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A major debate affecting environmental litigation and policy

Contingent valuation and passive-use values

Contingent valuation and passive-use values are the stuff that drive multibillion dollar lawsuits and major policy decisions. These are the tools that economists use to estimate the value that people place on the existence of environmental resources like wilderness areas. The legal system may use estimated values to help assess the environmental damage liability of companies like Exxon in the case of the large Alaskan oil spill. And government agencies may use the values to help formulate environmental policy, such as the Clean Water Act, which affects many businesses including agribusiness and farmers. Industry, led by Exxon, strongly challenges the validity of contingent valuation to measure these passive-use values of environmental resources.

In this series of articles, leading authorities give their views on contingent valuation. Richard Carson, Norman Meade, and V. Kerry Smith open with a brief history of passive-use values and contingent valuation and their significance for public policy and environmental litigation. Next, William Desvousges and coauthors tell why they believe contingent valuation does not give satisfactory measures of passive-use values and should not be used in environmental litigation and policy. And finally, Alan Randall presents the opposite view, arguing that contingent valuation is valid and should be used to assess damages and to formulate environmental policy.



Introducing the issues

by Richard T. Carson,
Norman F. Meade,
and V. Kerry Smith

Industry, environmental groups, and policy makers are currently debating the use of contingent valuation (CV) and passive-use values to formulate public policy and to assess economic damages from injuries to natural resources. Contingent valuation is a survey-based approach to place a dollar value on non-marketed goods. Passive-use values arise from the fact that some people care about environmental resources, such as wilderness areas, irrespective of their desire to visit them.

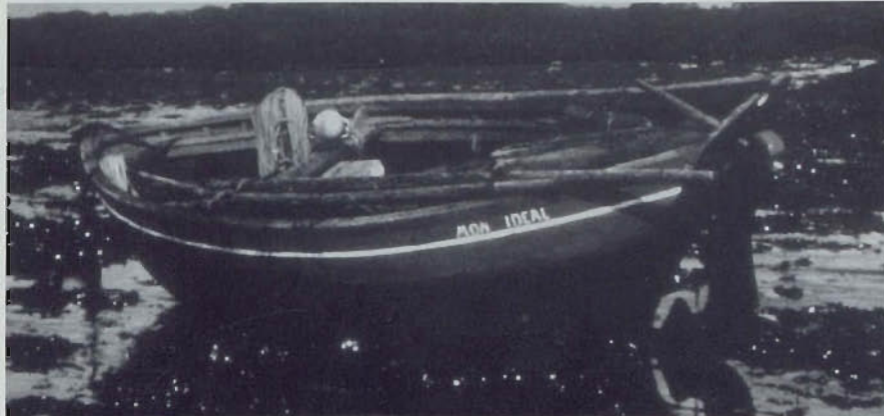
The CV-passive-use value debate has largely been initiated by recent industry-sponsored critiques of CV to estimate passive-use values. While most of the direct participants in the debate are economists—particularly environmental economists—lawyers, psychologists, ecologists, philosophers, survey researchers, statisticians, public administrators, and corporate executives have also joined in. Its interdisciplinary nature attests to the complexity of the issues. The key issues raised by these critiques (see, for example, Cambridge Economics) are whether passive-use val-

ues are real, should be counted, and can be reliably measured using contingent valuation.

Contingent valuation has been in use for over 30 years and is now the most frequently used approach to estimate nonmarket economic values. The concept of existence values was proposed over 25 years ago in a highly influential 1967 paper by John Krutilla. "Passive-use value" and "nonuse value" are newer and somewhat more inclusive terms for existence value. Krutilla argued that environmental resources may be important to people for a wide variety of reasons and that a potentially significant one, passive-use value, had been overlooked in natural resource policy making.

The novel element in Krutilla's framework was that passive-use values are not generally revealed by purchases in the market place. The key to measuring passive-use value, as with any economic measure of value, lies in the recognition that, due to scarcity, monetary value is a relative and not an absolute concept. Monetary measures of value are esti-

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Oil-covered boat and beach, Amoco Cadiz spill

mated by observing choices made subject to constraints such as income. Typically, economists use observed market choices, such as a decision to buy or not buy a particular product at a posted price, to determine value.

It is also possible, however, to use other types of decisions to infer value. The recent Nobel Laureate Gary Becker provides vivid examples of how economic concepts of value are revealed by actions such as marriage and retirement. It has also long been recognized that information about the value of public goods, such as wilderness areas, can be revealed by voting decisions.

For an economist to be able to estimate value, people need not have in mind well articulated dollar values for all the goods of interest. It is only necessary that when offered two alternative choices they can determine which one they prefer, given their income and other factors that motivate their choice. Economists recognized that tradeoff questions could be posed in a survey setting, and that, through survey questions, monetary values could be placed on a wide range of environmental amenities.

The practice of asking survey respondents to directly consider a tradeoff of money for the provision of the public good of interest came to be known as contingent valuation (see box on facing page). As the term implies, the values derived using CV are contingent on the

nature of the good, the context in which it would be provided, and the budget constraints of respondents. The survey aspect of contingent valuation is both the source of its flexibility and its most persistent criticism as articulated early by Scott (1965): "Ask a hypothetical question, get a hypothetical answer."

The first concrete and well developed proposal to use contingent valuation to estimate the value of natural resources was by Ciriacy-Wantrup in a 1947 *Journal of Farm Economics* article which focused on the public good aspects of soil conservation. He reiterated and expanded this proposal in his 1952 book *Resource Conservation: Economics and Policy*. The first serious empirical academic work on the topic was by Robert Davis in his 1963 Harvard dissertation on outdoor recreation. Davis' effort spawned a large amount of work on the development of techniques to successfully implement the contingent valuation approach as well as a large number of CV applications.

Early CV research focused on strategic behavior, comparisons with other nonmarket valuation techniques such as hedonic pricing and travel cost analysis where value for the good in question was dominated by direct use considerations, whether it was possible to split a total value CV estimate into various components such as use and passive use, and how to best convey to respon-



Oil-soaked sea bird

dents the characteristics of different types of environmental goods. A substantial amount of CV work also focused on methodological questions (Mitchell and Carson), such as how to actually elicit information about the monetary tradeoff, how to ensure that respondents take their budget constraint into consideration, what additional information about the respondent's attitudes and characteristics are useful for further analysis, alternative ways to administer the survey questionnaire, and approaches to the statistical summary of the data obtained. There is widespread agreement among CV practitioners at a general level as to the best practices on many of these issues. There are, however, disagreements on the importance of best practices when cost and complexity are introduced as factors in research design.

The lead authors of the companion articles presenting opposing views on CV have contributed significantly to the CV literature. In 1974, Alan Randall set the stage for many of the current applications of contingent valuation. His work estimated the value of improved air quality to maintain the scenic vistas we accept as an integral part of the Southwest. This work received both the American Agricultural Economics Association and the Association of Environmental and Resource Economists awards for a publication of enduring

quality. Bill Desvousges' contingent valuation research began in the early 1980s with a large EPA funded research project to compare different methods of measuring the benefits of water quality improvements for the Monongahela River. Desvousges also wrote the technical guidance document for the Department of Interior for their initial Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) natural resource dam-

age assessment regulation.

Contingent valuation is now widely used. Almost every federal agency with environmental or natural resource responsibilities (and an economics staff) has relied on contingent valuation results to help make policy decisions. Many state resource and regulatory agencies use contingent valuation. The use of contingent valuation is also increasing in Europe (Navrud). International development agencies such as the

World Bank and the Interamerican Development Bank commission contingent valuation studies.

A recent bibliography (Carson et al.) lists over 1,400 contingent valuation studies and papers from over 40 countries. The empirical applications of contingent valuation are highly varied. They include studies designed to estimate the benefits of improved national and regional air and water quality; reduced risk from contaminants in drinking and

Contingent valuation: A brief description

Contingent valuation is a highly developed survey approach to nonmarket valuation. Books (see, for example, Mitchell and Carson) and hundreds of articles have been written on CV methods. At its heart, a CV survey asks respondents for information about monetary tradeoffs involving the provision of public goods. Often this is done by asking respondents whether they would vote for or against a program to supply the good if the cost of the program to them was \$X. CV surveys differ from standard public opinion polls on government programs in two primary ways.

First, the good and the program that provides it are described in great detail. The highest quality CV surveys are typically conducted using professional interviewers in the respondent's home and involve the extensive use of visual aids such as maps, charts, and photographs. Second, the payment obligation for the program, if undertaken, is clearly described. The development of a CV survey often involves the use of focus groups, in-depth interviews, pretests, and pilot studies to help insure that respondents understand and take seriously the scenario presented.

As an example, the principal valuation question from the State of Alaska's contingent valuation survey for the Exxon Valdez oil spill is given

below. It is important to remember that this was only one question toward the end of a 40 minute interview. Earlier parts of the survey had described the harm caused by the Exxon Valdez oil spill and how a proposed escort ship program would help prevent and contain a future

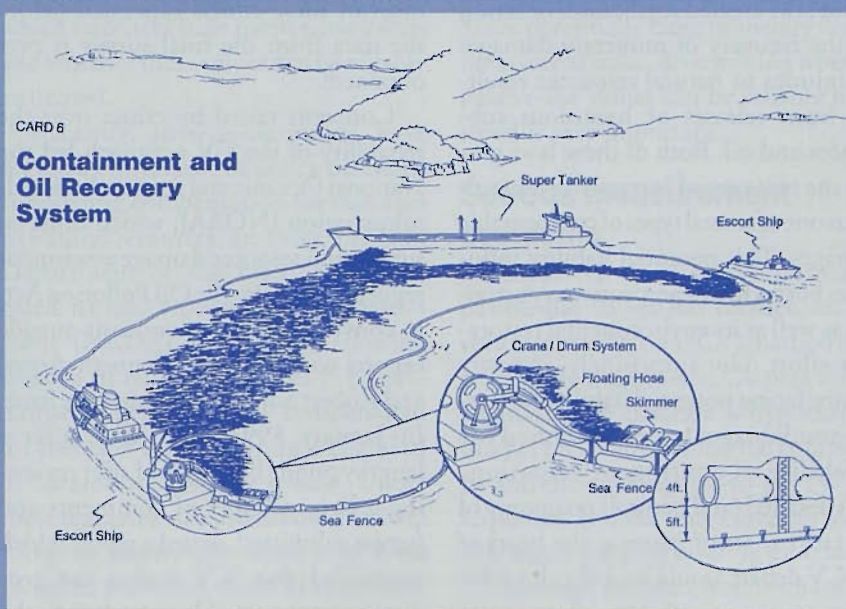
spill (see figure). In addition, the survey elicited information about concern for other public goods, the perceived effectiveness of the escort ship program, and the seriousness of the spill, as well as demographic information such as environmental attitudes and income.

[QUESTION] Of course, whether people would vote for or against the escort ship program depends on how much it will cost their household.

At present, government officials estimate that the program will cost your household a total of \$30. You would pay this in a special one-time charge in addition to your regular

federal taxes. This money would only be used for the program to prevent damage from another large oil spill in Prince William Sound. **[PAUSE]**

If the program cost your household a total of \$30, would you vote for the program or against it?



groundwater resources; improved fishing and hunting opportunities; protecting scenic rivers, wetlands, wilderness areas, and endangered species; senior companion programs; improved museums, public education, and food and transportation safety; reduced queues for public health care services; improved service reliability of electric and water utilities; tropical rain forests; and improved drinking water and sanitation services in developing countries as well as others.

There was a steady increase in the amount of CV research throughout the 1970s and early 1980s. Contingent valuation's importance in the United States was raised considerably by President Reagan's Executive Order 12291 which required an assessment of the benefits and costs of major new government regulations and re-authorization of existing ones. Most of the rapid growth in contingent valuation since the mid 1980s, both here and abroad, is in response to a growing demand for more comprehensive benefit-cost assessments. By far the greatest stimulus to the current CV debate, however, was the passage of two laws, CERCLA in 1980 and the Oil Pollution Act of 1990. These laws created legal causes of action for the recovery of monetary damages for injuries to natural resources resulting from releases of hazardous substances and oil. Both of these laws permit the recovery of lost passive-use values as one of several types of compensable damages. This potential liability influences both a firm's precautionary activities as well as its environmental restoration effort. Not surprisingly, industry groups facing potential liability for passive-use damages have questioned the reliability of contingent valuation.

A detailed (and neutral) taxonomy of the current set of issues at the heart of the CV debate would be difficult in this short space; nonetheless, some issues

can be mentioned. As noted earlier, the most fundamental criticisms of the CV approach to measuring the monetary value of a commodity with substantial passive use considerations originate from the fact that passive-use values leave no behavioral trail (people don't purchase a related good or visit a site). Critics of contingent valuation also note specific problems. They argue that there are inconsistencies between stated intentions and actual behavior because respondents get a "warm glow" from "giving" in a survey context, that the results of CV studies are incompatible with the tenets of economic descriptions of rational choice, that respondents to CV surveys must have had experience with the commodity before they can reliably value it, and that the results of CV surveys are sensitive to the details of survey design and statistical analysis.

Most proponents of contingent valuation acknowledge that poorly designed and poorly implemented studies can and frequently do produce results that reflect these problems. However, they argue that these problems are not inherent to the method. The lesson is that achieving reliability can be an expensive and time consuming process—with most of these efforts expended before the data from the final survey is ever obtained!

Concerns raised by critics over the reliability of the CV approach led the National Oceanic and Atmospheric Administration (NOAA), which must issue natural resource damage assessment regulations under the Oil Pollution Act, to convene a panel of eminent outside experts co-chaired by Kenneth Arrow and Robert Solow to examine the issue. In January 1993, the Panel, after a lengthy public hearing and after reviewing a large number of comments and papers submitted, issued a report which concluded that "CV studies can produce estimates reliable enough to be the

starting point for a judicial or administrative determination of natural resource damages—including lost passive-use value." This is unlikely to be the last word on the subject. However, by suggesting implementation guidelines to help ensure the reliability of contingent valuation estimates, the Panel has both set the context for debates to come and helped to chart an ambitious research agenda.

Debates generate both "heat" and "light." We leave to the reader to judge where we stand in the evolving dialogue on contingent valuation and the measurement of passive-use values. ■

■ For more information

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