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Toward an experimental foundation for benefit-cost analysis[☆]

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ABSTRACT

Empirical results from experimental economics and neuroscience have uncovered regularities in human behavior that may provide a base for new approaches to welfare theory and economic policy. These empirical findings do not challenge basic economic concepts but they do imply that our assumptions about “rational behavior”, “opportunity cost”, and “social welfare” should be revised using sound scientific evidence and methods. This research has the potential to make benefit-cost analysis more reflective of how people value gains and losses, and more responsive to considerations of environmental and social responsibility.

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1. Introduction — welfare economics and BCA

The field of economics is currently undergoing a revolution in the basic assumptions used to model consumer and firm behavior (Kahneman et al., 1997; Gintis, 2000; Fehr and Fischbacher, 2002). The traditional model of “rational economic man” underlying cost-benefit analysis has been found to be an inadequate description of actual human behavior (Kahneman and Tversky, 1979; Güth et al., 1982) and a poor predictor of individual choice (Field, 2001; Henrich et al., 2001; Glimcher et al., 2005). Empirical results from game theory, behavioral, and experimental economics have uncovered regularities in human behavior that may provide a base for new approaches to welfare theory and economic policy (Kahneman and Sugden, 2005; Layard, 2005). These new approaches have far-reaching implications for environmental valuation and benefit-cost analysis (BCA) (Gowdy, 2004) but contemporary environmental economics largely ignores these recent theoretical and empirical

advances (Knetsch, 2005). Recent research results have the potential to make BCA more reflective of actual human decision-making and more responsive to considerations of environmental and social sustainability.

The traditional economic worldview underlying BCA, and associated definitions of sustainability, is rooted in mid-twentieth century welfare economics with its key assumptions about rationality, efficiency, and the ability of policy makers to identify Potential Pareto Improvements (Gowdy, 2004; Bromley, 2006). The standard economic approach to environmental valuation and policy is forcefully spelled out in several high profile guidelines for economic analysis (Arrow et al., 1993, 1996; U.S. EPA, 2000). These papers are commendable in their advocacy of transparency and consistency in designing environmental protection policies, but they are flawed by a rigid adherence to an outdated economic methodology. In these guidelines, contrary to an expanding body of evidence from experimental economics, improving the human condition (increasing social welfare) is equated with increasing

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¹ The standard sustainability literature in economics recognizes that measured GDP fails to value many things that give people utility. The corrected GDP measure is called “Hicksian income.” But Hicksian income assumes that all externalities and public goods may be identified and correctly priced, no market power exists, and everything that gives utility to individuals can be properly priced so these goods can be traded in competitive markets. It also accounts for the maintenance of capital stock including so-called natural capital.

per capita income, and “rationality” is defined as conforming to the axioms of consumer choice embodied in *Homo economicus*.¹ There is a kind of unconscious “bait and switch” argument present in standard economic analysis. Advocates of the standard approach to BCA usually begin with the very reasonable observation that people try to do the best they can with the limited resources at their disposal and that individuals are generally the best judge of what is best for them. However, the facts that people act in their own best interest, that they respond to incentives, and so on, does not justify accepting standard BCA assumptions. Income is an important component of well-being but there are other, equally important, contributors.² People respond to a variety of non-monetary (as well as monetary) incentives. Self-interest includes acting fairly towards others, adhering to social norms, and enforcing these norms even at cost to oneself. Preferences include things like inequality aversion, loss aversion, maintaining or improving one’s social position relative to others, and non-linear and non-uniform discounting of the future.

Recent advances in economic theory and a growing body of empirical findings call into question many of the underlying assumptions of the standard approach (Gintis, 2000; Gowdy, 2004, 2005). These standard assumptions include (1) equating consumption with well-being, (2) setting aside questions of distribution and relative income by invoking the notion of a Potential Pareto Improvement, (3) implicitly assuming that money is a universal substitute for anything, and (4) assuming that preferences are stable and self-regarding so that the benefits and costs to individuals are independent and additive. Behavioral experiments, neuroscience studies, and game theoretic experiments have demonstrated that market consumption cannot be equated to well-being, lexicographic preferences are prevalent, especially with regard to environmental features, and that preferences are other-regarding. How individuals value monetary payoffs depends on social context, relative position, and the reference point of the valuation. The assumptions underlying the standard BCA approach are at odds with the observed human behavior and they yield poor predictions of the economic decisions people actually make. What do the new economic models of human behavior mean for BCA?

2. Experimental economics and the demise of traditional BCA

Criticisms of conventional economics are not new. Many of the “new” findings of behavioral economics and game theory can be

² Welfaristic approaches to sustainability usually begin by defining utility broadly but after that the measure of welfare becomes, in one form or another, the output of a market economy (output, consumption, or per capita consumption). The caveat is sometimes made that this output is produced by an economy in which all prices are corrected for market failure (Solow, 1993) but in practice reported economic output is used (Pearce and Atkinson, 1993; Beckerman, 1994; Nordhaus, 2001; Dasgupta, 2002). Although the Second Fundamental Theorem of welfare economics may be invoked to claim that all market failures can and should be corrected, utility is still equated with consumption. See the discussion of this in Frey and Stutzer (2002, p. 73).

found in the work of Veblen (1907) and others writing one hundred years ago. The reasons why current criticisms are finally having an impact are first, they are based on replicable experiments, and second, these experimental results offer constructive alternatives to modeling the behavior of economic agents (Gintis, *in press*). What are the major points of departure between the assumptions of conventional BCA and the findings of contemporary experimental economics?

2.1. Income cannot be equated with well-being

Conventional BCA assumes that (properly adjusted or “Hicksonian”) income can be equated to well-being. The fact that income is not a good proxy for happiness has long been a topic of interest to economists, inspired in part by the pioneering work of Easterlin (1974), Hirsch (1976), and Scitovsky (1976). This early work influenced the limits to growth literature within ecological economics but had only a limited impact within the economics profession as a whole. For the most part, those economists who took the limitations of income measures seriously merely modified traditional GDP accounts to include social and environmental considerations. A spate of recent work on the components of well-being uses direct measure of subjective utility as an alternative to per capita GDP (Kahneman et al., 1997; Frey and Stutzer, 2002; Layard, 2005). Subjective measures of well-being show consistently that, past a certain fairly low level, increasing income does not lead to permanent increases in well-being. Real per capita income in the U.S. has increased sharply in recent decades but reported happiness has slightly declined (Blanchflower and Oswald, 2000). Studies of individuals also show lack of correlation between increases in income and increases in happiness (Frey and Stutzer, 2002).³

There is a growing literature of non-welfaristic approaches to development policy. Sen (1999) has called for an approach to development emphasizing the ability to live an informed and full life rather than concentrating solely on income creation. Nussbaum (2000, chapter 4 and website of Human Development and Capabilities Association) has gone even further in calling for “distributive justice” creating the conditions for the realization of a set of central human capabilities.

Current work in quality of life indicators has resulted in theoretically sound measures of subjective well-being and suggests a much more robust approach to economic accounting for public policy than merely modifying existing flawed income measures of social welfare (Frey and Stutzer, 2002; Layard, 2005). A growing number of economists advocate the use of measures of subjective well-being in the objective welfare function rather than revealed preferences, that is, using an empirically-based subjective utility function (based on experienced utility) rather than a consumption function (Kahneman and Sugden, 2005).

The relatively weak link between income and happiness raises some serious questions about conventional BCA and

³ Part of the lack of correlation between income and well-being is to due the “positional” nature of consumption (Frank, 1999). It has also been argued that the growth in material prosperity has been accompanied by a decline in really important non-market goods like social capital, family support, etc. (Kasser, 2002).

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