

Opportunity Cost of Time Literature

Bockstael,-Nancy-E.; Strand,-Ivar-E., Jr.; Hanemann,-W.-Michael. "Time and the Recreational Demand Model." Markandya,-Anil; Richardson,-Julie, eds. *Environmental economics: A reader..* New York: St. Martin's Press, 1992, pages 171-83. Previously published: [1987].

Bockstael,-Nancy-E.; Strand,-Ivar-E.; Hannemann,-W.-Michael. "Time and the Recreational Demand Model." *American-Journal-of-Agricultural-Economics*; 69(2), May 1987, pages 293-302.

In this paper, a theoretically consistent approach to including time costs in recreational demand models is developed. The demand model is conditional on the recreationist's labor-market situation. For individuals at corner solutions in the labor market, utility maximization is subject to two constraints, leading to a demand function with travel costs and travel time as independent variables. With interior solutions in the labor market, time is valued at the wage rate and combined with travel costs to produce one "full cost" variable. In an illustration, welfare measures based on the new model are estimated for a sample of sportfishermen.

Casey,-James-F.; Vukina,-Tomislav; Danielson,-Leon-E. "The Economic Value of Hiking: Further Considerations of Opportunity Cost of Time in Recreational Demand Models." *Journal-of-Agricultural-and-Applied-Economics*; 27(2), December 1995, pages 658-68.

The paper tests two alternative specifications for the opportunity cost of time in travel cost models. The standard travel cost survey design is enriched to include a contingent valuation type question about peoples' willingness to accept compensation to forgo a precisely defined recreational experience. It is hypothesized that individually revealed value of time more appropriately reflects the opportunity costs of time associated with a particular aspect of recreation than the wage rate which measures the trade-off between work and leisure, generally. The results seem to indicate a better overall fit for the models with the elicited value of individual consumer's time than for the models with the more traditional hourly earnings (wage rates). The importance of the correct measurement of the opportunity cost time is illustrated by showing that estimated consumer surpluses based on two different value of time measurements differ significantly.

Cesario, Frank J. (1976). "Value of Time in Recreation Benefit Studies." *Land Economics*, 52(1):32-41.

Explicitly incorporating travel time valuations in recreation benefit analysis seems vastly superior to excluding them on both theoretical and practical grounds. As further research turns up more refined estimates of travel time valuations in different circumstances, future studies should make use of them. In the meantime the results presented here should lead to improved estimates.

Larson, Douglas M. (1993). "Joint Recreation Choices and Implied Values of Time." *Land*

Economics, 69(3):270-286.

A model of joint recreation quantity choices is developed. Individuals choose both total time spent at distant sites and the number of trips taken, implicitly choosing average on-site time. The model permits nonzero marginal utility of travel, makes on-site time endogenous, and is linear in the constraints. The scarcity value of time is analyzed without assuming the marginal utility of work time is zero. A partially testable assumption about relative marginal values of travel and on-site time yields nonparametric calculations of the scarcity value of time and marginal values of trips and days on-site from people's observed optimal quantity choices.

Larson, Douglas M. 1993. "Separability and the Shadow Value of Leisure Time." American Journal of Agricultural Economics, Volume: 75, Issue: 3, Pages: 572-577. **Keywords:** recreation demand, separability, two-stage budgeting, value of time, travel cost method.

Recreation choices are viewed as short-run decisions conditioned on longer-run labor supply. Using weak separability to reflect this relationship, the wage rate is the shadow value of time for individuals who get no utility from work. This result widens the circumstances under which the wage rate (not some fraction thereof) is the theoretically correct shadow value of time.

McConnell, K.-E. "On-Site Time in the Demand for Recreation." American Journal of Agricultural Economics; 74(4), November 1992, pages 918-25.

The standard travel cost model has treated on-site time ambiguously over the years. This paper shows how to handle on-site time by exploring the implications of two assumptions in the travel cost model: first, people choose the amount of time that they spend on a site and, second, the time spent on-site is exogenous. This paper uses a duality result to show that when on-site time is chosen, the standard travel cost demand function takes a particularly simple form. With slight modification, standard estimation and welfare calculations continue to hold.

McConnell, Kenneth E.; Ivar Strand. 1981. "Measuring the Cost of Time in Recreation Demand Analysis: An Application to Sportfishing." American Journal of Agricultural Economics, Volume: 63, issue: February, Pages: 169-173. **Keywords:** travel cost model, sportfishing.

McKean, John-R.; Johnson, Donn-M.; Walsh, Richard-G. "Valuing Time in Travel Cost Demand Analysis: An Empirical Investigation." Land Economics; 71(1), February 1995, pages 96-105.

The opportunity cost of time is usually a significant part of the price variable in the travel cost demand model. Thus, its accurate measurement is important to the estimation of demand and benefit valuation for nonmarket resources. This paper empirically tests models that assume that income is the basis for opportunity time cost with an alternative 'pooled' model based on a disequilibrium labor market for some recreationists. Acceptance of the hypothesis that disequilibrium models may be necessary for some individuals implies increased survey information requirements so that the appropriate model can be applied to each individual.

Shaw, W. Douglass. 1992. "Searching for the Opportunity Cost of an Individual's Time." Land Economics, Volume: 68, Issue: 1, Pages: 107-115. **Keywords:** travel cost, opportunity cost, time.

Smith, V. Kerry. 1997. "Time and Valuation of Environmental Resources." Resources for the Future, Washington, DC, Pages: Ii - 29. **Keywords:** time, revealed preference, complementarity.