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Is welfarism compatible with sustainability?

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The World Commission on Environment and Development (1987, p. 43) defined sustainable development as «development that meets the needs of the present without compromising the ability of future generations to meet their own needs.» Two interpretations of this definition have been explored in natural resource and environmental economics. Proponents of *weak sustainability* (Solow, 1993) begin with the assumptions that: (a) future preferences and technology may be predicted with reasonable precision; and (b) analysts are able to construct cardinally comparable measures of the utility or well-being of successive generations. Under these assumptions, an intertemporal path is said to be «sustainable» if the subjective welfare of a typical person is nondiminishing from generation to generation. Natural resource depletion and environmental degradation are consistent with this approach given sufficient investments in other forms of wealth.

The second interpretation, known as *strong sustainability* (Daly and Cobb, 1989), starts with the premise that uncertainties concerning future technology, preferences, and the behavior of environmental systems effectively preclude aggregate comparisons between the welfare of present and future generations. Decision-makers, however, can ensure that the life opportunities of future generations are no worse than those of the present by specifically conserving stocks of human and reproduced capital, technological capacity, natural resources, and environmental quality (Page, 1983). This approach permits substitutions of reproduced capital or new technologies for natural resources, but only when there is compelling evidence that such substitutions would benefit both present and future generations. Thus strong sustainability takes resource conservation as its operational criterion in cases where the costs and benefits of alternative policies cannot be characterized with precision.

The foundations of sustainability concepts have been explored in the philosophical literature on intergenerational justice in resource allocation (Laslett and Fishkin, 1992). Howarth (1995), for example, argues that prin-

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ciples of justice between contemporaries logically entail a moral duty to maintain human welfare or life opportunities from generation to generation. Under this interpretation, sustainability concepts are derived from premises of procedural fairness in the design of foundational institutions. In the Kantian tradition, duties to ensure intratemporal or intergenerational justice are logically prior to prudential considerations in the evaluation of alternative social states. As Rawls (1982, p. 184) frames this point, «Justice is prior to the good in the sense that it limits the admissible conceptions of the good, so that those conceptions the pursuit of which violate the principles of justice are ruled out absolutely: the claims to pursue inadmissible conceptions have no weight at all.»

This approach is criticized by skeptics who claim that sustainability criteria should be derived from an explicit specification of social preferences rather than imposed as *a priori* constraints on intergenerational choice (Beckerman, 1994). Dasgupta and Mäler (1995, p. 2394), for example, claim that «a more general (and intellectually firmer) approach would be to allow future generations' well-beings to be reflected in a function that is defined over the well-beings of all generations.» This statement, which equates social rationality with the selection of the most desired element of a complete social preference ordering, defines a methodological position that Sen (1979) labels *welfarism*. More specifically, Dasgupta and Mäler (see also Dasgupta and Heal, 1979) argue that the criterion of discounted utilitarianism that is commonly employed in optimal growth models offers an approach to intertemporal planning that is explicitly grounded on a set of plausible choice axioms.

The distinction between sustainable development and welfarism as approaches to intergenerational choice is significant in both conceptual and practical terms. As Dasgupta and Mäler point out, and as Asheim (1996) describes in detail, utility discounting can give rise to «optimal» paths where living standards erode steadily over time even when a constant level of welfare is technically feasible. Since utility discounting is a standard technique in intertemporal economics, and since it seemingly conflicts with expressed public sentiment concerning intergenerational decision-making, one is left with the uneasy impression that the usual techniques may give rise to anomalous policy prescriptions.

This paper investigates the relationship between sustainability and the normative assumptions that support welfarism as an approach to policy analysis. We find that strong sustainability and welfarism are at root incommensurable since they rest on very different assumptions concerning the predictability of future social states. Less obvious and perhaps more interesting is the deep-seated tension that exists between weak sustainability and a number of axioms commonly employed in the welfarist tradition – the assumptions that: (a) social preferences are continuous on the set of intergenerational utility paths; (b) an intertemporal path is socially preferred to a feasible alternative if it improves the welfare of at least one generation while leaving none worse off; and (c) exchanging the utilities of two generations should leave the perceived desirability of a path unaltered.

Characterizing the Conflict
Dasgupta and Heal (1979, ch. 9) seek to ground the analysis of intergenerational choices on a set of formal axioms that generate a well-defined intertemporal social welfare function. These authors consider a society characterized by an infinite sequence of discrete generations. The most important assumption supporting their approach is, in

fact, not actually formalized as an axiom by Dasgupta and Heal. This is the assumption that Sen (1979) terms *welfarism* – the notion that intergenerational choices should depend solely on the utility or welfare of each successive generation.

The introduction noted that the welfarist approach is incommensurable with the concept of strong sustainability. Strong sustainability begins with the assumption that future welfare cannot be predicted with sufficient precision to yield useful insights into intergenerational choices. Accordingly, access to a *structured bequest package* (Norton, 1995) of primary goods that ensures that life opportunities remain undiminished from each generation to the next becomes the operational standard of intergenerational justice (Page, 1983). Under welfarism, in contrast, analysts are able to calculate each generation's subjective welfare based on *ex ante* knowledge of future technology, preferences, and environmental conditions. Only realized outcomes, and not prior notions of rights or entitlements, are relevant under the welfarist approach.

The distinction between these views is depicted graphically in Figure 1. The two axes correspond to a particular generation's access to two primary goods. The indifference curve **I** represents this generation's subjective preferences. Under welfarism, the two choice sets **A** and **B** are construed as equally good – at least under certainty – since they are each tangent to the same indifference curve and hence yield equivalent levels of well-being. Suppose, however, that the present generation could choose from set **A** while succeeding generations were only able to choose from the small circle **B**. Although *ex post* utility is maintained over time, future generations are left with

Figure 1
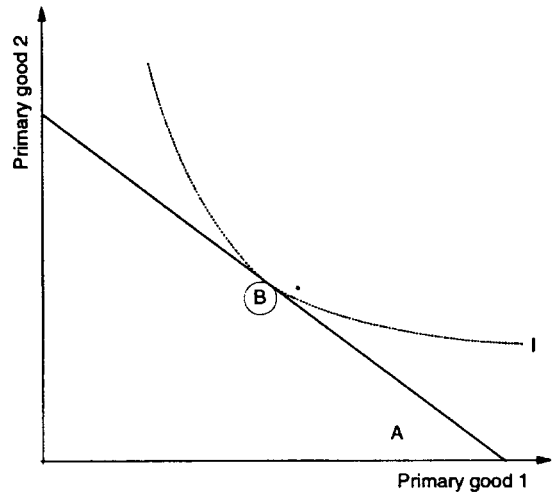
comparatively little freedom of choice. This state of affairs is thus incompatible with strong sustainability since life opportunities, defined in terms of freedom of choice, are not maintained over time[1].

Sustainable preferences
Under welfarism, social decisions concerning intertemporal trade-offs depend solely on the utilities of each successive generation, with social preferences given by a well-defined ranking over utility sequences. Without loss of generality, we limit attention to the case where there are only two generations – the «present» and the «future.» The problem may then be illustrated as in Figure 2, where the indifference curves I_0 and I_1 represent social preferences over intergenerational utility sequences.

Consider the standard definition of weak sustainability that utility or welfare should be nondeclining from generation to generation. Thus if present utility exceeds future utility, the path in question is classified as unsustai-

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1. With risk, freedom under welfarism has an *option value*, so that the choice set **A** would be preferred to the alternative **B**. This option value is instrumental, not intrinsic.

nable. This concept of sustainability is typically imposed as a side-constraint on intertemporal optimization. Unsustainable paths are ruled out as intrinsically unfair to future generations, so that no utility sequence below the 45° line in Figure 2 could be accepted as a social optimum. This approach is equivalent to the view that any utility sequence on or above the 45° line is socially preferred to all sequences below this threshold, while sustainable (or unsustainable) paths may be compared to each other on the basis of other preference criteria as embodied in the indifference curves I_0 and I_1. We shall term preference orderings that satisfy this assumption as *weakly sustainable*.

When sustainability is defined in terms of preferences, the tension between sustainability and welfarism becomes obvious, since weak sustainability is plainly inconsistent with central assumptions of the welfarist tradition. Consider, for example, the following choice axioms that are widely employed in studies of intergenerational choice (Koopmans, 1972; Dasgupta and Heal, 1979).

Continuity. In intuitive terms, preferences are continuous if they exhibit the following property. Suppose that a path A is socially preferred to an alternative B. Then for any third sequence A' that is sufficiently close to A, it follows that A' must also be preferred to B. The fact that continuity and weak sustainability are in conflict is apparent from Figure 2. In this figure, A is socially preferred to B since both paths are sustainable while A lies on a higher indifference curve. Under continuity, it must be the case that any intertemporal path A' that is in the neighborhood of A must also be preferred to B. Note, however, that A lies on the 45° line that divides sustainable and unsustainable paths. We may therefore find a point A' that, although arbitrary close to A, is unsustainable and hence strictly inferior to B under weakly sustainable preferences. We are therefore left with a contradiction.

The Pareto principle – the notion that one resource allocation is preferred to an alternative if it leaves at least one person (or generation) better off while leaving none worse off – is one of the most important concepts in the welfarist tradition, providing the basis for the use of potential compensation tests in cost-benefit analysis. It is readily shown, however, that this concept is in fact inconsistent with a systematic commitment to weak sustainability. Referring once again to Figure 2, we see that the sequence C is unsustainable and hence inferior to both A and B under weakly sustainable preferences. C, however, Pareto dominates each of these points and is thus preferred under the Pareto principle. In comparing these outcomes, weak sustainability and the Pareto principle generate conflicting recommendations.

Ethical neutrality. The notion that the interests and prerogatives of different individuals

Figure 2
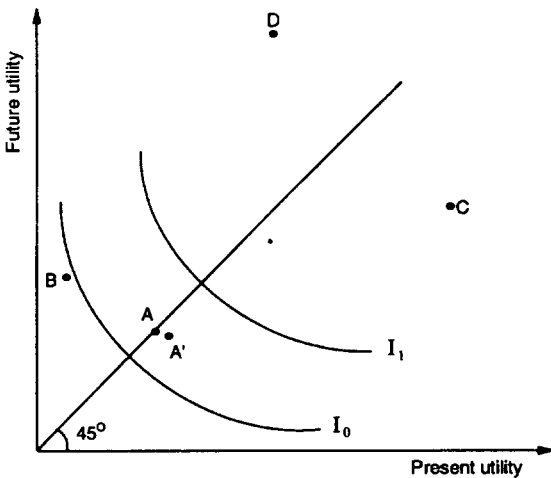
should count equally in social decisions is a foundational principle of moral philosophy. Deontological principles of justice, for example, require that individuals enjoy a common set of legal and economic rights (Rawls, 1971). Policies that systematically favored the interests of one group at the expense of another would, under this interpretation, be rejected as unfair. In the welfarist approach to intergenerational choices, the notion of ethical neutrality is sometimes interpreted as the requirement that social welfare should remain unchanged when the utilities of any two generations are exchanged in the social welfare function (Dasgupta and Heal, 1979). This premise, like those examined above, turns out to be in conflict with weak sustainability. In Figure 2, C and D are symmetric – we obtain D from C by interchanging the utilities enjoyed by present and future generations. Under ethical neutrality, D and C should therefore be construed as equally desirable. Note, however, that D is sustainable while C is not. Weakly sustainable preferences, in contrast, imply that D must be strictly preferred to C.

Interpretations and Conclusions

This paper examines the relationship between sustainability concepts and welfarism in the analysis of intergenerational choices. We find that strong sustainability and welfarism offer disparate approaches to what are, in essence, sharply distinct conceptual questions. Welfarism assumes that the future can be known and that intergenerational welfare comparisons may be meaningfully undertaken. Strong sustainability, in contrast, provides a principled choice framework in settings where information about the future is structurally incomplete. Settling the normative differences between these two approaches would therefore require the resolution of underlying epistemological disagreements.

Weak sustainability and welfarism are in one sense compatible since both rely on utility information as the sole basis for framing intergenerational choices. But weak sustainability is inconsistent with central axioms of the welfarist tradition, implying for example that preferences concerning intergenerational trade-offs cannot be represented by a continuous preference ordering defined over the utilities of all present and future generations. Weak sustainability also conflicts with the Pareto principle, which holds that one intertemporal path must be preferred to a feasible alternative if it leaves at least one generation better off while leaving none worse off; and with ethical neutrality, which utilitarians invoke as a plausible standard of intergenerational fairness (Broome, 1992).

How serious are the conflicts that arise between sustainability and welfarism? Since the value judgements implicit in sustainability concepts enjoy a significant degree of professed political support (WCED, 1987), it seems problematic to ignore their implications when making intergenerational welfare comparisons. Is it possible to defend sustainability within a welfaristic framework despite the problems identified above?

In the problems typically examined in resource economics, one may apply the principle of weak sustainability to rule out futures where human welfare is not maintained over time. The set of sustainable futures then generally includes some number of Pareto-efficient paths that may then be evaluated based on welfarist considerations. Howarth (1995) argues that this two-tier approach to intertemporal choice is justified on a deontological theory of intergenerational justice. Since this argument is deontological, it is not obvious that a similar line of reasoning can be extended to a teleological philosophy.

An alternative defense is to work with a social welfare function that identifies an efficient, sustainable path as its *optimum* under re-

alistic technological conditions and resource constraints. The maximin criterion, for example, generally has this property, although it rules out paths where human welfare is improving over time. The Calvo criterion is a more flexible choice rule that Asheim (1996) shows to give nondecreasing but possibly increasing welfare along optimal paths. This approach takes sustainability as a characteristic of optimal solutions rather than as an *a priori* principle of intergenerational fairness.

The conflict between welfarism and sustainability is analogous in important respects to the Paretian-liberal paradox identified by Sen (1970). Welfarism, it seems, is not easily reconciled with the deontological moral commitments that support both liberalism and related theories of justice (Rawls, 1971). Whether one favors welfarism or some alternative approach to public decision-making is a philosophical question that cannot be settled on the basis of purely technical considerations. As Sen and Williams (1982, p. 1) point out, critics worry that welfarism «represents an attempt to do too much, to give too comprehensive and extensive an answer to problems of personal and public choice.» Welfarists, in contrast, argue that the apparent conflict between sustainability and other normative commitments points to the need for more general choice axioms (Dasgupta and Mäler, 1995).

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