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Growth: Meeting the Challenge

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SETTING ENVIRONMENTAL STANDARDS: AN ECONOMIST'S VIEW

by

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Much has been written about economists being rather gross fellows who pursue something even grosser called the Gross National Product (GNP). In particular, it is asserted that economists advocate growth in the GNP regardless of its consequences for the environment and for all or most other civilized amenities as well.

The truth of the matter is that many economists have long been concerned with environmental problems—much longer, in fact, than most physical scientists. Economists long ago confronted these problems under the heading of what they call "negative externalities." For instance, many leading 19th century economists addressed themselves to such problems as the "dastardly effect of smoky, cindery steam engines on the countryside" and the kinds of economic taxes or adjustments that might alleviate these problems. They also gave attention to noise, odors and similar unpleasant side effects of increasing industrialization and to the costs that these pollutants imposed upon the community.

Negative externalities were, indeed, a central concern to economic theory in the first two or three decades of this century. The only topic that rivaled it in importance, at least in the Anglo-Saxon countries, was probably international trade. Many of the great names in economics of that era are associated with this interest in externalities: Pigou, Knight, Marshall and Clark. Later, Simon Kuznets, while laying the conceptual foundation for modern national income accounting at the National Bureau of Economic Research, was very careful in his work to differentiate between income accounting with an emphasis on available market measures and what would be needed to gauge the growth of real income and welfare. Indeed, Kuznets pleaded (as early as the 1930's) for an extension of the conventional market measures in order to capture non-market contributions to and deductions from aggregate economic performance.

One could even argue that economists in the first part of this century devoted entirely too much time to environmental concerns. One might suggest, for example, that it was this preoccupation, among others, that left economists totally unprepared intellectually for the coming of the great depression in the nineteen thirties. Instead of attempting to determine what made the economy contract and expand cyclically and what kinds of policies would minimize or eliminate such fluctuations, economists spent their time worrying about noise, soot, smells and smoke created by such diversely offensive manifestations of industrialization as the steam engine, stockyards, chemical plants and the like.

Needless to say, all that changed, though rather more slowly than it should have, when

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Note: Presented to the Western Electric Environmental Seminar, New York City, December 1971—an experiment in interdisciplinary exchange of information and views on a contemporary problem of concern.

the Great Depression arrived. By the early 1940's, if not before, economics as an academic discipline and science had been "revolutionized" by a combination of Keynes' theory and Kuznets' measures of aggregate market activity (as perfected in the U. S. Department of Commerce and other government agencies). Certainly, from 1940 through 1967, the economic profession did focus a very substantial part of its energies upon the issues of eliminating business cycle fluctuations and of keeping the economy growing at a rate sufficient to absorb the available and increasing supply of manpower.

But, this trend ended in the late 1960's. At that point the environmental issue began to "re-emerge"—and, in a way that at first was quite startling to economists since they were characterized as being in some way major villains contributing to environmental deterioration. Yet, the first new or mid-1960 committees on environmental quality in the Federal Government were chaired and encouraged by the then Chairman of the Council of Economic Advisors, Gardner Ackley (who is now a member of the National Bureau's Board of Directors).

Economists, when thus confronted, did that which usually comes naturally when any discipline faces new challenges: they reached back into their intellectual history to see if there were any guidelines or suggestions for handling these problems. It was easy enough to identify that the concepts of so-called "welfare economics," and particularly the contributions of Pigou, were potentially quite applicable. The main policy prescription to be found in that body of economic thought was that polluters should be taxed for the act of polluting. In a market economy producers could be expected to respond to these taxes by reducing pollution by whatever amounts seemed most efficient in light of the socially or politically determined price (i.e., cost) attached to the act of pollution. In essence, this act of attaching price or tax to pollution would make it possible to "internalize" pollution activities into producers' decision making processes and thereby also into the market system on which we rely for determining the allocation of resources within our society. In short, the economist would say that the sensible way to set environmental standards is to determine what costs are attached to harming the environment and then set a tax to reflect these costs so that individual producers and businessmen, as well as consumers, adjust their activities correspondingly.

In keeping with this emphasis on the market mechanism, economists also emphasized that reducing pollution or improving the environment almost invariably involves new or additional costs of one kind or another. Or to put it rather more dramatically, to a considerable extent we have relied too much on the assimilative capacity of our environment to absorb pollution created by production and consumption; we must recognize that the absorptive capacity of nature may well be limited and therefore is a scarce resource which needs to be priced like any other scarce resource. In essence, treating nature as a free good has led us to overuse it!

Accordingly, as the first step in intelligently analyzing environmental problems, economists would recommend that we determine the valuations placed on environmental improvements. Moreover, using a most fundamental economic theorem, the rational way to proceed with environmental improvement is to do so as long as the marginal costs of such improvement are less than the marginal benefits. From the economist's standpoint the proper environmental standard, always assuming that we have properly and *fully* measured benefits and costs, is determined by the intersection of the relevant marginal benefit and cost curves.

It should also be clear what the economist's approach excludes. In particular, it abhors oversimplified statements to the effect that "we must" eliminate this or that source of pollution "entirely." Such drastic either-or statements are to the economist simply emotional oversimplifications. The economist is

particularly disturbed when he observes, as he often does, that the costs of eliminating pollution or of improving the environment tend to rise steeply as we approach some idealized goal of zero pollution or of perfection in our environment. The economist further realizes that the resources that may be squandered on this pursuit of an idealized perfection are likely to be resources that *may* not be available for other very worthy purposes, such as reduction of poverty or improvement of our educational system.

The economist also tends to view dimly those phophets of doom and gloom who insist that short of such perfection our society will drop into some abyss or cataclysmic trauma. Apparently, many physical scientists work with models that embody a great deal of instability, that is have a tendency to degenerate into some extreme boundary condition when disturbed. The economist's experience, in contrast, is with systems of considerable stability; he observes that the economic system when dislodged from equilibrium has a strong tendency not to move exponentially toward some boundary but rather tends to react or move back toward equilibrium. In particular, the economist identifies many corrective mechanisms in human or social systems that tend to keep man from behaving utterly foolishly. I will admit, though, that I am not totally convinced that the economist's optimism about human nature and institutions is *always* well placed; nevertheless, I think that the economist's generalization about the stability of social systems stands up reasonably well to the test of empirical observation.

In short, the economist's typical advice about environmental standards would be: Have the public state what environmental protection is worth, apply a tax reflecting this valuation and let the market mechanism do the rest. But economists, being the argumentative fellows that they are, haven't been content to let matters stand at this. One group within the profession insists that the whole problem of environmental damage, pollution and other negative externalities is a "phony, trumped-up piece of nonsense" that would be quickly corrected in any good market economy, such as that of the United States, by those who are harmed striking bargains with those who do the harming. Discussion of how private bargains could eliminate the problem has led to some very interesting economic theory but not to much insight into the real problems of environmental maintenance. In essence, these models (in which the pollution problem disappears as a public concern) are based on assumptions that bear little resemblance to the realities of the American economy—or for that matter almost any other economy. An ex-president of the American Economic Association, Kenneth Boulding, has even gone so far as to characterize some of these contributors as "our (the economics profession's) lunatic fringe who virtually deny the existence of public goods and public bads and think that all things can be done by private bargains between smoky railroads and rational dairy farmers."

The majority of the profession, in fact, has adopted a rather more pragmatic approach. Their starting point has been to worry whether the simple prescription of pollution taxes was really enough or necessarily the best way of attacking environmental problems in all possible circumstances. Furthermore, some economists, usually those with more practical experience, also wondered about the administrative practicality of using taxes in many applications.

Actually many, if not most, economists have apparently come to the conclusion that probably taxes aren't necessarily the only or even always the best solution. In a world in which the market works, but not necessarily all that perfectly, the imposition of a pollution tax frequently could actually reduce total welfare in the society. For example, if one imposed a pollution tax on a monopolist, this could result in his reducing production—and it is a simple truth of economic theory that monopolists tend to produce less of their goods than is usually optimal from a social standpoint, even without pollution taxes. One

perverse result is that in such cases, everything else equal (a big assumption!) and other policy solutions not being available, government perhaps should subsidize monopolists to reduce their pollution; indeed, on purely economic grounds it might be desirable to carry that subsidy to the point of exceeding the actual costs of whatever equipment was required to eliminate the monopolists' environmental harm. Needless to say, I shall leave it to others to sell that particular proposition to Congressmen!

Economists, though, hardly are enthusiastic about subsidies (e.g., for acquiring equipment to reduce pollution) as a universal solution to environmental problems. Quite the contrary, economists believe such subsidies should be avoided wherever possible since, in essence, a subsidy amounts to subsidizing patterns of consumption and production that are high in pollution content. One of the great appeals of the tax approach is that in the long run it should induce people to consume less of the goods turned out by polluting activities and lead producers to use such processes less in production.

Economists have also been concerned that taxes as a solution to environmental problems could weigh heavily upon small producers or firms, thus running contrary to the whole thrust of anti-trust and other competitive policies promoted by governmental agencies. In the same vein, the imposition of taxes could have some very curious redistributive effects within our economy; for example, a tax imposed by a federal or state environmental protection agency on contaminated municipal sewage effluents would work directly counter to "revenue sharing" or other programs intended to alleviate the fiscal problems of cities. Furthermore, there are very practical difficulties with tax solutions to environmental problems, e.g., determining the appropriate tax level could be an extremely difficult and complex process. And once one moved to a consideration of a dynamic economy, with investment decisions and planning carried out over a long time horizon, the complexities and unforeseen adverse side effects of anti-pollution taxes could (and probably would) multiply.

As a consequence of these and many similar considerations, all inducing caution or reservation about simply imposing taxes on effluents, economists have been led to look ever more kindly on straight regulation or physical controls as a means of solving environmental problems. This has occurred in spite of the fact that economists generally consider the application of physical controls or standards as being potentially arbitrary and often self-defeating in a reasonably free market economy. Nevertheless, some professional consensus has emerged that in many cases simply setting regulations or physical standards might be the easiest and perhaps the best solution achievable. Certainly, such an approach would usually be preferred by economists to the use of subsidies—though important exceptions might be expected, as already noted.

As a consequence of all this, economists have become rather eclectic in their approach to environmental problems, that is a bit less dogmatic than their usual custom. Along with this new eclecticism, economists also have become increasingly impressed with the importance of institutional arrangements, in particular the need of creating new and possibly very different kinds of governmental agencies, as part of the environmental solution. Regional planning agencies have come into particular favor.

In essence, this conversion of market-oriented economists to advocacy of planning was induced by a growing recognition that many environmental problems involved a remarkable number of interdependencies and what economists would call complex general equilibrium problems. A regional watershed or river valley provides a particularly good illustration of these. For example, a minimal cost solution to depolluting a river usually involves very complex decisions: about where to locate treatment plants; what kinds of relocation of industrial activity, if any, one

should require; which communities and industries one should group together to achieve scale economies in treatment; and where and to what extent one might take advantage of natural assimilation. Air pollution problems demonstrate many of the same characteristics. Similarly, it has been recognized for some time that regional planning on a fairly extensive scale is the only sensible way to approach several transportation planning problems, for example airport location and highway alignments.

In short, economists have taken what one could describe as more of a "systems approach" to environmental problems and increasingly find themselves collaborating with engineers and other disciplines. Systems analysis is, of course, perfectly consistent with adopting a more eclectic approach to the setting of environmental policies. For example, a regional agency dealing with one or more classes of pollution problems might well find it expeditious to use a mix of subsidy, tax incentives and regulatory standards to achieve a minimum or lower cost solution to its problems. Indeed, and as implied by my previous remarks, such a mixed strategy may be absolutely essential.

If all this seems a bit less emphatic or clearcut in its policy implications than some would wish, I would say so be it. I am afraid that problems of economic externalities, of which environmental problems are only one example, are exceedingly complex and difficult, especially when we move from the simplified models of economic analysis to the realities of policy. Notwithstanding these obvious imperfections or limitations of the economist's contribution, I am also willing to argue that the economist is rather more advanced in his thinking on practical solutions to these problems than most of his academic colleagues in other disciplines. To again quote Kenneth Boulding:

> By comparison with the ignorance and even obscurantism of the natural scientist [on these environmental problems], economics stands out like a clear beacon of eighteenth century enlightenment.