Measuring Use Value from Recreation Participation: Reply

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In Whitehead (1992), I proposed a one-step method of estimating recreational use values. I appreciate the opportunity to clarify several points made in the original paper and correct some mathematical errors. The criticisms raise three major issues that should be addressed: the theoretical construct of use value, diminishing marginal utility, and empirical specification. Before I address the criticisms I would like to emphasize that the one-step, recreation-participation method is not viewed as superior to the two-step, travel-cost method or any of its extensions. The method is a means of obtaining order of magnitude use-value estimates if the travel-cost method can not be implemented. To re-state one of the conclusions: "The one-step method is a useful, low-cost substitute for two-step travel cost models when research budgets are limited (Whitehead, 1992 p. 118)." This notion was underemphasized in the original paper.

The Theoretical Construct of Use Value

As stated in the comment, the verbal and mathematical definitions of use value in Whitehead (1992) do not match. The verbal definition describes willingness to pay to avoid a price increase with the reference level of utility evaluated at the current price. The mathematical definition describes a willingness to pay to gain a price decrease where the utility level associated with the current price is the reference level of utility. Considering the implicit property rights associated with access, the appropriate welfare measure should be willingness to pay to avoid a price increase (the verbal definition) and the reference level of utility in equation (1) of Whitehead (1992) should be $u(x_i=0,y) = \tilde{u}$.[1]

Diminishing Marginal Utility

As recreation trips are made over a fixed time horizon, diminishing marginal utility will lead to reductions in the marginal value of each trip. Considering a fixed time horizon, the horizontal axis in English and Bowker's Figure 1 should be labeled x_i/t where t is the time horizon. The implicit assumption made in the comment is that t is equal to one year. When using the one-step method the implicit assumption is that the time horizon over which recreation decisions are made is one day. Both assumptions are fairly arbitrary. Our common mistake is that we do not make our assumptions explicit.

The type of trips that are represented in the Kentucky wetlands recreation sample include fishing, hunting, and nonconsumptive uses of the wetlands. The true time horizon may be a few days or a single day for a quantity rationed outdoor recreation activity, such as deer hunting, or an entire year for an activity such as bass fishing. For recreational activities that have several seasons over the year, participants may face the reservation price each season and diminishing marginal utility will set in over the course of the season. Fundamentally, the appropriate time horizon is an institutional or empirical matter.

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Empirical Specification

Related to the problem of diminishing marginal utility, English and Bowker's attempt to improve the empirical specification of the logit model which they feel is seriously flawed. In order to consider these recommendations suppose you wish to estimate a logit model of recreation participation such as $\pi(x > 0) = f(p,y)$ where π is the probability, x is the number of recreation trips, p is the on-site use price (round trip travel and time costs), and y is income. This is the type of model estimated in Whitehead (1992).

English and Bowker's proposals include estimating the participation model including a (dummy) variable for multiple trips to the site and replacing the price by the multiplicative term (px). Both of these proposals would generate misleading results since the proposed variables (1) are endogenous consumer choice variables and (2) have no variation for nonusers of the resource. Even if the latter proposed specification were econometrically sound[2], it would yield positive coefficients for the px variable and the value of recreation [SSV_1 in English and Bowker's equation (1)] would be negative for users of the resource and positive for nonusers of the resource.

The other proposals deserve some attention. First, estimate the logit model separately for each trip class generating n logit models and n use value per trip estimates, where n is the number of trip classes considered. This proposal will lead to lower use value per trip estimates for trips greater than one as required by theory if the time horizon is longer than one day. The other legitimate proposal is to include a separate observation for each trip taken by respondents. However, this is the premise behind the random utility model of recreation decisions which requires more computation effort than the one-step method (this model also implicitly assumes that the time horizon is one day).

Other Considerations

Ultimately, the accuracy of the one-step method and the appropriateness of its implicit assumptions are empirical questions. In on-going research I am testing the validity and reliability of the one-step method in comparison with the two-step, travel-cost method. Preliminary results suggest that the two-step travel-cost method, estimated using a truncated regression model, generates use value per trip estimates that are substantially greater than the use value per trip estimates from the one-step method. Using Tobit or Heckman self-selection regressions, the use value per trip estimates are very similar.

In conclusion, the one-step method can provide order of magnitude use value estimates for researchers who have data collection constraints or limited computer time when applied to recreation sites that have high participation rates. The method may be most useful, as suggested by an original referee, in application with secondary or published data sources which can be constructed from hunting and fishing licenses or visitor registration lists.

References

English, Donald B. K. and J. M. Bowker, "Measuring Use Value from Recreation Participation: Comment", *J. Agr. and Applied Econ.*, (1994):311-313.

Greene, William H., *Econometric Analysis*, 2nd Edition, New York: Macmillan, 1993.

Whitehead, John C., "Measuring Use Value from Recreation Participation," *S. J. Agr. Econ.*, (1992):113-119.

Endnotes

1. This reply also allows an errata to the original paper which should be followed to appropriately estimate use values. Equation (10) of Whitehead (1992) should appear with a negative sign in front of the numerator of the right hand side expression.

2. See Greene (1993, p. 651) for a short discussion of the problems that this variable could create.