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CAN USE AND NON-USE VALUES BE TRANSFERRED ACROSS COUNTRIES?

1. INTRODUCTION

An alternative to conducting a new environmental valuation study is to use existing values as an approximation. This method has been termed benefit transfer (or more general; value transfer) because estimates are transferred from a site where a valuation study has been conducted to a site of policy interest. Benefit transfer has become popular in practice due to the high costs and time associated with conducting original studies, regardless of the numerous difficulties associated with obtaining valid estimates. Numerous studies have tested the validity and magnitude of errors in benefit transfer for example Loomis (1992), Loomis et al. (1995), Bergland et al. (2002), Downing and Ozuna (1996), Kirchhoff et al. (1997), Brouwer and Spaninks (1999) and Ready et al. (2004) to name a few. It is easily argued that benefit transfer can only produce valid estimates in the few cases where the environmental good and the population are virtually identical. Otherwise there is no reason to believe that the willingness to pay (WTP) is the same for non-identical goods and populations. This raises a question about the way in which the validity is tested. Usually, a null hypothesis of no difference between the original and the transferred estimate is tested. Valid benefit transfer is reported in the cases where the null hypothesis has not been rejected at the chosen level of significance, most often $\alpha = 0.05$. However, non-rejection of a null hypothesis is not proof of its truth as a rejection is proof of its untruth (Lehman 1983, Hoenig and Heisey 2001). It is, therefore, not possible to prove equality when such a null hypothesis is not rejected. When we are interested in the validity of the null hypothesis itself, as is the case for studies of benefit transfer validity, it is appropriate to test for equivalence and not for difference. Such equivalence tests have been developed and used for quite some time in pharmaceutical research (Hauck and Anderson 1984, Schuirmann 1987, Welling et al. 1992 and Berger and Hsu 1996) and in psychological research, for example Stegner et al. (1996), but have no widespread use in economics.

We will here test the equivalence of benefit transfer values and original values for use and non-use values of freshwater fish populations between three Nordic countries; Norway, Sweden and Iceland. Identical contingent valuation surveys were conducted at the same time in these three countries. Observed differences in willingness-to-pay (WTP) should therefore be due to such factors as demographic differences between the populations, non-quantifiable differences in underlying preferences and the institutional organization of recreational fishing in different countries.

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To our knowledge, this is both the first application of equivalency analysis to environmental value transfers, and the first study to compare the transferability of non-use values versus use values.

2. BENEFIT TRANSFER

Assume that all respondents in all countries have identical underlying preferences. Using country m as the baseline country, WTP for individual i living in country m for an improvement in environmental quality from Q_0 to Q_1 is defined using indirect utility functions by:

$$V(p_m, I_i, Q_0) = V(p_m, I_i - WTP, Q_1) \quad (1)$$

where $\boldsymbol{p}_m$ is a vector of prices for goods and services in country m and I_i is the individuals income or wealth. Let us suppose that individual j has the same preferences as individual i but lives in country n. He faces prices $\boldsymbol{p}_n = \boldsymbol{p}_m$. Because the indirect utility function is homogeneous of degree 0 in prices and income, known as the absence of money illusion, it will not influence the result. The WTP of individual k will be $WTP_i = WTP_k$.

Benefit transfer methods can be divided into two major types: i) unit value transfer and ii) value function transfer.

Unit value transfer methods estimate total benefits at the policy site by aggregating exiting standard values per unit. These values are derived from study site data. For example, the total benefits of fishing at the policy site may be estimated as the product of some standard value for a fishing day at the study site and the number of fishing days at the policy site. The obvious problem with this method is that individuals at the policy site may not value the good in question in the same way as individuals at the study site. There are two principal reasons for this. First, the characteristics of the population may differ in terms of income, education, religion, demographic composition and so forth. Second, even if the individual preferences are the same, the supply of the good in question may differ (Kirchhoff et al. 1997).

A more sophisticated approach would be to adjust the value before transferring it to the policy location. There are two different types of adjustments that can be made. First, the analyst may regard the unit value available from the study site to be biased, or estimated inaccurately. This might be based on an evaluation of the methodology used in the original study. Second, the value may have to be adjusted to better reflect the conditions at the policy site. Four potential differences should be addressed in this kind of adjustments:

- The quality/quantity of the environmental good affected
- What caused the environmental change
- The socioeconomic characteristics of the households affected
- The availability of substitutes

In *value function transfer* methods, estimator models derived from study site data are used with explanatory variables collected at the policy site to estimate both value