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ECONOMIC CRITERIA IN ENVIRONMENTAL REGULATION- PROSPECTS FOR THE 1980's

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I. Introduction

If A.C. Pigou were to reflect upon the sequence of events in the United States during this century, he would probably be stricken by a mixture of joy and pain. On the one hand, the pioneering work of Pigou and others on welfare economics and its application in government policy has initiated a debate that continues over seventy years later. On the other hand, it is an open question as to whether or not there has been significant progress in furthering the understanding and acceptance of many of the tenets of welfare economics in government policy among the American public. The perspective in this paper is that the 1980's represent a critical testing period for the application of economic paradigms to actual policymaking related to natural resources and the environment. The results of this test will likely set the tone for such policy for decades.

The application of economic logic to the design of public remedies to environmental problems is viewed favorably by most economists, excluding perhaps those who do not accept the desirability of government intervention. Certainly the current discussion of deregulation and "privatization" represents this

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non-acceptance with regard to some environmental problems, particularly those involving public lands, and the mining, timber, livestock, and even recreational uses associated with such lands. But over the broader spectrum of environmental issues, common property and other sources of market failure, such as externalities, irreversibilities, and intergenerational issues, frequently necessitate government activity of some kind to ensure efficient use and allocation of natural resources.

"Environmental regulation" is only one type of governmental activity, and governmental activity is only one type of institutional structure, which might mitigate environmental problems in the U.S. The focus of this paper is on environmental regulation because natural resource management during the 1980's in the U.S. will most likely continue to be dominated by such regulation. The practical issue of concern here is with the prospects for reform in the existing regulatory structure which incorporates economically rational decision rules. There are many barriers to the application of such rules, not the least of which is the constraining effect of the legal complex upon which the present structure is based. As an economist working closely with economically astute lawyers, a famous remark by Justice Brandeis seems appropriate:

> A lawyer who has not studied economics . . . is very apt to become a public enemy.

II. The Literature Explosion in the Economics of Natural Resources and the Environment

"Natural resources and the environment" refers here to five categories of issues: (1) pollution of air, water, and land; (2) management of renewable resources such as timber, range, or fisheries; (3) use of nonrenewable resources such as fossil fuels or minerals; (4) human health and safety; and (5) preservation of wilderness, endangered species, and genetic resources. Over the past two decades, there has been a dramatic proliferation of applications of welfare economics to these issues. Among the earliest significant efforts in this regard were the studies of water resources by Eckstein and Bain. Applications to renewable and nonrenewable resources management have proceeded at a vigorous pace since the 1960's. At the same time, a body of literature has developed on the relationship between growth and natural resources initiated by Barnett and Morse's seminal work.

Only within the past decade or so has welfare economics been applied to any significant degree to pollution, human health and safety, and preservation of wilderness and species. Market failures, in the context of the theoretical legitimacy of governmental provision of goods and services, have been discussed for some time, with Samuelson's work in the early 1950's being perhaps the most prominent. But an explosion of literature on pollution did not occur until the late 1960's and early 1970's with such well-known works as Dales, Kneese, Schultze, and many

others which have been surveyed recently in Krutilla and in Portney.

This expanding literature on the economics of natural resources and environment is evidence that economists are capable of responding to important social concerns. The methodologies and information which have been developed could facilitate beneficial adjustments of government regulation. Most of the relevant literature has emanated from academia, where the most important market for research products is that of publication in professional journals. It is important to ask, however, how the research product has fared in the larger context of the policy marketplace. What does the market for economic criteria in environmental regulation look like, and what will the rate of diffusion of this product likely be during the 1980's and beyond?

III. The Market for Economic Criteria in Environmental Regulations

The "market for economic criteria in environmental regulations" has two important characteristics. First, there is economic information and knowledge. Second, there is the societal value of economic objectives in environmental regulations--a much more volatile characteristic. These characteristics are complementary, the temporal lag between new societal values and consequently increased information/knowledge being significantly less than the reverse. A number of factors involved in the

interplay between these characteristics will likely lead to a slow rate of diffusion during the 1980's.

Before enumerating these factors, it is important to emphasize the role of societal values in affecting both supply and demand. Societal values placed upon the use of economic objectives in governance of natural resources and the environment involve complex psychological, social, and ethical factors. These include the individual psychological and ethical dispositions of the regulators, as well as the political pressure manifested from the values of various interst groups. The interplay of values and economic information among interest groups appears to be a major long-run force in the market for economic criteria.

Several limitations of the quality of economic information and knowledge available to interest groups, regulators, and the general electorate represent significant barriers to the diffusion of economic criteria in environmental regulations. First, a common criticism of many economic paradigms and models is that they are based upon incongruous and unreasonable assumptions about human behavior, technology, availability of information, and the degree of competitiveness in markets. The notion that people are (or should be) rational economic actors in the sense of some mythical species of <u>homo economus</u> is at best daydreaming and at worst treachery to many people. Specification and estimation of empirical models of production, alone, is

frequently difficult. Their combination with behavioral models which are often not empirically verifiable, compounds the problem.

A second and related set of limitations concerns the measurement of economic phenomena in environmental issues. Available information is rarely adequate for comprehensive analysis. Economic analyses frequently involve joint probability distributions of technical and economic variables. In pollution and health studies, for example, the epidemiological data used to construct damage functions tend to be highly uncertain, as are the economic data used to assign values. Statistical methodologies provide for the analysis of such uncertain data, yet levels of uncertainty in results remain large due to the paucity of data. The impact of economic information on environmental regulatory decisions is inversely related to levels of uncertainty. Reducing uncertainty is costly, and a constraint currently being encountered is a declining level of public support, both federal and state, for necessary research and data-collection. It is paradoxical that the political rhetoric supporting the use of economic criteria is at an all-time high while public funding needed to implement the use of such criteria is in a very depressed state.

A third limitation on the use of economic criteria is associated with the fact that the analysis of problems with complex economic and technical dimensions requires sophisticated

methods. Having said this, an examination of the major professional economics journals indicates the presence of a rather perverse set of incentives. Diminishing social returns quickly set in when underlying hypotheses are incapable of being tested. It is an appealing argument that strictly theoretical work paves the way for future applied work. However, much of this work goes unnoticed and unused by those involved in analyzing and making policy decisions. Balancing sophistication of methods with success in communicating results to the regulatory audience is a continuing problem for economists. (See Ferguson and LeVeen). Joan Robinson has summed up these measurement and sophistication problems well:

> Mathematical operations are performed upon entities that cannot be defined; calculations are made in terms of units that cannot be measured; accounting identities are mistaken for causal laws; differences are identified with changes; and one-way movements in time are treated like movements to an fro in space. The complexity of models is elaborated merely for display, far and away beyond the possibility of application to reality.

Fourth, economists have generated a poor ethical reputation for themselves among regulatory audiences by what have been misguided efforts to perform risk analyses based in part on the assessment of the value of human life as measured by economic production foregone. A slightly different version of the same criticism applies to risk assessments in which non-human life is involved, such as endangered species. The approach has been

counterproductive in the effort to facilitate the application of economic criteria in particular to many issues of pollution, health and safety, and wilderness and species preservation. Fortunately, alternatives are emerging which focus on estimating the compensation necessary within affected groups in order to voluntarily assume certain risks. Schulze and Kneese have characterized the voluntary risk-taking approach as one of allowing ethical diversity to enter economic assessment of human risks. Alternative risk assessment techniques for human safety are explored in Hohenemser and Kasperson. A corresponding approach to risks to non-human species will no doubt be more difficult to develop.

The ethical dilemmas surrounding risk assessment are also present in the representation of intergenerational interests in economic analysis of environmental hazards and natural resource degradation. Measurement of the costs imposed upon future generations by irreversibilities and catastrophic events have not been accomplished. Nor has the controversy surrounding the proper weighting of future generations' interests, i.e., the social discount rate, been resolved with an agreed upon measure. These kinds of ethical questions are frequently ignored in the economic analysis of environmental problems, thereby adding to the skepticism with which economic quantification is received.

Fifth, perhaps the most difficult barrier to further application of economic criteria to government regulations is the

"redistribution" problem which is common to the environmental area and to other areas of regulation. If the design of regulations with economic criteria is based on good economic analysis, the outcome will have a "let the chips fall where they may" flavor. Such outcomes say nothing about equity impacts, and pose a threat to many interests in society when endorsing, for example, the use of cost-benefit analysis in regulation design. It becomes a politically troublesome obstacle in the environmental area because the underlying issues of resource ownership and transfers are unusually volatile. Even if the various interests could agree on ownership issues, the income transfer risks associated with the economic design of regulations would remain substantial. Any change in regulations is accompanied by an income redistribution. Since there is no commonly accepted "right" distribution, a continual process of losses and gains characterizes any regulatory scenario, a phenomenon explored recently by Thurow.

The inclusion of economic criteria represents no exception to this transfer phenomenon, except to the degree that major interest groups can all be shown to be better off from efficiency-gains. Unfortunately, such efficiency goals are vulnerable to distortion in the political process. The assertion that unemployment, inflation, and productivity problems are primarily due to environmental regulation and, therefore, that "regulatory reform" is imperative is a prime example of

distortion. Careful examination of this assertion has revealed that the macro impacts of environmental regulations are relatively small compared to other driving forces in the economy (see Peskin).

A strategy of achieving efficiency-gains which would leave all major interests at least as well off has been pursued during the past few years by the Environmental Defense Fund in its work on electricity generation alternatives. Case studies in a number of states, most recently New York, of individual utilities have been prepared. The approach has been to propose less costly alternative investment plans on a utility- district-specific basis and to advocate the use of economic incentives administered by state public utilities commissions to induce utilities to underwrite such investments. Consumers benefit from less dramatic rate hikes accompanying the lower cost plans, and utilities benefit from earning a rate of return on investments in a broader array of facilities (e.g. solar and cogeneration facilities as well as traditional fossil-fired central stations). Interestingly, some consumer groups protested the loudest, based primarily upon the fear that some classes of consumers would benefit more than others. Visceral reactions to any changes in distribution of income, even if the pie is bigger for everyone, will always be part of our political process. Nevertheless the "politics of efficiency" as articulated recently by Graff is likely to become an important factor during the 1980's, and may

offer an opportunity to alleviate some distributional barriers to the use of economic criteria.

Issues associated with property rights represent another dimension to income redistribution barriers to the use of economic criteria. The question of who owns a natural resource must be answered before addressing the question of who should pay for the use of the resource or the maintenance of its quality. Where common property characteristics are present, there is the additional distributional problem of determining who benefits as well as who pays. The controversy over "public versus private" ownership extends across the spectrum of natural resources. The continuing struggle over ownership and management of federal lands in the western U.S. is one example. Another prominent example, the use of tradable emissions rights, and how the initial allocation of those rights would be made in the control of air pollution, is discussed from several perpectives in Graymer and Thompson. In each case, environmental interest groups maintain that these resources (land and air quality in the above examples) are owned by the public whereas private industry interest groups would prefer a system which allocates rights to the use of these resources to private entities, which in many cases are the polluters.

A clearly defined set of such rights is an important prerequisite to the successful application of economic criteria in environmental regulation. Even where the use of such criteria

appear to be in the economic interests of everyone and hold potentials for environmental enhancement, this barrier to clearly defining rights is substantial. Just as some environmentalists oppose transferable pollution rights as a "license to pollute," some private water rights holders in the western U.S. oppose the development of markets for water rights transfers. Such hesitancies appear to stem from a fear of ownership loss (public or private); and the institutional reforms needed to implement such economic criteria involve complex legal and psychological factors. Thus, there is no uniform endorsement by either public or private interest groups of economic criteria or market mechanisms for the solution of environmental problems.

IV. "Regulatory Reform" and Barriers to Diffusion of Economic Criteria in Environmental Regulation

In spite of the current political atmosphere, the five sets of factors discussed above continue to constitute a significant barrier to the use of economic criteria in environmental regulations. This is not to say that there has not been a significant increase in the presence of economic concepts in environmental regulations-the issuance by President Reagan of Executive Order 12291 in 1981 alone ensured such an increase. This order requires federal agencies to prepare "regulatory impact analyses" so that regulatory goals consistent with some sort of positive net economic benefit criteria are pursued. The current "regulatory reform" movement, of which the application of

economic criteria in regulation is at least theoretically a part, actually began in earnest during the middle of the Carter Administration's term. Indeed, there has been a proliferation of economic jargon in environmental regulations in recent years. For example, there have been over 200 relevant entries in the Federal Register since 1980. These developments do not, however, represent substantive progress in the use of economic decision rules in environmental regulation.

Perhaps the best indication of the superficiality of the current "regulatory reform" movement as it applies to economic criteria and the environment can be seen in the behavior of Congress and the Administration. "Regulatory reform" became politically fashionable in the late 1970's, and it means different things to different interests. Reduction in government paperwork and the more efficient operation of government agencies are probably the aspects most widely understood by the electorate, and no doubt contributed to the Republican landslide in 1980.

At the same time that Congress has been adjusting to the tax-and deficit-conscious electorate, it has also been aware of the widespread and continuing demand for environmental quality among Americans. The opinion polls which have surveyed this demand for environmental quality have suggested that such demand exists exclusive of demands for regulatory reforms. Unfortunately, however, the polls have had little to say about

possible trade-offs between these demands. How much Americans are willing to pay for environmental quality is a question still open to discussion.

Given all this, it is not hard to understand why the performance of Congress on the inclusion of economic criteria in environmental legislation has been and continues to be inconsistent. A review, for example, of federal legislation regulating toxic substances during the 1970's in Portney reveals that about half require some "balancing of costs" and half do not. The role of economic analysis in the reauthorization of environmental legislation is predictably controversial, with mixed signals emanating even from within the Administration as to how to proceed. During reauthorization hearings for the Clean Air and Clean Water Acts, the Reagan Administration supported relaxation of several air quality standards and delays in compliance with water pollution treatment standards. Support for the use of economic criteria to weigh benefits and costs of air and water pollution controls, or to systematically implement tradable emissions markets, was not evident. This is in spite of significant evidence, for example, of the net economic benefits of the Clean Air Act standards (Wolcott and Rose). It appears that the Reagan Administration's policy on regulatory reform in the environment has focused primarily on the elimination of government programs through budget-cutting, a strategy

dramatically different from one based on the inclusion of rational economic criteria in environmental regulation.

The lack of commitment of the Administration to the use of economic criteria in environmental regulation is perhaps most dramatic in its failure to pursue such criteria in the water resources field. This is in spite of the fact that one of the most significant moves by the Reagan Department of Interior has been the pursuit of an increased cost-sharing by states in the financing of federal water projects. But this has less to do with whether the projects can meet economic criteria than who pays for them (federal or state government). This cost-sharing policy makes economic sense because it has the potential to slow the Congressional porkbarrel which has financed water projects in the past. Since water projects tend to involve less dramatic human health issues, there has been relatively more support among environmentalists for the use of economic criteria in water resources regulations. Consequently, a process which began many years ago culminated during the Carter Administration in the promulgation of "principles and standards", including important economic criteria for evaluation of water projects. The Reagan Administration's position surfaced in the dismantling of the U.S. Water Resources Council and in a proposal to repeal the principles and standards, and to replace them with guidelines which would not require federal water agencies to analyze costs and benefits of new proposed water projects. Similarly, there is

some question as to whether or not the current Administration is pursuing a meaningful standard of "fair market value" in its leasing of mineral and energy rights on federal lands, and in its outright sales of parcels of federal lands. This problem is exacerbated by the fact that sales of many of these resources are in effect are really no more than transfers of inventories, since weak markets will prevent their actual development at this point given current relative prices.

These developments indicate that the current "regulatory reform" movement contains little of substantive value in the long-term effort to include economic criteria in environmental regulations. On the contrary, the roll-backs in the use of economic criteria in the management of federal natural resources, the stalemate in their use in the pollution and human health fields, the budget cuts at EPA and elsewhere and the associated decline in economic research funding combine to suggest that the Federal government is moving backward. Certainly with regard to the obstacles to the use of economic criteria in environmental regulation discussed above, the only dramatic development thus far in the 1980's has been the attempt by the Administration to redistribute environmental wealth across-the-board from the public to the private domain.

V. The Long-Run

As long as there is a legitimate role for government to play in the use and allocation of America's natural resources, there

will exist environmental regulations. Eventually, there will likely be economic criteria of some sort associated with most of these regulations. Unfortunately, the orderly diffusion of such criteria is likely to be delayed by as much as a decade by the current notion of "regulatory reform" in Washington. This is due not only to the cutbacks in federally-sponsored programs and research related to economic criteria, but also to the backlash which is already occurring to the widely perceived notion that "selling the environment to the highest bidder" is what economic reform in environmental regulation is all about.

In the midst of all this, serious work on mitigating the impediments to the use of economic criteria must somehow continue. Many of the obstacles discussed in section III can be overcome by relevant research programs with integrated scientific and economic components. What is sorely needed is the evolution of a tradition of presenting relevant economic case studies within various environmental regulatory forums. Providing timely information in an understandable form is of utmost importance in the pressure-oriented decisionmaking that occurs in such forums. The regulatory forum-specific case study has proven to be a valuable tool in promoting the application of economic criteria in environmental regulation. It is a tool that has increasingly come to be recognized by many environmental interests and agencies. The Environmental Defense Fund has and continues to use it, particularly in its energy and water resources work.

There is vast potential for economic researchers to contribute to this process in all areas of natural resources and the environment.

An indication of where the American people may be headed on the economic regulation of the environment is to be found in the recent water project referendum (Proposition 9) in California. In June, 1982, the California voters turned down a proposed package of new water projects (including the "Peripheral Canal" project) by a nearly 2-to-1 margin. Post-election polls revealed cost and environmental impacts as the main concerns of voters. While one can discuss at length the various coalitions and campaigns involved, the point remains that a major water project proposal was rejected for the first time in California history. The fact that different voters rejected the proposal for different economic and environmental reasons suggests the need to integrate the two sets of concerns early on in the regulatory process. No such integration occurred in the State legislature or within the State agencies so that a referendum vetoing an action of the State government was the result. People want economic and environmental goals to be pursued by government, and have delegated the authority to do so to those who govern. When the pursuit of the goals is lax, a reconsideration not of the goals themselves but of the programs and people in government is the most likely result.

FOOTNOTES

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