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EXPLAINING MARKET MECHANISMS

Thomas W. Merrill*

In recent years, environmental regulation has seen a debate between supporters of traditional command-and-control regulation—a system of uniform pollution control standards—and proponents of a system of fees or permits for individual polluters known as market mechanisms. In this article, Professor Merrill considers two theories, wealth-maximization theory and distributional theory, that have been used to explain the emergence of market mechanisms in American environmental policy. He notes that (1) relatively few American environmental-enforcement programs have adopted market mechanisms; (2) those that exist overwhelmingly use grandfathered transferable permits instead of pollution taxes or auctioned permits; and (3) they are always based on pollution control standards that have been established before the market mechanisms are put in place. Professor Merrill finds that the distributional theory best explains why grandfathered permits are used most often and why, more generally, adoption of market mechanisms is not more widespread. Finally, noting that no inherent conflict exists between the wealth maximization and distributional theories, Professor Merrill concludes that a framework building upon both theories may lead to a better understanding of the debate between command and control and market mechanisms.

I. INTRODUCTION

Of the various innovations in environmental policy in the last twenty-five years, one of the most controversial has been the effort to replace traditional command-and-control regulation with market mechanisms.

Command-and-control regulation refers to a system of pollution control based on uniform standards of performance for sources of pollution. Most typically, regulators adopt standards that specify for a particular category of sources how much of a given pollutant a source is permitted to emit over a given unit of time. All sources that fall within the category are then required to achieve compliance with this standard,

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unless granted a variance. Often, but not always, these standards are fixed on the basis of the degree of control that can be achieved using existing technology.

Market mechanisms, in contrast, are systems of pollution control based on the imposition of a money charge on the emission of a quantity of a given pollutant over a given unit of time. The charge can take the form of a fee or tax imposed by the regulator, often referred to as a Pigouian tax, after the early proponent of the idea, economist Arthur Pigou. Alternatively, the charge can be imposed by requiring sources to purchase permits, from either the government or other sources, authorizing the emission of a quantity of a given pollutant over a given unit of time.

As befits a controversial subject, the literature on command-and-control versus market mechanisms is primarily normative. The partisans of market mechanisms stake their case on the superior efficiency of a system that sets a price on the emission of pollutants and thereby creates an incentive for sources to reduce those emissions. Such a system gives regulated firms a great deal of flexibility. Each firm can choose either to pay the pollution charge or to not pollute, whichever is cheaper. This flexibility permits a given level of emissions reduction to be achieved at the lowest cost: the emissions reduction will be carried out by the firms in a position to do so with the least expenditure of resources. Thus, it is argued, market mechanisms are more efficient than command-and-control regulation in the strong Pareto sense: no one is worse off (society achieves the same level of emissions reduction it would get from command and control), and some are better off (fewer resources that could be used for other worthy purposes are consumed in the pollution control effort).

1. Wendy Wagner, writing in this issue, defines command-and-control regulation to mean a uniform standard of performance based on technological feasibility. See Wendy E. Wagner, The Triumph of Technology-Based Standards, 2000 U. ILL. L. REV. 83. Although uniform emissions standards are most commonly based on existing technology, this is not invariably true. They can also be based on the perceived impact of emissions on the ambient environment (as with respect to point source controls under the water quality standards required by the Clean Water Act, see 33 U.S.C. § 1313(d)(4) (1994)) or can be based on a percentage adjustment from some benchmark of past emissions (as under the new motor vehicle standards of the 1970 Clean Air Act). See 42 U.S.C. § 7521 (1994).


4. See Dudek & Palmisano, supra note 3, at 222-23.
The defenders of command and control generally marshal two types of arguments in opposition. First, they express skepticism about whether market mechanisms would work as advertised. They point out that these mechanisms require a foolproof method of monitoring the emissions of all sources to make sure that no firms are cheating by emitting more pollution than the amount for which they have paid. Moreover, pollution taxes or tradable permits require the creation of elaborate institutional infrastructures, which may not be adequately funded. Second, command-and-control defenders argue that market mechanisms send the wrong message about environmental protection. Market mechanisms treat pollution as just another cost of doing business, whereas pollution should be treated as morally objectionable behavior that must be eliminated to the greatest extent possible.

I do not propose to add to this normative debate. Instead, this article is part of a small but growing literature that seeks a positive theory of the factors in the political system that favor or retard the adoption of market mechanisms. Specifically, I will address two questions about the historical emergence of market mechanisms in the last twenty-five years. The first asks why the political system remains so firmly committed to command-and-control regulation—which remains the dominant paradigm in environmental law—and adopts market mechanisms only in exceptional circumstances. The second asks what form market mechanisms are more likely to take when they are adopted: are such mechanisms more likely to take the form of pollution taxes, tradable permits auctioned by the government, or tradable permits issued to incumbent polluters?

More specifically, part II describes two types of positive theories employed to explain the emergence of market mechanisms as an alternative to command-and-control regulation: what I will call the wealth-maximization theory and the distributional theory. Then, to provide a foundation for some casual empirical assessment of these theories, part III presents a brief overview of the American experience with market mechanisms as a pollution control strategy. Part IV considers, in light of

5. See Latin, supra note 3, at 1331.
the information revealed in part III, which of the two types of theories offers the best explanation for the form that market mechanisms have assumed when they have been adopted. It concludes that the distributional theory clearly provides the best explanation for what appears to be a universal preference for grandfathered transferable permits rather than pollution taxes or auctioned permits. Part V then turns to the considerably more difficult question of why market mechanisms are so rarely adopted. Although this judgment is debatable, I argue that distributional theory again appears to provide the better explanation for the dominance of command and control than does wealth-maximization theory. I conclude with some comments about the possibility of achieving a synthesis of the wealth maximization and distributional perspectives to provide an even better explanation of the evolution of environmental control regimes.

II. TWO POSITIVE THEORIES FOR THE EMERGENCE OF MARKET MECHANISMS

Within the existing positive literature on market mechanisms, it is possible to discern two general types of explanations for their emergence: wealth-maximization theory and distributional theory.

A. Wealth-Maximization Theory

The wealth-maximization theory traces its provenance to the property rights literature of neoinstitutional economics and in particular to the pioneering work of Harold Demsetz. The basic insight is that property rights emerge and recede in accordance with a criterion of societal wealth maximization, in effect a type of cost-benefit analysis. The benefits of a property regime come in reducing wasteful competition to capture the economic rents associated with scarce resources (what the neoinstitutionalists call "rent dissipation") and by making it easier to control the external costs associated with resource use by reducing the number of parties affected by such uses. The costs of such a regime include the costs of defining property rights, identifying the owners of such rights, and protecting the rights against interference by others. According to wealth-maximization theory, if the social benefits of a property regime exceed the social costs of creating and enforcing such a regime, then society will recognize property rights over a resource. Conversely, if the social benefits of a property regime do not exceed the social costs of creat-


ing and enforcing such a regime, then society will not recognize property rights over the resource.

A corollary to the wealth-maximization theory is that property regimes will exist in varying degrees of complexity in terms of the number of “sticks” that are recognized as belonging in the bundle of rights of the property owner and will exist with varying degrees of formality in terms of how such rights are enforced. 11 If the net benefits of a property regime are positive but small, then this may result in the creation of a rudimentary property rights regime, such as one based on simple usufructuary rights and enforced by informal social norms. As the surplus of benefits relative to costs grows larger—that is, as the resources become more scarce or externalities become more severe or as the costs of creating and enforcing property rights fall—then we should expect to see more elaborate property regimes emerge. For example, usufructuary rights may evolve toward full ownership rights including the rights to transfer and inherit. Similarly, enforcement through social norms may be supplemented with common law remedies and criminal penalties.

Carol Rose, in a provocative article, has adopted this property rights framework to explain the evolution of different forms of environmental protection. 12 She describes four general control strategies, starting with DO-NOTHING (leaving the problem unregulated), followed by KEEPOUT (prohibiting new polluting sources), then RIGHTWAY (command-and-control regulation), and lastly PROP (market mechanisms). 13 She suggests that, as a general matter, these four strategies are characterized by progressively higher management costs, both in terms of the costs of administrating the system and the costs to users of complying with the system. 14 However, again as a general matter, these strategies are also progressively more effective in controlling rent dissipation and reducing externalities. The combination of these general features—higher management costs but greater effectiveness—means that as a rule, as pressure on resources increases, the political system will tend to shift to progressively more expensive but more effective control mechanisms.

Rose's adaptation of wealth-maximization theory to environmental controls yields a fairly straightforward explanation for the emergence of market mechanisms. In terms of air pollution, for example, her model suggests that the solution to the relative-cost controversy depends on how congested our air really is. If we are far enough out on the horizontal line of resource pressure, then PROP may be preferable

14. See id. at 24 fig. 8.
because at that pressure level it minimizes total costs, despite its arguably higher system-wide costs of organization and policing.\textsuperscript{15} More generally, as the external costs of a particular form of pollution rise—that is, as particular environmental goods like clean air or water become increasingly scarce—we should expect to see the control strategy for dealing with this problem shift from RIGHTWAY (command and control) to PROP (market mechanisms). Alternatively, if the costs of administering a system of market mechanisms were to fall, perhaps because of the invention of inexpensive and effective monitoring devices, then this drop might also trigger a movement from RIGHTWAY to PROP. These possibilities, of course, are not mutually exclusive. In many instances one would expect to see a combination of increasing benefits (because of increasing pressure on resources) and reduced costs (because of new monitoring technology or the like) causing a move from command-and-control regulation to market mechanisms.

B. Distributional Theory

The distributional theory traces its provenance to the interest group theory of politics, the leading figure in this case being Mancur Olson.\textsuperscript{16} The starting point here is not the efficiency of an institutional arrangement but rather its distributional implications. Different policy instruments will favor different social groups, and these groups are assumed to compete in an effort to persuade regulators to adopt those instruments that distribute the greatest wealth to themselves. Moreover, different groups will have different degrees of influence over whether the political process adopts any given instrument. Among the factors that determine a group’s influence are (1) the costs of organizing the group for political action; (2) the per capita stakes among the members of the group with respect to the particular issue; and (3) whether the interests of the group members are aligned or in conflict with respect to the issue.\textsuperscript{17}

Notice that the distributional theory suggests that society may adopt regulatory regimes that fail to maximize societal wealth. It will adopt those regimes whose distributional features are most favorable to the groups that can organize most effectively to influence the political process. These outcomes may well result in a decrease in total societal wealth relative to other regimes, but because of the high costs of bargaining and

\begin{itemize}
  \item \textsuperscript{15} Id. at 28.
\end{itemize}
disparities in influence among groups, a shift to a more efficient regime may not occur.\textsuperscript{18} 

The most comprehensive effort to date to apply distributional theory to explain the incidence of market mechanisms in environmental law is a recent article by Nathaniel Keohane, Richard Revesz, and Robert Stavins.\textsuperscript{19} They develop a model of a "political market" characterized by demand and supply curves.\textsuperscript{20} On the demand side, different groups demand different types of regulatory instruments and have differential capacities to "bid" for their preferred outcomes.\textsuperscript{21} On the supply side, the legislature offers to supply different regulatory instruments depending upon the "prices" the groups are prepared to pay.\textsuperscript{22} Actual policy is a function of the equilibrium that emerges in the political process between the demand-side and supply-side forces.\textsuperscript{23} Under this type of analysis, we should identify the "winners" and "losers" under different environmental regimes and ascertain which groups wield more influence with the legislature; the group or groups with the largest clout (in terms of campaign contributions and numbers of votes) will succeed in getting their preferred regime adopted.

Distributional theory does not generate the same kind of clear-cut hypothesis with respect to when market mechanisms will emerge that the wealth-maximization theory does. Much depends on the form that market mechanisms take and on the perceptions that different groups hold about the distributional effects of adopting market mechanisms. This lack of precision is a general weakness of the interest group theory of politics, which generally works better in supplying after-the-fact explanations than in predicting the future.\textsuperscript{24}

III. THE USE OF MARKET MECHANISMS IN ENVIRONMENTAL LAW—AN OVERVIEW

To engage in an assessment of the two competing positive theories for explaining the emergence of market mechanisms, it is necessary to have some data regarding when market mechanisms are adopted and what form they take when adopted. To this end, it would be helpful to have an historical overview of the experience with market mechanisms under U.S. environmental law. Curiously, I was unable to find any

\textsuperscript{18} See GARY D. LIBECAP, CONTRACTING FOR PROPERTY RIGHTS 16–18, 116 (1989) (emphasizing the need for mechanisms to distribute some of the gains from more efficient property systems from the "winners" to the "losers" to facilitate regime change in the context of property in natural resources).

\textsuperscript{19} See Keohane et al., supra note 7, at 313–14.

\textsuperscript{20} See id. at 329–39.

\textsuperscript{21} See id. at 329–33.

\textsuperscript{22} See id. at 333–39.

\textsuperscript{23} See id. at 339–46.

\textsuperscript{24} See generally DONALD P. GREEN & IAN SHAPIRO, PATHOLOGIES OF RATIONAL CHOICE THEORY 33–46 (1994).
American legal commentary providing such an overview. Notwithstanding the existence of some thirty-eight American law reviews specializing in environmental law,\textsuperscript{25} for some reason there is a dearth of descriptive literature about this feature of current law. Fortunately, however, I did find a useful overview in a recent monograph by Gert Tinggaard Svendsen, a Danish economist who surveyed the U.S. experience with market mechanisms as part of a study of policy options for controlling greenhouse gases in Europe.\textsuperscript{26}

According to Svendsen, there have been eight fully implemented environmental enforcement programs in the U.S. that rely on market mechanisms.\textsuperscript{27} Five of these programs have arisen under various provisions of the Clean Air Act, and three were stimulated by the water quality standards mandated by the Federal Water Pollution Control Act.\textsuperscript{28} It is possible to quibble with Svendsen's census of U.S. market mechanisms. The list could easily be lengthened either by expanding the definition of an environmental program or the definition of a market mechanism or both.\textsuperscript{29} Nevertheless, if we confine ourselves to environmental programs in the conventional sense of programs that control the discharge of physical pollutants, Svendsen's survey appears to be complete.\textsuperscript{30}

\textsuperscript{25} See Michael H. Hoffheimer, Anderson's 1999 Directory of Law Reviews and Scholarly Legal Periodicals 16–18 (listing 29 student-edited environmental law journals); see also id. at 35–36 (listing nine nonstudent-edited environmental law journals).


\textsuperscript{27} See id. at 72.

\textsuperscript{28} See id.

\textsuperscript{29} For example, with respect to the definition of an environmental program, a number of jurisdictions have adopted programs of transferable development rights to limit the destruction of open spaces. See James T.B. Tripp & Daniel J. Dudek, Institutional Guidelines for Designing Successful Transferable Rights Programs, 6 Yale J. on Reg. 369, 378–82 (1989) (describing the New Jersey Pinelands development control plan). If this kind of preservation program is included within the universe of environmental programs, then the number of market mechanisms would expand significantly. Similarly, with respect to the definition of a market mechanism, a number of jurisdictions have imposed charges on parties who engage in activities that generate externalities without making any effort to set the charges at a level equal to the external costs of these activities. Examples include charges on industrial emissions into municipal waste-treatment facilities, see William J. Baumol & Wallace E. Oates, Economics, Environmental Policy, and the Quality of Life 258–63 (1979), and deposit and refund programs to encourage recycling of cans and bottles. See Peter S. Menell, Beyond the Throwaway Society: An Incentive Approach to Regulating Municipal Solid Waste, 17 Ecology L.Q. 655, 693 (1990). If these programs are seen as legitimate examples of market mechanisms, then such programs would again have to be regarded as being much more numerous.

\textsuperscript{30} I offer this judgment based on previous discussions of market mechanisms found in the American literature. See, e.g., Ester Bartfeld, Point-Nonpoint Source Trading: Looking Beyond Potential Cost Savings, 23 Envtl. L. 43, 44, 83–88 (1993) (discussing the Dillon Reservoir Program and the Tar-Pamlico Program); Robert B. Hahn & Gordon L. Hester, Marketable Permits: Lessons for Theory and Practice, 16 Ecology L.Q. 361, 366–96 (1989) (discussing the Emissions Trading Program, the Lead Additives Trading Program, the Fox River program, and the Dillon Reservoir program); Hahn & Stavins, supra note 7, at 15–20 (discussing the Emissions Trading Program, the Lead Additives Trading Program, and the Dillon Reservoir program); Robert N. Stavins, Policy Instruments for Climate Change: How Can National Governments Address a Global Problem?, 197 U. Chi. Legal F. 293, 307–09 (discussing the Lead Additives Program, the Acid Rain Program, and the CFC/Halon Program). Cf. Baumol & Oates, supra note 29 (using a 1979 survey to show that no implemented U.S. programs would at that time qualify as market mechanisms in the sense that Svendsen uses the
The five air pollution programs were adopted at various times starting in 1974 and culminating most recently in 1993. They are: (1) the Emissions Trading Program, which is really four different trading rules—netting, offsets, bubbles, and banking—that apply primarily under the nonattainment provisions of the Clean Air Act;31 (2) the Lead Additives Trading Program that applied to the EPA-mandated phaseout of lead in refined gasoline from 1982 to 1987;32 (3) the CFC/Halon Trading Program that applied during the phaseout of these ozone-depleting substances mandated by the Montreal Protocol;33 (4) the sulfur dioxide trading program under the Acid Rain Program established by the 1990 amendments to the Clean Air Act;34 and (5) the Regional Clean Air Incentives Market (RECLAIM) program adopted under state regulatory authority in Southern California to achieve compliance with federal guidelines for smog.35

The three water pollution programs were adopted at various times between 1981 and 1989. They are: (1) a discharge trading program established on the Fox River in Wisconsin in 1981;36 (2) a point/nonpoint trading program established in 1982 at the Dillon Reservoir in Colorado;37 and (3) a point/nonpoint trading program established in the Tar-Pamlico River Basin in North Carolina in 1989.38

Several potentially significant generalizations about these market mechanism programs can be drawn from Svendsen’s survey.

First, it is clear that market mechanisms play a distinctively secondary role in the overall American pollution control scene. Among the five air programs, two were transitional programs no longer in use,39 and one is a regional program.40 The Emissions Trading Program and the Acid Rain Program are more permanent and significant, but they do not begin to exhaust the full range of air pollution control programs, most of which remain untouched by market mechanisms. The three water pollution programs are essentially local pilot programs; they have generated a grand total of two trades after nearly two decades of operation.41 Perhaps more significantly, the eight market mechanisms are wholly confined to

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36. See WIS. ADMIN. CODE § NR 212.115 (1986).
40. RECLAIM. See infra note 35 and accompanying text.
41. See SVEINSDEN, supra note 26, at 114, 117, 121.
the air and water pollution contexts. Other areas of pollution control, such as hazardous waste management and reclamation, evidently remain innocent of market mechanisms.

Second, the eight market mechanism programs all adopt the same method for putting a price on pollution. In each case, the programs rely on what have been called "grandfathered" permits—a system of tradable permits in which permits are allocated free of charge to existing pollution sources. None of the eight programs relies on any form of pollution fees or taxes or on tradable permits allocated by auction. This is the most striking consistency Svendsen's survey uncovers.

Third, each of the programs arises in a context where the standard for acceptable levels of pollution has been independently and authoritatively established before the market mechanism was put in place. The Emissions Trading Program and the RECLAIM program are based on the idea that new sources of pollution should entail no further deterioration in air quality below the national ambient air quality standards previously set by the EPA. Similarly, the three water pollution programs are based on the need to achieve compliance in individual watersheds with previously established water quality standards that apply throughout an entire state. The Acid Rain Program is based on the political commitment, made in the 1990 Clean Air Act Amendments, to cut the emissions of precursor gases of acid rain by fifty percent. Most strikingly, the lead and CFC/Halon programs are based on political commitments to reduce emissions of the relevant pollutants to zero. In no case do we find a market mechanism being adopted when the applicable pollution standard remains uncertain or yet to be determined.

Fourth, there is no consistent theme regarding the scope and severity of the external costs addressed by these various market mechanisms. Four of the five air programs are nationwide in scope. Two of these programs, the lead and CFC/Halon phasedowns, involved chemicals generally conceded to involve serious health risks as to which safe substitute products were known to exist. The acid rain program, in contrast, addresses a highly divisive issue that pits one section of the country against another and entails mostly welfare effects as to which it took a decade to
forge a consensus in support of any regulatory action. The two remaining air programs are designed primarily to accommodate more economic growth within existing pollution standards.

The three water programs are local in scope and are limited to single watersheds. They also appear to have been designed to permit continued economic growth within existing water quality standards. One reason these water programs have remained largely dormant is that the relevant standards have been interpreted in a sufficiently flexible fashion that the conflict with further growth did not materialize.

Fifth, it is also difficult to generalize about whether new monitoring technology or other administrative innovations may be responsible in part for these market mechanisms. Interestingly, two of the air pollution programs employ advanced monitoring technology. The acid rain program applies to electric utilities, which are required by law to install continuous-emissions-monitoring systems (CEMS) to monitor both SO₂ and CO₂ emissions. These systems, which cost about $120,000 per utility, give the EPA "accurate data on tons emitted and make[] it possible to run the [acid rain program] effectively from the federal level."

Similarly, the RECLAIM program requires either CEMS for large sources or continuous-process-monitoring systems for smaller sources. Other air programs, however, rely on old-fashioned double entry bookkeeping to monitor compliance. The lead phasedown and CFC/Halon phasedown both utilized simple self-reporting forms submitted by the parties to trades, which were then audited by regulators to assure a matchup. Evidently there was no direct monitoring of sources. The water programs rely on the same system of irregular administrative inspections utilized in connection with command-and-control requirements.

In sum, Svendsen’s survey shows that command-and-control regulation continues to dominate in all areas of U.S. pollution control policy; market mechanisms are exceptional. As to the handful of market mechanisms that exist, two generalizations hold true. First, these programs always proceed by creating grandfathered transferable permit programs.


50. See SVENDSEN, supra note 26, at 113–21; Bartfeld, supra note 30, at 83–88.

51. See SVENDSEN, supra note 26, at 124.

52. See id. at 93, 96.

53. Id. at 96.

54. See id. at 109.

55. See id. at 87, 91.

56. See id. at 114, 117, 120.
Second, they are based on pollution control standards that have been authoritatively established before the market mechanism is put in place. Otherwise, the scope and severity of the pollution problems addressed and the technology used to monitor compliance and otherwise implement these programs defy generalization.

IV. WHAT FORM MARKET MECHANISMS TAKE

In seeking to explain market mechanisms, the logical sequence would be to consider first why market mechanisms are rarely adopted and then to ask what form they are likely to take when they are adopted. I will, however, reverse the order of inquiry here for two reasons. First, there is always something to be said for addressing the easy question first. The "what form" question has a clear and uniform answer—grandfathered permits are always the market mechanism of choice—and it is not difficult to devise an explanation as to why this should be so. Second, once we have identified the factors that cause grandfathered permits to be preferred over other market mechanisms, we will have some clues that help unlock the puzzle of why market mechanisms generally remain a relatively marginal phenomenon in environmental law. Let us begin, then, by asking which of the two theories described in part II best explains the form that market mechanisms take.

The first candidate for an explanatory theory—the wealth-maximization theory—cannot account for the strong and consistent preference for grandfathered permits over pollution taxes and auctioned permits. In terms of effectiveness in reducing pollution, the calculus as to whether taxes or tradable permits are preferred depends in part on assumptions about the slope of the marginal benefit and marginal control cost curves, making a priori judgments impossible. Taxation is sometimes said to have an advantage when we know the marginal costs of pollution but do not know the marginal control costs because we can set the tax at a rate equal to the marginal costs of pollution and allow polluters to compare the tax to their own marginal control costs. On the other hand, when the desired level of pollution is established on some basis other than the marginal costs of pollution, tradable permits have the advantage: we can reach the desired level of pollution simply by printing the right number of permits, whereas the use of taxes in this context may make it necessary to adjust tax rates before the right level of pollution is reached. Whatever we make of these differences, however, they at most explain a preference for Pigouvian taxes over permits (or vice versa).

They cannot explain why one type of permit system (for example, grandfathered permits) is consistently preferred to the other options.

In terms of management costs, pollution taxes entail the costs of monitoring emissions and imposing and collecting taxes—costs that presumably would be borne by the public sector. But tradable permits entail similar costs. Monitoring is necessary here, too, to insure that sources are in compliance with permits, and it is necessary to expend resources in establishing a market in permits and engaging in trades. Some of these costs would be borne by the public and some by private parties. Again, there is little basis for thinking that the management costs associated with one type of market mechanism (e.g., grandfathered permits) are materially lower than those associated with other types of market mechanisms, such as might account for a universal preference for one relative to the others.

In the end, the wealth-maximization theory is simply too crude to permit fine-grained distinctions between policy instruments like pollution taxes and marketable permits. The theory permits us to identify the circumstances when some kind of property-rights regime will emerge. But it has little or nothing to say about exactly what kind of regime will be adopted. This feature is present in Demsetz’s original paper, where he noted that his theory could not predict whether property would take the form of private property, community property, or state-owned property.59 Similarly, Carol Rose notes that the question of what form a PROP regime takes is “[a]n especially divisive issue” that is “likely to be hotly contested.”60 But she does not suggest that her theory aids in predicting how the issue is likely to be resolved.

The distributional theory, in contrast, provides a ready explanation for the uniform preference for grandfathered permits over Pigouvian taxes and auctioned permits. Recall that under the distributional theory, the factors that determine a group’s influence in the political process include (1) the costs of organizing the group for political action; (2) the per capita stakes among the members of the group with respect to the particular issue; and (3) whether the interests of the group members are uniform or in conflict with respect to the issue.61

One group that has a vital interest in any effort to establish market mechanisms is the firms that engage in polluting activities. Adoption of any market mechanism means these firms henceforth will have to pay (either through taxes or purchased permits) for the privilege to pollute. The foregoing factors suggest that this group will exert strong political pressure in opposition to any proposal for Pigouvian taxes or auctioned

59. Demsetz, supra note 8, at 359; see also Steven N.S. Cheung, The Transaction Costs Paradigm, 36 ECON. INQUIRY 514, 515 (1998) (noting that the neoinstitutionalist paradigm covers all types of institutions for allocating resources, not just private property and markets).
60. Rose, Rethinking Environmental Controls; supra note 7, at 22.
61. See supra note 17 and accompanying text.
permits but is likely to have a much more equivocal response to grandfathered permits. Thus, if market mechanisms are to be adopted, grandfathered permits will encounter less resistance than the other types of market mechanisms.

To see how distributional impacts dictate the choice of regulatory instruments, consider first a Pigouvian tax scheme. Under such a scheme, pollution from any source is assessed a tax per unit of pollution, payable to the government. The tax creates an incentive to reduce emissions to avoid paying the tax. Thus, sources will presumably install control devices, change inputs, relocate, or shut down so long as the costs of these control measures are less than the costs of paying the tax. Unless the tax is set at an extraordinarily high level, however, there will always be some residual level of pollution from some firms as to which it is cheaper to pay the tax than to abate the pollution. Any company that emits such residual pollution must pay taxes. Unless market conditions permit firms to increase prices to cover the per-unit cost increase caused by the tax, they must either reduce output or suffer a loss in profits.

One would predict that polluting firms will be strongly opposed to a pollution tax and will exert considerable influence in opposition to such a tax. The polluting firms are likely to be members of a preexisting trade association, making the costs of organizing for political action with regard to the tax relatively low. It is true that different firms in the industry will face different levels of taxation. Firms that have high control or exit costs will face higher taxes; firms with low control or exit costs will face lower taxes. Presumably, however, all firms that do not relocate or shut down will face some positive level of taxation; hence, all will perceive that they have negative stakes in the proposal. And because all firms will be harmed or inconvenienced, at least to some degree, the firms will largely be aligned in opposition to the tax. Industry solidarity in seeking to defeat the tax should, therefore, be high. All this should translate into strong and effective industry opposition.

Compare now the situation that prevails in the face of a proposal to adopt tradable permits. Such a system should reduce emissions just as effectively as a pollution tax. If the number of permits is set at the desired level of pollution, emissions must be reduced to that level because no firm can emit without a permit. In deciding how to respond to such a scheme, each firm will compare the costs of reducing emissions to the costs of acquiring a permit and will reduce emissions until the control costs equal or exceed the costs of acquiring a permit. In equilibrium, the price of a permit should thus just equal the marginal cost of control at the level of emissions established as a goal of the system.

62. See supra note 2 and accompanying text.
Although the regulatory effect of a permit system is generally the same as that of a pollution tax, the distributional consequences can be very different. Under a tax scheme, the charges for engaging in residual pollution are paid to the government. Under a permit scheme, the charges for engaging in residual pollution are paid to the holders of unused permits. If permits are auctioned by the government, then the distributional consequences of the two programs are the same. But if the permits are issued on a grandfathering basis—that is, they are given away free of charge to incumbent polluters in proportion to some baseline of emissions that exists before the scheme is initiated—then the incumbent polluters receive new wealth from the system. In effect, the permits are like bonds printed by the government and given to the industry incumbents in accordance with their previous pollution levels.

From a distributional perspective, therefore, a grandfathered permit scheme looks very different from a pollution tax or an auctioned permit scheme. Industrial polluters will no longer face uniform high and negative stakes. For some polluters—those that face the highest control or exit costs—the program may still pose the threat of lost profits. But for others—those that can reduce pollution at low cost or were planning to shut down in any event—the program may actually leave them in a better position. They will need to use only a portion of their permits to cover their residual pollution and can sell the unused permits for cash. For such firms, a tradable permit scheme operates as a government subsidy. Given that the stakes are no longer uniformly negative, a tradable permit scheme is likely to fracture group solidarity among polluters. Incumbent polluters that receive the free permits and have no plans for expansion of output will tend to support the scheme. Firms contemplating expansion or planning to enter the market will oppose the scheme.

In short, distributional theory suggests that tax schemes and auctioned permit schemes fail because they encounter the strong and united opposition of existing sources of pollution. Grandfathered permit schemes succeed—at least some of the time—because the subsidy inherent in the distribution of free permits leaves some segments of industry better off, which shatters the industry’s united opposition.

I should note that it is possible to imagine tax schemes that have the same distributional features as grandfathered permits and hence the same predicted consequences. For example, one could adopt a Pigouvian pollution tax coupled with a provision that would rebate the proceeds of the tax to incumbent firms in proportion to some baseline of emissions before the tax was imposed. This would mirror the efficiency and distributional effects of a grandfathered permit scheme. The reason we do not see such schemes in lieu of grandfathered permits presumably relates to the general hostility in the American political system toward taxes and to the greater visibility of the subsidy to incumbents if delivered in the form of a rebate as opposed to a free permit.
Let us now turn to the more difficult question: why market mechanisms are utilized so infrequently in environmental law. Here, the wealth-maximization theory makes a more serious bid for explanatory superiority. Recall that under Professor Rose's framework, market mechanisms not only are assumed to be more effective in reducing pollution than command and control but also are assumed to be more expensive in terms of management costs. Given these assumptions, we can hypothesize that market mechanisms are used infrequently because environmental resources are not, as a rule, under sufficient pressure to warrant the adoption of market mechanisms. In other words, the basic reason command and control remains dominant is that pollution is not bad enough. Command and control will be displaced by market mechanisms only if the pressure on environmental resources becomes worse and/or the costs of implementing market mechanisms are reduced. It follows that in those areas where market mechanisms have been adopted, we should find that pressure on environmental resources is especially intense or that new monitoring devices or other administrative innovations have occurred that have reduced the costs of adopting market mechanisms or both.

Some of the American experience with market mechanisms is consistent with the wealth-maximization hypothesis. Here, it is important not to lose sight of the big picture. There is no question that new regulatory regimes to control pollution have emerged in the last twenty-five years, and these regimes are a response to the public perception that environmental degradation is a more serious problem than earlier generations had believed. Broadly speaking, therefore, the environmental revolution that started in the 1970s—featuring a new public sensitivity to the importance of environmental values followed by the adoption of elaborate regulatory regimes designed to improve environmental quality—is consistent with the wealth-maximization theory, as explicated by Rose. Moreover, there is some evidence suggesting that market mechanisms are associated with especially severe environmental problems, such as the lead additives scheduled for elimination by the Lead Additives Program and the ozone-depleting gases scheduled for elimination under the Montreal Protocols. Finally, evidence exists that market mechanisms have been facilitated by the development of new and more effective monitoring technology, such as CEMS.

64. See Rose, Rethinking Environmental Controls, supra note 7, at 22.
65. See generally id.
68. See Svendeson, supra note 26, at 96–97.
Overall, however, it would be a considerable stretch to insist that there is any kind of consistent correlation between the severity of pollution or the adoption of new administrative technologies and the use of market mechanisms. Market mechanisms have been adopted in circumstances where the evidence of harmful health effects is equivocal at best (acid rain and state water quality standards), and they have been adopted in circumstances where administrative techniques, including monitoring, remain primitive if not nonexistent (the Lead Additives Program, the CFC/Halon Program, and the water programs). Thus, our experience with market mechanisms to date (admittedly too limited to provide conclusive proof one way or another) offers little support for the hypothesis that market mechanisms emerge because of increasing pressure on environmental resources and/or innovations that reduce the costs of implementing such programs.

Can the distributional theory do better? Building on the discussion in part IV, I think it can. As we saw in that discussion, there will be some industry opposition to any type of market mechanism. Opposition to pollution taxes and auctioned permits will be intense because the stakes in such a program are uniformly negative for industry. These programs face tough sledding. Opposition to grandfathered permits will be more muted and mixed. Still, we can expect opposition to these programs from those firms with high control or exit costs or firms with plans for future expansion.

But to say that there will be some industry opposition to any market mechanism tells only part of the story. Presumably, there will be industry opposition to any costly environmental regulation, including command and control. Thus, the fact that there is partial industry opposition to grandfathered permits cannot explain why grandfathered permits triumph so rarely when pitted against command and control. To explain why command and control remains the dominant mode of environmental regulation, we must introduce the interests of other relevant actors. I will here consider two: local service providers, of whom unionized labor is the most prominent but not the only example, and environmentalists.

The role of the local service providers is particularly intriguing. To a large degree, the system of command-and-control regulation adopted at the federal level in this country in the 1970s can be seen as a form of local economic protectionism. That system imposed uniform federal emissions standards on major industrial sources wherever located, and it focused overwhelmingly on standards for new sources—new stationary

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69. Other examples of local services providers include virtually any group that supplies services at the local level to polluting facilities and the employees who work there, ranging from dry cleaning shops and restaurants to accountants and lawyers.

sources of air and water pollution, new automobiles, new pesticides, and so forth.\textsuperscript{71} Incumbent sources of pollution escaped more lightly or were not regulated at all. This system permitted the introduction of a degree of environmental control while largely neutralizing environmental standards as a potential cause (or excuse) for industry to relocate to other regions of the country in search of lower compliance costs.

Under a command-and-control regime that applies nationwide and places all its emphasis on new sources, the optimal strategy for a polluting firm is to stay put and to continue to operate older polluting plants as long as possible. This, of course, also protects the interests of local service providers in older polluting industries, which tend to be concentrated in the "rustbelt" states of the Midwest and North Atlantic. In contrast, allowing standards to vary by region or imposing controls on existing sources could trigger industrial out-migration in search of lower compliance costs. Such an industrial "race to the bottom" has been a matter of concern to unions, in part because areas with lower compliance costs are less likely to be unionized and in part because new workers tend to be younger, and younger workers are less likely to be interested in unions.\textsuperscript{72}

Note that grandfathered permits do not protect against industrial out-migration the same way that nationally uniform command-and-control regimes do. Grandfathered permits contain a local protectionist element. Incumbents receive subsidies, new entrants from the outside do not, and these subsidies clearly give incumbents a financial advantage. But grandfathered permits provide no incentive for incumbents to stay put. Indeed, they provide something of the opposite incentive, insofar as firms that shut down or move no longer need their permits and hence can sell them for cash. In other words, the subsidy element in traditional command and control applies only if an incumbent firm stays put and remains in operation. The subsidy element in grandfathered permits, in contrast, is portable: it applies to any polluting incumbent whether the incumbent stays, moves, or closes its doors altogether.

In light of this critical difference in the nature of the subsidies to polluters associated with the typical command-and-control regime (with its new/old distinction) and the typical market mechanism (with its grandfathered permits), it is not surprising that local service providers strongly prefer command and control. Local service providers above all

\textsuperscript{71} See generally Peter Huber, \textit{The Old-New Division in Risk Regulation}, 69 VA. L. REV. 1025 (1983).

\textsuperscript{72} Whether environmental control costs could in fact produce a race to the bottom is a matter of some doubt. See Revesz, supra note 70, at 1211-12; Richard B. Stewart, \textit{Environmental Regulation and International Competitiveness}, 102 YALE L.J. 2039, 2058-59 (1993). Suffice it to say for present purposes that there has been a widespread perception among local service providers that compliance cost differentials could lead to industrial out-migration. This perception continues to carry considerable weight in policy discussions—for example, with respect to whether U.S. participation in free trade agreements might lead to a shift of industrial jobs to countries with more lax environmental standards. See Thomas W. Merrill, \textit{Golden Rules for Transboundary Pollution}, 46 DUKE L.J. 931, 969 n.186 (1997).
else want incumbent polluters to stay put and remain in operation. Command and control creates just such an incentive. Market mechanisms, in contrast, create an incentive for plant closures.

If this is plausible, then distributional theory might offer the following story to explain the pattern of the law. In the 1970s, incumbent industry teamed up with local service providers in support of command and control. This protected industry incumbents from new entrants and protected the interests of the local service providers threatened by out-migration of industry. As time moved on, however, some incumbent polluters began to see greater advantage in grandfathered permits. One reason was that the industrial plant of the rustbelt simply became too old to remain competitive in the global marketplace. Industry had to modernize, whether it moved or stayed put. Either way, it would be subject to tough new source standards under the command-and-control regime. So the value of the protectionist element associated with command and control faded away. Another reason was that the environmental movement began to secure support for goals that required drastic controls by incumbent plants. The lead additive phaseout, the CFC/Halon phaseout, and meaningful acid rain reductions could not have been pursued without dramatic reductions in emissions by incumbent polluters. With respect to these sorts of initiatives, the new source/old source game was dead and with it whatever implicit subsidy remained from command and control.

These developments drove a wedge between the interests of incumbent industries and local service providers. Some members of industry no longer saw much to be gained from command and control and came to prefer grandfathered permits, which offer portable subsidies. Local service providers, of course, continued to prefer command and control, precisely because it does not offer any portable subsidy. By and large, this group has retained sufficient influence to block any large-scale movement away from command-and-control toward market mechanisms. Nevertheless, industry has scored isolated successes with grandfathered permits, especially where new programs were adopted requiring significant cutbacks from existing sources of pollution.

How do the environmentalists fit into the picture? Traditionally, environmentalists have embraced command and control and have opposed market mechanisms. Economists who tout market mechanisms have been puzzled by this, since market mechanisms are in theory more effective than command and control in achieving any given emissions standard. A permit scheme, for example, will always achieve its stated goal as long as permit conditions are enforced, and new permits are not printed. In contrast, command and control rarely achieves its stated objectives because variances and incomplete enforcement result in some

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73. See, e.g., Ackerman & Stewart, supra note 3.
slippage from regulatory standards. If environmentalists really care about the environment, the economists ask, why would they oppose what promises to be the more efficacious regulatory tool?

More recently, there have been signs of change in the environmentalist position. The Environmental Defense Fund broke ranks in the late 1980s and played an instrumental role in designing and promoting the tradable permit scheme of the Acid Rain Program.\(^7\) The official position of the Sierra Club and the Natural Resources Defense Council is today moderately supportive—roughly to the effect that well-designed and vigorously enforced market mechanisms can play a positive role in the overall system of environmental protection.\(^7\) What accounts for this cautious change of position, and how does the environmentalist position factor into the larger picture with respect to the use of market mechanisms?

Some insight here can be gathered by looking closely at the eight programs in which market mechanisms have been adopted. As noted in part III, these programs have arisen only after a consensus has been reached regarding the appropriate degree of emissions reduction. The most dramatic examples are the lead additive phaseout and the CFC/Halon phaseout. In both instances, an authoritative political decision was taken to reduce emissions of these substances to zero over a relatively short period of time.\(^7\) Environmental groups could hardly object to these decisions—they were major environmentalist victories. Given these victories, the question then became: what is the most efficacious way of getting to zero in a relatively short period of time? At this point, environmentalists readily acquiesced in the use of market mechanisms, presumably because they implicitly agreed that this would be the most effective way of reaching these goals.

A similar story can be told about the Acid Rain Program. Debate raged for over two decades about what, if anything, to do about acid rain.\(^7\) Eventually, Congress rather arbitrarily decided that emissions of sulfur dioxide would be cut in half over ten years from a baseline level in the later 1980s.\(^7\) Once this political commitment was taken, market mechanisms emerged as the choice for achieving this goal most efficaciously.

The other existing market mechanisms have also been put in place only after applicable ambient or emissions standards have been determined on independent grounds. For example, the three water pollution programs all arose after state water quality standards had been fixed, and the problem was how to achieve those standards without driving point

\(^7\) See Hahn & Stavins, supra note 7, at 24; Keohane et al., supra note 7, at 354.

\(^7\) See SVENDSEN, supra note 26, at 138.


\(^7\) See REGENS & RYCCROFT, supra note 48, at 4; Waxman, supra note 48.

sources of pollution out of business. Each program was designed to allow point sources to trade with nonpoint sources, where this would result in equal or greater progress toward achieving the standards at lower cost to the point sources.\footnote{See Effluent Trading in Watersheds Policy Statement, 61 Fed. Reg. 4994, 4996 (1996); Bartfeld, supra note 30, at 58.}

I would draw the following tentative conclusion from these reflections about the environmentalist position. Environmentalists have long opposed and continue to oppose setting emissions standards based on cost-benefit analyses.\footnote{Lynn Blais, writing in this issue, offers some reasons supporting this perspective. See Lynn E. Blais, Beyond Cost/Benefit: The Maturation of Economic Analysis of the Law and Its Consequences for Environmental Policymaking, 2000 U. ILL. L. REV. 237.} They prefer that standards be set without regard to economic costs on the basis of adequate protection of the public health, ecosystems, or particular species. In the formative years of the environmental movement—the 1970s—market mechanisms were espoused by persons who also espoused cost-benefit analyses.\footnote{See, e.g., WILLIAM F. BAXTER, PEOPLE OR PENGUINS? THE CASE FOR OPTIMAL POLLUTION (1974).} Hence, environmentalists opposed market mechanisms because they saw them as legitimizing cost-benefit analyses. Command and control, in contrast, was espoused by persons who supported health-based or environment-based standards. Thus, environmentalists were naturally more comfortable with the advocates of command and control.

As the years went by, particular situations arose in which environmentalists had already won the debate over standards, or the debate had already been resolved via political compromise. Environmentalists came to see that in these situations it was safe to endorse or at least acquiesce in the usage of market mechanisms, since they would function solely as a means to an end and would not undermine the environmentalist position regarding the proper metric for setting standards.\footnote{For succinct statements of this position by pragmatic environmentalists, see DANIEL A. FARBER, ECO-PRAGMATISM: MAKING SENSIBLE ENVIRONMENTAL DECISIONS IN AN UNCERTAIN WORLD 119 (1999); Richard J. Lazarus, Public Versus Private Environmental Regulation, 21 ECOLOGY L.Q. 438, 440 (1994).} Thus, in these situations, and these alone, we see significant environmentalist support for market mechanisms.

When we combine these accounts of the positions of three major institutional players—industry groups, local service providers, and environmentalists—we can patch together a somewhat complex but plausible account of why market mechanisms today play a small but not entirely inconsequential role in American environmental law. Environmental law began in the 1970s with a kind of "bootleggers and Baptists"\footnote{Bruce Yandle, Bootleggers and Baptists in the Market for Regulation, in THE POLITICAL ECONOMY OF GOVERNMENT REGULATION 29, 33 (Jason F. Shogren ed., 1989). The phrase "bootleggers and Baptists" is based on the claim that Sunday closing laws are enacted with the political support of two otherwise antagonistic groups—distributors of illegal liquor and teetotalers.} alliance centered on support for command-and-control regulation. Incumbent in-
industry supported the regime because it imposed higher costs on new entrants and thus granted a measure of protection to incumbents. Local service providers supported the regime because it discouraged out-migration of industry and hence protected existing demand for unionized workers and other local inputs. Environmentalists supported the regime because it avoided any suggestion that standards should be fixed with economic costs in mind.

When we flash forward twenty-five years later, we see that this alliance has frayed considerably, but the result is more deadlock than a new consensus for action. Local service providers remain fully committed to command and control and dislike grandfathered permits because they underwrite out-migration. Much of industry has been weaned from command and control and now supports grandfathered permits. This change occurred because industry realized that it had to modernize or move to lower cost production areas, and grandfathered permits provide portable subsidies. Environmentalists hold the balance of power. They remain unalterably opposed to any injection of economic reasoning into the standard-setting process. But in select areas where standards have been fixed and are no longer contested, they are willing to back the use of market mechanisms. Thus, the moderate movement toward market mechanisms in recent years more or less parallels the moderate degree of support for these instruments we find in the environmental community.

VI. CONCLUSION: TOWARD AN EXPLANATORY SYNTHESIS

My search for an explanation of the role of market mechanisms in environmental law has been framed in terms of a sharp dichotomy between wealth-maximization theory and distributional theory. But it may have occurred to the astute reader that there is no necessary conflict between these two explanations. To the contrary, it may be that both explanations are right, or at least partially right, and that the best explanation would entail some synthesis or combination of the two theories. Such a synthesis is intuitively plausible. It seems unlikely that society would devote substantial resources to establishing a new type of environmental control regime if the benefits of such a regime did not exceed or at least cover the relevant costs. On the other hand, it also seems plausible that society will not embrace a new type of environmental control regime if powerful groups stand opposed to such a transformation.

We have a model of sorts for such a synthesis in the work of Gary Libecap. Especially in his work on the history of property rights in natural resources, Libecap has stressed both the importance of the aggregate gains from changes in the structure of property rights and the importance of "devising politically acceptable allocation mechanisms to assign

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84. See id. at 34–35.
85. See LIBECAP, supra note 18, at 4–7.
the gains from institutional change while maintaining its production advantages." As he has argued, it is not enough to identify an alternative institutional arrangement, such as unitization of oil and gas pools, that promises to increase aggregate social welfare. If powerful groups have a stake in a system of separate ownership of oil and gas rights, they will resist such a change unless they can be assured that they will end up at least as well off after unitization as they were under separate ownership. In other words, wealth-maximizing changes in institutional arrangements cannot be secured unless some device for solving distributional issues is included in the mix.

A similar analysis applies to environmental law regimes. Take a phenomenon like transboundary pollution. It may well be that some sort of regulatory regime that limits transboundary pollution would increase the joint welfare of the source state and the affected state. But if such a regime creates net benefits for the affected state but only net burdens for the source state, the source state will resist cooperating in the creation of such a regime unless some mechanism for compensating it— for transferring a portion of the affected state's gains back to the source state—can be devised. Again, distributional problems must be overcome to achieve joint wealth maximization.

The slow emergence of market mechanisms in environmental law may perhaps also be best explained using a similar synthetic model. Carol Rose has made an important contribution in reminding us that even regimes that appear to be more cost-effective in limiting pollution will usually not be adopted if the management costs of operating those regimes exceed the allocative efficiency gains. Thus, one reason market mechanisms have not been more widely adopted may be that the management costs are just too high. Achieving a significant increase in social wealth is probably a necessary condition for any movement from command-and-control to market mechanisms, and it may be that the gains in social wealth are not as large as the enthusiastic proponents of market mechanisms have made them out to be, once the management costs are fully considered.

On the other hand, the distributional theorists are surely correct that to achieve a transformation in regulatory policy from command-and-control to market mechanisms, it will be necessary to "buy off" the most

86. *Id.* at 5.
87. *See* *id.*
88. *See* *id.* at 93–114.
89. *See* Merrill, *supra* note 72, at 975.
90. *See* *id.* at 972–84.
92. To be sure, it is not unthinkable that an environmental regime like market mechanisms might be adopted solely for distributional reasons—after all, history is littered with examples of tariffs and legally enforced cartels that can only be explained on distributional grounds. But it is difficult to identify any party that is benefited to such a great extent by market mechanisms that this kind of dynamic would be plausible.
important affected groups that have a vested interest in the command-and-control regime. A critical element in any such strategy appears to be grandfathering—awarding the initial permits that are to be traded to existing polluters free of charge. Grandfathering purchases the support of a critical group or at least a significant subset of a critical group—incumbent polluters. Without the subsidy reflected in free permits, this group would almost surely oppose any movement to replace command-and-control regulation with pollution taxes or auctioned permits.  

It is less clear how the support of other key players can be secured for the movement from command-and-control to market mechanisms. As we have seen, there is some evidence that the environmental community will insist on a precommitment to strict pollution control standards as a condition of their supporting any program of market mechanisms. Offering such commitments might bring more environmentalists into the market-mechanism camp, but these promises are not inexpensive. Polluters are unlikely to go along with making extravagant commitments, which could easily wipe out any advantage they gain from the implicit subsidy associated with market mechanisms. Overcoming the opposition of local service providers is even more problematic. Unless and until some method of neutralizing their opposition can be devised, they are likely to remain firmly wedded to the cause of command and control.

The best prognosis overall is probably that market mechanisms will see relatively limited use in the near future, notwithstanding the overwhelming consensus among economists that they are more efficient at achieving any desired level of pollution control than is command-and-control regulation. One problem with the economic argument is that it ignores the management costs of market mechanisms. Another problem is that it ignores distributional realities. Both problems will occasionally be overcome, but it will require considerable ingenuity to find solutions that apply across the board.

93. Another potential advantage to distributing free permits to existing polluters is that it awards to a "residual claimant" the social gains created by the formation of the property rights system. It has been argued that residual claimants will have an incentive to conserve the resources used in the process of establishing property rights as compared to nonclaimants (e.g., government officials). See Terry L. Anderson & Peter J. Hill, Privatizing the Commons: An Improvement?, 50 S. ECON. J. 438, 439 (1983).