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A Political Economy in an Ecological Web

JASON F. SHOGREN
Department of Economics, University of Wyoming, Laramie, WY 82071-3985, USA
(email: jramses@uwyo.edu)

Abstract. Behavior matters more to environmental policy than most people think. This paper illustrates why this point needs repeating in four ongoing policy debates in the United States – Children's health risk, ozone/particulate matter (PM), climate change, and endangered species.

Key words: endangered species, environmental policy, pollution, risk

JEL classification: Q2, H3

1. Introduction

> And don't let them fob you off with a royal commission or a task force on the grounds that economists (or any other experts) will be able to tell them exactly the right amount to spend on pollution prevention. No one knows the answer to that question. The politicians must decide what the public wants and stake their political lives on their decision; they are in a much better position to assess the benefits and costs of their action (or inaction) than any body of experts.
>
> J. Dales, *Pollution, Property, and Prices*, 1968

If you could tell the President of the United States anything you wanted to about the interaction of the economy and environment, what would you tell him? At first, one might be tempted to echo the economist's lament that the misunderstanding or strategic misdirection of fundamental economic concepts remains a serious obstacle to rational environmental policy.[1] Such frustration, of course, cuts broader than the environment, the US, or the present. Adam Smith and David Ricardo vilified "oppressive", "miserable", and "mischievous" policies that ignored basic human behavior.[2] Charles Schultze declared that "[f]orty years of observing policy debates, including 15 years of participating in them, have not dulled my amazement at how few participants have a grasp of fundamental economic principles and how differently from economist they analyze issues."[3] And the observation that good economics is often bad politics inspired Blinder's corollary to Murphy's Law: "economists have the least influence on policy where they know the most and are most agreed; they have the most influence on policy where they know the least and

disagree the most."[4] Their message is clear: good economics does not always win the day when politics drives policy.

In that light, I would sharpen my message – behavior matters more to environmental policy than most people think. The argument that "science defines environmental policy" is correct if the behavioral sciences are integrated into the calculus of ecological equilibrium. Choices can shape nature just as nature can shape our choices. Those policies that artificially separate natural from behavioral phenomena will generate biased predictions, and are ultimately self-defeating. To illustrate, this paper considers omitted economic considerations in four ongoing policy debates, and investigates where additional empirical trade-off analysis could buttress and sharpen the economic viewpoint. This empiricism has a purpose – to increase the costs to policymakers who neglect or downplay the importance of behavior in environmental policy. They can benefit from clear evidence showing that environmental progress could be less expensive by including relevant economic behavior.

Underlying many debates is the polemic notion that somehow economists adhere to unfeeling principles and do not care about the environment or kids or endangered species. Of course, nothing could be further from the truth – economists always have been environmentalists as witnessed by our century-long cry to get prices to reflect true social costs. We are more aware of supply and demand and are therefore more willing to stand up and say that wealth spent here is not spent somewhere else. And that with more rational policy, it is possible to provide more human and environmental health with less wealth. But politicians cannot be expected to act on principle just because the economic data and theory are convincing if the general perception of a principle might not be digestible to the voting public. Appearing to help the environment or kids even at the price of taking aid away in reality will be more appealing to policymakers, no matter how abhorrent to economists. While we cannot out-lawyer or out-engineer advocates in policy debates, politics does understand real and transparent economic costs. Adding more lucid empirical darts to our quiver can only serve to improve our standing in environmental policy debates.

2. Risks to Children's Health

Healthy kids – everyone supports that end. Evidence continues to accumulate that suggests children face disproportionate health risks from environmental hazards.[5] These unbalanced risks stem from several fundamental differences in the physiologies and activities of children and adults. As kids develop, their digestive, nerve, and immune systems are more susceptible to toxic pollutants and other environmental hazards. Children eat, drink, and breathe more for their weight, and spend more time outside in exposure to greater amounts of contamination and pollution for their weight than adults. Kids also face potential exposures over their entire

lifetime. They are also less able to recognize and to protect themselves. All this suggests children require special attention when designing environmental policy.

Based this argument, in April 1997 President Clinton unveiled a new executive order: EO 13045 "Protection of Children from Environmental Health Risks and Safety Risks" (Federal Register 1997). The EO directs the federal government to safeguard kids from environmental threats through three areas: policy, research coordination, and federal regulatory analysis. First, although many agencies thought this was already part of their mission (e.g., Federal Drug Administration, Health and Human Services), Section 1 requires all agencies to make the protection of children a high priority in implementing their statutory responsibilities and fulfilling their overall missions. Second, Section 3 creates an interagency task force to define a coordinated research agenda to identify research and other initiatives the Administration could take to protect children, and to enlist public input for these efforts. Third, Section 5 requires, for the first time, that agencies examine and explain the effects of their rules on children. Agencies promulgating major regulations that may have a disproportionate impact on children now must (a) evaluate the environmental health or safety effects of the planned regulation on children, and (b) explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the agency. The idea is to link policy decisions to the health science on children, to ensure accountability to the public, and to force agencies to refocus their research agendas. Section 5 is the key to the order and, potentially, the most controversial – it has been called the "kick me" provision and requires an explanation when actions beneficial to kids are passed over. Supporters argue that without Section 5 the order will be merely hortatory and symbolic.

The kids EO raises several issues deserving more empirical attention. First, by maintaining that environmental risk is exogenous, and beyond the control of kids or adults, the EO maintains the false separation of the mechanistic risk assessment and behavioral choice. But risks to kids are not derived from autonomous sources, they are functions of both natural science parameters and their parent's self-protection decisions (Crocker and Shogren 1998). Given the relative marginal effectiveness of different self-protection actions, how people confront risk differs across individuals and situations, even though the natural phenomena that trigger these actions apply equally to everyone. Thus the EO does not address the evidence that suggests the most significant threats to children's health are the behavioral choices frequently associated with poverty, e.g., high discount rates (see, for example, Duncan et al. 1997). Researchers need more information to determine the bias in assessing risks to kids solely in terms of natural science information given that the sources of systematic variation are relative prices, incomes, and other economic and social parameters. Omitting private behavioral responses to risk will result in overestimating the risk to kids, and underestimating the value of reduced risk.

Second, the kids EO was designed purposefully for a few federal agencies who wanted a potential counterweight to the cost-benefit EO 12866 – the regulatory

review order that already requires similar analysis on costs, small business impact, and other issues, and future regulatory reform aimed at a broader accounting of risk-benefit trade-offs in federal regulations. This issue is tricky, deserving of a fuller account at a later date. For now, a quick point must suffice. While EO 12866 provides significant latitude to agencies and has not served as a strict constraint on behavior, that could change with a new administration. The kids EO provides a potential wedge to divide-and-conquer regulatory decisions if children's health is played as the trump card in the regulatory debate. Suppose a cost-benefit analysis reveals a new regulation is a net loser overall but a net gain to kids, the decision not to implement is no longer clear. The research need is to reduce the knowledge gap on how society evaluates risks to children, and how explicit distributional weights for kids in cost-benefit analysis complicates welfare measurement (see, for example, Harberger 1978).

Finally, the kids EO will pressure agencies to ratchet up their regulatory standards, with a corresponding and potentially unjustified increase in the costs and burdens of regulation. Industry has and will continue to criticize this pressure to raise standards across the board. The additional burden of Section 5 may further delay the regulatory process, and add resource demands to agencies already confronted with budgetary constraints. If agencies do not strengthen the relevant regulatory standards, the EO provides a ready basis to mount judicial challenges to decisions. Every supplement to a rule or regulation provides a new avenue to attack and compromise the core focus of the rule. Whether disclosure produces net economic benefits remains an empirical question.

3. Health Thresholds and the Lost Triangle

Clean air – everyone's for this too. But the U.S. Environmental Protection Agency's (EPA) recent rules to tighten the ozone and particulate matter (PM) ambient air quality standards (NAAQS) triggered an intense debate in and outside the Administration about the quality of the research used to support these decisions. The debate ranged from the actual health effects to be ameliorated by these standards and the scientific support underlying these standards to the real economic costs of implementing and complying with these standards. In the end, President Clinton supported the tighter federal air pollution standards stating that "...I think kids ought to be healthy." The new standards for PM of 2.5 microns ($PM_{2.5}$) in diameter call for daily means not to exceed 65 micrograms per cubic meter of air, and for annual means not to exceed 15 micrograms per cubic meter. The new ozone standards call for concentrations in the air not to exceed 80 parts per billion over an eight-hour period, and areas that exceed the new standard more than four times per year averaged over a three-year period would have to take corrective action.

Among the many contentious issues raised in this debate, consider two points in more detail. First, under the Clean Air Act, the EPA Administrator sets air quality standards to protect public health with an "adequate margin of safety." These are

health-based standards – in principle, the Administrator can and should ignore all economic considerations in setting the degree of stringency. As such, the standards are to be decided based on the current science that considers whether a statistically significant cause-and-effect relationship exists between the feared pollutant and health. But in this debate the underlying science is not at all clear. Even the EPA's science advisory board determined that no "bright line" existed to separate one proposed standard from another as being more protective of public health, including the current standard. And therefore the choice of a standard is a policy judgment, not a scientific decision (see, for example, Wolff 1997).

Health effects associated with ozone are transitory, and a strong link between ozone exposure and long-term human health effects or mortality has not been confirmed by the scientific community. For example, based on the EPA's own risk analysis, the expected reduction in excess hospital admissions of asthmatics in the New York City area is about 30 per ozone season when moving to the proposed standard from the current standard, compared to total hospital admissions of asthmatics of about 15,000 per ozone season. The number of children playing outdoors in the nine urban areas that EPA studied who would experience an ozone-related cough would be reduced by about 5,000 – about 0.2% of outdoor children, and 30–40% of children are outdoor children. The changes in health risk are so small, uncertain, and overlap from moving to the proposed standard from the current standard that no clear distinction emerges. The weakness in the scientific evidence with $PM_{2.5}$ is even more evident given the lack of a plausible biological mechanism, the limited number of studies considering $PM_{2.5}$ directly, and the feeble correlation in the studies. Even Dr. Jack Gibbons, the President's chief science advisor, recommended delaying the rules so additional analysis could be performed. Ultimately, the administration did delay actual implementation until 2002 to allow the EPA to collect additional data; data that should have been on the table before proposing a change in the current standard.

Economists who scrutinize the econometrics of epidemiology will be more effective in debates over setting health-based standards. The current state of epidemiology is such that econometricians could make significant contributions to estimation procedures. Biases associated with measurement and specification errors are prevalent, especially when self-protection behaviors are left unaccounted for (e.g., Lave and Seskin 1977); ambient concentrations are usually taken to be synonymous with exposure, which is not the case when people change behavior to reduce risk.

For example, consider the case of the Six Cities study, the most important data in the EPA's case for their $PM_{2.5}$ standard (Dockery et al. 1993). The study examined the relationship between air pollution and premature deaths in six American cities, finding that mortality was 26 percent higher in Steubenville, Ohio than Portage, Wisconsin, the two cities with the most and least air pollution of the six considered. But the Six Cities findings are subject to criticism that the study did not correct for differences across cities. Key differences left unaccounted for include temperature,

humidity, and income – median family income in Steubenville is about $7000 less than Portage. But the missing point is identical to the argument with kids risk: economic variables affect behavior which affect the risks faced by people, and exclusion of these variables from risk assessment bias predictions (see, for example, Atkinson and Crocker 1992; Kremer 1996). Studies have shown that people persistently below the poverty line are far more likely to become sick than wealthy people for a variety of reasons including habits, lifestyle, less medical screening, and the ability to self-protect (Korenman and Miller 1997). Wealth equals health, as the saying goes. Ignoring this causality will bias the estimated objective risk to these children.

The second point is that although economics has thus far been rejected in standard setting, EO 12866 requires the agency to prepare an economic analysis of the implementation of the proposed and final rules. These analyses included modeling inventories of known emissions sources to identify the most efficient set of control measures to meet the standards in various geographic areas, the health benefits that would be achieved based on projected air quality improvements, and the costs of these measures. The EPA did estimate the costs and benefits of implementation with varying degrees of credulity.

Let us consider one of the more unsubtle positions in the debate – the cost of the ozone standard. The proposed standards will be a significant burden to states. Under the proposed standard, nearly two hundred additional counties containing about fifty million people will be out of attainment. The emissions reductions required to meet the standard are substantial for big areas like Los Angeles (90%) and New York (80%), and for smaller areas like Hartford, CT (80%), Portland, OR (25%), and Huntington, WV (50%). The EPA estimated the costs to reach partial attainment of the ozone standard to be about $2.6 billion per year, based on marginal abatement costs between $3,000 to $10,000/ton(t) of ozone (see Fumento 1997).

But the Clean Air Act does not mandate partial compliance, it calls for full compliance, albeit eventually. As such, the appropriate measure is the costs of full attainment, which according to the President's Council of Economic Advisers could be as high as $60 billion per year.[6]

The EPA responded by claiming that the $10,000/t is a cut-off on the marginal cost curve for ozone abatement, even if reduction is mandated. Their explanation is that nobody will pay more than $10,000/t to reduce ozone pollution either due to new innovations, tradable emission systems, or delayed compliance. The argument presses on to say that these cost figures are exaggerated anyway, and that business estimates of compliance costs are always inflated (see the discussion on acid rain abatement costs in Forster 1993). Marginal abatement costs exceeding $10,000/t must be irrelevant.

Figure 1 illustrates this lost-cost triangle. Costs are on the vertical axis, and reduced ozone tons on the horizontal axis, up to the point of full compliance. The area under the marginal cost represents the costs of full compliance. But the upper

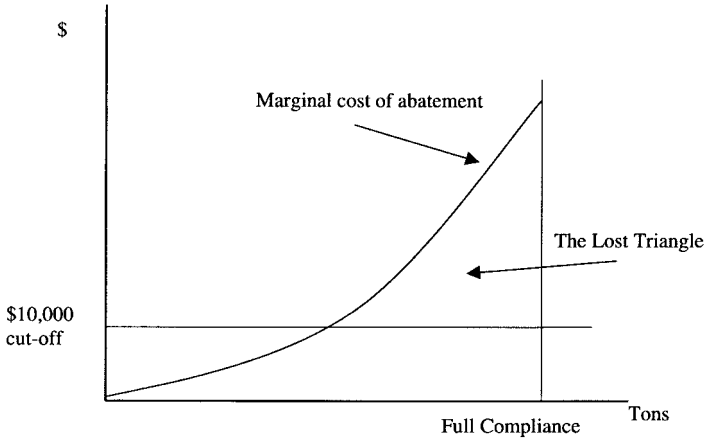

Figure 1. Ozone abatement and the lost triangle.

triangle, according to the EPA is extraneous because no one would ever adopt these high-cost technologies – the lost triangle. Unfortunately, only one of the EPA's three reasons for holding costs down actually reduces social costs – innovation. Postponement and redistribution do nothing on their own to change the nature of the marginal abatement cost curve.

Yet the belief in a cost cap persisted straight into a Presidential directive, in which he asks the EPA to encourage ideas like a Clean Air Investment Fund to cap control costs at $10,000/t. A factory or power plant that faces abatement costs greater than $10,000/t can reach compliance by paying into the fund (tons to complaince@$10,000/t), which will then use the money to buy reductions from other sources. If actual costs exceed $10,000/t, the Fund would be insufficient to cover full compliance, implying that full compliance can only be achieved if costs are lower than the cap. The cap creates an ambiguity about the real costs of this policy since only the degree of compliance that can be afforded will be achieved. Obviously a cap does not remove these costs, and economists must insist that these costs be counted, if for nothing other than keeping the heat on the administration for flexible pollution regulations.

The key empirical question is whether economists are guilty of cost inflation. If we frequently overestimating the costs of environmental compliance, this can be held against us to the point that our future claims can be dismissed as too pessimistic. For example, with the Acid Rain emission trading program, administration and industry economists predicted that abatement costs to achieve targeted emission reductions would range between $170 to $1500 per ton. If these predictions had been realized, high-cost utilities should have demanded more allowances from the low-cost utilities, driving up trading volume and market price. This was not the case. As of the first quarter of 1996, the trading volume between independent parties is estimated at 6.5 million tons, and the going price for an allowance is hovering around $100 per ton. Several reasons exist to explain this gap, such as

extra bonus permits, cheap low sulfur coal from Wyoming, and fuel blending.[7] But the fact that realized costs were much lower than predicted provides enough ammunition to tar high-cost estimates for other environmental issues, such as global climate change. A comprehensive survey of *ex ante* cost predictions and *ex post* cost calculations would be a useful addition to our toolbox.

4. Climate Change, Technology, and Behavior

Preventing untold global catastrophe – who could be against that? And central to President Clinton's global climate change policy is technology. The President proposed tax cuts and spending programs up to $5 billion over the next five years in research and development to encourage energy efficiency and the use of less carbon-intensive energy sources. These technologies are presented in a recent Department of Energy report, *Scenarios of U.S. Carbon Reductions* – the five lab study. The report does not, however, present the specific policies or the behavioral responses that will trigger the adoption and diffusion of these technologies that supposedly will be used to reduce US carbon emissions by 34 percent in 2010. Rather the report stresses that "a vigorous national commitment" to reduce emissions through energy efficiency alone leaves the impression that these reductions are free.

In times like these, a familiar point like the no-free-lunch cliché is worth making clear with numbers. The free lunch argument comes up again and again in climate change because some policymakers continue to play up the mechanistic while downplaying the behavioral aspects of technology. Engineering studies suggest that from 20 to 25 percent of existing emissions in the greenhouses gases that cause climate change could be eliminated at no additional costs. Climate change policy, so the argument goes, will not really cost the economy anything because low hanging fruit exists in the form of energy-efficient technologies that people do not currently use because they ignore or are ignorant of the benefits. If government could wipe the mud away from the eyes of the nation, we could achieve our policy at no net cost to society.

Economists are typically skeptical of these no-cost, energy-saving arguments heard in climate change policy debates because they do not believe in the free-lunch. The skepticism comes from observing that people do not take advantage of cost-effective, energy-efficient technologies which, in the long run, are good for both the pocketbook and the environment. Economists are not technological pessimists. It is just that we cannot ignore the evidence which suggests people still prefer conventional appliances – at least at current prices. At current prices, many consumers do not experiment with compact fluorescent light bulbs, improved thermal insulation, better heating and cooling systems, and energy-efficient appliances (see Jaffe and Stavins 1994; Nichols 1994). But when prices change so do choices about energy, as our experience with the oil shocks of the 70s shows. Economists

see the most effective way to curb excessive energy consumption is to raise its price to reflect the harmful effects on the environment of burning fossil fuels.

Why do people resist new technologies at current prices? People do not see the "no-net costs" as reality when confronted with these technologies. People have or act as if they have a short time horizon, perhaps reflecting their uncertainty about future energy prices and the reliability of the technology. Several studies have estimated that when consumers buy air conditioners, space-heaters, water-heaters, and refrigerators, they implicitly apply a substantial discount to future cost-savings (e.g., Hausman 1979). Due to incomplete markets, their implicit time horizons are shorter than those reflected in market interest rates. People still pay more attention to immediate outlays even when confronted with estimates of future cost savings. And factors other than energy efficiency matter – quality and features, the time and effort to learn about a new technology and how it works. People are also wary about claimed energy savings that might not be realized. Although a technology is cost-effective in its energy use on average, it may not be cost-effective for people who use little energy.

Why does this debate continue? The reason is many policymakers think the market fails when people prefer not to make energy-efficient choices. Blurring the distinction between a true market failure and preferences frustrates economists who have learned to appreciate the distinction after 200 years of intense debate. A market fails when individual choices diverge from what society wants as a whole; in this case, fewer adoptions than desired.[8] Policy intervention to eliminate a market failure can make society better off, depending on the costs of the intervention.

In contrast, preferences are preferences – individual choices, however fuzzy, do match what society wants. This implies that engineering studies that omit behavioral responses will overestimate the rate of technology adoption. Policies that try to eliminate barriers when people believe these technologies are not cost-effective for them, will usually not pass a benefit-cost test. Intervention to change people's preferences does not necessarily improve social welfare, and can make society worse off. Granted government policies can change how people think, but most economists do not see these campaigns as cost-effective. Changing relative prices is usually seen as a more effective tool to achieve some goal. Adoption rates will increase relative prices change such that the technology now looks profitable. Additional evidence to drive this point home would be most welcome.

5. Endangered Species and Banking on Conservation

Maintaining our ability to function by keeping the web of life intact – what madman would reject that goal? Over the past three centuries, more than 500 of this country's 20,000 known species of plants and animals have become extinct or are missing and possibly extinct. Endangered species protection is a classic example of a public good. The Endangered Species Act (ESA) was passed in 1973 to correct

for the market failure associated with the unpriced social benefits of such species – but a new set of problems arose. Although the benefits of protecting endangered species accrue to the entire nation, a significant fraction of the costs imposed by the ESA are borne by private landowners. An estimated 75–90 percent of the over 1,000 species of plants and animals that are listed as endangered or threatened under the ESA are found on private land, and many of these landowners complain that the costs of complying are too high. How these landowners choose to protect their investment will affect the success of the ESA.

The pressure to answer the question of whether these costs are too high relative to the social benefits has thrust economists right into the middle of the ESA reauthorization debate. And while a precise cost-benefit analysis of the ESA may be beyond our current reach, thinking about the ESA from this perspective makes sense – if only to force people to realize that trade-offs exist. The main sticking point is a lively and heated debate over how to estimate the economic social value of endangered species protection. The debate spins between two views on how we should value and measure a good that most people will never directly use. Economists have invested significant time and energy assessing the validity of using surveys to measure what a person's hypothetical, non-use value to guarantee the existence of some species that they may or may never see.

At one end, proponents view non-use values as useful indicators of preferences for specific preservation questions that can be reasonably captured in a survey. This side argues that benefits elicited through surveys are valid and usable in policy discussions. Critics dismiss these hypothetical, non-use values as surrogates of general environmental preferences, stating that these benefits are white noise at best and misleading at worst. The answer most likely lies somewhere in-between: endangered species protection provides valuable services to society that are not fully captured in market prices but probably are not as large as suggested by some survey results. People do place an economic value on species preservation, and it seems worthwhile to try and measure that value to help guide decisions. The problem is that precise estimates are not forthcoming. If, for instance, we crudely summed the benefits estimated by several surveys valuing specific endangered species, the answer suggests an implausible result that people would pay over 1 percent of the U.S. Gross National Product for less than 2 percent of all endangered species (Brown and Shogren 1998). Results such as these reinforce the conclusion that while nonuse values may be a valid concept, the measurement tool is still blunt.

While difficulties still exist in nonmarket valuation, economists can still frame the endangered species debate in benefit-cost terms. Economists seek criteria and conduct analysis to discriminate among species and the resulting extinction of some in recognition of binding budget constraints. Unpleasant choices may have to be made. And while we cannot maximize social value by saving the least costly species, a policy will do poorly that tries to save all and makes no distinctions among species except those governed by "science." Although the idea of extinction unnerves most people, benefit-cost reasoning still has a role because it is ques-

tionable whether encyclopedic species protection holds a moral trump card over all other priorities today, such as kids' health. Again the point worth repeating – resources spent on species protection are resources not spent on kids' health.

A second issue is to consider flexible strategies for private landowners. Federal statutes often mandate conservation of natural resources on private land through strict land-use policies, e.g., the Clean Water Act requires minimization of wetlands loss, the ESA requires protection of habitat. Although conflicts between conservation and development are inevitable, a market based approach – conservation banking – offers public officials and landowners a way to work toward a mutually satisfactory resolution of such conflicts.

Conservation banking puts a market value on preservation. A "bank" is established when an investor protects a parcel of land. Public officials then assign credits to the land based on the value of its ecological services and certify the long-term viability of these services. Developers then buy the credits and use them to offset environmental effects on their own land for which they would otherwise be liable. When all credits are purchased the banked land is protected in perpetuity, either by deed restrictions or transfer to a protector, often government.

Unlike traditional land-use policies, which require specific on-site restoration or protection, conservation banking encourages landowners to find the least-cost protection strategy. Landowners with relatively low incremental protection costs conserve land and bank credits, while high-cost developers must buy credits. Both parties gain from the exchange of credits, and so too does society. Banking also increases stakeholder involvement by bringing buyers and sellers together. Regulatory approval and management of a single, large tract of land instead of numerous individual tracts reduces transaction costs and allocates resources on a more regional scale, which minimizes landscape fragmentation. And these benefits are achieved without sacrificing environmental objectives. In practice, the challenge is actually defining "equivalent" ecosystems given so that trades can take place. Different sites offer different ecological services. Measuring and matching the set of services require a fundamental understanding of substitution possibilities.

About 100 wetlands mitigation banks covering well over 20,000 acres are operating nationwide to satisfy the Clean Water Act. In Pembroke Pines, Florida, for example, Wetlandsbank, Inc. has restored 350 acres of wetlands, and they are selling credits for an average of $40,000 each. About 40 habitat banks have emerged in California to ease development pressure on endangered and threatened species. In 1995, for example, Bank of America established the 182-acre Carlsbad Highlands Conservation Bank in Southern California and sold all the credits within a year.

Conservation banking is risky. Banks are created by regulatory agencies with differing missions, which can undermine the security of bank investments. Additionally, banks deal in ecological services that are difficult to match up across regional landscapes. Nevertheless, conservation banks already protect about 32,000 acres and will probably play an increasingly important role in mitigating

conservation-development conflicts created by urban expansion that proceeds at a rate of 860,000 acres per year in the United States. Additional research into the nature of flexible regulations such as conservation banking will provide useful insight into how behavior can work for and not against species protection.

6. Concluding Comments

Political motives dominate root economic ideas in final decisions – to imagine otherwise would reveal naiveté sufficient to bounce one from Washington, D.C., Paris, Tokyo, or any capital in-between. Scores of economists will testify to this reality in most policy debates (e.g., free trade, deregulation). And while this brief run through the landscape of how the omission of basic economic principles frustrates rational environmental policy may be old news to veterans, hopefully it hints at what to expect for those interested in becoming less apolitical.

Perhaps the small town hick in me shows through, but I must admit to being taken aback by some advocates' unwillingness to accept basic economic principles. And being told that the academic distinctions made by textbook environmental economics add little value to actual public policy debate did make me wonder how exactly we failed in our Econ.101 drills. Neglecting to include positive theories of political behavior in our standard microeconomic models might be one likely culprit (see Hahn 1989). But I also confess that being typecast as a member of the tribe of lemon-sucking economists eventually did turn my disgust into amusement.

What I know now and will not again forget is the power that numbers at your fingertips have in accelerating this change in attitude. Empiricists must continue to generate and push forward an accessible inventory of evidence to withstand the real and artificial fog surrounding environmental policy. Whether good economics ultimately wins out is a long run question – just look at tradable permits. Conceived in 60s, test piloted in the 70s and 80s, implemented at a large scale in the 90s, and now commonplace in discussions of environmental policy for the 21st century, tradable permits have gone native in the political arena. Success stories such as the Acid Rain trading program which reduced emissions by fifty percent at one-half to one-third the cost of a command-and-control approach raise the costs to policy makers who neglect behavioral choices. So, if asked by the President, my response would be: behavior matters – a point worth driving home at every opportunity.

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Notes

1. Also see Portney (1990).
2. Smith (1994, book 4, chapter 9): "Though, by this oppressive policy, a landed nation should be able to raise up artificers, manufacturers, and merchants of its own somewhat sooner than it could do by the freedom of trade a matter, however, which is not a little doubtful – yet it would raise them up, if one may say so, prematurely, and before it was perfectly ripe for them." Smith (1994, book 5, chapter 2): "Such is his distrust in the justice of his assessors that he counterfeits poverty, and wishes to appear scarce able to pay anything for fear of being obliged to pay too much. By this miserable policy he does not, perhaps, always consult his own interest in the most effectual manner, and he probably loses more by the diminution of his produce than he saves by that of his tax." Ricardo (1963): "A country whose financial situation has become extremely artificial by the mischievous policy of accumulating a large national debt, and a consequently enormous taxation, is particularly exposed to the inconvenience attendant on this mode of raising taxes. After visiting with a tax the whole round of luxuries; after laying horses, carriages, wine, servants, and all the other enjoyments of the rich, under contribution; a minister is induced to have recourse to more direct taxes, such as income and property taxes, neglecting the golden maxim of M[althus]. 'Say, that the very best of all plans of finance is to spend little, and the best of all taxes is that which is the least in amount.' "
3. See Schultze (1996, p. 27). Schultze was the Chairman of the Council of Economic Advisers during the Carter administration, 1976–80.
4. See Blinder (1987, p. 1).
5. See, for example, Wargo's (1996) inquiry into pesticide exposure of children.
6. The CEA estimate is based on EPA predictions of emission deficits for non-attainment areas and marginal abatement costs between $30, 000 to $80,000 per ton.
7. See Burtraw (1996).
8. Examples of market failure include imperfect capital markets, public information, moral hazards, and externalities. Imperfect capital markets make it difficult for low-income families to get loans to buy goods with longer payback periods. Information has both public and private attributes, and market failure occurs, if once information becomes public, it is too costly to exclude others from using it, and one person's use of information does not preclude another person's use. The public good nature of information results in the under-supply of R&D investment and low adoption rates. Moral hazard exists when a person's actions are hidden from another person. He imposes a cost on the other person, and has insufficient incentive to stop. Consider rental housing – the owner could pay for more energy efficiency, but he has no incentive to invest since it is the renters who benefit because they pay the utility bill. Externalities cause the private marginal cost faced by people to be lower than the social marginal cost, resulting in an oversupply of pollution. For electricity, people to be lower than the social marginal cost, resulting in an oversupply of pollution. For electricity, people do not pay for environmental costs from carbon when they buy coal-based electricity. This makes coal-based electricity more attractive than non-carbon energy sources (e.g., renewable energy).

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