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# Passive-use values and contingent valuation—valid for damage assessment

by Alan Randall

**B**ig disasters generate big dollar numbers. Exxon Corporation spent about \$3 billion, they say, cleaning up the *Exxon Valdez* oil spill. Clean-up is, of course, an imperfect process. Some damage remains; exactly how much is still uncertain. People's use and enjoyment of the impacted environment was, is, and will be diminished, until restoration is complete. Conservative estimates from contingent valuation studies suggest that the interim lost use value is in the range of \$3-5 billion. In addition to clean-up costs, Exxon agreed to pay compensation of \$1.1 billion, in a settlement negotiated before the contingent valuation studies had been completed.

Exxon and the American Petroleum Institute are determined to reduce the oil industry's exposure to costs arising from environmental disasters. Accordingly, they have mounted a sustained attack on interim lost use values, especially the passive-use component, and contingent valuation.

## Passive-use values

Passive-use (or existence) value does not require visiting, or on-site use of a resource. Like all economic measures of welfare change, passive-use value re-

flects changes in the satisfaction of people's preferences. The preferences relevant for passive-use value are preferences about the state of the environment.

Remote and pristine environments are by definition little visited; the paucity of traffic accounts, at least in part, for their pristine condition. Yet there is widespread recognition that such places rank among the world's great environmental treasures. Popular support for protection of these environments far exceeds the number of people who have visited or expect ever to visit them. It follows that some places that generate relatively small visitation values have large passive-use values.

To exclude passive-use values from damage assessment would violate the standard utility-theory foundations of benefit cost analysis. In addition, the exclusion would cause serious resource misallocation. First, understating the true cost of exposing natural resources to environmentally-risky activities would encourage too much environmental risk-taking. Second, it would systematically reallocate risky activities to places that have relatively low visitation values and high passive-use values. The most risky activities would be assigned to the most pristine environments.

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### “Grossly disproportionate”

The passive-use values controversy is not just about compensation claims for interim lost use. The law allows the responsible party to avoid restoration

able that it should not be accepted for damage assessment by the courts. Let us consider for a moment the structure of this argument. The reasons for including passive-use values are principled:

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expenditures if the costs of restoration are “grossly disproportionate” to the value of what is being restored. Thus, a kind of benefit-cost test is applied to restoration itself. The requirement is surely not that benefits exceed restoration costs; but I can easily imagine defendants claiming that restoration costs of, say, ten times the *measurable* benefits are grossly disproportionate.

Berkeley economist Dan McFadden and colleagues argued that interim lost use from the *Exxon Valdez* spill was limited to lost recreational visits. They estimated that the value of lost visits to Prince William Sound was \$3.8 million. If this estimate was accepted by the courts and lost passive-use values were excluded, the public would lose most of its protection in the event of a future Valdez-like oil spill. Not only would the \$1.1 billion compensation settlement disappear; a \$3 billion clean-up expense would surely be ruled grossly disproportionate to \$3.8 million in lost recreational use. The oil industry has a lot at stake in its attack on passive-use values.

### Estimating passive-use values

Given the state of the art, lost passive-use values are measured using contingent valuation, or not at all. Accordingly, the brunt of the oil industry attack on passive-use value is borne by contingent valuation. The argument is that contingent valuation is so unreli-

such values are firmly grounded in utility theory and the theory of efficient resource allocation. In contrast, the argument for excluding passive use is entirely pragmatic: measurement techniques for passive-use values have been questioned. We are asked to exclude that which we have principled reasons for including, on the pragmatic ground that we may not be able to measure it reliably. Contingent valuation would need to be shown to perform very poorly indeed, for pragmatic concerns about estimation error to trump the principled reasons for including lost passive-use values in accounts of natural resource damage.

### The oil industry attack on contingent valuation

After the *Exxon Valdez* compensation agreement, Exxon and API commis-

sioned a consulting firm, Cambridge Economics, Inc., to perform a number of studies testing the reliability of contingent valuation. A group of these studies was released at a public meeting in Washington early in April 1992. The timing coincided with a massive industry lobbying effort focused on the White House and the Cabinet.

The industry-sponsored studies took a fairly wide range of approaches, but they all reached the same conclusion: contingent valuation is not a reliable method for estimating passive-use values. To my mind, the core of the Cambridge Economics attack consisted of several original contingent valuation studies designed and executed by the researchers. In each case, split samples of respondents provided data to test hypotheses, such as willingness to pay (WTP) to avoid threatened logging of national wildernesses would increase as the number of wildernesses to be saved was increased; and WTP to protect migratory waterfowl from alighting in oil-covered ponds would increase as the number of birds claimed to have died that way in a recent year was increased. However, the hypothesized significant differences in WTP were not found. The researchers, in each case, concluded that these empirical results are sufficient evidence that contingent valuation is generally unreliable.

### Campeche oil spill



Photo: U.S. Coastguard

Note that the industry-sponsored studies were not about the *Exxon Valdez* oil spill. The agenda was a direct attack on contingent valuation itself. The attack took the form, "my contingent valuation exercise failed to obtain the expected result, therefore contingent valuation is generally unreliable." In other words, it is claimed that "contingent valuation is reliable" is a testable hypothesis and that each of these studies is a crucial experiment capable of refuting it.

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## The overwhelming import of this literature is that contingent valuation provides useful information about the value of nonmarket goods.

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The crucial experiment is possible only if contingent valuation results are invariant to contingent valuation practice. But, of course, they are not. Serious researchers do not test hypotheses such as "survey research is reliable" or "econometrics gets good results." Instead, the research agenda in these fields is less sweeping but more constructive: in what ways does survey design affect survey results, and under what conditions is  $\hat{x}$  an unbiased estimator of  $x$ ? So it is with contingent valuation.

There is great variety among contingent valuation practices, and there is theoretical and empirical evidence that practice affects performance in important ways. So, it is necessary to ask whether these particular studies implemented state-of-the-art contingent valuation practice. As it happens, they fell short of best practice in important ways. Phone surveys and shopping mall intercepts were used, whereas best practice uses face-to-face interviews with representative samples. In most cases, respondents were asked to state their maximum WTP. Contingent valuation insiders call this the open-ended format, and it is

widely regarded as the least-preferred of all the standard formats.

It is well known that open-ended formats typically generate data that includes a few extreme-valued responses. Researchers often delete extreme observations, for fear they would exert excessive influence on the econometric estimates. It is intuitively obvious that extreme observations, if retained for analysis, tend to increase the variance in WTP for each treatment, thus making it hard to detect differences between

treatments. The Cambridge Economics team used methods that generate some extreme observations and retained those observations in their analyses. Their claim that contingent valuation is unreliable hinges on their failure to detect significant differences between treatments, a failure that could well be due to their chosen survey and statistical methods. In this connection, it is interesting to note that the Cambridge Economics team includes world-renowned econometricians who would hardly have walked blindly into such methodological traps.

Finally, while their "crucial experiments" concerned hypotheses about WTP differences across experimental treatments, economic theory is unclear about how much inter-treatment difference in WTP there *should* be.

Also sponsored by industry sources, another group of researchers has been circulating reports of experiments comparing hypothetical and real-money offers to buy ordinary household goods. So far, so good. However, the researchers claim these experiments are direct tests of contingent valuation. This seems

to be quite a stretch, considering that the preferred form of contingent valuation is a contingent policy referendum for public goods.

## The contingent valuation literature

This very recent flurry of industry-sponsored research contrasts with the steady accumulation of theoretical and empirical results by contingent valuation researchers over thirty years. A recent bibliography lists more than one thousand items, including many refereed articles in the major general and specialized economics journals. This literature is not the captive of any particular clique, and it contains reports both favorable and unfavorable to contingent valuation. There are theoretical contributions about the interface with welfare measurement theory, the incentives in contingent valuation, and econometric estimation methods. There are reports of many and various applications. There are experiments comparing alternative contingent valuation formats and practices. Experiments have compared benefit estimates from contingent valuation with estimates from, for example, the travel cost method of recreation economics. Meta-analyses have examined different studies of the value of similar amenities, looking for evidence of (in)consistency.

This vast literature includes its share of anomalous results, many of which have disappeared under further examination, although some persistent anomalies remain. Nevertheless, the overwhelming import of this literature is that contingent valuation provides useful information about the value of nonmarket goods, and that the experts, collectively, know a lot about the performance of alternative contingent valuation methods. The experts have a solid basis for designing reliable contingent valuation studies, and for critiquing the reliability of studies performed by others.

## Contingent valuation and the courts

A close examination of the recent spate of oil industry-sponsored contingent valuation studies serves to emphasize the futility of the "crucial experiment," the experiment to prove once-and-for-all whether contingent valuation is reliable. Instead, contingent valuation, and the credibility of any particular application, must be evaluated on the basis of a preponderance of the evidence. Contingent valuation is by no

obtain preferred estimates of passive-use values, and to map the sensitivity of value estimates to the contingent valuation conditions. Where it turns out that values are quite sensitive, arguments can be prepared as to which valuation conditions are most appropriate, and why.

Through discovery, contesting parties can learn of each other's research methods and results. They can examine them, test their robustness econometrically and experimentally, and pre-

to map the sensitivity of value estimates to the valuation conditions. Courts can then entertain arguments about what valuation conditions are appropriate for the case at hand. We can confidently expect the courts to take a conservative approach to damage claims. Incompetent studies in pursuit of preposterously large damages will be unable to withstand the heat. For these reasons, contingent valuation provides an adequate framework for applying the "preponderance of the evidence" test for determining nonuse values in natural resources damage assessment.

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## The oil industry argument fails

The industry argument is that contingent valuation is so unreliable that lost passive-use values should be deleted from natural resource damage assessments. As we have seen, if this argument succeeds, the industry will be spared not only substantial compensation settlements but also restoration expenses under the "grossly disproportionate" test. Fortunately, there are principled reasons — having to do with utility theory and efficient resource allocation — for including passive-use values. The industry suggests that these principled reasons are trumped by a pragmatic concern that contingent valuation is an unreliable method for estimating passive-use losses.

Much more is known about the performance of contingent valuation than the industry would have us believe; and much of what is known is favorable to contingent valuation. The courts are well-equipped to apply the appropriate tests for evaluating claims based on contingent valuation studies. The industry argument fails completely. Concerns about the reliability of contingent valuation have been grossly exaggerated. Such concerns cannot trump the principled reasons for including lost passive-use value in natural resources damage assessment. ■

means unique in this respect. Litmus tests are the exception, rather than the rule, when studying complex phenomena.

The essence of the present controversy is whether contingent valuation provides information that would be useful to a court of law, in assessing lost passive-use values. I have no doubt that it does.

The courts are accustomed to dealing with controversy, uncertainty, and contesting speculative claims about what are, in principle, matters of fact. Some of these claims are about economic matters; for example, the losses suffered by victims of workplace discrimination. It is by no means unusual for courts to be confronted with well-qualified economic experts offering conflicting testimony on these kinds of questions. Given this experience, it is unlikely that the courts will find any special difficulty in resolving conflicts about the magnitude of lost passive-use values. Contesting parties are free to conduct research to

pare reasoned and detailed critiques. The processes of direct and cross-examination and rebuttal provide a structured format for the essential critical process.

It is my most fundamental point that there is no need to demonstrate that contingent valuation is a fool-proof, black-box method of reliably estimating passive-use values. Instead, it is necessary only to show that contingent valuation provides an adequate basis for applying the "preponderance of the evidence" test in the judicial setting.

Contingent valuation is itself a well-defined process. Researchers have established many of its performance characteristics. Contingent valuation draws upon disciplinary traditions in communications, psychology, survey research, incentive theory, welfare change measurement, and econometrics, all of which provide bases for critical evaluation of aspects of contingent valuation. Finally, contingent valuation permits a planned program of research