"The Role of Insurance and Mitigation in Reducing Disaster Losses"

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I. Setting the Scene

Natural hazards involve both private and social risks and therefore may require some type of government involvement. This paper addresses two key policy tools--insurance and mitigation--which may require a public and private sector partnership to be effective. Several key questions that need to be addressed in this connection are:

1. How can we get people to adopt mitigation measures prior to a disaster?
2. What is role of insurance in aiding recovery as well as encouraging mitigation measures?
3. How do we balance equity and efficiency in dealing with both the recovery and mitigation process?

Figure 1 depicts a framework that guides the development of alternative programs for dealing with natural hazards. The current institutional arrangements--existing legislation, judicial rulings and cultural norms---affect the benefits and costs of different strategies ranging from a free-market approach at one extreme to strict government regulations at the other.

It is desirable to constrain individual choice as little as possible so that the first line of attack is to provide information (communicate) to the relevant decision makers. Thereafter one can develop economic incentives (e.g. subsidies, fines) and finally one can turn to regulations. These policies need to be evaluated on both their effects on resource allocation (efficiency) as well as distribution (equity). Policy makers should examine all four programs before determining which course of action to adopt.

Insert Figure 1 here

II. Why There Is Limited Interest in Protective Measures

The challenge in developing programs for dealing with natural hazards is that individuals
do not voluntarily invest in mitigation and loss prevention methods. In a recent survey of 3,500 homeowners in four California counties subject to earthquake damage Risa Palm and her colleagues reported that only between 5 and 9% had adopted any loss-reduction measures. If most of these homeowners had purchased earthquake insurance, their behavior could have been explained by their feeling that they were covered against potential losses. That was not the case, however. Although recently there has been a much greater interest in earthquake insurance than there was 20 years ago, only 30 percent of homes in earthquake prone areas of California have purchased coverage today.

With respect to flood insurance most individuals in hazard-prone areas do not purchase coverage voluntarily. For example consider the seven Midwest states affected by the Mississippi floods of August 1993. Less than 42,000 households out of the 803,000 residing in special flood hazard areas had purchased flood insurance as of August 3, 1993. (Karr 1993)

There are many reasons why individuals do not protect themselves voluntarily against the consequences of natural hazards. Primarily, people think that "it will not happen to me." By their treating the probability of an earthquake as effectively zero, these individuals avoid considering the consequences of a disaster and hence have no interest in insurance or adopting mitigation measures.

Another reason homeowners may not invest in cost-effective loss-reduction measures is that they focus on upfront expenditures without recognizing potential long-term benefits. For some measures, such as bracing the concrete foundation of a house at a cost of $1500, this behavior may be understandable. Such a large expenditure may be precluded by budget constraints, even though the damage reduction could be $20,000 to $30,000 should a severe
earthquake occur. In contrast, a homeowner may not reflect on the wisdom of spending $50 to secure their water heater to the wall to prevent it from toppling during an earthquake. There is a need for more detailed studies to increase our understanding as to why individuals in hazard-prone areas do not invest in such measures voluntarily, and an evaluation of alternative strategies for their adoption.

Homeowners are not the only ones who have failed to adopt protective measures prior to a disaster. While there is limited empirical data on business behavior, a recent study by Dan Alesyach and his colleagues reveal that relatively few small businesses have earthquake insurance, unless they are required to purchase coverage in order to secure a loan. In particular, firms located in earthquake-prone areas of the Midwest or eastern U.S., appear to share an "it will not happen to me" attitude.

With respect to the degree of protection undertaken in the public sector a very comprehensive study by Raymond Burby and his colleagues reveals that most local governments have not adopted hazard mitigation measures. (Burby 1992). A 1992 GAO report noted that approximately 40 percent of federal buildings are located in seismically active areas but most government agencies lack data on construction type and soil properties to determine the vulnerability of specific buildings.

A study by Steven French and Gary Rudholm (1990) of the damage to public property in the Whittier Narrows, California, earthquake of October 1987 revealed that few public buildings were protected by earthquake insurance, even though it is readily available from the private sector. Consequently, a large portion of the damage was paid for by the Federal Emergency Management Agency (FEMA) in the form of disaster relief.
III. A Proposed Program for Integrating Insurance with Mitigation

The above evidence suggests that homeowners and insurers are reluctant to deal with the natural disasters for very different reasons. Many homeowners at risk are not anxious to purchase insurance because they feel the disaster will not happen to them; others who have compared costs with potential benefits may feel that insurance and loss reduction measures are not good investments. In addition, few homeowners have adopted cost-effective LRM LRM because they utilize short-term horizons in determining the expected benefits relative to the upfront costs.

The insurance industry has been reluctant to promote coverage against floods and earthquakes because they fear the consequences of a catastrophic disaster and hence want to limit their exposure. Following Hurricane Andrew there has been a concern with the impact that future hurricanes and severe windstorms will have on their surplus. In general, premiums for losses from natural disasters are significantly higher than expected cost because of the ambiguity associated with the risk.

The current situation can be costly to all of the interested parties concerned with disasters. First, the potential damage from natural hazards will be larger than it would be if cost-effective LRM LRM were adopted on new and existing property. Second, the insurance industry fears that a catastrophic disaster could cause many insurance firms to become insolvent, and a study undertaken by the Wharton Risk Management and Decision Processes Center for FEMA on the consequences of a catastrophic earthquake on the solvency of private insurers supports this concern. (Doherty, Kleffner and Kunreuther 1992).

Third, many uninsured homeowners will be saddled with large recovery costs following a severe disaster. If the past is a guide to the future the federal government will come to the
rescue by helping the insurance industry to cope with its financial losses and provide victims with liberal disaster relief. Hence all U.S. citizens will have to pay for the losses generated by future severe disasters.

To cope with each of these three problems the following elements of a hazard management program (HMP) should be explored. A more detailed discussion of the objectives of such an HMP program and an expanded treatment of the interaction between different policy tools can be found in Kunreuther, Ericksen and Handmer (1993).

1. **Institute more stringent building codes on new homes.** Relevant government agencies should develop stringent building codes which incorporate cost-effective mitigation measures on new structures, and insure compliance with, and enforcement of, the codes. The limited voluntary adoption of these measures on existing homes in the U.S. suggests that innovative ways need to be found to encourage homeowners and the building industry to modify structures to meet appropriate standards. This means ensuring that key players, like the building industry and home owners, are behind the program.

   While building codes can serve an important function in reducing future property damage, Cohen and Noll, (1981) provide an additional rationale for having them. When a building collapses it may create economic dislocations and social costs in addition to the economic loss suffered by the owners. These may not be taken into account when the owners evaluate the importance of adopting a specific mitigation measure.

2. **Use seals of approval on structures meeting codes.** Each building that meets or exceeds the specific building code would be given a seal of approval. This would provide homeowners with the knowledge that the building has been safely designed and built in accordance with a
federal or national code. Local governments would be held liable for all damage from a disaster to a structure that was given a seal of approval and shown to not meet the code.

3. **Use insurance to encourage hazard mitigation.** To reduce their losses from disasters, insurers are likely to limit coverage to structures that are given a seal of approval. If banks require insurance as a condition for a mortgage, then financial institutions together with the insurer can help enforce building code regulations. The reduction in potential losses from the adoption of building codes could be reflected in the form of reduced premiums, lower deductibles and/or higher coverage limits.

4. **Develop all-natural hazards insurance.** The insurance industry should be encouraged to market homeowners insurance which includes protection against earthquake, flood and hurricane damage. Rates would be based on risk, with the potential losses diversified throughout the country. This type of insurance policy would also eliminate having to determine the causes of a loss as insurers in the United States currently have to do for hurricane damage.

5. **Institute government reinsurance.** The Federal government should provide reinsurance protection against catastrophic losses from all disasters on the newly designed homeowners policy. Private insurance firms would build up the fund by being assessed premium charges in the same manner that a private reinsurance company who levy a fee for protection. The need for such a government fund arises from the apparent inability of the private reinsurance market, due to limited financial capacity, to provide sufficient protection against large-scale disasters that might occur in the United States. The advantage of a Federal reinsurance program is that it reduces uncertainty about probability and consequences of a catastrophic disaster and should enable insurers to reduce their premiums for disaster coverage.
6. **Subsidize low income families.** Many of the poorly constructed homes are owned by low-income families so that they cannot afford the costs of mitigation measures on their existing structure nor the costs of reconstruction should their house suffer damage from a disaster. Two measures should be undertaken to aid these households:

- low interest loans and grants should be provided for them to adopt cost effective mitigation measures or to relocate their home.
- special disaster assistance should be given to them to aid their recovery process.

In summary, by coupling insurance requirements with building codes and risk-based premiums for adopting cost-effective LRM, we will have taken a giant step in reducing losses from future natural disasters as well as aiding the recovery process of homeowners who suffer severe damage to their property.

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**REFERENCES**


Figure 1

Conceptual Framework for Developing Policy Programs

Institutional Arrangements
- Legislation
- Judicial Rulings
- Cultural Norms

Alternative Programs
- Free Market
- Information Provision
- Economic Incentives
- Regulation

Societal Objectives
- Welfare (Efficiency)
- Distribution (Equity)