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Non-market methods - stated preference

Excerpt from draft SAB Committee report, *Valuing the Protection of Ecological Systems and Services*: *In contrast to revealed-preference methods, stated reference methods infer values or economic benefits from responses to survey questions about hypothetical tradeoffs. As with social-psychological methods, stated reference methods often use focus groups to improve survey designs. In some cases, survey questions directly elicit information about willingness to pay or accept, while under some survey designs (e.g., conjoint or contingent behavior designs) monetary measures of benefits are not expressed directly. Rather, quantitative analysis of the tradeoffs implied by survey responses is needed to derive economic benefit measures. Although the use of stated-preference methods for environmental valuation has been controversial, there is considerable evidence that the hypothetical responses in these surveys provide useful evidence regarding values (see related detailed discussion on the use of survey methods for ecological valuation on the SAB Web site at [http://yosemite.epa.gov/Sab/Sabproduct.nsf/WebFiles/SurveyMethods/\\$File/Survey_methods.pdf](http://yosemite.epa.gov/Sab/Sabproduct.nsf/WebFiles/SurveyMethods/$File/Survey_methods.pdf)).*

Further reading

- Arrow, K., et al. 1993. Report of the NOAA Panel on Contingent Valuation, Federal Register 58:10 (Jan.15, 1993), 4601-4614.*
- Banzhaf, S., D. Burtraw, D. Evans, and A. Krupnick. 2004. Valuation of natural resource improvements in the Adirondacks. Washington, DC: Resources for the Future.*
- Bateman, I.J., and K.G. Willis, eds. 1999. Valuing environmental preferences: Theory and practice of the contingent valuation method in the US, EU, and developing countries. Oxford: Oxford University Press.*
- Carson, R.T. and W.M. Hanemann, 2005, Contingent Valuation in Handbook of Environmental Economics Vol. II, ed. K. Göran-Mäler and J. R. Vincent Amsterdam: North Holland, pp. 821-936.*
- Champ, P., K.J. Boyle and T.C. Brown, eds. 2003. A primer on non-market valuation. Dordrecht: Klumer Academic.*
- Freeman, A.M., III. 2003. The measurement of environmental and resource values, 2nd ed. Washington, DC: Resources for the Future.*
- Haab, T.C. and K.E. McConnell. 2002. Valuing environmental and natural resources. Cheltenham, UK: Edward Elgar.*
- Kanninen, B.J., ed. 2007. Valuing environmental amenities using stated choice studies. Dordrecht: Springer.*

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Kopp, R.J., W.W. Pommerehne, and N. Schwarz, eds. 1997. Determining the value of non-marketed goods: Economic, psychological, and policy relevant aspects of contingent valuation methods. Boston: Kluwer Academic Publishers.

Murphy, J.J., P.G. Allen, T.H. Stevens, and D. Weatherhead. 2005. A meta-analysis of hypothetical bias in stated preference valuation. Environmental and Resource Economics, 30: 313-325.

Smith, V.K. 1997. Pricing what is priceless: A status report on non-market valuation of environmental resources. In The International Yearbook of Environmental and Resource Economics, eds. H. Folmer and T. Tietenberg. Cheltenham, U.K.: Edward Elgar, pp. 156-204

Brief Description of the Method. Stated preference methods rely on survey questions that ask individuals to make a choice, describe a behavior, or state directly what they would be willing to pay for specified changes in environmental services not traded in markets. The various stated preference techniques are distinguished by how the information is presented, what questions are asked, and how their responses are formatted. It is important to acknowledge that the choices, stated values, or revised patterns of use are derived from answers to questions that ask respondents what they would do, or how much they would pay for, or how they would alter their choices in response to changes in the amount of a non-market good or service in a specified hypothetical setting. This is in contrast to Revealed Preference Methods, which are based on observing the actual choices made by people facing real constraints on income, etc. Stated preference methods offer the opportunity to measure trade-offs for anything that can be presented as a credible and consequential choice. Hence, their primary advantage is their ability to, in principle, measure a wider set of values. In particular, they are the only economic methods that can measure non-use values.

Although not all authors use the same terminology, the term stated preference methods generally include any survey questions in which respondents are asked hypothetical questions designed to reveal information about their preferences or values. The term encompasses three broad types of questions. The first type involves questions that ask directly about monetary values for a specified commodity or environmental change. These are usually called contingent valuation method questions (CVM). In the past, the most commonly used CVM questions simply asked people what value they place on a specified change in an environmental amenity or the maximum amount they would be willing to pay to have it occur. These are usually open-ended

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in that the individual has to state a number rather than respond to a number offered by the researcher. The responses to these questions, if truthful, are direct expressions of value. The other major type of CVM question asks for a yes or no answer to the question, "Would you be willing to pay \$X ...?" Each individual's response reveals only an upper bound (for a no) or a lower bound (for a yes) on the relevant welfare measure. Questions of this sort are termed discrete choice questions. Responses to discrete choice questions can be used to estimate willingness-to-pay functions or indirect utility functions.

The second and third major types of Stated Preference methods do not reveal monetary measures directly. Rather, they require some form of analytical model to derive welfare measures from responses to questions. The second type of question is called variously "choice experiment," "conjoint analysis," or sometimes an "attributes based method" (Holmes and Adamowicz 2003). In this approach to questioning, respondents are given a set of hypothetical alternatives, each depicting a different bundle of environmental attributes. Respondents are asked to choose the most preferred alternative, to rank the alternatives in order of preference, or to rate them on some scale. Responses to these questions can then be analyzed to determine, in effect, the marginal rates of substitution between any pair of attributes that differentiate the alternatives. If one of the other characteristics has a monetary price, then it is possible to compute the respondent's willingness to pay for the attribute on the basis of the responses.

In the third type of SP question, individuals are asked how they would change the level of some activity in response to a change in an environmental amenity. If the activity can be interpreted in the context of some behavioral model such as an averting behavior model or a recreation travel cost demand model, the appropriate indirect valuation method can be used to obtain a measure of willingness to pay. These are known as contingent behavior or sometimes contingent activity questions.

Status of the Method. The method has an extensive literature of principles and applications extending over a forty-year period. Mitchell and Carson's (1989) pioneering treatise is still the primary reference on CVM, especially for design and implementation questions. See also Carson (1991). Two new works that focus on best practice and empirical estimation for CVM and stated choice studies are Boyle (2003) and Holmes and Adamowicz (2003), respectively. The so-called NOAA Blue Ribbon Panel (U.S. National Oceanic and

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Atmospheric Administration 1993) reviewed CVM in the context of assessing damages to natural resources in support of litigation and provided its guidelines for best practice. Other important references are: Bjornstad and Kahn (1996) for a review of theoretical and empirical issues that includes assessments by both proponents and critics of stated preference methods; Kopp, et al. (1997); Bateman and Willis (1999); Bateman, et al. (2002); and Smith (2004, 2007).

Use of the stated preference methods for environmental valuation has been controversial. A major issue concerning the status of stated preference methods is the validity of the resulting value estimates. There are several concepts of validity and various approaches to assessing the validity of responses. A commonly cited issue related to validity is the existence of what is known as hypothetical bias. The argument is that the hypothetical nature of stated preference questions results in the overstatement of economic values, or what is known as hypothetical bias. However, the evidence regarding the extent of this bias is mixed (see Murphy, et al. 2005 for a recent discussion). The controversy surrounding stated preference methods had the salutary effect of stimulating a substantial body of new research on both practice and on the credibility or validity of stated preference estimates of value. A good overview of the issues raised in this controversy is contained in the three essays published as a symposium in the *Journal of Economic Perspectives* (Portney 1994, Hanemann 1994, and Diamond and Hausman 1994). See also, Hausman (1993) and Freeman (2003) and references therein for further discussion.

Strengths and Limitations. Strengths include the accumulated experience of forty years of practice and research. Also in principle, stated preference methods are the only set of methods capable of capturing so-called nonuse values, since without use there is no behavior that can reveal values through application of revealed preference methods.

In addition to the controversy stemming from the hypothetical nature of the questions noted above, some people question whether surveys are capable of providing useful information about preferences. One issue is whether preferences regarding unfamiliar environmental goods are well-formed and stable (see Part 1, section 2.4). In addition, since responses to questions must reflect in some sense the knowledge that individuals have about the thing being valued as well as respondents' preferences, the methods cannot be used to value ecosystem services about which people are ignorant. For example, if respondents were asked questions concerning phytoplankton but were ignorant of the role of phytoplankton in supporting the aquatic food

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chain and higher order species that they might value, their responses might be interpreted as placing no value on phytoplankton. In such a case, stated preference methods will not generally be useful for valuing changes in supporting ecosystem services (see Part 1, section 2.1) since most lay individuals are not aware of the crucial role of these services. One solution to this problem is to use the survey instrument to convey information to respondents about the role of the ecosystem service being valued and the potential consequences of changes in the level of this service. See, for example, Banzhaf, et al. (2004). Then, of course, the question becomes one of the validity of the information provided to respondents and the potential for biasing responses by providing biased information.

Finally, even if preferences are well-formed and individuals are aware of the role of the relevant environmental attributes, the survey might not provide incentives for respondents to reveal their preferences accurately. This depends, among other things, on the degree of incentive compatibility of the various questioning formats and the set of methods as a whole. Carson, et al. (2000), reasoning from first principles about what is in the best interest of respondents faced with a scenario, payment vehicle, and elicitation question, have established under what conditions stated preference questions give people incentives to reveal their true values. The first two conditions are that the survey question be about something that matters to the respondent and that the respondent believes that his/her response might affect the outcome of the policy issue that is the subject of the survey. If both conditions hold, then the survey question is termed “consequential” to respondents. For consequential questions, it is possible to reason from an assumption of acting on rational self interest to predict whether responses will be truthful and if not, then at least in some cases what the direction of bias will be.

For consequential questions, the only question format that can in principle be incentive compatible is the single discrete choice question. In addition, this form requires the further condition that the government agency is perceived as being able to compel payment of some amount from the respondent if the good is provided. For example, questions that ask about the willingness to make a voluntary contribution to support some government action fail this condition and provide incentives to respond “yes” even when the requested contribution is greater than the respondent’s WTP.

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