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Economic Thinking in Environmental Coverage: *It's Not Accounting*

Reporting on the environment and policies to protect it, journalists frequently overlook economic causes and consequences. In the first of two NewsBackgrounders, veteran FACS teacher Rob Stavins provides an analytical framework designed to sharpen the focus of environmental coverage by defining the appropriate questions.

By Robert Stavins

Two questions seem fundamental in environmental policy. Both can be informed by economics. The first question is:

What is the appropriate goal?

This refers to the desirable degree of environmental protection. How clean is clean? Is a ten-million ton reduction in sulphur dioxide emissions sufficient? Should it be only 8 million tons? Perhaps it should be 12 million tons.

A conceptually distinct question, though it is interrelated in terms of how we actually formulate our policies, is:

What are the appropriate means?

Once we have established the goal or the standard, there are alternative means by which we can try to achieve that goal. Is the best public policy a liability scheme, a tax, conventional standards, or some other approach?

Economic thinking can help to inform answers to both the question of goals and the question of means.

Of course, this claim may beg still other questions: what does economics have to do with the environment? Are economics and environment mutually exclusive, or are they compatible? And can one help us to think about the other? I want to make two assertions that respond to those fundamental questions.

1. The causes of environmental problems in market economies are fundamentally economic.
2. The consequences of environmental problems have exceptionally important economic dimensions.

Let me turn to the implications of the first assertion. Why do firms simply not control pollution on their own? The quick answer from some environmentalists, 30 or 40 years ago, was that the people within private industry were somehow ethically impure. Some environmentalists today may still believe that. But in the 1990s, when we are all part of the environmental problem, that is clearly not a useful answer. So we have to go a bit deeper. What we begin to find is that private firms in a market economy do not, on their own, control pollution to the levels that we might wish them to because the environmental consequences in costs or social damages do not show up in the bottom line of the firms' financial statements. Yes, there are public relations impacts, and those are implicit in the bottom line. But most of the damage is outside the firm. This is why economists think of this entire area of environmental pollution as a problem of "externalities."

Now let's think a bit further about the economic consequences of pollution. The consequences are not simply financial. It bothers me when I hear people talk about the loss of Amazon rain forest in terms of economic consequences such as lost pharmaceutical products that we might have been able to produce if the forest had remained. That is only a small part of the story; there is a difference between economics and accounting. Accounting is about dollars and cents. Economics is about human welfare under conditions of scarce resources.

Measuring the Benefits of Environmental Protection

Take a specific question: "What is the economic measure of the human health impacts of environmental pollution?" To start with the obvious, the accounting approach, we could say that the health care costs of people getting sick from environmental pollution are one measure. For 40 or 50 years, economists have gone further. We observe that since those people are no longer working, we must also include in the costs the lost wages, or lost productivity, to the economy. That is still the accounting part. Lawyers would tell us that there is something else: pain and suffering. The economic answer is not to separate out such a factor, but to recognize that the true overall economic measure of those health damages is in how people really value their health. Let's reemphasize that; *how they really value their health*, but not necessarily what people would tell you if you were to ask them how they value it. That is a very important distinction in economics, one it will be helpful for reporters to keep in mind.

What are the benefits of environmental protection? They are the value of the environmental damages that are avoided.

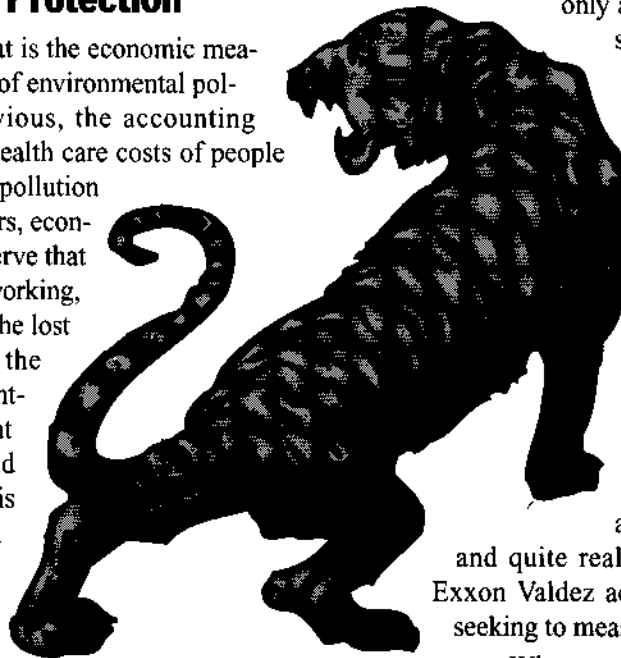
Remember: damages in economic terms are however people really do value them. That means that the benefits of environmental protection are equal to the sum of the sacrifices that people would actually make. Economists talk about willingness to pay for environmental protection, or willingness to accept compensation to tolerate a lack of environmental protection. In other words, it is the sum of the way people actually evaluate environmental quality. What are you willing to give up to have a clean environment? That's the measure.

That might not sound like an operational definition: how can we possibly measure it? Over a period of 50 years economists have devised, and been applying around the world, a series of methods for determining the true value of environmental degradation. There are strange names for some of these methods: the hedonic property method, the hedonic wage method, the travel cost method, and lastly, contingent valuation methods. Some of these are controversial, some are not. None is perfectly precise; uncertainty is involved. But these methods provide ways of beginning to understand the benefits of environmental protection in somewhat rigorous, economic terms.

Values: Use, Option, Existence

When we move from looking at the benefits of environmental protection to determining who the beneficiaries of that protection are, we confront additional complexities. Direct beneficiaries, those immediately affected by environmental pollution or environmental degradation, may be only a small part of the story. If we lose a species in the wild, such as the Bengal tiger, very few of us will have our welfare directly affected by not being able to see it, photograph it or hear it. That "use value" is very small. But many people will lose the option to do that in the future, should they care to. Economists call that "option value." Further, many people around the world derive some benefit just from knowing that Bengal tigers exist in the wild. That is "existence value." Option value and existence value are measurable and quite real. In the court cases following the Exxon Valdez accident in Alaska, the parties were seeking to measure existence value.

When we turn from theory to practical empirical matters, we find that with higher levels of pollution, not only do the damages increase, but the incremental damages increase. The first bit of pollution may simply have aesthetic consequences: my car is getting dirty as a result of suspended particulates. If we increase pollution, the most sensitive members of the population may become ill. If we increase pollution still more, everyone becomes ill. If we increase it even



more, people begin to die. So the key factor to look at is the increase in marginal or incremental damages. That turns out to be important because it means that the marginal benefits of controlling pollution are decreasing as we take it down to zero. We get the most return from controlling pollution when things are worst. We still get benefits when we cut it additionally, but those benefits become smaller. In devising public policy, it is the marginal benefits that matter, not the total benefits.

The Costs of Environmental Protection

Before I pursue that point, I want to turn to the other side of the ledger, the costs of environmental protection. If we were to ask the general public what the economic costs of environmental protection are, people would respond in terms of what shows up in the budgets of government, primarily the monetary enforcement costs. However, except for a rare number of public policies, those budget figures turn out to be a trivial part of the cost, anywhere from two to five percent or, sometimes, ten percent of the costs. More important are the private sector costs that take the form of new capital required, augmentations of capital, or additional operating costs. These constitute 80-90 percent of the true cost of environmental protection. These costs, of course, are passed on to consumers. Being sensible, we tend to first do the easy cleanup, or (to put it in economic terms), that which is cheapest to clean up. As we move to higher and higher standards, we find that not only are the total costs of environmental protection increasing, but the marginal, or incremental, costs of environmental protection are also increasing. The cost to go from a 10- to a 12-million-ton reduction of sulphur dioxide for acid rain prevention in the United States is five times greater than the incremental cost to go from an 8- to a 10-million-ton reduction. It is the marginal cost that matters for public policy.

How Clean Is Clean?

That takes us to the point: if the marginal costs are increasing, and if the marginal benefits are decreasing, it means that at some intermediate level the difference between benefits and costs — the surplus or net benefit — is going to be at a maximum. Therefore, we face a difficult and important question in public policy: "How much pollution control is optimal? How clean is clean enough?"

Consider environmental policy decisions that we make in our homes when we decide about environmental control — for example, how often to sweep the floor in the kitchen. I don't keep my floor in an infinitely clean state. I don't invest all of my resources in keeping the floor clean. I strike some kind of a balance in terms of how clean I will keep the floor. On the other hand, I want to make sure that the floor of a surgical theater in which I might have an operation is going to have imposed upon it a much higher standard of cleanliness. The reason, of course, is that the marginal benefits of pollution

control — preventing infection — are much greater in the surgical theater than in my own kitchen, where I tend not to carry out open heart surgery.

Public Policy Decisions: A Role for Economic Efficiency?

When we observe peoples' behavior and collective decision-making in their communities, we often see that they are balancing benefits and costs. The question is: what can or should we do to achieve that balance in public policy? There is one criterion that uses everything we have been talking about in terms of benefits and costs: the efficiency criterion, the notion of maximizing net benefits. This notion is not simply that benefits should be greater than costs. Rather, the rule is that the difference between benefits and costs should be as great as possible. We may find a program that has benefits greater than costs, but it could be that by making the standard more strict, or by relaxing the standard, the difference between benefits and costs could be increased.

I hasten to add that efficiency is only one of many criteria. Another, of course, is equity: how are these benefits and costs distributed? We might develop an environmental policy that is efficient in terms of maximizing net benefits in the aggregate, but that had unacceptable consequences for particular income classes or geographical areas.

Putting aside the goals, I want to turn briefly to the other big question for environmental policy, the question of the means.

A Role for Cost-effectiveness?

Whether we choose a goal on the basis of economic criteria, political criteria, scientific criteria, or simply guess and go blindly ahead, we must decide how to achieve that environmental goal. Here, economic analysis is a powerful tool to enable us to choose the least costly means of achieving the goal. Whether or not it is efficient, if we decide that our goal is a ten-million-ton reduction in sulphur dioxide, we can then attempt to reach that goal as cheaply as possible. That is the criterion of cost effectiveness.

There are two principal types of environmental policy instruments. Some are cost effective. Some are not. Command-and-control, or conventional, regulatory approaches have been used in all of the industrialized countries and in virtually all of the developing countries since the beginning of the modern era of environmental protection (around 1970). They are a set of approaches in which governments dictate to individual firms how much to clean up, and how to do it. These are uniform performance standards or technology standards, and they tend to be excessively costly; they lock in existing technology rather than provide true dynamic incentives over time, for us to adopt better and cheaper pollution control technologies.

More flexible approaches are now getting a great deal of attention, sometimes only lip service, but sometimes real consideration. They are so-called market-based, or economic incentive, approaches. The idea is to harness market forces to protect the environment. These include tradable permits, pollution charges or taxes, and deposit refund systems. The next FACS *NewsBackgrounder* will concentrate on these and other innovative environmental policy instruments.

Until then, here's something to think about as you cover environmental problems: ***there is no panacea. It is not the case that market-based approaches are always appropriate, or that market-based approaches are never appropriate. The real challenge for regulators, polluters and environmentalists alike is to select the right pollution policy instrument for each specific problem that we face.***