

**Environmental Decisions without Benefit-Cost Analysis:**  
**A Ranking-Based Alternative**

by  
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Longstanding, simmering results from experiments and environmental valuation have shown that individuals often do not have well-formed or well-behaved preferences for environmental goods. These results cast a shadow over the benefits component of benefit-cost analysis, particularly for environmental resources that either do not have a use component (existence value) or have highly amorphous uses (ecosystem services). An alternative to benefit-cost analysis – and by extension to valuation – has been difficult to produce, however.

Development of an alternative has been particularly challenging because benefit-cost analysis has many practical advantages that appear to outweigh doubts about valuation. Policy-makers need rigorous and systematic decision-making tools; benefit-cost analysis exhibits these properties; environmental valuation is therefore required, whatever its weaknesses.

This research project examines an alternative public-choice procedure to benefit-cost analysis for environmental projects without a strong *use* component. The procedure consists of two steps: Scientists are asked to rank environmental policies based on their assessment of ecosystem services and ecological value. Then, the public is asked whether more environmental protection is needed. That is, the public faces a (repeated) dichotomous choice about whether to keep “moving along” the scientists’ scale.

We argue below that this procedure shares the transparency and rigor of benefit-cost analysis, is democratic (which we argue is a more apt way of looking at the normative component of benefit-cost analysis), yet avoids valuation or an assumption of neoclassical preferences.

This proposed procedure does, however, rely on the assumption that citizen and scientist assessments of the *relative* desirability of environmental actions are consistent with each other. Since scientist assessment is considerably less noisy than citizen assessment, citizens should then want to delegate the ranking of environmental desirability to scientists. This claim of convergence between citizen and scientist rankings is an empirical claim. We describe below the empirical research we undertake to examine this hypothesis.

## **1. The Benefits of Benefit-Cost Analysis**

Benefit-cost analysis has clearly succeeded as a decision-making tool or, more precisely, as a decision-*aiding* tool. Benefit-cost analysis is transparent, systematic, and rigorous. Even when a precise comparison of benefits and costs is impossible or inadvisable, decision-makers are believed to benefit from the analytical discipline that benefit-cost analysis induces. It makes policy-makers be concrete and explicit about the effects of a proposed policy. No alternative decision-making procedure has yet appeared that exhibits these desirable qualities to such a degree.

Economists have also appealed to the welfare-theoretic basis of benefit-cost analysis. This foundation is perhaps its weakest selling point. Economists should be cautious about touting benefit-cost analysis' welfare-theoretic consistency. There are

several reasons for our claim. First, no one, to our knowledge, is willing to bind himself or herself to the outcome of a benefit-cost test. Economists rightly recognize that unquantified elements exist for every policy and that decision-maker discretion is needed to account for these. But the absence of strict reliance on benefit-cost results greatly weakens the claim that it is consistent with an underlying neoclassical welfare model.<sup>1</sup>

Second, the “well-defined preferences” assumption underlying the welfare theory for benefit-cost analysis is both empirically and conceptually weak. (We will of course elaborate on these claims in the final paper.)

A third, related argument is that because decisions imply valuation, decision-makers would be better off explicitly stating their values. We see this as a “practicality” argument rather than a welfare-theoretic argument.

In summary, the strongest argument for benefit-cost analysis is that no alternative exists that is as systematic, transparent, or analytically rigorous.

## **2. A Ranking-Based Alternative**

Our proposed procedure, like benefit-cost analysis, first relies on the specifying of potential environmental actions and their expected consequences, both economic and environmental. Projects or policies will need to be framed in terms of specific actions or regulations that can be undertaken or achieved at a given cost (\$10 million in costs, for example).

The procedure then consists of two steps. In the first step, a panel of natural scientists generates a ranking of these same-cost policies based on the policies’

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<sup>1</sup>One advantageous exercise for benefit-cost advocates would be to identify barriers to using benefit-cost results as a *binding* criterion, and then to work toward removing those barriers.

“environmental desirability.” These scientists are meant to bring a sophisticated understanding of ecosystem effects and ecosystem services to this evaluation, without explicitly defining environmental desirability.

In the second step, the citizenry is then asked whether to move down this list. In essence, the public is asked whether more environmental protection is desirable on the margin. Note that there is a clear cost to such a choice. This is a dichotomous choice (such as “spend more” vs. “spend less”) (alternatively, “move up the list” vs. “move down the list”), albeit one that must be revisited periodically. Both steps 1 and 2 must be periodically repeated as new information becomes available, both about new problems and about the consequences of previous environmental decisions.<sup>2</sup>

The procedure retains the analytical rigor, concreteness, and practicality of benefit-cost analysis without invoking valuation. The procedure requires information-gathering efforts by economists and natural scientists similar to current benefit-cost analysis, although again without the benefits-valuation component. The procedure has a clear and prominent role for the expertise and judgment of natural scientists, yet those scientists must make a decision that recognizes tradeoffs, a feature that is often missing from scientific advice but that is key to economics. Like benefit-cost analysis, the procedure rests on citizen “preferences,” yet it does not involve valuation and is consistent with most behavior-based models of preferences.

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<sup>2</sup>Are there incentive concerns involved in this kind of repeated choice? We do not think so. (Note that “incentive compatibility” is no longer a unified concept outside neoclassical economics.)

### 3. Loose Ends

We are not blind to the many questions and concerns that such a procedure will evoke. We mention just four of these here.

First, this procedure is still a “black box” in terms of decision criteria to be used by scientists. This black box exists, in part, because the procedure has not been used and therefore no systematic decision-making apparatus has been developed. Furthermore, this procedure puts the black-box where it belongs: In the important but difficult-to-pin-down category of “overall ecosystem services.”

Second, there will likely be dissent from the final ranking, and possibly multiple rankings. Our view is that moderate disagreement among rankers is probably acceptable. Just as we do not bind ourselves to benefit-cost analysis, we are unlikely to bind ourselves to the scientists’ rankings. Serious, persistent, multi-directional disagreement among rankers, however, would probably be fatal to our procedure.

Similarly, there may be projects that are politically infeasible; climate change comes to mind. Scientists will likely rank it highly, as deserving high-priority action. Lower-ranked policies should not wait for climate change action. We believe it should be possible to skip over some of the ranked projects without negating the value of the overall exercise.

Third, this procedure will be most valuable for policies that do not have a strong use-value component or for which use-values are difficult to specify. More precisely, it will be most valuable for policies in which *citizen rankings* are based on scientific criteria rather than individual preferences. Therefore, we do not think this procedure would be

useful for policies involving health or safety, or recreation, or commercially valuable natural resources with few environmental consequences.

Fourth, readers might also note that environmental groups rarely propose such rankings, so perhaps rankings simply cannot be identified. We think the lack of environmental-group prioritizing is best thought of as an incentive-compatibility problem. Such groups currently have incentives *not to rank* environmental solutions.

#### 4. Needed Research

The key research question is whether citizen preferences over environmental projects are consistent with scientist judgment. More precisely, do individuals *want* to cede ranking of environmental policies to experts? The hypothesis that they do is key to our proposal. If this hypothesis were to fail, we do not believe that an expert-based decision procedure would be better than benefit-cost analysis.

Researchers have strong a priori reasons to suspect that citizen rankings are based primarily on scientific criteria. At a casual level, we note that the public, when asked about environmental issues, strongly emphasize ecosystem services (albeit without that specific jargon) such as water purification, pollination, soil maintenance, and medical discoveries. Existence value – which is *potentially* separate from scientist judgment – is hard to categorize, especially since citizens rarely evoke existence value unless pushed. Still, it appears to us that existence value is essentially perfectly correlated with ecosystem services.

There is some preliminary evidence *contra* our hypothesis, however. In 1995, one thousand Maryland residents were asked the following question in a telephone survey:<sup>3</sup>

When choosing which undeveloped areas to protect, do you think the highest priority should be given to:

- \_\_\_\_\_ Areas most in danger of disappearing from nature, or
- \_\_\_\_\_ Those areas most enjoyed by people.

The results were 73.3 percent for “enjoyed by people” vs. 24.1 percent for “disappearing from nature.” This result does not support our hypothesis.

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<sup>3</sup>The telephone-format required this abbreviated format for the question.

We should note, however, that many respondents appeared to believe that these two types of areas *were the same*. This possibility suggests that future research needs to make clear that a tradeoff exists between the two types of preservation goals. (There are many similar concerns. The above question is a useful starting point, but many survey design issues remain.)

Our current research consists of in-person surveys, using a convenience sample.<sup>4</sup> We are currently devising questions that are similar to the above format (though with the benefit that in-person surveys allow) and that shed light on the key assumption needed for our proposed procedure.

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<sup>4</sup>Convenience sampling requires additional considerations to make sure we are getting a close-to-representative sample of the population. The population is all non-incarcerated adults in our state; at present, we are not conducting a nationwide sample.