



SUMMARY OF PRESENTATION

Khalid Abdul Rahim

CONTINGENT VALUATION METHOD (CVM)

Overview. The most obvious way to measure nonmarket values is through directly questioning individuals on their willingness-to-pay for a good or service. Called the contingent valuation method, it is a survey or questionnaire-based approach to the valuation of non-market goods and services. The dollar values obtained for the good or service are said to be contingent upon the nature of the constructed (hypothetical or simulated) market and the good or service described in the survey scenario.

The contingent valuation technique has great flexibility, allowing valuation of a wider variety of non-market goods and services than is possible with any of the indirect techniques. It is, in fact, the only method currently available for estimating nonuse values. In natural resources, contingent valuation studies generally derive values through the elicitation of respondents' willingness-to-pay to prevent injuries to natural resources or to restore injured natural resources.

Since the first published contingent valuation study on valuing outdoor recreation appeared in 1963, more than 1,400 related documented papers, reports, and books have been published. In contingent valuation methods, randomly selected samples or stratified samples of individuals selected from the general population are given information about a particular problem. They are then presented with a hypothetical occurrence such as a disaster and a policy action that ensures against a disaster; they are then asked how much they would be willing to pay — for instance, in extra utility taxes, income taxes, or access fees — either to avoid a negative occurrence or bring about a positive one. The actual format may take the form of a direct question ("how much?") or it may be a bidding procedure (a ranking of alternatives) or a referenda (yes/no) vote. Economists generally prefer the referenda method of eliciting values since it is one most people are familiar with. The resulting data are then analyzed statistically and extrapolated to the population that the sample represents.

Contingent valuation studies are conducted as face-to-face interviews, telephone interviews, or mail surveys. The face-to-face is the most expensive survey administration format but is generally considered the best, especially if visual material needs to be presented. Non-response bias is always a concern in all sampling frames. In other words, people who do not respond have, on average, different values than people who do respond.



A Sampler of Contingent Valuation Questions

· Would you approve of the wetlands protection program if it reduced your income by some dollar amount (\$5-1500, posted price varied on questionnaires) per year in order to have your bag or catch preserved at current levels (or 50% or 25%), rather than have your bag or catch reduced to zero because of continued marsh loss? (Circle one letter.)

a. Yes b. No

Source: Bergstrom, J.C. et al. 1990. Economic Value of Wetlands-Based Recreation. *Ecological Economics* (2):129-147.

· Suppose that the Terrebonne wetlands were to disappear tomorrow and that persons like yourself had a chance to save this particular area. What would you reasonably estimate to be the maximum you would be willing to pay each year in order to guarantee the use of this area for you and your household?

\$0-\$15 __ \$45-60 __ \$90-100 __ \$200-250 __
\$15-30 __ \$60-75 __ \$100-150 __ More than \$250 __
\$30-45 __ \$75-90 __ \$150-200 __

Source: Farber, S. 1988. The Value of Coastal Wetlands for Recreation: An Application of Travel Cost and Contingent Valuation Methodologies. *Journal of Environmental Management* (26):299-312.

· What amount on the payment card, or any amount in between, is the most you (your household) would be willing to pay in taxes and higher prices each year to continue to keep the nation's freshwater bodies from falling below the boatable level where they are now? In other words, what is the highest amount you (your household) would be willing to pay for Goal C each year before you would feel you are spending more than it's really worth to you (all members of your household)? (Note: Payment card is income dependent and shows average household public expenditures on various public programs such as roads, education and defense.)

Source: Mitchell, R.C. and R.T. Carson. 1989. *Using Surveys to Value Public Goods*. Baltimore. Johns Hopkins University for Resources for the Future.

Pros and Cons of Contingent Valuation

PROS

1. Based in economic utility theory and can produce reliable estimates.
2. Most biases can be eliminated by careful survey design and implementation.
3. Currently the only method available to measure important nonuse values associated with natural resources.
4. Has been used successfully in a variety of situations.
5. Is being constantly improved to make the methodology more reliable.



CONS

- 1. Estimates of nonuse values are difficult to validate externally.**
- 2. Stated intentions of willingness to pay may exceed true feelings.**
- 3. Results may appear inconsistent with tenets of rational choice**
- 4. Respondents may be unfamiliar with the good or service being valued and not have an adequate basis for articulating their true value**
- 5. Respondents may express a value for the satisfaction ("warm glow") of giving rather than the value of the goods or service in question**
- 6. Respondents may fail to take questions seriously because the financial implications of their responses are not binding.**



HEDONIC PRICING METHODS

Overview. The hedonic pricing method is another technique to determine environmental value. In its earliest applications, these techniques were intended to capture the willingness-to-pay measures associated with variations in property values that result from the presence or absence of specific environmental attributes, for instance, air pollution, noise, or water views. By comparing the market value of two properties which differ only with respect to a specific environmental attribute, economists may assess the implicit price of that amenity (or its cost when undesirable) by observing the behavior of buyers and sellers.

A variation on the approach of comparing the effects of an environmental attribute would involve comparing the price of a single piece of property over successive sales. By correcting for other factors that might influence the value of the subject property, economists are able to isolate the implicit price of some amenity or bundle of amenities which have changed over time. The price of a house may be affected by factors such as the number of bedrooms, the square footage, the existence of a pool, the proximity to local schools, shopping, highways. The price may also be affected by the proximity to, or quality of, environmental amenities. Air quality has been found to be a determinant of housing prices in Los Angeles; whether or not a property abuts a woodland may also matter. Hedonic methods can also be used to estimate the effect of certain disamenities on the price of a house, for instance, the impact on the price of a residential property adjacent to an area affected by a spill or some proposed unfavorable development.

The process for estimating an hedonic price function that relates housing prices to the quantities of various characteristics is reasonably straightforward. However, it is much more difficult to derive value measures from these estimated functions. Only under very restrictive assumptions can values be obtained directly from these estimated functions. In most cases, a two-stage procedure that depends on information from multiple markets is necessary.

Advantages of This Technique. The hedonic techniques, like travel cost and random utility models, depend on observable data resulting from the actual behavior of individuals. Market data on property sales and characteristics are available through real estate services and municipal sources and can be readily linked with other secondary data sources.

Disadvantages of This Technique. Most environmental incidents will have only small, if any, effects on housing prices. Even where effects do exist, it may be difficult to estimate them using econometric methods because many factors, many of which are correlated, influence housing prices. For example, a house located near a factory with emissions that reduce air quality may be in a poorer section of town where schools are not as good and there are few other amenities like parks. Even when implicit prices for environmental amenities can be estimated, it is usually very



difficult to obtain measures of value from these models. The connection between the implicit prices and value measures is technically very complex and sometimes empirically unobtainable.

Data Needs. Data needs include prices and characteristics of houses sold in the housing market of interest. In particular, a measure or index of the environmental amenity of interest is needed.



BENEFIT TRANSFER

Application of environmental valuation techniques may be expensive, particularly for local decision-making where research budgets are limited. Benefit transfer offers a lower cost alternative to performing a full-scale study for any particular issue.

Benefit transfer is an application of a data set developed for addressing one particular environmental or natural resource valuation question to another context. Given the expense and time associated with estimating values of non-market natural resources and services, benefit transfer can be a reasonable method for determining such values. Benefit transfer applications can be divided into three classes:

- Estimates based upon expert opinion (e.g., the transfer of average net willingness-to-pay or proxy values)
- Estimates based on observed behavior (e.g., transfer of the entire demand equation)
- Estimates based upon preference elicitation mechanisms, i.e., the contingent valuation method

Benefit transfer are considered to be valid under well-defined conditions. Factors to consider in conducting a benefit-transfer decision include some of the following considerations:

GENERAL ASSUMPTIONS

- For what purpose were the original value estimates generated?
- What user group(s) were considered in generating the initial estimate (e.g., duck hunters versus all citizens in an area)?
- Did the existing study address a specific or unique problem that may have influenced the magnitude of the estimates obtained (e.g., during a period of heightened concern for the resource in question)?
- Have general attitudes, perceptions, or levels of knowledge changed in the period since the existing study was performed in a way that would influence the value of the benefit estimate? Are these values likely to be consistent over time?
- If the value being considered is for a generic resource category (e.g., common songbirds), are the species considered in the original study relevant to the case at hand?
- Were adjustments to the data made in the existing study? For example, were outliers deleted? Were any adjustments made for perceived biases?
- Does the existing study consider the same or a similar geographic area? Are the demographic and socio-economic characteristics of the two areas similar?

METHODOLOGY

- If the source being used presents a composite of existing values based on an earlier literature review, what methods were used to derive these composite values and what was the nature of the underlying studies?



- Were baseline conditions (e.g., ambient water quality) in the existing study similar to baseline conditions in the case at hand?
- Were variables omitted from the original study that are believed to be relevant to the case at hand? To what extent does such omission prohibit the transfer?
- If current best research practices were not used to generate the value estimate(s), can the estimate(s) be adjusted to reflect changes in the state-of-the-art?

ECONOMIC METHODS/EVALUATION

- Was the study used to generate the value estimate published in a peer reviewed journal, or did it receive other forms of peer review?
- How is the original study viewed in the professional community? How was the study viewed by its sponsor?

RESOURCE

- How does the resource that was affected compare to that considered in the referenced study (e.g., is the species of concern more common in the policy study area than in the initial study area)?
- What was the nature of substitutes in the initial study area, and how does this compare to the policy study area (e.g., are alternative recreational opportunities more or less available in the policy study area)?
- Was the original analysis conducted to value all organisms of a given species, a sub-population, individual members of the species, or some other grouping?

Decision-makers should consider all available estimates, each based on the factors described above. Once a final set of values has been chosen, consideration should be given to their general magnitudes. If the existing value estimates differ significantly, or if values generated using alternative models differ significantly from one another, consideration should be given to whether they differ in a predictable and consistent manner. In some cases it may be possible to combine these estimates formally through meta analysis. In all cases, more defensible benefit estimates will result from comparative

analysis. In many cases the defensibility of the transferred economic benefit estimate will depend on the quality of the underlying research.

However, no globally accepted, standard criteria are available to judge the quality of existing studies. The professional and academic community can provide guidance with regard to the current minimum conditions for quality assurance of the benefit transfer. The Economic Analysis and Research Branch of the U.S. Environmental Protection Agency, Office of Policy Planning and Evaluation has prepared *The Environmental Economics Database*, a collection of references for national resources and environmental amenity valuation studies collected over several years. Computer disks of the database are available.