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STATED PREFERENCE: WHAT DO WE KNOW? WHERE DO WE GO?

PROCEEDINGS
SESSION FOUR

PANEL DISCUSSION: "THE NOAA PANEL AND THE SEVEN-YEAR ITCH"

A WORKSHOP SPONSORED BY THE US ENVIRONMENTAL PROTECTION AGENCY'S NATIONAL CENTER FOR ENVIRONMENTAL ECONOMICS AND NATIONAL CENTER FOR ENVIRONMENTAL RESEARCH

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Panel Discussion: "The NOAA Panel and the Seven-Year Itch"

Introduction

The purpose of this panel discussion was to explore the state-of-the-art of stated preference research, taking stock of how the field has advanced since the 1993 NOAA panel report, and to discuss the direction future research could take in order to help inform policy decisions.

Panel members were chosen because of their involvement in stated preference research or because of their involvement with the use of stated preference results in a policy context.

Prior to the panel discussion Nicole Owens, US EPA, NCEE, presented an overview of the NOAA panel report. Then, each of the panelists addressed pre-assigned questions. This was followed by an open discussion period.

The following sections of the proceedings contain a combination of notes, summaries, and statements provided by panel members as well as a summary of the open discussion period.

Panel members included:

Richard Carson, University of California, San Diego
David Chapman, DOC, NOAA
Paul DeCivita, Health Canada
Maureen Cropper, University of Maryland and World Bank
Michael Hanemann, University of California, Berkeley
Carol Jones, USDA, ERS
Randall Lutter, American Enterprise Institute
Al McGartland, US EPA, NCEE
V. Kerry Smith, North Carolina State University

Questions for Panelists:

1. What have we learned since the NOAA panel?
   (Carson, Cropper, Hanemann, Smith)
2. What remains to be done to ensure that stated preference results are valid and defensible for use in policy or regulatory settings?
   (Smith, Jones, Lutter)
3. How has your agency used stated preference research in the past and what type of stated preference research does it need for the future?
   (McGartland, Jones, Chapman, DeCivita)
4. What do you see as the three biggest stated preference research priorities?
   (All)

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Panel Discussion

Recap of the NOAA Guidelines

by Nicole Owens, US EPA National Center for Environmental Economics

Before our panel turns its attention to discussing what we've learned since the NOAA panel, what remains to be done to ensure the validity and reliability of stated preference methods, and directions for future research, we thought it would be useful to briefly discuss and review some aspects of the National Oceanic and Atmospheric Administration (NOAA) Panel and its recommendations. The point of what follows is to provide some context for our panel discussion, not to critically assess the majority of the NOAA Panel's conclusions.

Federal statutory natural resource damage assessment provisions were first implemented in the 1977 amendments to the Clean Water Act. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (or CERCLA) contained provisions for recovery for injury to, destruction of, or loss of natural resources. During the 1980's there was controversy over limits on the use of contingent valuation in assessing damages at the same time that natural resource damage assessment cases were being brought before the courts. After the Exxon Valdez oil spill and subsequent passage of the Oil Pollution Act of 1990, contingent valuation studies gained new prominence in the natural resource damage assessment process.

It was in this context that NOAA convened an expert panel in 1992 to explore whether or not contingent valuation studies were reliable enough to measure total value (direct plus passive use) for the natural resource damage assessment process. The panel report was commissioned as part of rulemaking concerning the natural resource damage assessment and restorations regulations required by the Oil Pollution Control Act. The panel consisted of Kenneth Arrow, Robert Solow, Edward Leamer, Paul Portney, Ray Radner, and Howard Schuman. While the evaluation was conducted specifically within the context of natural resource damage assessment, the panel guidelines affected the contingent valuation method more generally. To some extent, the panel's recommendations shaped the development of the method, use of the results of stated preference studies by Federal agencies, and the direction of research in the area since 1992. This occurred despite some claims that the panel lacked knowledge of contingent valuation techniques, despite that the Panel was not asked to consider the use of contingent valuation in the regulatory process, and despite that the final version of the NOAA rule did not include any specific requirements for how to implement assessment methods.

The NOAA panel was charged specifically with evaluating the use of stated preference studies in determining nonuse values for pollution-related impacts to natural resources. Although important, nonuse valuation is a more narrow application than is relevant for many agency needs. Despite the relatively narrow focus of the Panel and criticism of the Panel, the report does have some relevance to the design of and use of results from contingent valuation studies.

Briefly, the NOAA panel concluded that stated preference studies could provide valid and reliable results and gave several specific and fairly stringent recommendations on

how stated preference studies should be designed and administered to ensure reliability and validity.

The panel's report emphasizes the importance of the scenario surrounding the valuation questions. Respondents need to understand and believe the context in which they are given. The panel also recommended that the payment vehicle must be meaningful to respondents and that respondents be reminded of budget constraints and of available substitute resources.

The panel also noted, among other things, that low response rates would make survey results unreliable, the importance of pretesting, and a preference for conservative design as well as the use of follow-up questions and checks on respondents understanding and acceptance of the scenario.

However, the panel gave three specific recommendations that were particularly controversial. These recommendations helped direct some of the stated preference research, the results of which render some aspects of these recommendations obsolete. Despite this, it is interesting to note that many surveys are still reviewed upon the bases of these recommendations.

These three recommendations are the use of split sample scope test, the use of in person interview, and the use of a referendum value elicitation format.

The results of some of the research presented over the last two days have dealt with these three recommendations. Further the results of other research since the panel have rendered some aspects of these recommendations obsolete.

One important point that we come away with is that all stated preference research should be evaluated on first principles, not just on the basis of one group's recommendations, which, at least in terms of some of the surveys EPA is involved in still happens. This view also seems to be supported by the fact that in the end NOAA did not incorporate any specific standards of performance in the regulations.

References

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Panel Discussion

Discussion of Questions 1 & 4

by Richard Carson, University of California, San Diego

I. What Have We Learned Since the NOAA Panel?

A. A Deeper Understanding of Relevant Welfare Economic Theory

1. WTP and WTA can be very different for a variety of reasons.

Large divergences between WTP and WTA are empirically seen in *both* survey and actual transactions.

2. "Embedding" as used in CV literature is not a well-defined concept but rather should be thought as two distinct concepts with different economic predictions: sequencing and nesting.

3. Sequence effects operate in different directions under WTP and WTA sequences.

4. Sequence effects are likely to be large.

5. Income elasticity of WTP is likely to be smaller than the corresponding income elasticity of demand.

6. Interdependent utility functions, not altruism *per se*, is the source of potential double counting.

This is avoided if either altruism is toward the good (*e.g.*, a wilderness area) or if the agent is aware that other agents will also have to pay for the good.

B. A Deeper Understanding of the Properties of Preference Elicitation Formats

1. Different elicitation formats should produce different results.

Finding "procedural invariance" would suggest non-optimizing agents.

2. Stringent auxiliary conditions are needed for incentive compatibility of a binary choice question.

3. A binary discrete choice question cannot be incentive compatible in the case of:

(a) voluntary contributions, or

(b) private goods.

4. In a double-bounded question, the two responses should not be perfectly correlated.

5. An open-ended type question should produce a substantial numbers of zeros and responses to it should be correlated with any information that is perceived related to cost.

6. In a multinomial choice context, optimal "non-truthful" preference revelation is likely to result in: (a) estimates of marginal tradeoffs between attribute levels that are correctly estimated, but (b) estimates of the "scale" parameter, hence total WTP, that are biased.

The problem is likely to be most severe if only one good will be provided.

C. Recognition that SP and RP Estimate Comparisons Are Consistent With Theoretical Predictions

1. Voting—close correspondence.

2. Voluntary contributions—SP estimates substantially higher than actual contributions.

3. Quasi-public goods—SP estimates slightly lower than and highly correlated with SP estimates.

4. Private goods—SP estimates overstate demand for new goods and overstate price sensitivity for existing ones.

May be "worse" rather than "best" case situation to compare SP and RP estimates.

D. Results Are Sensitive to Scope of Good Being Valued

1. A very large number of split sample studies now reject the scope insensitivity hypothesis.

Further, some "Exxon" scope insensitivity results do not hold up under closer scrutiny.

2. Recent meta-analyses conducted for air quality, outdoor recreation, and wetlands all reject scope insensitivity hypothesis.

3. The finding of a strong correlation between SP and RP preference estimates rejects scope insensitivity hypothesis unless both are insensitive.

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4. "Internal" scope tests such as those found in multinomial choice experiments, CV studies valuing multiple levels of a good, and CV studies looking at perceptions of the probability of providing the good or the "size" of the good being provided all tend to reject scope insensitivity.

5. Survey problems, such as vague descriptions, bad payment vehicles, and failure to control for differences in "implied" probability of provision, that can result in scope insensitivity are better understood.

The low power of many statistical tests to reject substantially different estimates is now also better understood.

The greater threat now is probably someone falsely rejecting a study that shows agents do not value substantially larger increments of a good very much more.

Scope insensitivity is a serious issue with respect to valuation of low-level risk. The problem here, however, is the difficulty of risk communication (which also influences behavior toward risk) and the manner in which measures such as the statistical value of life are derived and used.

E. Other Areas of Knowledge Improvement

1. Broader understanding of the survey development process.

2. Development of robust estimation techniques/better understanding of estimation issues.

3. Repeated demonstrations of temporal reliability.

4. Greater recognition that there is not a single "critical" experiment.

II. What Are the Three Biggest SP Research Priorities?

A. Determine the best ways to reduce costs of doing studies (following NOAA Panel guidelines) while still maintaining acceptably high quality.

- Choice of survey administration mode and sample design.
- Choice of elicitation formats.
- Dropping suggested design features: temporal averaging, scope test, offered don't know.

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B. *Determine the best ways to systematically conduct studies to fill in the "gaps" in ways that will facilitate doing benefit-transfers in areas where government agencies are most likely to need estimates.*

- Systematic identification of the gaps.
- Development of comprehensive long-term agency plans for filling in those gaps.
- Collection and storage of data in a manner to facilitate benefit-transfers.

C. *Sort out what are basic criticisms of neoclassical economics from what are separate issues with SP methods.*

- Are there any systematic violations of neoclassical theory that are confined to surveys?
- What modifications, if any, should government agencies take in response to these violations?
- What really are the arguments against the use of benefit-cost analysis (and of SP estimates in that context) versus what are the arguments against the use of SP estimates for any purpose?

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Panel Discussion

Discussion of Questions 3 & 4

by David Chapman, National Oceanic and Atmospheric Administration

First, I would like to thank the organizers for putting together a very interesting and stimulating conference. It is clear that there is a lot of exciting work ongoing and I look forward to reading the papers as they come out.

I am from the NOAA, the National Oceanic and Atmospheric Administration. NOAA has been keenly interested in the applicability of Stated Preference (SP) methods to both policy and natural resource damage assessments for many years now.

At NOAA there are two main interests we have in using state preference methods: First is in natural resource damage assessments and, second in management decisions for areas such as National Marine Sanctuaries. There are four main statutes that NOAA operates within: The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); The Oil Pollution Act of 1990 (OPA); The Coastal Zone Management Act (CZMA); and the National Marine Sanctuaries Act (NMSA). Each of these statues allows NOAA to assess human induced impacts to natural resources. NOAA feels that stated preference methods are viable tools to evaluate management and damage assessment decisions.

How has your agency used SP research in the past and what type of stated preference research does it need for the future?

NOAA uses the results from SP research in both it's management of coastal areas, such as marine sanctuaries, and in NRDA. In areas such as the Florida Keys NMS NOAA is involved in making policy decisions weighing resource protection versus access for such things as recreation. In this arena, SP methods have been very useful in determining the effects of new or novel management methods.

In Natural Resource Damage Assessments, we have used SP methods to both estimate the total value of injured resources and to measure the amount of compensation, in terms of restoration actions, that are necessary to compensate for injuries. It is this latter approach of using SP methods to balance the public losses resulting from an oil spill or Superfund site, with the potential gains from alternative restoration actions that to me is really most exciting.

Since the NOAA's Blue Ribbon Panel in 1993, we have learned quite a lot about a number of the key questions the Panel raised about the applicability of CV to passive use values. And I feel confident that we are at a stage where we can design and implement CV studies that passes the Panel's recommendations. However, at least so far, those studies have been focused on measuring the lost interim use value resulting from an environmental insult. In the intervening years, NOAA has re-directed it focus on estimating the amount and types of restoration that would adequately compensate the public for degradation, or lost of use, of natural resources. Some of the newer stated preference methods such as stated choice paired comparisons seem to show promise in helping answer these technically more

complex questions. NOAA has undertaken preliminary research efforts to investigate these issues. In 1998, NOAA held a workshop on the use of Stated Choice Methods for Resource Compensation. The proceedings from that workshop will be available early in 2001.

In the Lavaca Bay Damage Assessment, NOAA participated with the Responsible Party (ALCOA) in conducting a Stated Choice study to estimate the public losses resulting from a limited closure to fishing in Lavaca Bay, Texas. This study was designed to both measure losses and gains from proposed creation and enhancement of recreational fishing facilities (piers, docks etc) by combining both RP and SP data. The results of this study were used to design compensatory restoration projects for the damage assessment.

Major Research Priorities

And this leads me to my final point: NOAA Research priorities for Stated Preference Methods.

1. Getting costs of high quality, defensible SP studies down.

Instrument Design

Sampling Costs

In-person, all the variants of phone/mail, Internet.

This is a major hurtle for any agency in applying these tools. Unless a study is affordable, we won't be able to undertake it. And it's not just an issue of – is the problem big enough to justify such an expense, we are all very budget constrained. And if we don't undertake the study, it can't be used in the decision making process, whether those are management decisions, or court proceedings.

2. Extending what we already know about combining the RP and SP data. As defined earlier, I would put myself in the agnostic category. I do feel that there is a lot of information that can be gained from both SP and RP data. And as we all recognize there are strengths and weakness to each approach to data collection. And in the end, when we are sitting in front of our computers trying to figure out way to analyze these two data sources, we really need to have a good understanding about what each source of data is really measuring. In some instances we may be very confident that they really are measuring similar preferences and combining in some linear manner in the likelihood function is appropriate, but that may not always be the case, and then we may need think of other ways to extracting information from the two sources of data. For me, using both RP and SP data has some of the most exciting applications.

My final research priority is in understanding more about the transferability of the results of from SP studies. I see this as a question on both, how do we do the best job we can with what we have, and a fair amount has been written on that such as Kerry's paper, and the book by Bill Desvousges et. al but also a question about how to design our work with Benefits Transfer in mind. I think that if we keep in mind that fact that many of these studies will be used to transfer to other situation, or at a minimum to a different time when the population demographics may have changed we may be able to increase a greater

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number of government decisions in a timely and effective manner. Some of the SP, or SP/RP work seems to lend itself to very transferable or flexible results. Often, at the time a study is being undertaken, we do not know the final policy that will be proposed for implementation, or the damage scenario that might finally be proven. To ensure that the results of our studies are applicable, they have to be flexible enough address at least a reasonable range of possible outcomes.

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Panel Discussion

Discussion of Questions 2 & 4

by Maureen Cropper, World Bank and University of Maryland

QUESTION 2: **What remains to be done to ensure that stated preference results are valid and defensible for use in policy and regulatory settings?**

I would like to focus this question more narrowly on the health area: What remains to be done to ensure that stated preference estimates ***of the value of avoiding mortality and morbidity*** are defensible for use in policy and regulatory settings?

But, at the same time, I would like to broaden the question to encompass ***revealed preference*** methods as well: What remains to be done to ensure that estimates ***of the value of avoiding mortality and morbidity*** are defensible for use in policy and regulatory settings?

The "big ticket" items that drive the benefits of health and safety regulation are the value of reduced mortality and, occasionally, the value of avoiding chronic illness. Most estimates of the Value of a Statistical Life (VSL) that are used for regulatory purposes come from revealed preference studies—primarily labor market studies but, increasingly, studies based on consumer behavior.

The one thing we have learned from stated preference studies—as you heard this morning—is that it is very difficult for people to comprehend risk levels and risk changes. Performing internal and external scope tests is essential, and it is also essential that WTP vary with covariates such as income. Such tests are essential if stated preference studies are to be used for policy.

However, it is also essential that revealed preference studies pass similar tests. These tests, however, are almost never performed. Only one study of which I am aware (Gegax, Gerking and Schulze) uses risk perceptions rather than objectively measured risks in a revealed preference (compensating wage) study. All other studies either assume that people correctly perceive objective risks, or they appeal to correlations between qualitative measures of risk and objective risks to justify using objective risk measures in a revealed preference study.

The failure to test the risk perceptions of people in revealed preference studies is especially surprising in view of the poor performance of subjects who are asked to value risk changes in stated preference studies. The standard justification for not performing such tests in revealed preference studies is that, while many people may not understand risk, there are a few knowledgeable people who do and who "move the market." This may be true, but it is a defense that is not allowed in stated preference studies: When a researcher in a contingent valuation study discovers that a subset of respondents who are "very sure" of their answers behaves more consistently than all respondents, it is usually lamented that policy makers cannot rely on the preferences of such an elite when performing benefit-cost analyses. But, that is exactly what may be happening in revealed preference studies.

To summarize, all studies that purport to value risk of death or illness should be required to:

(1) Provide tests of subjects' understanding of the nature and magnitude of the risks valued;

(2) See how WTP varies with (a) the magnitude of the risk change and (b) income;

(3) Investigate the sensitivity of the results to choice of functional form for econometric relationships and, in the case of revealed preference studies, to the variables one must control for to estimate WTP;

(4) employ adequate statistical methods with regard to choice of sample, number of observations, etc.

The second test, incidentally, is likely to be extremely difficult to perform in hedonic analyses. Estimating an individual's marginal willingness to pay function for risk of death requires solving the identification problem in hedonic markets. In this respect, the contingent valuation method has a great advantage over revealed preference techniques.

QUESTION 4: What do you see as the three biggest stated preference research priorities?

In the health context, to obtain values of the following commodities, which typically drive benefit-cost analyses of health and safety regulations:

- WTP to reduce risk of death today
- WTP to reduce risk of death in the future
- WTP to reduce risk of contracting a chronic disease (e.g., cancer or chronic lung disease) that entails serious morbidity and may increase risk of death.

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Panel Discussion

The Health Canada Perspective

by Paul De Civita, Health Canada

PANEL QUESTION #3: How has your agency used SP research in the past and what type of stated preference research does it need in the future?

Context

Health Canada's approach to SP research is influenced as much by our policy and science needs as they are by our available budget resources.

Status

Defensible stated preference studies on health are rare in Canada. Several years ago, there were virtually no SP studies that addressed either morbidity effects or premature mortality (there are 4 wage risk studies with similar results to the US studies). So in order to do our benefits assessments we relied almost entirely on US and UK studies and on the transfer method. While we still rely on the transfer method, over the last three years HC has had the opportunity to commission two primary studies.

Two studies

The first SP study commissioned was a stated choice survey on the acute cardio-respiratory morbidity health effects specifically to be used in air pollution mitigation initiatives. The principal researchers for this survey were Reed Johnson and Bill Desvousges of Triangle Economic Research. The science and policy motivation for undertaking this survey was simply that Canadian data were unavailable.

The second survey is a mortality risk study that has just recently been completed and is undergoing an expert review. The principal researchers are Maureen Cropper (who presented the study at the conference), Anna Alberini and Alan Krupnick. There were strong science and policy needs that motivated us to sponsor the survey including understanding small risk changes and age effect.

Transfer method

Because of resource challenges, both surveys were administered in one city and, as a result, the results may not be representative of the Canadian population. In the design of both surveys, we were conscious that the results would be used in transfer method applications so we encouraged our researchers to include and report the information to allow us to undertake a defensible transfer. In fact, for the morbidity survey we have developed a protocol that allows us to employ equations transfers to generate regional specific values. We plan to do the same for the mortality risk survey.

Government economists usually enjoy working with the researchers and design an instrument from scratch. However, for the mortality risk survey, because of time and

resource constraints, we instead searched for a survey instrument that was already largely developed and adjusted it to meet our policy needs thereby saving us most of the development costs.

Needs of policy makers

With regard to the question of what kind of information do policy makers need to use SP, I believe that the answer to this question is not just a technical one – its not just a question of continuing to refine our approaches to minimize biases. The answer is mostly one of promotion and communication. Economic valuation is not an easy topic for non-economist managers to understand. Our senior policy managers are constantly being approached by stakeholders with simple sounding common sense argumentation that lead them to have doubts about applying SP results.

- We need to take action that will allow us to provide them with the confidence in the scientific integrity of our results.
- We need to continue to communicate these very complex ideas in very simple terms.
- We need to continue to draw parallels between our approaches and approaches used in other economic fields and in business for example.
- We need to be prepared to revisit issues that may no longer be interesting academically.

From my experience, senior managers are prepared to support us if they can be reassured that our methods and results are based on sound scientific principles and are generally accepted among the expert community.

Collaboration

Lastly, I would like to underline the importance of international collaboration on these issues. Sharing our respective research efforts among the US, Europe, Australia and Canada can bring about considerable benefits that include: reducing unnecessary duplication of efforts; cost sharing; cross fertilization of ideas; validation of results; and, international support.

Replication of surveys in other countries not only helps with validation of the results but it will also allows us to better understand national differences in values that would, in turn, allow us to better transfer results internationally. There are already some very good examples of these efforts.

PANEL QUESTION #4: What do you see as the three biggest stated preference research priorities?

Categories

Our three biggest research priorities can be placed in two distinct but interrelated categories: commodity/issue and methodology.

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Gains / losses

One methodological issue that needs continued work is the WTP / WTA issue. We need to establish a clear framework to characterize environmental challenges as either gains or losses and then we need to develop defensible questions to elicit WTA values in contingent valuation. This is an important issue because there can be significant differences between the two values that can distort policy if WTP values are used as proxies. The explanation that the absence of budget constraints for WTA questions leaves us with only WTP questions is simply not good enough anymore. Perhaps one result of trying to capture WTA values will be to increasingly use stated choice formats. Canada, with the help of Jack Knetsch who has written extensively on this topic, is working towards articulating a framework to help us systematically characterize environmental challenges as either gains or losses.

Altruism

The second methods priority I would like to flag is evolving the SP technology to defensibly elicit altruistic values – and I am thinking more about the specific challenges for generating values for children diseases, but not exclusively. This issue has long been expressed qualitatively because of these distinct challenges and, as a result, can undermine the importance that policymakers may place on these values.

More premature mortality studies

Thirdly, while there has been quite a bit of activity on this front, we need to encourage more surveys on premature mortality. As you all know, human health benefits and in particular premature mortality are dominating our assessments and as such have also generated a lot of focus from our stakeholders. We need to create a critical mass of literature that looks at a variety of risks.

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Panel Discussion

What Have We Learned Since the NOAA Panel?

by W. Michael Hanemann, Department of Agricultural & Resource Economics and Goldman School of Public Policy, University of California, Berkeley

Background

The NOAA Panel was formed in unusual circumstances; it was announced immediately following the conference on CV that Exxon sponsored in Washington DC in April 1992.

The conference was a brilliant public relations stunt, and it effectively framed the agenda for the NOAA Panel.

The papers presented at the conference were designed to make a point. The empirical studies were not representative of the state of the art in CV, and the conceptual discussion was not a balanced assessment of the issues. Nevertheless, they became the NOAA Panel's point of departure. The Panel's report reflects this influence.

An example is the question of sensitivity to scope, where the Panel took an issue that is a molehill and made it into something of a mountain.

Since the Panel Report

The focus has largely been constructive — refining and testing SP methods.

What is considered good practice has changed because of the Panel; at all levels, there is now widespread recognition of the importance of

- using a multidisciplinary team to design the survey;
- striving to make the scenario economically consequential;
- using a closed-ended response format;
- carefully testing the questionnaire;
- including debriefing questions in the field version of the study; and
- obtaining a reasonably high response rate.

Approaches to SP have been broadened and new formats have been introduced, including choice experiments ("contingent behavior"), rating, new types of payment card, one-and-a-half bound, deliberative polling, MAUT, etc.

In consequence there is some blurring of the boundaries — e.g. choice experiments combine features of CV with revealed preference.

There Is Now Recognition of the Commonalties Between RP and SP

Instead of exaggerating the differences and viewing them as mutually exclusive, as at the Exxon Conference, researchers are more open to combining approaches and are more aware of the similarities.

The key commonality is that RP and SP both focus on individual preference and behavior with respect to specific narrow commodities, and they both confront the irreducible complexity of human cognition and behavior. They are both forms of what may be called *Disaggregated Choice Analysis.*

Distinguish two types of demand analysis:

> (A) Aggregate data on very broadly defined commodities (housing, food, transportation, etc)
>
> (B) Disaggregated data on very specific commodities (e.g. 16 oz bottle of Hunt's low-cal, organic, tomato ketchup in a plastic, easy-pour container)

Those who worked with (B) tend to be well aware of

> (i) Profound heterogeneity in behavior among individuals whom economic theory would consider identical (same prices, same income, etc);
>
> (ii) Preferences are complex. They depend on a variety of attributes that can vary with the situation; and
>
> (iii) Real behavior is by no means as simple or straight forward as in economic theory.

Theorists and those who worked with (A) tend to be clueless.

Many of the Things We Have Learned Were Known Already to Practitioners of Travel Cost

We knew that there is no such thing as procedural invariance.

> E.g., When you try to measure the number of times somebody visited a beach, or how many hours they spend watching TV, there is not invariance with respect to either the mode of asking the question or the context in which the question is answered.

Looking at the demand for Boston area beaches in my Ph.D., I found

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- Both perceptions of quality and preferences for quality were context-dependent.

- Objective measures of beach and water quality played little role in explaining people's behavior, while their subjective perceptions had a significant impact.

- Possibility of cognitive dissonance — behavior might shape perceptions, rather than the other way around.

Complexity of Preference

People care not just about what they pay and what they get, but also about

- whether they are overpaying;

- who else is paying;

- whom they pay; and

- what is being done with the money they pay.

These are all potential arguments in a Generalized Lancaster utility function.

The quantity units are subjective. Whether an orchestra has 20 or 30 violinists may hardly matter; whether it has 2 or 3 might matter hugely. With subjective response to quantity, as with attributes, one is dealing with psychophysics.

Context Matters For Both Preference and Perception — They Are Both Context-Dependent

The same words can mean different things (Harold Pinter).

The meaning — of words and commodities alike— is implicit in the situation. It is also socially determined — there is a shared understanding of implicit meaning.

Therefore, different attributes matter, and the same attributes get different weights, in different situations.

This has implications in both RP and SP for

- the design of survey instruments,

- the analysis and interpretation of survey data, and

- the extrapolation of results from the survey data analysis.

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The goal must be to understand and model the context-dependence of preferences and of survey response strategies. Use this knowledge to design surveys, analyze the survey data, and match context when extrapolating the survey results.

This makes benefit transfer harder, but it is necessary for good science.

Some Lessons for SP

Concreteness and realism matter. Avoid a scenario that is overtly hypothetical or counterfactual. Avoid a scenario that is incomplete (leaves important details unspecified). In both cases, respondents may deal with this by making "best case" assumptions.

Emphasize making the payment right now.

Choose the right context — since sequence matters, choose the sequence that is relevant.

People don't want to overpay; therefore,

- Avoid open-ended
- Seriously problem for payment cards
- Prefer one and a half bound.

One can detect and correct for yea-saying — this should be done.

Certainty of response should be investigated and accounted for.

Use simple split-sample survey experiments to investigate respondent behavior in surveys.

Issues

- How can one impart realism and concreteness to choice experiments? How does a lack thereof influence outcomes in them?
- Are multiple pieces of data from the same respondent as good as less data from more respondents? I am dubious, because of both the correlation among successive responses, which reduces the amount of information, and also the heterogeneity among individuals, which is undersampled.
- How reliable are self-administered surveys (mail, internet)? I am concerned about both selection bias and the loss of quality that comes from the presence of an interviewer.

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Research Areas

1. Survey mode

   Test mail-telephone against in-person.
   Test internet against mail-telephone, phone and in-person.

2. Introduce careful debriefing into choice experiments. Use survey experiments to test whether respondents accept the scenario and are valuing what the researcher assumes.

3. Design experiments to test whether and how(1) economic consequentiality, and (2) hypotheticality/unrealism affect survey responses.

4. Investigate — through data collection, statistical analysis and Monte Carlo simulation — the tradeoff between more subjects and more questions per subject.

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Panel Discussion

Discussion of Questions 2, 3, & 4

by Carol A. Jones, Associate Director for Research, Resource Economics Division, USDA Economic Research Service

Question 2: What remains to be done to ensure that stated preference results are valid and defensible for use in policy or regulatory settings?

I am assuming that the panel addressed this question from the ***methods*** perspective in response to the first question. I will focus on issues associated with ***applications*** of the methods to policy and regulatory settings.

A. First, we must recognize that the requirements for validity, precision *will depend upon the specific context at hand:*

1) What levels of validity, precision are required by the decision-making context?

- Burden of proof is different for litigation (the context for the NOAA regulations for natural resource damage assessments) vs. regulatory contexts: in litigation, one must establish the "weight of the evidence", whereas for challenges to regulations, the agencies must meet an "arbitrary and capricious" standard

- Budget constraints may be different: the potential for cost-recovery when the government wins in litigation may lead to a relaxation of the otherwise very stringent budget constraint the government faces

- [Of course most legal cases are settled not litigated, so the trade-off is somewhat of a moving target.]

2) What is the value of additional refinement of the analysis?

- The key questions include: will improved estimates change the policy conclusion *or* will they improve the likelihood and timeliness of a reasonable settlement?

- There may be trade-offs between unbiasedness and variability of estimates:

    - E.g., for cost-benefit analysis, if the data support doing the project based on a downward biased estimate of benefits and/or upward biased estimate of costs, then what is the value in further refining the estimate?

        - Analogously if the expected biases work toward overstating the net benefits of a choice and they do not support doing the policy, one has to ask if there is a benefit of additional information.

    - Of course it's not so simple when the choice structure is not a simple 0,1 option.

B. In order to value to what extent policies generate benefits, we must first have the capability of relating policies to specific outcomes — *in order to know what to value.*

As an example we take the case of an agricultural policy with environmental implications. An essential ingredient to analysis is developing modeling architecture that creates linkages between economic models and environmental models. In this case, linkages need to be made among 3 sets of models:

- Economic models of private decision-making in response to policies (e.g., farmer management of nutrients in response to TMDLs, with outputs that may include quantity of nutrients transmitted to edge-of-field)

- Environmental models that translate the outputs from economic behavior (e.g., quantity of nutrients transmitted to edge-of-field) into quality attributes of natural resources, (such as inland, estuarine water quality) that can feed into:

- Economic valuation models of the natural resources (based on either value of use of resources, or direct valuation of resources) — these use as inputs the changes in resource quality resulting from policy changes and provide the final link between, say, water quality policy and the value it may provide to the public in improved water quality

Accomplishing these linkages takes long-term investments in inter-disciplinary research, which is not consistent with the standard reward structures in most academic and other research organizations. Promoting this work will take require sustained commitments by funding agencies and creative organizational responses by research organizations.

C. We have to be able to conduct valuation in a cost-effective way, in many cases with a minimum of data collection and a maximum range of scenarios covered.

Basic strategies for meeting this goal include:

1) Designing valuation studies to be as flexible as possible for evaluating projects within the specified policy context, potentially long after the survey has been completed.

- Public decision-making processes may become very extenuated, though beginning before an SP survey is started, concluding with a final decision long after the survey has been concluded. Circumstances change, options are eliminated, and a 1 or 2 fixed scenario CV survey may not provide values for what the ultimate options turn out to be.

- Consequently, stated choice elicitations that make it possible to develop valuation functions could serve a very important role in providing the needed flexibility.

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2) Developing strategies for conducting benefits transfer from analysis sites to policy sites in the most effective and efficient way.

- Practical reality is that it is not feasible to collect data in each policy context

- At the same time, it has been documented that there are limits to the reliability of benefits transfer approaches to different contexts with different populations — so more work needs to be done there.

Question 3: How has your agency used stated preference research in the past and what type of stated preference research does it need for the future?

ERS is an economic research unit in the USDA, providing economic research for all agencies within USDA (except for the Forest Service, which conducts its own economic analysis). Its formal mission is to conduct economic analysis on efficiency, efficacy and equity issues related to agriculture, food, the environment and rural development to improve public and private decision-making. (See the ERS website, www.ers.usda.gov.)

Two broad policy areas in which we have conducted and/or are currently conducting SP analysis are:

1) Food and drinking water safety

2) Environmental policies or policies with environmental implications (along with income support goals), including policies promoting:

- Use of environmentally sound practices

- Set-aside of environmentally sensitive land — wetlands, or lands that can generate environmental damage is cropped — e.g., highly erodible land

- Agricultural lands preservation

Most ERS analysis is conducted in-house. A major exception is the Food Assistance and Nutrition Research Program, which provided approximately $10.0 million in external funding in the area during FY 2000.

A. Valuation of reduction in morbidity and mortality risks from consumption of food and drinking water consumption (private market goods)

USDA policy role:

- Each year, there are approximately 76 million cases of food-borne illnesses, including about 5000 deaths. USDA, EPA and FDA are responsible for regulating health risks in food.

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- For drinking water, USDA has a role in promoting farmer behavior that may reduce drinking water contamination, for example nitrates in well water.

ERS research accomplishments:

- Drinking water

To assess consumers' WTP for safe drinking water, ERS included multiple-bound discrete choice SP questions in the National Survey of Recreation and the Environment and has analyzed the data in several reports.

References

Stephen R. Crutchfield, Joseph C. Cooper, and Daniel Hellerstein. 1997. "The Benefits of Safer Drinking Water: The Value of Nitrate Reduction." USDA/ERS Agricultural Economics Report No. 752, 15p.

Stephen R. Crutchfield and Joseph C. Cooper. 1997. "Valuing Risk Reduction: The example of Nitrates in Drinking Water." Food Review 20(1):38-41.

"Outdoor Recreation in American Life: Participation Trends, Final Report.

Results from the National Survey on Recreation and the Environment." 1998. In Cordell, H. Ken et. al, 1998. Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends. Champagne, IL. Sagamore Publishing

- Food safety

ERS has two ongoing multi-year cooperative agreements in this area.

ERS current research goals:

The emphasis in current research is to provide an empirical foundation for moving beyond regulatory impact analyses (RIAs) using cost-of-illness and revealed preference value of life literature, based primarily on wage market studies. The goal is to be able to value risk reduction in a specific context, including different populations (children, elderly, etc) and to value specific impacts, including morbidity.

B. Environmental risks

USDA policy role:

USDA has a number of programs to promote the use of more environmentally beneficial agricultural practices and land use. Examples include rental or easement payment programs for temporary or permanent land set-asides or cost/share programs to induce farmers to use environmentally beneficial practices.

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ERS research accomplishments:

The research has focused on the two sides of the coin in policy design:

- The supply-side, in order to assess the minimum amount of compensation that is needed to change farmers' behavior, and

- The benefit side, in order to target better the programs to producers.

1) **Supply side**: willingness of producers to adopt new production practices (or change land use) — in order to better design compensation policies or insurance policies to promote economically efficient adoption.

   a) **Best Management Practices**. Environmentally beneficial production practices, often referred to as "best management practices" (BMPs), are encouraged by the USDA. Adoption of these practices in concept is profitable to producers in many cases, though they may involve incurring investment costs. Despite this, many producers have chosen not to adopt them, and little was known about determinants of adoption. In the 1992 Area Studies Survey, we elicited information from farmers with which we estimated an adoption schedule used SP techniques drawn from the CVM literature. The results of this research influenced the Agricultural Conservation Innovation Center in the development of BMP-Plus, an insurance program designed to encourage farmers to adopt BMPs.

References

Joseph Cooper. 1997. "Combining Actual and Contingent Behavior data to Model Farmer Adoption of Water Quality Protection Practices," Journal of Agricultural and Resource Economics, Vol. 22(July):30-43.

Joseph Cooper and Russ Keim. 1996. "Incentive Payments to Encourage Farmer Adoption of Water Quality Protection Practices," American Journal of Agricultural Economics, Vol. 78(February):54-64.

Peter Feather and Joseph Cooper. 1995. "Strategies for Curbing Water Pollution." Agricultural Outlook, Vol. AO-224 (November).

Peter Feather and Joseph Cooper. 1995. "Voluntary Incentives for Reducing Agricultural Nonpoint Source Pollution." USDA/ERS Agricultural Information Bulletin No. 716. 11p.

Margriet Caswell, Keith Fuglie, Cassandra Ingram, Sharon Jans and Catherine Kascak, 2001. "Adoption of Agricultural Production Practices: Lessons Learned from the U.S. Department of Agriculture Area Studies Project." USDA Economic Research Service Agricultural Economic Report No. 792, forthcoming.

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Analogous issues arise with conservation tillage, which are considered to be profit-maximizing investments for farmers in many circumstances.

b) **Conservation Reserve Program** (CRP): In the CRP, rental payments may be larger than necessary, especially for farmers who enrolled in earlier rounds. In 1993, trichotomous choice SP survey questions addressing farmer re-enrollment in the CRP were elicited from over 8,000 CRP contract holders. With this data, ERS estimated acreage re-enrollment as a function of the rental rate.

Reference

Joseph Cooper and Tim Osborn. 1998. "The Effect of Rental Rates on the Extension of Conservation Reserve Program Contracts," American Journal of Agricultural Economics, Vol. 80(February):184-194.

2) **Benefit side:** valuation of non-market environmental benefits of policies

a) **Conservation Reserve Program, Wetlands Reserve Program, etc:** To complement benefits estimations based on benefits transfer of revealed preference studies of hunting, wildlife viewing and freshwater based recreation, ERS conducted a CV survey to measure changes in **total value** of grassland bird populations due to CRP. Two papers are currently in draft form.

b) **Valuation of rural amenities from agricultural land use:** are the benefits primarily realized by local residents and therefore captured in market land valuations, or is there a substantial component of value from others in the region or beyond?

In states with active expansion of urban/suburban land use (particularly the west and east coasts), there is a tremendous amount of policy activity in farmland preservation. A series of policy tools have been employed. The newest ones establishing markets for easements in which property owners sell their rights, apparently in perpetuity, to develop their land. Purchases may either be the public sector (public development rights) or other land developers seeking dispensation for development elsewhere in the region (tradeable development rights). USDA has a small program in farmland preservation. This work is currently ongoing.

Question 4: What are the three biggest stated preference research priorities?

A. Incentive compatibility (i.e., incentives for truth-telling) of alternative formats for stated preference methods

Many of the "biases" that have been identified in the literature can be traced to the incentive properties of the survey instrument. The line of work begun by Carson, Grove and Machina is very important, in that it *differentiates* incentive properties among different

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elicitation formats and provides many testable hypotheses about differing results on validity across the literature. This line of work is extremely promising for high returns: it provides an important organizing principle for a meta-analysis of the extensive but fragmented stated preference literature. It should provide guideposts for understanding the bias and reliability of survey data, and the most appropriate approaches for analyzing and interpreting the data.

B. Methodological development of choice experiments

Among the stated preference portfolio of valuation methods, substantial investments have been made in the development of the single (or 2) scenario approach of "contingent valuation (CV)." The CV framework for eliciting stated preferences has limited flexibility for use in policy analysis — the policy outcomes to be valued have to be well-specified ahead of time.

In contrast are **choice experiments**, a less well-developed stated preference approach, in which survey respondents are given repeated opportunities to choose among alternative policy outcomes in which several variables (attributes) are allowed to vary. Because choice experiments allow the analyst to estimate valuation functions for multiple attributes, it is possible to value a wide range of scenarios with changing levels of attributes, rather than simply 1 or 2 pre-defined scenarios.

- The approach has the potential for several major advantages over the CV framework, including:
  - it facilitates a broader evaluation of the efficient scale of programs, rather than evaluating simple yes/no choices of 1-2 pre-defined scales;
  - it facilitates valuing provision of multiple public goods, which is critical when valuing the providing of alternative bundles of public goods (as opposed to measuring damages to natural resources from an accident, where the appropriate approach is to value the damage holding all else constant).
- At the same time, a variety of methodological issues arise in implementing any stated preference approach, including the nature of the incentives for truth-telling, which remain to be evaluated for this approach.

C. Understanding and identifying whether respondents scenario rejection, or scenario redefinition

We need to be able to diagnose when respondents are either rejecting the scenarios, or when they are redefining the question to terms that they think are more plausible.

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Panel Discussion

Stated Preferences: An Outsider's View

by Randall Lutter, American Enterprise Institute-Brookings Joint Center for Regulatory Studies

I. Why Me?

- Never a producer of stated preference estimates, I am a sometime user of CV.
- Formerly close to decision-making
  - At OMB and CEA I presented estimates of costs and benefits for a variety of environmental initiatives to senior officials.
- Will offer a pragmatic outsider's views about
  - the overstated importance of CV
  - its validity and defensibility for use in policy and regulatory decisions
  - the underrated importance of context.

II. Why CV?

CV can usefully complement revealed preference studies for categories of benefits that can be analyzed with both. For example, estimates of the value of reduced mortality risk are made more reliable by complementary estimates based on both revealed preference and stated preference methods. My remarks focus on applications of stated preference to areas where revealed preference estimates do not exist and can provide no benchmark for comparison.

Pure science: Understanding what people say/mean when asked questions about payment for natural resources.

Policy: Environmental economists justify CV on pragmatic grounds: the environment will be more highly valued in decision-making than would otherwise be the case and no better decision aids are available. (Pearce et al. 1989, Pearce 1998)

A. Let's Consider This Notion Carefully

In U.S. most environmental policy is federal.

In federal policy-making, benefit-cost info has 2 uses:

Management tool

For decision-making within EPA, Administration

Public accounting device

Informing the public about the merit of different policies

B. As A Management Tool Does Benefit-Cost Analysis Suffer From The Non-Monetization of Passive-Use Values?

Non-quantification and non-monetization are routine. Hahn et al. (2000)[1] surveyed 46 economically significant rules and found:

Only 70 % had any quantitative benefits estimates.

< 50 % had any benefits estimates in $.

EPA data were similar. See Figure 2 from page 212 of Hahn et al. (2000)

Non-monetization is common outside of categories of benefits related to passive use.

Non-quantification occurs because:

No data on exposure to toxic substances

Epidemiological evidence is too crude

Non-monetization occurs because:

Some health effects are not monetized in the literature:

birth defects
sterility
neurotoxic developmental effects

How many of the decisions would be improved by better or new CV estimates of previously un-monetized categories of benefits? My subjective answer is very few. As a management tool improved economics has had little value in environmental policy making.

Thus as a practical matter, non-monetization of passive use values, the forte of CV, may be a small part of a superficial effort to rationalize administrative decision-making.

C. Public Accounting: Would greater and better use of CV improve the public's understanding of the effects of environmental policy? Perhaps. But this is a

[1] See Hahn et al. (2000) at http://www.aei.brookings.org/publications/working/working_00_01.pdf

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hard question, so I answer an easier one. Has the past use of CV contributed to improving the public's understanding of environmental policies?

Most CV studies value benefits well before action is taken. Thus they inform people about the reason to take action, but not about the merit of specific actions taken.

Solutions to the benefits transfer problem are so poor as to hinder credibility.

Species extinction and preservation of wildlife areas are understood to be important even without expressing this importance in terms of dollars.

D. Thus CV, if well done, may solve less of the problem of inefficient resource allocation than its proponents suggest.

III. Validity and Defensibility

A. EPA already uses CV in regulatory decision-making

1. Examples:

- Great Lakes Water Quality Initiative
  - WTP to fish in waters "free from" contaminants
- Coastal Zone Oil and Gas, WTP for wetlands
- Pesticide Management Plans, WTP for clean ground water
- Regional Haze, WTP for visibility

2. Did such CVs help decision-makers? — Not really.

- No credible evidence of scope or valuation on the margin.
- Difficult problems of benefits transfer. Waters are never "free from" contaminants.
- Little internal consistency/ validity
  - Protest bids, inability to understand or believe scenario.
- Little external validity: non-random survey, very low response rates.
- No treatment of uncertainty

These difficulties are echoed in those reported at this conference where WTP estimates vary sharply with estimates of the confidence that respondents had that their answers were right.

B. Could CV serve as basis for greater consideration of BCA than allowed by all environmental statutes other than TSCA, old FIFRA, and perhaps the new SDWA?

CV as practiced to date is not up to judicial scrutiny.

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Substantially greater validity and relevance would be needed.

IV. Decision-Making Context Affects Estimated Values More Than We Acknowledge

A. "I struggled with this money business."

Many respondents dislike and resist answering WTP questions. See Clark, Burgess and Harrison (2000) who analyze respondents to a survey that sought to adopt NOAA recommendations wherever possible. "[Respondents] unequivocally rejected CV as an acceptable means of representing their values or views to decision makers."

Many difficulties arose:

- "[Respondents] felt it was impossible for them to make a meaningful judgment about the worth of the scheme in relation to the large number of probably equally worthy schemes around the country." p. 55.

- Of 31 visitors "asked directly if they felt that the amount that they agreed to pay was a good measure of what conserving wildlife on the Levels was worth to them, 19 answered no, six answered yes, and the rest were unsure or avoided the question." p. 55.

- "There was consensus in all three groups that decisions about such things should be made by government, advised by experts who had an understanding of relative claims of different places and different nature conservation schemes, and based on national standards." p. 56.

- Post-survey discussions increased doubts about the use of the WTP figures and feelings that participants had been duped. p. 56.

Some related literature reaches similar conclusions. Thus there may not be much internal validity.

B. The Process May Affect WTP Estimates.

- When groups were told how WTP figures are analyzed and what the results might mean to economists or decision-makers, a number of individuals expressed anger and distress, feeling that they had been manipulated. ("Don't sort of hoodwink us, you know.") p. 57.

- This suggests that the use of WTP estimates in any decision-making process may affect stated WTP. Consider an extreme and heuristic example that is timely but not perhaps legally sound:

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- EPA bans mercury emissions under Toxic Substances Control Act. CV estimates of the value of loons and panthers figures as part of benefits analysis that is subject to judicial review under TSCA's unreasonable risk standard. Inadequate or unreliable monetization may leave EPA's rule fatally vulnerable to legal challenges.

- EPA mandates such stringent technology based (MACT) standards under the Clean Air Act that coal consumption is infeasible and electric generating plants switch to natural gas and oil. The legal standard for MACT prohibits any consideration of benefits. Thus if EPA were to conduct a benefits analysis it would be only for use as a minor managerial tool, in that the law precludes the consideration of benefits in setting the standard, and for public accounting purposes. The benefits analysis would be exempt from judicial review.

- I conjecture that stated WTP would vary according to the prospective use of the WTP estimates.

- But such variation would have very troubling implications for the interpretation of stated WTP. How could it reflect exogenously given preferences, if indeed these varied with the context in which stated preferences would inform policy-makers?

- Stated preference methods have a long ways to go to have the validity necessary to be a respected contribution to informed decision-making.

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Panel Discussion

Discussion of Questions 3 & 4

by Al McGartland, Director, US EPA National Center for Environmental Economics

QUESTION 3. How has your agency used SP research in the past and what type of SP research does it need for the future?

EPA's use of stated preference research tends to be in a benefit transfer context.

Economists tend to represent a small minority in the Agency. The Agency employs many engineers, risk assessors, toxicologists, lawyers, etc.; but there is only a small community of economists. At EPA, economists really are the "tail of the dog." That is, we take what hard scientists provide us and attempt to estimate the benefits of changes in environmental conditions using this information. Being able to employ the "damage function approach" makes us feel more confident about our benefit-cost analyses. In this approach changes in emissions or concentrations of pollutants are translated into changes in health endpoints.

The Office of Air is one office for which there are a relatively large number of studies allowing EPA to provide estimates of changes in health endpoints. In the case of mortality, from the valuation context, however, economists must still use estimates provided by the hedonic wage literature. But is this the right value to use for estimating the value of risk reductions for environmental pollutants? It is unlikely because in the environmental context we're often dealing with long-term illnesses such as cancer and/or diseases with a latency period – that is with deaths that have different attributes than those dealt with in the hedonic wage literature. Further, in many cases health scientists don't have a good understanding of some of the attributes of these illnesses, particularly latency. In many cases economists are only as good as risk assessors can make us.

Dealing with water may be even more of a problem because scientists aren't always able to translate changes in environmental pollutants into effects economists are able to value.

Economists may be further hampered by other developments and shortcomings in other fields. For example, the Agency is developing cancer risk assessment guidelines that move away from the provision of continuous dose-response functions for many contaminants. Risk assessors are much more comfortable providing a contaminant level above which is considered "safe" and below which is considered "unsafe." This movement actually makes it more difficult for economists to provide benefit estimates. Recently we convened a meeting of economists and toxicologists at which I made the case that for benefit-cost analysis we need a shift in thinking.

In a few cases, the Agency has tried to conduct/fund a stated preference study in anticipation of a regulation. However, we haven't had much success with these studies. For example, EPA funded research on visibility that hasn't fared well in the literature. EPA also

funded a study on the value of protecting groundwater. It was believed that because groundwater is relevant to a few programs (pesticides, solid waste, water), the payoff to having reliable values would be large. However, this study was also not well received.

So, we remain in the benefit transfer game. As it stands there aren't a lot of standards that govern benefit transfer. There are examples of both good and bad transfers both within and outside of the Agency. I believe that Kerry's *(V. Kerry Smith, North Carolina State University*) idea of preference calibration and benefit transfer will allow us to do a better job.

I'd also like to make a plug for more "replication" studies. While these may not be as publishable as those dealing with new methods, theory, or even a new commodity, there is great value for them at EPA.

QUESTION 4. What do you see as the three biggest stated preference research priorities?

My office conducted an intranet survey of economists that asked them to identify where EPA should spend it's economic research dollars. Those that involve the use of stated preference methods are noted in bold in the table below.

Top 8 Research Areas Identified by EPA Staff Economists	
1	**Estimation of ecosystem services benefits**
2	**Estimation of morbidity risks**
3	**Estimation of other welfare benefits**
4	Uncertainty and economic analysis
5	**Estimation of mortality risks**
6	**Estimation of non-use benefits**
7	Equity and Distribution
8	**Estimation of benefits to vulnerable populations**
Source: Report on the Results of the Agency-Wide Economic Research Agenda Questionnaire (May 1998)	

My three research priorities are:

1. Value of groundwater improvements or protection.
   Again, this affects many offices and the lack of a core study accepted in the literature means economists can't provide monitized benefit estimates.

2. Value of improvements to coastal and estuarine waters.
   Research valuing national improvements in these areas does not exist.

3. Value of reductions in mortality risks related to environmental causes.
   The current transfer of $5.8 million (1997) to all risks is too simplistic and doesn't take into account how the nature of the risk and the death differs from those considered in the hedonic wage literature. Additionally, this category tends to be the major benefit of many of EPA's regulations.

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Panel Discussion

Responses to the Itch

by V. Kerry Smith, Center for Environmental and Resource Economic Policy, Department of Agricultural and Resource Economics, North Carolina State University and Resources for the Future

Outline

- Historical Perspective
- NOAA/CV Performance Standards
- Issues Posed to the Panel
- My Answers

What Did the NOAA Panel Say About Reliability?

"If a CV survey suffered from any of the following maladies, we would judge its findings 'unreliable':

- a high nonresponse rate to the entire survey or to the valuation question
- inadequate responsiveness to the scope of the environmental insult
- lack of understanding of the task by the respondents
- lack of belief in the full restoration scenario
- 'yes' or 'no' votes on the hypothetical referendums that are not followed up or explained by making reference to the cost and/or the value of the program." (Arrow *et al.*, 1993 p. 4609)

Presenting an Object of Choice

- Alaska Survey
- Montrose Survey
- CV/SP Studies and Reliability

What was Learned?

- Scope Test Satisfying the NOAA Panel Guidelines

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CV / SP Studies and Reliability

Construct Validity (Mitchell and Carson, NOAA Panel)

CV responses related to:

- cost or financial consequence
- measure of availability if relevant to access to what is offered
- income
- factors related to quality of object of choice
- availability of substitutes
- taste-related demographics and attitudes

Consistent with Adding-Up Property

Headlines Conditions

Issues Posed

I. **SP Reliability —** current status and research to enhance it
II. **SP and Policy** — design and evaluation of policy
III. **SP Research** — methods or applications

CV Research Since the NOAA Panel

- Prompted the most serious investigation of individual preferences ever undertaken in economics; types of research include:
  - refinement in econometric methods (new parametric, semi-parametric and non-parametric methods)
  - application of repeated choice, preference scaling, ranking and matching questions with focus on attributes of commodities
  - investigation of incentive properties of different elicitation modes using theoretical, experimental and survey methods
  - integration of revealed and stated preference data in joint estimation of preferences

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- Transformed framework used in experimental economics:
  - conventional experimental economics — evaluates performance of institutions using *induced preferences*
  - new environmental economics uses *known incentive properties* of institutions to estimate preferences and evaluate ways of eliciting them
- Supplement to revealed preference methods at a very general level in that methods argued we can learn about individual preferences for goods whose consumption is rationed by prices.

Path to Reliability

- There is no crucial experiment (or set of experiments) that once conducted will allow a decision up or down with the method. This strategy will never succeed.
- Reliability will not be realized by focusing on estimating values for well-defined changes in an environmental objective of choice. Instead must estimate economic value as part of larger set of preferences.

Policy and CV

- Focus on measuring Hurwicz-Uzawa income compensation functions; policy is never about point estimate of single object of choice
- Research — complementary sample analysis; companion samples linked to large on-going sources of data

Three CV Research Priorities

- Characterizing CV object of choice
- Treating CV/SP information as economic data linked to preferences
- Characterizing individual heterogeneity

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Question and Answer Period for Session IV

Edna Loehman, Purdue University, asked for comment on the payment card method, which got a black mark from the NOAA panel. She believed the method could be useful and informative if researchers took appropriate care to deal with scaling. Incentive problems are perhaps not as important as problems with communicating the nature of the good being valued. She did a study of common morbidity effects with payment cards and got results with surprisingly good scaling and proportionality. However, she recently got involved in a study valuing highway safety and found use of the payment card method difficult. The difference was that the highway study was asking people about unfamiliar and uncertain risks of accident injuries instead of familiar and certain morbidity from headaches and colds. The psychology of such choices is little understood and needs exploration.

Richard Carson remarked that the payment card method in theory is not incentive-compatible, but its biases are well known. It gives too few small answers, and on the high end respondents tend to shift down towards where respondents think the costs are. The result is shrinkage near zero and at the high numbers. If you are prepared to accept that shrinkage, the format will give you a lot of information without much loss. Among open-ended-type formats, this format is probably the best one.

Why? Because the incentives that underlie an open-ended question pivot on costs. The old psychological literature that said willingness to pay (WTP) should be independent of cost is completely wrong. When you look at the optimal response strategy, if your WTP is below cost you should go towards zero, and if your WTP is above cost you should go towards the cost. So a bidding game question conveys a fair amount of information about cost, and an open-ended question forces the respondent to think about the costs. A payment card format actually diffuses whatever the original prior on costs was. As the prior on costs gets diffused so the person gets risk-averse, you converge from below to the true WTP number. It works reasonably well, as long as you don't get hung up on the downward bias.

Michael Hanemann was a bit less positive in his assessment. As long as there is no controversy in the results, this is an acceptable method. But if someone wanted to attack your results, he could devise a different payment card survey that would give different results. Something like this happened in Great Britain two years ago.

Glenn Harrison, University of South Carolina, followed up on Kerry Smith's earlier concerns about what valuation methods are going to be considered reliable in policymaking situations. There seem to be two settings in which reliability is going to be judged. One is in open adversarial questioning by the interested publics and the other is in litigation. Harrison asked the panel about their experience since the Exxon Valdez on the acceptance of contingent valuation method (CVM) studies by the courts and by the academic community.

Richard Carson said he was not very familiar with what has happened in litigation. However, he believed that many attacks on methods there were simply convenient ways to couch what were really attacks aimed at the bottom line. As a result, some attacks against stated preference (SP) were simply thinly veiled fights over money.

Michael Hanemann related an anecdote concerning a beach closing in Los Angeles. At trial, he testified on the lost value due to closure, based on a study of travel costs, a revealed preference (RP) method. On the witness stand, the other side's attorney said, "You claim the value of a visit to the beach is about $15. Have you ever asked anyone whether he had a consumer surplus of $15 to go to the beach?" In other words, the attorney attacked Hanemann for not having SP data. The point is, any method that relies on analysis and modeling assumptions will be vulnerable in any public policy debate. If your analysis is not transparent to the lay audience, you are open to disbelief.

David Chapman noted that attorneys are paid to attack during litigation. But to his knowledge in the damage assessment area, no CVM studies have gone to trial. That does not mean the studies have not been useful.

Richard Carson noted that in the Exxon Valdez case, the studies happened to value an actual future incident. The Coast Guard adopted a spill prevention plan almost equivalent to one favored in a study, including the use of escort ships. About three years later, a tanker out of Valdez lost power, and the escort ships prevented the tanker from running aground and towed it safely out to sea.

The top journals have been sporadic about survey use. But a 1995 review found about 2000 CV surveys in the literature, and now there are about 3600 surveys from 90 countries reported. So survey use continues to explode. A large number of the studies were in developing countries, on practical policy issues like provision of water systems and sewers or eco-tourism use of parks. Often, regardless of the quality of the survey work, the underlying engineering estimates of costs are poor.

Kerry Smith said that he was not directly involved in any litigation and so got to observe it from both sides. He noted a change in the structure of analysis that goes into litigation, with a move towards stated choice. In many cases, the models used were unable to come up with WTP.

In fact, the attorneys do not care about the correct WTP. They only want numbers to start the bargaining, to put a position in play to bound the negotiation.

On another point, he would argue that the study that Hanemann mentioned involved not primary analysis of travel cost, but benefit transfer. Most litigation does not involve primary research. If it is cheaper to get a transfer number than a primary number, the attorneys will go the cheaper route if they think the number will hold up in court.

Regarding the status of contingent valuation in academia, many economists treat contingent valuation lightly, almost condescendingly. They would not allow their graduate students to do it.

Glenn Harrison noted that economists who were critical of CV often could offer no practical alternatives to its use in a given situation. Many academic economists do not pay attention to whether their work is specifically relevant to pending policies.

Richard Carson said once you exclude macroeconomists, the international trade specialists, and most of the econometricians who are doing time series, you are left with a

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much smaller group of people who might care. His department is satisfied to have just one environmental economist.

John Halstead, University of New Hampshire, said he has met economists whose attitude towards empirical research is that everyone should do it – once. Some branches of economics do not take the sub-profession of environmental economics seriously. He wondered if anyone would ever win a Nobel Prize for environmental economic work.

Kerry Smith thought that the general perception of environmental economics was not as negative as the perception of CV. Look at the composition of EPA's environmental economics advisory committee. It includes people working on auctions and other issues relevant to environmental economics who are happy to be recognized for their work. Another example is the NBER summer workshops on public economics and environmental economics, where you will find little work on SP but much on other relevant topics.

Michael Hanemann said the gap between valuation and policy analysis and design is not that large. He personally is interested in what it takes to shift behavior, which is very relevant to practical policy design. Most economists think abstractly, but what they do is still relevant to policy.

Kerry Smith noted that the Nobel citation for Dan McFadden mentioned that his work helped in the valuation of the Exxon Valdez damage.

Glenn Harrison raised the role of an agency's research incentives and funding efforts in resolving outstanding issues. He noted that some issues, such as equity issues or varying the value of statistical lives (VSLs) for children of different ages might be too controversial for an agency to take on in-house. Could such work be usefully done outside the agency? To what extent can academic work complement agency work and tackle issues the agency would like to but cannot?

Al McGartland said EPA's environmental economics advisory committee did grapple with the issue of valuing children's lives and agreed it was too sensitive an issue for the agency to specify values.

He thought that it would be good to engage the next EPA Administrator on the issue of research. Few political leaders in EPA have actively sought to be briefed on economic tools.

Maureen Cropper asked, wasn't EPA funding research on valuation of children's health? Al McGartland said yes.

Matthew Clark said EPA was probably going to redo the evaluation of children's health solicitation. He encouraged people to watch EPA's web page for details.

Richard Carson found interesting that people could understand changes in life expectancy better than they understood risks stated in terms of increased numbers of deaths per year. Couple that with some notion of how people discount risk over different time periods, and you might have one function explaining risk perception that politically might be acceptable.

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Maureen Cropper noted that the whole QALY (*quality adjusted life years*) literature asks people to trade off two things: quality of life and length of life. The concept of the survival curve and its relation to life expectancy is not easy for people to grasp. To communicate the true meaning of the risk is hard.

Richard Carson said that work had progressed from studies that showed people are insensitive to increased risk to studies that showed it is possible to communicate about risk to make people's responses more proportional. This issue will not be solved soon, but if it is a priority for EPA, a concentrated, coordinated effort could yield results.

James Hammitt, Harvard University, noted that on valuation, trade-offs between an individual's own money and own risk turn on a combination of age and other things. Empirically, these life-cycle models can lead to a wide range of results. We have not nailed things down yet. People have been working on risk communication for a long time – the first risk ladder dates to the early 1980s.

With regard to using academic economists to develop work and break new ground, EPA played a major role in stimulating CV research in the first place. That initiative has been a success.

Matthew Clark asked how much agency-sponsored research should be on basic methods and how much should be on practical applications?

Richard Carson encouraged the agency to welcome speculative proposals.

Also, he believed that the agency has been too passive in filling in the gaps in the benefit transfer grid. The agency should have a systematic plan to fill in the gaps. EPA should not expect outside researchers to initiate these studies without encouragement. An academic researcher's inclination is to design work that can be published, not necessarily novel work that satisfies practical needs of policymakers.

He concurred with the idea of setting up a standing agency peer review panel to encourage a consistent high level of research.

Kerry Smith proposed the EPA assemble a panel of four to six senior economists to operate under a model pioneered by the Russell Sage Foundation. The panel would meet annually to award, say, one million dollars for SP research. They could not fund their own work. They would critique the funded research once a year for three years. One person on the panel would be from EPA, and one could be from another agency, but the majority would be from outside the government.

Kelly Brown, EPA, commenting on Richard Carson's suggestion to fill in the gaps, noted that it can be hard to get academics to pursue work they cannot easily publish. And while EPA might like to do the work within the agency, it is difficult for the agency to get the legally required approvals to do surveys. Making SP more respectable among academics would help.

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Glenn Harrison suggested institutional support would be a good step in that direction. Perhaps EPA could fund two or three centers in the United States to focus on SP research and teaching.

Richard Carson agreed, noting that students could support project contracts. An institution could use graduate students to pursue projects with a high level of peer review in a cost-effective manner.

Carol Jones noted that contracts were not grants and wondered if academics would be interested in working under contractual constraints. She also noted that graduate student work would have to be carefully supervised to be credible in policymaking or litigation.

Richard Carson thought that since the contracts would be with the professors, not the students, there would be little problem with quality control or continuity of research.

Kerry Smith said his proposal would use grants, not contracts. The topics would be under control of a group with built-in peer review, not EPA.

On the issue of how EPA can get the work done that it needs, Smith noted that EPA and USDA Economic Research Service (ERS) are already collecting data such as the 1994 national recreation survey of water-based sites. How much work has actually been done with that survey? Another survey is about to go into the field. Why not link small-scale CV studies to these large RP surveys?

Daniel Hellerstein, USDA ERS, said it was hard enough to get an RP survey approved through the federal bureaucracy. To try to get a linked CV study approved adds an additional hurdle. Kelly Brown concurred. Kerry Smith asked if the linked studies could be done by outside investigators through grants. Glenn Harrison said there is a vehicle for doing that. David Chapman agreed that if EPA does not have certain control over the process of data collection, he understood that the survey would not require OMB approval. But if EPA is actively involved in the study or is planning to use the results in a particular way, the survey needs approval.

Glenn Harrison saw potential for piggybacking studies on the large government data collection project, taking advantage of the large data set to magnify the usefulness of the small studies.

David Chapman said the National Marine Fisheries Service piggybacks small surveys on the broader data collection they do annually or every few months.

Michael Hanemann said he was doing a large RP survey in Los Angeles, hanging small CV modules on the RP work. We need basic research on survey modes. This can be hard to fund, but it would be a public good if it leads to money-saving techniques. Perhaps a consortium of funders, including the National Science Foundation, could fund such basic CV work.

Hanemann also seconded Smith's idea of a program of research funded through a peer review panel.

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Richard Carson said his idea of filling in the benefit transfer grid also needs a systematic agency funding mechanism and is not a substitute for Smith's proposal. Smith's proposal would address deeper, more fundamental issues; Carson's would address more practical issues. The agency needs to address both, and to do so well, in a coordinated way that creates an increasing, integrated base of knowledge.

Carol Jones said EPA should use grants to support research on fundamental issues and contracts to direct work on specific practical areas.

Matthew Clark said NOAA, EPA, and USDA could be looking at jointly supporting research on fundamental issues.

Richard Carson urged agency people to get together to identify what their common needs are and where they have run into common problems, limiting information, or bad studies. If they define those problems, that may identify areas of research that could generate publishable studies.

Matthew Clark concluded the session with special thanks to the panelists, the researchers, the organizers at EPA's National Center for Environmental Economics, and the cooperating agencies including USDA ERS.

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