Contingent valuation: the wrong tool to measure passive-use losses

by William H. Desvousges, Alicia R. Gable, Richard W. Dunford, and Sara P. Hudson

The measurement of passive-use values, values that do not depend on human use of natural resources, is one of the most controversial topics facing environmental economists today. Most economists, including ourselves, feel that people may value the existence of unique beaches, lakes, and other natural resources, even though they may not actually use them. However, while use values can be readily estimated by observing people's actual behavior, passive-use values have no associated behavior to use in estimation. The main empirical challenges are to determine which resources have passive-use values and whether these values can be reliably estimated.

Recently, passive-use values have played a critical role in policy decisions concerning compensation for damages to natural resources. In 1986, the U.S. Department of the Interior promulgated natural resource damage assessment (NRDA) regulations, allowing trustees of natural resources (i.e., government agencies) to be compensated for damages resulting from a chemical or hazardous substance release. Under these regulations, trustees could recover foregone passive-use values only if no foregone use values could be estimated. In 1989, the U.S. Court of Appeals significantly expanded the potential role of passive-use values in natural resource damages by ordering potentially responsible parties to pay for foregone passive-use values, if those values are "reliably" measured. The Oil Pollution Act of 1990 further increased the potential importance of passive-use damages in NRDAs, supporting the Court of Appeals' decision. As a result of these developments and an increasing number of state legislative actions, trustees have filed numerous suits against potentially responsible parties (PRPs) to recover foregone passive-use values. Since potentially large monetary settlements are at stake, determining whether passive-use values can be reliably measured is very important.

Serious measurement problems

Much of the discussion surrounding passive-use values has focused on the contingent valuation (CV) method used to measure these losses. CV uses survey techniques to describe a hypothetical market for an environmental commodity and elicit willingness-to-pay (WTP) responses. It is the only currently available technique for measuring these losses.

Although many economists have undertaken CV surveys, these past studies

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are of limited value for assessing the accuracy of CV for measuring NRDA-related passive losses. Most previous CV studies have estimated active-use values, not the more complex passive-use values. Furthermore, most existing passive-use studies address situations that are very different from most damage assessments. They involve large changes in unique natural resources (such as the Grand Canyon), while NRDAs usually involve small, temporary changes in lesser known resources. Therefore, the extensive CV literature does not offer much assurance that this method can measure lost passive-use values accurately in damage assessment contexts. Rather, it points to CV's ability to measure use values.

In 1992 the National Oceanic and Atmospheric Administration (NOAA) formed a blue-ribbon panel headed by two Nobel laureates (Kenneth Arrow and Robert Solow) to evaluate the reliability of CV for measuring passive-use damages in NRDAs. In its report, the NOAA panel highlighted several potential problems with the use of CV. We believe that the NOAA panel's concerns (Federal Register 1993) deserve serious consideration.

In an NRDA context the CV method assumes that respondents are able to estimate their value for *temporary* and *marginal* changes in a commodity with which they are likely to be unfamiliar. The NOAA panel questions whether people are able to understand the situations presented in passive-use CV surveys for damage assessments. For example, a damage assessment may ask a person's value for a one percent reduction in a bird population over a 5-year period, rather than the extinction of an entire species. The difficulty in placing a value on such a small, temporary change is evident, and most past CV studies have not addressed this type of situation. We have performed a study asking for passive-use values for a commodity of this type. We asked for values for preventing the accidental death of different numbers of migratory waterfowl, ranging from 2,000 birds to 200,000 birds. These numbers represent less than 2 percent of the total population. Our results indicate that respondents have difficulty expressing meaningful values for such small changes in a population. However, these changes are precisely the type of resource service that need to be valued in a NRDA. (For more details on this experiment, see Desvousges et al., 1992.)

Osprey nesting Photo: RTI

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Surveys frequently do not provide respondents with adequate, relevant background information on the affected natural resource. Even if enough information is given, participants may not be able to thoroughly understand what is being asked, especially if they have little previous experience with making choices concerning that resource. Also, respondents with some related previous experience may use correct or incorrect prior knowledge that is not included in the survey and that other respondents do not use. Researchers must take extra care to ensure that respondents understand exactly what they are being asked to value and that all respondents have comparable information. Although analysts, including ourselves, have used extensive pretesting to try to address this problem, we are concerned about the difficulties posed by the lack of choice experience.

Marketing research has shown that potential market demand studies consistently overestimate the actual purchases of new products. Similarly, the NOAA panel repeatedly expresses concerns that CV estimates are significantly higher than "actual" willingness to pay (WTP) values. If this is true, the validity of CV passive-use estimates is undermined, unless some legitimate way is developed to calibrate CV estimates. At this point, we do not know whether that calibration factor is 10 percent or 90 percent.

We found this problem to be especially pronounced when using the referendum technique. With this technique, the respondents are each given a randomly assigned dollar amount, and asked if they would be willing to pay at least that amount. Many studies have found that an unreasonably high number of people say "Yes" to very large dollar amounts. In one of our experiments 34 percent of the respondents accepted an amount of $1,000. However, when we administered the same survey and asked for the maximum amount the respondent was willing to pay rather than having them respond to an offer, only 4 percent of the respon-

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dents gave WTP amounts of over $1,000. Our experience is not unique, as others have found evidence of what may be called "yea-saying" bias. This experience does not support the NOAA panel's endorsement of the referendum format.

Another problem arises when respondents express emotional responses to CV questions, rather than responses with economic meaning. Environmental damage, particularly damage resulting from an oil spill, is often widely publicized and involves a high level of emotion, including feelings of outrage. Such emotions may cause people to give the same valuation for a minor spill with few effects as they give for a major spill with significant effects. We found such a result when we administered two different versions of a survey asking for values for investing in oil-spill response centers. We did not find an increase in WTP values for local and regional response centers that would be equipped to handle all oil spills, as compared to local response centers that would only handle small spills. Because the first policy obviously offers a higher level of environmental protection, it is difficult to understand why the WTP values are not higher.

In addition, we agree with the NOAA panel's emphasis on budget constraints and the availability of substitutes. Respondents tend to ignore their specific budget constraints and ability to pay when expressing a WTP for a hypothetical situation. Thus, income is often not a significant explanatory variable in WTP models. Also, there are often a large number of high values, some higher than 25 percent of the respondent's annual income.

Finally, respondents often fail to consider substitute resources. Respondents' expressed WTP should reflect the number and the quality of available substitutes. Because in passive-use studies people do not actively use the resource, there are many more potential substitutes than for active use. Time and money limitations on travel do not apply to resources that people do not actually use. Following economic theory, the greater the number and the quality of available substitutes, the less consumers should be willing to pay. Ignoring either budget constraints or substitutability will considerably distort the total damage estimate.

Photo: RTI

Conclusions

Accuracy is essential in CV measures of passive-use value because important resource allocations are at stake. Incorrect passive-use value estimates may cause damage estimates to vary by tens or even hundreds of millions of dollars for the same situation. Neither overestimation nor underestimation benefits society because everyone will eventually have to pay for the inefficiency created by either type of mistake.

We have identified several major concerns with the accuracy of the CV method in its measurement of passive-use values. The NOAA panel also acknowledges many of these hurdles. In the absence of an alternative method, NOAA plans to incorporate measures of passive-use values from the CV method into the forthcoming Oil Pollution Act regulations. Although the CV method has proven useful in other contexts, we have serious doubts about its ability to elicit meaningful passive-use values. We urge NOAA and other federal agencies to further investigate the accuracy of such estimates before they are used to assess natural resource damages. ◘

■ For more information

Desvousges, William H., F. Reed Johnson, Richard W. Dunford, Kevin J. Boyle, Sara P. Hudson, and K. Nicole Wilson. *Measuring Nonuse Damages Using Contingent Valuation: An Experimental Evaluation of Accuracy.* Research Triangle Institute Monograph 92-1, June 1992.

Federal Register. 1993. NOAA Panel Report on Contingent Valuation (58 *Fed. Reg.* 4,601).