RECREATIONAL ACTIVITIES AND NONMARKET VALUATION: THE CONCEPTUALIZATION ISSUE

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Recreational pursuits have been discussed by economists and others involved in the planning of public sector investment since early in the 1930s. This discussion developed from a peripheral concern to an intense interest as legislative legitimacy was gained for the use of recreational benefit measures to justify public sector investment in multiple purpose river developments. The history of recreation benefit assessment has been adequately discussed elsewhere. In this paper, the justification for inclusion of recreation benefits in economic analyses is not addressed. However, it is worth noting that emphasis has shifted over time from an almost exclusive concern with recreation opportunities provided by development activities to an emphasis upon the recreation opportunities lost in that process as well.[1]

Empirical measurement of recreation values, which in some cases are values lost (costs) and in others values gained (benefits) is the focus of this paper. The concern is basic, one which must come prior to any application or development of empirical measurement techniques, but one which often appears to have been overlooked. The following questions are addressed here: What are we, as policy analysts, attempting to value when we look at recreation as a commodity? More importantly, is recreation a commodity?

Two common methods used to measure the economic value of recreational activities and resources, contingent valuation and travel cost, will be addressed in the first section. These nonmarket valuation techniques will be described and categorized according to the functional approaches for their use. Following this discussion, a more preliminary valuation concern is raised, that is, the nature of the commodity whose value these techniques are used to measure. The implications of this discussion will be presented in the third section, and a brief concluding section will be devoted to consideration of selected topics for future research.

NONMARKET VALUATION TECHNIQUES

There are currently two accepted techniques for evaluating water and related land resources not traded in markets, the travel cost (TCM) and contingent valuation (CVM) methods (U.S. Water Resources Council). The TCM was first proposed by Hotelling as an approach to estimating the demand for a recreation site. After its initial recognition, the method was forgotten until Clawson resurrected it and substantially improved upon it. Since Clawson, a large number of researchers have used the method, and it has been considerably refined (Burt and Brewer; Dwyer, Kelly, and Bowes; Cichetti, Fisher, and Smith).

The TCM is an approach to estimating the demand for a recreation site by using variable expenditures (primarily travel costs) as a proxy for the nonexistent market price. By distinguishing between users having origins at different distances from the destination site, sufficient variation in variable expenditures is obtained, and a site demand curve is estimated. Three specific weaknesses of this approach govern its applicability for measurement of the values associated with recreational activities.[2] First, the TCM is applicable to specific sites, but is awkward if not impossible to use for evaluating specific components of a site. Second, the TCM can not be applied with much confidence to extremely unique recreation sites, for example, the Grand Canyon, or, third, to sites which are located in urban areas, for example, urban forests. In the latter two cases, problems arise because the observed willingness to travel distribution is truncated. That is, those persons willing to incur greater travel expenses do not need to and the true value of the site will not be revealed by observed behavior. Although this could be a problem for any TCM study, it particularly plagues unique or urban sites where the proportion of site users willing to incur greater travel expenses than actually borne is expected to be large.

These weaknesses draw attention to the second technique, the contingent valuation method (CVM). The CVM was developed more than a decade after the TCM. Davis first used this approach to estimate the value of big game hunting in the Maine Woods. His pioneering work was also set aside for a period of time

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[1] Note the Tellico Dam case which, in addition to the snail darter, included a concern for the loss of one of the last wild and scenic rivers in Tennessee; or other cases, e.g., Hells Canyon, which are steeped with arguments for the preservation of pristine environments and endangered species.

[2] These weaknesses determine which types of sites are suitable for application of the travel cost method. There are a variety of other potential weaknesses which may undermine the reliability of estimated value measures obtained in any given application, i.e., measurement of travel and site time costs, congestion costs, multiple site trips, substitute site availability, and the basic assumption that recreationists react to cost changes in identical fashion regardless of the source (entrance fees or travel cost). For related literature see Dwyer, Kelley and Bowes; Cichetti, Fisher and Smith; Burt and Brewer; Anderson and Bonsor; McConnell and Strand.

until the early 1970s when Randall, Ives, and Eastman used a much more refined approach to value visibility in the Four Corners Region of New Mexico. Hammack and Brown also used this basic approach for estimating the value of waterfowl hunting at about the same period of time. Since these studies, this technique has been subjected to much professional criticism and, as a consequence, has been considerably improved (Dwyer, Kelley, and Bowes; Randall et al., 1978; Brookshire, Randall, and Stoll; Thayer).

Contingent valuation is defined as any approach to valuation that relies upon individual responses to contingent circumstances posited in an artificially structured market. This definition encompasses a wide range of valuation techniques, for example, experimental (Smith), household substitution (Blank et al.), and bidding. Bidding approaches to valuation are by far the most widely recognized form of contingent valuation. This latter approach can be divided into two categories: iterative bidding and noniterative bidding.

In the *iterative bidding* approach a respondent is confronted with a structured choice situation in which he must make a decision involving a trade. For example, after determining the current cost of an annual fishing license, a question could be posed in the following basic form: "Would you continue fishing if a license cost 'X' annually?" There are two choices, fish or quit fishing. If the response is "yes," then the cost of the license, X, is increased and the question is repeated. This procedure is conducted iteratively until a "no" response is obtained. The "no" response indicates that (1) fishing is not valued any higher than the amount to which the individual previously responded "yes" and (2) at any higher amount the individual would quit fishing. A "no" response to the initial question would cause the survey enumerator to ask the respondent a follow-up question to determine whether (1) current license fees are at a level which places him at a threshold of quitting ("a little more and I would quit") or (2) he objects to the idea of increased license fees or license fees in general. Respondent bids falling in the second category are usually considered to be protest bids and not legitimate zero valuations. Thus, in most cases, these responses are deleted from the data set.

The underlying justification for this iterative questioning procedure is that it forces the individual respondent to continuously reevaluate his decision and "hone in on" a reliable response. Practitioners of this technique argue that this process results in greater accuracy in identifying the respondent's true valuation of the commodity than do other bidding approaches.

Noniterative bidding as a technique is quite similar to the basic iterative bidding approach. As its name implies, the iteration is removed from the questioning procedure. Thus, a noniterative version of the previous question would be: "Would you continue fishing if a license cost $25 annually?" After obtaining a "yes" or "no" response the question is judged to have been completely administered. At first glance a question regarding this procedure arises. How is the dollar amount in the structured question, $25, to be determined? One way to circumvent this problem is to revise the question format as follows: "I would not continue fishing if a license cost ___ annually." With this format the respondent must choose the amount which would induce him to discontinue fishing.

The previous two question formats provide a convenient distinction between types of noniterative bidding: those which use close-ended (former) question formats and those which use open-ended (latter) question formats. Close-ended formats provide a set of responses that may be used to determine the proportion of respondents who value a commodity at least as much as the preselected value. However, these responses do not indicate the maximum value of the commodity to all respondents. Some may value the commodity less ("no" response), some more ("yes" response), and other exactly at the preselected value ("yes" response). On the other hand, open-ended questions do obtain estimates of the maximum value of the commodity to all respondents, but rely totally on the respondent to state this value. There is no iterative bidding process which provides an incentive for the respondent to reconsider or "hone in on" a maximum value estimate.

Another form of noniterative bidding is represented by attempts to approximate iterative bidding through the manner in which responses to noniterative bidding questions are analyzed statistically. This has been done two ways: (1) by arraying responses and using sampling proportions with various preselected close-ended values to estimate demand curves (Ness) and (2) by using alternative preselected values in close-ended questions with a sample population and then analyzing the data using a logit model of the decision process (Bishop and Herberlein 1979, 1980; Sellar, Stoll, and Chavas). The results of these studies appear quite promising; however, this still does not negate the fact that they are a form of noniterative bidding. As such, any weaknesses in the basic data obtained by noniterative procedures remain a problem, although they may be masked by the analytical procedures utilized.

One may ask why there are two major categories of bidding approaches, iterative and noniterative. Most practitioners would argue that iterative bidding yields more thoughtful and, most likely, more reliable responses. However, the only way to administer a truly iterative procedure is by personal interview. Thus, practitioners must administer the survey instrument in person or over a telephone. This entails greater cost per response. The alternative, noniterative bidding, enables the survey instrument to be administered by mail as well as by personal interview or telephone. Mail administration will be less costly, but may sacrifice reliability of responses. Thus, a trade-off exists. It is for this reason that "approximations to iterative bidding" are being developed using noniterative models and their properties examined.

It has been argued that the many weaknesses cause estimates of economic value obtained with the CVM to be subject to question. Most of these purported weaknesses can be traced back to survey administration and design problems (Thayer; Schulze, d'Arge, and

Brookshire; Brookshire et al. 1982). But one weakness stands out: value estimates derived with this approach are obtained in response to hypothetical circumstances. On the other hand, the TCM derives value measures obtained from revealed behavior.

RECREATION: AN ALTERNATIVE CONCEPTUALIZATION

"Recreation" is a term which, as used by economists, denotes a commodity. Since traditional economic conceptualizations regard a commodity as a relatively homogeneous and unidimensional item, recreation is not well suited to this viewpoint. Recreational activities are multifaceted experiences produced by households using market commodities, nonmarket amenities, and time. For this reason, they constitute an exceptionally good example of the "activities" which are the object of household production theory (Becker; Stigler and Becker; Michael and Becker) and the source of desired characteristics in the "new theory of demand" (Lancaster 1966, 1971; Lipsey and Rosenbluth). The conceptual framework adopted here represents an integration of both of these more recent theoretical approaches.

When households produce a recreational experience, they use some inputs purchased in the market and others provided free of charge (nonmarket commodities). These inputs are then combined, in some way, to produce a recreational experience. The household's ability to use inputs in production is represented by its production function for the activity, e.g., recreation experiences, as

$$(1) \qquad z_j = z_j(x_{j1}, \ldots, X_{jn})$$

where

z_j = quantity of the j^{th} activity produced
x_{jn} = the n^{th} input to the household's production process for the j^{th} activity.

The parameters of this household production function are subject to change over time in response to a variety of factors, for example, education, past production, changes in quality of inputs, and changes in the institutional structure that circumscribes the household's opportunity set. These parameters define the household's "production technology."

Household production of activities is undertaken in order to obtain desired characteristics. According to Lancaster, to be useful in an operational sense, characteristics must be defined in an objective manner:

> It is essential that the characteristic be an objective, universal property of the good (or activity). The spirit of the whole analysis requires that personal reactions are reactions to the characteristic, not reactions about what the characteristic is. Thus, the calorie content of a food or the cooling power of an air-conditioner is a characteristic—it is an objective property—but "beauty," which is presumably in the eye of the beholder, is not. (Lancaster 1971, p. 114)

He goes on to say,

> Every objective property of size, shape, performance is a potential characteristic. In principle, if we take an object, measure it in every possible dimension and in every aspect of performance, in every biological, chemical, and physical aspect, we have evaluated all its possible characteristics. When this is said, it becomes immediately obvious that the operational problems concerning the use of the characteristics analysis do not lie in the measuring of the characteristics (since they are objective, this is simply a technical matter) but in selecting which characteristics to measure.

A desired characteristic may thus be defined as an objectively measurable characteristic (necessary condition) from which the household or consuming unit derives satisfaction (sufficient condition).

Clearly, the set of all possible characteristics is likely to be larger than the set of desired characteristics for a given household. However, it is also clear that the satisfaction obtained from a recreational experience is dependent upon the set characteristics the experience provides. This may be represented as

$$(2) \qquad C_j = (c_{j1}, c_{j2}, \ldots, c_{jm})$$

where

c_j = the set of characteristics provided by the j^{th} activity or experience
c_{jm} = quantity of the m^{th} characteristic provided by the j^{th} activity or experience

Since there are multiple activities that households may produce (engage in) and each activity may provide one or more characteristics, the total quantity provided of a characteristic (c_m) is a function of the activities produced. That is

$$(3) \qquad c_m = c_m(z_1, z_2, \ldots, z_J)$$

where

c_m = total quantity of the m^{th} characteristic consumed

The total utility (satisfaction) the household derives from this bundle of activities can now be expressed as

$$(4) \qquad U = U(c_1, c_2, \ldots, c_m).$$

In this conceptual framework, characteristics are derived from recreational activities in a two-step process: (1) through the household's ability to use inputs to produce the activity, that is, production technology, and (2) through the household's ability to derive characteristics from the activity produced. In combination these two steps depend upon the household's "consumption technology," that is, the feasible processes

for producing and deriving characteristics from activities at a given point in time.

The set of characteristics provided by recreational activities should be the central focus for studies seeking to evaluate (1) alternative recreation site management policies and (2) other policies affecting recreational opportunities or resources. The end result of these policies is to change the quantity of certain characteristics or to eliminate them totally from the recreationist's characteristics set, C, and, thereby, change the satisfaction which individual households can derive from recreational experience.

An Example

Suppose a public policy is implemented eliminating all campsites from a recreation site and replacing them with a wildlife sanctuary. This policy affects the characteristic set which individuals can derive from recreation experiences at the site being considered. Some desirable characteristics are removed from and some added to the set of characteristics provided by these experiences, while other characteristics may be diminished in quantity, unaffected, or increased.

A public policy of the sort described above impacts the quality of recreation experiences that can be produced by households at the given site. The quality of an experience is defined by the set of characteristics provided by that experience. Lesser-quality experiences are those possessing a less desirable set of characteristics than the experiences to which they are being compared. Quality is, therefore, determined by the individual, and the perceived quality of any specific site may vary among individuals.

If camping is part of an overall recreation experience that provides a more desirable set of characteristics than an activity including visits to the wildlife sanctuary, then the elimination of camping from that experience reduces its quality. However, unless camping is the only source of desirable characteristics, that is, comprises the total characteristics set, its removal from the experience serves only to reduce quality, not eliminate the quality of that experience.

A policy or management change of the sort described above will manifest itself in three ways. First, individuals will substitute other activities at the recreation site for the camping activity which was eliminated (a forced change). Second, they will engage in a greater amount of site activities that provide characteristics similar to camping (a voluntary shift in individual demands for site activities). Finally, individuals will reduce the number of times they visit the site in question and increase their demand for recreational activities at other sites or for other activities in their opportunity set. Overall, implementation of the public policy results in (1) altered quality of the recreational activity produced at the site, (2) shifts in demand for the specific on-site activities, and (3) shifts in demand for recreational activities at alternative sites or other nonrecreational activities. The exact nature of these shifts, in aggregate, depends upon the preferences of the producing households and whether they view the policy change as one which improves or reduces the quality of the recreational experiences they can produce for a given cost.

IMPLICATIONS FOR ECONOMIC ANALYSES

Given the motivational assumption that the household maximizes its satisfaction, equation (4), at any point in time the household has attained a specific welfare level, U°, which is dependent upon its consumption technology, encompassing both activity production and characteristic derivation as expressed in equations (1) and (3), and the constraints it faces. Proposed public policies affect household's production processes, equation (1). Changes in household production of activities affect the characteristics the household derives, equation (3), and, thereby, the household's welfare level, equation (4).

Measurement of welfare change is an attempt to ascertain the amount of money that the gainers and losers from some action consider equivalent to their respective gains and losses. Welfare gains and losses are equal to the changes in consumer's surplus experienced by the affected parties (Mishan; Harberger; Willig). In many instances of concern to recreation policy analysts, proposed policies will affect available quantities of inputs to household production processes. The characteristics framework presented here has a variety of implications for empirical studies with the object of measuring the changes in consumer's surplus resulting from these types of policy modifications. Several of these implications are discussed in the remainder of this section.

In some cases an agency charged with management of a recreational facility or resource may be using an inappropriate input mix. That is, support facilities for the activities the resource is managed to provide, for example, boating and camping, are inefficiently provided. Inputs to consumer, that is, recreationist, activity production functions may be redundant. If a specific input, for example, boat ramps, can be reduced in supply without altering the satisfaction derived from an activity, such as recreational boating, then that input is redundant for the recreationist.[3] When this is true for a large number of recreationists, the management agency can conserve its limited resources by reducing the level of input provision. This result can only be obtained in traditional neoclassical consumer theory if one assumes perfect complementarity in consumption.

A second implication can be derived by considering the number of inputs to activity production. As the number of inputs involved in producing a recreational experience (e.g., water-oriented recreation) increases, the value of any specific input is expected to decline. When more inputs are used, the probability that one can be substituted for another in the household's produc-

[3] An input can only be redundant when production is governed by some degree of fixed proportions (Ferguson).

tion of a recreational experience (e.g., water skis for fishing tackle or scuba gear) is increased. It follows that when the above is not true, an input may be judged essential, having few or no substitutes, to the activity production process, that is, travel to the recreation site.

A related implication is that the value of an input is expected to be directly related to the number of activities using it. When many activities can be produced by the household without using the input of concern, it is likely that similar satisfying characteristics can be derived from one or several alternative activities. In the event that this is found to be not true, the conclusion is that the activity of concern provides a unique set of desired characteristics. The identification of activities providing unique characteristics is important for ensuring proper resource management. Resources used in production of these activities need to be carefully managed to ensure the continued availability of their unique characteristics for present and future generations. One might argue that an obvious resource input of this sort is the Grand Canyon. But it is expected that many less obvious examples exist, especially when concern is focused upon regional or local areas.

Since satisfaction is derived from characteristics, shifts in preferences for characteristics will cause the value of inputs to alter, some more than others. If certain characteristics can be derived from only a few inputs and/or activities, the value of inputs to these activities would be more responsive to changes in preferences for these characteristics.

Finally, two implications can be derived from an examination of household consumption technology. First, the more developed a consumption technology is, that is, the greater the knowledge, skill, or experience required, the more valuable inputs will be. This follows from the fact that more well developed consumption technologies will yield a greater quantity of characteristics than less well developed ones. The second implication is that indicators of household consumption technology (e.g., education, age, sex) will be more important factors in the explanation of variations in input (resource) value when production is complex. For activities requiring simple production processes, it is more likely that many households will be able to derive similar quantities of characteristics from input use. This would not be expected for activities produced by complicated processes, for example, hang gliding vs. swimming, or mountain climbing vs. bicycling.

In general, there are many concerns which arise from viewing recreation in the manner proposed herein. It is argued that testable hypotheses can be derived and that future work should be oriented in this direction. Clearly, the proposed framework presents an alternative way to view recreational activities. The task now is to test this framework by using it to generate additional and unique hypotheses to be empirically evaluated that cannot be derived from standard economic theory.[4]

SUMMARY

Two accepted nonmarket valuation techniques were discussed: the travel cost method and the contingent valuation method. The implications and arguments are numerous regarding the relative worth of these two approaches to measuring nonmarket values. However, for the purposes of the present paper and its focus on recreational activities, it seems clear that the CVM is more readily applicable to value measurement. The CVM is adaptable to a wide range of circumstances and is useful for investigating specific components of urban or rural recreation sites. In addition, uniqueness of the recreation area or its components is not a significant problem for the CVM as it is for the TCM. For these reasons, despite its weaknesses, CVM's will quite often be used in future research. This being the case, attention needs to be directed toward ways to improve the reliability of this technique and to investigate its comparative validity when possible, that is, comparability with value estimates yielded by alternative nonmarket techniques under the same conditions. But, even if the technique is accepted as yielding comparatively valid estimates, its proper use requires that the subject of its application, recreational activities, be better understood and conceptualized.

Recreation is not a commodity in the usual economic sense. Rather, it is an activity that provides households with satisfying characteristics, produced using market, nonmarket and time inputs.[5] This viewpoint can enable researchers to approach recreation resource allocation problems in a more realistic manner. However, realism is not the sole criterion for evaluation of a theoretical construct's usefulness. For this reason the alternative conceptualization is used to derive several implications for future recreation research.

Objectively measurable characteristics, which are relevant for the recreation problem being examined, need to be identified and measured. The number of desired characteristics obtained from a recreational activity and their uniqueness is expected to be related to the value of the activity. Further, the number of inputs to household production processes for recreational activities is expected to be related to the impact of public policies affecting recreational site characteristics and specific activity inputs. Also, the degree of development of household consumption technology and indicators of that technology will probably be related to the value of recreational activities to the household and, in aggregate, to the public in general. These are only a few of the implications that can be derived from the conceptual framework; they are by no means all-encompassing.

Future research needs to be directed toward the role of recreational resources in household production activities if these resouces are to be allocated efficiently among their alternative uses. This research should ex-

[4] Since the original draft of this article was presented at the 1982 Southern Agricultural Economics Association meetings it has been adapted by Majid, Sinden and Randall in a forthcoming article. Their study examines the value of increments to a park system in Australia. In this study the authors derive testable hypotheses which, they argue, can not be derived from standard economic theory.

[5] As pointed out by an anonymous reviewer, recreation is not unique in this regard. Many other activities which use market purchased items can be identified, e.g., home-cooked meals. However, recreation is especially noteworthy in that a much greater proportion of the inputs to its production are derived from nonmarket sources.

amine the type and manner in which satisfying characteristics are derived by households from recreational activities. To adequately evaluate proposed policies, attention needs to be directed toward their impact upon the characteristics sets households consume. Identification of relevant characteristics, that is, those desired by households, will enable the welfare impacts of proposed public policies to be estimated and changed-behavior patterns to be predicted. Identification of the set of desired characteristics will enable substitute sites or activities to be determined, categorized by quality, and ranked according to degrees of substitutability.

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