

AT WAR WITH THE WEATHER AND OTHER EXTREME EVENTS

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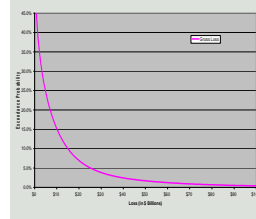
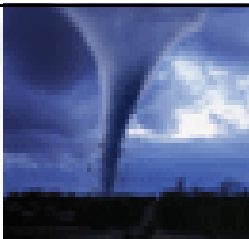
<http://opim.wharton.upenn.edu/risk>

**Society for Risk Analysis and Resources for the Future
Conference on**

New Ideas for Risk Regulation

Washington, DC

June 22, 2009



Outline of Talk

- 1. Cause for Concern: A New Era of Catastrophes**
- 2. Impact of Mitigation on Loss Reduction**
- 3. Why Property Owners Do Not Want to Invest in Cost-Effective Mitigation Measures**
- 4. Need for Long-Term Contracts**
- 5. Summary and Conclusions**

1. Cause for Concern: A New Era of Catastrophes

A radical change in the scale and rhythm of catastrophes

Natural disasters have caused severe insured losses to property in recent years

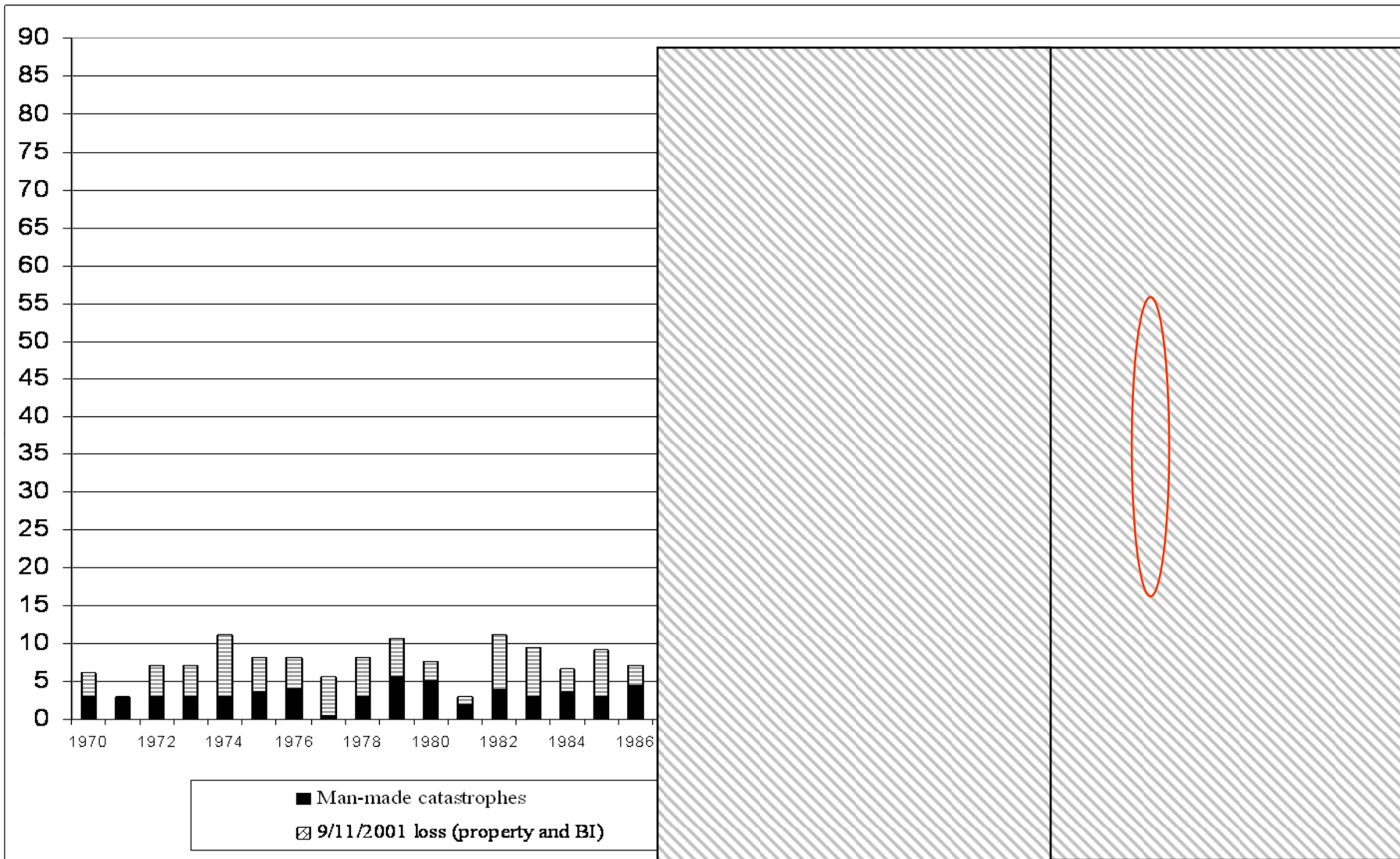
- Hurricane Katrina: \$46.3 billion
- Hurricane Andrew: \$23.2 billion (2005 dollars)
- Hurricane Ike: \$15-25 billion

Victims complain about receiving substantially less than the actual costs to repair or rebuild their damaged structures

Public sector and international organizations (e.g. World Bank) are committed to providing financial assistance to aid the victims of disasters



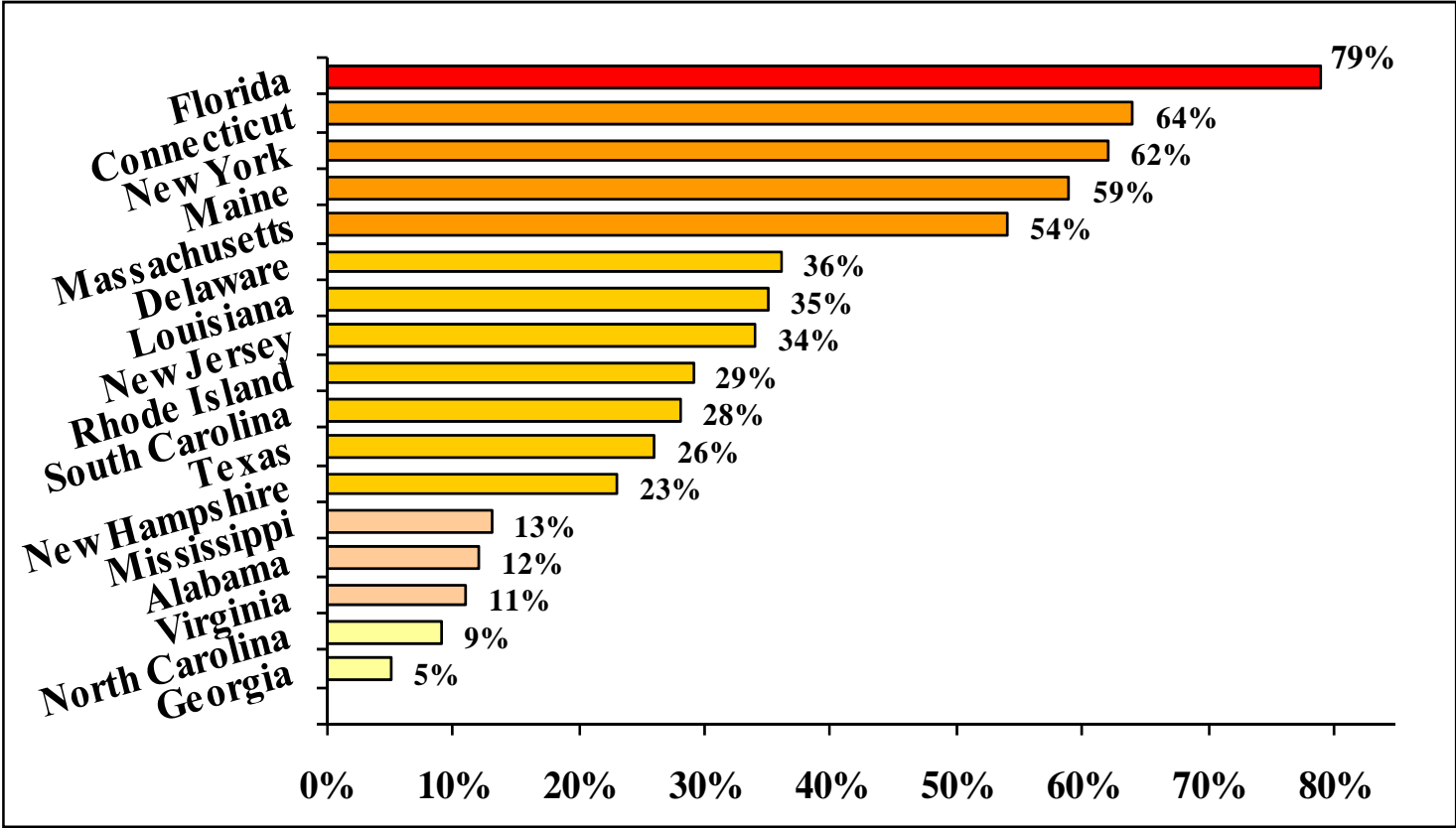
Worldwide Evolution of Catastrophe Insured Losses, 1970-2008



(Property and business interruption (BI); in U.S.\$ billion indexed to 2007, except 2008 which is current)

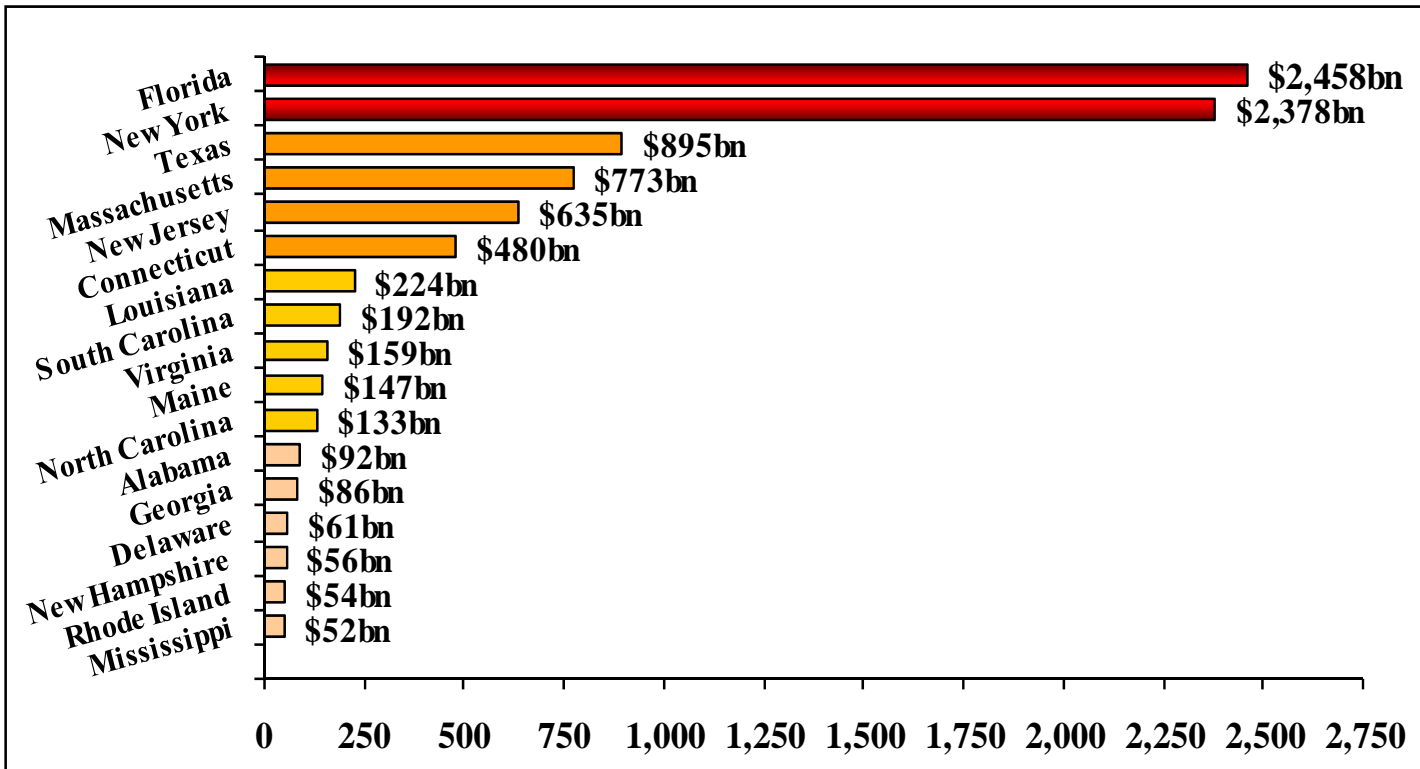
Sources: Kunreuther and Michel-Kerjan, *At War with the Weather* (2009) - data from Swiss Re and Insurance Information Institute

Insured Coastal Exposure as a Percentage of Statewide Insured Exposure as of December 2007 (Residential and Commercial Properties)



Source: Data from AIR Worldwide Corporation

Total Value of Insured Coastal Exposure as of December 2007 (in \$ billion; Residential and Commercial Properties)



Source: Data from AIR Worldwide Corporation

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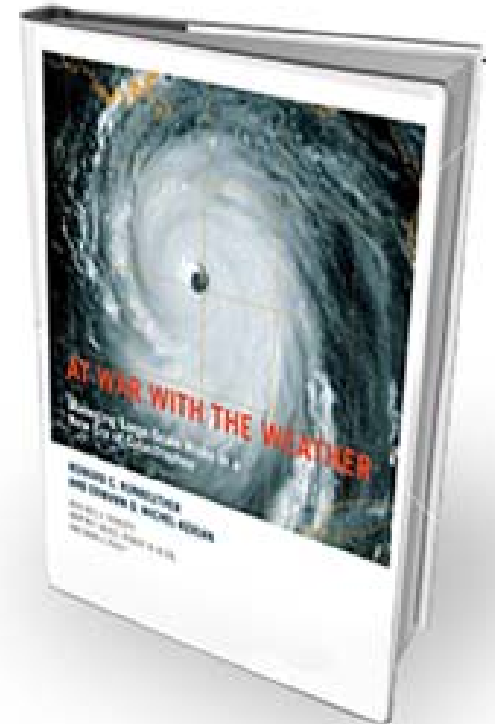
June 2009 - MIT Press

A better understanding of how individuals decide whether or not to protect themselves against natural disasters.

A set of guiding principles for using insurance to deal more effectively with these events.

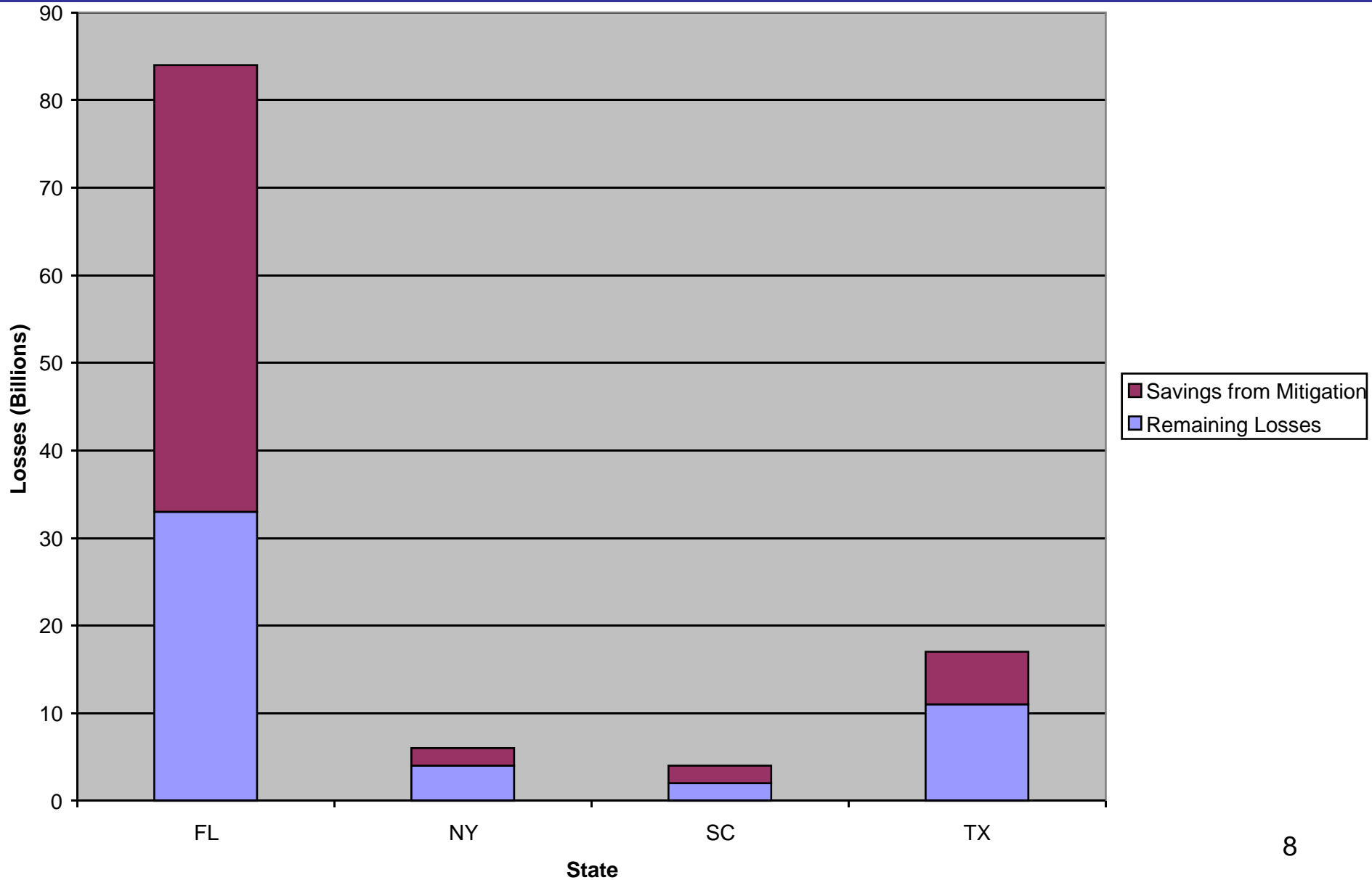
Key lessons from the financial management of natural disasters to be applied to other global risks such as pandemics, financial crises and terrorism.

Ideas for the private sector, and sustainable public policy solutions to protect trillions of dollars of assets and the residents at risk in hazard-prone regions.

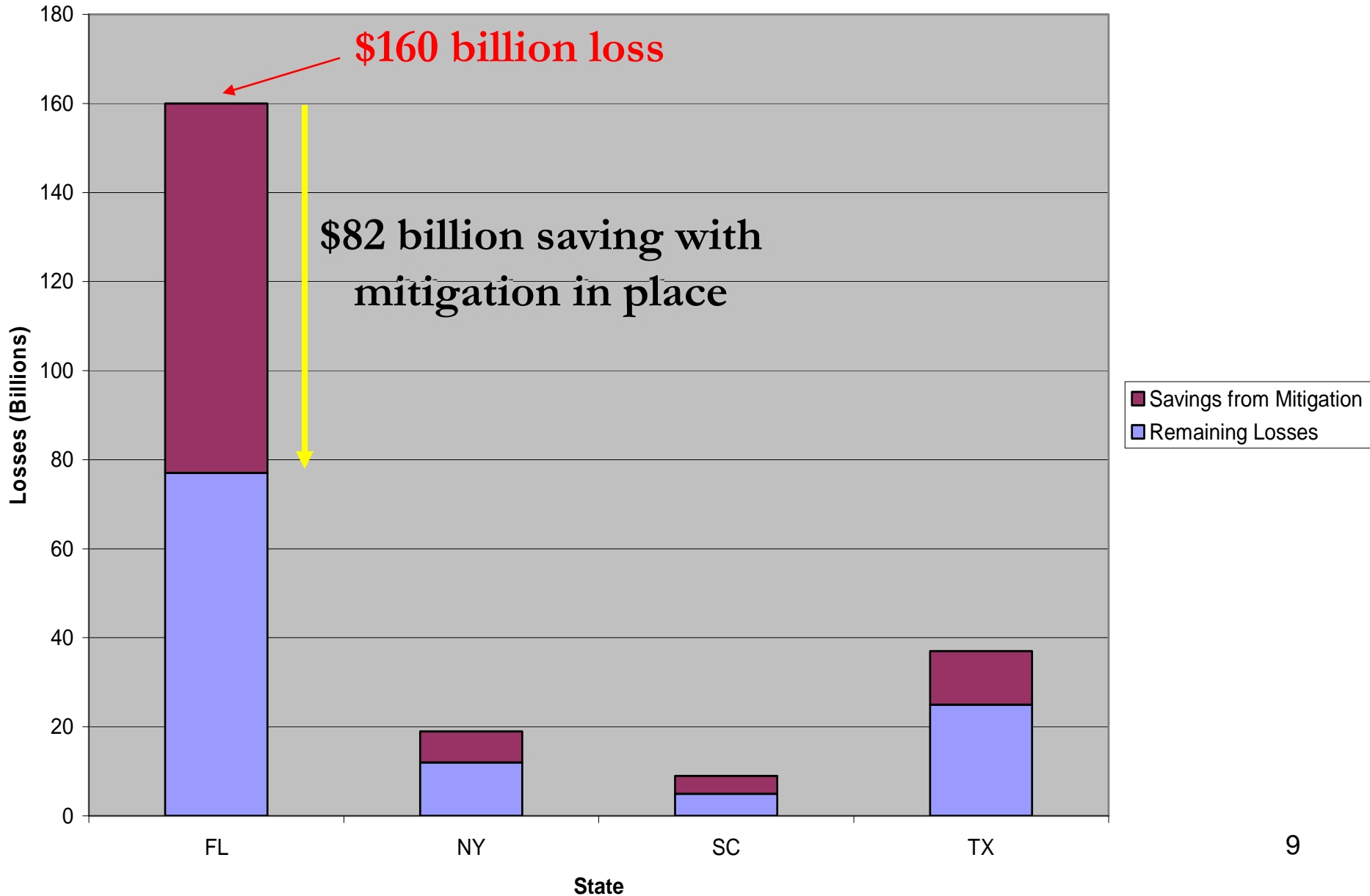


2. Impact of Mitigation on Loss Reduction

Illustration with a 100-Year Event



Impact of Mitigation On a 500-Year Event



Motivating Mitigation Example

Characteristic of Mitigation

Upfront cost/long-term benefits

Cost of Mitigation – \$1,500 to strengthen roof of house

Nature of Disaster

– 1/100 chance of disaster

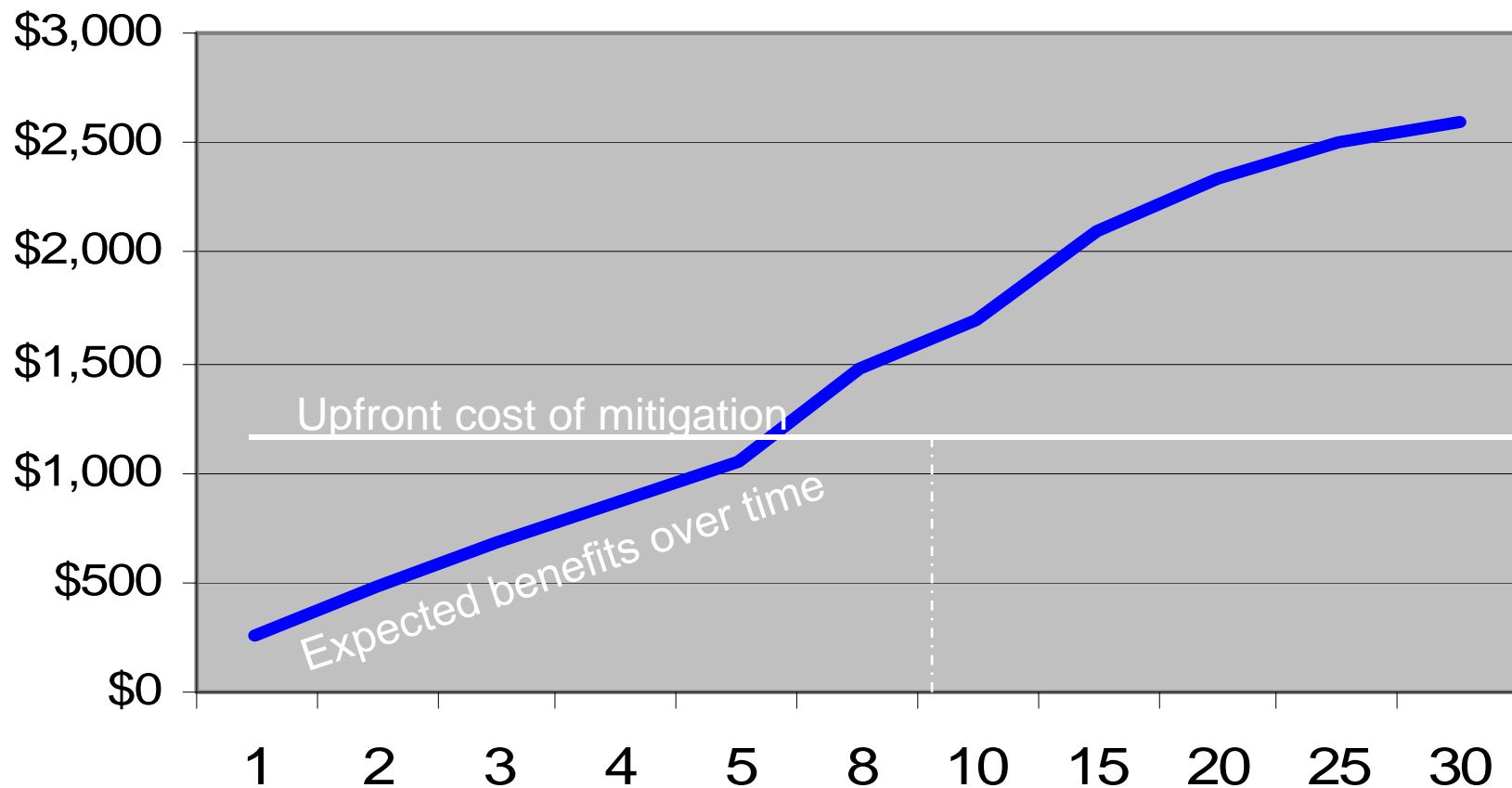
– Reduction in loss (\$27,500)

Expected Annual Benefits: \$275 $(1/100 * \$27,500)$

Annual Discount rate of 10%

Expected Benefit-Cost Analysis of Mitigation (Annual Discount Rate 10%)

Benefits over 30 years



3. Why Property Owners Do Not Want to Invest in Cost-Effective Mitigation Measures

Short Time Horizons (Quick return on investment)

High Short-Term Discount Rates (Hyperbolic discounting)

Misestimating Probability (Flood will not happen to me)

Liquidity and Upfront Costs (We live from payday to payday)

Truncated Loss Distribution (Only responsible for small portion of loss due to disaster relief)

May Move in 2 or 3 Years (Can't recover costs of mitigation)

4. Need for Long-Term Contracts to Deal with Myopia and Misperceptions of Risk

Proposed strategy:

Long-term flood insurance contracts through National Flood Insurance Program tied to property

Long-term loans for mitigating one's property



Guiding Principles for Insurance

Principle 1: Premiums Reflecting Risk

Insurance premiums should be based on risk in order to provide signals to individuals as to the hazards they face, and to encourage them to engage in cost-effective mitigation measures to reduce their vulnerability to catastrophes.

Principle 2: Dealing with Equity and Affordability

Any special treatment given to homeowners currently residing in hazard-prone areas (e.g., low-income uninsured or inadequately insured homeowners) should come from general public funding and not through insurance premium subsidies.

Long-Term Flood Insurance Provides Stability to NFIP

Would assure spread of risk within the program by having all homeowners in flood prone areas with coverage.

It would sustain revenue for the program over time by having a much larger policy base.

If homeowner moved to another location, the flood policy would remain with the property unless the new owner did not have a federally insured mortgage.

One might also consider have everyone in flood prone areas *required* to take out the insurance as with automobile coverage today.

Long -Term Insurance Would Prevent Individuals From Cancelling Their Flood Insurance Policy

Many homeowners cancel their flood policy if they have not experienced a flood for several years.

Reason: Flood insurance was not a good investment.

Data: Of 1,549 victims of a flood in August 1998 in northern Vermont, FEMA found 84% of residents in SFHAs did *not* have flood insurance, 45% of whom were required to purchase it. (Tobin and Calfee, 2005)

If Individuals Have Flood Insurance There Is No Need to Determine Cause of Damage from Hurricanes

If homeowners had flood insurance they would be protected against water damage and not have to argue that the losses were due to wind so they could collect on their homeowners policy.

Would avoid lawsuits such as those filed after recent hurricanes (Florida hurricanes of 2004, Katrina, Ike) as to whether the damage was cause by wind or water.

Encouraging Mitigation with Long-Term Loans

Illustrative Example:

Cost of partial roof mitigation: \$1,500

Expected annual benefit of partial roof mitigation:
\$275 (1/1000 * \$27,500)

Annual payments from 20 year \$1,500 loan at
10% annual interest rate: \$145

Reduction in annual insurance payment: \$275

Reduction in annual payments due to mitigation:
 $\$275 - \$145 = \$130$



Linking Long-Term Home Improvement Loans with Long-Term Flood Insurance

Everyone is a Winner:

Homeowner:

Lower total annual payments

Insurer:

Reduction in catastrophe losses and lower reinsurance costs

Financial institution:

More secure investment due to lower losses from disaster

General taxpayer:

Less disaster assistance

5. Summary

The Facts:

Totally new era of “large-scale risks”; huge and still growing concentration of value in high-risk areas; indication of more devastating disasters in the future.

The Reality:

Need guiding principles for insurance and long-term contracts for providing incentives for investment in loss-reduction measures

Research and policy questions:

How can long-term contracts be put on the Obama administration’s agenda?

Is the National Flood Insurance Program a good place to start?

