Insuring Against Terrorism and Other Extreme Events

Linking Intuitive and Deliberative Thinking

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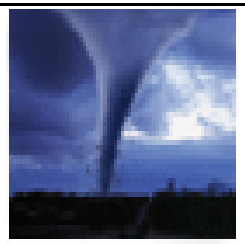
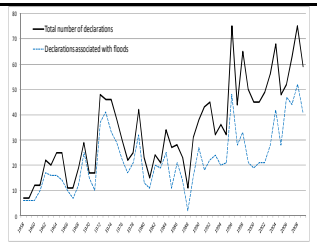
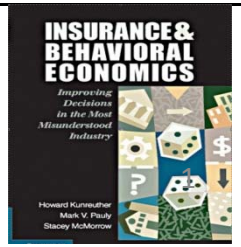






Nature of Insurance Markets

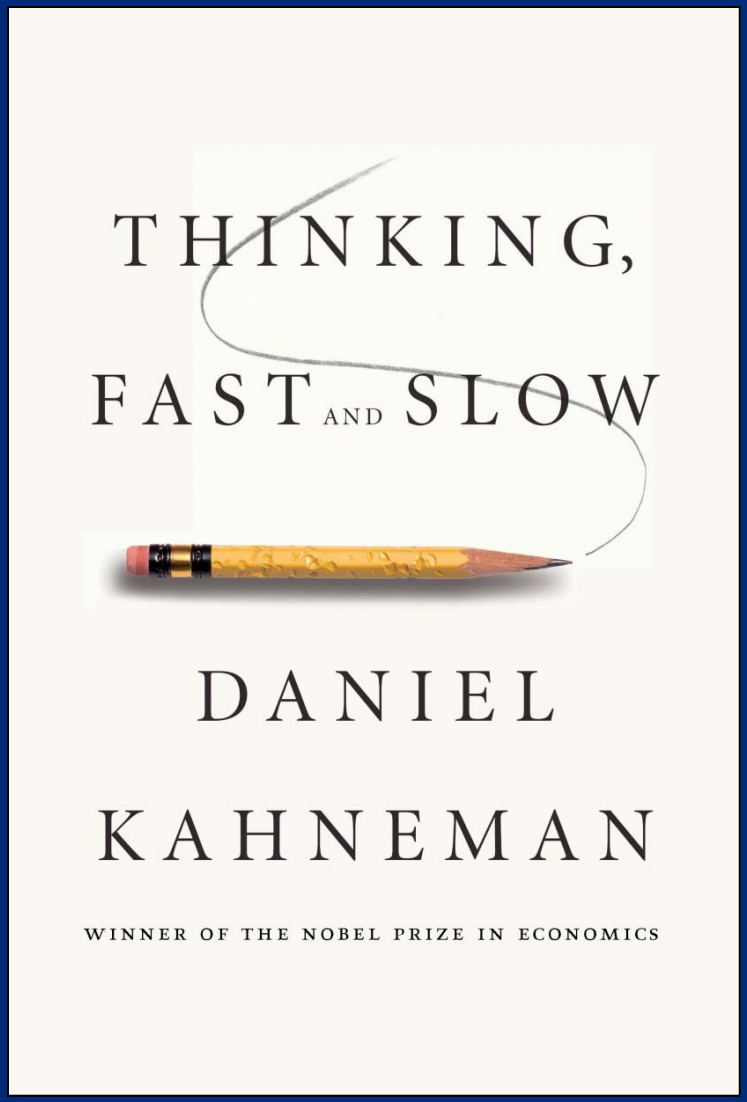
Some insurance markets work well

- Term life insurance
- Auto collision insurance
- Homeowners' insurance

Insurance markets face challenges for extreme events

- Limited personal experience with events
- Systematic biases in estimating likelihood of events occurring
- Simplified decision rules for making choices

Linking Intuitive and Deliberative Thinking for Dealing with Extreme Events



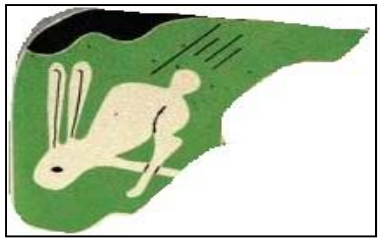
Intuitive Thinking (System 1) & Deliberative Thinking (System 2)

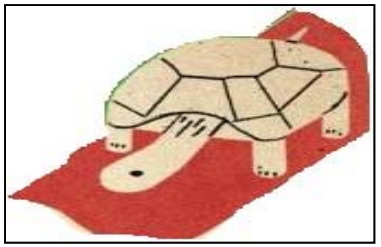
System 1 operates automatically and quickly with little or no effort

- Individuals use simple associations including emotional reactions
- Highlight importance of recent past experience
- Basis for systematic judgmental biases and simplified decision rules

System 2 allocates attention to effortful and intentional mental activities

- Individuals undertake trade-offs implicit in benefit-cost analysis
- Recognizes relevant interconnectedness and need for coordination
- Focuses on long-term strategies for coping with extreme events





Behavior Triggered by Intuitive (System 1) Thinking

Availability Bias – Estimating likelihood of a disaster by its salience

Threshold Models – Failure to take protective measures if perceived likelihood of disaster is below threshold level of concern

Imperfect Information – Misperceives the likelihood of event occurring and its consequences.

Myopia – Focus on short-time horizons in comparing upfront costs of protection with expected benefits from loss reduction

Aiding Decision Makers to Undertake Deliberative (System 2) Thinking

Provide better information on the role of insurance

Deal with emotions by highlighting the importance of buying insurance for peace of mind

- The best return on an insurance policy *is no return at all*
- Relieving one's anxiety and worry

Use availability bias to focus on consequences

- Highlight financial problems if disaster occurred and the property were destroyed because it was unprotected and it was uninsured

Overcome threshold model by stretching time horizon

Example: Likelihood of 100 year flood

- Next year: 1-in-100
- 25 years: greater than 1-in-5 chance of experiencing at least 1 flood

Insurer Behavior: Terrorism Insurance

Prior to 9/11, insurers in the United States did not charge anything for terrorism coverage despite the attempted bombing of the World Trade Center in 1993, the 1995 Oklahoma City bombing and terrorist attacks throughout the world.

After 9/11, most insurers refused to offer terrorism insurance, or if they did provide coverage they charged extremely high premiums.

Insurer Behavior on Terrorism Coverage Triggered by Intuitive (System 1) Thinking

Responses by insurers

- ***Threshold Behavior:*** Prior to 9/11 insurers treated the likelihood of a terrorist attack in the U.S. as below their threshold level of concern so ignored potential consequences.
- ***Availability Bias:*** After 9/11 insurers focused on enormous potential claim payments from another terrorist attack. As a result, they felt terrorism was an uninsurable risk.
- ***Imperfect Information:*** Insurers failed to take into account the likelihood of a future terrorist attack when determining premiums they would have to charge for coverage, and how much firms would be willing to pay for protection.

Example: 6 months after 9/11 a brokerage firm negotiated an insurance policy where an industrial company paid $900,000 for $9 million in coverage for damage to their building next year from a terrorist attack.

Challenges in Estimating Risk of Terrorist Attacks

Unpredictability of future events

- Nature of terrorism has changed; past data are not very helpful in predicting the future
- Limited data in the public domain (different than natural hazards)

Dynamic uncertainty

- Likelihood and consequences of terrorist attack determined by mix of strategies and counter-strategies
- Terrorism risk is changing over time

Impacts on unprotected targets

- Terrorists respond to security measures by attacking more vulnerable targets
- Interdependencies: Damage to unprotected targets can impact on protected ones

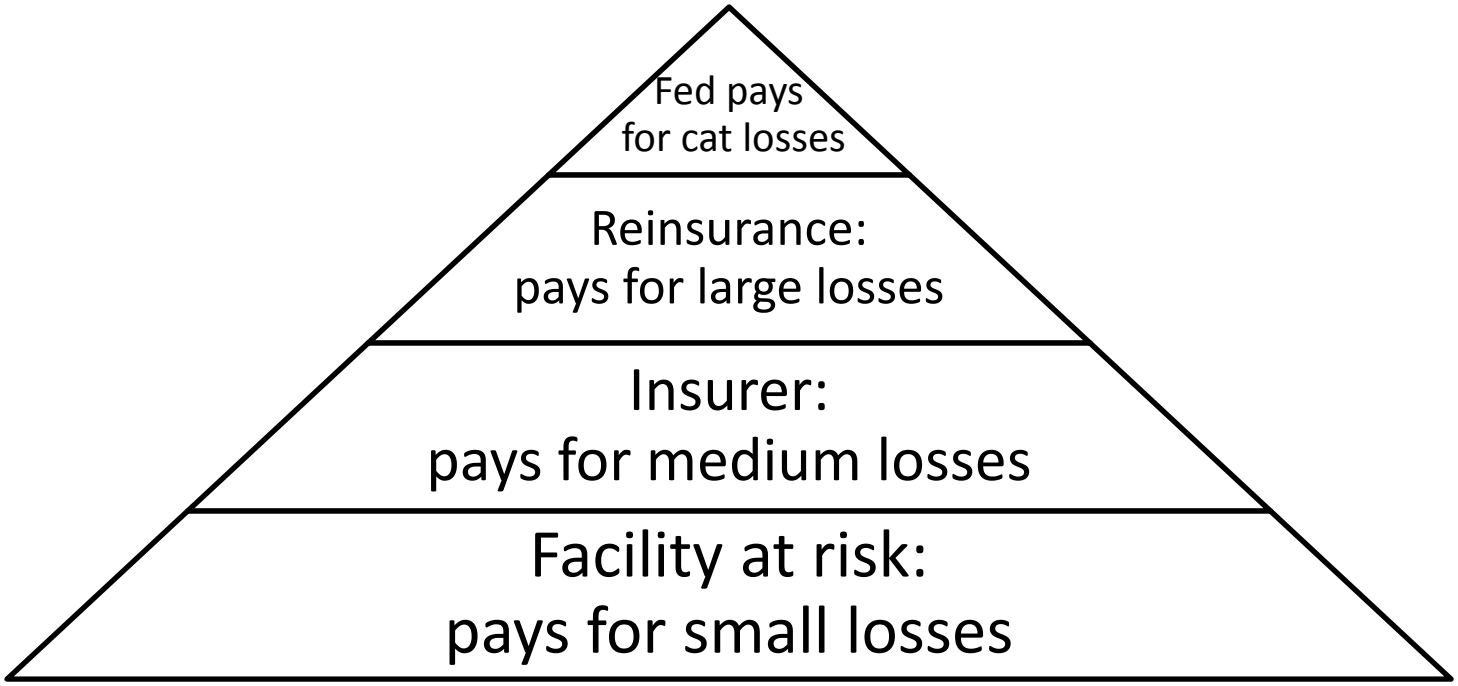
Government influences the risk of future attacks

- Develop counter-terrorism policies and international cooperation.
- Some decisions made by government as part of foreign policy can affect the will of terrorist groups to attack this country or its interests abroad

High correlation of extreme losses

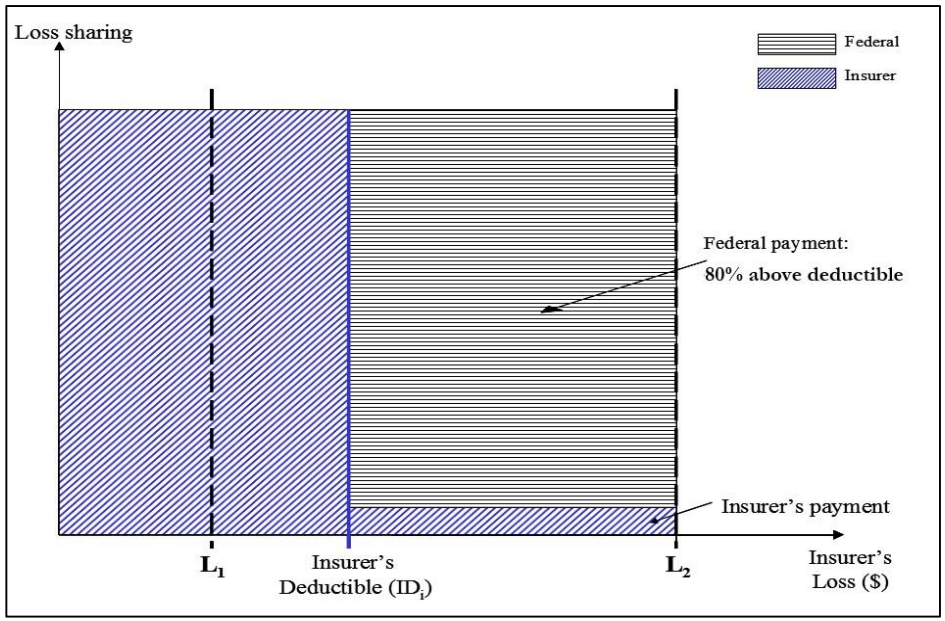
- Geographically and across lines

Features of a Public-Private Partnership for Insuring Terrorism and Other Extreme Events

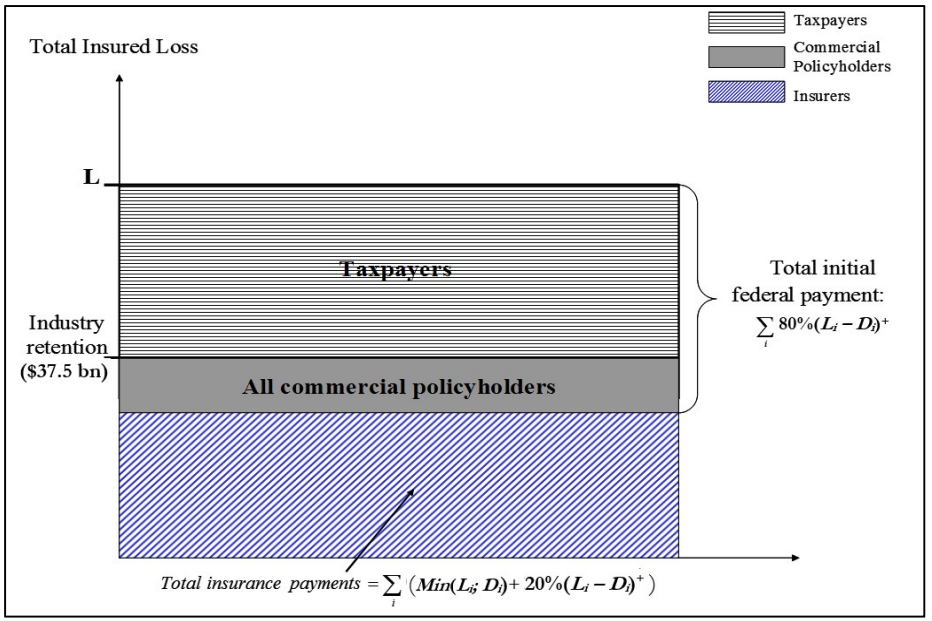


Public-Private Risk Sharing under TRIA

Firms at risk have standard deductible on commercial policies.



LOSS SHARING UNDER TRIA
BETWEEN AN INSURER AND THE FEDERAL GOVERNMENT



OVERALL LOSS SHARING UNDER TRIA

Program triggered by certified acts with insured losses > $100 million (2015) up to $200 million (2020).
Federal payment: 85% (2015), then gradually reduced to 80%.
Industry aggregate retention: $29.5 billion (2015), the gradually increased to $37.5 billion ($2bn increase per year) (to 2019), then recalculated annually based upon the annual average of the sum of insurer deductibles for all insurers for the prior 3 years
The mandatory recoupment of the federal share through policyholder surcharges is 140%.

Creating Scenarios of Plausible Attacks

10-ton truck bomb

1-ton Sarin gas release

1-kiloton nuclear bomb

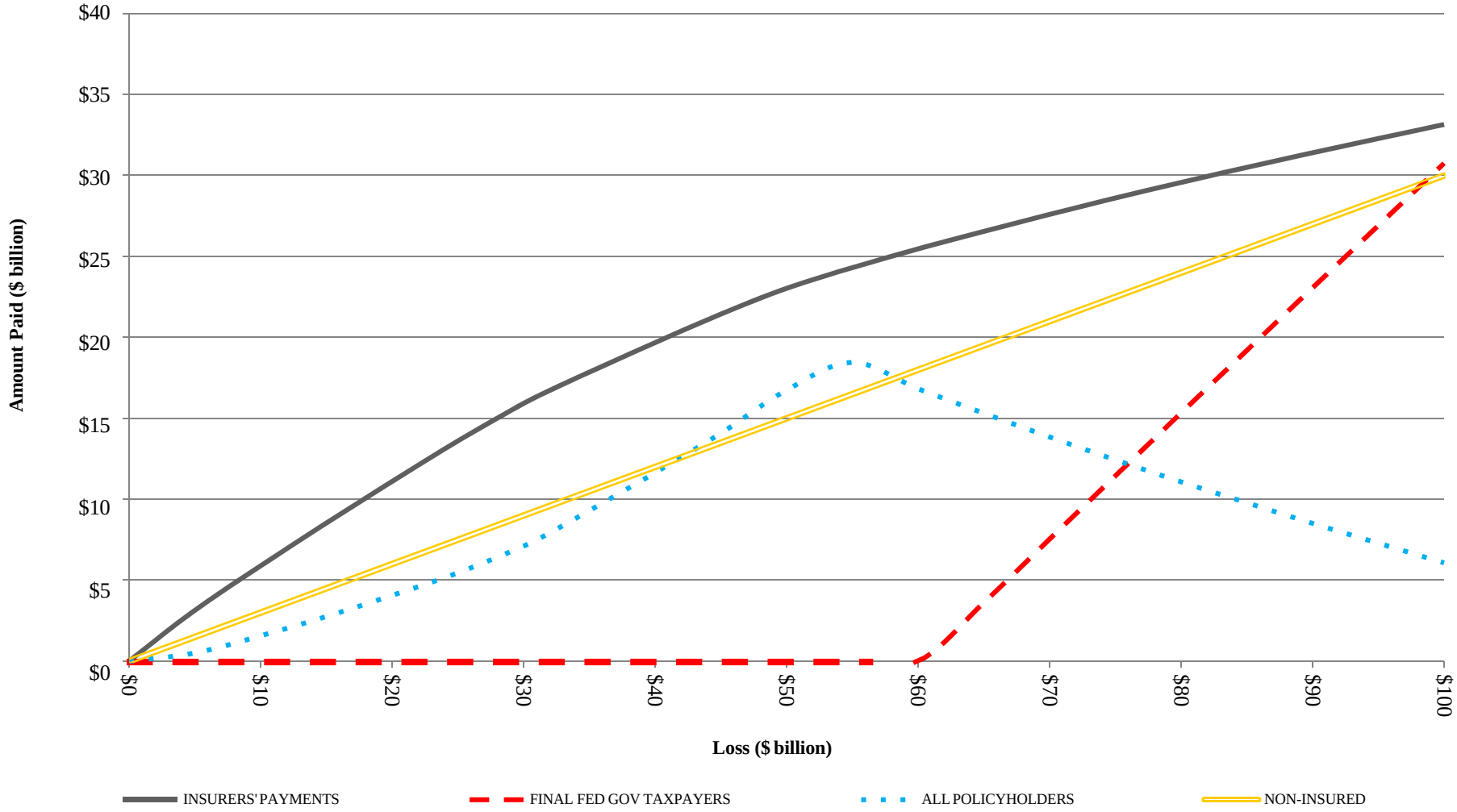
The Wharton Risk Center collaborated with Risk Management Solutions (a modeling firm) to examine impact on terrorism coverage (property and workers' compensation) in the following four major cites:

Houston
Chicago
Los Angeles
New York

Estimated Losses from a 10-Ton Truck Bomb Attack in Four of the Largest American Cities

Location	Property Loss ($ Billion)	Workers' Compensation Loss ($ Billion)	Total Loss ($ Billion)
Chicago	$26.4	$10.2	$36.6
Houston	$19.0	$ 9.3	$28.3
Los Angeles	$19.9	$ 6.7	$26.6
New York	$19.4	$12.7	$32.1

Amount Paid by Stakeholders for Different Loss Amounts from Terrorist Attacks in New York City



We assume a 50% take-up rate on property lines, 100% on workers ' compensation lines (WC) and a federal recoupment that applies only to the mandatory recoupment portion.
20% Co-Share, 20% Deductible, $37.5bn Retention; 140% recoupment rate against commercial policyholders.

Open Questions

Estimating the risk of terrorist attacks

- What data can be provided by the public sector to address this issue?
- Constructing worst-case scenarios and estimating likelihood of these attacks
- Role of cat modeling companies in providing data

Mitigation measures to reduce future losses

- What measures can be undertaken?
- Role of public sector in providing relevant data
- Nature of premium reductions to encourage investment in risk reducing measures

Impact of future attacks on insurers' behavior

- Minor economic losses (e.g., 2013 Boston Marathon bombing) will have little impact
- Large attacks (9/11) may cause insurers and reinsurers to restrict future coverage

Dealing with uninsured firms

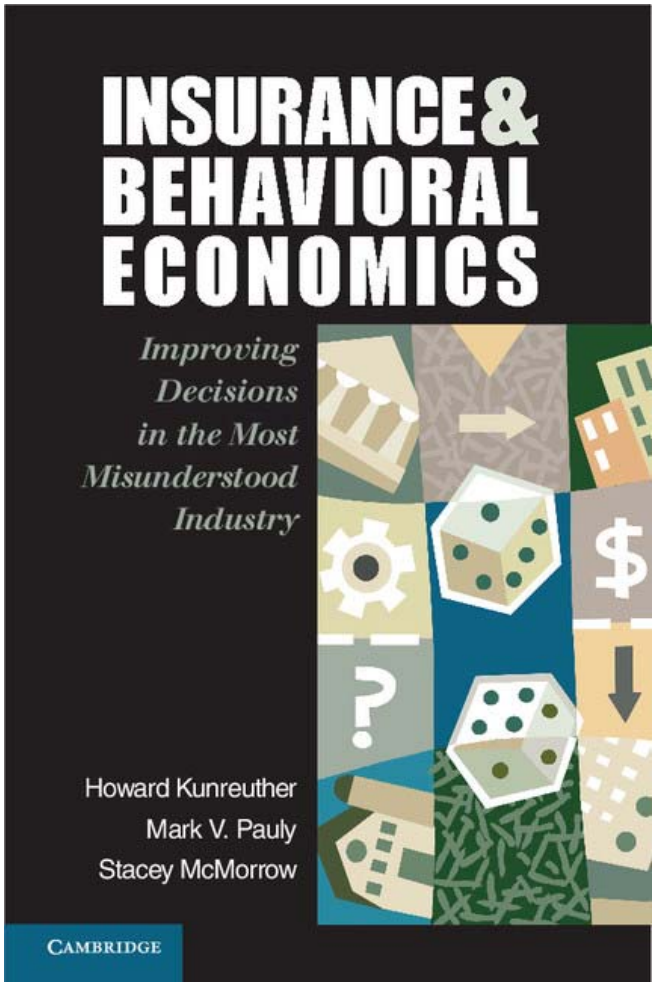
- Will *uninsured* firms that suffer losses from terrorist attack receive federal relief?
- Are there affordability issues that need to be dealt with and if so, how?
- What can we learn from international comparisons?

Conclusions

Insurance can help spread the risk of unavoidable disasters and offer incentives to invest in adaptation measures.

We need to encourage deliberative thinking by focusing on the long-term while providing short-term incentives for acting now rather than waiting by assuming *it will not happen to me*.

Insurance and Behavioral Economics: Improving Decisions in the Most Misunderstood Industry



Part I: Contrasting Ideal and Real Worlds of Insurance

Chapter One: **Purposes of this Book**

Chapter Two: **An Introduction to Insurance in Practice and Theory**

Chapter Three: **Anomalies and Rumors of Anomalies**

Chapter Four: **Behavior Consistent with Benchmark Models**

Part II: Understanding Consumer and Insurer Behavior

Chapter Five: **Real World Complications**

Chapter Six: **Why People Do or Do Not Demand Insurance**

Chapter Seven: **Demand Anomalies**

Chapter Eight: **Descriptive Models of Insurance Supply**

Chapter Nine: **Anomalies on the Supply Side**

Part III: The Future of Insurance

Chapter Ten: **Design Principles for Insurance**

Chapter Eleven: **Strategies for Dealing with Insurance-Related Anomalies**

Chapter Twelve: **Innovations in Insurance Markets through Multi-Year Contracts**

Chapter Thirteen: **Publicly-Provided Social Insurance**

Chapter Fourteen: **A Framework for Prescriptive Recommendations**