

# LDI *Issue Brief*

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## *Preparing for the Next Natural Disaster: Learning from Katrina*

Editor's note: Hurricane Katrina exposed the nation's ongoing vulnerability to large-scale losses from natural disasters. The catastrophic loss of life and property has lead people to question why the United States is not better prepared for such disasters. In this Issue Brief, a leading expert on decision processes and low-probability events discusses the reasons why people do not take protective measures voluntarily. In addition, he suggests ways to reduce losses through a disaster management plan that includes well-enforced building codes and land-use policies, insurance incentives, and long-term loans.

## *Hurricane Katrina illustrates the "natural disaster syndr ome"*

Hurricane Katrina has highlighted the effects of what is called the "natural disaster syndrome," in which individuals and businesses leave themselves unprotected from a low-probability, high-consequence event, and the federal government comes to the rescue. The syndrome results from the combination of personal underinvestment in protection prior to a disaster followed by generous government bailouts after the event.

- Prior to a disaster, most homeowners and businesses in hazard-prone regions do not voluntarily adopt protective measures, such as strengthening their houses, even where the expected benefits over the lifetime of the structure exceed the costs of the measure.
- Under current insurance arrangements, coverage for flood and earthquake damage is not provided by homeowners policies, but must be purchased separately. Since 1973, flood coverage in federally-designated areas has been required as a condition for a federally-insured mortgage. However, it is estimated that less than 40% of the victims of Hurricane Katrina in Mississippi and Louisiana had flood insurance to cover their losses. Some homeowners simply didn't buy coverage; in other cases, the area had not been designated as hazard-prone (such as the heavily-flooded 9th Ward in New Orleans).
- Development in hazard-prone areas has resulted in skyrocketing disaster costs in recent years. Local public officials often do not enforce building codes due to a dearth of inspectors, or impose land-use regulations that might limit construction in hazard-prone areas.

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***Individuals tend to underestimate and ignore the risk of natural disasters***

There are several reasons why people do not protect themselves against a natural disaster before it occurs. The principal reason is that they believe the event will not happen to them. In the case of New Orleans, people may have also felt that they were fully protected by flood-control measures such as the levees.

- People may underestimate the likelihood of a future disaster. Research shows that if people believe that the probability of an event is sufficiently low, they do not think about the event in making decisions, and have no interest in protecting themselves against it, even at reasonable cost.
- If individuals or families have budget constraints and limited disposable income, they may be unwilling to invest anything in protective measures against a natural disaster because the event is not on their radar screen.
- In making decisions about what to purchase, individuals tend to be short-sighted, often taking into account potential benefits only over the next year or two rather than for the expected life of the property.
- Individuals' decisions are interdependent with their neighbors'. For example, a homeowner may not want to be the only one on the block modifying a property, because it might stick out like a sore thumb. However, more individuals might be willing to follow if a few leaders in the community modified their properties first.

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***Public sector can use cost-benefit analysis to evaluate protective measures***

The public sector can play an important role in reducing losses from future disasters by examining measures that will be cost-effective from both the residents' and general taxpayer's perspective.

- For example, New Orleans faces a number of choices in the aftermath of the hurricane: should it require that homes in hazard-prone areas invest in protective measures to reduce the likelihood of serious disaster losses, or should it allow residents to rebuild to pre-Katrina standards? Or should residents receive grants or low-interest loans to rebuild in other areas, and convert the hazard-prone areas to wetlands?
  - Cost-benefit analysis provides an economic framework for evaluating such options. In general, a cost-benefit analysis includes five steps:
    1. Specify the options and key interested parties, including who will benefit and who will pay the costs associated with each option.
    2. Determine the direct costs to implement each measure. For example, a property owner incurs the costs of making a house disaster-resistant; if residents are required to move, they incur financial expenses as well as social and psychological costs of moving to a new community.
    3. Determine the expected benefits of each option to each of the interested parties (by estimating the disaster losses in each option compared to the status quo).
    4. Calculate the attractiveness of the options (by comparing the estimated benefits to each party with the upfront costs). Whenever the ratio of estimated benefits to costs exceeds 1, the option can be considered attractive (although other factors, such as budget constraints or an unwillingness to move, may affect individuals' decisions).
    5. Choose the best alternative, based on the principle of allocating resources to their best possible use. The choice should be economically efficient, while still taking into account distributional and equity issues such as the impact on low income residents.
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- Cost-benefit analysis can play an important role in determining what types of actions the public sector should engage in to reduce future disaster losses. Policymakers should recognize, however, the uncertainties that surround estimates of risks and benefits, and differences in how public and private decisions are made. Individuals may perceive that they are worse off than before, or feel that they cannot afford the proposed measure.

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### *Public-private partnerships can reduce future losses*

The challenge in developing a disaster management plan is to use approaches that will encourage individuals and businesses to *want* to undertake cost-effective protective measures. One such approach is through public and private sector partnerships that couple insurance protection with well-enforced building codes and land-use regulations, as described below.

- One way to reduce future losses is to have insurers join with banks and other lenders who would require that the house meet certain building code standards before they issued a mortgage and make disaster insurance a requirement for a mortgage. Banks could provide home-improvement loans with a payback period identical to the life of the mortgage.
- Inspectors could provide a seal of approval for each structure that they determine meets or exceeds building code standards. Such a seal is likely to increase the property value of the home, and may qualify the owner for an insurance credit. The success of such a program requires the support of the building industry and a pool of qualified inspectors.
- Communities can encourage residents to invest in protective measures through tax incentives. For example, homeowners who seal the foundation of their houses to reduce the risk of damage could get a rebate on state taxes or a reduction in property taxes. The community or state gains much larger savings than just reduced property damage—it saves the extensive costs of feeding and housing residents who might otherwise have had to leave their homes.
- Disaster insurance should be offered at premiums that reflect the risk of living in the area. A risk-based system could then reward homeowners who make their properties disaster-resistant, by providing them with lower premiums.
- Low-income families might need public sector subsidies to purchase insurance or to make structural improvements.

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### *Designing a better disaster insurance program: sharing the risk*

Disaster insurance can be restructured to better share the risks across the public and private sector. The time appears ripe to develop a comprehensive disaster program whereby all hazards are covered under a standard homeowners policy at risk-based rates. A multi-layered program would help protect private insurers against catastrophic losses.

- The first level of disaster losses would be borne by the victims themselves. This form of self-insurance is equivalent to having a deductible on an insurance policy.
  - Private insurers would cover the second layer of risk, with amounts of coverage based on their current portfolio and their ability to diversify across risk.
  - The third layer would consist of private sector mechanisms to transfer risk, such as reinsurance or capital market instruments such as catastrophe bonds.
  - The last layer would cover large-scale losses. It could take the form of multi-state risk pools in hazardous regions, or federal reinsurance for mega-catastrophes.
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## POLICY IMPLICATIONS

The losses from Hurricane Katrina should focus the nation's attention on ways to reduce future losses from natural disasters and restructure and reduce the need for government assistance after the event. A creative partnership between the public and private sectors can help overcome the "natural disaster syndrome" using well-enforced building standards and land-use regulations coupled with insurance protection. Subsidies may have to be given to low income residents in hazard-prone areas. The economic justification for such a subsidy would be avoiding the large disaster assistance payments that would otherwise be given to these individuals.

- If structures are well-designed and appropriate land-use regulations are in place, injuries and fatalities will be reduced, as will the need to relocate large numbers of victims.
- Economic incentives, in the form of long-term loans and tax credits, will help put protective measures within financial reach of property owners in hazard-prone areas.
- The insurance industry should consider developing all-hazards homeowners policies. Such policies can have considerable appeal to insurers and consumers. The diversification of risk across all hazards can reduce insurers' uncertainty about huge losses and consumers' uncertainty about what their homeowners policies cover. Risk-based premiums send a clear message about the risk of living in certain areas, and premium reductions can be used to reward individuals who take protective measures.

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*This Issue Brief is based on the following articles: H. Kunreuther. Disaster mitigation and insurance: learning from Katrina. Annals of the American Academy of Political and Social Science, March 2006, vol. 604, pp. 208-227 ; and H. Kunreuther. Has the time come for comprehensive natural disaster insurance? in: R. J. Daniels, D.F. Kettl, and H. Kunreuther (eds.) On Risk and Disaster: Lessons from Hurricane Katrina. Philadelphia, PA: University of Pennsylvania Press, January 2006.*

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## Issue Brief



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