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The Economics of Natural and Unnatural Disasters

Throughout history, humankind has been subject to disasters produced by “Mother Nature” as well as the now too-familiar man-made variety. Only recently, however, have economists understood disasters as economic phenomena to be formally analyzed. Given the magnitude of many recent disasters, their impact on local, regional, and national economies, and the coverage of their consequences in the popular press, it is puzzling that the attention of economists was for so long largely diverted from analysis of these events. Perhaps George Stigler provided the answer to this puzzle in his Nobel lecture, where he observed that economists have frequently neglected the study of important current events. He points out, for example, that “during the Industrial Revolution, economists adopted the law of diminishing returns but ignored the most widespread growth of output that the world had yet observed.” The explanation that he offered, perhaps tongue in cheek, was that “the scholars who create economic theory do not read the newspapers regularly or carefully during working hours” (1992, p. 61).

We are now observing a reversal of this practice, as more economists have begun to study the economics of disasters during the past several decades. Although the number of economists who study disasters is still small, the economics of disasters appears to be well on the road to establishing itself as an important subdiscipline in economics.

This article summarizes the papers that were presented during the 2008–2009 Werner Sichel Lecture-Seminar Series at Western Michigan University and which appear in a new book published by the Upjohn Institute titled *The Economics of Natural and Unnatural Disasters*.

Why are economists now more likely to pay attention to disasters? As Howard C. Kunreuther and Erwann O. Michel-Kerjan report in their paper, “Market

and Government Failure in Insuring and Mitigating Natural Catastrophes: How Long-Term Contracts Can Help,” disasters were, for much of history, regarded as low-probability events. However, they argue that we are now entering “a new era of catastrophes” in which disasters occur with greater frequency and the losses are of a much greater magnitude than in the past. Why are disasters occurring more frequently and why are the losses increasing? One change in recent decades is a significant increase in the population concentrated in urban areas on coasts, which puts more people at risk of losses due to hurricanes and tsunamis. Economic development in coastal areas has also increased the magnitude of losses.

Kunreuther and Michel-Kerjan therefore call for a new strategy for coping with disasters. In their opinion, the recent losses suffered in catastrophic events suggest that inadequate preparation and inadequate mitigation efforts have been the norm. This, they argue, is due in large part to myopia and misperception of the actual risks, both by potential victims and policymakers.

Kunreuther and Michel-Kerjan offer several guiding principles designed to stimulate greater mitigation efforts and minimize insurance losses while still offering protection against catastrophe. The primary principle is that insurance should be priced in accordance with risk. They argue that such pricing will create incentives to invest in mitigation efforts. Unfortunately, most property owners will be unlikely to bear the high up-front cost of mitigation efforts in light of the uncertainty of short-run cost savings. The authors therefore argue for the development of long-term insurance contracts designed to induce property owners to take a long-run view of the problem.

Anthony M. Yezer’s paper, “Expectations and Unexpected

Consequences of Public Policy toward Natural and Man-Made Disasters,” focuses on the significance of changes in the expectations of disasters for our understanding of their economic impact. He points out that the infrequency of disasters, the spatial concentration of their effects, and the size of disasters all raise the possibility that the expectations of disasters will change as a consequence of their occurrence. He cites this as a distinguishing feature of disasters in comparison with hazards generally considered. In fact, he claims that this is the most underresearched aspect of the economics of disasters.

Yezer’s analysis of the impact of disasters on expectations reveals several possible models of response. His analysis is based on the assumption that disaster expectations are formed on the basis of a comparison of recent occurrences with the historical record. An increase in the frequency of disasters thus raises the expectations of disasters. From this model, he draws conclusions about the relations between economic growth and disasters, the incentives to develop land in disaster-prone areas, and the significance of disaster expectations for insurance markets and public policy. Several puzzles regarding the relations between disasters and economic growth, the optimal development of land in hazardous areas, and the market for disaster insurance can be better understood once one considers that the occurrence of disasters will also change the expectations of disasters.

One of the important lessons he derives from his analysis is the need to distinguish between expected and unexpected disasters in considering the economic impact. The magnitude of the economic losses a disaster produces depends on the difference between expected losses and unanticipated losses. Therefore government aid to disaster areas should be concentrated on unanticipated disasters.

Hal Cochrane’s paper, “The Economics of Disaster: Retrospect and Prospect,” provides an overview of the development of the economics of disasters. He provides a thorough survey of the nature of the cost-loss trade-offs involved in managing hazards as well

as a useful discussion of the value of disaster forecasts in this framework. His application of this model to the case of rising CO₂ emissions and the uncertainty of the forecasts of global warming is a simple but powerful example of the insights that can be derived from the cost-loss model.

Cochrane points out that a correct estimate of losses is a key element in the cost-loss framework. In contrast to Yezer, Cochrane holds the opinion that housing markets provide little good evidence about the extent to which hazards and disasters are capitalized in housing and land values. He argues that analysis of housing and land market values offers an inadequate measure of the willingness to pay for safety. He also points out that disasters yield several distinct sorts of losses that are contentious and difficult to measure, including the loss of cultural community and historical assets.

Cochrane concludes with a discussion about the use of input-output analysis as a means of measuring the impact of disasters on local and regional economies. In his opinion, input-output analysis is incapable of addressing the impacts of the supply-side bottlenecks in local and regional economies that occur in the aftermath of disasters. Other techniques such as computable general equilibrium models and econometric analysis are also found wanting. He contends that the unique nature of these events makes it difficult to draw general lessons about the impact of disasters and to predict the pace of recovery, when such analysis is often based on factors present in the predisaster setting but absent in the postdisaster environment.

While much of the literature in the economics of disasters focuses on market failures and the role of government in postdisaster relief efforts, Peter J. Boettke and Daniel J. Smith, in their paper, "Private Solutions to Public Disasters: Self-Reliance and Social Resilience," examine the neglected role of the private sector and markets in the postdisaster recovery process, using post-Katrina New Orleans as an example. They point out that while most of the discussion is focused on the role that government should play, one needs to consider the

important role that private entities—both for-profit and nonprofit—can and do play in the recovery process. Furthermore, they argue that one should also consider that the attempts by private entities to cope with the recovery process are often thwarted by government actions both pre- and postdisaster.

For example, in New Orleans, government policies encouraged people to locate in flood-prone areas and left them vulnerable to loss because of inadequately constructed levees. In the aftermath of Katrina, occupational and building code regulations thwarted private recovery efforts and distorted the set of price signals necessary to ensure efficient use of the available resources.

Boettke and Smith argue that the price system and private efforts must be an integral part of disaster recovery. However, in disaster situations we are likely to want to suspend the use of the market and distort the price signals necessary to help with the recovery, perhaps out of public concern to keep someone from profiting at the expense of others. But Boettke and Smith argue that the pursuit by entrepreneurs of profitable opportunities created by the disaster is the basis of the economic recovery and that efforts to thwart those pursuits are misguided and delay the recovery.

Daniel Sutter and Kevin M. Simmons, in their paper, "The Socioeconomic Impact of Tornadoes," point out that tornadoes constitute one of the most common forms of disaster. The authors concentrate on three issues: 1) the trend of losses due to tornadoes, 2) the role of the National Weather Service's tornado warning program, and 3) the cost-effectiveness of several tornado loss-mitigation strategies. They estimate that the largest segment of losses caused by tornadoes—approximately two-thirds of the total—is the opportunity cost of time spent under tornado warnings. That so much of the cost can be attributed to time spent under warnings is partly accounted for by the steady decrease in the losses attributable to tornado fatalities during the past half-century.

The paper devotes considerable discussion to the factors contributing to tornado losses, including the time

of day, the severity of the winds, the location of the storm, and even the day of the week. However, of greatest interest to economists will be the authors' discussion of potential ways to minimize tornado losses and their estimates of the cost-effectiveness of several mitigation strategies. Sutter and Simmons find that attempts to minimize the time spent under warning have the greatest potential, given that this time is the largest component of costs. They claim that the recently adopted use of Storm-Based Warnings by the National Weather Service has the potential to reduce losses by as much as \$1 billion per year. In addition, increasing the lead time of warnings also appears to be a cost-effective strategy, up to a point.

Conversely, Sutter and Simmons find that tornado shelters are rarely a cost-effective means of reducing casualty losses. They estimate that even with the widespread use of shelters in a tornado-prone area like Oklahoma, the cost would be about \$57 million per life saved. However, they do find that significant value has resulted from the stringent regulation of manufactured home construction mandated by HUD in 1994.

Taken together, the papers comprise a sample of the sort of research now being undertaken in the economics of disasters. Several themes long dominant in this literature are addressed, including the ability of potential disaster victims to accurately assess the risks they face, the role of incentives in ensuring that mitigation efforts are undertaken, the adequacy of our evaluation of the impact of disasters on economies, and discussion of the effectiveness of current government policies toward disaster prevention and relief. In light of ongoing events, these will in all likelihood continue to be relevant topics of discussion.

Reference

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