastrophes, and are necessarily are passed on to policyholders through higher premiums. As of September 30, 2009, the U.S. property and liability industry had policyholders' surplus of \$491 billion, which was over one-third of the assets in the industry and greater than annual premium volume.

As part of its ongoing research initiative in managing and financing extreme events, the Wharton Risk Management and Decision Processes Center, in collaboration with **Oliver Wyman**, is conducting a survey of executives in property and casualty insurance and reinsurance firms.

The purpose of the study is to gain clarity on a number of issues of interest to the insurance industry, policymakers and researchers alike, such as:

1. How relevant are capital constraints in the day-to-day operations of insurance companies?
2. What are the significant differences in capital measurement and management across major segments of the industry?
3. Has progress toward modeling of risk and capital needs impacted key decision processes?

On completion of our analysis of the survey data, we will make aggregate results available to all participants. Individual responses will be treated confidentially by the research team.

For more information, please contact **Scott Harrington**, Alan B. Miller Professor; Professor of Insurance and Risk Management, harring@wharton.upenn.edu.

To participate in the survey, please follow the link
<http://opim.wharton.upenn.edu/capitalsurvey/>

Russell Ackoff Doctoral Student Fellowship Awards, 2010

The Wharton Risk Center is pleased to announce the recipients of its 2010 Russell Ackoff Doctoral Student Fellowships. The awards are used to fund data collection, conference fees, and other research expenses for studies in human decision making by doctoral students across the Wharton School and other departments at the University of Pennsylvania. This year, fellowships were awarded to 21 doctoral students at Penn.

The Russell Ackoff Fellowships are funded by an endowment provided to the Wharton School by the Anheuser-Busch Charitable Trust. Prof. Emeritus Russell Ackoff's (1919-2009) work was dedicated to furthering our understanding of human behavior in organizations. More information can be found at <http://opim.wharton.upenn.edu/risk/ackoff.html>.

The 2010 Russell Ackoff Fellowships were awarded to:

RECIPIENT	DEPARTMENT	PROPOSAL TITLE
Pavel Atanasov	Psychology	Asymmetric Payoffs and Cooperation in Inter-Dependent Security and Prisoner's Dilemma Games
Jonathan Berman	Marketing	Warm Glows and Cold Truths: Affective Reactions from Donations to Charitable Causes
Amit Bhattacharjee	Marketing	Moral Decoupling: Motivated Dissociations of Moral Value and Product Value
Cabral Bigman	Annenberg School for Communications	Testing the Effect of STI Racial Health Disparities Information on Perceived Risk and Prevention Intentions among Black and White Women
Peter Busse	Annenberg School for Communications	Testing normative messages to promote intentions to get tested for HIV among Latinos
Cindy Chan	Marketing	Differentiating the "I" in "In-Group": How Identity-Signaling and Uniqueness Motives Combine to Drive Consumer Choice
Stephanie Finnel	Marketing	Moral Identity and Unpleasant Donations of Time versus Money
Santiago Gallino	Operations and Information Management	Does Inventory Have Psychic Effects? A Test Using Extreme Weather for Exogenous Variation
Jose Guajardo	Operations and Information Management	Do warranties matter? An empirical analysis in the automotive industry
Adam Isen	Business and Public Policy	The heritability of cognitive & non-cognitive skills, their genetic overlap, and environmental moderation
Fern Lin	Marketing	Human Decision Processes and Risk Management
Antonio Moreno-Garcia	Operations and Information Management	The Impact of Customer Behavior on the Automobile Supply Chain: A Study of Consumer and Manufacturer Reactions to Gas Prices
Anita Mukherjee	Applied Economics	Estimating Structural Models of Insurance Demand Using Data from a Randomized Field Experiment in Gujarat, India
Adam Powell	Health Care Management and Economics	An exploration of firm goals and uncertainties when acquiring a high-tech durable good: The case of CT machines
David Rothschild	Business and Public Policy	Forecasting: Expectations, Probabilities, and Observable Characteristics
Eric Schwartz	Marketing	Exploration and Exploitation in Interactive Media
Jason Schwartz	History and Sociology of Science	Advisory Committees in U.S. Biomedical Regulation
Vivek Shah	Applied Economics	Motivated Beliefs, Attention, and Insurance
Ewa Szymanska	Psychology	Moral impartiality and neglected loyalties in third-party punishment
Alison Wood	Operations and Information Management	Bring it on: How Successful Negotiators Strategically Choose to Feel Worse
Joel Wooten	Operations and Information Management	Managing Uncertainty in Leader Retention: How Firing on Firm Performance Can Be the Wrong Choice

In addition to supporting the costs of research, one of the goals of the Ackoff awards is to foster a sense of community among scholars at Penn involved in research on decision making. As such, the Risk Center hosts events which provide the opportunity for recipients of the Ackoff Fellowships to share their research accomplishments.

Recipients of the **2009 Ackoff Doctoral Fellowship Awards** presented their research findings to faculty and students at the annual Ackoff Fellowship luncheon, hosted by the Wharton Risk Center on April 15, 2010. Participating at the event were:

Amit Bhattacharjee (Marketing)
 Stephanie Finnel (Marketing)
 Joelle HY Fong (Applied Economics)
 Jose Guajardo (Operations and Information Mgmt)
 Shawnika Hull (Annenberg School for Communication)
 B. Kyu Kim (Marketing)
 Matthew Nassar (Medical School—Neuroscience)
 Chieh Ou-Yang (Applied Economics)
 Eric Schwartz (Marketing)
 Ben Shiller (Business and Public Policy)
 Ewa Szymanska (Psychology)
 Alison Wood (Marketing)
 Joel Wooten (Operations and Information Mgmt)

Eric Schwartz, a PhD student in Marketing, presents "Integrative Framework of Dynamic Latent State Models: An Application to Visits to an Online Streaming Video Site," research with Yao Zhang, Oliver Entine, Eric Bradlow and Pete Fader, which received Ackoff Fellowship funding from the Wharton Risk Center in 2009.



Visiting Scholars

The Risk Center is delighted to welcome several visiting scholars who doing research on catastrophe risk management.

Professor Wenge Zhu

Fulbright Scholar

Shanghai University of Finance and Economics
 Shanghai, P. R. China

Visiting: September 2010 - July 2011

Dr. Wenge Zhu is professor of finance and insurance at Shanghai University of Finance and Economics, China. He was selected by the Council for International Exchange of Scholars (CIES) as a Fulbright scholar to conduct research in the United States for ten months. His case study of catastrophe events in China is entitled "The Role of Insurance in Managing Natural Disasters: A Comparative Study of Financing Mechanisms for Catastrophic Risk in China and in the United States."

Dr. Barbara Klimaszewski-Blettner

Postdoctoral Fellow

Ludwig-Maximilians-Universität
 Institute for Risk and Insurance Management
 Munich, Germany

Visiting: April - September 2010

Barbara is a recent PhD focusing on economic aspects of public-private partnerships in catastrophe risk management. She is undertaking an empirical investigation examining property insurers' responses to catastrophic events, comparing the reaction among personal and commercial lines, and working on an experiment on the demand for long-term insurance against catastrophic risk.

Sabine Lemoyne de Forges

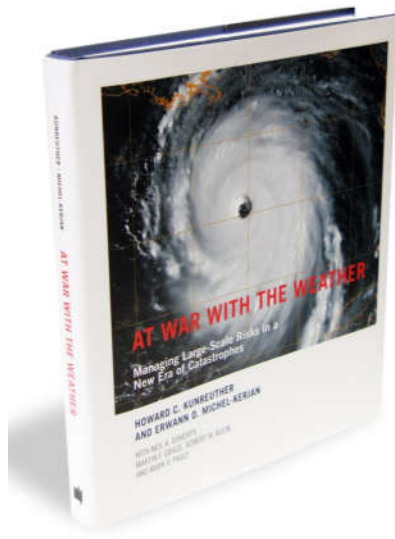
Doctoral Candidate

École Polytechnique
 Economics Department
 Paris, France

Visiting: January - May 2010

Sabine is a PhD student studying financial coverage of natural catastrophe risks. She is working with the Risk Center in its ongoing research on flood insurance.

RECENT PUBLICATIONS



AT WAR WITH THE WEATHER: Managing Large-Scale Risks in a New Era of Catastrophes

by **Howard Kunreuther** and **Erwann Michel-Kerjan**
with Neil A. Doherty, Martin F. Grace, Robert W. Klein and Mark V. Pauly
MIT Press, July 2009 www.AtWarWithTheWeather.com

Despite record losses from hurricanes, many still think we can continue to gamble with Mother Nature and win. But we have now reached a breaking point because of the concentration of population and asset values in high-risk coastal regions of the country.

At War with the Weather delivers a groundbreaking examination of how we think about catastrophes and (mis)manage risks, and how financial recovery from natural disasters in the United States must radically change. It offers innovative, long-term solutions for reducing losses and providing financial support for disaster victims – a coherent strategy to ensure sustainable recovery from future large-scale disasters.

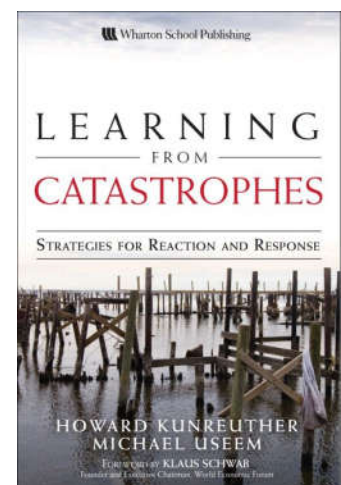
LEARNING FROM **CATASTROPHES**: STRATEGIES FOR REACTION AND RESPONSE

HOWARD KUNREUTHER and **MICHAEL USEEM**, editors

Foreword by **KLAUS SCHWAB**, Founder and Executive Chairman, World Economic Forum
Wharton School Publishing, December 2009 www.whartonsp.com

Leading experts in extreme risk management present innovative approaches to mitigation, preparedness, and response. They show how to dramatically improve forecasting and communication about high-consequence risks, use economic incentives to improve resilience and sustainability, and proactively implement operational steps for rapid, effective response to disaster.

Contributors: **Alan Berger**, Massachusetts Institute of Technology; **Case Brown**, Project for Reclamation Excellence, and Clemson University; **Séan Cleary**, Parmenides Center for the Study of Thinking; **Arnold Howitt**, Harvard University; **Bridget M. Hutter**, London School of Economics; **Michel Jarraud**, World Meteorological Organization; **Carolyn Kousky**, Resources for the Future; **Howard Kunreuther**, Wharton School, University of Pennsylvania; **Herman “Dutch” Leonard**, Harvard University; **Geoff Love**, World Meteorological Organization; **Thomas Lovejoy**, The H. John Heinz III Center for Science, Economics, and the Environment; **Michele McNabb**, Freeplay Energy; **Erwann Michel-Kerjan**, Wharton School, University of Pennsylvania; **Suzanne Nora Johnson**, Former Vice Chairman of Goldman Sachs Group; **Kristine Pearson**, Freeplay Foundation; **Harvey Rubin**, Institute for Strategic Threat Analysis and Response, University of Pennsylvania; **Jiah-Shin Teh**, Institute for Strategic Threat Analysis and Response, University of Pennsylvania; **Michael Useem**, Wharton School, University of Pennsylvania; **Detlof von Winterfeldt**, International Institute for Applied Systems Analysis (IIASA); **Lan Xue**, School of Public Policy and Management, Tsinghua University; **Richard Zeckhauser**, Harvard University; **Kaibin Zhong**, China National School of Administration



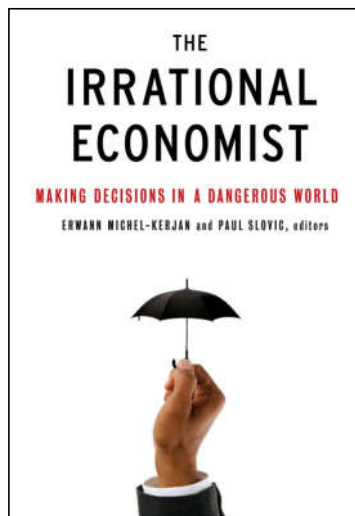
THE IRRATIONAL ECONOMIST: **MAKING DECISIONS IN A DANGEROUS WORLD**

ERWANN MICHEL-KERJAN and PAUL SLOVIC, editors

PUBLICAFFAIRS BOOKS, January 2010

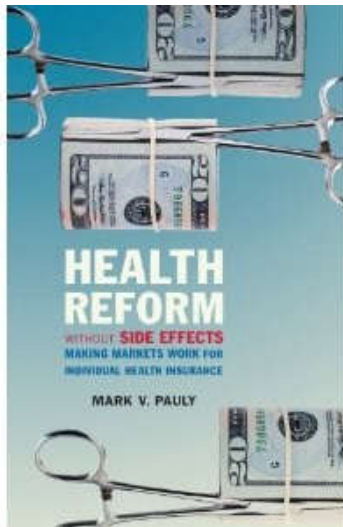
www.TheIrrationalEconomist.com

The Irrational Economist aims to shed light on some important developments in decision making including some of the most recent discoveries. Distilling the best knowledge from decision sciences, behavioral economics, neuroscience, psychology, management, insurance, and finance, leading pioneers in these fields, including several Nobel laureates, introduce the latest discoveries that might help us to get our decisions right.



Contributors:

George A. Akerlof	Paul R. Kleindorfer	Mark V. Pauly
Kenneth Arrow	Carolyn Kousky	John Pratt
Colin F. Camerer	David H. Krantz	Howard Raiffa
Neil Doherty	Howard Kunreuther	Thomas Schelling
Baruch Fischhoff	Joanne Linnerooth-Bayer	Paul J. H. Schoemaker
Kenneth A. Froot	Robert Meyer	Robert J. Shiller
Christian Gollier	Erwann Michel-Kerjan	Paul Slovic
Geoffrey Heal	David Moss	Cass R. Sunstein
Robin M. Hogarth	Robert E. O'Connor	W. Kip Viscusi
Dwight M. Jaffee	Ayse Öncüler	Dennis E. Wenger
Ralph L. Keeney	Olivier Oullier	Richard Zeckhauser



HEALTH REFORM WITHOUT SIDE EFFECTS: Making Markets Work for Individual Health Insurance

by **Mark V. Pauly**

Hoover Institute Press, May 2010

www.hooverpress.org

Health Reform without Side Effects offers a detailed look at the individual health insurance market in the United States, and suggests approaches that build on what currently works well. It provides a realistic assessment of how much improvement we can demand and expect. Although there are some serious deficiencies in today's individual insurance market, the current criticisms are often based on anecdote and speculation, and ignorant of some important advantages in this market that should be preserved.

RECENT PUBLICATIONS more at <http://opim.wharton.upenn.edu/risk/papers.php>

Nitin Bakshi and Paul Kleindorfer, **Co-opetition and Investment for Supply-Chain Resilience**, *Production and Operations Management*, 2009, 18:6, 583–603

Cary Coglianese, **The Transparency President? The Obama Administration and Open Government Governance**, Vol. 22(4), Pg. 522, October 2009

Cary Coglianese, Adam M. Finkel, David Zaring (eds.), **Import Safety: Regulatory Governance in the Global Economy**, University of Pennsylvania Press, 2009

David M. Cutler and Alexander M. Gelber, **Changes in the Incidence and Duration of Periods without Insurance**, *Kew England J of Medicine* 2009, 360:17, 1740-1748

Min Ding, Young-Hoon Park, Eric Bradlow, **Barter Markets**, *Management Science*, 2009

Neil Doherty, and Alexander Muermann, **On the Role of Insurance Brokers in Resolving the Known, the Unknown and the Unknowable**, in "*The Known, the Unknown and the Unknowable in Financial Risk Management*" F.X. Diebold, N. Doherty, and R. Herring (eds.), Princeton University Press, 2010

Stephen E. Flynn, **Homeland Insecurity** *American Interest*, June 2009

Christian Gollier and Alexander Muermann, **Optimal Choice and Beliefs with Ex Ante Savoring and Ex Post Disappointment**, *Management Science*, forthcoming

Min Gong, Jonathan Baron and Howard Kunreuther, **Group Cooperation under Uncertainty** *Journal of Risk and Uncertainty*, 2009, 39:3

Scott E. Harrington, **The Financial Crisis, Systemic Risk, and the Future of Insurance Regulation**, *National Association of Mutual Insurance Companies*, September 2009

Geoffrey Heal and Howard Kunreuther, **Social Reinforcement: Cascades, Entrapment and Tipping**, *American Economic Journal: Microeconomics*, 2010, 2:1, 86–99

Geoffrey Heal and Howard Kunreuther, **Environment & Energy: Catastrophic Liabilities** in "*Measuring and Managing Federal Financial Risk*." D. Lucas (ed.), University of Chicago Press, 2010

Dwight Jaffee, Howard Kunreuther, and Erwann Michel-Kerjan, **Long-Term Property Insurance** *Journal of Insurance Regulation*, forthcoming

Paul R. Kleindorfer and Yoram Wind (eds.), **Network Challenge: Strategy, Profit and Risk in an Interlinked World**, Wharton School Publishing, Upper Saddle River, NJ: 2009

Howard Kunreuther, Robert Meyer and Erwann Michel-Kerjan, **Overcoming Decision Biases to Reduce Losses from Natural Catastrophes**, in "*Behavioral Foundations of Policy*" E. Shafir (ed.), Princeton University Press, in press

Howard C. Kunreuther and Erwann O. Michel-Kerjan, **Market and Government Failure in Insuring and Mitigating Natural Catastrophes: How Long-Term Contracts Can Help**, in "*Public Insurance and Private Markets*" J.R. Brown, (ed.), AEI Press, 2010

Howard Kunreuther and Mark Pauly, **Insuring Against Catastrophes**, in "*The Known, the Unknown and the Unknowable in Financial Risk Management*", F.X. Diebold, N. Doherty, and R. Herring (eds.), Princeton University Press, 2010

Howard Kunreuther, Gabriel Silvasi, Eric T. Bradlow, Dylan Small, **Bayesian Analysis of Deterministic and Stochastic Prisoner's Dilemma Games**, *Judgment and Decision Making*, 2009, 4:5, 363–384

Erwann Michel-Kerjan, **Catastrophe Economics: The National Flood Insurance Program**, *Journal of Economic Perspectives*, forthcoming

Erwann Michel-Kerjan and Debra Decker, **Insure to Assure**, *Innovations: Resilience in a Turbulent World* (MIT Press), 2009, 4:2, 135-155

Erwann Michel-Kerjan and Carolyn Kousky, **Come Rain or Shine: Evidence on Flood Insurance Purchases in Florida** *The Journal of Risk and Insurance* 2010, 77:2 pp. 369-397

Eric Orts and Alan Strudler, **Putting a Stake in Stakeholder Theory**, *Journal of Business Ethics*, forthcoming 2010

Suresh Ramanathan and Patti Williams, **Immediate and Delayed Emotional Consequences of Indulgence: The Moderating Influence of Personality Type on Mixed Emotions**. *Journal of Consumer Research*, forthcoming

Christian Schade, **Entrepreneurial decision making: A paradigm rather than a set of questions** *Journal of Business Venturing*, 2010, 25(2), 173-174

Deborah Small, **Reference-dependent sympathy**, *Organizational Behavior and Human Decision Processes*, 2010, 112, 151-160

Haitao Yin, Howard Kunreuther, Matthew White, **Risk-Based Pricing and Risk-Reducing Effort: Does the Private Insurance Market Reduce Environmental Accidents?** *Journal of Law & Economics*, forthcoming

Anja Zimmer, Christian Schade, Helmut Grundl, **Is default risk acceptable when purchasing insurance?** *Journal of Economic Psychology*, 2009, 30: 11-23

RISK CENTER IN THE NEWS more at <http://opim.wharton.upenn.edu/risk/facultynews.php>

June 29, 2010. **Fortune**

[Companies have a constitutional right to sue their regulators](#), says Penn Law's Deputy Dean, Cary Coglianese.

Spring 2010. **Wharton Magazine**, "[Masters of Disaster](#)"

Wharton Risk Center researchers are investigating why humans do such a poor job planning for, and learning from, catastrophes.

May 18, 2010. **Financial Times**, "How to manage risk in complex projects"

Leaders should map interdependencies among organizations and across risks, says Erwann Michel-Kerjan, discussing the May 2010 oil rig disaster in the Gulf Coast.

April 19, 2010. **Reuters Television**

Maurice E. Schweitzer, Prof. of Operations and Information Management, is interviewed about the fraud charges facing Goldman Sachs, noting that "these allegations hit at the core of what Goldman Sachs is."

April 18, 2010. **Washington Post**

Mark Pauly, Prof. of Health Care Management, discusses health insurers' responses to the new health-care legislation, predicting that insurance companies may get "prices up while [they] can."

March 7, 2010. **Scripps Interactive Newspapers Group, Florida's Treasure Coast**

["Why relatively few Americans in catastrophe-prone areas invest in risk-reduction measures."](#)

Excerpted from the Wharton Risk Center issue brief on decisions related to catastrophe risk.

March 1, 2010. **Newsweek**, "[A More Dangerous World: Why we misunderstand risk.](#)"

Op-ed by Erwann Michel-Kerjan and Paul Slovic: "Understanding behavioral quirks is critically important to those in charge of developing long-term strategies to make their countries more resilient."

February 15, 2010. **NPR "Morning Edition"**

Professor of Health Care Management, Mark Pauly, explains why the [individual health mandate was once favored among conservatives](#).

January 18, 2010. **Washington Post**, "[Overcoming our disaster myopia in Haiti](#)"

Op-ed by Howard Kunreuther: "Haiti offers an opportunity for one to design strategies that have relevance not only for natural disasters in all parts of the world but for other low-probability, high-consequence events."

January 2010. **Newsweek Special Issue, America Remains at Risk -- From Itself**

Op-ed by Stephen E. Flynn: "The greatest peril today is our lack of resilience as a society – our gravest vulnerability is not of an attack, but the danger our country will overreact."

November 30, 2009. **The Miami Herald**, "[Flood insurance program awash in red ink.](#)"

Erwann Michel-Kerjan comments on the National Flood Insurance Program.

October 21, 2009. **The Wall Street Journal**, "Competition and Health Insurance"

Op-ed by Scott Harrington: "Repealing the insurance industry's antitrust exemption won't reduce prices or profits."

September 19, 2009. **The Philadelphia Inquirer**, "Urge to buy turns on ethics"

Patti Williams, Assoc. Professor of Marketing, is interviewed in an article about purchase decision-making.

September 1, 2009. **Risk & Insurance Magazine**, "[At War with Ourselves](#)"

An interview with Howard Kunreuther about the book "At War with the Weather."

September 2009. **Forbes/Wolfe Emerging Tech Report**, "[Dealing with the Extraordinary.](#)"

Erwann Michel-Kerjan answers questions on the nature of catastrophic risk.

August 28, 2009. **Anderson Cooper 360**, "[Reckless Neglect: A Disaster Waiting to Happen...Again?](#)"

Stephen E. Flynn, Frank J. Cilluffo, and Sharon L. Cardash remember Hurricane Katrina and discuss the risks from future natural disasters if infrastructure is ignored.

August 2, 2009. **USA Today**

Eric Orts discusses Wharton's Environmental Studies degree program, noting that "there's an increasing interest among businesses to take the environment seriously."

May 28, 2009. **New England Journal of Medicine**

Op-ed by Mark Pauly: "Reform should envision...the expansion of offerings for all groups."

May 2, 2009, **Boston Globe**, "['70's Era Law Won't Solve Global Issue](#)"

Op-ed by Cary Coglianese: The EPA recently proposed regulating greenhouse gases under the Clean Air Act. Unfortunately, using this 1970s-era law to address climate change is like driving a Model T on a cross-country trip.

Risk Regulation Seminar Series

The Risk Regulation Seminar Series is jointly sponsored by the Penn Program on Regulation; the Program on Law, the Environment and the Economy; the Wharton Risk Management and Decision Processes Center; the Institute for Global Environmental Leadership; and the Fels Institute of Government. Information on upcoming seminars can be found at <https://www.law.upenn.edu/academics/institutes/regulation/seminars.html>

Fall 2009-Spring 2010 seminars:

Why the Law is So Perverse. April 20, 2010

Leo Katz, Frank Carano Professor of Law, University of Pennsylvania
 Commentators: **Bruce Chapman**, University of Toronto
Lewis Kornhauser, Alfred B. Engelberg Professor of Law, New York University

Economics and Climate Change. March 23, 2010

Gary Yohe, Woodhouse/Sysco Professor of Economics, Wesleyan University

Well-being and Equity: A Framework for Policy Analysis. February 23, 2010

Matthew Adler, Leon Meltzer Professor of Law, University of Pennsylvania

Obama's Regulatory Agenda: A One-Year Retrospective. January 26, 2010

Panel appraising the first year of regulation under President Obama

Susan E. Dudley, Director, The Regulatory Studies Center, George Washington University (former Administrator, Office of Information and Regulatory Affairs, White House)

Sally Katzen, Executive Managing Director, the Podesta Group (former OIRA Administrator, White House)

Jeff Ruch, Executive Director, Public Employees for Environmental Responsibility (PEER)

Rena Steinzor, President, Center for Progressive Reform and Professor of Law, University of Maryland

Jim Tozzi, Co-Founder, Center for Regulatory Effectiveness (former Asst. Director, Office of Management and Budget, White House)

Does the Sarbanes-Oxley Act Have a Future? November 17, 2009

Roberta Romano, Oscar M. Ruebhausen Professor of Law at Yale Law School; Director, Yale Law School's Center for the Study of Corporate Law

Regulating in the 21st Century: A New Federal Environmental and Consumer Protection Agency and Other Proposals for Reform. October 20, 2009

J. Clarence "Terry" Davies, Senior Fellow, Resources for the Future

Commentators: **E. Donald Elliott**, Willkie Farr & Gallagher LLP, and **Marissa Golden**, Bryn Mawr College

Comparative Effectiveness Research as Social Science: Implications for Technology Assessment in U.S. Health Care Reform. September 22, 2009

David Meltzer, Department of Medicine, Department of Economics and Graduate School of Public Policy Studies, University of Chicago



Discussing the regulatory environment in the first year of the Obama Administration are:

Jim Tozzi, Co-Founder, Center for Regulatory Effectiveness (former Assistant Director, Office of Management and Budget, White House)

Sally Katzen, Executive Managing Director, the Podesta Group (former OIRA Administrator, White House)

Susan E. Dudley, Director, The Regulatory Studies Center, George Washington University (former Administrator, Office of Information and Regulatory Affairs, White House)

Rena Steinzor, President, Center for Progressive Reform and Professor of Law, University of Maryland

Jeff Ruch, Executive Director, Public Employees for Environmental Responsibility (PEER)

Cary Coglianese, Edward B. Shils Professor of Law and Professor of Political Science, University of Pennsylvania

Research Sponsors and Corporate Associates are a vital part of the Wharton Risk Center's operations.

In addition to providing crucial support for the Center's operations, **Corporate Associates** participate in roundtable discussions and offer insight into the value, direction and timing of research projects. **Research Sponsors** provide funding for specific research initiatives of mutual interest and regularly interact with Risk Center directors, faculty and fellows to discuss these initiatives. Associates and Sponsors attend our workshops and conferences at no cost. These meetings offer an opportunity to consult with experts and policy makers from research institutions, industry and government agencies from the U.S. and abroad.

The Risk Center is inviting interested organizations to become **Strategic Partners**. With a multi-year commitment, Strategic Partners play a key role in the Center's future research, which can enable these companies to impact the future of their industry. Strategic Partners will also benefit from greater visibility and customized relationships across the Wharton School through membership in the Wharton Partnership, Wharton's primary vehicle for fostering industry-academic collaboration.

Corporate Associate, Research Sponsorship, and Strategic Partnership contributions to the Risk Management and Decision Processes Center of the Wharton School are tax-deductible.

We thank our Corporate Associates, Research Sponsors and Strategic Partners for their support and involvement.

American Insurance Association

Bahrain Petroleum Company

CITON, Inc.

Liberty Mutual

Oliver Wyman / Marsh & McLennan

PricewaterhouseCoopers, LLP

**Property Casualty Insurers Association
of America**

State Farm Fire & Casualty Company

Travelers Companies, Inc.*

U.S. Department of Homeland Security

U.S. Environmental Protection Agency

**WeatherPredict Consulting, Inc.
(a division of Renaissance Re)**

Willis Re

World Bank

Zurich North America

* Strategic Partner

For information please contact:

Howard Kunreuther
phone: 215-898-4589
fax: 215-573-2130
email: kunreuther@wharton.upenn.edu

Erwann Michel-Kerjan
phone: 215-573-0515
fax: 215-573-2130
email: erwannmk@wharton.upenn.edu

Or visit our website at <http://opim.wharton.upenn.edu/risk/sponsors.php>

WHARTON RISK MANAGEMENT AND DECISION PROCESSES CENTER

**Risk Management and Decision
Processes Center
The Wharton School
University of Pennsylvania
558 Jon M. Huntsman Hall
3730 Walnut Street
Philadelphia, PA 19104-6340**



**Risk Management Review is a publication
of the Risk Management and Decision
Processes Center of the Wharton School,
University of Pennsylvania**

Editor: Carol Heller

To comment on this publication or to be
added to or removed from our mailing list
please contact Carol Heller:

Telephone: 215-898-5688

Fax: 215-573-2130

Email: hellerc@wharton.upenn.edu

For over 25 years, the Risk Management and Decision Processes Center at the Wharton School has been at the forefront of basic and applied research to promote effective corporate and public policies for low-probability events with potentially catastrophic consequences. The Wharton Risk Center has focused on natural and technological hazards through the integration of risk assessment and risk perception with risk management strategies. After the attacks of September 11, 2001, research activities were 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 team — 50 faculty, fellows and students — 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, Project Snapshots and Issue Briefs provide updates of Center activities and publications.

Risk Center on the World Wide Web

**Visit the Wharton Risk Management and Decision Processes Center
on the World Wide Web at: <http://opim.wharton.upenn.edu/risk/>**