

THE VALUATION PROBLEM AND NON-MARKET VALUATION THEORIES

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Summary

Economists interested in environmental management have developed a range of techniques for attributing monetary values to environmental entities such as wildlife, habitat, and aesthetics. These methods are often misused or used without regard to their theoretical and practical limitations. Those limits are explained along with the range and type of values economists are attempting to bring forward into environmental policy. In the latter regard, a classification of values is offered that distinguishes the exchange values found in markets from other classes of environmental values that fall beyond the scope of economics to evaluate. Since techniques such as cost-benefit analysis continue to be used in various policy contexts, a thorough understanding of their limited potential role is required in order to avoid rhetorical use and misguided policy.

1. Introduction

Economic valuation methods have been employed to assess whether project and policy costs are justified in terms of their benefits and this approach has been extended to include environmental gains and losses in monetary terms. This article provides a survey of methods used for environmental valuation. Such methods have been

proclaimed as relevant to addressing a range of issues, from building a new motorway through a forest to the enhanced greenhouse effect. In Section 2, an overview is provided of environmental values divided into market, non-market, and non-economic values. A range of methods used in cost-benefit analysis (CBA) is explained with reference to the main problems associated with their application. Section 3 summarises the principal methods for generating estimates of the non-market values and major problems in their application. The techniques discussed are the travel cost method (TCM), the production function approach (PFA), hedonic pricing (HP), and stated preference techniques, mainly the contingent valuation method (CVM). Emphasis throughout is on awareness of the limitations of these methods, which therefore demand prudent use in any policy context. Overall conclusions are given in Section 4, which summarizes the applicability of different methods for assessing various categories of environmental change.

2. The Range of Relevant Environmental Values

Economic assessment, associated with evaluating externalities (i.e. the impacts on the environment that stem from factors “external” to an economic actor’s decision making), differs from impact assessment under a natural science or engineering approach, where physical impacts are central. That is, under the economic approach, emphasis is on the physical impacts only to the extent that they follow a path to specific targets affecting human welfare. Environmental change is then linked to human welfare via characterizing the environment as goods and services (which are broadly defined). Thus, changes in the provision of identifiable environmental goods and services, such as the number and range of common birds species, form the focus of attention. This means economic value categories relate to welfare, generating aspects of the environment as a commodity rather than the source of physical changes; for example, the priority is loss of tourism or new medicines rather than ecosystems or biodiversity. A further difference relates to human expectations and how environmental change interacts with social psychology in terms of economic welfare. Human concerns about impacts may have no physical basis but they may have dramatic social, welfare, and economic effects (e.g. some “food scares”). Economic valuation techniques appeal to human preferences and are therefore influenced by whatever affects those preferences and ignores whatever those preferences fail to take into account.

The next three sections aim to show where economic valuation techniques are regarded as being operative. This requires some identification of the type and range of environmental changes that valuation methods are expected to address. These changes can be divided into those affecting market values, those outside normal markets but that may be assessed in monetary terms, and those values beyond economic assessment.

2.1. Potential Impacts on Existing Markets

Goods and services sold directly to consumers or to firms as inputs to production may be affected by practices in other sectors that would normally be regarded as unrelated. For example, emissions from cars may be converted to tropospheric ozone smogs and affect agricultural crops, thereby raising production costs; large-scale monoculture may reduce recreation and affect the tourist industry. In such cases, a market exists where

goods and services are traded so that standard economic models of supply and demand in that market can be employed to estimate the economic impacts. In order to understand how a good or service will be affected, the connections with the environment are required. As an example, consider the impact that intensive agricultural land use, intensive forestry, mineral/aggregates extraction, and waste disposal can have on water supply, freshwater and coastal products, and recreation and tourism.

Both ground and surface water may be adversely affected by the application of fertilizers and pesticides. The water supply industry may see costs rise, reflecting the additional treatment to potable standards, or in order to pay farmers to change their practices. Where water quality is reduced, industry reassurances may be insufficient to prevent consumer substitution away from the supplier, thereby reducing demand. In order to capture these effects, a model of the water supply market would be required that allowed both consumer and producer welfare surpluses to be estimated.

The quantity and quality of freshwater and coastal life also provide direct benefits as a source of food. In the bioeconomic literature, the term “fish” is used to cover all living freshwater, estuarine, and marine resources including fish, mammals, crustaceans, and mollusks. The water environment provides a nursery for young fish, as well as providing food and habitat. The life cycle and thus productivity, quality, and quantity of fish for consumption (as well as for by-products) are related to the quality of the water environment. Soil deposition and pollution runoff from farmland or forestry can influence fish stock recruitment and distribution. Marine plant seafood is harvested but currently in small amounts in Europe (e.g. seaweed sold by the Findhorn community in Scotland). Non-food products include primary goods (e.g. shells, star fish, fertilizers) and by-products (e.g. fish oils). Pollution from intensive agricultural practices may also reduce the option for exploiting or harvesting marine products that are currently regarded as non-commercial.

Recreational and tourist opportunities may be temporarily or permanently lost due to intensification of land use. Some uses allow a site to be restored, ameliorating these impacts and restricting them to the duration of the land-use conversion, as with some mineral extraction. The impact of lost demand for recreation and tourism would be felt in the local economy if no alternative (perfect) substitute site were available in the area for the activities involved, and a regional substitution effect might occur. Alternatively, the site may have unique characteristics with no opportunities for substitution. For example, destruction of a specific habitat may prevent ornithologists from viewing an associated rare species.

Some recreational activities may have close market substitutes. Thus, non-commercial harvesting of food can be related to the markets for the commercial substitutes to estimate the value of the product loss. However, in general, recreational activities involve an experience related to the quality of the environment that depends on not only site characteristics and the availability of substitutes, but also the value gained from participation in the activity. Thus, recreational and tourist activities can involve values besides those costs associated with related markets or identifiable physical aspects of ecosystems. For example, gathering flowers, wild berries, or mushrooms for recreation may be related to market substitutes but the experience of harvesting is often of more

central concern to the welfare gained. This means people may incur travel costs in excess of the value of the harvest gathered, as measured by the equivalent commercial product costs, because the experience is valued in itself. If markets are directly related to an activity (e.g. travel costs, entry fees, equipment costs), the opportunity cost can be approximated but not the welfare gained (i.e. consumer surplus). The welfare in terms of surplus would require using a technique that would derive a surrogate demand function for the site's non-market values (e.g. CVM, or TCM as discussed below).

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Biographical Sketches

Dr. Spash is professor of environmental and rural economics in the Department of Agriculture and Forestry at the University of Aberdeen. He is programme director of socioeconomic research at The Macaulay Institute in Aberdeen. He is also president of the European Society for Ecological Economics. His work has covered a range of issues in environmental valuation and across disciplinary boundaries including environmental philosophy and social psychology.

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