

Nonmarket Economic Valuation and “The Economist’s Fallacy”

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ABSTRACT: It is important that noneconomists understand and consider three key points regarding the use of economic cost-benefit analysis. First, economists undertaking applied cost-benefit analyses use expected values by necessity in forward-looking models. Second, economists tally changes in economic value, comparing “with” and “without” investment scenarios, using producer and consumer surplus. Third, marginal changes in the “nonmarket” components of consumer surplus can, and should, be quantified in monetary terms and included in evaluations whenever possible. These three factors highlight the need for multidisciplinary research on complex problems relating public investments to the social, cultural, health, and environmental impacts of those investments.

KEYWORDS: *cost-benefit analysis, nonmarket valuation, stated preferences; public goods; opportunity costs*

There has been a recent discussion, initiated by Scriven (2008) in the *Journal of MultiDisciplinary Evaluation*, on the role of economics in evaluation. The calculation of net economic benefits, Scriven first argued, requires that both the costs and benefits of select investments or policy alternatives are calculated in advance of outcomes actually being realized; thus there is a circular logic to economic analysis. Second, he argued, the definition of costs used by economists—opportunity costs—is flawed because it cannot be used in situations where relevant outcomes are outside the domain of economics (e.g., the “cost” of pain to an individual).

In this short comment, I outline three key points regarding economic cost-benefit analysis (CBA) that noneconomists need to understand and consider in evaluation research and practice: (1) costs and benefits used in economic CBA are expected values; (2) the marginal value of changes in quality of life that matter to people

are measured using the sum of producer and consumer surpluses; and (3) changes in the “nonmarket” components of consumer surplus can, and should, be quantified in monetary terms and included in evaluations whenever possible. My primary focus is on the third point, the role of nonmarket valuation in economic analysis and evaluation.

Expected Values

Economists do use models to estimate the future costs and benefits of private or public investments.¹ By necessity, models simplify reality and the projected outcomes and impacts of investments are uncertain. As a result, economists undertaking applied cost-benefit

¹ In this paper, I refer to investments in a general sense that includes public-sector policy and program initiatives, as well as private-sector investment decisions.

analyses use expected values in their calculations.

It is important to recognize that expected values are only as good as the model underlying them. For instance, in my field—ecological economics—we often have a relatively limited understanding of the “ecological production functions” linking environmental integrity with societal-level impacts that matter to people. Similar circumstances exist in cultural and health economics, where the links between investments and their ultimate societal impacts can be very complex. When underlying causal models are highly uncertain, expected values can have high margins of error. Any forward-looking analysis must, however, account for uncertainty and, crucially, present its results in a way that makes the likely range of outcomes and impacts transparent for decision makers. Credible multidisciplinary input regarding linkages along the activity-output-outcome-impact causal chain is critical if economic analyses are ultimately to be credible for policy and investment decisions.

Producer and Consumer Surplus

Who bears economic costs and who experiences benefits is often confusing to noneconomists. In economics, well-being is measured using the sum of the “surpluses” accruing to both producers and consumers. A surplus is simply the difference between total benefits and total costs, appropriately discounted to take into account the fact that surpluses accrue at different time periods. For private-sector firms, producer surplus essentially equals profit, with some adjustments to account for returns to management and risk. Consumer surplus is defined as total benefits (the area under the marginal benefit, or demand, curve) of consuming a commodity less the total expenditure (price $\times$ quantity) needed to purchase it. To avoid unnecessary confusion over the definition and calculation of “costs” and “benefits,” it is important to use the

concepts of consumer and producer surplus as they help provide clarity in economic analyses. The relevant measure of economic efficiency for CBA is the change in the sum of surpluses arising from an investment relative to the status quo “no investment” scenario. Calculating producer and consumer surplus are empirical problems, each with their own challenges.

Consumer Surplus for Nonmarket Goods and Services

Quality of life is obviously a function of more than the market commodities that we consume. It is influenced by environmental quality, our relationships with other people, health and education, the state of the communities in which we live, our arts and culture, and a variety of other factors. Many of the factors that are most important to our quality of life are not market commodities and have no market prices attached to them. That is, we do not have market expenditures and well-defined demand (benefits) functions readily available to calculate consumer surplus. That does not mean, however, that these nonmarket services do not provide people with well-being and that consumer surplus cannot, in theory, be calculated.

Why would we even want to bother with this? Individuals, firms, and governments incur real opportunity costs and need to consider them when making investment decisions. Accounting for the full range of components contributing to consumer surplus can therefore help bolster the economic argument for making real investments in public goods. If things like environmental quality, human health, or cultural heritage are not economically valued, they are usually assigned a functional value of zero in CBA and, as a result, are typically (incorrectly) ignored in investment decisions. Consequently, society will under-invest in the provision of nonmarket goods and services that have very important impacts on quality of life.

Economic theory and methodology have advanced dramatically in the past two decades, and there are now a plethora of studies quantifying consumer surplus for nonmarket goods and services. The basic intuition of nonmarket valuation is that most people can be equally satisfied when faced with two situations: (1) having a higher level of financial wealth and a lower quality of life (defined along environmental, health, community, and/or cultural axes) and (2) having a lower level of financial wealth and a higher quality of life. Most people are willing to invest financial wealth—they exhibit a positive willingness to pay (WTP)—to improve their quality of life or are willing to accept (WTA) financial compensation for degradations to their quality of life. Trade-offs that individuals are willing to make vary tremendously (a function of personal values, income constraints, social pressure, etc.) but these trade-offs can be quantified. Measures of household-level WTP or WTA can be aggregated² to provide the theoretically correct measures of consumer surplus that can then be included as one component in CBA.

Scriven (2008) argued that the cost of pain equals the value of being pain-free and that, because the right side of the equation is always the same and the left side varies (depending on whether one experiences mild or severe pain), the “economist’s definition of cost [opportunity cost] is totally insensitive to major difference in true cost [mild versus severe pain]” (p. 74). This is incorrect from an economics perspective. The correct way to economically value mild and severe pain would be to assess the trade-offs that people are willing to make between money

(financial wealth) and the level of pain they expect to be subjected to. This allows for the calculation of changes in consumer surplus associated with varying types/levels of pain (see, for example, Anderson et al., in press).

Similarly, it is quite possible to value marginal changes in other nonmarket factors impacting quality of life. Many economists have adopted the choice experiment (CE) as the preferred survey tool for nonmarket valuation research over the past decade. Figure 1 shows an example of one CE question from a recent Canadian survey on the economic value of social science and humanities research impacts. In this survey, each respondent saw nine such questions, each of which varied in the degree of improvement for a range of quality of life indicator variables³ and by annual cost.

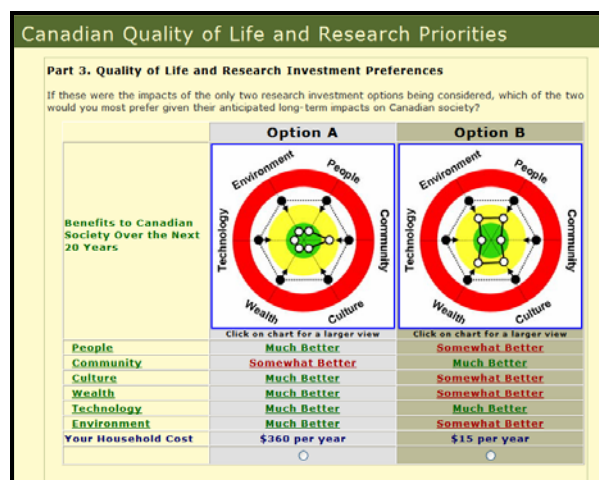


Figure 1. Example of a Stated Preference Survey Question Used to Estimate Changes in Implicit Price (Willingness to Pay) for Potential Research Investment Impacts

² Scale issues play a crucial role in aggregate analyses of consumer surplus. Changes in producer surplus tend to be more identifiable, geographically concentrated, and quantifiable compared with changes in consumer surplus. If citizens from across society or internationally benefit from an investment, their individual WTP may be very small, but the impact of that investment on overall consumer surplus can be huge when we consider millions of households. Assessing the proper geographic scope of analysis is critical for CBA concerned with public goods.

³ Two indicators were used for each attribute describing overall quality of life: educational attainment and female breast cancer rate for “people;” volunteering and average homicide rates for “community;” heritage institutions and performing arts organizations for “culture;” gross domestic product and average household net worth for “wealth;” infrastructure age and patents for “technology;” and greenhouse gas emissions and surface freshwater quality for “environment.”

While it is not possible to go into the details of the analysis in this comment, preliminary results from my research suggest respondents from six distinct segments of Canadian society made statistically distinct trade-offs between the attributes used to describe quality of life. Because annual cost was included in the survey as an attribute of a hypothetical government social science and humanities research investment program, implicit prices (WTP) could be calculated for each of the six segments.

For the largest segment (19.6% of the $n = 1,920$ national sample), respondents exhibited WTP of approximately \$400⁴ annually for an improvement from the status quo situation to the situation where all attributes were “somewhat better” than the status quo and a similar WTP for a further increase from “somewhat better” to “much better.” Respondents differentiated between different factors defining quality of life, and priorities differed amongst segments. For example, mean annual WTP for Segment 1 respondents ranged from \$35 for improving the “environment” from “somewhat better” to “much better” to \$117 for a similar improvement—from somewhat to much better—in “people.” For Segment 3, priorities were reversed, with mean annual WTP of \$65 and \$118 for “people” and “environment,” respectively. These measures are direct household opportunity costs, as the financial costs of a research investment (funded via taxes) would diminish a household’s capacity to purchase market goods and services.

Conclusion

Confusion surrounding the appropriate role of economics in investment decisions has several causes. In order to minimize confusion and take full advantage of the potential contributions of economics (and economists) for policy design, resource allocation, monitoring, and evaluation, it is important for noneconomists and

economists to work together. Noneconomists need to make efforts to understand the technicalities of economic valuation and CBA in order to appreciate when and how economic surpluses can be used to quantify the net costs of investment decisions. It is also incumbent upon economists to undertake the most transparent analyses possible and to present their results in ways that make assumptions transparent and that clearly illustrate the impact of various types of uncertainty on CBA results.

With regards to nonmarket valuation, the primary challenge is not the economic valuation of nonmarket impacts per se, but the development of credible models that causally link investments and policy interventions with their societal-level impacts that matter to people. This highlights the crucial need for multidisciplinary research on complex problems relating public investments to the social, cultural, health, and environmental impacts of those investments.

References

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⁴ All dollar amounts are in Canadian dollars.