Economic Advice and Public Decisions

by Carolyn R. Harper
and Cleve E. Willis

Academic economists are often astonished by the way public decisions concerning the environment are made. Academics usually preach incentives to correct for external effects, but most environmental actions are still of a regulatory nature.

Solutions to water contamination problems provide a good illustration of the point. In the Northeast, as in most parts of the country, severe water shortages exist in some areas, caused by pollution of surface and groundwater from underground fuel storage leaks, septic systems, lawn fertilizers, landfills, agricultural chemicals, and road salt. In Massachusetts more than 130 municipal wells have already been closed. That number is expected to double over the next 3-5 years because new federal Clean Water Act standards require testing for hundreds of additional pollutants. Cleanup of water supplies is not always possible within a reasonable period and alternative sources are becoming more expensive.

Often the economist's recommendation in such cases is to "just drink the water," since the value of the health risk appears to be less than the cost of developing alternative sources of water, buying bottled water, or installing filters. This assessment is based on a comparison of expected net benefits from each available option—assigning dollar values extrapolated from market behavior to statistical human lives and non-fatal diseases, and assigning probabilities to uncertain outcomes.

Advice Ignored

The striking reality is that households and public agencies rarely heed such advice, choosing instead to spend millions of dollars on new water sources in order to escape health hazards "worth" far less.

The behavior of the citizens of Whately, Massachusetts and their state legislators is a case in point. A total of $4 million is being spent on development of a new water supply to protect only 200 households from health risks due to agricultural pesticides in underground water supplies. Health risks from continued use of the aquifer were valued at less than $50,000 by agricultural economists at the University of Massachusetts applying conventional methods of analysis and using a value of a statistical life at $600,000.

Possible explanations include the following:

- Historical experience (asbestos, atomic testing) may justify the public in mistrusting some types of official risk estimates.
- Individuals may be strongly risk averse with respect to certain types of health effects, and may especially dislike risks which are involuntary.
- Anxiety about invisible dangers in food or water may in itself have a negative impact on the quality of life, so that "not having to worry" has intrinsic value. For these reasons, some type of safety first rule, such as the maximization of income subject to high environmental standards, may express social preferences better than the maximization of expected net benefits.
- The public is not always rational in responding to probabilistic risk situations.

Carolyn R. Harper is Assistant Professor and Cleve E. Willis is Professor, University of Massachusetts.

Adequacy of Economics

When choosing among alternatives, it seems obvious (at least to economists) that one should use the best available knowledge and a sound economic framework. But there are real problems here. It seems clear that the value of human life cannot be inferred from markets in any satisfying way, and further that no single value is applicable to the range of situations calling for risk analysis. Quite simply, the current methods of "determining" a valuation of a statistical life, and the true level of risk, are so poor as to make it a real question whether an economic model can be fruitfully applied.

Rationality of Non-Economists

But neither can we assume that community members always make mathematically rational decisions where probabilities are involved. In the simple setting in which the risk event is perceived as either an increase or decrease in likely mortality, Kahneman and Tversky have shown that people are conservative on gains, but are willing to gamble when faced with a choice between a known, small loss and a probable larger loss.

Consider the experiment in which two physician groups were presented with hypothetical decisions regarding an imminent outbreak of a rare disease. If no action were taken, they could expect 600 deaths to result. Physician Group 1 was asked to choose between two programs to counteract the disease. Program A would save 200 of the 600 people; Program B would have a one-third probability of saving all 600, but a two-thirds chance of saving no one. Most of the Group 1 physicians chose not to gamble and picked A.

A second group of physicians was asked to choose between two different programs. Program C would result in the deaths of 400, and Program D involved a two-thirds probability of 600 deaths and a one chance in three that no one would die. These Group 2 physicians chose Program D. They chose to gamble when faced with the awful knowledge that 400 would certainly die if Program C were selected.

But of course Programs A and C are identical, as are B and D.

The idiosyncratic result stems from how the outcomes were described—the first in terms of lives saved and the second in terms of lives lost.

To borrow from Frost: How you pose the question "makes all the difference". Until the rational and irrational reasons for individual and public decisions in such cases are understood, the contribution of normative economic models to problems like that of Whately, Massachusetts, will remain dubious.