The Ethics of Intergenerational Distribution: Reply and Response to John E. Roemer

Partha Dasgupta

Environmental & Resource Economics

The Official Journal of the European Association
of Environmental and Resource Economists

🐎 Springer

🐎 Springer

Springer

The Ethics of Intergenerational Distribution: Reply and Response to John E. Roemer

Partha Dasgupta

Abstract   Recent concerns among economists over global climate change have given rise to an uneven literature on intergenerational welfare economics. *Environmental & Resource Economics* in its March 2011 issue published a paper by the political philosopher John E. Roemer that contains not only errors of interpretation of what others have written, but also misunderstandings of settled matters. I respond and reply to Roemer by re-exploring the foundations of intergenerational welfare economics. I show that ethical pluralism gives rise to a very different framework for thinking about the subject than the one Roemer presents in his paper. Moreover, his dismissal of much of what welfare economists write on such concepts as social discount rates has as its source an utterly narrow view of the contexts in which economic evaluation is undertaken in the contemporary world.

Keywords   Teleological theories · Classical utilitarianism · Intuitionist theories · Coarse-grained theories · Fine-grained theories · Consumption discount rates · Felicity discount rates · Dysfunctional societies · Continuity and completeness of social orderings

JEL Classification   D63 · D90 · H43

1 Introduction

In a Special Issue entitled "Environmental Social Science", the Guest Editors of *Environmental & Resource Economics* (Vol. 48, No. 3, March 2011) have included a paper by the political philosopher John E. Roemer, on the ethics of intergenerational distribution (Roemer 2011). The article contains strong criticisms of a number of passages in two papers of mine (Dasgupta 2005, 2008). As neither Roemer nor the Guest Editors had sent me the typescript

P. Dasgupta (✉)
University of Cambridge, Cambridge, England, UK
e-mail: partha.dasgupta@econ.cam.ac.uk

P. Dasgupta
University of Manchester, Manchester, UK

to seek confirmation that they had understood what I had written, I didn't get to read Roemer's paper until receiving my subscription copy of this journal. And I can only imagine that the referees of his submission didn't check whether, mathematics apart, the author had shown a grasp of the subject on which he was writing. In this paper I not only reply to Roemer's criticisms, I also try to understand why and in which ways he has mislaid modern welfare economics. Although Roemer is critical of other economists as well, in particular William Nordhaus (Nordhaus 2007, 2008), I confine my reply to those passages in Roemer's paper that bear on my work.

Far too much has been published in the past few years on intergenerational welfare economics, in that errors of interpretation have crept into discussions of well known concepts, such as "utility discount rates" (Sect. 2) and "consumption discount rates" (Sect. 4). That poses the danger of derailing readers new to the subject. Roemer is especially guilty of that charge. So, in Sect. 2 I rehearse a number of issues in intergenerational welfare economics that had been probed and clarified way back, in the 1960s, most prominently by the late Tjalling Koopmans (Koopmans 1960, 1965, 1967, 1972). In Sects. 3 and 4 I reply to Roemer's criticisms of my own writings.[1]

2 Roemer's Reasoning

Roemer's analysis begins (p. 365) with the assumption that the domain of "intertemporal welfare functions" (IWFs) is a set of feasible consumption paths, denoted by Z, so that "any path in Z can be implemented, from the technological and physical/biological viewpoint." Alarm bells should sound even at this early point in his article. If an IWF is to reflect a moral viewpoint, it should be defined on the set of *possible* paths, not merely implementable paths. Much moral and ethical reasoning involves exercises in possible worlds, not just in the world we think we know. Otherwise coarse-grained value judgments would lack the universality they should be required to possess. It is a point to which I return below.

Roemer's moral view (he calls it "Our ethical view" on p. 365) is summarized by an IWF, W, which "aggregates the welfare levels of the various generations into an index of social welfare." The arguments of W are sequences of generational utilities induced by consumption paths. In his numerical computations on a dynamic model of his creation (pp. 380–384), Roemer injects wider content into the elements of Z by requiring Z to mean the set of feasible "amenity" paths; but nothing will be lost here if we regard "amenity" to be a single consumption good.

At times Roemer refers to utility as "welfare". In Dasgupta (2008) I used the term *felicity* in place of utility. I continue the practice here, although it is increasingly common among economists to use the term "well-being" in its place. Moreover, in order that readers are easily able to relate this paper to those papers of mine he criticizes, I follow the notation there even while quoting Roemer. For example, in place of the vector z for Roemer's amenities, I write the scalar C for consumption. Aside from a necessary digression in Sect. 2.3, I assume for simplicity an absence of uncertainty, including any risk of the extinction of the human race as we know it. What Roemer has to say (pp. 367–368) about the way risk of extinction can be accommodated in welfare economics has been said many times before (e.g., Yaari 1965, on

---

[1] Page-proofs of Roemer's article were at best perfunctorily checked for typographical errors. In a number of places punctuation marks followed by gaps stand in for English words. So as to unearth what Roemer intended to say, I searched on the internet and located a November 2009 Discussion Paper issued by Centro de Estudios Andauces, Seville. Roemer (2011) would appear to be the published version of that discussion paper. In quoting directly from misprinted lines in his published paper, I have relied on the Seville version.

the consumer facing an uncertain lifespan; and Dasgupta and Heal (1979), on the concerned citizen behind Rawls' veil of ignorance but guided by the von Neumann–Morgenstern axioms of choice under uncertainty).

Like many others writing on intergenerational welfare economic theory, Roemer eschews distributional considerations among people alive in the same period. So he supposes (p. 365) that "each generation is represented by a single agent . . . the single agent being the 'average person'."

Time is discrete: $t = 0, 1, 2, \ldots$ Let the consumption available to an agent in "period t" be $C(t)$. A consumption stream is an infinite sequence $C = (C(0), C(1), \ldots, C(t), \ldots)$ and the corresponding value of W in $t = 0$ is

$$W_0 = W(U(C(0)), U(C(1)), \ldots, U(C(t)), \ldots) . \tag{1}$$

U ("welfare" or "utility", in Roemer's words) in Eq. 1 is taken to be an increasing function of C. Roemer observes (p. 365) that "[W_0] embodies our *ethical views* about how the welfare of one generation should be traded off against the welfare of other generations, and the set Z embodies *facts about the world*." He therefore interprets the problem before the "social planner" (p. 366) as[2]:

$$\text{Choose that } C \text{ in } Z \text{ which maximizes } W_0. \tag{2}$$

There is much talk in the article about keeping "facts" and "values" separate from one another, including an implicit criticism (p. 365) of the "Many discussants in the climate-change debate . . . [who] want the function W to embody facts about the world, not only ethical views," a remark that could be interpreted as being a critique of the practice of suitably altering the parameters in W_0 if it is found to embody a morally questionable ordering of infinite felicity sequences associated with Z. This is a matter to which I return in Sect. 2.3.

"Dates" and "generations" are not distinguished by Roemer. We may then imagine that if, say, people live for 70 years and the unit of time is a year, all who are alive in period t are to be called "generation t", and $C(t)$ is to denote the average consumption level of generation t. Comes the next year, and the composition of the population is a bit different, with all previously 70-year olds replaced by newborns. $C(t + 1)$ however is deemed to be the average consumption level of generation $t + 1$. This terminology, although a commonplace in modern welfare economics, will be seen to be misleading (Sect. 3).

2.1 Teleological and Intuitionist Theories

In Dasgupta (2008) I presented an account of intergenerational welfare economics by discussing the works of Cline (1992), Nordhaus (1994), and Stern (2006) on the economics of global climate change. The authors had adopted a nearly identical mathematical form for W_0, which is

$$W_0 = U(C(0)) + U(C(1))/(1 + \delta) + \cdots + U(C(t))/(1 + \delta)^t + \cdots$$
$$= {}_{t=0}\Sigma^\infty [U(C(t))]/(1 + \delta)^t , \quad \delta \geq 0. \tag{3}$$

Roemer interprets equation (3) to be an embodiment of "discounted utilitarianism" if $\delta > 0$ (p. 366) and of "undiscounted utilitarianism" if $\delta = 0$ (p. 370). One of my purposes

---

[2] Roemer's account of who does the thinking is at best undisciplined. He refers to the agent responsible for framing and solving the planning problem just mentioned in the text sometimes as the "social planner" (p. 366), sometimes as the "social evaluator" (pp. 367–368), at other times as the "Ethical Observer" (p. 377).

in Dasgupta (2008) and the sole purpose in Dasgupta (2005) was to show that although W_0 in Eq. 3 is widely referred to as a *utilitarian* IWF, there are at least two moral theories that, under appropriate assumptions, lead to that common form. In Dasgupta (2005, 2008, 147) the Classical Utilitarianism of Ramsey (1928)—which is a Teleological theory—was distinguished from the Intuitionism of Koopmans (1960, 1972) and Diamond (1965). In using these terms, I am following Rawls (1972, pp. 22–26, 34–40, 183–194). Because I borrow the distinction he drew, it will prove useful to quote him directly.

Rawls (p. 34) introduced Intuitionism as "... the doctrine that there is an irreducible family of first principles which have to be weighed against one another by asking ourselves which balance, in our considered judgment, is the most just... Intuitionist theories ... have two features: first, they consist of a plurality of first principles which may conflict to give contrary directives in particular types of cases; and second, they include no explicit method, or priority rules, for weighing these principles against one another: we are simply to strike a balance by intuition, by what seems to us most nearly right."

Tradeoffs between total welfare and the distribution of welfare among people, a common object of study in welfare economics and political philosophy (e.g., Barry 1965), reflects plurality, which is the hallmark of Intuitionism. I think by "first principles" Rawls meant what Sen (1967, 1970) called "basic value judgments", namely, those that apply unconditionally. A value judgment is *basic* if there are no conceivable revision of factual information that would make one revise the judgment. I doubt that in practice we can be confident we know what they are, unless we so condition a value judgment that it is 'basic' by default. So, the version of Intuitionism I rely on here is the one that refers to the plurality of moral principles, whether or not they are basic.

Rawls (pp. 184–186) described Classical Utilitarianism as a theory that regards something as right, an allocation of resources, say, or more generally a social system, "... when an ideally rational and impartial spectator would approve of it from a general point of view should he possess all the relevant knowledge of the circumstances. A rightly ordered society is one meeting the approval of such an ideal observer... Thus an impartial spectator experiences this pleasure in contemplating the social system in proportion to the net sum of pleasure felt by those affected by it. The strength of his approval corresponds to, or measures, the amount of satisfaction in the society surveyed."

Rawls interprets Classical Utilitarianism as a teleological theory, in as much as it defines the "good" independently of the "right", and then defines the right as that which maximizes the good. For Classical Utilitarians, the principle of arriving at moral judgments from the recommendations of the Ideally Rational and Impartial Spectator (Impartial Spectator for short) trumps all other considerations.[3]

The distinction Rawls drew was borrowed by Dasgupta and Heal (1979, Ch. 9) for classifying various theories governing the ethics of intergenerational welfare distribution. It was noted there and in Dasgupta (2008) that although in Classical Utilitarianism U in Eq. 3 would denote felicity, in Koopmans' intuitionist theory, U would be an increasing function of felicity (Eq. 4 below). Moreover, in Dasgupta (2008) I noted that while Cline, Nordhaus, and Stern inferred U from people's behaviour, they differed in the way they chose δ: Cline and Stern looked to moral philosophers for their choice of δ, whereas Nordhaus studied market data. I suggested that differences in their approaches on the matter explain why Cline (1992) set $\delta = 0$, why Stern (2006) set $\delta = 0.1\%$ a year, and why Nordhaus (1994) assumed $\delta = 3\%$ a year.

---

[3] Rawls (1972, pp.183–192) has a fine account of the role of the Impartial Spectator in Classical Utilitarianism. He relates Sidgwick's version to that of David Hume and Adam Smith. Mirrlees (1982) contains a summary of the Classical Utilitarian interpretation of W.

Social ethics contains an irremediably democratic element. Even though Classical Utilitarians based their moral theory on the judgment of the Impartial Spectator, they didn't choose U, but regarded it as something to be determined by the persons themselves. That may be why economists are drawn to the study of behaviour as a way of determining ethical parameters. (Roemer, 2011, 371–373) is dismissive of any reliance on "revealed preference". He thinks the only way to justify studying behaviour in the market place to infer, say, δ is to assume that the data are generated either by the decisions of an immortal citizen whose preferences are represented by W_0 in Eq. 3, or by an altruist parent whose extended preferences are represented by W_0 in Eq. 3. Roemer doesn't pick on the fact that the immortal citizen is a figment of the economist's imagination, but instead dismisses the construct because it countenances the *hegemony* of the present generation. He lodges the same complaint against the model of the altruistic parent. But if we are entitled to indulge in the figment of our imagination, why can we not assume that the representative citizen's decisions on consumption, saving, and bequest are guided by an intuitionist ethic, reflected in W_0 of Eq. 3?

I jest of course. The practice of equating market interest rates to (societal) consumption discount rates in a world that is far from the full optimum seems highly dubious to me. A large literature on welfare economics in imperfect economies (e.g., Marglin 1976) tells us why those who follow the practice should have abandoned it long ago. Roemer (p. 376) imagines that in Dasgupta (2008) I was "... advocating the model of the infinitely-lived consumer, and deducing the discount factor from market data." I have absolutely no idea where he got that idea: there is not even a *mention* of the immortal citizen in any of my papers, nor any suggestion that market data from imperfect economies can reliably inform us of ethical parameters; quite the contrary (Dasgupta 2008, p. 158).

2.2 Productivity of Capital and the Ethical Observer's Idea of Fairness

In developing intergenerational welfare economics, Ramsey drew on Classical Utilitarianism (Sidgwick 1907; Pigou 1920), which evaluates social states in terms of the point of view of the Impartial Spectator. The Impartial Spectator is understood to make the rounds, from person to person across space and time, summing everyone's felicities as She does so, much as a vessel accumulates rain water over time. In effect, of course, the Impartial Spectator has *no* particular point of view, which to the Classical Utilitarian is Her main attraction, or so I imagine. In this vein, Sidgwick (1907, 412) wrote: "It seems ... clear that the time at which a man exists cannot affect the value of his happiness *from a universal point of view*; and that the interests of posterity must concern a Utilitarian as much as those of his contemporaries ..." (italics mine).

In presenting his conception of intergenerational welfare, Roemer also invokes a higher authority, a Being he calls the Ethical Observer. As his entire paper is based on what he believes the Ethical Observer would countenance, readers could be left with the impression that Roemer can't imagine that theories of intergenerational welfare could be constructed without the help of that Being. But there are perfectly respectable moral theories, such as the contractual theory of Rawls (1972) and as noted above, the intuitionist theory of Koopmans (1960, 1972), which do not derive a social ordering of alternatives from the musings of the Ethical Observer. Koopmans' moral axioms, for example, are directed at someone here and now. The person could be the concerned citizen, the responsible public decision-maker (in Dasgupta 2008, p. 143, I referred to them collectively as the *social evaluator*), or anyone seeking to evaluate infinite felicity sequences from the moral point of view without having to take refuge in the putative instructions of some mythical Being.

Roemer is dismissive of any moral theory that commends a positive δ in Eq. 3. At one point he suggests (p. 366) that to do so implies that the first generation is accepted as a "hegemon". He says (p. 369) that for the Ethical Observer to choose a positive δ (which would imply "social impatience" in Eq. 3), would be to violate "*fairness*, which requires that we give all generations equal consideration." And he goes on to say, "Formally, this [fairness] is summarized by the requirement that the social-welfare function be symmetric."

That sounds grand; and many moralists have expressed the same sentiment many times before, even insisting that the principle of awarding equal weight to the welfares of all generations trumps every other moral consideration (Sidgwick 1907, in the passage just quoted; Pigou 1920; Ramsey 1928; Parfit 1984; Cowen and Parfit 1992; Broome 2008).[4] The problem is that it's merely an assertion, not much else. For we should ask: "Fairness in what?"

Roemer says there is a unique answer to the question, which is that W_0 in Eq. 1 is a symmetric function of the Us, implying that $\delta = 0$ in Eq. 3. This straight-jacketing of the word "fairness" lands Roemer into all sorts of trouble. For example, what if "fairness" as interpreted by him commends a grossly unfair distribution of felicities across the generations? We live in a world where, owing to the productivity of capital, later generations enjoy a natural advantage over earlier ones. If stocks are not too large, fisheries grow when left undisturbed; if trees are not too old, forest biomass increases when left unmolested by humankind; and so on. These are deep facts, not incidental ones, and they tell us that the generations are not symmetrically placed in regard to the allocation of resources.

Many years ago Koopmans showed that because capital is productive, to require δ to equal zero in Eq. 3 could mean that the present generation, *even if very poor*, is asked to save at huge rates. There are classroom models, known since Ramsey (1928) and reproduced in Dasgupta (2008, p. 155), where the *optimum* rate of saving is nearly 100% of GDP. That enormous sacrifice by members of even poor societies is demanded by the theory in order to ensure that future generations in those models will enjoy consumption rates beyond the dreams of Avarice. No doubt earlier generations would complain bitterly, but Roemer's Ethical Observer would insist they are serving a Higher Cause. But that's to assume without explanation or justification that the value judgments embodying W_0 are all 'basic'.

Roemer is wedded to the symmetry axiom on W_0, but offers no grounds for it except only to repeat in effect (pp. 373–374) that "Our social welfare function must be founded on ethical judgments only, not on technological facts."

2.3 Completeness of Social Orderings

Call the set of all possible infinite felicity sequences, Ω. Every element in Z maps onto an element in Ω, although of course, there are elements in Ω that don't correspond to any element in Z (recall the distinction we drew earlier between the "possible" and the "feasible"). So we study Ω.

Koopmans' axiomatic theory supposes that Ω is uniformly bounded. There is no presumption in the theory that future generations enjoy a natural advantage over the present generation on account of the productivity of capital. Nevertheless, his moral axioms imply that δ in Eq. 3 is positive (Eq. 4 below). The productivity of capital is a feature of Z in the world we have come to know; it isn't an assumption in Koopmans' normative theory.

---

[4] Those economists writing on the economics of global climate change who reject felicity discounting (Cline 1992; Stern 2006), do so on the authority of Classical Utilitarian philosophers; they don't provide any argument of their own. It was not without bemusement that Solow (1974a, p. 9) wrote, "In solemn conclave assembled, so to speak, we ought to act as if the [discount rate on future felicities] were zero."

Roemer dismisses Koopmans' moral axioms. I suspect he dismisses them because he can't imagine someone arguing that the value judgment that W_0 should be symmetric isn't *compulsive* (Sen 1967); that is, the judgment does not have priority over all other value judgments. The requirement that W_0 be symmetric should be made to compete at the margin with other, possibly also non-compulsive value judgments. In view of the productivity of capital, it may even have to give way to them. Pluralists would argue that the value judgments embodying W_0 are neither basic nor compulsive.

It is notable that one of the topologies Koopmans (1960, 1972) chose to work with in his axiomatic theory was based on the "sup" norm, which, unlike the product topology, is neutral across generations when it comes to measuring the distance between any pair of elements in Ω. Nevertheless, positive felicity discounting follows from his axioms. Subsequently, Diamond (1965) proved that a complete, continuous, and monotone ordering of infinite felicity sequences displays some form of social impatience.[5]

Roemer (p. 370) thinks a good way to evaluate a theorem such as Diamond's or Koopmans' is to ask what kinds of social orderings it declares inadmissible. One would have thought a better way would be to derive the consequences of adopting a social ordering based on the theorem and ask if those consequences are in keeping with our other values. But Roemer puts his methodology to work and notes that because undiscounted infinite sums may not converge, not all infinite felicity sequences are comparable under Classical Utilitarianism. So, the Koopmans axioms rule out Classical Utilitarianism. Roemer suggests that is all the worse for Koopmans' axioms.

It should be noted that the infinite sum in Eq. 3 may not converge even if $\delta > 0$. For example, if U is unbounded below, infinite consumption sequences in Z that converge to zero in the long run at a sufficiently fast rate would not be comparable by W_0. All such Cs would be infinitely awful. That wouldn't matter to the *optimizing* social evaluator, though. If her object was to solve the problem in expression (2) *and* the problem was soluble, she would be nearly home and dry. Conditions sufficient to guarantee the existence of optimum programmes in economic models were much studied in the 1960s, in particular by Koopmans (1965), Mirrlees (1967), Levhari and Srinivasan (1969), and Arrow and Kurz (1970). Of particular interest to us here is the paper by Levhari and Srinivasan, who studied a pure capital model in which the return on capital is random but independently and identically distributed over time. The authors assumed that intergenerational welfare (the IWF) is the expected value of W_0 in Eq. 3. They uncovered a condition involving both ethical and technological parameters of their model under which an optimum exists. They also showed that no optimum exists if the condition is violated.

Suppose $\delta > 0$. The Levhari-Srinivasan condition for the existence of an optimum programme is violated if (i) the elasticity of marginal felicity is constant and exceeds 1 (implying that $U(C)$ is unbounded below as C tends to 0), and (ii) the uncertainty in the return on capital is large relative to the other parameters of the model. It transpires that if (i) and (ii) hold, no matter what feasible contingent consumption plan is considered, there is a better one in which savings are uniformly higher. But a saving rate of 100% of GNP is the worst possible policy. It follows that no optimum exists (Dasgupta 2008, 165). The reason no optimum exists if (i) and (ii) hold is that all consumption plans are infinitely awful (Arrow 2009). Weitzman's Dismal Theorem (Weitzman 2009) is an illustration of the Levhari-Srinivasan result.

---

[5] It transpires that zero discounting would be hard to purchase even if continuity were dropped. Van Liedekerke and Lauwers (1997) have shown that there exists no complete ordering of infinite felicity sequences satisfying "monotonicity" and "symmetry" of W in expression (1). Van Liedekerke and Lauwers' definition of symmetry is stronger (and perhaps more natural) than the symmetry requirement in Diamond (1965); it demands social indifference between infinite felicity sequences that are related to one another by infinite permutations.

It is obvious that the expected value of W_0 in Eq. 3 converges if $\delta > 0$ and $U(C)$ is a bounded function. It can be shown that under those conditions the "sup" of the expected value of W_0 in Z is attainable in standard economic models. This means an optimum exists there. In models of long run development, however, it has become customary among welfare economists to work with Us (assumed strictly concave) for which dU/dC is iso-elastic. Such Us are unbounded functions of C (at least at one end). But iso-elastic functions have only classroom convenience to commend them; other than that they are utterly indefensible. So we should be circumspect when using them. There is no harm invoking them in theoretical work so long as they don't mislead. They mislead especially when they are a source of paradoxes (as in the Dismal Theorem). When that occurs, they should be abandoned. Years ago Arrow (1965) explained why $U(C)$ should be taken to be bounded and why the elasticity of dU/dC should be assumed to rise with increasing C, from a figure below 1 to a figure above 1.[6] The problem of the non-existence of an optimum doesn't arise in pluralist theories in which (i) U is bounded and (ii) $\delta > 0$. The set of infinite felicity sequences, Ω, is assumed to be uniformly bounded in Koopmans' axiomatic theory (Koopmans 1960, 1972). That means someone (e.g., Dasgupta 2008) who explores questions in intergenerational ethics via Eq. 3 with $\delta > 0$ and an unbounded U-function cannot justify it by pointing to Koopmans' axiomatic theory. He would be simply trying out ideas for size in a pluralist framework, while being guided by that theory. The point remains: there is no Dismal Theorem lurking within a properly formulated model.

As Classical Utilitarianism violates an assumption in the Koopmans-Diamond framework, namely "completeness", Roemer concludes (p. 370), "So [classical] utilitarianism is eliminated [in the Koopmans-Diamond theory] only because it is incomplete," and asks, "...[is] incompleteness such a defect of an ethical theory? Where, indeed, do we have an ethical theory that provides convincing answers to all ethical questions?" To which the reply should be, "nowhere", but only if the social evaluator insists even without studying Ω that she is unable to compare an unspecified set of elements in it. But if someone claims they are unable to make a comparative evaluation of a pair of alternatives, we should be permitted to ask: "Why?"

2.4 Coarse- and Fine-Grained Moral Theories

Pluralist moral theories are necessarily *coarse-grained*. They identify principles of wide applicability, but are at pains not to discriminate among alternatives satisfying those principles while differing in their other moral features. No pluralist would countenance a moral theory that leaves no room for an evaluation of the particularities of alternatives. In order to evaluate those particularities, however, pluralists appeal to values that are *fine-grained*.

Imagine someone following Koopmans. If U (a bounded function of C), is felicity, Koopmans' axioms on Ω imply

$$W_0 = {}_{t=0}\Sigma^\infty \left\{ G[U(t)]/(1+\delta)^t \right\} = {}_{t=0}\Sigma^\infty \left\{ G[U(C(t))]/(1+\delta)^t \right\}, \quad \delta > 0.$$

(4)

G in Eq. 4 is an increasing, bounded function of U. The axioms specify neither δ nor the form of G.[7]

---

[6] An optimum would avoid zero consumption if marginal felicity tends to infinity as C tends to zero.

[7] The latter is true only if the measurement of U does not afford the social evaluator any degree of freedom (i.e., U is unique up to the identity transformation), which is what Koopmans assumed in his work. Restrictions on G appear if, say, U is unique up to positive linear transformations (i.e., proportional transformations).

Roemer finds the open-endedness a reason for dismissing Koopmans' and Diamond's work. He says (p. 370): "...one must call into question the usefulness of the Diamond result. It is furthermore the case—and it is of the utmost importance in the climate-change discussion—that the Diamond (and Koopmans) axiomatic characterizations give no clue as to what size the discount rate should be. They both provide axiomatic characterizations of *classes* of social preference orders, where the class in each case contains orders represented by social welfare functions with many discount rates."

Only moral fundamentalists would insist on axioms that give rise to a known, complete ordering of the elements of Ω even before the social evaluator knows much about Ω. Classical Utilitarians are one such tribe; those subscribing to the "maximin" form of W_0 (Sect. 2.5) is another. Roemer (pp. 373–374) insists "facts" must not influence the identification of the morally right W_0 ("Our problem is to maximize a welfare function justified by *general ethical principles*, which properly incorporates the relative worth of all generations, subject to constraints which are determined by *facts about the world* ..."), but that's to misrepresent moral reasoning.

We are continually obliged to choose among courses of actions that reflect trade-offs among the values we hold. It may even be that unless those trade-offs are presented to us in vivid ways, we won't know what our values are. Moral principles, no matter how attractive they may appear to be at first blush, are capable of commending choices that lead to consequences which violate other values we hold. That is why even the most seemingly attractive moral principles should be subjected to conceptual tests. As diverse a group of contemporary moral theorists as Rawls, Koopmans, Arrow, Sen, Parfit, Ronald Dworkin, Thomas Nagel, and Bernard Williams have repeatedly used those lessons to subject moral judgments (more generally, value judgments) to tests. They would not have dreamt of subscribing to value judgments *ab initio*. In the field of intergenerational welfare economics, Koopmans prepared his readers to be especially vigilant because of the paradoxes to which an infinite horizon can give rise. His finding, that a seemingly attractive set of moral axioms on infinite felicity sequences is inconsistent with the principle that says that the derived welfare indictors of present and future people should be awarded equal weight, is an example of the conflicts that can arise between moral values in possible worlds. Even though Koopmans' axioms are coarse-grained, they carry a good deal of punch.

Imagine someone who subscribes to Koopmans' axioms but insists that although she knows she will be able rank all the elements of Ω once she comes face to face with them, she is unable to rank them all without further study. That only means she is unable to specify δ and G in Eq. 4. The person holds other values as well, values that are not reflected in Koopmans' axioms; such as, for example, an aversion to inequality in the distribution of U across the generations. So suppose the person believes that by appealing to those values she would be able to rank the elements of Ω once she comes face to face with them. In effect the person would be saying that by experimenting on Ω with different values of δ and forms of G, she would be in a position to arrive at a complete ordering of Ω.

Koopmans (1965, 1967) argued that if a particular choice of δ and G recommends policies that violate other values we hold, the numerical figures for δ and the parameters embodying G on which the tests were undertaken should be abandoned. For example, he and Cass (1965) showed that if δ exceeds the marginal productivity of capital, optimum consumption is a declining function of time. The implication is at odds with the judgment that in a world

Footnote 7 continued

For a fine study of the restrictions on G that would arise under alternative assumptions on measurability and interpersonal comparability of the Us, see Roberts (1980a,b). But as Eq. 4 makes clear, no matter what restrictions are entailed on the form of G, the function is unique up to positive affine transformations.

that is poor but where the productivity of capital is positive, future generations should not be asked to consume less than their predecessors. The finding would provide a reason for reducing δ in a poor world. Koopmans also argued that it is only by iterating over such thought-experiments that the social evaluator would have a hope of reaching something like a considered judgment on economic policies. In the wider context of the basic structure of society, not just felicity sequences, Rawls (1972) called the terminal point of such an iterative process, a "reflective equilibrium".

A tempting alternative move is to introduce the demands those additional value judgments make on resource allocation, as side-constraints. Roemer's problem as formulated in specification (2) would then include a set of additional constraints, reflecting the force of values not adequately captured in W_0. Certainly, that's how *rights* are often defined (Nozick 1974). They are side-constraints ensuring the protection of certain social states because of their particular non-welfare characteristics. But the device would not satisfy pluralists, who would be nagged by the question of how much the constraints cost in terms of foregone W_0. If the cost of a side-constraint is found to be enormous, there will be an argument for relaxing it. But that only invites the social evaluator to face up to the trade-offs explicitly and incorporate them in W_0. For example, people have argued that it should be acceptable to violate even the right not be be tortured, perhaps as inviolable a human right as one can think of, in a situation where it's the only means of saving thousands of innocent lives from a terrorist attack. Side constraints are useful for rough-and-ready purposes, but they are no substitute for facing trade-offs directly.

Contemporary welfare economists typically work with a flexible form of W_0 (Eq. 4). The parameters embodying "societal impatience" δ and aversion to inequality (and risk) G are then made to assume a range of values. On the rare occasion an analyst doesn't test the social ordering for sensitivity, there can be a suspicion that parameter values have been tailored to reach the conclusion sought by him. Because the pre-publication copy of Stern (2006) that I was sent for comments didn't contain any sensitivity analysis over δ and G, I criticized it (Dasgupta 2007). Thought experiments (Dasgupta 2008, pp. 151–152) suggest that G on its own is unable to shoulder the extent of inequality aversion the social evaluator may regard as desirable, while being consistent with the axioms in Koopmans' theory. Fine-grained value judgments influence both δ and G.

Roemer doesn't appreciate the differences between intuitionist and teleological theories; nor does he realize that there are people who are confirmed pluralists. He seems to think Eq. 3 with $\delta = 0$ and Eq. 3 with $\delta > 0$ come from the same philosophical stable. At one point he says (p. 374): ". . . [if] it turns out that the optimal policy has [future generations] consuming more than we do, their *average unit* of consumption will not receive as much weight in the social-welfare function as our average unit as long as η [the elasticity of marginal felicity] > 0, which implements diminishing marginal utility. Why *further* discount their utility with positive discount rates? This is, again, an issue of mixing the ethics (which determine what social welfare function we maximize) with the facts about the world (which determine the feasible set of paths over which maximization takes place)." Comment is superfluous.

And he goes on to write (p. 375): "Because often it is the case that the maximum of the *undiscounted* utilitarian welfare function is infinite . . . the utilitarian view provides no way of choosing an optimal path! This, indeed, is why many economists today use discounted-utilitarianism: not because it has sound ethical foundation . . . but because it *gives a unique answer* to the problem. There is no good justification for this practice: it is an example of looking for a lost diamond ring under the street lamp, because that is the only place one can see!"

As most working economists, even working welfare economists, are reluctant to disclose their philosophical positions when composing their papers, I have no idea how Roemer knows

why they choose to work with positive values of δ. As for me, I always work with positive values of δ when in my applied-theoretic mode; but then, I am an incurable pluralist.

2.5 Continuity of Social Orderings

I don't know if there are many moral and political philosophers who are familiar with Koopmans' formulation of intergenerational welfare; but a number of those who are and who find his axioms abhorrent, do so because they imply $\delta > 0$. The axiom most frequently objected to by critics (e.g., Broome 1992) is the requirement that the social ordering be *continuous*. (There have been far fewer questions raised over the appeal of the 'independence' axiom in Koopmans' work, which in effect says that the marginal rate of substitution in W_0 between the felicities of any two generations is independent of the felicities of all other generations.) Keeping in step with those authors, Roemer (pp. 369–370) writes, ". . . the axiom of continuity is very powerful and abstract. . . . Do our intuitions really grasp the import of requiring this condition on a social preference order?" To that the answer can only be, "no". When it comes to evaluating *infinite* felicity sequences, no intuition is firm.[8] Following his preferred methodology for evaluating axiom systems, Roemer (p. 370) notes that a social ordering that violates continuity is *maximin*.[9]

Maximin was given an axiomatic basis in welfare economics by Hammond (1976) in a timeless world with a finite number of people. Imagine that the Us are unique up to positive affine transformations and fully comparable among people.[10] Hammond didn't assume that W is continuous, but required it to respect a strong equity axiom, so strong that it leads unerringly to maximin. In contrast, Maskin (1978) offered an axiomatic basis for utilitarianism in a timeless world with a finite number of people. He also assumed that the Us are unique up to positive affine transformations and fully comparable among people. He didn't require W to satisfy Hammond's equity axiom, but assumed W is continuous. Both authors imagined that W is symmetric, but neither mentioned the Impartial Spectator. To me, their studies offer moral axioms anyone can discuss and debate.[11] For example, pluralists are drawn to the requirement that W be continuous because it accommodates trade-offs among people's felicities, something maximin prohibits.[12]

Roemer (2011) doesn't ever address the question of measurability and interpersonal comparability of the Us, but the numerical model he constructs (pp. 380–384) is based on an amenity index that is unique up to proportional transformations and interpersonally fully-comparable (see the side constraint in specification (6) below). He is drawn to intergenerational maximin ("My collaborators and I find this an attractive ethic. . ."; p. 377); but in view of the criticisms maximin has been subjected to over the decades, Roemer knows he needs a new language if he is to market it. He finds it in the language of *sustainability* (pp. 377–379). Moreover, it transpires that the Ethical Observer isn't the Impartial Spectator of Classical

---

[8] One can obviously ask, "Why bother with *infinite* felicity sequences?" The reason is that each of the "paradoxes of infinity" appears in a slightly attenuated form if the horizon is finite but long. Turnpike theorems drew attention to that fact (Cass 1966). Notice that the word "slightly" carries with it the notion of continuity.

[9] I am eliding over the difference between "maximin" and "leximin" because it plays no role in the points I am raising here.

[10] That is, if the U-function of each person is transformed to $aU + b$ ($a > 0$), where the constants a and b are the same for all people, then the social ordering induced by W remains the same.

[11] See d'Aspremont and Gevers (1977) and Roberts (1980a,b) for further explorations on the way moral pluralism is influenced by the extent to which the Us can be measured and interpersonally compared.

[12] That inflexibility was much commented on in the 1950s by decision theorists. Luce and Raiffa (1957) contains a fine discussion of the literature of that period.

Utilitarianism. Rather, the Ethical Observer says what Roemer bids Him to say; for Roemer writes (p. 377): "I propose . . . that the Ethical Observer should choose a consumption path which maximizes the level of human welfare that can be *sustained forever*. . ." This means the Ethical Observer's instructions are:

$$\text{Choose } C \text{ in } Z \text{ so as to maximize } S, \text{ such that } \quad U(C(t)) \geq S, \quad t \geq 0. \tag{5}$$

Formulation (5) harbours a well-known defect. It can recommend a stagnant economy even in a world capable of sustaining a never-ending increase in U over time. In standard economic models, intergenerational maximin (or "maximin", for short) disallows even a tiny bit of saving on the part of a generation. That's why Rawls (1972, 284–293) abandoned "maximin" when deriving his conception of intergenerational justice.[13] Of course, if capital can't be eaten into and the economy enjoys indefinite *exogenous* technological progress, the optimum programme under "maximin" has felicity increasing over time. Roemer (p. 377, footnote 6) thinks he knows what I might say in response to that:

> Suppose we applied the reasoning of Dasgupta (2008). Suppose that the solution of the intergenerational maximin program produces increasing utilities as time progresses. Should we then go back and alter our maximin objective to penalize later generations because they did well in the first formulation? Hardly.

I have no idea to which of my reasonings in Dasgupta (2008) he is referring, but I wouldn't have applied any of them in the way Roemer believes. That's because I have never been able to take "maximin" seriously; it's social objective that can only have been conjured up in the Common Room. Even Roemer recognizes "maximin" would cause him a major headache in plausible economic models. So he next writes (p. 378) ". . . the issue of sustainability versus growth (of human welfare) cannot be settled at the abstract level: it requires discovering what the actual trade-offs are—that is, how much the early generation(s) would have to sacrifice to permit positive rates of growth of human welfare." So, in addition to studying problem (5) in his numerical model, Roemer studies the problem

$$\text{Choose } C \text{ in } Z \text{ so as to maximize } S \text{ subject to } U(C(t)) \geq S(1+g)^t, \quad t \geq 0;$$

$$g \ (> 0) \text{ exogenously given.} \tag{6}$$

In justification, Roemer says (pp. 378–379), "We will argue that small positive values of g deliver solutions that may be ethically preferable to the solution with $g = 0$ (pure sustainability), because the cost borne by the first generation to sustain a small positive g seems acceptable." The concession goes against the grain of "maximin", but Roemer offers two arguments in support of specification (6) to those who share his fondness for "maximin".

The first argument is based on an assumed impersonal desire on the part of each generation that "human development" takes place. It is hard to judge how strong that desire is among us. In a charming talk, published posthumously by the philosopher Richard Braithwaite, Frank Ramsey confessed:

---

[13] "It is now clear why the difference principle does not apply to the savings problem. There is no way for later generations to improve the situation of the least fortunate first generation. The principle is inapplicable and it would seem to imply, if anything, that there is no saving at all." (Rawls 1972, p. 291).

Arrow (1973), Dasgupta (1974), and Solow (1974b) explored several possible interpretations of what Rawls could have meant in his theory of intergenerational justice. Each was found to be seriously defective. I am now convinced Rawls didn't have a coherent theory of justice among the generations after all (see Dasgupta 2010, *Introduction*).

My picture of the world is drawn in perspective and not like a model to scale. The foreground is occupied by human beings and the stars are all as small as threepenny bits. I don't really believe in astronomy, except as a complicated description of part of the course of human and possibly animal sensation. I apply my perspective not merely to space but also to time. *In time, the world will cool and everything will die; but that is a long time off still, and its present value at compound interest is almost nothing.* (Ramsey 1931, 291; italics mine).[14]

Roemer constructs his second argument by observing (p. 378) that "... humans want their children to be better off than they are; indeed, they are willing to sacrifice their own welfare to make this possible ..."

Having trashed the model of the "altruistic parent" as a basis for thinking about inter-generational welfare (p. 367), it could seem curious that Roemer should adopt the position described in the above passage; but he assures readers that problem (6) bears no resemblance to the model of altruistic parents.

Nevertheless, justifying problem (6) by modifying the assumption regarding parental (more impersonally, generational) desires is problematic for someone wedded to "maxi-min". I don't know what Roemer means by "small" when proposing a maximal growth rate g, but suppose, for example, people want their children when they become adults to be a *lot* better off than they themselves were when the children were conceived. Suppose parents want their children when they reach adulthood to enjoy twice the felicity they them-selves enjoyed when the children were born. Assuming a generation span of 25 years, this would mean a desired annual growth rate in felicity of 3%. If, for the sake of illustration, the elasticity of marginal felicity is 1, the desired annual growth rate in the composite index of consumption would also be 3% a year. Would Roemer permit g to be as high as 3% a year? Or even higher, as there is no telling what parents might desire? If the answer is "yes", "maxi-min" would lose its bite entirely. If the answer is "no", he is up against a problem. In recent years Norway has maintained the highest international score in a wide variety of measures of societal well-being (the practice of democracy; equality; public services; and so on) and the economy has grown at 3% or more. What would Roemer's retrospective recommendation be for Norway's citizens? That the elderly should have saved at a lower rate so as to better their own selves? My guess is he would be shown the door by the elderly.

One reason they would react strongly is that for parents, children are extensions of their own selves. Concern for one's children is not so much a reflection of "altruism", as it is of one's own extended felicity. Feelings of altruism are what prompt us to donate time and money to charity and support international aid. Our feelings for our children are different. We love our children and want the best for them. This too is a deep and enduring fact, not an incidental one; and it invites the social evaluator to build an account of intergenerational welfare from parents' *extended* felicities. To the best of my knowledge, not much has been done to reconstruct the foundations of welfare economics along such lines. Current concep-tions of intergenerational welfare have a chilling core in them. They are detached from the

---

[14] I am most grateful to Kenneth Arrow for the reference. Ramsey's talk ("Is there anything left to discuss?") was given on 28 February 1925, to a weekly meeting of the Apostles, a predominantly undergraduate discus-sion society at the University of Cambridge. Its membership is kept secret to avoid being lobbied for inclusion. Meetings among the Apostles (or "the Society", as its members fondly refer to it among themselves) are the occasion for airing not only whimsical thoughts, but, as the quotation in the text reveals, explorations on ethics and, more generally, the theory of knowledge. The picture of the world Ramsey draws there should be contrasted with the famous passage in Ramsey (1928, 261), where he wrote that to discount future well-beings is "ethically indefensible and arises merely from the weakness of the imagination." That is, of course, not an argument, merely an expression of his Sunday-best beliefs.

emotional attachment governing parental choices over their children's upkeep and the formation of their human capital. And yet, it can't be enough simply to base our conception of intergenerational welfare on the feelings of parents. I have little sense of what a defendable moral theory that builds on those emotions looks like.

3 Time, Persons, and the Generations

Current conceptions of intergenerational welfare, for example those expressed in Eqs. 3 and 4, are also insensitive to the idea of *personhood*. Roemer (2011, 369) quotes from Dasgupta (2005), where I wrote:

> An individual's lifetime well-being is an aggregate of the flow of well-being she experiences, while intergenerational well-being is an aggregate of the lifetime well-beings of all who appear on the scene. It is doubtful that the two aggregates have the same functional form. On the other hand, I know of no evidence that suggests we would be way off the mark in assuming they do have the same form. As a matter of practical ethics, it helps enormously to approximate by not distinguishing the functional form of someone's well-being through time from that of intergenerational well-being.

Roemer disparages the passage by remarking that it is "an amazing statement" (p. 369). He also claims that the passage relates to the model of an immortal consumer. But in neither my 2005 nor my 2008 paper did I ever invoke that mythical figure. The reservation I was expressing in the passage Roemer quotes is as applicable to Ramsey's utilitarian formulation of the optimum saving problem facing a country (Eq. 3 with $\delta = 0$) as it is to models of optimum economic development based on Koopmans' moral theory (e.g., Koopmans 1965). The point is that neither Eq. 3 nor Eq. 4 is able to distinguish *time*, *persons* and *generations* from one another.

Consider W_0 in Eq. 3, with $\delta > 0$. Let the unit of time be less than life expectancy (remember, there are many theoretical exercises in optimum development where time is taken to be continuous, and many empirical applications where the unit of time is assumed to be a year). Then, an individual's *lifetime welfare* would enter W_0 as the discounted sum of the flow of her felicities over her lifetime and *intergenerational welfare* would enter as the discounted sum of individuals' lifetime welfares. Crucially, the discount rate δ would be the same in both constructions. That's the sense in which a person's lifetime welfare has the same functional *form* as intergenerational welfare: the elements in each are aggregated in the same way; what differs is only the time horizon. Equations (3) and (4) value only the flow of felicities, they don't acknowledge the ethical significance of the bearers of those felicities. But such a move can only be justified if we were to assume that even though a person lives for many periods, she is an entirely separate self in each period.

Rawls (1972, 294) recognized that feature in Classical Utilitarianism:

> Sidgwick thought that the notions of universal good and individual good are in essential similar. He held that just as the good of the person is constructed by comparison and integration of the different goods of each moment as they follow one another in time, so the universal good is constructed by the comparison and integration of goods of the many individuals. The relations of the parts to the whole and to each other are analogous in each case, being founded on the aggregative principle of utility.

Here is a quote from Dasgupta (2008, 147) elaborating on the same point:

Although it is ubiquitous in intergenerational welfare economics, expression (2) [Eq. 3 in the present paper] suffers from a serious conceptual weakness: it doesn't admit any concept of the "self" that lives through time. The ethical calculus at the basis of the formula treats differences between an individual's felicities in two periods of time in the same way as it treats differences between the felicities of two individuals in those same two periods of time. The lifetime well-being of a person is constructed in the same way as intergenerational well-being is constructed; which is to say that, even though a person lives for many periods, she is regarded as a distinct self in each period. It can be argued, however, that for someone to ask oneself "How much should I save for my children?" involves ethics that are different from those pertinent when that same person asks "How should I spread out *my* consumption over time?"

In work under preparation, Eric Maskin and I have considered a simple way to distinguish the two motivations (Dasgupta and Maskin 2011):

Imagine a dynastic head who is a Classical Utilitarian in regard to the way he regards the trade-offs between his lifetime welfare with those of the lifetime welfares of his descendents. That means he interprets dynastic welfare to be the *undiscounted* sum of the members' *lifetime* felicities. However, in deliberating over his own life, he arranges his affairs so as to accommodate his personal desire for early over delayed experience (e.g., consumption) and believes no meddlesome moralist has any business to tell him how to live his life. Suppose, for simplicity, the person regards his lifetime welfare to be the *discounted* sum of his felicities and believes his descendents will regard their lifetime welfares the same way. His bequest motive would then be based on Classical Utilitarianism, but his personal life (being *his* personal life) would be fashioned by a desire for early felicity.

If U is bounded above and the return on capital is high enough, an optimum exists. Along an optimum there are two sets of consumption discount factors, one of which applies to projects affecting the living only, while the other, typically a higher set of figures, applies to projects whose benefits and costs accrue in the distant future. The model provides a possible explanation for why market data, if used to derive ethical parameters, as in Nordhaus' work, would misleadingly yield high values of δ (as high as 3% a year) if by mistake the social evaluator imagines that market data reflect the solution of a maximization problem, in which W_0 is given by Eq. 3.

4 Consumption Discount Rates

"Social discount rates" often bring out the intellectually worst among moral and political philosophers writing on the subject. Roemer (2011, 374) quotes a passage from Dasgupta (2008, 145) in which I sought to identify circumstances in which the social evaluator could be justified in using positive rates to discount small additions or subtractions to future *consumptions*. Here is the passage:

There are two reasons why it may be reasonable to do so. First, an additional unit of consumption tomorrow would be of less value than an additional unit of consumption today if society is impatient to enjoy that additional unit now. Therefore, impatience is a reason for discounting future costs and benefits at a positive rate. Second, considerations of justice and equality demand that consumption should be evenly spread across the generations. So, if future generations are likely to be richer

than us, there is a case for valuing an extra unit of their consumption less than an extra unit of our consumption, other things being equal. Rising consumption provides a second justification for discounting future consumption costs and benefits at a positive rate.

Roemer says the passage suffers from a "conceptual error", but then disparages it on two grounds. He first asks (p. 374): "Who is "society" in [Dasgupta's] phrase? It is *the present generation*. Surely, if "society" included all future generations, his phrase would be nonsensical. (How could we say that our great-grandchildren are impatient to enjoy an extra unit of consumption *now*?) But society, for the Ethical Observer must comprise *all* generations of humans who will ever live."

Early in that same paper (Dasgupta 2008, 143) I had explained what I meant by "society" in the passage Roemer dismisses:

Policy evaluation involves comparisons of different people's well-being. We will call the person doing the evaluation the *social evaluator*. The social evaluator could be a citizen (thinking about things before casting his vote on political candidates), she could be an ethicist hired to offer guidance to the government, he could be a government decision maker, and so on. In what follows, I frequently adopt modern convention by replacing the "social evaluator" by "society" and say, for example, that "society entertains the view . . .," when I mean "the social evaluator entertains the view . . ."

In Sect. 2 it was noted that moral reasoning doesn't require the social evaluator, in the sense I have been using the term here and in my previous articles, to consult Roemer's Ethical Observer. It could even be that the social evaluator is a pluralist (Sect. 2.1), convinced of Koopmans' theoretical programme.

Roemer's second objection (p. 374) is on the meaning of consumption discount rates: "Dasgupta's second reason for discounting future utility is incoherent, for it puts the cart before the horse. We do not know that future generations will be "richer" than we are: whether or not that occurs will be an *outcome* of the policies we decide to implement—it cannot be taken as a premise."

This comment is also wholly baffling to me. The penultimate sentence in the passage Roemer quotes, only to dismiss, says explicitly that the argument I was rehearsing (it's origins can be traced to Boehm Bawerk) is of an "if, then" kind. And it is that same "if, then" reasoning which was applied later in the paper (p. 150), where I observed: "Just as growing consumption provides a reason why discount rates in use in social cost-benefit analysis should be positive, declining consumption would be a reason why they could be negative."

Roemer is confused about the meaning of consumption discount factors and the associated consumption discount rates. Consumption discount factors are shadow prices of future consumptions, while consumption discount rates are the percentage rates of decline in consumption discount factors. Shadow prices involve both values and facts. It isn't possible to define shadow prices without specifying the economic programme round which the evaluation of a small perturbation is being conducted.

It could be Roemer is unable to imagine an evaluation exercise that doesn't involve identifying the full optimum. But the idea that intergenerational welfare economics consists only of a study of maximization problem (2), which is what Roemer restricts himself to in his entire paper, is so limiting as to beggar belief. If welfare economics is to be of any worth, it must not only have a language for policy evaluation in the Perfect Society (Utopia) and the Good Enough Society (see Meade 1989, who named it Agathotopia); but also in the dysfunctional society (which could be called Kakotopia; see Dasgupta 2001, where I tried to develop

intergenerational welfare economics in a form that is applicable not only in well-ordered societies, but also in dysfunctional societies).

Imagine a social evaluator given the task of evaluating a small public investment project in Kakotopia. She is a minor government official and is an honest official. She isn't asked to maximize anything; she has no authority to do anything other than evaluate the occasional project. Her task as she sees it is to do an honest job determining whether the project will raise intergenerational welfare or lower it in her discordant society. So she wants to conduct a social cost-benefit analysis of the project. But she can conduct the analysis only if she has a forecast of the economy. That's where "facts" come in. If the forecast is gloomy, say, that consumption will decline at a rapid rate, the consumption discount rates she would use are negative; but if the future looks promising, the discount rates would be positive. Consumption discount factors embody both values and facts; and they can be defined by a social evaluator even in a dysfunctional society. If it were not possible to define them in Kakotopia, welfare economics would be of little worth.[15]

5 Summary

Ultimately, Roemer (2011) is a mess because of the author's moral fundamentalism. While he writes abundantly, he appears not to be able to read others. He seems to think that inter-generational welfare economics can be conducted satisfactorily only if it is confined to those theories that invoke his Ethical Observer. Moreover, he gives every indication of thinking that welfare economics amounts to optimization exercises in Utopia (the problem in formulation (2)). And he is obsessed with his personal interpretation of fairness, which is the requirement that W_0 in Eq. 1 be symmetric even in a world where the productivity of capital gives an innate advantage to future generations over the one that is deliberating economic policies.

But there are moral theories, such as the contractual theory of Rawls (1972) and intuition-ist theories such as that of Koopmans (1960, 1972), which don't invoke an Ethical Observer but instead seek to identify those moral judgments that a concerned citizen, *here and now*, would be led to. Those theories are insistent that there is more than one moral consideration to respect, that they are almost always non-compulsive and non-basic, and that they commend the concerned citizen to seek an accommodation among them, even in a dysfunctional world.

References

Arrow KJ (1965) Aspects of the theory of risk-bearing. Yrjö Jahnssonin säätiö, Helsinki

Arrow KJ (1973) Rawls' principle of just savings. Swed J Econ 75(3):323–335

Arrow KJ (2009) A note on uncertainty and discounting in models of economic growth. J Risk Uncertain 38(1):87–94

Arrow KJ, Kurz M (1970) Public investment, the rate of return and optimal fiscal policy. Johns Hopkins University Press, Baltimore

Barry B (1965) Political argument. Routledge and Kegan Paul, London

---

[15] Until recently friends and colleagues in the US used to be bemused at seminars when I pointed out that consumption discount rates could be negative. They found illustrations involving negative economic growth unrealistic. In fact a number of countries in sub-Saharan Africa suffered from negative growth in both income and consumption during 1970–2000. What discount rates should government project evaluators there have chosen in 1970 if they had an approximately correct forecast of the shape of things to come?

Broome J (1992) Counting the cost of global warming. White Horse Press, London

Broome J (2008) The ethics of climate change. Sci Am 298(6):69–73

Cass D (1965) Optimum economic growth in an aggregative model of capital accumulation. Rev Econ Stud 32(2):233–240

Cass D (1966) Optimum economic growth in an aggregative model of capital accumulation: a turnpike theorem. Econometrica 34(4):833–850

Cline WR (1992) The economics of global warming. Institute for International Economics, Washington, DC

Cowen T, Parfit D (1992) Against the social discount rate. In: Laslett P, Fishkin JS (eds) Justice between age groups and generations. Yale University Press, New Haven

d'Aspremont C, Gevers L (1977) Equity and the informational basis of collective choice. Rev Econ Stud 44(2):199–209

Dasgupta P (1974) On some alternative criteria for justice between generations. J Public Econ 3(4):405–423

Dasgupta P (2001) Human well-being and the natural environment, 2nd edn. Oxford University Press, Oxford (2004)

Dasgupta P (2005) Three conceptions of intergenerational justice. In: Lillehammer H, Mellor DH (eds) Ramsey's legacy. Clarendon Press, Oxford, pp 149–169

Dasgupta P (2007) Commentary: the Stern review's economics of climate change. Nat Inst Econ Rev 199:4–7

Dasgupta P (2008) Discounting climate change. J Risk Uncertain 37(2–3):141–169

Dasgupta P (2010) Selected papers of Partha Dasgupta, vol I: institutions, innovations, and human values. Oxford University Press, Oxford

Dasgupta P, Heal G (1979) Economic theory and exhaustible resources. Cambridge University Press, Cambridge

Dasgupta P, Maskin E (2011) Persons and time: a theory of life-cycle saving (in preparation)

Diamond PA (1965) The evaluation of infinite utility streams. Econometrica 33(1):170–177

Hammond P (1976) Equity, arrow's conditions and Rawls' difference principle. Econometrica 44(5):793–804

Koopmans TC (1960) Stationary ordinal utility and impatience. Econometrica 28(2):287–309

Koopmans TC (1965) On the concept of optimal economic growth. Pontificiae Academiae Scientiarum Scripta Varia, 28. Reprinted in the Econometric Approach to Development Planning, (1966) North Holland, Amsterdam

Koopmans TC (1967) Objectives, constraints and outcomes in optimal growth models. Econometrica 35(1):1–15

Koopmans TC (1972) Representation of preference orderings over time. In: Bart McGuire C, Radner R (eds) Decision and organization. North Holland, Amsterdam

Levhari D, Srinivasan TN (1969) Optimal savings under uncertainty. Rev Econ Stud 36(2):153–163

Luce RD, Raiffa H (1957) Games and decisions. Wiley, New York

Marglin SA (1976) Value and price in the labour-surplus economy. Oxford University Press, Oxford

Maskin E (1978) A theorem on utilitarianism. Rev Econ Stud 45(1):93–96

Meade JE (1989) Agathotopia: the economics of partnership. University of Aberdeen Press, Aberdeen

Mirrlees JA (1967) Optimum growth when technology is changing. Rev Econ Stud 34(1):95–124

Mirrlees JA (1982) The economic uses of utilitarianism. In: Sen A, Williams B (eds) Utilitarianism and beyond. Cambridge University Press, Cambridge

Nordhaus WD (1994) Managing the global commons: the economics of climate change. MIT Press, Cambridge

Nordhaus WD (2007) The *Stern review* on the economics of climate change. J Econ Lit 45(3):686–702

Nordhaus WD (2008) A question of balance. Yale University Press, New Haven

Nozick R (1974) Anarchy state and utopia. Basic Books, New York

Parfit D (1984) Reasons and persons. Oxford University Press, Oxford

Pigou AC (1920) The economics of welfare. Macmillan, London

Ramsey FP (1928) A mathematical theory of saving. Econ J 38(4):543–549

Ramsey FP (1931) Epilogue. In: Braithwaite RB (ed) The foundations of mathematics and other logical essays. Routledge & Kegan Paul, London

Rawls J (1972) A theory of justice. Oxford University Press, Oxford

Roberts KWS (1980a) Possibility theorems with interpersonally comparable welfare levels. Rev Econ Stud 47(2):409–420

Roberts KWS (1980b) Interpersonal comparability and social choice theory. Rev Econ Stud 47(2):421–439

Roemer JE (2011) The ethics of intertemporal distibution in a warming planet. Environ Resour Econ 48(3):363–390

Sen A (1967) The nature and classes of prescriptive judgments. Philos Q 17(1):46–62

Sen A (1970) Collective choice and social welfare. Holden Day, San Francisco

Sidgwick H (1907) The methods of ethics. MacMillan, London

Solow RM (1974a) The economics of resources and the resources of economics. Am Econ Rev 64(Papers & Proceedings):1–21

Solow RM (1974b) Intergenerational equity and exhaustible resources. Rev Econ Stud 41(Symposium Issue):29–45

Stern NH (2006) The stern review of the economics of climate change. Cambridge University Press, Cambridge

Van Liedekerke L, Lauwers L (1997) Sacrificing the patrol: utilitarianism, future generations, and infinity. Econ Philos 13(2):159–174

Weitzman ML (2009) On modeling and interpreting the economics of catastrophic climate change. Rev Econ Stat 91(1):1–19

Yaari M (1965) Uncertain lifetime, life insurance, and the theory of consumer. Rev Econ Stud 32(2):137–158