Do Advanced Catastrophe Models Pull the Plug on Risk Pools?

By Rade Musulin

I recently spoke with a newspaper reporter who offered an interesting observation about advances in catastrophe modeling. As modelers gain particular knowledge of individual structures and the risks that natural disasters can pose to them, they are able to more finely divide risk pools. The logical conclusion of this trend would seem to be a unique premium for each homeowner. But as the premium increasingly reflects individual expected loss, are we still pooling risk or simply self-insuring?

Many people mistakenly think that risk pooling requires common pricing for all members of a risk pool. They believe that efforts to refine pricing to individual risks somehow violate the principle of risk pooling. This has become a common refrain among residents (or their elected representatives) in high-risk areas, who argue that the cost of natural disaster insurance should be spread throughout the population.

Insurance involves a process where a large number of people pay funds into a pool, which then indemnifies that small subset of individuals who suffer losses. Whether every member of the pool pays a unique premium or an average cost is irrelevant in terms of whether the scheme is insurance.

Consider an automobile market consisting of 100 drivers where the probability of having an accident is proportional to the number of miles driven and where there will be exactly one accident per year among this group costing $100,000. On average, drivers travel 10,000 miles each year. Thus, a $1,000 average premium will generate the $100,000 needed, which could be expressed, on average, as 10 cents per mile driven. A completely reasonable and actuarially fair system might charge a premium of 10 cents per mile, based on odometer readings at the beginning and end of each year. If the minimum and maximum miles driven in the group were 1,000 miles and 20,000 miles, there would be premiums ranging from $100 to $2,000 based on miles driven. Every driver would pay a different premium into a pool that collected $100,000. The one unlucky soul who had the accident would get $100,000.

In this example, charges are based on something related to risk, and everyone in the pool is getting insurance. Even the individual paying the highest rate of $2,000 has the chance of getting

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- Consumption tax on individuals
- Value-added tax on employers
- Wage tax on individuals.

The monograph concluded that each of the alternatives considered would reduce or eliminate the tax incentives for employer-provided health insurance and pensions.

New analysis is needed to expand the focus from solely employer-sponsored health insurance and pensions and to consider how changing current incentives in the tax code would affect the individual health insurance market, life insurance and annuities, and casualty products. At the same time, reform proposals under consideration need not be limited to (or even include) large overhauls of the tax system. Instead, more incremental tax options may be worth reviewing. As it moves forward, the work group can build on existing work by various Academy groups, such as the Pension Practice Council's 2005 analysis of the Bush administration's retirement savings proposals.

Asbestos Monograph

The Academy's Mass Torts Subcommittee has published an update of its 2001 asbestos monograph revised to reflect recent asbestos-related activity in government and in the courts.

In addition to a history of asbestos-related litigation, *2006 Update: Overview of Asbestos Issues and Trends* discusses the current climate for asbestos personal injury litigation, including recent trends such as the establishment of a plaintiff trust fund. The monograph also offers an overview of asbestos-related legislation introduced in the 108th and 109th Congresses, the features of asbestos-related bankruptcies (along with a list of affected companies), and epidemiological studies.

Because asbestos was widely used in thousands of products for decades, it is difficult to predict the number of claims that will ultimately arise out of asbestos exposure or how much those claims will cost. According to the monograph, recent evidence indicates that more than 100 million people in the United States may have been occupationally exposed to

the $100,000. This illustrates the difference between pooling risk and subsidizing premiums. The latter would occur if everyone were forced to pay $1,000 per year regardless of risk.

Now, extend the concept to gasoline. Assume society decides that it is unfair for the person driving 20,000 miles a year to pay more than someone driving 1,000 miles. Everyone could pay a flat charge of $1,000 per year for gasoline and then get as much as he or she needed. What would happen then? Maybe people would stop paying attention to how far they drove or to using a fuel-efficient car, increasing the total amount of gasoline used.

This is exactly what happened in the property insurance market when prices failed to reflect refined measures of risk. Pooled rates encouraged excessive development in high-risk areas and discouraged investment in "insurance-efficient" structures. In the long run, society will pay a very high price for this, as incentives for mitigation are dampened and risky behavior is encouraged.

Catastrophe models have given actuaries tools to develop far more refined prices for natural disaster insurance. Where 30 years ago we may have needed 10,000 risks to generate a credible price, now we can simulate the experience of one risk 10,000 times using models. Absent government intervention, this will naturally lead to more refined prices for natural disaster insurance if the analysis indicates different expected costs for various risks.

There are many examples of successful insurance systems (such as workers' compensation after experience rating) where every risk is charged an individual premium. Whether more refined prices in residential property insurance are fair is a valid public policy question. But it is not an actuarial one.

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Updated

asbestos during the 20th century.

In a significant recent development, U.S. District Judge Janis Graham Jack questioned the validity of many of the chest x-rays used to justify nonmalignant claims. Physicians' depositions taken in silica multi-district litigation hearings in Corpus Christi, Texas, last year cast doubt on the silicosis diagnoses of 10,000 claimants. The depositions revealed that some doctors had diagnosed claimants with asbestosis and silicosis even though it is very unlikely someone would contract both diseases. At the same time, more than 50 percent of the claimants who had been diagnosed with silicosis were found to have previously filed asbestos claims with the Manville Trust. These discoveries prompted heightened scrutiny of newly filed asbestos cases and spurred the establishment of inactive dockets, in which the claims of those without impairment are shelved until the plaintiffs demonstrate that they meet minimal medical requirements for case activation.

The introduction of inactive dockets and increased scrutiny of asbestos cases has led to a decrease in the number of mass settlements in the past two years. However, it isn't clear that current reduced claim activity will continue, and the number of cases that will be filed over the next few years remains to be seen.

The Mass Torts Subcommittee is chaired by Jenni Biggs. Other members are Raji R. Bhagavatula, Hsiu-Mei Chang, Bryan C. Gillespie, Thomas S. Johnston, Steven E. Math, Claus S. Metzner, Steven J. Symon, and Trevar K. Withers.

—LAUREN PACHMAN

Creating a National Plan for Natural Disaster Risk

IN DUPLICATE JULY 11 **letters** to the National Association of Insurance Commissioners (NAIC) and the National Conference of Insurance Legislators (NCOIL), the Academy's Natural Catastrophe Subcommittee commented on a joint effort by the two organizations to create a national plan for handling extreme natural catastrophe risk.

Among its comments, the subcommittee discussed

- The importance of loss mitigation measures, such as promoting strong building codes;
- The need for adequate commercial flood insurance capacity to reduce secondary catastrophic financial effects, including time-element losses such as unemployment compensation (residential flood insurance is available through the National Flood Insurance Program);
- The need for the threshold for public involvement to be at a level below that which would exhaust private market capacity and yet not compete with private insurance;
- The need for the trigger level to recognize industry capacity;
- Its observation that if underlying catastrophe premium rates are at adequate levels, an adjustment could be required to eliminate a federal plan's contribution to the overall average loss, thus creating lower premiums for consumers.

The subcommittee is currently preparing a monograph on insuring extreme natural catastrophe risk. The monograph will feature several model scenarios of the estimated financial impact of an extreme natural disaster on both property and workers' compensation insurance. Estimates are also being produced for noninsured losses, such as government buildings and infrastructure.