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Cost-benefit analysis incorporates future costs and benefits into current economic calculations via the process of discounting. Thus the problem of evaluation of future outcomes appears to be reduced to the choice of the correct discount rate (as well as the ever-present uncertainty surrounding future events). This article shows that, even under the ideal conditions often assumed in economic theory, the choice of the optimal discount rate depends on nonmarket decisions about intergenerational bequests, or transfer of resources.

Economic Theory and the Discount Rate

The choice of a discount rate is simple in the ideal world of economic theory. If there are no distortions in capital markets, there is no uncertainty about future economic conditions, and the distribution of wealth is socially optimal, then the market rate of interest is equal to both the marginal return on investment and the marginal rate of substitution between present and future consumption. That rate also constitutes the optimal discount rate. The issue is more complex in reality because these ideal conditions arguably do not hold.

Discussion of the choice of a discount rate under second-best conditions has often focused on the problems of taxation and other capital market distortions and on the implications of risk and uncertainty in future outcomes. This paper addresses another concern: the desired distribution of wealth and welfare between generations. Past discussion distributional questions has often led to calls to reject discounting, or to use a discount rate below the marker rate of interest. Here it will be argued that such approaches are based in part on a misinterpretation of the role of cost-benefit procedures.

"[C]ost-benefit analysis is properly concerned with al1ocatie efficiency not distributional equity." [339] Distribution must be addressed first, through appropriate intergenerational asset transfers; cost-benefit procedures can then be used to improve efficiency, given the desired distribution. Thus sustainability, for example, cannot be evaluated in terms of cost-benefit analysis. "Sustainability is a criterion defining the just distribution of assets between generations; cost-benefit analysis is intended to improve the efficiency of resource allocation subject to the prevailing asset distribution." [340]

Intertemporal Equilibrium: A Simple Model

A simple mathematical model (presented and analyzed in detail in the original article) can facilitate the analysis of these questions. Consider the allocation of a single, socially managed, nonrenewable resource in a three-period economy. There are two overlapping generations that each live for two time periods (generation 1 lives in periods 1 and 2, generation 2 lives in periods 2 and 3). Assume that there are large populations of identical consumers and of identical small firms.

Individuals of the first generation begin with equal) capital endowments; individuals of the second generation have no initial capital endowment, hut may receive public or private bequests from the first generation, in period 2. Each individual chooses between consumption and investment in the first period of her life; in the second period, the first generation chooses between their own consumption and bequests to the next generation. Individuals receive income on their capital at the market rate of interest and wages on their (fixed) supply of labor at the market wage rate.

It is assumed that all agents are self-interested and have perfect foresight regarding future prices and other economic considerations. The utility function, identical for all individuals, is the sum of the logarithms of consumption in the two periods of life. Individuals maximize their lifetime utility, subject to assumptions about bequests to be discussed below. Firms maximize their profits, and the resource management agency sells all of the nonrenewable resource to firms, aiming to maximize the discounted sum of sales revenue over the three periods. Each period's revenues from resource sales arc distributed equally to everyone alive in that period.

Given any fixed level of bequests, these assumptions are sufficient to define a competitive equilibrium in each of the three time periods of the model. The equilibria are efficient over time if and only if the social discount rate in each period is set equal to the market rate of interest. Yet different levels of bequests imply different values for the discount rate—and for virtually everything else in the model. Each solution is equally efficient, given its assumption about bequests; the criterion of efficiency cannot select one level of bequest over another.

Three particular policies for intergenerational transfers can be explored: laissez-faire, with zero transfers; maximin, choosing transfers to maximize the utility of the most disadvantaged individual (or generation); and utilitarianism, choosing transfers to maximize the sum of all individuals' (and generations') utilities. The outcomes are quite distinct, with the first generation much better off than the second under laissez-faire, both generations identical in utility under maximin, and the second slightly better off than the first un utilitarianism.

Modifications and Alternatives

Let us now examine a different world, based on different assumptions, especially that individuals are altruistic, so that what they seek to maximize is weighted sum of their own utility as well as that of their contemporaries, offspring, and other members of the future generation. Different choices of weights allow different specifications of altruism, and again very different solutions can be calculated.

If parents care only about their own offspring and value their children's consumption almost as highly as their own, then the results, at least in this simple model, are quite similar to the maximin solution. (However, this coincide not analyzed further, and may not hold more generally.) If altruism applies more broadly to all members of the present or future generations, then the institutional context for bequests is crucial. No one can make private bequest that correspond to his/her own altruistic interests; everyone will prefer the outcome achieved by public transfers of assets to the results of individual action alone. Broadly diffused altruism is in effect a demand for public goods, which can only be supplied efficiently by the public sector. Something similar arises even under pure parent-offspring altruism, if the time horizon is extended a few generations: the farther into the future you look, the more descendants you will have, and the more your descendants overlap with everyone else's. In short, concern for your own descendants soon merges into a 'public good" concern for the future population as a whole.

Consider another modification of the basic model. Assume that there are institutional barriers that prevent the appropriate intergenerational transfers. What can be accomplished by "second-best" policy making? The social optima defined by the maximin and utilitarian philosophies can be recalculated, subject to the constraints of zero intergenerational transfers. The new solutions are less equitable than the unconstrained maximin and utilitarian solutions; the second generation does worse in the absence of transfers, though it does better than it would under a laissez-faire approach with no attempt at equity. In the con strained, no-transfer solutions, the price of the nonrenewable resource drops over time (while in the unconstrained solutions the price rises over time, as predicted by conventional economic theory). In order to compensate for the absence of transfers, the public agency managing the resource acts as if it were applying a negative discount rate, or "overvaluing" the future. However, this provides only partial compensation and is less efficient than allowing the optimal transfers to be made.

Conclusions

Cost-benefit analysis docs not ensure a socially desirable distribution of welfare across generations, and a social optimum will result only if intergenerational transfers are chosen with social objectives regarding the proper distribution of welfare in mind. Furthermore, decentralized private altruism may yield intergenerational transfers that both present and future individuals would agree are too small. This fact suggests a potential role for collective institutions in the provision of intergenerational transfers.

In a world where intergenerational transfers are nonoptimal and policy makers are unable to alter them, second-best policy making may imply a constrained optimum that is inefficient. [354]