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ANALYSIS

Toward a new welfare economics for sustainability

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Abstract

The debate over various definitions of sustainability has for the most part been conducted within the framework of traditional welfare economics. Discussion has centered on technical issues imbedded within the functional forms of various optimization models, especially the coefficient of the elasticity of substitution and the social discount rate. Two more basic problems are: (1) intractable theoretical difficulties within welfare economics call into question the results of traditional models of sustainability regarding intergenerational welfare and (2) equating per capita consumption with welfare contradicts empirical evidence suggesting that the link between happiness and wealth/income is relatively weak. Alternative approaches to measuring well-being are being developed and these have great potential to move the sustainability debate forward.

Keywords: Boadway paradox; Potential Pareto improvement; Subjective well-being; Utility; Weak sustainability; Welfare economics

JEL classification: D6; D91; O11; Q01

1. Introduction

The debate between advocates of weak and strong sustainability has, for the most part, focused on the substitutability between natural capital and human-made capital of various sorts (see the summary by Pezzey and Toman, 2002). A great deal of work has explored the conditions for optimizing intergenerational social welfare but little attention has been given in the sustainability literature to the intractable difficulties inherent in making Pareto consistent welfare comparisons. Weak sustainability is firmly rooted in the New Welfare Economics (NWE) that dominated economic theory from the late 1930s until the 1990s (Bowles and Gintis, 2000; Suzumura, 1999). The emphasis of NWE is on achieving efficiency in allocating economic outputs and inputs through substitution and seeking potential Pareto improvements (PPIs). Weak sustainability is based on the work of Solow (1974, 1993) and Hartwick (1977, 1996) concerning the allocation through time of an exhaustible resource. The basic idea is that social welfare (defined as the sum of individual utilities) should be

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non-declining through time.[1] Welfare is (explicitly or implicitly) equated with consumption, broadly defined, so sustainability across generations is assured by maintaining the total stock of capital used to generate economic goods, broadly defined. In the weak sustainability framework, substitution is not only permitted, it can be a moral imperative: if the net present value generated by transforming natural capital into human-made capital is greater than the net present value generated by leaving natural capital intact, then this transformation should be done (Beckerman, 1994; Solow, 1993). Otherwise, the inefficient use of capital will mean that future generations will be needlessly worse off.[2]

Advocates of strong sustainability argue that traditional neoclassical models overestimate the possibilities of substitution between natural and manufactured capital including the related problems of complementarity, irreversibility, pure uncertainty and discontinuous change (Daly, 1995; Gowdy, 2004; McDaniel and Gowdy, 2000; Ng and Wills, 2002). The debate over strong sustainability has, for the most part, also taken place within the framework of NWE. The question of the substitutability of manufactured for natural capital can be reduced to a purely empirical question within neoclassical economics as to the elasticity of substitution between different kinds of capital. Weak sustainability, and strong sustainability as it relates to capital substitutability, boils down to applying the Second Fundamental Theorem of Welfare Economics and "getting the prices right". But the problems with NWE models of sustainability run much deeper than disagreements over which prices to use and the degree of substitutability between human-made and natural capital. NWE has foundered on the attempt to make social welfare judgments without making interpersonal comparisons of utility. This calls into question a central concern of economics during the last 50 years, that is, the identification of the most "efficient" economic policies to increase the output of goods and services. The theoretical difficulties with neoclassical measures of potential Pareto improvements, and the abandonment of NWE by leading neoclassical theorists, are critically important for the sustainability debate.

If the NWE framework cannot be used as a guide to evaluate welfare changes over time, what framework should take its place? Fortunately, theoretical and empirical research is quickly filling the void left by NWE. Economists are going back to Bentham to address the question: "What makes people happy?" (Dixon, 1997; Easterlin, 2001; Frey and Stutzer, 2002; Kahneman et al., 1997; Layard, 2003; Ng, 1997, 2003; Schwarz and Strack, 1999). Accepting the necessity of interpersonal comparisons of well-being, what economic policies should be put in place to increase the greatest good for the greatest number? Instead of using consumption as an indicator of well-being, economists are directly estimating human "welfare" in all its complexity. This body of work has the potential to move the sustainability debate out of the quagmire of theoretical difficulties associated with the NWE. Replacing the perfectly rational *Homo economicus* with realistic models consistent with known facts from anthropology, neuroscience and psychology is a logical step toward improving economic science (Camerer and Loewenstein, 2003). Among the most important findings of the happiness literature are these: (1) traditional economic indicators such as per capita NNP are poor measures of welfare, (2) utility depends on interpersonal comparisons and relative position, (3) all humans have common, identifiable biological and psychological characteristics related to their well-being. These observations have direct bearing on the sustainability debate and

[1] Sustainable consumption and intertemporal resource allocation has been extensively discussed. Dasgupta and Heal (1979) proved that a sustainable consumption path exists if a rising marginal product for the resource compensates for resource depletion. They also show that any positive discount rate implies declining consumption levels. Hartwick (1977) demonstrated that a constant per capita consumption path is possible if all scarcity rent is invested in capital. Howarth and Norgaard (1990) showed that efficient allocation of resources across generations does not necessarily result in sustainable consumption. Pezzey (1989) points out that the definition of sustainability as non-declining welfare over time is different than maximizing net present value. For further discussion, see Pezzey and Toman (2002) and Tietenberg (2003, chapter 23).

[2] Also central to this analysis is Weitzman's (1996) result that Net National Product (NNP) is equal to the present value of consumption. Following the usual economic convention of equating consumption and welfare, it is an easy step to the result that a set of prices exist so that maximizing wealth is equivalent to maximizing welfare (see the discussion in Brekke, 1994). The Second Fundamental Theorem can then be invoked to take care of everything from externalities to existence values.