Material for Breakout Session B:
Group Expressions of Value: Referenda and Citizen Juries
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    - Kahn, M.E., and J.G. Matsusaka. 1997. Demand for environmental goods: Evidence from voting patterns on California initiatives. Journal of Law and Economics 40:137-173.
    - RK Blamey, RF James, R Smith and S Niemeyer. 2000. Citizens' Juries and Environmental Value Assessment. http://cjp.anu.edu.au/docs/CJ1.pdf.: The first in a series of reports to be published containing the results of the research project Citizens' Juries for Environmental Management.

Valuation Methods Based on Referenda and Other Public Decisions

Referendum votes and other formal public decisions provide the basis for a set of valuation approaches that can provide monetized values, but use somewhat different logic than that of the conventional individually based revealed-preference and stated-preference methods. The outcomes of referenda (measures placed on the ballot by a legislative body), initiatives (ballot measures proposed by citizens), or other official public decisions directly express what the body politic as a collectivity values in terms of policy outcomes. These expressions may or may not correspond closely to the aggregated values of the individuals in the community in terms of outcomes. Referenda approaches (not to be confused with the "referendum format" often used for posing questions to solicit contingent valuation responses) provide information about the policy preferences of the median voter; under certain circumstances this information can tell us about the median voter's valuation of specific environmental amenities, and can even provide information, albeit weaker, about mean valuations of those who participate in the voting process.

Referenda and initiatives are formal solicitations to the public to determine the public's *willingness to pay*. In a referendum or initiative, officials or policy activists present voting choices that formally specify environmental *objectives*, such as reducing air pollution,

establishing a wildlife preserve, or building a storm run-off system. In some cases, these objectives are clearly specified in quantitative terms: number of tons of sulfur dioxide expected to be removed, number of acres of reserve, or reduction of the area subject to flooding. The *costs* of achieving these objectives are specified in various ways, ranging from the financial costs in taxes or bonds, to the restrictions that would be expected to impose opportunity costs such as reduced employment opportunities or restricted resource extraction.

The logic of using formal public outcomes to infer how much "society values" particular outcomes has been used primarily in the literature on health and safety. For example, the value of a "statistical life" has been estimated by calculating how much public policies commit to spend in order to reduce mortality rates from health or safety risks, or, conversely, how much economic gain is associated with public decisions that reduce safety (e.g., by examining official decisions of U.S. states to raise or lower speed limits, Ashenfelter & Greenstone [2004] estimated the market value of the time saved by getting to the destination more quickly, and from that estimated the value of the additional expected traffic fatalities). The logic of making valuation inferences from referenda and initiatives has been addressed in a few publications, most directly in Deacon & Shapiro, 1975; and Shabman & Stephenson, 1996.

In addition to taking the valuation derived from the analysis of public decisions as an input in itself, the analysis of public decisions, particularly referenda and initiatives, can be used to validate the results of other valuation methods. Several studies have compiled the results of initiatives and/or referenda in order to try to validate more conventional valuation techniques, especially contingent valuation (Kahn & Matsusaka (1997), List & Shogren (2001; 2002), Murphy et al. (2003), Polasky, Gainutdinova & Kerkvliet. (1996), Schläpfer, Roschewitz, & Hanley (2004). Vossler & Kerkvliet (2003)). As Arrow et al. (1993) recommend:

> The referendum format offers one further advantage for CV. As we have argued, external validation of elicited lost passive use values is usually impossible. There are however real-life referenda. Some of them, at least, are decisions to purchase specific public goods with defined payment mechanisms, e.g., an increase in property taxes. *The analogy with willingness to pay for avoidance or repair of environmental damage is far from perfect but close enough that the ability of CV-like studies to predict the outcomes of real-world referenda would be useful evidence on the validity of the CV method in general. The test we envision is not an election poll of the usual type. Instead, using the referendum format and providing the usual information to the respondents, a study should ask whether they are willing to pay the average amount implied by the actual referendum. The outcome of the CV-like study should be compared with that of the actual referendum. The Panel thinks that studies of this kind should be pursued as a method of validating and perhaps even calibrating applications of the CV method…*(emphasis added)

In comparing the valuations yielded by stated-preference approaches with those derived from

public decisions, the studies typically show the inferences from public decisions to yield lower values—not surprising in light of the absence of the hypothetical element in the public-decision results. Although systematic comparisons with conventional revealed preference approaches are lacking, it is likely that the valuations of eco-system components calculated from public decisions would be higher, because public decisions do capture whatever elements of public-regardedness are present among the voters. The valuations based on public decisions have intrinsic validity within the paradigm that gives standing to the community votes as reflecting the policies that the public prefers.

A. Direct Referendum/Initiative Analysis

The valuation analyst can chose to take the referendum choices as they are formally specified, in which case a winning proposal can be interpreted as having standing as the electorate's choice. For example, a municipal government may propose a referendum measure to purchase and maintain 500 acres of currently unused land as a forest reserve costing $1,000,000 annually for a community of 10,000 households. Assume that the measure is not significantly entangled in controversies over how it will be financed (e.g., there is no opposition that a bond measure would simply saddle future generations). The measure passes by 51%. The value can be metricized in various ways; e.g., as

- $1,000,000 per annum for the 500 acres for the community
- $2,000 per annum per acre for the community
- $100 per annum for the 500 acres per household
- $.20 per annum per acre per household.

If the initiative or referendum passes by a slim majority, this valuation can be considered to be quite close to the "community's" valuation. If the vote is more strongly in favor, then the valuation represents a floor on the community's value of the eco-system benefits. If the initiative or referendum loses by a slim majority, then (more arguably) one could assert that the community's valuation is also close to the value implied by the proposed measure.

If the outcome is not close (e.g., the initiative or referendum passes by 70%), the inferred value is a floor on the community's value. This is because a higher cost may have still gained a majority, albeit probably a narrower one.

However, the fact that a referendum or initiative fails to pass does not necessarily mean that the inferred value is a ceiling on the community's value, because other issues, such as how the measure is to be financed, may lead to the rejection of a measure that otherwise would have been accepted. The results will be most easily interpreted if the initiatives or referenda are: a) as focused as possible on a single dimension of environmental protection or amenity; b) free of ideological debate; c) confined to easily identifiable government costs rather than diffused and uncertain costs such as job losses.

Note that the approach does not primarily address the *mean* value of the ecosystem improvement or protection. This is because the electorate's choice is not the conventional

utilitarian notion of the total value summed across all individuals who vote. It is possible to determine a very modest floor on this aggregate value (and therefore on the mean value) by attributing to the "yes" voters the value of the benefit-cost ratio specified by the proposal, and a value of zero to all voters who opposed the proposal. For example, in the case of the forest reserve proposal described above, if the proposal had received a 70% "yes" vote, the minimum mean value would be $1,400 per annum per acre for the community (i.e., .7 x $2,000 + .3 x 0).

Making valuation estimates directly from referendum or initiative outcomes has two advantages over conventional valuation methods. Unlike the standard revealed-preference approaches, such as hedonic pricing or the travel-cost method, voting on referenda or initiatives will reflect as much (or as little) public-regardedness as the voters actually hold toward the objectives involved. Standard revealed-preference approaches reflect the private-utility-maximizing decisions of individuals who purchase homes, spend money to visit parks, etc.; these decisions do not reflect what individuals want for their communities. Voting affirmatively for referendum- or initiative-proposed public expenditures do elicit valuing on behalf of the community, insofar as the voters are so disposed. Of course, a voter may vote for or against a referendum or initiative proposal strictly out of concerns for herself and/or her family, but the outcome does not exclude the existence value component if it exists.

Unlike the conventional stated preference approaches such as contingent valuation, the analysis based on referendum or initiative outcomes is not subject to the possible distortions of hypothetically-posed choices. If a voter supports the referendum or initiative proposal, the vote contributes to the likelihood that the expenditures will actually occur and the costs will actually be borne. Some might argue that the chance that any one vote will decide the outcome of the referendum or initiative is remote, and therefore the vote is more of a symbolic act than a tradeoff choice. However, there are two important responses to this point. First, whatever the mix of motives of the voters, the outcome *is* the community's decision, and therefore has standing in and of itself. This is the same logic by which we accept elected officials as legitimate even if we are dubious about the motives or rationality of the voters. Second, even if a voter believes that the chances that his or her vote will make the difference are negligible, the vote is still an expression of support or opposition to the proposal. There is little reason to believe that a "yes" vote would reflect just the gratification of voting "yes" (especially in secret balloting) rather than a belief that the proposal merits support.

The most useful referenda or initiatives would propose direct costs to the voters, typically in the form of taxes, fees, or bonds to finance actions designed to improve or protect eco-systems. Referenda or initiatives that entail restrictions on development (such as more stringent emissions or effluent standards) are less useful, because of the uncertainty of the level and incidence of the economic impacts. Similarly, in order to isolate the values attributed to particular ecosystem benefits, referenda and initiatives that address only one objective, such as preserving habitats or reducing air pollution. With multiple objectives, the analysis cannot assign the willingness to pay to each component. Similarly, if it is clear that

a referendum or initiative entails additional partisan political stakes (e.g., if it is widely viewed as a political test of a government official), the results are less illuminating in terms of the ecosystem values that the voters hold.

Another concern that some would level against inferences based on referenda or initiatives is that these votes are often subject to intense efforts by interest groups, advocacy groups, and even governments to manipulate public perceptions. This concern has two aspects: whether the information on which voters base their decisions has been distorted, and whether the votes are swayed by appeals on one side or the other. The first aspect is more compelling: we certainly would be less willing to accept the validity of an estimate derived from voting decisions driven by serious misconceptions of the proposed benefits and/or costs. The outcome is still the official decision of that community, but the justification for using the result as the basis of benefits transfer to other communities would be very weak. On the other hand, the fact that referenda and initiatives are often subject to intensive campaigns of persuasion may be considered a virtue rather than a drawback, insofar as it would provide more information on both sides. In addition, the fact that individuals are exposed to efforts at persuasion is by no means confined to referenda and initiative contests: respondents to contingent valuation surveys have of course been subjected to many years of promotional activities by environmental groups; people who travel farther to a particularly popular national park such as Yosemite have been influenced by all sorts of communications extolling its virtues. In short, efforts at value persuasion are pervasive, and in any event should not be a basis for rejecting the significance of decisions of individuals exposed to those efforts. The philosophical basis underlying the use of referenda or initiatives, namely that the public's preferences are legitimately shaped by the political process, and that the public's policy preferences are important beyond how the public values the outcomes that these policies may produce, is quite different from the so-called "progressivist" position that individuals' values should be determined in isolation of "politics" (Sagoff 2004: 177-178).

Another difference in philosophical basis is that the referendum and initiative results reflect intensity of attention to the issue, at least insofar as those who do not care enough to vote are excluded from the analysis. From the progressivist, technocratic perspective, everyone's values ought to be incorporated, because the policies ought to maximize utility (i.e., the consequences of public decisions) regardless of whether specific individuals are mobilized to take action. On the other hand, prominent strains of pluralist democratic theory regard intensity as a fully legitimate factor in determining policy outcomes (Lowi 1964).

One limitation of estimating values from referendum or initiative outcomes is that it is sometimes difficult for voters to assess the actual stakes involved. The benefits will often have to be predicted (e.g., how much biodiversity will be reserve really safeguard; how much less flooding will the flood-control system actually prevent?), entailing a certain amount of uncertainty. The benefits that do occur will often be community-wide, with some uncertainty as to how much an individual or particular household can take advantage of the benefits. On the cost side, the burden of a tax increase or bond measure on household expenditures may be very difficult for the typical voter to estimate, and the impacts of development restrictions

may be even more difficult in light of the uncertainty as to which families would ultimately be affected. Insofar as the costs specified by the referendum or initiative are not easily translatable into household budget terms, the outcome, though it is still "the community's decision," is less revealing about the values held by the voters.

B. Referendum/Initiative Analysis Followed by a Survey

Therefore another variant that relies on referendum and initiative outcomes to make willingness-to-pay estimates consists of combining the voting outcome with a follow-up survey to determine the perceptions of the stakes. This variant amounts to a hybrid of the first variant and the "referendum format" contingent valuation approach. The floor of the willingness-to-pay value of the proposed eco-system improvements is estimated by determining the voters' *perceptions* of the eco-system improvements and costs proposed by a recent referendum or initiative. The respondents are asked whether they voted, how they voted, and what they believed the benefits and costs of the proposal were. As with Variant 1, if the initiative or referendum passes by a slim majority, this valuation can be considered to be quite close to the median voter's valuation. If the initiative or referendum loses by a slim majority, then (more arguably) one could assert that the median voter's valuation is also close to the value implied by the proposed measure. (Note: again, a losing initiative or referendum does not necessarily mean that the inferred value is a ceiling on the median voter's value, because other issues may lead to the rejection of a measure that otherwise would have been accepted.) As with Variant 1, the results will be most easily interpreted if the initiatives or referenda are: a) as focused as possible on a single dimension of environmental protection or amenity; b) free of ideological debate; c) confined to easily identifiable government costs rather than diffused and uncertain costs such as job losses.

If, in addition to asking how respondents voted and their perceptions of the benefits and costs of the proposal, the randomly-sampled respondents who opposed the proposal are asked what (lower) cost would have induced them to vote for the proposal, and those who supported the proposal are asked how much more they would have been willing to pay, this approach also permits an estimate of aggregate and mean values, just as a standard contingent valuation study would, with less potential distortion arising from respondents' desire to be regarded in a favorable light. Thus the survey following a referendum or initiative can provide an internal cross-check of how much correspondence there is between the stated-preference approaches and the referendum or initiative findings.

It should be noted that in focusing on the benefits and costs that respondents report, rather than the actual benefits and costs that the referendum or initiative proposal specifies, the results do not reflect the community's formal decision. This is a significant difference in the philosophy underlying the standing of the results. That is, the first variant, even if it does not necessarily reflect the values that voters perceive, it does represent what the voters have chosen. Different logics underlie their standing.

C. Direct Analysis of Public Decisions to Accept Pollution or Resource Depletion

While the approaches outlined above provide information about willingness to pay, there are some public decisions that can provide inferences for willingness-to-accept decisions. These decisions involve a community's vote as to whether to permit the entry of a new firm or a new (or increased) economic activity despite the expectation that such permission will degrade the eco-system. Assuming that a) the vote is explicit; b) the expected damage is well specified, c) property rights are clearly held by the community (i.e., the community has the right to refuse entry), d) the community's gains can be easily estimated, and e) the transactions costs are low, the payment represents the ceiling on the community's valuation of the environmental amenities that are being relinquished. It is a ceiling because of the possibility that the community would have accepted a lower level of compensation, and if the community valued the forgone eco-system services more than the compensation, then presumably it would not have accepted the compensation. However, if there is a vote and the outcome is close, the calculated valuation can be considered to be close to the community's valuation.

The estimation task involves assessing the amount of environmental damage in physical terms and the amount of compensation in monetary terms. Typically this compensation will come in the form of additional sources of taxes, the value of infrastructure that the new entrants provide for the community, additional income earned by community members, etc. The per-household as well as per-community compensation would be relevant. For example, the entry of an air-polluting factory may be accepted only after the factory's owner commits to a certain number of jobs for the community, building a park, upgrading roads, contributing to the community's vocational program.

Obviously many "community decisions" to permit the entry of polluters or other activities that degrade the ecosystem are not amenable to this approach, because community leaders negotiate the level of benefits that the community will receive without a vote being taken, or the benefits or costs are difficult to estimate.

D. Public Decisions to Accept Pollution or Resource Depletion Followed by a Survey

Just as the analysis of referendum and initiative outcomes can be augmented by determining voters' perceptions of the stakes, the ceiling of the willingness-to-accept value of eco-system deterioration can be estimated by determining the benefits perceived by voters who supported the arrangement accepting the entry of a polluting or depleting operation into the community, and their perceptions of the damage that would be done. Like the direct analysis of willingness-to-accept votes, if the arrangement was approved by the electorate, and the property rights clear and transactions are low, the ratio of the perceived benefits and costs represents the ceiling of the median voter's valuation. The survey, best administered as soon as possible after the actual vote, would reveal what the community members interpreted the benefits and costs to be, thus bringing the valuation closer to individual values; but again with the tradeoff that the results would not have standing as the "community's choice." If

the survey includes the questions of the conventional contingent valuation survey questions regarding how much each respondent would have been willing to accept, then the results would be even more robust in finding mean and aggregate valuations as well as median valuations.

E. Uses and Limitations of All Four Variants

All of these approaches attempt to measure the sum total of values of improving or protecting eco-systems and eco-system services; therefore both means and ends (instrumental and intrinsic) values can be involved. All variants in principle could measure the values attributed to all types of services, expressed in terms of monetary values per unit of eco-system improvement or protection. The variants are flexible in terms of levels of data, detail and scope, inasmuch as initiatives, referenda and other public decisions have been made at all sub-national levels. The valuations can be aggregated across benefits and with other methods, as long as the scale and magnitude of benefits are roughly the same. While highly complex initiatives, referenda, and other public decisions are not good candidates for estimating value, the valuations generated from simpler cases can be used as inputs for complex applications.

Any EPA decision context calling for monetized valuation could employ any of these variants, either singly or as cross-checks with conventional revealed preference or sated preference approaches. Benefit transfer applications will be limited to cases of similar magnitudes of benefits, because of the likelihood that community decisions are highly sensitive to such magnitudes.

The first two variants, in analyzing referenda and initiatives, can evaluate tradeoffs between community and/or household costs (higher taxes, possibly job losses) and eco-system improvements (establishment or improvement of air, water, biodiversity protection, etc.). The third and fourth variants can evaluate tradeoffs between community and/or household benefits (increase in tax base, job creation, infrastructure improvements, etc.) and eco-system deterioration (greater pollution, amenity reductions).

In uses that apply valuations directly to the jurisdiction previously experiencing the initiative, referendum or negotiation, the scale would be the same municipality, country or state. For benefits transfer, the scale should also be the same, given the need for similar magnitude of benefits and costs mentioned above.

The outputs of these approaches should be easy to understand and to communicate to the public. It is a significant advantage to be able to say that the valuation of an eco-system component has been estimated on the basis of how community's have decided what these components are worth.

These approaches would work best when:

a) applied to the same jurisdiction (e.g., if Portland is considering another storm control issue, the analysis of the Portland referendum would be most appropriate), but can

still be used via benefits transfer;

b) a unitary conservation or environmental benefit is involved;

c) the initiative or referendum outcome was a close vote (this yields stronger inferences about the actual valuation, rather than floors or ceilings);

d) extraneous issues (such as whether the vote is a "political test" on particular politicians, or the mode of financing is controversial) are unimportant;

e) surveys can be accomplished soon after the actual vote.

The resources needed to implement the variants would depend on the applications. If the purpose is to compile a set of initiative and referendum results, this could be done for the first approach by a) assigning an EPA economist to oversee the effort (perhaps 10% effort over a year); b) assigning an intern to compile as many U.S. municipal, county and state initiatives and referenda related to environmental and conservation held over the past half-decade. (perhaps 50% effort over a year). The analysis to generate valuations would require 10% of the time of a two-person team of EPA economists, perhaps one being a consultant. For the second variant, more effort is required for each survey: two EPA analysts (or consultants) each devoting one month to develop, administer, and analyze the survey results.

The major obstacle to the effective use of these approaches may be the lack of familiarity within government of the approach of drawing inferences from public decisions, although the method has had a respectable history of use in estimating the value of a "statistical life." It is striking that despite the multiple studies of how conventional valuation methods such as contingent valuation compare to initiatives or referenda outcomes, there is apparently no literature that takes the outcomes of the initiatives or referenda *per se* as valuations, except to study why different subunits (e.g., counties within California [Kahn & Matsusaka, 1997]) yield different outcomes. Perhaps it is just too simple a finding—that a particular initiative or referendum that devotes X dollars to gain Y enhancement or protection of the eco-system—to warrant publication. Nevertheless, the paucity of literature may be an obstacle to adopting this approach.

F. Addressing the Uncertainty Entailed in these Approaches

The uncertainties involved in the variants (first and third) that focus on benefits and costs specified in the proposals lie in the estimates of actual benefits and costs entailed in the proposals. They should be analyzed with the standard methods of projecting consequences, and conveyed through probability distributions and confidence intervals. The uncertainties involved in the approaches that rely on surveys lie in the potential for biased sampling in the selection of survey respondents, as well as poor memory and response set (e.g., respondents may report that they voted). These can be reduced through careful random sampling and cross-checks within the questionnaires.

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Background on Citizen Juries