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This article argues that questions of economic efficiency should be based on moral decisions about the rights of future generations and that it is fallacious to determine the morality of decisions using a criteria of economic efficiency. Among the many complex, long-term, global environmental issues, global climate change is one that is relatively amenable to conventional economic analysis. However, it is easier for economists to quantify the costs of mitigating climate change through the reduction and absorption of greenhouse gases than to quantify the benefits. Economists are beginning to grapple with these issues and are staking out their positions in public. Based on standard economic assumptions about technological progress and natural resources, economists have generally argued that: 1) in the long run the costs of most mitigation measures are greater than the benefits; 2) until present uncertainties are reduced no action should be taken; and 3) the present generation should not bear the burden of mitigating climate change since, irrespective of what climate changes are occurring today, future people will be materially better off.

There is a flaw in the way economists have framed the questions regarding the mitigation of climate change. At a time when people are concerned that future generations will not be as well off as the present generation, the question that economists are asking is whether mitigation is a good investment decision. This approach implicitly assumes that current generations have the right to exploit the atmosphere, and that doing so will not leave future generations worse off. While economists are questioning how this generation might most efficiently exploit the environment, the political discourse is questioning whose environment it ought to be. The critical question is what kind of a world we want to leave to our children and how best to do it, rather than whether mitigation of climate change is a good investment for us.

The important point to be made regarding questions of efficiency and equity is that what constitutes an efficient outcome will vary depending on how the rights to resources are distributed. Present economic cost-benefit analysis takes the existing distribution of rights to resources as given, but other distributions are possible and potentially valid. However, while economic reasoning may incorporate different distributions of rights for the sake of analysis, it cannot determine which distribution of rights should prevail. The moral question as to whether future generations should have rights to a climate approximately like the climate of today must be determined through the political process. Once this is done, then it is appropriate to use economic reasoning to decide how to allocate resources efficiently.

The current efficiency-based approach of economists also conflicts with the concept of sustainability because of the narrow definition of efficiency that economists use. However, when environmental goods and services not traded in the market are included in the analysis, there is less of a conflict between the efficient and the sustainable. In spite of this, a fundamental contradiction exists: all techniques to measure benefits are developed in the context of current generations, whereas sustainability is concerned with the future. Thus sustainability is also an issue of intergenerational equity. Again, this tension between the present and future generations must first be resolved in the political arena, and the questions regarding global climate change correctly framed, before empirical research on the question is pursued. A broad consensus appears to exist in political discourse that sustainability is a minimum criteria for intergenerational equity.

Acknowledging that sustainability involves both equity and efficiency does not necessarily define the rights of future generations or the responsibilities of the present generation. However, it does clarify some of the issues regarding the efficient allocation of resources, nonmarket valuation and contradictions of discounting the future.

The Allocation of Resources

Based on a seminal paper by Hotelling[1] (1931), an extensive literature has developed on the optimal depletion of stock resources. Hotelling argued that in a perfectly competitive world producers would extract resources up to the point where the returns from holding units of the resource for future extraction equaled the returns from extracting the resource and investing the net revenue earned in the capital markets. While economists have looked into the equity implications of this analysis, they have not developed models which show that different intergenerational distribution of assets will result in different efficient solutions, and that the equity implications of different efficient allocations can be significant. Instead, economists have implicitly assumed that technological progress will make resources available to future generations. Questions of intertemporal resource use have been addressed only from the framework of efficiency, as if the present generation had all the rights to resources, and research has focused only on how efficiency can be improved within these narrow limits. If questions of equity and the rights of future generations are not incorporated, then although efficiency of resource allocation may improve, we may still only be moving from one unsustainable point to another.

The Discount Rate Controversy

On the one hand, low discount rates aid sustainable development, since the lower the discount rate is the more concern it shows for future generations. On the other hand, low interest rates lead to higher investments, including investments in capital necessary for mineral extraction and the transformation of environmental systems, leading environmentalists opposed to water development projects and other major investments to argue against subsidizing discount rates. The issue of using lower discount rates to protect future generations becomes moot if instead we think in terms of the intergenerational distribution of rights to resources and environmental services. The interest rate would not be seen as the instrumental variable, as it is really just another price. The emphasis should instead be on what rights are passed between generations.

Transferring rights to future generations will itself affect the interest rate. Bringing equity back into neoclassical analysis resolves the contradiction between efficiency and the concern for the future.

Environmental Valuation

The value of environmental services is a function of how environmental and other rights are distributed across generations. Lowering the rights of the present generation to the environment will result in a higher marginal value of environmental services. Economists have argued that environments are misused and degraded because the costs of using environmental services are not fully reflected in markets, and that by introducing the valuation of nonmarket goods and services - i.e., internalizing externalities - a more efficient use of environmental services will result. However, internalizing externalities will not always ensure that the economy will move closer to sustainability; present methods of environmental evaluation will not be effective in protecting the welfare of future generations. Therefore, given the moral issues at stake, the ethical questions should be answered first before valuations are made. In other words, issues of sustainable development must be tackled first as issues of equity, and then as issues of efficiency.

Notes

1. Harold Hotelling, "The Economics of Exhaustible Resources," in *Journal of Political Economy* 39(2), 132-175 (1931).