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International benefit transfer: Methods and validity tests

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ABSTRACT

The use of value estimates measured in one country to value policy changes in another country would seem to introduce some unique issues and challenges, even when the good being valued is identical. These issues include, how should values be converted from one currency to another; how to account for differences in measurable characteristics when those can vary markedly between countries (especially income); and how to account for differences between countries in culture and shared experiences that are difficult to quantify. However, these challenges in international benefit transfer are not that different from those encountered in transfers between regions within a country, and transfer errors are comparable to those seen in intra-country transfers.

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1. Why international benefit transfer?

Intuitively, when conducting benefit transfer, it is preferable to find a study site located close to the policy site of interest. The closer the study site is to the policy site, the more likely that both the good being valued and the user population affected will be similar. Rosenberger (2001) has found some evidence that transfers conducted within a region perform better than transfers conducted between regions.

Still, there are good reasons to explore the feasibility of benefit transfers conducted across national boundaries. First, while the bulk of valuation studies have been conducted in the United States and Western Europe, nonmarket values are increasingly demanded for policy analyses in less developed and transitioning countries. Second, multinational bodies (for example the European Union and the North American Commission for Environmental Cooperation) need to be able to conduct policy analyses for coordinated environmental actions. If benefit transfer is feasible across national boundaries, then it is attractive both because of the potential cost savings and because of the

ability to use consistent values in analyses of actions that impact more than one country.

In these comments we highlight some of the issues that must be addressed when conducting international benefit transfer, and review some empirical tests of the validity of international benefit transfer. Many of the issues are illustrated using results from a study valuing health improvements conducted in five European countries (Ready et al., 2004).

2. Challenges in international benefit transfer

2.1. Currency conversion

The first issue that must be addressed when conducting international benefit transfer is the conversion to a common currency. As will be shown, even in situations where the same currency is used in more than one country, there is still an issue related to currency conversion between countries.

Consider two individuals living in two different countries with the same preference structure over consumption of market goods, x , and the level of public goods available, Q .

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Under what circumstances would we expect these two individuals to have the same WTP for a change in the level of the public good? The individual in Country A has willingness to pay (WTP) for a change from Q_0 to Q_1 defined by

$$V(I_A, p_A, Q_0) = V(A_A - WTP_A, p_A, Q_1)$$

where I_A is income in Country A and p_A is the price of market goods in Country A. If the exchange rate between the currency in Country A and the currency in Country B is given by β , what do we know about WTP_B relative to WTP_A ?

Because indirect utility functions are homogeneous of degree 0, we know that

$$V(\beta^*I_A, \beta^*p_A, Q_0) = V(\beta^*I_A - \beta^*WTP_A, \beta^*p_A, Q_1)$$

Therefore, the individual in Country B will have willingness to pay $WTP_B = \beta^*WTP_A$ only if he has income $I_B = \beta^*I_A$ and faces prices $p_B = \beta^*p_A$. This last point is critical. Identical individuals using different currencies will have the same real WTP only if they have the same real income and face the same real prices. Thus, the appropriate exchange rate for converting values into a common currency is the exchange rate that equalizes market prices (see also [Pattanayak et al., 2002](#)).

This type of exchange rate is called a purchasing power parity (PPP) adjusted exchange rate. For any two countries, the PPP-adjusted exchange rate measures the amount of the local currency in one country that would purchase the same amount of market goods as one unit of the local currency in the other country. The Penn World Table includes a list of PPP-adjusted exchange rates for 168 countries, based on surveys of market prices conducted by the OECD and the World Bank. PPP-adjusted exchange rates can differ markedly from financial exchange rates (the conversion rates offered in international financial markets). For example, in the five-country health study, the financial exchange rate between Dutch guilders to Portuguese escudos at the time of the study was 91 escudos/guilder. The PPP-adjusted exchange rate was 60 escudos/guilder. This difference of 50% reflects the fact that market prices tend to be higher in the Netherlands than in Portugal.

This issue has not disappeared as a result of currency unification. Although both the Netherlands and Portugal now use the euro, there remain differences in market prices between the two countries. An individual living in the Netherlands with an annual income of 50,000 euros has a very different standard of living than an individual with identical preferences with the same income in Portugal, and will likely have different WTP for public goods.

When the policy site is smaller than an entire country, the analyst may need to worry about differences in prices even within a country. At the time of the five-country study, for example, prices for market goods in Lisbon were 45% higher than the national average for Portugal. When city or regional PPP indices are available, those should be used to account for local differences in prevailing prices. This is true whether the benefit transfer is being conducted between two countries, or within a country. In the U.S., the American Chamber of Commerce Research Association (www.accra.org) calculates cost of living indices for more than 300 cities. For example,

their cost of living index for Bergen County, NJ is 34% higher than for Paduka, KY.

2.2. Differences in measurable attributes of the users

Typically, we think of the value of an environmental good as being determined by three different sets of factors: the characteristics of the good itself (quantity, quality), the context within which the good exists (availability of substitutes, etc.), and the characteristics of the users who value the good (income, age, experience). When conducting any benefit transfer, whether international or within a country, it is important to account for differences in the good and its context. When possible, a study valuing a good similar to the good in the policy site should be chosen. When enough different sites have been valued, a meta-analysis may be possible that estimates a value function that includes characteristics of the good as arguments. Similarly, effort should be taken to assure that the source study was conducted in a context similar to the policy context. For example, the value for protecting a cold water fishing stream would depend on how many such streams exist nearby. If cold water fishing streams are rare in the policy country, then a study should ideally be taken from a country where they are also rare.

As for the third set of factors, measurable characteristics of the users, the most striking issue in international benefit transfer is differences in the level of incomes across countries. Even within the European Union, average per capita GDP measured in PPP terms varies by over a factor of five between the richest and the poorest countries.

Because most existing valuation studies were conducted in the U.S. or Western Europe, international benefit transfer often involves transfer of a value from a high-income country to a low-income country. One common, simple approach to dealing with income differences between the study country and the policy country is to multiply unit values by the ratio of income in the policy country to income in the study country (or per capita GDP). This approach assumes that WTP varies proportionally with income, an assumption that is typically not found to hold within individual studies, however. Studies conducted within one country more typically show that WTP for environmental goods increases with income, but at less than a proportionate rate. Using the income ratio as an adjustment will tend to overcorrect for income differences when the policy country is much poorer than the study country.

A conceptually better approach is to apply a value function. In order to estimate such a function, variability in income is needed in the source data. This variability typically comes from variation within the sample of users surveyed at the study site. For example, we may discover that WTP for a public good valued at a study site is higher for users with higher income. We use this variation to estimate a value function. If the average income at a policy site is higher or lower than that at the study site, the value function adjusts for that difference. A simple value function might include only income as the explanatory variable, and assume constant income elasticity of WTP. However, the value function could account for other measurable characteristics, and could take other forms.

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