Chapter XI

IS SYMPATHY AN ECONOMIC VALUE? PHILOSOPHY, ECONOMICS, AND THE CONTINGENT VALUATION METHOD

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INTRODUCTION[1]

If a toxic chemical is spilled in a wilderness stream, leaving human lifestyles unaffected, has harm been done? To those concerned about animals, ecosystems, and the environment, the answer is surely yes. What is controversial is how to think about and measure the economic magnitude of the loss. These measurements affect government decisions about how much public money to allocate to prevent spills, which private sector projects on public lands and properties to approve, what mitigating measures to require, and so on.[2] In addition, by determining the fines assessed by courts and agencies for environmental damage, such measurements influence the allocation of private resources among environmental preservation activities and between those activities and other valuable uses.

There are several possible conceptions of the value of environmental resources, but only one has received much attention from economists—the approach based on the theory of public goods. In this theory, a (pure) public good is a good that, once created, is available to all without exclusion and for which the total cost and the quality of service do not depend on the number of people being served. National defense, educational television broadcasts, and protection of the ozone layer are examples. In the wilderness-as-public-good view, the existence or maintenance of a totally inaccessible wilderness area in its pristine state is a public good because knowledge of the existence can be enjoyed by many people without any congestion or crowding.[3] The value to an individual of a pristine wilderness that will never be used, called the nonuse, or existence value,[4] is the largest amount that the person would be willing to pay to preserve the pristinity. The existence value to society as a whole is the total of all the individual existence values. In the quarter century since the idea of existence value was introduced (Krutilla, 1967), dozens of studies and research papers have sought to apply it by using survey methods called contingent valuations, which attempt to measure individual existence values directly, or "total" values that include existence values.[5]

This approach, which is based on the idea of existence as a public good and uses contingent valuations to measure existence values, is problematic for three kinds of reasons. First, there are theoretical objections. The nature and proper scope of the existence-value idea has confused proponents and critics of contingent valuation alike. People's total willingness to pay for the existence of unspoiled environments is likely to include components like altruistic values that should, according to standard economic theory, be excluded from benefit-cost studies, and may exclude components that should be included. Second, even if the relevant components of existence value could be isolated in theoretical terms, the survey methods used to measure existence values cannot be validated or calibrated within this kind of application. There are strong *a priori* reasons for thinking that survey respondents cannot respond meaningfully to questions that elicit their existence values, either in isolation or as part of a more comprehensive total value. This theoretical presumption makes the reliance on unvalidated and uncalibrated methods dubious at best. Finally, the contingent valuation surveys that have actually been conducted have consistently shown that survey values are sensitive to variations in survey design and implementation in ways that are inconsistent with the notion that surveys measure the relevant economic values. The three sections that follow investigate each of these problems in sequence.

PROBLEMS WITH THE CONCEPT OF EXISTENCE VALUE

Feelings, Knowledge, and Value

Discussions of existence value often proceed from the premise that these values arise from the good feelings people get from merely knowing that, say, visibility is good over the Grand Canyon or that Prince William Sound is free of oil. These discussions take for granted a utilitarian philosophy, "which places men at the very center of the universe, with their states of feeling as the source of all value in the world. . . . Destruction of things is evil in so far as it is, or will be, felt as a loss by sentient beings; and the creation of things, and the preservation of species, are to be aimed at and commended only in so far as sentient beings are, or will be, emotionally and sentimentally interested in the things created and preserved" (Hampshire, 1978:2).[6]

This utilitarian conception of value reverberates through modern debates about benefit-cost analysis. For example, critics Rosenthal and Nelson have attacked the concept of existence value for being too broad, complaining that "anything that shapes perceptions of the world becomes potentially eligible for estimation as an existence value" (Rosenthal and Nelson, 1992:117). In reply, Kopp (1992:124) vigorously defended the concept, explaining: "One can enjoy a particular nonconsumptive service—for instance, reflecting on the beauty of the Grand Canyon—without using it or, more generally, without engaging in any observable behavior. . . ."

Conceptions of existence value based on such naive utilitarian calculations, with their emphasis on human perception and enjoyment, lead to unacceptable conclusions. If the value of an unspoiled wilderness depends on human knowledge or belief about its existence, then the secret destruction of an environmental resource does no damage. By the same logic, real damage is wrought by the journalist who first publicizes the destruction.

If the objective of environmental policy is to preserve the real animals, ecosystems, and physical environments, rather than the warm feelings that people experience when they think about them, then utilitarian calculations cannot provide a satisfactory basis for the policy. A satisfactory theory must identify a value— to be estimated in benefit-cost studies—that depends as much as possible on the actual state of the environment and is as free as possible from distortions caused by mistaken perceptions, miscalculations, and incomplete information. Such values are the only kind that are consistent with modern economic theory, and they are the only ones we shall consider in the analysis that follows.[7]

Altruism

A second conceptual stumbling block for thinking about existence values is the determination of which motives for value are properly included in a public-goods analysis. The importance of this determination had been largely ignored by contingent valuation researchers until the recent paper by Kahneman and Knetsch (1992), which reported experiments to support the claim that "Contingent valuation responses reflect willingness to pay for the moral satisfaction of contributing to public goods, not the economic value of these goods" (p. 57). Both the methods and the conclusions of this article were quickly attacked (Smith, 1992; Harrison, 1991) and defended (Kahneman and Knetsch 1992 a,b), but neither side paid much attention to what kinds of values are properly included in benefit-cost analyses. This important question can be answered only by reviewing the economic foundations of public-policy analysis.

The economic analysis of public policy is rooted in the idea of efficiency, or Pareto optimality, according to which one allocation of resources is indisputably better than another if everyone prefers it. The move from one allocation to another that all prefer is called a Pareto improvement. The purpose of benefit-cost analysis is to identify potential Pareto improvements, that is, projects that could, in principle, be implemented and financed in a way that makes everyone better off. It may not always be possible to finance a project in a way that accomplishes an actual Pareto improvement, and the policymaker's political or ethical concerns about how the benefits of public projects are distributed may then properly determine whether the identified projects are adopted. Within the standard neoclassical model of the economy, it is a theorem that a public project is a potential Pareto improvement exactly when the sum of each citizen's willingness to pay for the project exceeds the cost of the project. This theorem supplies the logical underpinning of benefit-cost analysis.

The standard economic model on which this conclusion is based is an abstract one that incorporates very particular assumptions about people's values. Most importantly, it assumes that the amount people are willing to pay for a public project is independent of the benefits that others receive, the amounts that others are called upon to pay (or receive), and the processes by which decisions are made. In other words, value is treated as a purely personal matter that is related to the personal benefits each individual receives from the project. This model can be extended and elaborated in various ways to examine what other kinds of values should be incorporated in a more complicated world. *In the extended model in which some citizens may be concerned about the happiness of others, the part of willingness-to-pay* (WTP) *that arises on account of altruistic feelings must be excluded from the benefit-cost calculation in order to identify correctly the projects that are potential Pareto improvements.*[8] Intuitively, the reason is that counting one person's WTP for another's happiness in a benefit-cost calculation amounts to a double (or triple or. . .) counting of the beneficiary's benefits. The following illustrates this double counting in a particularly simple example.

Altruistic Values and Benefit-Cost Analysis: An Example

To illustrate how benefit-cost calculations can go awry when altruistic values are included, consider the following simple example. Suppose the local swim club proposes to extend its hours by hiring a lifeguard. Two people are affected by the project. The first person enjoys a benefit of $100 from the project, minus any amount y that he must pay to have the project implemented. We denote the first person's increased utility from the project with this financing by A, where:

$$A = \$100 - y.$$

The second person gets $50 of direct benefit from the project and, in addition, feels altruism toward the first person, and so is willing to pay $1 for each $2 in increased net benefits that the first person enjoys. If we let B denote the additional utility that the second person enjoys and z the amount he pays, then

$$B = \$50 + \tfrac{1}{2} A - z.$$

The cost of the project is X. The central question is: Under what conditions is there a potential Pareto improvement? First, the amounts y and z must be sufficient to finance the project: $X \leq y + z$. The second person must be made better off: $z < \$50 + \tfrac{1}{2} A = \$50 + \tfrac{1}{2}(\$100 - y)$. Finally, the first person must be made better off: $y < 100$. Combining these three inequality conditions in the order presented yields:

$$X \leq y + z < y + \$50 + \tfrac{1}{2}(\$100 - y) = \$100 + \tfrac{1}{2}y < \$150.$$

The project involves a potential Pareto improvement only if $X < \$150$. Conversely, if $X < \$150$, then the project can be financed so that both parties benefit.

Observe that each party alone would be willing to pay $100 for the project,

but it would be a mistake to conclude that the project should be carried out if its cost is between $150 and $200. Including the altruistic values leads to false conclusions. The example illustrates the general principle that *there is a potential Pareto improvement if and only if the project passes the benefit-cost test with the altruistic value excluded.*

How important are altruistic motives in people's survey responses? Apart from the Kahneman and Knetsch study cited earlier, evidence is sparse, but the potential for altruism appears to be quite large. Many people feel altruistic toward members of their family and community and toward the next generation. Some hold similar feelings toward all of humanity and all of posterity. They may also hold such values toward members of nonhuman species. To the extent that direct values are already included in the calculation, also including altruistic values amounts to double counting. *A priori*, these values could be a large fraction of the total reported WTP of survey respondents.

Valuing the Distribution of Benefits

Incorporating concerns for others in benefit-cost calculations would also tend to justify as "efficient" projects and policies that favor more popular groups relative to less popular ones. For example, according to some critics, surveys would measure positive existence values for maintaining automobile manufacturing jobs in Detroit (Rosenthal and Nelson, 1992). Yet the greater or lesser sympathy that some people may feel for Detroit's auto workers compared to workers in Tennessee or South Korea cannot determine where it is efficient to preserve jobs. Nor is it likely that such sympathies can determine whether it is more efficient to protect the habitat of spotted owls or the jobs of Oregonian lumberjacks.

Other kinds of preferences that people may express within the context of existence values are more deeply disturbing. Some people may be willing to pay for the existence of racially or ethnically homogeneous neighborhoods, in which nonwhites are not welcome, or for the existence of protected wilderness environments, in which humans are not welcome. Economic values do not account for the very different responses that these two scenarios evoke.

Valuing the Outcome Process

Some survey respondents may value the very process by which an outcome occurs. For example, some may consider a fire in a national park to be more acceptable if it is started by lightning than by a careless camper. Natural oil seepage may be deemed acceptable, whereas comparably small oil spills are not. Valuations like these, in which the fundamental values assigned to changes in the state of the world are dependent on the process by which the states are reached, are inconsistent with the standard foundations of benefit-cost analysis. There could be pragmatic reasons to distinguish natural from man-made environmental changes. For example, such

a policy may prevent growth in the numbers of fires or spills beyond some critical level. Values such as these, however, can only be determined by a detailed analysis of the full effects of the policy. To poll citizens on the value of such a policy makes no more sense than it does to ask them about how much they would be willing to pay to add particular equipment to NASA's space station: they have too little information to answer intelligently.[9]

Values from Rights and Obligations

A related objection to the public-good conception of existence value is based on how poorly it reflects the terms of the modern debate about the environment. The arguments commonly made for preserving the environment are wide-ranging. Some people cherish the environment for its own sake. Others emphasize human society's obligation to preserve the earth's ecosystems. Still others recognize rights for, or human duties toward, individual animals or species.[10] Many trace current obligations to the rights of human generations to come.

People's conceptions of their rights and obligations may affect the values they feel and express in various ways. Some may be willing to make large personal sacrifices to preserve a particular environment, yet be unwilling to pay others anything to preserve another similar environment because that is *their* obligation. The appropriate treatment of these values in economic analysis has not yet been established, but it is clear that simply adding them to other values is not the proper, general procedure.

The phenomenon that contingent valuation researchers call "protest responses" tends to confirm that values based on notions of rights and obligations are prevalent in significant portions of the population. Protest responses are extreme responses that express an objection to some aspect of the contingent valuation scenario, rather than reflecting the respondent's economic self-interest. These include reports of willingness to pay a large fraction of the respondent's income and probably also include some WTP responses of zero. The regularity of protest responses and the absence of similar responses in survey valuations of consumer products suggest that protest responses do reflect some kind of genuinely felt value for environmental goods. Such responses would be understandable and even expected if some respondents were evaluating the survey questions in terms of whether a particular matter is "my responsibility" or "someone else's responsibility."

In a diverse population, values of all these kinds are likely to be found in some degree. These values are real, and many of them have a role in the political part of public-policy considerations. They are not, however, properly included in benefit-cost analyses, because including them obscures those analyses and prevents them from fulfilling their proper economic function.

PROBLEMS IN MEASURING EXISTENCE VALUE

One of the principal attractions of the contingent valuation method has been that it seems to offer a way for determining an objective value for the preservation of unused environmental resources. I indicated in the previous section why the value measured is likely to be the wrong one. For the present section, in order to focus on the measurement issues, let us set aside these concerns and suppose that the public-goods model applies. Our question now is whether respondents who wish to report only the proper elements of value to a surveyor would be able to do so.

Assume that informed individuals base their existence valuations of particular environmental resources on the actual *characteristics* of those resources; on their ordinary consumption opportunities (determined by their income and prices of consumer goods); and on other facts about the consumer's personal situation and about the world. In the formal language of consumer theory, the key premise is that for each individual j there is a utility function $U_j(C_j,E,F)$ that determines the consumer's full information utility level, where C_j is individual j's bundle of consumer goods, E is the bundle of environmental characteristics including those whose mere existence is valued, and F is a variable denoting other facts about the world that are relevant to the consumer in assessing the importance of the existence of some resource. The bundle E might list the number of acres of habitat suitable for various kinds of wildlife, the number of miles of (relatively) unpolluted shoreline, the presence of these things in combinations or in large enough aggregations to be self-sustaining, and so on. The variable F might include facts about the size of a viable ecosystem including particular species, which might color a survey respondent's judgment about, say, the value of preserving a small parcel. But for the explicit recognition of the respondents' uncertainty, this framework is the usual one for the analysis of public goods.

The first question we must face is this: What is the correct measure of benefits and costs when respondents lack some relevant information? The main subtlety in this question arises from the fact that various survey respondents have different information. It is well established that answers to survey questions can be sensitive to the information that is provided, and that fact has been used both to attack and to defend contingent valuation surveys (Cummings, Brookshire, and Schulze, 1986; Bergstrom, Stoll, and Randall, 1989, 1990; Kahneman and Knetsch, 1992; Randall, Hoehn, and Brookshire, 1983). There is little need for a full formal analysis of this issue because the informal analysis is equally convincing. The proper basis for economic valuation of costs and benefits is the choices consumer-citizen respondents would make if they were well informed about the matter and experienced in making similar choices. As explained earlier, the ideal benefit measure must not depend on the extent of the respondents' knowledge; rather, it must depend, to the greatest possible degree on the actual facts about the world. Similarly, the valuation must not depend on mistakes that could be avoided by experienced people with ample time to think and analyze. The most appropriate valuations are those that reflect the best available information and the most seasoned judgments. Valuations that are not based on good information and extensive experience can be poor indicators of the respondents' real interests.

Decisions with Imperfect Information and Bounded Rationality

This last conclusion may, perhaps, need additional elaboration and justification for a few readers who wear both the lenses and the blinders of professional economists because it seems to infringe on the traditional principle of consumer sovereignty. This subsection argues that our perspective is in fact consistent with the modern mainstream of economic thought.

The principle of consumer sovereignty has its basis in the thinking of nineteenth-century utilitarian philosophers and economists, who argued that the actual choices made by adults could be taken to represent their real interests and objectives and used as a basis for social policy. This may be a reasonable approximation for decision situations that are familiar and easy and those in which the relationship between choices and outcomes is clear, but it is far less appropriate for unfamiliar, complex situations or those with high uncertainty. For example, one cannot infer from a bad move made in a chess game that the player wants to lose; it is far more likely that the bad move is a mistake caused by the complexity of the choice.

Since the 1950s, the principle of consumer sovereignty has gradually been reinterpreted to accommodate more and more aspects of the problems of imperfect information and complexity of decisions. Economic theory now allows for bad choices caused by poor consumer information. The idea that such poor choices may be a reason to regulate markets for consumer goods is a recurrent theme in both the formal and informal traditions of economics (Boulding, 1958; Galbraith, 1967; Gintis, 1972; Lerner, 1972; Mirrlees, 1987; Spence, 1977). In practical terms, the economic justifications for many kinds of regulations—health and safety regulations, certification standards for various occupations, regulation of medical and financial institutions and of complex products like life insurance—are rooted in the idea that consumers may make serious mistakes because of a lack of information, training, and experience.

Even the idea that perfectly rational and experienced consumers would choose well has been challenged by modern economic analysis, especially when the consumers are initially uncertain about the merits of the alternatives presented to them. For example, suppose a decision maker faces a long sequence of similar choices. It may pay for the decision maker to experiment, selecting some options that would otherwise be unattractive in order to learn more about their consequences. Even in the hypothetical case of an infinitely-lived decision maker, there would eventually come a time after which experimentation no longer paid, because the decision maker would not expect to learn much from further experiments and because there is a real cost incurred by experimenting. During the period of learning, choices may not reflect actual preferences, because the consumer is experimenting. More surprisingly, it has been shown that, because rational consumers do stop experimenting, some fraction of them reach the wrong conclusion about which choice is best. In the steady state, some nontrivial fraction of choices made by even the most experienced consumers are mistaken and do not coincide with their real interests.[11] These mistakes by experienced choosers are most likely to occur for choices that

are made infrequently and where there is high initial uncertainty and little informational feedback from previous choices.

Applying the Theory to Existence Values

Most people have few opportunities to decide about the preservation or destruction of an environmental resource. It is the fact that there is so little actual choice data available that forces advocates of the public-goods approach to rely on surveys of hypothetical choices—the contingent valuation method. The absence of data about actual choices also means that the contingent valuation method cannot be calibrated against other kinds of independent measurement. Because it is impossible to convert survey respondents into well-informed decision makers who are experienced at making similar choices in any practical amount of time, it is also impossible to validate that the surveys measure the proper theoretical construct.

Because empirical validation and calibration are both impossible for contingent valuations of most existence goods, one might look for theoretical reasons to suppose that survey measurements of existence value are like survey forecasts of consumer demand or survey predictions of election outcomes. Then, one might be able to justify transferring information about validation and calibration from one or both of those empirical domains. The theory, however, points to reasons to expect the instrument reliability to be especially poor for the case of existence values, so that any evidence from those other domains must be regarded as suspect.

In considering the problem facing a respondent who is asked to assess the nonuse value for an environmental good, one must focus on the information demands that the question poses and the complexity and unfamiliarity of the question. The response depends on how the question is posed. One way is to ask respondents to assess the existence value of complex environmental goods directly. This approach has a whole series of drawbacks.

First, in order to assess the rate of substitution between an environmental amenity and some private goods, a consumer would need to know the quantities of the various environmental amenities that already exist. If environmental amenities are like ordinary consumer goods, then a consumer's willingness to pay for additional units must depend on the quantities that are already available. (If they are not like ordinary consumer goods, then the survey question is even more unfamiliar than supposed here.) It is doubtful that many consumers have even a rough idea of how many acres of national forest or wildlife refuge exist or how many more acres are likely to be set aside or restored in the future. Yet, in principle, this information is essential to answer the question accurately.

Second, even if respondents to the surveys could be taught the answer to some quantitative questions—for example, if the contingent valuation surveyor were to tell respondents how many acres of various kinds of wildlife sanctuaries actually exist—it is unlikely that most respondents could meaningfully compare, say, data about damaged acreage or numbers of birds killed with other relevant data. Few

people, for example, could estimate to an order of magnitude the acreage of the state of Texas; many could not estimate the number of acres in a square mile. Without such a basis for assessing quantitative information, comparisons between consumer goods and environmental amenities are meaningless: respondents cannot even know their values, let alone report them to contingent valuation surveyors. The uncertainty of contingent valuation respondents is likely to make their reports quite sensitive to how questions are framed and to what background information is supplied.

If respondents could somehow be made aware of the quantitative measures of environmental amenities and taught to understand them in terms of other comparable quantities, many still couldn't make the relevant judgments. The other variables F, for example, might include obscure scientific knowledge about ecosystems (How many acres of contiguous habitat are required to prevent certain species from becoming extinct?) or about the accepted uses of wilderness, which few respondents could be expected to know.

Partly to avoid these problems, many actual contingent valuation studies try to focus on simpler environmental goods. For example, one group of studies evaluated improvements in visibility over the Grand Canyon resulting from emission controls at the Navajo Generating Station (Carson, 1991; Rowe, Chestnut, and Skumanich, 1990; Schulze et al., 1981). Even in this case, however, the good being valued is hardly a simple one. The times of year that visibility is improved, the normal levels of haze over the canyon, and the properties of the canyon itself, such as its size and the variety of its environments, all add to the complexity of the choice. In addition, at least for some respondents, the availability of other views and the status of other environmental priorities will be relevant factors. Although survey design can reduce the complexity of the respondents' problem, it often cannot make the problem a simple one.

The complexity of the choice, and the amount of information it demands, is amplified by the respondents' inexperience with buying and selling environmental amenities. It is not easy for respondents to acquire meaningful experience about such activities because there is so little direct feedback from the choices that they may make. Consumers who buy an uncomfortable pair of shoes can learn that they made a mistake and make a better choice next time. Other consumers who want to evaluate the qualities of different brands of car can ask friends about their experiences. But how can respondents ever learn if their assessments of the value of the existence of a wilderness area are too high or too low? Without such learning, there is little reason to suppose that the reported values represent unbiased estimates of the respondents' real values, that is, those that they would report if they were experienced and well informed.

Statistical Bias in Assessing Existence Values

Other authors who have considered respondents' uncertainty and inability to compute have reached more sanguine conclusions about the prospects of the contingent valuation method. I find the contrary arguments unconvincing. This subsection explains why.

The perspective taken by the proponents of contingent valuation is rooted in statistical theory. Thus, suppose that one wishes to estimate the average WTP for some resource among members of some group. We denote the quantity to be estimated by μ. The experimenter formulates a contingent valuation question and obtains a response from individual n of $x_n = \mu + \varepsilon_n$, where ε_n is the error, that is, the amount by which the respondent's answer differs from the quantity μ that was to be measured. If the errors ε_n are statistically independent and have an expected value of zero, then, by the Law of Large Numbers, the mean of a large sample of responses will, with high probability, be close to the theoretical value μ. This is true regardless of how large the individual errors are expected to be. The mean of a large sample will be different from μ only if the errors are not independent or if the expected value of the error is different from zero, that is, if the estimates are biased.

The optimistic conclusions of contingent valuation researchers seem to be based on two ideas. One is that the general assessment that biases in contingent valuation measures are identifiable and correctable. For example, Mitchell and Carson (1989) devote one entire chapter to developing a typology of the biases in these studies and the means for correcting them. The second is the idea that, even if uncorrectable, biases are of determinate sign, so one can at least obtain empirical bounds for the relevant existence values. For example, Hoehn and Randall (1987) have argued that, for theoretical reasons, one should expect that respondents' reported WTP will be less than the theoretically correct sums and so can be used to estimate a lower bound for actual value of preserving an environmental resource.

The problem with the first idea is that identifying the bias of an estimate in a range of situations requires that it be possible to calibrate the measure, either by using another measure or some direct observation of the theoretically relevant quantity. Currently, for example, there is a dispute concerning what is variously called "part-whole bias" or "embedding bias" in contingent valuation surveys. Experiments show that the WTP for public goods can vary by a factor of a hundred or more, depending on whether that good is considered on its own or as part of a much larger bundle of goods (Kemp and Maxwell, this volume). At least one of these measurement techniques provides severely biased estimates and, indeed, both may. If one is unbiased, which one? How would we even know? Without a means of validation and an alternative measure to be used for calibration, contingent valuation assessments of unfamiliar goods are highly speculative. The unavoidable problem with surveys of existence value is that there are never alternative measures that can be used for validation and calibration.

The second idea, that the biases are of determinate sign, is based on particular models of how error arises in responses to surveys. In Hoehn and Randall, cited above, for example, and applied in subsequent work (Bergstrom, Stoll, and Randall, 1989), the authors assume that respondents make unbiased estimates of the scope or effectiveness of proposed changes and that they are risk-averse with respect to

variations in effectiveness. The authors then conclude that the respondents' mean WTP is biased downward. An additional downward bias is found by positing a particular kind of systematic error in the respondents' valuation process. The assumptions made to derive the first of these biases are neither more self-evident nor more easily verified for the existence-value setting than the conclusion that they imply, so they provide no independent support for the conclusion. In the second case, a more complete analysis of the model reverses the Hoehn and Randall conclusion, showing that the bias is actually ambiguous (Bergstrom, Stoll, and Randall, 1990). Thus, even in principle, the direction of unobserved biases cannot be predicted except by using other untestable hypotheses. This approach is without promise.

Analysis can be useful to identify particular biases in order to design surveys that avoid them. Still, it is foolishness to assume that simply because a bias has not been theoretically identified, no bias exists. Because there is no way to validate or calibrate survey reports of existence values and because of the huge and systematic variations found across studies, there is little reason to suppose that any particular study gives a reliable, unbiased estimate of the actual public-goods value.

INAPPROPRIATE SENSITIVITY

One way to view several of the issues raised here and to connect them to criticisms of empirical tests of the theory is to ask whether contingent valuation survey responses in the existence-value context are too sensitive to irrelevant considerations and not sensitive enough to relevant ones. In the second section, "Problems with the Concept of Existence Value," we showed why contingent valuation estimates of existence values are likely to incorporate values that, although perhaps relevant for political and ethical analysis, have no place in economically based benefit-cost analysis. These include values arising from perceived rights and responsibilities, altruistic values, the desire to contribute or to redistribute wealth from unpopular people and institutions to popular ones or to animals or other natural objects, and so on. In the third section, "Problems in Measuring Existence Values," we argued that contingent valuations are likely to be insensitive to the real public-good component of existence values because people have too little information and experience to make good personal assessments of value and find it impossible to gain the needed experience.

Compounding the insensitivity of survey measures of nonuse values to objective characteristics is the measures' excess sensitivity to economically irrelevant elements of the survey design. This second problem has been stressed by critics of the contingent valuation method. The sensitivity to the payment vehicle used (e.g., income taxes or higher utility rates) or to the timing of payments (e.g., monthly, annual, or one-time payment); the large differences between the amounts respondents would be willing to pay to *acquire* a public resource and the amount they would be willing to accept to *surrender* the same resource (if they already owned it); the sensitivity of the amounts to the format of the question (dichotomous-choice versus open-ended); the difference in orders of magnitude between what people report themselves

willing to pay to acquire a resource considered in isolation and what they report when it is part of a larger package; the insensitivity of responses to the numbers of animals saved by conservation projects—all of these were unexpected according to standard economic reasoning, although various attempts have recently been made to explicate them (Hanemann, 1991; Carson, Flores, and Hanemann, 1991).

One reason these debates are possible is that theoretical economics makes many assertions about tendencies, but few about magnitudes. Because many of the other differences are considered by other papers in this volume, I shall focus on the controversy about the differences between willingness-to-pay (WTP) and willingness-to-accept (WTA).

Willingness-to-Pay and Willingness-to-Accept

The phenomenon here is that, in laboratory experiments, the smallest payment that people are willing to accept in exchange for a resource they own is many times higher than the most they would be willing to pay to first acquire the same resource (Cummings, Brookshire, and Schulze, 1986; Knetsch and Sinden, 1984). The precise magnitudes vary across studies, but ratios of four times to fifteen times are not uncommon, despite prior expectations by almost all the researchers involved that the WTP and WTA measures of value should be approximately equal. In addition, there is some evidence that as subjects become more experienced, the ratio begins to shrink, consistent with the commonsense idea that judgment improves with experience (Coursey, Hovis, and Schulze, 1987).

In view of the prior expectations, most economists would regard this evidence as damaging to the idea that the contingent valuation method measures real economic values. Some, however, have tried to confront the issue directly by reexamining the theoretical basis for the experimenters' expectations. In a short but influential note, Hanemann (1991) has observed that WTA measures can, in principle, be unboundedly larger than WTP measures. For example, to preserve one's own life year after year, one cannot offer to pay more than one's whole income, a finite amount, but there might be no finite sum one would accept to sacrifice one's life. Hanemann then argues on theoretical grounds that the difference between WTP and WTA could plausibly be quite large for environmental goods that have few close substitutes. This reasoning has been accepted and echoed by others (Mitchell and Carson, 1989; Carson, Flores, and Hanemann, 1991). If, as some have claimed, "WTA compensation is clearly the correct property right," (Carson, Flores and Hanemann, 1991:20),[12] then the much larger magnitude of WTA compensation is important.

There are several problems with this argument and its application. First, there is no economic justification for the claim that "WTA compensation is clearly the correct property right." Suppose, for example, that a proposal has been made to build a highway over a particular piece of public land that would otherwise be preserved as open space. If the road could be built only when the benefit exceeded

the total of everyone's WTA for loss of the open space, then any one citizen could veto the project by claiming a very high WTA. It is hardly "clear" that public-works projects should be undertaken only when there is unanimous approval, or that the public should make resources available to private exploitation only if everyone agrees.

A second problem is that, although Haneman's argument is theoretically correct for the extreme example he cites, the ratio of the reported WTAs and WTPs is much too large to apply consistently in contingent valuation studies that show people are willing to pay only a small fraction of their incomes. As an example, suppose that the average respondent has, say, a $20,000 annual income and reports a WTP for some good or service of $20 and a WTA of $40. This ratio of two-to-one is much smaller than those found in many laboratory experiments, but still too large to be consistent with rational behavior. To see why, we need a short theoretical digression.

Let $WTP(I)$ and $WTA(I)$ represent the WTP and WTA for a family with an annual income of I. Suppose the respondent is indifferent between having an income of I and the services of the public good or the larger income of $I + X$ without the public good. This indifference can be represented in two ways. On one hand, it means that a respondent with an income of I would be only willing to accept a payment of X to give up the good: $X = WTA(I)$. On the other, it means that a respondent with income of $I + X$ and without the public good would be just willing to pay X to acquire the good: $WTP(I + X) = X$. The important fact for our analysis is that these two equations express the same underlying condition and so are logically equivalent statements.

Returning to our hypothetical example, we are given that $WTA(20,000) = 40$. From the logic explained above, this second statement about WTA is equivalently expressed by this statement about the WTP: $WTP(20,040) = 40$. We are also given that $WTP(20,000) = 20$. Together, these two statements about WTP imply that, for this respondent, the increased WTP for the good is $.50 for each dollar of additional income in this range. This is a striking prediction, and it hardly seems consistent with the survey data. If such a high marginal WTP out of extra income were to be found over a wide range of income levels, as would be necessary to rationalize the observed divergence of WTPs and WTAs in a wide cross section of respondents, then the average WTP should rise from about $20 at an income of $20,000 to about $5,020 at an income of $30,000. This conclusion is quite implausible and would imply much higher average WTPs than are typically reported.

Similar reasoning can be used to challenge the plausibility of survey findings about how respondents' WTPs respond to variations in quantities of the services supplied.[13] Surveys often find that willingness to pay is quite insensitive to the actual level of additional services proposed,[14] which implies a quickly declining marginal WTP for increased services. Notwithstanding the protests of contingent valuation advocates (Randall, 1991), these findings are contrary to the predictions

of standard economic theory for situations with substantial uncertainty. Such findings cast doubt on whether what is being measured is an economic value.

CONCLUSION

The fundamental issue is whether there exists any objective, scientific way to assess the nonuse component of value for wilderness or other resources in a way that is suitable for inclusion in benefit-cost analyses. Advocates of the public-goods approach to nonuse values are optimists on this score: they argue that the value of the environment arises from the values that individual human beings attach to it, and that these values can be measured by survey methods. For this approach to be even theoretically valid, it would be necessary for people's individual existence values to reflect only their own personal economic motives and not altruistic motives, or sense of duty, or moral obligation. People would also have to be experienced enough in making similar environmental choices to ensure that their reported values were stable and represented their actual interests. Then, to measure the resulting values, it would have to be possible to validate and calibrate the survey measures in order to be reasonably sure that they correspond numerically to the underlying theoretical constructs.

None of these conditions is often satisfied in reality. One need only read the opinion columns and letters to the editor of local newspapers to see that the values many people attach to environmental preservation arise not only from considerations of their personal welfare, which are uniquely suitable for use in benefit-cost analyses, but also from a huge variety of other concerns ranging from the welfare of animals, the human spirit, and future human generations to fairness in distributing burdensome obligations, concern for the Earth as a living system (the "*Gaian*" principle"), and so on. Even in the highly unlikely event that the relevant values are of trivial magnitude, the problem of measuring nonuse values would most often be insurmountable.

Part of the appeal of contingent valuation surveys has been that they promise some kind of answer when methods based on observing actual choices cannot be applied even in principle, because no similar actual choices have ever been made. The problem is that these are precisely the kinds of circumstances in which survey estimates are most in danger of being highly biased and unreliable, because this is precisely when people are most unfamiliar and inexperienced with the kinds of choices being made. Moreover, unlike values that result from actual use, the possibility of learning and improving choices so that they come to match the respondent's real interests is completely missing for existence (nonuse) values. And, because the relevant choice information is missing, one cannot validate or calibrate the survey instrument, checking that it is related to the theoretical construct or that the estimates it supplies are unbiased. Those who would apply the contingent valuation method to measure existence values sometimes point to evidence of the method's successes in other domains where it can be validated and calibrated against actual choices. These defenses miss the point. It is precisely where these checks are impossible

that the theory predicts the method is likely to suffer its greatest failures. Environmental valuation problems are chock full of circumstances like these.

If environmental protection is like a public good at all, it has more in common with providing national defense or building NASA's space station than with creating parks and playgrounds. Setting priorities well for complex decisions in areas outside of citizens' everyday experience requires that the expertise and judgment of experienced decision makers be harnessed to serve the common good through the democratic political process. Substituting the uninformed, inexperienced judgments of survey respondents for this process to help allocate effort and resources between, say, rescuing trapped whales and preserving old-growth forests is much more likely to muddle the choice than to fulfill its goal of establishing objectively which alternative is most efficient.

NOTES

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[2] In the United States, benefit-cost analysis has been used for all major regulatory programs since 1981, when it was mandated by executive order during the first year of the Reagan presidency.

[3] See, for example, Mitchell and Carson (1989) or Kopp (1992).

[4] These terms are used inconsistently and not quite interchangeably in the literature. Nonuse value is sometimes defined to include option value, which is the value associated with potential future uses, including ones that are not presently known. This is a subtle value, but one that has firm roots in economic theory and especially in financial economics. Here, I focus on the more amorphous and novel concept of existence value, which I take to be the same as nonuse value except that it excludes potential future uses.

[5] Mitchell and Carson (1989) provide a summary of 104 "selected contingent valuation surveys." Since their book was written, the pace of new surveys has quickened in response to a court decision (*Ohio v. United States Department of Interior*, 880 F. 2nd 432, D.C. Cir., 1989) asserting that Congress intended to include all reliably measured values in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 proceedings and relying on DOI's apparent judgment that nonuse values could be reliably measured.

[6] Many utilitarians, beginning with Bentham, have included in their calculations the feelings of animals, on the grounds that they are sentient beings, capable of suffering.

[7] In modern microeconomic textbook treatments (Varian, 1978; Kreps, 1990), rational choice among actions under conditions of imperfect knowledge or information is founded on two things. The first is the chooser's preferences among the possible consequences of those actions and the second is any information that may help to forecast how the choice affects the probability of various consequences. It is information about and preferences among consequences, and not preferences directly among actions, that are the proper data for benefit-cost analysis.

[8] Formally, the extended framework is one in which each person n's welfare U_n is an increasing function of his own utility of consumption $v_n(x_n)$ and a nondecreasing function of others' utilities of consumption $(v_j(x_j))$, $(j \neq n)$ and in which altruistic transfers alone cannot result in Pareto improvements. See Winter (1969) for a closely related analysis.

When altruism is so powerful that transfers alone can result in Pareto improvements, then the status quo is no longer the proper point of reference for evaluating a new project. New project proposals can then be evaluated by using similar principles, but we shall not digress to consider them in this essay.

[9] In the same vein, most people's assessments of the leading environmental concerns differ considerably from those of EPA experts. According to a recent study, the public is most concerned about water pollution from manufacturing plants, oil spills, hazardous-waste releases and industrial air pollution, whereas EPA experts tend to emphasize global climate change, habitat destruction, species extinction, and ozone-layer depletion (Stipp, 1990).

[10] The idea that the environment itself should have rights or standing in the welfare calculus has been asserted in many quarters. U.S. Supreme Court Justice Douglas, dissenting in *Sierra Club v. Morton*, 405 U.S. 727 (1972), wrote: "Contemporary public concern for protecting nature's ecological equilibrium should lead to the conferral of standing upon environmental objects to sue for their own preservation. See also Stone (1972).

[11] For example, see Rothschild (1974).

[12] A similar view is espoused by Yang, Dower, and Menefee (1984).

[13] Where we used WTP and WTA to compute marginal WTP from increased income in the previous example, the survey responses can be used to estimate respondents' marginal WTP for increased levels of service in these examples. Where we used variations among respondent income levels in the WTP versus WTA example, one may introduce variations in respondents' estimates of current levels of service in this example. Where respondent uncertainty is substantial, and the additional services created by the proposed programs are modest, economic theory predicted that the WTP would be nearly proportional to the level of additional service.

[14] For example, see Carson, Flores, and Hanemann (1991) and Kopp (1992).

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