

What Good Is Economics?

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INTRODUCTION

One cannot study environmental law today without encountering economic analyses. Economics is everywhere — in legislative hearings and debates, regulatory documents, judicial opinions, legal casebooks, and academic articles. People interested in working in the environmental field or understanding environmental policy, therefore, need to be fluent in economics. Otherwise, they risk missing or misunderstanding much of the debate.

Yet many people active or interested in the environmental field question the value and even the legitimacy of using economics to decide environmental questions. To them, environmental protection is not about maximizing the economic value of the environment to humans. Rather, it is about honoring rights to a healthy and sustainable environment, maximizing the spiritual potential of humanity, or preserving the integrity of the entire biotic community.¹ From this perspective, any suggestion to decide environmental goals based on an exacting economic balancing of the costs and benefits of proposed measures seems simply wrong-headed. Those who believe in a strong code of environmental ethics, a group I will label “environmental moralists,” frequently see the prevalence of economic analysis in current environmental policy debates as an error to be remedied.

My goal in this Article is to convince environmental moralists that economics may provide far more value than they assume — that economics may be more friend than foe. Economics may even provide environmental moralists with a tool for promoting broader environmental ethics within society, as I discuss in Part IV of this Article. Economic enthusiasts and ethical pragmatists should find this Article valuable for its cataloguing of the ways in which economics can be used in the pursuit of environmental goals. My target audience, however, is the environmental moralist who is skeptical of, or downright averse to, using economics to address environmental issues.

Economics can play a variety of roles in environmental policy. Some uses of economics may conflict with the ethical precepts of environmental moralists and perhaps even threaten their strategic goals.

¹ See, e.g., ALDO LEOPOLD, *A SAND COUNTY ALMANAC* (1949); BRUCE MORITO, *THINKING ECOLOGICALLY: ENVIRONMENTAL THOUGHTS, VALUES, AND POLICY* (2002); HOLMES ROLSTON III, *ENVIRONMENTAL ETHICS: VALUES IN AND DUTIES TO THE NATURAL WORLD* (1988); MARK SAGOFF, *THE ECONOMY OF THE EARTH: PHILOSOPHY, LAW, AND THE ENVIRONMENT* (1991); PAUL W. TAYLOR, *RESPECT FOR NATURE: A THEORY OF ENVIRONMENTAL ETHICS* (1986).

In other contexts, however, economics may provide the environmental moralist with a valuable strategic or practical tool. Environmental moralists who reject all forms of economic analysis because some uses of economics conflict with their ethical beliefs risk undermining their goals of improving and protecting the environment and changing our relationship with the environment. Far from being inherently inconsistent with environmental ethics, economics may actually be essential to accomplishing ethical ends.

Economics can be used in at least four partially overlapping ways. First, it can be used as a *normative* tool to determine the appropriate type and level of environmental protection. This is the realm of cost-benefit analysis, where the economic benefits of various environmental proposals in the form of avoided health injuries, increased recreational opportunities, species value, and the like are balanced against the economic costs of lost jobs, new equipment, and reduced consumer choices. Much of the criticism of economic analysis in the environmental context has focused on this normative use of economics. To the environmental moralist, cost-benefit analysis errs at the outset by focusing on the Heaven-rejected "lore of nicely-calculated less or more"² rather than the ethical importance of a healthy and sustainable environment.

Beyond the question of whether cost-benefit analysis uses the correct criteria, critics also object to how the government makes cost-benefit comparisons. Critics, for example, have challenged the methods used to measure the benefits of environmental programs, the decision to measure benefits based on individuals' current preferences, the comparison of benefits and costs that environmental moralists find economically "incommensurable," and the decision to discount future benefits (such as lives saved many decades from now due to current environmental protection measures).³

Economics, however, can be used for purposes other than normative evaluations of potential environmental measures. A second use to which economics is frequently put, for example, is as a *diagnostic* tool to determine why society is not achieving the desired type and level of environmental protection (regardless of how the desired types and levels of protection are determined). Garrett Hardin's famous discussion of the

² WILLIAM WORDSWORTH, *Inside of King's College Chapel, Cambridge* (1821-1822), in THE COMPLETE POETICAL WORKS (1888), available at <http://www.bartleby.com/145>.

³ See, e.g., Lisa Heinzerling, *Discounting Life*, 108 YALE L.J. 1911 (1999); Lisa Heinzerling, *Environmental Law and the Present Future*, 87 GEO. L.J. 2025 (1999); Cass R. Sunstein, *Incommensurability and Valuation in Law*, 92 MICH. L. REV. 779 (1994).

"tragedy of the commons" is a good example of this diagnostic use of economics: when a common resource is free, users enjoy all of the benefits of use but share the losses and thus tend to overutilize the resource.⁴ Used as a diagnostic tool, economics can help point to the reasons for, and thus the most effective solutions to, a wide variety of environmental problems.

Third, environmental advocates can use economics as a strategic *political* tool to help overcome opposition to environmental measures and increase the chances of successful adoption. Economic concerns often generate opposition to environmental measures, and opponents frequently cite economic concerns as a rationale for not enacting the measures. Although proponents might view many of these economic concerns as normatively irrelevant or misconceived, the concerns are nonetheless a political reality. Economic analysis can sometimes disprove the basis for these concerns and thus hopefully eliminate them as a source of political opposition. Studies of a particular measure, for example, may demonstrate that the measure will not reduce employment as unions fear. In other cases, environmental proponents can use economic analysis to find means of minimizing economic impacts on key political stakeholders while still achieving environmental goals.

Finally, economics can be used as a *design* tool to evaluate and devise approaches or techniques for achieving various environmental goals. Economics lies behind the market concepts that have been much in vogue over the last several decades — pollution taxes, tradable pollution permits, water markets, individual tradable quotas (ITQs) for fisheries, mitigation banks for wetlands and species habitat. Economic theory suggests that such measures can protect the environment in a more effective and less costly manner than purely directive measures.⁵ Beyond the identification and creation of market-based approaches, economic analysis can help determine the effect of various other regulatory alternatives on technological innovation, compliance, and other relevant measures, and thus guide policymakers. Most interestingly, psychological research suggests that, while some forms of economic incentives may undermine altruistic behavior, other forms of economic rewards may actually sustain and encourage ethical action.

⁴ See Garrett Hardin, *The Tragedy of the Commons*, 162 *SCI.* 1243 (1968).

⁵ For a classic overview of market-based environmental approaches, see Robert W. Hahn & Robert N. Stavins, *The Incentive-Based Environmental Regulation: A New Era from an Old Idea?*, 18 *ECOLOGY L.Q.* 1 (1991).

The remainder of this Article looks at the uses to which confirmed environmental moralists might put economic analysis and the qualms or concerns they may encounter in doing so. The Article assumes that environmental moralists firmly reject the idea of determining environmental goals by trying to maximize economic value and that any use of economic analysis must be consistent with the environmental moralist's ethical criteria. Part I considers whether and how environmental moralists might use economics to evaluate or bolster the normative case for environmental protection. Parts II through IV look at the potential uses of economics for the three other purposes identified above: diagnostic, political, and design. Part V concludes.

I. NORMATIVE USES OF ECONOMICS

Although economics can be used in multiple ways to address environmental problems, cost-benefit analysis has generated the greatest attention and controversy. Every President since Richard Nixon has required federal environmental agencies to examine the potential costs and benefits of at least some proposed regulations, and Congress has considered multiple bills to require cost-benefit analysis as a matter of law.⁶ Opponents of environmental regulation have been the principal proponents of cost-benefit analysis, convinced that the costs of most proposed regulations far outweigh the regulations' potential economic value.

Environmental moralists, as noted in the introduction, are unlikely to find cost-benefit analysis much to their liking. Policymakers generally rely on cost-benefit analyses to limit rather than expand environmental regulation, and cost-benefit analyses do not focus on the ethical considerations that the environmental moralist believes should shape environmental policy. Ethical rights and obligations are considered only indirectly in cost-benefit analysis, to the extent that they influence how much people are willing to pay to preserve the environment. Most environmental moralists also are troubled by the way economists calculate and compare the economic costs and benefits. An example is the practice of valuing environmental benefits based on people's current preferences for environmental amenities. If people currently do not care much about old growth forests, forest preservation will have a low economic value. To the environmental moralist, this measuring

⁶ JAMES SALZMAN & BARTON H. THOMPSON, JR., *ENVIRONMENTAL LAW AND POLICY* 31 (2003).

approach is arbitrary and unjustified. Why should policymakers measure environmental value based on the preferences of individual members of society rather than on a conscious consideration of what is best for society? If preferences matter, moreover, why should policymakers give greater weight to current preferences than to the preferences of a more "enlightened" public that has fully considered and discussed environmental values?⁷

Although environmental moralists are unlikely to favor formal cost-benefit analysis, many environmental moralists may still find economic costs relevant in deciding on the appropriate level of environmental protection. As Professor Mark Sagoff has discussed, ethical theory often draws a distinction between "perfect duties," which admit of no exception, and "imperfect duties," which can be balanced against other considerations such as economic costs.⁸ To the degree that an environmental moralist believes that some environmental responsibilities are only "duties of virtue" and not moral imperatives, economic costs can be relevant. Eliminating all pollution, for example, might be ethically good but understood to be economically "infeasible" or "irresponsible." Economics thus may be relevant to the normative judgments of at least some environmental moralists through a more nuanced consideration than formulaic cost-benefit comparisons.

Even environmental moralists who reject any economic tempering of ethical obligations may find normative economic arguments useful for supplementing their ethical entreaties. Although environmental moralists might believe that non-economic criteria should be used in judging the merits of environmental goals, many politicians, voters, bureaucrats, and courts are far more attuned to wealth-maximization arguments. Indeed, Professor Christopher Stone's contribution to this symposium suggests that arguments based on non-economic precepts of environmental ethics have played only a marginal role in legislative debates and judicial decisions over the past several decades.⁹ If this is correct, environmentalists have a strong strategic reason to look for arguments that resonate more robustly with key decisionmakers. Even if environmental ethics currently play a stronger role than Stone suggests, environmentalists might wish to broaden their base of support by

⁷ See Mark Sagoff, *The Principles of Federal Pollution Control Law*, 71 MINN. L. REV. 19, 55-61 (1986) (discussing role of preferences in welfare economics).

⁸ See *id.* at 92-95.

⁹ See Christopher D. Stone, *Do Morals Matter? The Influence of Ethics on Courts and Congress in Determining U.S. Environmental Policies*, 37 U.C. DAVIS L. REV. 13 (2003), simultaneously published in 27 ENVIRONS ENVTL. L. & POL'Y J. 13 (2003).

making economic arguments in favor of their goals.

In some cases, economic arguments are clearly supplemental to and thus separable from arguments based on environmental ethics. The famous battle between the Tennessee Valley Authority and proponents of the endangered snail darter over completion of the Tellico Dam is an example. Environmentalists opposed the dam because it risked causing the extinction of the snail darter, threatened to eradicate the last free-flowing stretch of the Little Tennessee River, and required the flooding of a beautiful valley. But environmentalists were not hesitant to argue that the dam also made no economic sense, costing more in federal funds than it was ever likely to produce in benefits. Indeed, while the environmental arguments led to a Supreme Court decision enjoining further construction of the dam under the Endangered Species Act,¹⁰ the economic arguments almost won the day politically when Congress balked at stopping construction on the almost-completed dam to save the economically "worthless" snail darter. The cabinet-level Endangered Species Committee, which Congress created to decide the fate of the dam, voted unanimously not to exempt the dam from the Endangered Species Act because it concluded that the dam was economically not worth completing.¹¹ Unfortunately, neither the environmental nor the economic arguments were capable of overcoming political support for the dam, which Congress ultimately exempted from the Act.¹²

Environmental opposition to the federal reclamation program, which constructed hundreds of dams in the western United States during the 20th century in an effort to expand irrigation, provides another example of the effective use of normative economic arguments. Environmentalists have long opposed many reclamation projects because of their environmental impact, including the dewatering of major rivers, the extinction or decline of a significant number of fish species, and the loss of wetlands.¹³ In addition to cataloguing this

¹⁰ *Tenn. Valley Auth. v. Hill*, 437 U.S. 153 (1978).

¹¹ For a short history of the dam battle and the Endangered Species Committee's vote, see SALZMAN & THOMPSON, *supra* note 6, at 261-64. Secretary of the Interior Cecil Andrus, who was a member of the committee and ultimately responsible for the implementation of the Endangered Species Act, bemoaned at the time that he hated to see the snail darter get the credit for stopping a project that was ill-conceived and uneconomical in the first place. *Id.* at 262.

¹² *Id.*

¹³ See, e.g., Harrison Dunning, *Confronting the Environmental Legacy of Irrigated Agriculture in the West: The Case of the Central Valley Project*, 23 ENVTL. L. 943 (1993) (describing environmental harms of reclamation program's largest project); Lawrence MacDonnell, *Managing Reclamation Facilities for Ecosystem Benefits*, 67 U. COLO. L. REV. 197

damage, however, environmentalists also have argued that Congress should rein in the reclamation program because it has paid out billions of dollars in unnecessary and economically inefficient subsidies to western farmers. In a major 1985 report, the Natural Resources Defense Council calculated that federal taxpayers were providing almost \$300 million per year in water subsidies to California's Central Valley farmers even though the farmers were growing "surplus" crops that the government was paying other farmers not to grow.¹⁴ Largely as a result of these economic arguments, Congress has reduced the subsidies, encouraged conservation in federal reclamation projects, and not authorized any major new irrigation projects since the 1970s, saving federal dollars while preserving the environment.¹⁵

An environmental mantra of recent decades has been that reforms that are good for the environment can often also be good for the economy. As the federal reclamation program illustrates, economically unjustified governmental subsidies have been and often remain a major source of environmental harm. The list of such subsidies extends beyond reclamation subsidies to include fishing subsidies (which have encouraged over-capitalization and over-fishing), agricultural price supports and subsidies (which have fostered the destruction of environmentally important habitat), below-cost timber sales (promoting over-harvesting), and various forms of subsidies for urban sprawl.¹⁶

Tax reform can also be potentially both economically and environmentally beneficial.¹⁷ Many traditional taxes lead to economic inefficiencies. By taxing the products of labor, for example, the income tax discourages work. Taxes on environmental "bads," such as pollution or resource extraction, however, can raise revenue while discouraging environmentally harmful behavior. Shifts in tax bases, from economic

(1996) (providing overview of many of ecological problems created by reclamation program).

¹⁴ See E. PHILLIP LEVEEN & LAURA KING, *TURNING OFF THE TAP ON FEDERAL WATER SUBSIDIES* (1985) (attacking subsidies involved in federal reclamation program).

¹⁵ See WESTERN WATER POLICY REVIEW ADVISORY COMM'N, *WATER IN THE WEST: CHALLENGE FOR THE NEXT CENTURY* 5-23 (1998) (outlining principal changes in federal reclamation program since 1970s).

¹⁶ See, e.g., David Malin Roodman, *Paying the Piper: Subsidies, Politics, and the Environment*, 133 *WORLDWATCH* INST. PAPER 70 (1996) (discussing impact of subsidies on environment); ORG. FOR ECON. CO-OPERATION & DEV., *SUBSIDIES AND ENVIRONMENT: EXPLORING THE LINKAGES* (1996) (discussing impact of subsidies on environment).

¹⁷ For this reason, European Green Parties have strongly endorsed ecological tax reform. See EUROPEAN FED'N OF GREEN PARTIES, *GREENING THE TAXES!* (2002), at <http://www.europeangreens.org/info/resolutions/berlin11.html> (last visited Sept. 15, 2003).

"goods" to environmental "bads," can potentially lead to increased economic output and efficiency while reducing environmental harm, although the existence and size of this "double dividend" is the subject of current economic debate.¹⁸

Finally, emphasizing that pollution (which is merely the unwanted byproduct of industrial processes) and high levels of resource consumption are both examples of waste, some environmentalists, academics, and even business interests have argued that improved environmental performance frequently leads to better economic performance. Businesses, therefore, may be open to voluntary pollution prevention programs that can improve their environmental performance and reduce costs. In some situations, mandatory regulation may also spur improvements that simultaneously benefit the environment and bottom lines.¹⁹

Such *supplemental* arguments for environmentally beneficial measures should be neither surprising nor troubling. Given that environmentalism frequently emphasizes the husbanding of resources, environmental goals often are economically beneficial. More importantly, environmental moralists do not risk undermining or controverting their arguments for particular measures by also pointing out the economic benefits. Environmental and economic arguments can be kept separate but used in a way that allows them to be mutually reinforcing.

Somewhat more troubling to the environmental moralist might be efforts to prove that elements of the environment, which the environmental moralist believes worthy of protection in their own right, also should be protected for their significant economic value. Efforts to bolster the Endangered Species Act (ESA) with economic arguments provide an example. Although species preservation may be an obvious goal to environmental moralists, many people find it hard to understand why snail darters, Delhi-sands flower-loving flies, and fringe-toed lizards should thwart other societal goals. To bolster support, some proponents of the ESA have looked for potential economic value in

¹⁸ See Firouz Gahvari, *Environmental Taxation and the Double Dividend*, 40 J. ECON. LIT. 221 (2002) (providing short overview of double dividend issue).

¹⁹ See generally THE GREENING OF AMERICAN BUSINESS: MAKING BOTTOM-LINE SENSE OF ENVIRONMENTAL RESPONSIBILITY (Thomas F.P. Sullivan ed., 1992); Michael Porter & Claas van der Linde, *Green and Competitive*, HARV. BUS. REV. 120 (Sept.-Oct. 1995); Michael Porter & Claas van der Linde, *Toward a New Conception of the Environment-Competitiveness Relationship*, 9 J. ECON. PERSP. 97 (1995). For a skeptical view of the argument that regulation can prove cost effective by spurring innovations, see Jane S. Shaw & Richard L. Stroup, *Do Environmental Regulations Increase Economic Efficiency?*, 23 REG. 13 (2000).

protected species. Inspired by the endangered rosy periwinkle which provided a cure for lymphocytic leukemia and Hodgkin's disease, for example, some environmentalists have argued that society should preserve endangered species for their potential genetic value in medicine, farming, or industry.²⁰

Recent environmental interest in the concept of "ecosystem services" or "natural services" is another example of placing an economic value on what many environmental moralists would consider sacred.²¹ Seeking another argument in favor of general preservation efforts, many environmentalists have begun to emphasize that healthy ecosystems provide a variety of economically valuable services, including climate stabilization, air and water purification, flood control, crop pollination, soil fertility, and the detoxification and decomposition of wastes.²² One controversial 1997 study valued these ecosystem services at \$33 trillion (with a confidence interval of \$16 to \$54 trillion), almost two times the annual global gross national product.²³

For the environmental moralist, the most disturbing example of the merging of environmental and economic arguments may be the effort to calculate the existence and bequest values of species and other environmental amenities. To demonstrate the high value of species and other environmental amenities, economists survey cross-samples of the public to determine how much they would pay to ensure the continued existence of the species or other amenities now and for future generations. The studies often yield exceptionally high numbers. Surveys, for example, have suggested that the average United States household would be willing to pay from \$5-\$10 to protect some lesser known fish such as the striped shiner to almost \$100 for more infamous and charismatic species such as the northern spotted owl.²⁴

²⁰ See, e.g., WILLIAM J. SNAPE II & ROBERT M. FERRIS, *SAVING AMERICA'S WILDLIFE: RENEWING THE ENDANGERED SPECIES ACT* (1995). See also David Pearce & Seema Purosothaman, *Protecting Biological Diversity: The Economic Value of Pharmaceutical Plants*, CENTRE FOR SOC. & ECON. RESOURCES, GEC (Working Paper 92-27 (1992)) (suggesting that species might hold total present genetic value of \$420 billion).

²¹ The bible of ecosystem services is *NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS* (Gretchen C. Daily ed., 1997).

²² Gretchen C. Daily, *Introduction: What Are Ecosystem Services?*, in *NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS* 1, 3-4 (Gretchen C. Daily ed., 1997).

²³ Robert Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 387 *NATURE* 253, 259 (1997). Many economists have criticized the Costanza study as methodologically flawed. See, e.g., David Pearce, *Auditing the Earth*, *ENV'T.*, Mar. 1998, at 23 (criticizing study for failure to value services at margin).

²⁴ John B. Loomis & Douglas S. White, *Economic Benefits of Rare and Endangered Species: Summary and Meta-Analysis*, 18 *ECOLOGICAL ECON.* 197, 199 (1996).

Should environmental moralists give in to the temptation to try to place price tags on some elements of the environment? The potential advantage, as noted already, is that the economic arguments will convince decisionmakers who do not share the moralist's ethical values to support the moralist's goals because of their economic utility. Pricing the environment, however, is risky in ways that additive economic arguments, such as the economic advantage of eliminating environmentally destructive subsidies, are not.

First, pricing the environment may not actually win many converts for the environmental cause. Efforts to place a price tag on environmental amenities such as ecosystems and endangered species often are controversial and subject to challenge. Because there is no active market for many of the amenities, economists must value the amenities through indirect approaches that are subject to significant uncertainties and methodological critiques.²⁵ Estimates often vary substantially from study to study, raising further doubts about their accuracy.²⁶ In light of the uncertainties, valuation arguments are unlikely to sway decisionmakers who otherwise would oppose the environmental measure at issue. Indeed, it is difficult to think of many instances where valuation arguments appear to have made a difference in a policy debate.

Second, many environmental amenities are unlikely to carry a sufficiently high economic value to win in a cost-benefit comparison. Consider efforts, for example, to value endangered species. Despite early claims that species hold high genetic value, one of the most careful economic studies suggests that the average species probably carries a maximum expected value of \$10,000.²⁷ Although contingent valuation methodology (CVM) surveys may produce relatively high values for most fish, birds, and mammals, existence and bequest value is likely to be far smaller for species such as the Delhi-sands flower-loving fly, the black clubshell clam, or the Coffin Cave mold beetle. Yet these are exactly the species where ethical arguments currently fall short and for

²⁵ The controversy surrounding the use of contingent valuation methodology (CVM) to determine the existence and bequest value of environmental amenities is exemplary of the controversies that frequently surround valuation efforts. See, e.g., KRISTIN M. JAKOBSSON & ANDREW K. DRAGUN, *CONTINGENT VALUATION AND ENDANGERED SPECIES* 78-82 (1996) (discussing problems involved in CVM).

²⁶ See Loomis & White, *supra* note 24, at 202 (noting range of CVM values found for some species).

²⁷ See R. David Simpson et al., *Valuing Biodiversity for Use in Pharmaceutical Research*, 104 J. POL. ECON. 163, 177-78 (1996) (finding that only ten in 250,000 species are likely to produce commercially valuable genetic discovery, yielding maximum marginal species value of less than \$10,000).

which a showing of large economic value could make a difference. The environmental moralist could be an economic opportunist, citing the economic value of a species or other environmental amenity when it is high and thus politically useful and returning to the pure ethical argument when the economic value is less compelling. Unfortunately, such opportunism places the environmental moralist in a difficult spot. If the high value of some species or amenities is relevant, why is the low value of other species or amenities not equally relevant?

Environmental moralists could respond that value is simply an *additional* reason, over and above the ethical arguments, to protect species or other amenities — much like the economic reasons to eliminate environmentally harmful subsidies. Some of the valuation efforts are supplemental: one can argue that society should protect endangered species *both* as a matter of ethics and because of their potential genetic value. But other valuation efforts, such as CVM, effectively try to place a value on people's ethical support of the environment and thus merge ethics into economics. Even where valuations and ethical arguments can be separated, efforts to place a value on a species or amenity can confuse the two arguments.

The best long-term strategy for environmental moralists might be to keep environmental and economic arguments as separate as possible. By emphasizing the economic value of species or other environmental amenities, environmental moralists imply that the environment is part of the economy and that environmental protection is merely a variant of economic regulation, similar to antitrust law, consumer protection, or price restraints. Yet the goal of environmental moralists is to convince the public and policy-makers that the environment is not an economic commodity and should be valued for non-economic reasons. When an environmental moralist wins an argument by relying on the pricing of some aspect of the environment, the moralist may lose the larger battle to reform the way in which people think about environmental issues. Moralists may find economics a valuable ally in arguing for measures that protect and restore the environment, but caution should be the watchword.

II. DIAGNOSTIC USES OF ECONOMICS

Even the environmental moralist who eschews any normative use of economics may find economics valuable for other purposes. Indeed, economics is indispensable in diagnosing why society currently does not achieve the level of environmental protection desired by the moralist. Those who turn their backs on economics and rely instead on ethical

intuition to diagnose environmental problems are likely to find themselves doomed to failure.

Economic theory suggests that flaws in economic markets and institutions are often the cause of environmental problems. Three concepts of market failure have proven particularly robust in analyzing environmental problems. The first is the "tragedy of the commons."²⁸ If a resource is open and free for multiple parties to use, the parties will tend to over-utilize the resource, even to the point of its destruction. Economists and others have used the tragedy of the commons to explain such environmental problems as over-fishing, the over-drafting of groundwater aquifers, the early and inept exhaustion of oil fields, and high levels of population growth.²⁹ The second, more general concept (of which the tragedy of the commons actually is a specialized instance) is the "negative externality."³⁰ When parties do not bear the full cost to society of environmental harms that they cause, they tend to under-invest in the elimination or correction of the harm. Externalities help explain why factories pollute, why landowners destroy ecologically valuable wetlands or other forms of habitat, and why current generations consume high levels of exhaustible resources. The final concept is the problem of "collective action."³¹ If political or market actions will benefit a large group of individuals and it is impossible to exclude anyone from enjoying the benefits, each individual will have an incentive to "free ride" on the actions of others rather than acting themselves, reducing the possibility that anything will get done. This explains why the private market does not provide us with more wildlife refuges or aesthetic open space.³²

Although these economic explanations for environmental problems are not universal truths, accurate in all settings, they do enjoy a robust

²⁸ For a brief explanation of the tragedy of the commons, see SALZMAN & THOMPSON, *supra* note 6, at 16-17.

²⁹ See, e.g., Alan E. Friedman, *The Economics of the Common Pool: Property Rights in Exhaustible Resources*, 18 U.C.L.A. L. REV. 855, 855 (1971) (discussing problems with petroleum extraction); H. Scott Gordon, *The Economic Theory of a Common-Property Resource: The Fishery*, 62 J. POL. ECON. 124 (1954) (discussing problems with fisheries); Hardin, *supra* note 4 (discussing population growth); Paula K. Smith, *Coercion and Groundwater Management: Three Case Studies and a "Market" Approach*, 16 ENVTL. L. 797 (1986) (discussing groundwater overdrafting).

³⁰ For a general explanation of externalities, see SALZMAN & THOMPSON, *supra* note 6, at 17-18.

³¹ See *id.* at 17.

³² See, e.g., Barton H. Thompson, Jr., *Conservation Options: Toward a Greater Private Role*, 21 VA. ENVTL. L. REV. 245, 255 (2002) (discussing collective action problems in preserving private lands with broad environmental value).

applicability. Experimenters, for example, have found that subjects in a wide array of countries succumb to the tragedy of the commons.³³ Smaller groups sometimes have been able to overcome the tragedy of the commons and govern a resource in collective wisdom. Yet this exception appears to be the result of institutional characteristics peculiar to the group and resource that make it easier to devise a local and informal regulatory system rather than the result of cultural differences that undermine the economic precepts of the tragedy of the commons.³⁴

These economic explanations point to a vastly different approach to solving environmental problems than a focus on environmental ethics alone would suggest. To environmental moralists, the difficulty is that the population does not understand the ethical importance of protecting the environment. Although governmental regulation might be necessary in the short run to force people to do what they do not yet appreciate is proper, the long run answers are education and moral change. A principal means of enlightening the citizenry is engaging them in a discussion of environmental goals. Economic analysis, by contrast, suggests that the problem lies in our economic institutions. The solution under economic analysis is to give those who might harm the environment the incentive to avoid the harm through the imposition of taxes or regulatory fines or the awarding of environmentally beneficial subsidies.

The few studies that have tried to test the relative importance of environmental precepts and of economics in predicting environmentally relevant behavior suggest that economics trumps ethics. In one 1992 experiment designed to test whether subjects would yield to the tragedy of the commons in a simulated fisheries common, the researchers looked

³³ See Barton H. Thompson, Jr., *Tragically Difficult: The Obstacles to Governing the Commons*, 30 ENVTL. L. 241, 243 n.4 (2000) (reporting that commons appear to lead to tragic results in most societies). The tragedy of the commons, however, does not apply universally. In one of the few exceptions, researchers found that recent Vietnamese immigrants to the United States did not behave tragically when locked in a commons with other Vietnamese immigrants, although they did when they competed against individuals from other cultures. See Craig D. Parks & Anh D. Vu, *Social Dilemma Behavior of Individuals from Highly Individualistic and Collectivist Cultures*, 38 J. CONFLICT RESOL. 708, 716 (1994); see also Joseph Henrich et al., *In Search of Homo Economicus: Behavioral Experiments in 15 Small-Scale Societies*, 91 AM. ECON. REV. 73 (2001) (discussing experiments in several developing regions in which subjects often appeared to care more about fairness and reciprocity than material payoffs).

³⁴ For a lengthy and excellent discussion of local examples of collective regulation, see ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* (1990). Ostrom uses basic economic concepts in her analysis. See ELINOR OSTROM ET AL., *RULES, GAMES, AND COMMON-POOL RESOURCES* (1994).

to see whether the environmental attitudes of individual subjects made any difference in the subjects' behavior. The researchers measured subjects' environmental beliefs through various means. They administered questionnaires designed to elicit environmental beliefs; they asked the subjects how they would behave in various hypothetical scenarios (e.g., if someone asked them to volunteer to pick up litter on the weekend); they even tried to see how the subjects would react to real requests for environmental help (e.g., by asking them to participate in a Saturday recycling campaign). No matter how the researchers tried to measure the environmental attitudes of the subjects, attitude failed to provide a statistically significant explanation for participants' behavior in the fishing commons. Those who appeared to have strong environmental beliefs behaved just as tragically as those who did not when fighting for the limited stock of fish.³⁵

In another study, researchers examined domestic consumers of high amounts of electricity in Perth, Australia. After administering a survey to determine whether the consumers believed they had a personal and ethical duty to conserve energy, the researchers tried various methods for changing the behavior of those who reported that people have a conservation obligation. Informing these individuals of their high electricity usage and even supplying them with conservation tips did not make a statistically significant difference in their energy use. The only thing that led these individuals to reduce their electricity consumption was a letter reminding them of the earlier survey in which they had espoused a conservation duty and emphasizing the inconsistency of that view with their high electricity usage. In response to this letter, the subjects reduced their energy use. Apparently shame can be a valuable catalyst in converting ethical beliefs into action. But the effect may be short lived. Within two weeks, the Perth subjects' energy use had risen back to its earlier levels.³⁶

Ethical beliefs, in short, frequently fall victim to personal convenience or cost considerations. Ethical views sometimes can make a difference in how people behave. Examples include the role that ethics has played in encouraging people to recycle or to eat dolphin-free tuna.³⁷ But the

³⁵ Jeffery M. Smith & Paul A. Bell, *Environmental Concern and Cooperative-Competitive Behavior in a Simulated Commons Dilemma*, 132 J. SOC. PSYCHOL. 461 (1992).

³⁶ S.J. Kantola et al., *Cognitive Dissonance & Energy Conservation*, 69 J. APPLIED PSYCHOL. 416 (1984).

³⁷ See, e.g., Ann E. Carlson, *Recycling Norms*, 89 CAL. L. REV. 1231 (2001) (discussing importance of recycling norms); Rachel C. Hampton, *Of Dolphins and Tuna: The Evolution for an International Agreement*, 10 FORDHAM ENVTL. L.J. 99 (1998). For examples outside the

personal cost, if any, of recycling or of eating dolphin-free tuna is exceptionally small. For most of the environmental dilemmas that face the nation and the world today, the economic cost of changing behavior is far more significant. And where costs are high, economics appears to trump most peoples' environmental views. Even if ethics played a more powerful role, we do not know for certain how to create or strengthen environmental norms.³⁸ In contrast, we do know how to change economic incentives. Although environmental moralists should continue trying to promote environmental ethics, economic analysis currently provides the strongest tool for diagnosing and thus helping to resolve environmental problems. The environmental moralist who ignores this tool in trying to improve the environment is doomed to frustration.

III. STRATEGIC POLITICAL USES OF ECONOMICS

The environmental moralist also may find economic analysis useful in helping to defuse or reduce political opposition to proposed environmental regulations. A major obstacle, if not the most significant obstacle, to new environmental legislation is the opposition of industrial groups, firms, and individuals who believe that the legislation will harm them economically. Even if the environmental moralist believes that the costs are irrelevant or offset by ethical responsibilities, key political interest groups and the public at large often are interested in the economic impacts of new legislation. To pass new legislation, therefore, the environmental moralist must be ready both to deflate misperceptions of cost and to find means of reducing or eliminating actual costs.

Economic impacts obviously will influence the degree to which regulated companies will fight new regulations. Economic impacts, however, also influence both public support for the regulations and the public's view of what environmental protections are ethically required. A mid-1990s survey of the British population found that 99% of respondents believed that wildlife and the landscape have a "right" to protection. When subjects were told that such protection would cost jobs and money, the number responding that wildlife and the landscape have a right to protection dropped to only 49%. When told that the protection

environmental field, see Henrich, *supra* note 33; Ernst Fehr & Urs Fischbacher, *Why Social Preferences Matter — The Impact of Non-Selfish Motives on Competition, Cooperation and Incentives*, 112 ECON. J. C1 (2002).

³⁸ See Peter Kollock, *Social Dilemmas: The Anatomy of Cooperation*, 24 ANN. REV. SOC. 183, 193-94 (1998).

would lead to a 10% reduction in the respondent's own income, support for the principle dropped to only 39%, and when told that income would drop by 25%, support dropped to less than 20% of the population.³⁹ Although the relevance of economics to how people think about environmental rights and particular policy proposals should not be surprising given the earlier discussion of how economics influences environmental behavior, it highlights the importance of economics to political feasibility.

Economic analysis can help reduce or overcome economic opposition to environmental measures in several ways. First, economic analysis may help disprove inaccurate fears or claims that a measure will adversely hurt the economy. Opponents of the Endangered Species Act (ESA), for example, have long argued that implementation of the ESA causes severe economic dislocations. While the ESA clearly has the potential to have a significant impact on individual property owners, few owners appear to have actually been affected. The economic analyses that have been conducted to date indicate that the ESA generally has not had a serious effect on regional or state economies.⁴⁰ Industrial lobbies have long claimed that environmental regulations in the United States have reduced the nation's competitiveness, costing the nation jobs and gross domestic product. Yet economic analysis convincingly shows that most environmental regulations do not put companies at an international competitive disadvantage or cost the nation jobs.⁴¹

Environmental moralists might be justifiably skeptical of how helpful such economic studies will be. Charges linger that pollution regulations and the ESA are harmful to the economy despite these economic studies to the contrary. Once opponents of environmental measures have floated economic concerns, it is typically difficult, even using rigorous

³⁹ See N. Hanley & J. Milne, *Ethical Beliefs and Behaviour in Contingent Valuation*, 29 J. ENVTL. PLANNING & MGMT. 255, 259 (1996).

⁴⁰ See, e.g., William R. Freudenburg et al., *Forty Years of Spotted Owls? A Longitudinal Analysis of Logging Industry Job Losses*, 41 SOC. PERSP. 41 (1998); Stephen M. Meyer, *Working Paper No. 4, Endangered Species Listings and State Economic Performance*, MASS. INST. TECH. PROJECT ON ENVTL. POL. & POL'Y (MAR. 1995); Stephen M. Meyer, *The Final Act*, NEW REPUBLIC, Aug. 15, 1994, at 24.

⁴¹ See ORG. FOR ECON. COOPERATION & DEV., *ENVIRONMENTAL PERFORMANCE IN OECD COUNTRIES* (1996); ORG. FOR ECON. COOPERATION & DEV., *ENVIRONMENTAL PERFORMANCE REVIEWS: UNITED STATES* (1996); E.B. Goodstein, *Jobs and the Environment: The Myth of a National Trade-Off* (monograph, Econ. Pol'y Inst. 1994); Adam Jaffe et al., *Environmental Regulation and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?*, 33 J. ECON. LIT. 132 (1995).

economic analysis, to rid public debate of the concerns. Opponents of environmental measures often find technical grounds, legitimate or not, for challenging economic studies in support of the measures. Personal stories of a property owner not being able to build her home or of a factory closing down, even if inaccurately attributed to environmental regulation, are often more powerful testimony in political debates than quantitative economic studies.⁴²

Environmental moralists also may fear that studying the economic impacts of proposed regulations will give credibility and weight to the economic criticisms even if the completed studies refute the criticisms. Studying the issue suggests that economic impact is important. Given that even well designed studies may fail to eliminate economic concerns, environmental moralists may conclude that it is better to focus on ethical or other non-economic reasons for adopting the regulations.

Environmental moralists, however, can put economics to a second strategic political use. Where economic concerns about a new environmental measure cannot be defused, economic analysis may help proponents of the measure find means of offsetting or resolving the economic concerns. As an example, consider proposals to regulate or tax carbon emissions in order to reduce emissions and avoid global climate change.⁴³ The major suppliers of fossil fuels and those industries that rely heavily on fossil fuels have strongly opposed such measures because of the potential economic impact.

In recent work, Professors Lawrence Goulder and Lans Bovenberg have suggested that the United States may be able to meet the economic concerns of suppliers and industrial users while still adopting an effective and efficient regulatory regime. Key to their conclusion is the finding that, by restricting total output within the industries, either regulations or taxes would generate very sizable economic rents that could be used to offset companies' potential profit losses. By providing companies with free permits for limited amounts of carbon emissions or by exempting some inframarginal emissions from a carbon tax, the government could provide the companies with sufficient rents to avoid

⁴² This phenomenon may be an example of the "availability heuristic," where people who recently have heard about the occurrence of a particular event believe that the event is more likely to occur in the future than it actually is. See Jeffrey J. Rachlinski, *The Psychology of Global Climate Change*, 2000 U. ILL. L. REV. 299, 311-12 (2000) (describing applicability of availability heuristic to environmental issues).

⁴³ See Robert N. Stavins, *Policy Instruments for Climate Change: How Can National Governments Address a Global Problem?*, 1997 U. CHI. LEGAL F. 293, 315 (1997) (discussing approaches to addressing carbon-based climate change).

any income loss. Although this policy would reduce the revenue that the government could collect by selling the emission permits or taxing all the emissions, the policy would not undermine the environmental effectiveness of the regulation or tax.⁴⁴ Although companies may still oppose new regulatory authority because of their inability to control how that regulatory authority evolves, the Goulder/Bovenberg research provides a useful framework for trying to lessen or overcome the existing political opposition to carbon measures.

IV. USING ECONOMICS TO DESIGN REGULATORY APPROACHES

For reasons already discussed, economics is a useful tool for identifying and analyzing alternative regulatory approaches to accomplishing environmental goals. Economic analysis can provide valuable insight into the opportunities and incentives, positive and negative, that alternative approaches create. Economic analysis can also reveal the likely economic impacts of the alternative approaches. While environmental moralists might eschew the use of economics to determine environmental goals, they should still favor adopting the least costly approach that works. That approach saves economic resources for other societal goals and is more likely to be politically feasible. The research by Goulder and Bovenberg is an example of using economics to help design an environmental policy approach.

Perhaps not surprisingly, economic analysis typically suggests that environmental policy should make greater use of various market tools. Economists most frequently tout the use of environmental taxes in which pollution, habitat destruction, or other actions that harm the environment would be taxed and thus discouraged. The flip side of taxes is incentive payments in which the government pays firms or individuals to engage in environmentally beneficial behavior. The most actively discussed market tool is the tradable permit system in which the government caps the amount of an activity, such as polluting or fishing, and then sells or issues an equivalent amount of permits that members of the regulated industry can trade among themselves.⁴⁵

⁴⁴ See A. Lans Bovenberg & Lawrence H. Goulder, *Neutralizing the Adverse Impacts of CO₂ Abatement Policies: What Does It Cost?*, in *BEHAVIORAL AND DISTRIBUTIONAL IMPACTS OF ENVIRONMENTAL POLICIES: EVIDENCE AND CONTROVERSIES* (C. Carraro & G. Metcalf eds., forthcoming).

⁴⁵ For a good overview of the different types of market mechanisms, see Hahn & Stavins, *supra* note 5; see also SALZMAN & THOMPSON, *supra* note 6, at 45 (identifying basic approaches).

Market approaches, such as taxes and tradable permits, offer a number of potential advantages over more traditional regulatory methods. First, market approaches can reduce the overall cost of achieving environmental goals. Under market approaches, members of the regulatory community can determine and use the least expensive means of meeting environmental standards. Moreover, if regulated entities have differing abilities to improve their environmental performance, which is frequently the case, market approaches automatically encourage those that can most inexpensively improve their performance to play the principal role, again minimizing the overall cost of meeting the environmental standard. With tradable permits, companies that find it expensive to improve performance will buy permits from those that can more affordably improve performance. With taxes, companies that find it least expensive to improve performance will do so since it will be cheaper than paying the taxes, while other companies will prefer to pay the taxes. In either case, the overall cost of meeting a specified environmental goal will decline.

By providing the regulated community with more flexibility and reducing the overall cost of regulation, some market approaches also increase the political feasibility of new environmental measures. Political observers, for example, attribute the passage of acid-rain controls in the Clean Air Act Amendments of 1990 in part to the inclusion of a tradable permit system that lowered the overall cost faced by the electricity industry in reducing SO₂ emissions.⁴⁶ States also have used markets to minimize the economic impact of mandated water reductions and thus increase their political acceptability.⁴⁷ With markets in place, water users who otherwise would face unacceptable shortages can purchase additional water while those who are able to spare water can enjoy a new profit-making opportunity. For these reasons, Texas's Edwards Aquifer Act, which reduced groundwater withdrawals from the aquifer, included market provisions permitting high-value water users to purchase needed water from those more able to do without.⁴⁸

⁴⁶ See Paul L. Joskow & Richard Schmalensee, *The Political Economy of Market-Based Environmental Policy: The U.S. Acid Rain Program*, 41 J. LAW & ECON. 37, 45-51 (1998); David B. Spence, *Paradox Lost: Logic, Morality, and the Foundations of Environmental Law in the 21st Century*, 20 COLUM. J. ENVTL. L. 145, 160 n.61 (1995).

⁴⁷ See Richard E. Howitt, *Water Market-Based Conflict Resolution*, in ROSENBERG INTERNATIONAL FORUM ON WATER POLICY: RESOLVING CONFLICT IN THE MANAGEMENT OF WATER RESOURCES 49 (1998) (explaining how market mechanisms can be used to help resolve conflicts over water resources).

⁴⁸ See Barton H. Thompson, Jr., *Tragically Difficult: The Obstacles to Governing the Commons*, 30 ENVTL. L. 241, 266-67 (2000) (describing use of markets in restricting

Efforts to reduce water use and increase instream flows in California have similarly recognized the importance of water markets in gaining needed consensus.⁴⁹

Market approaches also can encourage dynamic innovation and improvement. Under a traditional regulatory regime in which the government orders the regulated community to meet a specified goal, members of the regulated community generally have no incentive to do better than the government mandates. Environmental taxes encourage members of the regulated community to find and use new ways of improving their environmental performance at lower cost, since they can reduce their tax payments by improving performance. Tradable permits also encourage entities to find ways of further improving their performance since the entities can then sell their unneeded permits, but the improvement does not translate into an overall improvement in the environment unless regulators reduce the overall amount of permits available in light of the improved performance.⁵⁰

Tradable permits also provide environmental organizations with an opportunity to use their resources to improve the environment. With the growth in water markets in the western United States, for example, a number of environmental organizations such as the Oregon Water Trust have begun to purchase water rights and dedicate them to instream environmental use. In most years since the mid-1990s, environmental organizations have acquired more than half a million acre-feet of water.⁵¹ To a lesser degree, environmental organizations have purchased and retired rights to pollute and to graze cattle on the public domain.⁵²

withdrawals from Edwards Aquifer); *On Groundwater Control & Markets: Managing the Edwards Aquifer*, WATER STRATEGIST, at 7 (Fall 1996) (also describing use of markets in the Edwards Aquifer Act).

⁴⁹ See CALFED BAY-DELTA PROGRAM, PROGRAMMATIC RECORD OF DECISION 71-72 (Aug. 28, 2000) (discussing steps to be taken to promote water marketing in California).

⁵⁰ See Barton H. Thompson, Jr., *The Search for Regulatory Alternatives*, 15 STAN. ENVTL. L.J. viii (1996) (discussing comparative incentives to innovate under tradable permit and tax systems). Regulators, of course, can also build incentives for innovation into traditional regulatory systems. For example, if the government mandates that companies use new innovations, inventors have an incentive to devise new approaches for which they can enjoy monopoly returns.

⁵¹ Barton H. Thompson, Jr., *Markets for Nature*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 261, 270 (2000).

⁵² See Sally K. Fairfax, *State Trust Lands: The Culture of Administrative Accountability*, in ENVIRONMENTAL FEDERALISM 61 (Terry L. Anderson & Peter J. Hill eds., 1997) (discussing efforts to acquire grazing rights on public trust lands); Charles P. Lord & Eric Strauss, *Natural Cities: Urban Ecology and the Restoration of Urban Ecosystems*, 21 VA. ENVTL. L.J. 317, 377 (2003) (noting purchase and retirement of pollution rights); accord Robert H. Nelson, *How to Reform Grazing Policy: Creating Forage Rights on Federal Rangelands*, 8 FORDHAM

A final advantage to market mechanisms is that they can generate revenue for the government that can be used to fund other public goods or services or to offset taxes that hurt the economy. Environmental taxes obviously provide a new source of revenue. The government also can use permits to generate revenue by selling or auctioning off at least some of the permits. As discussed in Part I, many economists have proposed that the revenue from taxes or permit sales be used to reduce income taxes or other taxes that, by discouraging valuable activities, impose deadweight losses on the economy.⁵³

In light of these and other potential advantages, a few environmental organizations, such as Environmental Defense, actively embrace the use of market systems and look for ways to use economics to design environmental approaches that are cost-effective, politically feasible, dynamic, and flexible. Most environmental organizations, however, remain decidedly lukewarm about market approaches to environmental goals or oppose outright the adoption of such approaches.⁵⁴

Why should most environmentalists be so skeptical of market solutions, given that economics is not being used to determine the environmental goal but merely to design an optimal tool for meeting the goal? One of the reasons is likely fear over whether and how market approaches can be effectively implemented. Permit systems, for example, can sometimes increase or concentrate environmental harms unless trades are carefully regulated. Illustrative of this effect are "hot spots" where polluters in one region disproportionately acquire additional pollution permits, significantly increasing local pollution even while overall pollution is falling.⁵⁵ Taxes need to be carefully calibrated and recalibrated, a difficult and ongoing task, in order to achieve any specific level of environmental protection.⁵⁶ Congressional tax committees, loathe to raise taxes and not attuned to environmental issues, also may be hesitant to raise environmental taxes as high as

ENVTL. L.J. 645, 657 (1997) (discussing efforts to acquire grazing rights on public trust lands).

⁵³ See, e.g., Scott Farrow, *The Duality of Taxes and Tradeable Permits: A Survey with Applications in Central and Eastern Europe*, 4 ENVTL. AND DEV. ECON. 519 (1999); Ian Parry et al., *When Can Carbon Abatement Policies Increase Welfare? The Fundamental Role of Pre-Existing Factor Market Distortions*, 37 J. ENVTL. ECON. & MGMT. 52 (1999).

⁵⁴ See Nathaniel O. Keohane et al., *The Choice of Regulatory Instruments in Environmental Policy*, 22 HARV. ENVTL. L. REV. 313, 354 (1998) (noting that Environmental Defense is "outlier").

⁵⁵ See Richard L. Revesz, *Federalism and Interstate Environmental Externalities*, 144 U. PA. L. REV. 2341, 2412 (1996).

⁵⁶ See STEVEN P. KELMAN, *WATER PRICE INCENTIVES?* 54-55 (1981).

needed.⁵⁷

Environmental moralists may oppose market solutions because of the additional fear that these solutions conflict with moral, spiritual, or community justifications for environmental protection. In this regard, many environmentalists complain that market mechanisms are mere "licenses to pollute" or, in the context of wetland mitigation banking or water markets, perhaps "licenses to abuse the environment."⁵⁸ Under environmental taxes, anyone willing to pay the taxes can harm the environment; under tradable permits, anyone who acquires additional permits can engage in corresponding harm. In both cases, people buy the right to injure the environment.

On the surface, this attack on market mechanisms seems ill founded. Under a traditional command-and-control regulatory structure, the government permits people to harm the environment for free. If the Clean Water Act limits effluent discharges to a certain level, the government is giving companies a free right to dump that amount of effluent. So long as a market approach does not permit any greater harm to the environment, the market approach seems superior to the traditional approach. Not only does the government get the benefits of market approaches itemized above but regulated companies may now have to pay for the right to harm the environment. Given a choice between a free right to harm the environment and a system that forces companies to pay for the right, the latter would appear to be morally superior.⁵⁹

However, the attack on market mechanisms as mere "licenses to pollute" reflects a subtler issue of environmental ethics. The environmental moralist hopes not only to constrain current behavior but also to change the public's long-term perspective on the environment. As noted earlier, environmental moralists hope to inculcate an environmental ethic that will reduce the need for regulation and lead people to exceed voluntarily the minimum level of environmental protection that the government demands. Many environmental moralists fear that market mechanisms will undermine this effort. Command-and-control regulation, particularly when backed by criminal penalties, sends a strong message that pollution and other forms of environmental harm are bad, with no doubts or caveats. Standard

⁵⁷ Keohane et al., *supra* note 54, at 355.

⁵⁸ E.g., Kelman, *supra* note 56, at 44.

⁵⁹ For a similar response to the argument that environmental markets are mere "licenses to pollute," see Hahn & Stavins, *supra* note 5, at 37.

market mechanisms suggest, even if only at a naive level, that environmental harm is merely a matter of economics and that people should strive to protect and improve the environment only to the degree that this is economically in their interest.

We unfortunately have neither a strong theory for, nor significant empirical insights into, what types of regulatory mechanisms are likely to generate pro-environmental behavior on a voluntary basis. There are at least two questions. First, does the regulatory mechanism lead to an improvement in environmental norms? Second, does the regulatory mechanism encourage people to act on these normative beliefs or does it "crowd out" such altruistic behavior? A regulatory mechanism may do neither, one or the other, both, or even work at cross-purposes. Determining how particular regulatory mechanisms affect voluntary environmental action is an important area for future empirical research.

Social scientists have started to examine the second question: which governmental policies encourage, and which crowd out, altruistic actions. Confirming the worries of environmental moralists, a few of these studies suggest that some forms of market approaches can indeed "crowd out" altruistic behavior.⁶⁰ A major problem in recent years, for example, has been the siting of "locally unwanted land uses" (LULUs). Few communities want to be home to waste dumps, polluting power facilities, and the like. Studies in the United States and Europe have found that the willingness of people to let a LULU locate in their community actually can decline if the government or developer offers to pay the community for the privilege.⁶¹ One Swiss study found that, on average, about 50% of a given community's population was willing to accept a LULU if no compensation was provided but only about 25% percent was willing when compensation was offered.⁶² Compensation reduced the number of people open to siting LULUs in their community by about half.

This does not mean that incentive payments are necessarily bad public policy. As the size of the payment increases, the payment may ultimately convince people to support LULUs or other environmental

⁶⁰ For summaries of the studies, see Bruno S. Frey & Reto Jegen, *Motivation Crowding Theory*, 15 J. ECON. SURVEYS 589 (2001); Hannelore Weck-Hanneman & Bruno Frey, *Are Incentive Instruments as Good as Economists Believe? Some New Considerations*, in PUBLIC ECONOMICS AND THE ENVIRONMENT IN AN IMPERFECT WORLD 173 (Lans Bovenberg & Sijbren Cnossen eds., 1995).

⁶¹ See, e.g., Bruno S. Frey et al., *The Old Lady Visits Your Backyard: A Tale of Morals and Markets*, 104 J. POL. ECONOMY 1297 (1996); Howard Kunreuther & Doug Easterling, *The Role of Compensation in Siting Hazardous Facilities*, 15 J. POL'Y ANALYSIS & MGMT. 601 (1996).

⁶² Frey et al., *supra* note 61 at 1297.

policies out of pure economic self-interest. As the payment crowds out altruism, however, the government must pay more than it otherwise would. There is a risk, moreover, that no matter how high the payment is set, public support for the environmental policy will be less than if no payments were made. If incentive payments are terminated, altruistic behavior might remain suppressed below the level that prevailed before payments were offered.

One cannot generalize from these studies to the broad conclusion that traditional command-and-control mechanisms will encourage altruistic environmental behavior more effectively than market approaches. First, government mandates may also tend to crowd out altruistic behavior.⁶³ Researchers have suggested several reasons why incentive payments may crowd out altruism, including the impairment of both self-determination and self-esteem.⁶⁴ By paying people to act in a particular way, the government converts a matter of internal motivation into a subject of external pressure. People stop asking themselves how they *should* behave. The offer of a reward can also debase the value of the intrinsic motivation that underlies altruistic behavior. These explanations would seem to apply equally well to command-and-control regulations, which both impose external pressure and, by suggesting that people cannot be trusted to act properly on their own, may debase intrinsic motivation. Indeed, regulation may eliminate self-determination even more completely than incentive payments, since regulation requires compliance while incentive payments still permit individual choice.

One recent simulation study supports the conclusion that regulations, like incentive payments, can reduce altruistic behavior.⁶⁵ The study asked rural Colombians how many trees they would harvest if they knew that the harvesting, by denuding the soil, would lead to increased pollution of local drinking water through sedimentation. In the simulation, the Colombian villagers were initially free of any regulation. Paralleling the findings of other studies, the villagers reported that they would cut less timber than made sense from a purely personal economic perspective, suggesting that they had some altruistic regard for others in

⁶³ See Bruno S. Frey, *Morality and Rationality in Environmental Policy*, 22 J. CONSUMER POL'Y 395, 399 (1999) (noting that both rewards and regulations can crowd out intrinsic motivation).

⁶⁴ For a discussion of the reasons that incentive payments might crowd out altruism, see Frey et al., *supra* note 61, at 1299-1302.

⁶⁵ Juan Camilo Cardenas et al., *Local Environmental Control and Institutional Crowding-Out*, 28 WORLD DEV. 1719 (2000).

their village. When the researchers then introduced a law limiting the amount of timber that could be cut, most villagers initially reduced their harvesting to the mandatory level. As the villagers learned that they could violate the law without being discovered and, if caught, with little penalty, the amount of timber being cut slowly crept up. Ultimately the villagers ended up cutting more timber than they had before the regulation was imposed.

Second, there are instances in which market approaches appear to help form voluntary environmental norms. Governments, for example, have encouraged recycling primarily through market means (e.g., higher garbage pickup fees, bottle refunds, etc.) rather than by dictate. Yet recycling norms are among the strongest environmental norms that exist.⁶⁶ In a similar fashion, water metering appears to lead not only to reductions in use but also to improved water ethics.⁶⁷

Some psychological studies suggest that monetary incentives may increase altruistic behavior if recipients view the incentives as "supportive" rather than "controlling."⁶⁸ Such monetary incentives would include rewards that reflect and incorporate social praise, are discretionary (so that no one must accept the reward for their behavior), and are awarded after the beneficial behavior. Unexpected monetary compensation similarly may have a tendency to reinforce rather than undermine altruistic behavior. A variety of monetary incentives in the real world might meet some or all of these criteria, including bottle refund provisions and tax deductions for individuals who donate conservation easements to environmental land trusts.

Environmental moralists thus may be able to use some market approaches to increase the amount of environmental altruism practiced by the population. If so, the environmental moralists will find economics not simply supportive but constructive of environmental ethics. None of the uses of economics itemized in earlier sections helps environmental moralists reach their ultimate goal of changing the underlying beliefs of society. Some of the uses of economics may even be inconsistent with the ethical beliefs motivating the environmental moralist — such as the normative use of economics to evaluate environmental goals. Environmental moralists might find other

⁶⁶ See Carlson, *supra* note 37, at 1231.

⁶⁷ See Ken Sharratt, *Do Water Meters Reduce Wastage?*, ENVTL. SCI. & ENG. MAG., Mar. 2001, at 67.

⁶⁸ See, e.g., Bruno S. Frey, *Motivation as a Limit to Pricing*, 14 J. ECON. PSYCHOL. 635, 639-40, 646 (1993) (describing how rewards that recognize good actions can increase intrinsic motivation).

economic applications useful in diagnosing problems or overcoming political opposition. But environmental moralists are likely to remain uncomfortable using economics because of the underlying tension between the self-interest of markets and the altruism of environmental ethics. If some economic tools can increase the degree to which people act out of environmental altruism, however, the gap between economics and environmental ethics may shrink.

CONCLUSION

Environmental moralists are naturally skeptical of economics. Economics appears to speak of human wants, individual preferences, and self-interested behavior, while most variants of environmental ethics emphasize the importance of the entire biotic community, the relevance of societal values, and the need to look beyond one's immediate interests. Used as a normative tool, economics can clash with environmental ethics. Used in other contexts, economic analysis accepts a world that the environmental moralist rejects.

Environmental moralists may wish for a different world. Yet economics remains an undeniable and powerful force. The environmental moralist who wishes to accomplish immediate change must confront economic truths and learn to utilize economic analysis in support of the environment. As discussed, economics can supply supplemental arguments for protecting and improving the environment, provide insight into why even environmentally enlightened individuals often harm the environment, help defuse opposition to valuable environmental measures, and furnish new and more effective tools for accomplishing environmental goals. In many of these contexts, environmental moralists can make use of economics without undermining ethical precepts or education.

Recent studies raise the additional and intriguing possibility that environmental moralists might be able to use economic tools to help develop new environmental mores, encourage environmental altruism, or both. Social scientists still know little about how governmental policies affect societal norms and the willingness of individuals to behave altruistically. At least some economic incentive systems, however, may encourage environmental altruism. If so, environmental moralists might find economics not only a tool for immediate environmental change but for longer-term shifts in the way in which society regards and treats the environment.

