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HOW MUCH IS ENOUGH? THE VALUE OF INFORMATION FROM BENEFIT TRANSFERS IN A POLICY CONTEXT

1. INTRODUCTION

With the growing body of non-market valuation studies, benefits transfer using single studies or meta-analyses have become increasingly popular. While a common justification for these approaches is the hope of being cheaper than conducting original on-site studies, while also providing *sufficiently* reliable welfare estimates, few have evaluated this cost-effectiveness argument. Extending the question of a recent paper, the answer to “how dirty?” needs to be divided by the answer to “how quick?” (van de Walle and Gunewardena 1998). Practical applications of welfare loss functions for information collection which can be used in the course of a benefit-cost analysis are needed for benefit transfer to become a familiar aspect of environmental policy evaluation. In this paper, a stepwise Bayesian updating approach to valuation is suggested where a practitioner evaluates whether to go ahead with a large survey based on such a welfare loss function, weighing study cost against the value of expected reduction in policy uncertainty.

This study uses an “intuitive” first-cut approach to Bayesian updating of the benefit estimate using a computationally simple approach which assumes normal distributions. An extension of this paper is the updating of the whole variance-covariance matrix, allowing for flexible distributional assumptions. The approach is evaluated based on the criteria of convergent validity and the expected net benefits of uncertainty reduction. A series of datasets are employed as they would realistically arise over time, including meta-analysis of a number of contingent valuation (CV) studies, benefit function transfer using census and pilot data, and a main CV survey at the policy site. The time-sequenced decision-making process on further information gathering is simulated, using actual study cost information, set in the policy context of a benefit-cost analysis of waste water treatment in Costa Rica. While none of these ideas are new on their own, various authors have called for studies that evaluate the transfer method itself in a context of information of differing quality and in an actual policy setting (Desvousges et al. 1998; Smith 1992).

2. PREVIOUS RESEARCH

Two strands of literature are of particular relevance to this chapter. One strand discusses the convergent validity of benefit transfer using a variety of regression models from a single study site or pooled estimates from meta-analyses of several studies. The other covers the use of Bayesian theory to update welfare and regression parameter estimates as new information on the policy site becomes available.

2.1. Benefit Transfer and Convergent Validity

Perhaps the largest group of studies in this field test convergent validity of transferring study site benefit estimates to new policy sites (Bergland et al. 1995; Brouwer and Spaninks 1997; Downing and Ozuna 1996; EC 1999; Kirchhoff et al. 1997; Loomis 1992; Parsons and Kealy 1994). By and large these studies reject the statistical transferability of benefit function coefficients between sites, and in most cases also the statistical equality of mean consumer welfare estimates, whether 'raw' or conditioned on study site coefficients and policy site characteristics. Studies dealing with convergent validity have found that the similarity of study populations and environmental good characteristics usually leads to lower transfer errors, but that this is by no means a sufficient condition for statistical transferability. Transfer errors range from only a few percent to several orders of magnitude. Some authors advocate the use of more complex benefit function transfers for improving convergence (Desvousges et al. 1998), while other find that transferring unconditional consumer surplus estimates performs as well, or better than, conditional approaches (Parsons and Kealy 1994). In anticipation of such results other authors emphasise evaluating the effect that transfer error has on policy decisions – 'importance tests' – rather than statistical significance tests in judging the applicability of benefit transfer (Smith 1992).

As valuation studies become more numerous, examples of meta-analyses on the contingent valuation, travel cost and hedonic pricing literature have appeared over the last decade (Brouwer et al. 1997; Desvousges et al. 1998; Kirchhoff 1998; Loomis and White 1996; Schwartz 1994; Smith and Huang 1995; Smith and Kaoru 1990; Sturtevant et al. 1995; Walsh et al. 1992). Transfer of a meta-benefit function or 'mother distribution' assumes that no single 'best' study is available, providing a different starting point for convergent validity tests. Common for both of these approaches in the literature is that they test convergence of particular transfers with original policy site estimates, but not the validity of the transfer method itself in a policy context (Desvousges et al. 1998). In a comparative study, Kirchhoff et al. (1998) find that single benefit function transfer outperforms meta-function transfer in most cases, but that single study transfers have mostly been 'experimental', designed to improve conditions of transferability under as similar site conditions as possible. In a rare case of policy application, Desvousges et al. (1998) use Monte Carlo simulation techniques to combine various econometric approaches to meta-analyses for the different health consequences of air pollution from a power utility, and then evaluate the policy consequences for power plant siting. The best single meta-benefit function transfers come within about 50% of the mean of this combined simulation method, although the authors believe this may be acceptable to decision-makers.

A review of all these transfer studies gives the feeling that the jury will be out for some time on the reliability of benefit transfer, perhaps awaiting a consensus on the reliability of non-market valuation methods in general in environmental policy-making. While we wait, an eclectic approach is called for. While most benefit transfer studies opt for one particular transfer method, a more realistic