

Public Choice and Environmental Policy: A Review of the Literature

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I. Introduction: Public Choice and Environmental Policy

This chapter reviews the contributions that public choice research and scholarship have made to our understanding of the decisions of governments responding to environmental issues. The literature examined concentrates on domestic policy making within the United States, although occasional reference is made to the growing literature that studies European and international decision making. Much of this literature is theoretical, while a growing portion of it is descriptive. At the same time, public choice analyses are routinely invoked in discussions about the appropriate role of government in addressing environmental problems, where the implications of this literature takes on normative implications as well. This chapter considers the theoretical, the descriptive and the normative dimensions of the literature.

A portion of the public choice literature, especially some of its influential early work, depicts government as a system in which all participants ignore welfare-improving actions in favor of ones that advance their own narrow self-interests, and where participants representing economically powerful special interests predominate. The results are government decisions that routinely benefit industry and concentrated wealth at the expense of broad citizen concerns about environmental quality. The normative implication seems clear: Anyone concerned with the public interest or simply opposed to being victimized by the self-interested motives of someone else ought to avoid putting important environmental decisions in the hands of such a system, if possible.

More recent work has exposed several flaws in this descriptive account. One constant throughout the literature insists on examining “politics without romance,” by maintaining the hypothesis that public officials do not someone magically abandon their own interests upon assuming their public responsibilities in order to embrace an entirely public-minded agenda. Even so, research now strongly suggests that -- while self-interest remains a powerful presence in politics -- public officials also act on their own convictions, including their convictions about the public good, and their decisions can reflect broad-based public interests as well as narrow, concentrated economic interests. A further refinement, which partially explains this more nuanced view of elected officials, comes from studies showing that broad-based interests are sometimes capable of effectively projecting their interests into the public arena, a possibility that the early public choice literature discounted too quickly. These refinements have several important payoffs. As a descriptive matter, models that account for the influence of broad-based interests as well as for the tendency of public officials to respond to mixed motives do a better job predicting the outcomes of government decisions than those that do not (Farber & Frickey 1991, p. 33), and hence form a sounder basis for normative

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discussions of government performance. (Jim Rossi describes a similar trajectory and makes similar observations about improved descriptive accuracy in his chapter on energy regulation and deregulation, this volume.) Furthermore, public choice has always claimed a methodological commonality with neoclassical microeconomics and its study of markets, yet the models upon which the bleak picture of government have been based were methodologically incompatible with market theory. Some of the most important methodological inconsistencies are corrected by these refinements. Finally, the normative implications of these improved descriptive accounts change.

Public choice research has had a long engagement with environmental issues. In a sense, the two grew up together. The modern environmental era in the United States was launched in the late 1960s and early 1970s, with Congress first enacting an impressive number of important environmental statutes and then the Environmental Protection Agency and other federal agencies promulgating extensive regulations to implement those statutes. In just this same time frame, seminal works in public choice's study of legislation and regulation were being published, such as Mancur Olson's *The Logic of Collective Action* (1965) and George Stigler's "The Theory of Economic Regulation" (1971). These early works focused on the then-dominant forms of federal economic regulation, but soon a large public choice literature developed applying the ideas of these early works to the expanding world of environmental regulation.

Even before public choice engaged with environmental issues, its intellectual predecessor, microeconomics, had already done so, but for very different reasons. Microeconomics' axiomatic account of how ideally functioning markets can produce a social maximum naturally invites inquiry into whether actual markets conform to the conditions necessary to achieve such a maximum. One of the necessary conditions is the absence of externalities of the sort that environmental problems typically exemplify. It was thus nearly inevitable that microeconomics' study of market failure would generate recommendations specifically aimed at improving market performance in the presence of environmental externalities, eventually producing a tool kit that includes pollution taxes, fee systems, marketable permits, and expansion of private ownership as means to improve the performance of markets in the face of such externalities.

Because the idea of a society getting the most it can out of the use of scarce resources is normatively attractive, advocates of measures like these frequently appealed to public decision makers to adopt them. More often than not, these recommendations did not receive warm receptions, as legislatures and agencies pursued quite different approaches to regulating the environment. Public choice enters the story at this point, offering to explain why the recommendations of its market theory colleagues are so frequently ignored. Unlike microeconomics, however, public choice did not first develop an axiomatic account of the ideal conditions that would produce socially optimal government decisions and then ask how the conditions under which actual governments operate may cause governments to fall short of the ideal. Arrow's impossibility theorem taught that it was impossible to identify socially attractive conditions within which any

decision making mechanism could simply aggregate individual public preferences based on votes, analogous to the way in which markets can aggregate individual private preferences based on willingness to pay. Instead, public choice approached government by taking the individual behavioral assumptions that microeconomics uses in market settings, applying them to public decision makers, and seeking to understand what kinds of decisions would result. The prediction that emerged was that such government decision makers would systematically exploit their government positions for their own gain – just as market actors are assumed to do – but that the government setting lacked a comparable invisible hand to produce socially desirable outcomes from these privately motivated actions. So, unlike microeconomics’ treatment of markets, public choice lacks any general account of the conditions that could theoretically produce such normatively attractive results, and it does not generally generate recommendations for how government decision making can be improved. Instead, it offers accounts of government failure, predicting that government decisions will deviate from the socially optimal because the decisions will be dominated by narrow, well-endowed interests that are best equipped to advance the self-interest of government decision makers. Its take away message from these predictions echoes the conclusion of President Reagan in his first inaugural address: “government is not the solution to our problems, government is the problem.”

That normative message obviously depends upon the reliability of the descriptive account. If government does not in fact respond to problems as public choice models predict, there is less reason to endorse recommendations that are based on those very predictions. Environmental problems and the numerous programs that governments have enacted and implemented in reaction to them provide a fertile proving ground for public choice’s descriptive account, and hence also for refining its normative message.

The following two sections elaborate upon how the connection between the study of market failure and the study of government failure has evolved. Early public choice theorists observed that governments frequently failed to follow the advice of market theorists in their responses to correcting for environmental externalities, and offered a theory of government failure as an explanation. After tracing this relationship in Sections II and III, Section IV identifies two ways in which the earliest descriptions offered by public choice were actually inconsistent with its own professed methodology. When these theoretical flaws are corrected, public choice’s descriptive models improve. Sections IV and V review the literature regarding four significant questions common to much environmental policy making, illustrating the evolution of public choice contributions to our understanding of environmental policy making. The final section offers suggestions for further research.

II. Markets, Market Failure and the Environment

Microeconomics grounds market theory on a parsimonious set of assumptions. It assumes that individuals are rational in that they have a coherent set of preferences. This starting point only concerns the structure of individual preferences and assumes nothing about the content of those preferences. Regarding what people actually prefer, the

guiding principle is *de gustibus non est disputandum* – there is no questioning someone’s tastes. As for how preferences are structured, “coherence” assumes that individuals can rank order their preferences in a way that avoids inconsistencies such as preferring A to B, B to C and then also C to A. Beyond these assumptions regarding preferences, individuals are also assumed to pursue those preferences by making strategic decisions: they survey the group of choices available to them and then select the one that promises the highest ranked package of preferences. Finally, if welfare is represented as preference-satisfaction, market theory demonstrates that if individuals for whom these assumptions are true exchange goods and services with each other through private exchanges that themselves must satisfy some necessary conditions, the resulting allocation of goods and services within the society as a whole will achieve a social welfare maximum, as measured by willingness to pay. It is a social maximum because any further adjustment in goods and services, such as by regulation, would leave someone with a lower ranked group of preferences than she held prior to the adjustment, without benefiting anyone else sufficiently so that the beneficiary would be willing to pay the loser enough to induce a voluntary exchange between the two. If someone had been willing to make such a payment, the exchange would have already occurred.

The price mechanisms of the market produce this result. Prices are bid up until buyers are not willing to pay a higher price because the good does not bring sufficient benefit to be worth paying more, and sellers will not drop the price to attract more buyers because the money they would get from the purchase is not sufficient to offset to costs they incur in providing the good to the buyer. Prices therefore settle at the point where marginal benefits equal marginal costs. With marginal benefits and costs equal, anyone who does not have a good is someone whose marginal benefit from attaining it (again, registered by willingness to pay) is not great enough to offset the marginal cost incurred by taking it from someone who currently has it. This implies that any transfers that are made outside the market structure will reduce social welfare and that market transactions have achieved a social welfare maximum.

Societies have goals other than allocative efficiency, including equitable or distributional goals; these goals might be served by constraining or regulating markets. Even so, market theorists often insist that constraining or regulating markets to advance such other goals is generally an inferior means of advancing those other values, because such interventions impair the market’s resource allocation capabilities, shrinking the total welfare pie. Better, in their view, that society should achieve other objectives through measures like monetary transfer programs that do not directly interfere in markets. Market regulation ought to be restricted to cases in which existing markets fall short of achieving efficient allocations, and then its objective ought to be primarily directed at corrections that will improve the allocative performance of those actual markets.

Here is where market theory engages environmental policy. One of the conditions that ideal markets must satisfy in order to allocate resources optimally is that private exchanges must not generate appreciable costs or benefits that the parties to the exchange fail to take into account. If such costs or benefits external to market transactions do exist, then the prices established by the market will not be set at the place

where marginal benefits equal marginal costs. When the transaction generates external benefits, the goal of maximizing social welfare would argue for more of the goods to be produced, because the functioning market will fail to incorporate some existing additional willingness to pay that would give sellers an incentive to produce more than they actually have. Conversely, when the transaction generates external costs, markets will overproduce, because some costs that would have reduced supply have been left out of account. In either case, markets will fail to maximize society's welfare, as represented by willingness to pay.

Economics textbooks often illustrate the problem of externalities with environmental examples. They are easy to grasp, involve familiar situations and attract student interest. For example, suppose the process that a paper company uses to manufacture paper generates pollution that flows into the neighboring river, killing fish downstream, which the population downstream would otherwise eat. If the paper company had to purchase fish from those downstream fish eaters, just as it must purchase the raw materials that it uses in producing its products, the company's costs and consequently its prices would rise and less paper – and less pollution -- would be produced. But because the fish eaters' costs are externalities, the price of paper is set too low and too much paper and pollution are produced.

Economists have long appreciated the problem of externalities and have developed a number of ideas about how to address the problem. When A. C. Pigou analyzed the problem of externalities, he saw a role for government to intervene in a positive way. "It is possible," he wrote, "for the State, if it so chooses, to remove the divergence in any field by 'extraordinary encouragements' or 'extraordinary restraints' upon investment in field." (Pigou 1920, p. 192). To address the problems created by the paper manufacturer, Pigou preferred a tax equal to the external costs to the fish eaters. With that tax in place, the price that the manufacturer agreed to in selling its product would have to be able to defray the costs that were formerly external to the transactions. Internalizing the externalities in this way would once again permit the price mechanism to set marginal benefits equal to total marginal costs, correcting the resource misallocation that the externality otherwise created.

Methods other than a tax could also be employed to approximate the results of fully internalized costs. A certain amount of pollution could simply be prohibited by the state, either plant-by-plant or in the form of a cap-and-trade program applicable to numerous sources, or particular technological methods of controlling pollution could be mandated. Provided that these techniques ended up with approximately the result that market transactions with fully internalized costs would achieve, the result would improve the existing situation in terms of allocational efficiency. Of these options, economists have generally preferred the approach of imposing a Pigouvian tax to internalize the externalities. Even when policies other than such a tax are being advocated, the underlying externality/market failure diagnosis of environmental problems has proven powerful as a powerful justification for government intervention because the diagnosis is widely taken to be reliable and improving allocational efficiency – increasing the size of the pie – is taken to be desirable, *ceteris paribus*. The market and externality-based

analysis of environmental problems has been thoroughly developed in numerous works including *The Theory of Environmental Policy*, Baumol and Oates (1975) and *Markets and the Environment*, Keohane and Olmstead (2007).

III. Government Choices, Government Failure and the Environment

Notwithstanding the cogency of the externality/market failure diagnosis and the logic behind recommendations to improve market functioning, when market theorists took their ideas into the public arena, they often came away disappointed. Government frequently failed to follow their advice. Public choice theory now enters the scene, bringing a message of explanation to their market theory colleagues. For public choice theorists, their colleagues' disappointment bordered on the naïve, because it indicated that the market theorists were "largely assum[ing] that political actors are mainly concerned with the public interest." (Tullock, Seldon and Brady 2002, p.4) While it is doubtful that many people who have actually had experience trying to persuade elected officials to act have ever been quite that naïve, taking the time to advocate a social-welfare improving government policy does seem to require a belief that public officials place some value on the public interest, that they will listen to arguments based on the public interest and that they will respond positively to them some of the time. Otherwise, why make the effort?

Some public choice theorists met even this more modest version of "public interest" theory with skepticism, however. In fact, they thought that any market theorist who approached government with this frame of mind was guilty of a certain inconsistency. When thinking about human behavior in the market context, market theory assumes human beings to be rational and motivated to maximize his or her own welfare. Those assumptions are in principle completely generalizable, seemingly having nothing to do with the immediate market setting in which the individual is making choices. To the public choice theorist, market theorists' "public interest" expectation for government behavior implicitly relies upon a bifurcated view of human behavior, in which assumptions about human motivations mysteriously change when the institutional setting changes from the market to the public arena. This more complicated view ought to require some justification. Until the advocates of the public interest theory of government have carried the burden of proof on the issue of why basic assumptions concerning human behavior should be complicated in this way, public choice theorists argued that the rational welfare maximizing assumptions ought to be maintained throughout, whether public or private decisions were being made. (Buchanan 1984, p. 13-14) Public choice proceeded to develop a theory of government performance based on applying these universal assumptions to public as well as private decision making. Where "Pigou saw government as an environmental manager, a benevolent agent unaffected by special interest demand for government favors," public choice saw government officials as self-interested. (Yandle 1999, p. 8).

Not content to defend this position simply by shifting the burden of proof to the other side, public choice theorists also set out to verify that actual government performance could be explained better if one assumed that the behavioral assumptions

that worked so well in market settings did indeed extend to public decision making settings as well. Their general claim soon generated a research program that constructed models of government and then sought to verify them. To give its work some interesting flavor, the public choice literature was also salted with numerous anecdotal illustrations of its basic thesis. For instance, Milton Friedman, whose most famous work sought to change the way in which the Federal Reserve managed the money supply, put public choice's core diagnosis in the following way:

“Only recently have I come to the conclusion that the Federal Reserve System's imperviousness to my technical advice reflects neither the wrongness of the advice nor the ignorance of the powers that be, but rather the simple fact that the self-interest of those powers and of the Federal Reserve System would not have been served by adopting that advice. Could a System that had restricted itself to maintaining a steady and moderate rate of growth in the quantity of money conceivably have acquired the prestige and influence that the System now has? Would the head of a system that had limited itself to that modest and feasible task be regarded in poll after poll as the second most powerful person in the land?” (Friedman 1985, p. 18)

Earlier, George Stigler had offered a similar diagnosis. Remarking on how economists regularly criticized regulatory agencies such as the ICC for failing to adopt measures consistent with maximizing social welfare, Stigler wrote that “this criticism seems to me exactly as appropriate as a criticism of the Great Atlantic and Pacific Tea Company for selling groceries, or as a criticism of a politician for currying popular support.” Arguments and persuasion based on the public interest are ineffective in such settings. “The fundamental vice of such criticism is that it misdirects attention: it suggests that the way to get an ICC which is not subservient to the carriers is to preach to the commissioners or to the people who appoint the commissioners. The only way to get a different commission would be to change the political support of the commission, and reward commissioners on a basis unrelated to their services to the carriers.” (Stigler 1971, p. 16)

In and of themselves, the criticisms that public choice leveled at the behavior of government were not new; when Stigler wrote, capture theory was an established school of thought within political science. Traditional capture theory, however, relied heavily upon close historical observation of prior agency behavior. (E.g., Bernstein 1955). Public choice instead sought to systematize the study of government. By postulating that the actions of governments can be explained and anticipated through an analysis that presumes that public officials are rational self-interested maximizers, public choice defines “a program of scientific endeavor that expose[s] government failure.” (Rowley 1993, Vol. I, p. xiv). Anecdotal accounts such as Friedman's and Stigler's can provide color for public choice's criticism of government but as a research program public choice theory aspires on systematic theoretical elaboration and testing.

Mancur Olson *The Logic of Collective Action* (1965) informs many of the public choice models of government action, and raises an issue that is crucially important for the analysis of environmental decision making. Olson applied rational actor, welfare-maximizing assumptions to one of the basic building blocks of politics, interest groups. Olson reasoned that the presumption of political theories of pluralism that interest groups somehow just formed around a shared concern was an inadequate explanation for why individuals would engage in costly behavior that might bestow large group benefits, but small individual benefits. By failing to analyze the problem from the perspective of a rational, welfare-maximizing individual, this approach to group formation commits the same error as the “public interest” theory about elected officials. When Olson corrected the error by analyzing the individual costs and benefits that rational individuals confront in deciding whether to act collectively or not, he predicted that groups would be hard to organize when the group activity promised to produce benefits that were spread out among beneficiaries in amounts that are small for each beneficiary. In the case of such broad-based groups, each individual would see that her contribution to the group effort had little chance to affect her own personal fortunes -- either others would contribute enough so that she could free-ride on their efforts or others would not contribute and the minimal amount she was willing to contribute would not put the effort over the top. In either case, no benefits to her would be produced by her contribution, and hence it would be irrational to join in the group effort. In contrast, smaller groups containing members who stand to gain more concentrated benefits would be better able to organize, either because a single member would have enough at stake to underwrite much of the effort individually, or because some subgroup would be small enough to overcome the transactions costs associated with reaching an agreement to pool sufficient resources to produce the benefit. Compared to broad-based groups, concentrated groups thus enjoy a comparative advantage with respect to their ability to organize to advance group interests compared to groups facing diffuse, individually small benefits.

Using Olson’s insights, Stigler argued that the regulation he observed was the logical result of the domination by the industry being regulated, a concentrated group compared to the diffuse group of consumers who might have desired welfare-improving regulation. For Stigler, “regulation is acquired by the industry and is designed and operated primarily for its benefit.” (Stigler 1971, p.3) Unlike Bernstein’s earlier thesis that regulatory capture developed as regulatory agencies matured, Stigler’s theory suggests that industry interests dominate regulatory design from its very conception in the legislature, a view consistent with revisionist histories of the ICC by Kolko (1965) and MacAvoy (1965), whose examination of the early regulatory history of the ICC led them to conclude that the ICC was created to shore up a railroad cartel that was operating privately with only moderate success.

Stigler’s rudimentary model of interest groups and regulatory agencies has been improved upon significantly, but even its primitive form embodies the distinctiveness of the public choice approach. While other students of regulation had observed the fact that regulatory decisions frequently fell short when judged against a market-correction ideal, students of public choice claim that they can provide a systematic explanation of why they do -- an explanation based on a generally applicable theory of government. The key

to the theory is that because individuals are rational and strategic, they will react in predictable ways to the choices they face: they will make the choice that maximizes their own welfare. If this is no less true in the context of political institutions than in the market, and if the sequence of choices that must be made in order to produce a political result, along with the incentives and costs presented at each choice, can be identified and modeled, political outcomes can in principle be systematically characterized and predicted. Developing adequate models of the political process has proven challenging, but so long as modeling disagreements occur within a conceptual framework that encompasses the rational actor assumption, they fit within the public choice paradigm.

The predictions about government performance that flow from Stigler's and similar models are systematically "grim" and "pessimistic" about the ability of government action to improve overall social welfare. In these models, government choices are effectively dominated by concentrated economic interests who are better able to reward government officials. (Mashaw 1997, p. 21; Eskridge 1988, p. 288; Krueger 1974). In that environment, the decision public officials make will enable concentrated interests to gain advantages that they could not achieve even in flawed markets. Overall, the effect of public choice's diagnosis of government failure "is to encourage cynicism about governmental institutions, and to promote hostility toward any invocation of the coercive powers of the state." (Merrill 1997, p. 1070)

IV. Developments in Public Choice Research about Environmental Politics

Environmental externalities are generated by phenomena that vary in their chemical, biological or physical composition, in their spatial distribution, in how long their effects endure, in the harms they cause, in the methods through which they can be mitigated or remediated, and in how costly it is to mitigate or remedy them. Government responses to them also vary, in part due to the differences in these characteristics, and in part due to the characteristics of the political environment in which the problems are addressed. Whatever the specific government responses are, they typically must face up to four basic questions: (1) whether or not government action is warranted; (2) if it is, the scope and stringency of the government action, including the manner in which a bureaucracy will implement and enforce any statutory standards; (3) the level of government that will assume responsibility; and (4) the type of regulation, or regulatory instrument, that will be employed. A considerable public choice literature examines each of these questions. The last two issues are the subject of the section following this one. This section takes up the first two. In the course of doing so, it traces two refinements in public choice theory: incorporating a more accurate understanding of the possibility for broad-based collective action, and acknowledging a broader and more realistic range for the preferences of public officials.

The earliest public choice models were also vulnerable to a number of ancillary criticisms besides those that led to these refinements. The models often treated governments as monolithic rather than structurally complex. Relatedly, many early models were entirely demand-side models – examining the nature of the demand for regulation from concentrated interests – virtually ignoring the supply side – the political

process through which regulation is produced. (Keohane, Revesz and Stavins 1997, pp. 4-5) Both of these limitations diminished the usefulness and reliability of the models. Many analysts also did not simply accept the rational actor assumption uncritically. Challenges to that assumption are, however, outside the scope of this chapter, which focuses on developments within the public choice paradigm itself. Here, the issue has not been whether rational actor models are appropriate ones for the analysis of government decisions, but rather whether or not rational actor assumptions are being properly defined and applied. In two significant respects, the most pessimistic predictions of government performance turn out to be based on work that fails to remain faithful to those underlying assumptions. The following two subsections examine how more recent scholarship has been correcting for these errors.

A. Collective Environmental Action

In the models that predict the most grim or pessimistic results from government action to protect the environment, concentrated economic interests effectively dominate. While some regulatory contexts do exhibit this kind of narrow interest group domination, to predict that this will always or routinely be so when government addresses environmental problems misinterprets Olson's collective action logic. That logic does not suggest that large diffuse groups can never effectively organize so as to counteract the influence of concentrated special interests. His argument was only that, in light of the costs of collective action, in situations where the incentives that accrue directly from such action are small, such groups face additional obstacles compared to smaller groups in which each member has a greater stake in the outcome. These conditions do not accurately describe every situation in which environmental policy is being determined, and when different conditions are present, large groups can organize effectively. Indeed, Olson's *Logic of Collective Action* contains an entire chapter exploring how large groups use incentives other than individual material benefits in order to produce collective action. Far from thinking such action to be impossible, Olson argued that further study was necessary to understand from a public choice perspective how collective action by broad-based groups succeeded. A growing literature examines how diffuse groups overcome their disadvantages to succeed in organizing in different areas, including environmental advocacy. (Chong 1991, Everett & Peirce 1992, Lubell 2002, Lubell et al. 2006)

The organizational difficulty facing collective action is structurally the same as the multi-person prisoners' dilemma often present in common pool resources problems. Consistently with the models that routinely predict agency capture, Hardin's "tragedy of the commons" suggested that all such situations lead to overuse because that is where a rational actor would see his individual self-interest to be best advanced. (Hardin 1968). Once again, however, research such as Elinor Ostrom's demonstrates that groups can find means to manage the environmental problems associated with common pool resources to avoid the tragedy. (Ostrom 1990) Whether any particular group succeeds depends on the presence of favorable conditions, making cooperation in any specific setting an empirical question. The situation with diffuse groups in other environmental policy settings is analogous. Under favorable conditions they can and do organize and then can influence

public decision making. When diffuse groups do succeed in effectively organizing, the most pessimistic predictions of government failure will not be correct.

The common pool resources literature and the literature on social movements demonstrate both theoretically and empirically that individuals can overcome collective action problems to pursue environmental objectives and that large, broad-based environmental groups can organize to achieve collective goals. Does this ability carry over into the political and regulatory arenas where Stigler and others were so confident that concentrated economic interests would necessarily dominate? The answer is yes, if conditions are right. On the one hand, environmental organizations have never been able to compete with the coalitions and organizations representing industries and commercial organizations in terms of the financial benefits they can provide for elected officials. On the other hand, if their numbers are large enough, environmental groups have available to them effective resources that small groups may lack: votes. Votes are the basic currency of election or re-election, and so the ability of diffuse groups to marshal a significant number of votes can be an effective tool for advancing interests in the political arena, and have the potential to be more effective than the ability to marshal financial resources, which may not be convertible into that currency. A model developed by Arthur Denzau and Michael Munger (1986) demonstrates the point. Their model contains three actors, all of them rational, self-interest maximizers — legislators seeking to maximize re-election votes and who can supply public policy, organized interest groups who have no votes but can supply campaign resources, and individuals who cannot supply campaign resources but who do have votes. Denzau and Munger show in straightforward fashion that if voters are informed about their preferences and the relation of policy proposals to those preferences, interest groups who can supply campaign resources but not votes do not influence policy. In later work, Aidt (1998) even shows that when all relevant interest groups are able to compete for public policy, the result of interest group competition over environmental policy can be the social welfare maximum, the opposite of the result predicted by the Stigler model, all the while maintaining the assumption that politicians are motivated by their narrow self-interest. Aidt's conditions are not ordinarily met, but even when they are not, the introduction of the possibility of broad-based group action influencing political behavior generates a much larger range of possible outcomes, meaning that whether outcomes favor concentrated economic interests or broad-based interests depends upon the circumstances.

These and other models demonstrate how it is possible for broad based groups to influence policy. These findings are consistent with the empirical evidence. In reviewing the history of environmental decision making, "what ... seems surprising is the extent to which environmental advocacy groups have mobilized their constituencies so effectively," in seeming contradiction to some interpretations of Olsonian theory. (Oates and Portney 2003, p. 336) It is impossible to explain the origins of the many stringent environmental regulations that governments have enacted since 1969 without incorporating the influence of the preferences of environmentally concerned citizens. The statutes enacted by the Congress in the period between 1969 and 1975 have their flaws, but they were serious efforts to reduce environmental externalities and they imposed significant costs on powerful industries. In an early effort to estimate the costs

of meeting environmental standards under the laws enacted 1969-75, the Environmental Protection Agency estimated that the country was then spending about 2.1% of GNP complying with environmental regulations. (U.S. EPA 1990). Even single policy initiatives, like the program to reduce acid deposition by reducing sulfur dioxide emissions from electric utility companies, carried hefty cost estimates. In the acid deposition case, compliance cost estimates were \$4 to \$5 billion per year. (Cook and Miller 1996). Such statutes are not the product of a political process that is being effectively dominated by the industries subject to these new and costly standards. Plausible explanations need to incorporate a role for the influence of broad-based concerns that environmental contaminants be substantially reduced.

Efforts have been made to model situations in which industry itself might advocate for regulations that imposes costs on itself, but they are not successful in identifying actual situations in which such advocacy has actually occurred. For instance, Maloney and McCormick (1982) identify conditions under which imposing environmental standards on firms can cause profits to go up. The standards must be imposed in a manner that restricts entry, effectively cartelizing the industry; without this condition, other firms would see the supra-normal profits and enter, gradually returning profits to their pre-standards level. They must also not be too strict. To test whether such profit improvement can actually occur in practice as a result of environmental standards, Maloney and McCormick examined the effect of OSHA's cotton dust standards on firm profits. They found that the stock market traded value of some firms affected by the standards increased after OSHA's standards were upheld by the Supreme Court. From this single instance, they draw the conclusion that "many of the existing laws and institutions [imposing environmental restrictions] can be explained as devices for distributing rents created by regulation." (Maloney and McCormick 1982, p. 121; see also Stavins 2004, p. 11). This conclusion has two flaws. First, it is a mistake to extrapolate from a case study to a conclusion about "many" laws and institutions. More importantly, however, the fact that some firms can benefit in the short-term from regulations that restrict entry does not explain either the causal mechanisms that produce such regulations or the purposes for which they were written, and so can hardly be considered an explanation of them. Environmental regulations nearly always create winners and losers, but this includes regulations for which broad-based environmental interests – or, in the case of cotton dust, unions – successfully advocate over the opposition of industry. Simply demonstrating that some firms gain ex post does not show that those firms demanded the regulation ex ante. The regulation might have been written despite, rather than because of, that gain or the gain might have been a co-benefit of the regulation that was otherwise serving the public interest and not a motivating factor for it. In the case of cotton dust, the evidence suggests that the industry consistently opposed OSHA's restrictions throughout the administrative process and that this opposition continued afterwards, to the point of the American Textile Manufacturers Institute and the National Cotton Council of America taking the legal challenge all the way to the Supreme Court in an attempt to overturn them. Overall, pointing to the preferences and lobbying efforts of regulated industries "does not seem ... very successful as a positive theory of environmental policy." (Oates and Portney 2003, p. 330; Moe 1997, pp. 462-63)

While models that posit regulated firm dominance of the decision making process do not fare well as general explanations for why stringent environmental laws are enacted, the situation is somewhat different when focus shifts the choice that legislatures when selecting the regulatory instruments and procedures to be used to enforce those laws. The influence of firm preferences is often a useful explanatory variable for these second-order decisions. For more on this, see Section V(B) below, describing the literature on instrument choice.

Another approach to explaining the existence of costly environmental regulations depends on the idea of bootlegger and Baptist coalitions – or “unholy alliances,” in Ackerman and Hassler’s (1981) terminology -- which unite environmental advocates and particular sub groups within industry who stand to gain substantially from environmental regulation, such as waste disposal firms. (Zywicki (2002); Greve and Smith, 1992; Yandle 1983) In such coalitions, each partner may advocate the same or similar action, yet each for their own distinct reasons. Coalition explanations of this type diverge from special interest dominance models because they acknowledge the explanatory value of including broad-based environmental interests. Oftentimes the “bootlegger” element of the coalition is a less substantial industry or sub-industry component than the industry component that stands to lose from the regulation, suggesting that if the contest simply pitted the two industrial interests against each other, the bootlegger element might well not prevail. A number of case studies have explored instances in which coalitions of industry and environmentalists may explain government decisions. Brandt and Svendsen (2004), for instance, argue that manufacturers of equipment for wind energy, where European firms dominate, help explain why the EU was willing to commit to the Kyoto limits on greenhouse gases even after the United States had defected from the agreement. Earlier Lamm and Yasinow (1969) revealed how the billboard industry combined with environmental interests in successfully advocating for the Federal Highway Beautification Act. See also the case studies in Greve and Smith (1992).

Once the possibility that broad-based interests can effectively influence decisions is incorporated into public choice modeling, a wide range of results becomes possible when governments are making environmental decisions. The outcome of environmental policy ceases to be predictably favorable to concentrated economic interests and unfavorable to broad-based interests, and becomes a process in which different interests interact, with the balance of influence shifting according to their strength, the institutional structure of the public choice being made and other factors. The foundational period of federal environmental policy making in the 1969-1975 period constituted a period in which mass movement dynamics made environmental interests particularly influential, with elected officials eager to respond to the broad based clamor for aggressive action to ameliorate environmental problems. (Bryner 2008, pp. 320-322)

B. Preferences and Motives: The De Gustibus Principle

Recognizing that broad based, diffuse groups can effectively mobilize to influence policy decisions improves the quality of public choice modeling of

environmental policy. But what explains the ability of such groups to overcome collective action obstacles? In addition to shedding light on a question important in its own right, the general explanation of how groups of citizens are able to organize also has implications for a more realistic explanation of the behavior of public officials as well.

Initially, public choice contended that the public interest approach to government decision making errs by assuming that a different set of assumptions regarding individual behavior should be used when modeling public decisions than neoclassical economics successfully uses in modeling private markets. Having expressed skepticism regarding the assumption that officials will be public-minded, however, the early efforts of public choice to explain decisions by government actors made the opposite error by assuming that they never will be. Neither position can be squared with market theory's approach toward market actors. Under the *de gustibus* principle, market theory makes *no* assumption about the content of individual preferences, relying instead on revealed preferences to disclose that information. By not consistently maintaining the *de gustibus* principle, early public choice contributions did not live up to their own critique. Satz and Ferejohn refer to a conception of rationality that imposes no restrictions on substantive preferences as "thin" to distinguish it from "thick" accounts that do place such restrictions. (Satz & Ferejohn 1994). Many of the early public choice theories of government decision making, such as Stigler's economic theory of regulation, Niskanen's theory of bureaucracy, as well as others, are thick accounts: they posit that the relevant political actors will pursue their material self-interest.

In order to be consistent with market theory's assumptions, thin rationality accounts of government decision making appropriately make no a priori assumptions regarding the preferences of public actors. Instead, they concentrate on revealed preferences, taking the question of preferences to be an empirical one. Models that assume preferences are limited to material self-interest can sometimes be helpful as a first approximation, but whether this is so needs to be verified empirically, not assumed a priori. Oftentimes, observed behavior shows that people's preferences are a good deal more complex. The thick account of rationality has great difficulty explaining the existence of large group citizen activity that promotes greater environmental quality, for example. To explain such activity, students of large group collective action of the kind experienced in such fields as civil rights and the environment typically find three types of preferences or benefits that individuals may be furthering when they participate in collective action, only one of which is material. Beyond material benefits, individuals can obtain both solidary benefits and purposive or expressive benefits from participation in collective action. (Loomis and Cigler 2007, pp. 9-10) The possibility that these benefits can flow from collective action implies that broad-based action is possible even when the positive contribution that any individual can make to achieving material benefits is small and participation is costly.

The decision to participate in collective action can be modeled as $R = pb - c + d$, where R equals the reward from participation, b equals the material benefits that an individual will gain if the collective action is successful, p equals the probability that the individual's participation will be decisive in gaining that collective benefit, c and d equal

the costs and benefits of participating, respectively. Participation is warranted when R is positive. Assuming that the only benefits that accrue to an individual are material ones amounts to setting d equal to zero. Doing so generates the conclusion that large diffuse groups will seldom be able to organize, because the prospects of pb exceeding c when individual material benefits are small and the group is large are unlikely. When the d -term – which incorporates solidary and purposive benefits -- is positive, however, then R can also be positive, and an individual's choice to participate in large group activity likewise becomes rationally explicable. (Schroeder 1998) Analysts have identified further features of collective action situations that can have a significant effect on participation rates. For instance, the participation decision can be influenced by the amount of trust individuals have toward others in their group, because trust increases an individual's confidence that others will also participate if they do, increasing the value of p . (Lubell 2002).

Incorporating purposive and solidary benefits into the study of large group behavior has become widely accepted in the literature, although we do not yet have a thorough understanding of the conditions under which these benefits together with considerations of trust and other possible influences on the collective action decision contribute enough to the perceived benefits of participation that they are able to overcome the costs. Even without having a complete explanation of how groups form and act effectively, studies regularly find evidence of the influence of such mobilization on environmental decisions. Hamilton and Viscusi (1999, pp. 145-47), for instance, find correlations between stricter clean ups at hazardous waste sites and measures of citizen mobilization such as higher voter turnout and higher per capita membership in environmental groups. Similarly, Daley (2007) finds that the participation of citizen advisory groups in the development of clean up standards for hazardous waste sites has a statistically significant correlation to selection of more health-protective remedies at such sites. Other studies have found the presence of environmental organizations affects environmental enforcement activity. (Davis & Davis 1999, Helland 1998c, Hamilton 1996). In a case study, Bernauer and Caduff (2004) test the hypothesis that NGOs can effectively translate public concerns into regulatory policy, defeating producer or industrial interests. They document the influence of NGOs in setting European policy toward the use of growth hormones in meat. (The EU banned growth hormones, over the objections of local and international beef producers. Subsequently, the World Trade Organization ruled that the ban was an impermissible trade barrier because it lacked a sufficient scientific basis.) Applying a times-series regression analysis to United Nations' Global Environmental System monitoring data from 1977 to 1988, Binder and Neumayer (2005) find that the strength of environmental NGOs has a statistically significant impact on the strength of country controls on sulfur dioxide, smoke and heavy particulates. They identify a number of causal mechanisms that may explain the influence of NGOs, including their ability to convince policymakers that their political support from its members and the larger public will increase as a result of supporting more protective pollution standards.

The results of individual studies such as these are difficult to generalize. They neither establish that large groups will regularly be able to overcome collective action

barriers nor that when they do they will prevail against producer or industrial interests. They are, however, telling counter-examples against the claim of effective dominance by producer or industrial interests and they provide ample justification for modeling environmental policy decisions in ways that incorporate the possibilities that diffuse groups can organize and, when they do, sometimes prevail against opposing interests. Thinning out the notion of rationality by admitting the possibility of solidary and purposive benefits improves the ability of public choice to describe observed behavior, producing better models that can generate better predictions. Normative or prescriptive judgments about government's appropriate role in addressing environmental problems will then be founded on more reliable estimates of the consequences of assigning various decisions to government.

If the activity of large-group organizations helps substantiate the impact of solidary and purposive benefits among citizens, similar non-material benefits may be accruing to other participants in public decisions in ways that ought not to be ignored. In fact, modeling of the behavior of elected officials and bureaucrats also improves if the possibility of their having non-material preferences is acknowledged. In an important early study, Kalt and Zupan (1984) analyzed the voting patterns of Senators during the period 1977-78 when twenty-one separate votes on the Surface Mining Control and Reclamation Act were taken, due to President Ford vetoing the measure twice before President Carter signed it. Employing an econometric model, they find that including in the model's specification the Senator's "ideology" – their "ideas about how government can best serve" their "conception of the public interest," *id.* p. 281 -- significantly increased the model's ability to predict how a Senator will vote. In a study aimed primarily at determining whether Senators vote to protect their states from the costs of environmental compliance, Hussain and Laband (2005) examined roll call votes on environmental legislation from 1991-2002. They found that pro-environment ideology significantly increased the probability of a pro-environment vote, while the prospect of the senator's state being adversely affected relative to other states decreased that probability. In a study of Senate and House votes on the Superfund legislation, Hird (1994) tested the influence of member's ideological commitments to environmental protection compared to the prospects for returning net financial benefits to their districts or states. While finding evidence of programmatic pork in Superfund voting behavior, in both House and Senate voting Hird also found that ideological positions had greater explanatory power.

More generally, the best models of legislative behavior do not restrict the factors that influence them to ones that advance a legislator's material interests. Instead, they acknowledge "a constellation of factors made possible by being a legislator: making public policy, doing good things for the country or for the district, satisfying ideological beliefs, having prestige and the prerequisites of the office and so on." (Keohane, Revesz and Stavins 1999, p. 95; see also (Farber & Frickey 1991, p. 33) Contextual features will determine how an individual legislator can maximize the overall benefits he or she receives from all of these contributing factors, including such circumstances as the type of decision being made, its visibility and the distribution of observable costs and benefits. Sometimes this may mean supplying public policy that narrow economic interests want,

but at other times it will be achieved by serving one's constituents or by acting to advance principled commitments, including commitments to the general welfare.

Studies show that bureaucrats as well as elected officials are influenced by a larger set of factors than a thick rationality account recognizes. In a multi-variate econometric study of decisions by the EPA to cancel uses of registered pesticides over the period 1972-1987, for instance, Maureen Cropper and colleagues found that cancellation decisions were significantly influenced by balancing health risks against the economic value of continued use. While this result might be interpreted as the EPA simply engaging in a trade off between the selfish concerns of different special interest groups, Cropper and her colleagues found evidence that EPA was performing an informal cost-benefit analysis of the general kind considered necessary by economists in order to produce sensible regulations. (Cropper, et al. 1992). The study concluded that "it appears that EPA is indeed capable of making the kind of balancing decisions that economists presumably support and that FIFRA clearly requires." Id. p. 193. While the specific results may well deviate some from those that market theory's welfare maximization goal would recommend, they also suggest that the choices made reflect an appreciation of both the general welfare gains that reduced exposure to pesticides can achieve as well as the concerns of producers. Other studies have produced similar results. When Hird (1990) studied expenditures at Superfund sites, he found that the site's hazard risk ranking – a measure of the amount of public health risk associated with the site -- was the most significant factor influencing site specific spending, with the preferences of legislators playing a lesser role. Likewise, in a study of decisions made by the Interior Department on the sale of leases for offshore drilling, Hoagland and Farrow (1996) found of legislator and interest group priorities influenced outcomes, but so did the expected net social value of each lease.

Such studies move away from thick accounts of rationality to ones that accommodate a richer set of arguments in the objective function of public officials. In doing so, they lose some of the tractability of modeling that come with thick accounts, because it typically is easier to determine what choice will improve material well being than it is when using thinner accounts, where assessing the comparative ability of different choices to advance a more complex menu of influencing factors is more difficult, especially when some of these influences are intangible and unobservable. One way that analysts accommodate the greater complexity of the thin rationality assumption is to employ reduced-form analyses in which a number of different possible influencing factors can be represented as independent variables in empirical studies of decision making. The research objective then is to test the significance of each factor, rather than specifying a formal public choice model. A variety of interesting findings have emerged from such studies, amply demonstrating that decision makers respond to multiple influences. In a study of decisions by the Fish and Wildlife Service with respect to endangered species, Metrick and Weitzman (1996) tested whether agency decisions are affected by "scientific" characteristics of species, such as empirical evidence of their threatened or endangered status, or by "visceral" characteristics, such as whether the species involved are perceived in emotionally favorable ways. They found significant influence of visceral factors, with decisions favoring visually attractive species, like the

spotted owl, or familiar mammals, like grizzly bears. They also found that different types of decisions are differentially influenced by these factors. Scientific considerations seem to play a heavier role in the initial listing decisions, for instance, than they do in the decisions about how much money to spend on protective actions, where visceral factors predominate. They find evidence that conflicts with development projects also have a bearing on agency outcomes.

Hamilton and Viscusi (1999) analyzed the records of decision at Superfund sites in order to understand what factors affected decisions regarding the stringency of clean up at those site. Using voter turnout, membership in environmental organizations and the environmental advocacy ratings of the state's senators as proxies for collective action by concerned citizens, they found "that the likelihood that residents will engage in collective action does cause regulators to adopt more stringent cleanup standards and spend more to avert cancer cases." *Id.*, p. 154. Because more stringent clean up often imposed costs greater than could be justified by the expected monetary value of the anticipated health benefits, the influence of citizen collective action seems to push regulators away from decisions likely to maximize social welfare judged by willingness to pay. Hamilton and Viscusi also suggest an interesting implication for advocates of environmental justice: because low income communities tend to be less politically active, decisions that are less responsive to local community organization and more responsive to formal cost-benefit analysis may actually improve outcomes from an environmental justice perspective. On the other hand, Daley's work, cited earlier, suggests the alternative hypothesis that greater use of community advocacy groups in low income community may improve the responsiveness of clean up decisions to their concerns. (Daley 2007).

The interplay of interest group priorities and other preferences of agency officials can be complex, sometimes due to the number of interest groups reflecting different priorities that have a stake in an outcome. For instance, Martin et al. (1996) identified seven distinct interest groups with a stake in oil and gas leasing on federal lands: the oil company, local organizations representing environmental, tourist, timber, retail and wholesale concerns, local government and the agency itself. Regulatory actions typically involve a large number of discrete decisions, and it is plausible that different interest groups may have greater influence at different points in the process. In a study of the use of environmental taxes in Europe, for instance, Ekins and Speck (1999) identified a number of specific exemptions or other forms of tax relief benefiting different sectors of the economy. Similar targeted benefits, this time in the form of bonus allowances, were included in the legislation establishing the acid rain control program in the United States. (Joskow and Schmalensee 1998)

One particular potential influence on agency behavior that has received much attention is that of the legislature. Here, as is the case with the study of bureaucratic behavior more generally, principal-agent models have become the standard. (Wood and Waterman 1994, Davis and Davis 1999) Among the principal concerns here has been to determine what influences bureaucratic behavior. One possibility is that agencies follow the decision rules of the statutes under which they operate. Another possible influence comes from the preferences of current legislators who exercise oversight authority and

control the size of an agency's budget through annual appropriations. Presidents, too, have a strong interest in directing the bureaucracy and likewise have several tools available to them, primarily the power to appoint agency leadership as well as centralized oversight through the Office of Management and Budget that all Presidents since Nixon have exercised. Interest group influence, either indirectly through the legislature or the President, or directly by providing benefits to agency officials, of course must also be considered.

Wood and Waterman examined the influence of congressional and presidential preferences by using a number of different tests to examine how agencies responded to preference changes in the Congress and the Presidency. Examining different agencies and political circumstances, they regularly found changes in agency behavior corresponding to changes in the political branches, suggesting that the one was responsive to the other. At the Nuclear Regulatory Commission, when Congress expressed anxiety about nuclear safety by enacting legislation in 1980, enforcement actions by the agency increased, but they then decreased after President Reagan replaced President Carter, bringing with him a deregulatory philosophy as well as strong support for commercial use of nuclear power. (Wood and Waterman 1994, pp. 49-50) During the same time period during the Reagan administration, inspections and product seizures at the Food and Drug Administration also declined. *Id.*, pp. 52-57. Similarly, the number of auto defect engineering inspections at the National Highway Traffic Safety Administration fell early in the Reagan administration, *id.*, pp. 59-61, as did the number of violation notices issued by the Office of Surface Mining, *id.* pp. 62-64.

These changes occurred while the Congress, which remained in democratic hands, was much more pro-enforcement than the President, thus suggesting presidential dominance. On the other hand, enforcement of the hazardous waste laws increased during the Reagan administration, when Reagan's control of the agency was weakened by scandals involving the EPA administrator, Anne Gorsuch Burford and Rita Lavelle, the hazardous waste administrator, enabling Congress to gain an upper hand. In a test of the relative influence of the Congress that enacted legislation compared to the current Congress, DeShazo and Freeman (2003) looked at the determinants of Fish and Wildlife Service decisions either listing subspecies or setting the funding allocated to their recovery. They found the preferences of the members of the appropriations and oversight committees of the current Congress had statistically significant effects on those decisions, while the influence of the factors written into the statute was statistically insignificant. See also Rawls and Laband (2004) Beyond the studies already noted, a number of others have examined the bureaucratic decisions that are often critical in determining how statutory standards will actually be applied with respect to Superfund (Gupta, et al. 1996), toxic substances (Van Houtven and Cropper 1996), the endangered species program (Simon et al, 1995) and leaking underground storage tanks (Berrens et al. 1999).

The principal-agent framework has been employed by a large and growing literature examining the determinants of the decisions of agencies implementing environmental policy. The context-dependent nature of these analyses again prevents broad generalizations about the comparative role of interest groups and the ideological or

other non-material preferences of public officials, except to say that an emerging theme of this work is that both matter. The earlier work that posited dominance of concentrated economic interests was not wrong to conclude that those interests influenced public decisions. Its error was in neglecting to consider the significant role played by a much larger range of interests, including broad-based environmental interests, as well as the role played by ideological and other non-material preferences.

V. Environmental Federalism and Instrument Choice

This section examines the literature on environmental federalism and regulatory instrument choice, the last two of the four questions identified at the beginning of the prior section. Once again, theoretical and empirical contributions as well as normative implications receive attention.

A. Environmental Federalism

Within the United States, government responses to environmental problems could occur at the federal, state, regional or local levels, as well as at multi-national or even global levels. The variation of environmental problems will determine what level or combination of levels can most sensibly respond; there is no universally correct solution to how responsibility should be allocated among them. Appropriate and sufficient responses to global warming require global or at least multi-national responses; appropriate and sufficient responses to congestion on city streets can often be made by local or regional government. There is a body of thought within economics generally advocating that responsibility be assigned to the lowest level of government that still encompasses the vast preponderance of both the effects of the environmental externalities and the sources of those externalities. That governmental unit is capable of fully appreciating the competing costs and benefits associated with the externality, and it can then balance them by taking into account the preferences of those citizens who are adversely affected by the externality as well as of those whose activities are producing the harm. It is straightforward to show that such government responses can produce greater social benefits than a one-size-fits-all approach established at a higher level of government, while responses at a lower level of government will fail to internalize all the relevant costs and benefits. So when the causes and effects of environmental problems are localized, the preference from the perspective of allocative efficiency is to assign regulatory responsibility to a local rather than a national level of government.

Many environmental problems are not localized. For just one example, much air pollution has a spatial reach that extends for hundreds of miles, even around the globe. A non-negligible amount of the mercury emissions that falls on United States territory can be traced to Chinese power plants, for instance, and the effect of greenhouse gas emissions from any locality eventually affects the entire planet. These spillover effects prevent any local government from being able to encompass the problem, and the presence of spillovers weakens the case for assigning responsibility to lower levels of government, out of concern that they will disregard negative spillovers into other

jurisdictions. Empirical work tends to substantiate this, by showing that states seem to enforce laws less stringently against firms located near borders with other states. (Helland and Whitford 2003). Even granting the need for national treatment of spillovers, however, a common criticism of American environmental policy is that it has federalized too many environmental decisions, and thereby falls short of achieving the allocative efficiencies of a more decentralized approach.

Often times, advocates of nationalizing environmental regulation buttress the spillover-based argument for national standards with one that has even broader applications. They often argue that even the regulation of local problems – problems that from an efficiency perspective could to be handled at a lower level of government -- ought to be federalized in order to save local jurisdictions from the destructive effects of a “race to the bottom.” The claim is that when local jurisdictions are left to make environmental regulatory decisions, the demands on local jurisdictions to compete with other jurisdictions for capital by offering lax environmental standards will undermine environmental protections.

The race to the bottom thesis has generated an enormous literature, especially if one includes the general literature on inter jurisdictional competition that is not limited to environmental regulatory matters. For reviews, see Oates (2002), Wellisch (2000), Wilson (1996). Initially, it is worth remarking on the nature of the literature that the thesis has generated. It might be thought that the excessive federalization of environmental standards that from an efficiency perspective ought to be handled locally would be framed as a flagrant instance of government failure, and therefore that it would produce a body of work developing and testing models to explain why this particular failure emerges from the self-interest of concentrated economic forces, national legislators, bureaucrats and other relevant actors. Some work in this rein has been done. It has been plausibly suggested, for instance, that national industries prefer the economies of lobbying for and coping with a single standard setter rather than with fifty or more different state standards. Yandle (1999). Then, too, bootlegger and Baptist explanations that incorporate the influence of environmental organizations have also been advanced. On this account, the reasons that environmental organizations prefer national standards include lower costs of influencing and monitoring federal actions and the greater membership marketing opportunities associated with the more visible role environmental organizations play in national rules compared to state or local ones. Farber (1992), Yandle (1999).

Overall, however, the search for public choice explanations for federalization-as-government-failure has played a relatively minor role in the literature compared to theoretical examinations of whether the race-to-the-bottom hypothesis is itself a plausible description of how competing states would behave if regulation were left up to them. Perhaps the reason this question has received so much attention is that until it is resolved, it cannot be decided whether existing levels of federalization are government failures or not. If race-to-the-bottom is correct, then assigning regulation to either level of government would be sub-optimal, and it would be a matter of trying to determine which deviated more from the welfare-maximizing solution. Consequently, scholars of public

choice have vigorously debated whether competition among environmental standard-setting jurisdictions produces a race to the bottom, a race to the top, the selection of welfare-maximizing optimal standards, or something else.

Oates and Schwab have produced the most prominent theoretical model of competition among local jurisdictions with respect to environmental problems that lack significant spillover effects. (Oates and Schwab 1988). Their model identifies the conditions under which local government would establish standards at socially optimal levels, rather than engaging in a race to the bottom. Individual citizens are assumed to be both consumers trying to maximize their entire package of goods and services, as well as workers who provide labor for industry. Capital is assumed to be mobile, while labor is immobile. Production activity varies with the stringency of the emissions standards, and production determines labor rates, so allowable emissions are proportional to labor rates. Oates and Schwab use a median voter model to describe government standard setting, in which government chooses the standard that maximizes the preferences of the median voter. Under these conditions, they show that the median voter (who is also the representative citizen because the population is homogeneous) will prefer a standard that maximizes the combination of the environmental quality benefits and the wage benefits she receives, and hence this is the standard that government delivers. Each citizen will receive the amount of environmental quality that they are willing to pay for via foregone wages. This is the socially optimal level of regulation. Since Oates and Schwab, models addressing both domestic and international situations, have proliferated. (Esty and Geradin 1997; Barrett 1994; Wilson 1996).

Models like Oates and Schwab's have been relied upon by critics of the federalization of environmental standards, who infer from them that the worry about overly lax standards being set by local governments is overdrawn, and hence that the decisions to federalize local environmental problems is a further instance of government failure after all. (Revesz 1992, Revesz 2001, Adler 2005b). The conditions required for the socially optimal result are restrictive, however, similar to those required by Aidt's (1998) model for when interest group interactions result in socially optimal regulation. When they are not met, theory predicts that results will deviate from the ideal. Some deviations produce regulation that is too lax from an efficiency perspective while others in regulation that is too strict. As an example of the latter, if citizens exhibit the NIMBY response to polluting industries, standards are set too high. (Levinson 1999, Glazer 1999). Some scholars consider the NIMBY danger –in which localities enact environmental standards that are too strict, in order to prevent undesirable facilities from locating in them – to be at least as great a worry as the race to the bottom. (Adler 2005b). On the other hand, when political decision makers fear capital flight, lowering environmental standards can be used as a strategic tool to attract and retain capital, in which case standards may be set too low. (Oates 2002). Generally, when regulators react strategically to decision made in other jurisdictions, the results vary according to the preferences of the actors and their incentives, with no universal result, and empirical findings in particular settings must be interpreted carefully.

The empirical literature on the race-to-the-bottom issue is thinner than the theoretical literature, although it is growing. Before looking at it, however, several features of the theoretical debate are worth noting. When skeptics of the race to the bottom hypothesis rely on model like those of Oates and Schwab, they are relying upon a prediction of local government being relatively successful compared to higher levels of government. Describing a world in which some governments can succeed while others fail is a remarkably more nuanced picture than the bleak one generated by the early interest group models. In fact, the respective approaches to modeling could not differ more. Instead of assuming the dominance of economically powerful interest groups as in an interest group model, median voter models of the kind employed by Oates and Schwab assume that government is responsive to the preferences of the general population. Under the Oates and Schwab model, for instance, a local government reaches a welfare-maximizing decision because the median voter prefers a policy where the marginal monetary benefits she gains from increased environmental quality and increased wages are equal, and that translates to the socially optimal result.

It also follows from the Oates and Schwab model that if the median voter prefers economic growth to improved environmental quality, government will adopt lower standards, and *visa versa*. In other words, government is responsive to majority preferences, as democratic theory urges that it ought to be. (Oates and Schwab 1988, pp. 345-349). At the same time, either of those results – higher or lower standards than is socially optimal from a willingness to pay perspective -- would deviate from the allocatively efficient outcome, which would seem to mean that from the public choice perspective each would be an instance of government failure. That is an odd conclusion to reach regarding decisions that reflect majority preferences. As such, the conclusion ought to warn of a problem with the standard public choice conception of government failure that can go unnoticed: even though public choice seeks to explain how government makes decisions by translating preferences into outcomes, its normative baseline exists completely independently of whether it corresponds to anyone's preferences. Many normative accounts of democracy, on the other hand, place great weight on whether outcomes are responsive to majority preferences. Of course, majority decisions are not immune from criticism on normative grounds, and as a constitutional democracy the United States is committed on placing limits on unfettered majoritarianism. At the same, within a broad range of policy making discretion, decisions that reflect the will of the majority possess an enormously powerful democratic pedigree, and are hardly considered instances of government failure simply because they are not welfare-maximizing. Public choice theory fails to distinguish between decisions diverging from a social welfare maximum, based on willingness to pay, that are due to special interest group influence versus those due to a majority's preference for some other choice. This may well be a reason to be somewhat skeptical of public choice's definition of government failure.

Even decisions that diverge from both the majority will and the welfare-maximizing result cannot be automatically written off as government failures. Majority will can be driven by passions and prejudices, as well as by rational ignorance. One of the most challenging tasks of elected representatives is to mediate the gap that can exist

between what is perceived to be majority will and the representative's own understanding of what is best for the country. Resolving the tension between the two raises the classic Burkean dilemma, requiring an act of judgment on the part of each representative, one that not infrequently results in a decision embodying neither a complete endorsement of the perceived majority will nor a complete expression of the representative's individual commitments. The resulting government decisions can thus end up deviating both from the popular will of the moment and from the outcome that the representative thinks to be best public decision. Such a result, however, may well be the just the kind of compromise that democracies often end up making, and that are thought essential to responsible governing.

Lastly, another complexity is added by the fact that there is no justification within the premises of public choice theory itself to insist that either citizens or their representatives adopt welfare-maximization as the sole legitimate objective for public decisions to pursue. Once the thick rationality view of material self-interest is dropped in favor of a thin rationality account consistent with the *de gustibus* principle, public choice's agnosticism toward individual preferences should extend to individual preferences about public decisions and values as well as their preferences about private ones. Accordingly, public choice cannot deny the possibility of individuals preferring their government to pursue multiple goals, of which welfare-maximization may be just one. After all, market theorists do not deny that society can legitimately pursue distributional goals, or justice-related ones, or others. Their preference for reserving market regulatory measures to those that improve efficiency and for using other mechanisms to pursue other objectives is a preference that is itself rooted based on an efficiency concern. Individuals whose value system ranks values differently will be inclined to approach regulatory decisions differently, giving greater priority to other values.

For these and other reasons, the relationship between decisions that diverge from welfare-maximization on the one hand and government failure on the other much more fraught with ambiguity than public choice regularly acknowledges. The case of local government following the preferences of the median voter by adopting a welfare-maximizing environmental standard is a relatively easy one to see as a government success story, and the case of government following the materially self-interested preferences of a narrow industrial sector to reach a result that is heavily welfare-reducing is an easy one to condemn. *Ceteris paribus*, the first combines the attractive features of both majority responsiveness and a certain substantive appeal while the second is doubly unattractive. When cases do not fit these extremes, however, the judgment will be more contestable. Decisions may be only partially responsive to majority will and they may be subject to criticism on some substantive grounds while praiseworthy on others. The fact that a particular decision diverges from the single-minded goal of welfare-maximization seems insufficient by itself to put it automatically in the same category as the welfare-reducing, special-interest benefiting decision. The divergence might reflect a difference of opinion about the goals of government and how to prioritize them when they conflict, or a compromise between majority responsiveness and principled commitment.

As an illustration of how various legitimate considerations can affect environmental decision making, consider the environmental federalism question itself. Assigning government decisions to the lower rather than higher levels of government can be defended for reasons quite independent of comparative abilities to make welfare-maximizing decisions. The principle of subsidiarity in the European Union, for instance, establishes a presumption of decentralization in order to recognize the significant autonomy of member states. Subsidiarity permits member countries to enact laws that take into account their own cultural norms, legal traditions and other social factors distinctive to individual countries. Whether or not subsidiarity is welfare-maximizing, a separate case can be made for the principle on these grounds. Therefore, even if race-to-the-bottom problems could be convincingly shown, the conclusion that continuing to abide by the principle of subsidiarity constitutes government failure would surely be contestable. It might be the case that the competing values of maximizing welfare and maintaining local autonomy had been appropriately balanced by a responsible government.

In sum, government decisions can be evaluated for their welfare enhancing properties and criticized when they fall short. As the discipline of public choice becomes more consistent with its own fundamental premises, however, it becomes increasingly problematic to affix the label of government failure solely on that basis. Empirical results in public choice confirm a more nuanced description of the preferences that go into public decisions, finding that the relevant actors are frequently influenced by a mix of motives, including but not limited to the general welfare measured by willingness to pay. Decisions may often not correspond precisely to what the single minded pursuit of welfare-maximization would recommend, but if these decisions reflect other values that members of society hold, and if those values cannot be rejected on normative grounds, then they are not appropriately labeled government failures for that reason alone. In this respect, public choice's normative implications have evolved at the same time as its descriptive methods have.

What do the empirical results say about the race to the bottom? The empirical studies are less numerous than the elaborate theoretical debate, and no clear pattern has emerged. Overall, however, the evidence of races to the bottom is not compelling. Engel (1997) and Saleska and Engel (1998) surveyed state regulators and concluded that regulators were generally aware of the standards set by other jurisdictions. They also examined whether standards were lower when regulators reported that they were concerned about businesses leaving the jurisdiction, and found that they were. Relying on other studies suggesting that environmental standards do not generally influence location decisions by industry, they concluded that lowering standards to keep industry when it was not going to move in any event was evidence of unnecessarily lax local standard setting. Fredriksson and Millimet (2002) similarly found evidence that state regulators are aware of the regulatory standards of other jurisdictions. Using industry-adjusted data on relative state environmental abatement costs and unadjusted pollution and control expenditures per dollar of manufacturing per state – two measures of the stringency of environmental regulations – they found a positive correlation between stringency of one state's standards and those of its neighboring states, suggesting that

individual regulators make changes to match what their neighbors are doing. As they note, however, strategic interaction need not be destructive; it could be an indication of healthy competition. In this case, they find that “states are responsive to abatement cost changes in neighboring states with initially more stringent environmental policy, but we detect no significant impact of changes in neighbors with lower abatement costs. ... [T]his implies that states are being ‘pulled’ toward higher abatement costs by improvements in neighbors with already higher abatement costs.” *Id.*, pp 103-4.

Several papers examine the effect of the devolution of authority under President Reagan. (List and Gerking 2000, Millimet 2003). The stringency of environmental standards is a combined function of the standards, how the standards are implemented by an administrative agency and how they are subsequently enforced. By giving states greater autonomy to implement and enforce national standards, President Reagan’s devolution policy provided an opportunity for states to compete with each other for capital. Using pollution and abatement control expenditures, both per capita and per unit of manufacturing output, as well as nitrogen oxide and sulfur dioxide emissions as measures of effective environmental standard stringency, Millimet (2003) examined the years 1929-1994. First, Millimet found that the Reagan year trends were distinguishable from both the preceding and following periods. However, whereas per capita nitrogen oxide and sulfur dioxide emissions levels deteriorated in the period preceding the Reagan presidency, during his presidency this trend was reversed. With respect to pollution and abatement expenditures, Reagan devolution had no discernible effect in the first term, when states were under severe fiscal constraints. In the late 1980s, however, Millimet’s findings continue not to support a race to the bottom, and indicate increasing stringency of environmental standards. List and Gerking’s results were similar. (List and Gerking 2000).

Taking a different approach, Revesz (2001) surveyed the period prior to the extensive federalization of environmental standards. He found evidence that state standards increased in stringency in a number of different areas, and that states have occasionally continued to take action beyond the federal standards even after much environmental regulation has been federalized. In another approach to the question, Paul (1994) finds that centralization has not tightened packaging-waste regulation in the EU, perhaps due to effective lobbying by industry at the EU level.

The hypothesis that states will race to the bottom rests several underlying assumptions. First, industry makes locational decisions based on the stringency of environmental standards. Second, states understand this and react strategically to encourage industry to remain or locate in-state. State strategies will be determined not so much by absolute levels of their standards but by comparing their states to those of other states. We have already discussed some research results indicating that states do take the standards that their neighbors are setting into account. Other studies have examined the issue of industrial location decisions and whether they are influenced by environmental standards.

The results are not consistent. In a study of plant location decisions, McConnell and Schwab (1990) found environmental standards had little influence. Tobey (1990) also found no impact across different countries. When Jaffe, et. al (1995), p. 157, surveyed the entire body of work on this subject, they found little evidence to support the claim that stringent environmental regulations have an adverse impact on industrial locations. Other work, however, has found identifiable effects of environmental regulations on plant location decisions. Henderson (1996) compared plant decisions to locate in attainment areas for ozone versus non-attainment areas for ozone, where regulatory standards are stricter, and found a decided preference for the attainment areas. List et al. (2003) analyzed the decisions of foreign multinational corporations and found that these companies took the stringency of air quality standards into account in making location decisions. Looking at these and other studies, Jeppesen et al. (2002) performed a meta-analysis of the results. They found that the locational effects on foreign companies were greater than on domestic ones. They also found a division in the research, with earlier studies finding smaller effects than later ones. While they could identify methodological differences in the two waves of research, they could not isolate within them reasons for the differences between them, ultimately concluding that why the discrepancy “occurs is not entirely clear.” Id. at 24.

B. Instrument Choice

Regulators approach environmental problems with an extensive tool kit. They can establish performance standards for pollution sources based on the capabilities of abatement technology, or they can set standards for permissible concentrations of pollutants in the air, ground or water, for which there are then a variety of ways to develop individual source standards so that aggregate emissions will meet the ambient standards, or they can define a level of adverse health effects that is not to be exceeded, again with a variety of methods for assigning individual responsibilities for controlling the pollution associated with those health effects. Where the standards set numerical limits, the legislature can establish them itself, as the Congress does in the case of auto emissions, or it can delegate that responsibility to an agency, as in the case of ambient air standards, either with or without deadlines for action, and with or without default standards that automatically take effect if the agency fails to act. The legislature can instruct the agency to employ a cost-benefit test for any regulation, either as a check against performance, ambient or health standards being too stringent or as a direct standard setting methodology. Notwithstanding the diversity of tools available – and this summary only touches on some of the variations available – public choice lumps nearly all of them under the single label of “command-and-control” to signal their differentiation from market correcting or market-based instruments, and perhaps also in the hope that the comparison will invoke unhappy memories of failed attempts by government to implement planned economies. Here we will refer to the first group as direct regulatory instruments and the second as incentive-based instruments.

Incentive-based instruments also come in different forms, but among the most frequently discussed are variant of tax measures on the one hand and tradeable permits on

the other, the former building on the work of Pigou (1920) and the latter on the work of Dales (1968). Taxes or fees are “price” instruments. They set the price and let market forces determine the quantity of emissions resulting from that price. Tradeable permits are “quantity” instruments. They set the total quantity of allowable emissions and permit the trading market to determine the price. Neither approach is necessarily welfare-maximizing. To be welfare-maximizing, emissions must settle at the level where the marginal costs of further abatement equals its marginal benefits. Regulators, however, typically lack the information to identify that point, and they may not be aiming for it in any event. Still, economists argue that incentive-based instruments are superior to direct regulatory instruments because in theory they are the most cost-effective way to achieve whatever result is desired, by virtue of the fact that they create incentives for the regulated community to minimize the costs of pollution reduction.

Whatever the ultimate amount of reduction in environmental stressors is being sought, incentive-based regulatory instruments promise to achieve that objective at the smallest social cost. Early on, market theorists interested in environmental problems developed a rich literature building on the seminal work of Pigou, Dales and others designing tax, fee or tradeable permit systems for an enormous range of environmental problems. From the very beginning of the modern environmental era that has seen so much government involvement in problems of the environment, those theorists have advocated incentive-based instruments for their cost-effectiveness property. Government decision makers have been aware of these recommendations for some time. In the late 1960s and 1970s, for instance, President Nixon seriously considered employing a carbon tax as a central tool in air quality regulation. And yet decision makers often did not pull incentive-based instruments from their regulatory tool kit, preferring instead one of the direct regulatory options.

This mismatch between what markets theorists were recommending and what governments preferred constitutes the oldest puzzle in public choice’s engagement with environmental policy making. Buchanan and Tullock (1975) offered the earliest public choice explanation of the preference for direct regulation over taxes. They argued that businesses prefer direct regulation to taxes because the direct regulation of emissions functions as a barrier to entry, giving firms the potential for increased profits that come from cartelization. This is especially true if the direct regulations impose tighter regulations on new sources than on existing ones. Direct regulation will frequently be less expensive for firms because a tax attaches to every unit of pollution emitted, even after cost-justified abatement technology has been installed, whereas under direct regulation, in contrast firms pay only for abatement control technology. Therefore, firms prefer command-and-control over taxes. Dewees (1983) subsequently refined the Buchanan and Tullock analysis by specifying how firm preferences may change from one set of circumstances to another.

Other work has extended the study of firm preferences. Tradeable permits of any kind are thought to be less preferred than direct regulation because their costs are similar to taxes. In addition, firms prefer price certainty with respect to their inputs, and tradeable permits have the further disadvantage of being price uncertain. Within the class

of tradeable permits, however, the method of distributing allowances matters at great deal to firms. If allowances are distributed without charge based on historical data, such as historical emissions levels, often called grandfathering, this serves as an entry barrier for new firms while also existing firms to the extent they can sell excess allowances. For a review of possible firm preferences, see Keohane, Revesz and Stavins (1999), pp. 104-107.

Buchanan and Tullock's model of government is similar to Stigler's in that firm preferences are the only ones considered, and government is simply assumed to provide what firms want. When we examined the question of why governments would tackle environmental problems by imposing costly measures on firms at all, we saw that such firm-dominance models did not square with the observed facts. With respect to instrument choice, however, firm-dominance models have a great initial plausibility, because their predictions are generally more consistent with our observations: direct regulation is widespread, emissions taxes are relatively rare and when tradeable permits have been employed they almost always have relied upon a grandfathering scheme for distribution of all or nearly all of the available allowances. Nonetheless, we know from the earlier discussion that many government decisions are not dominated by narrow economic interests. Environmentally minded individuals can and do organize effectively and individuals including elected officials have preferences extending beyond their own material self-interest, among them being commitments to public values, including promoting the general welfare. So the treatment of instrument choice ought not simply to ignore the possibilities that these influences may be at play here as well.

More recent contributions to the public choice analysis of instrument choice incorporate the preferences of environmental organizations, legislatures and bureaucrats. The more complex picture that emerges describes the preferences of these other participants as often congruent or substantially overlapping those of industry, particularly with respect to the preference for direct regulation. If groups that on other issues may oppose one another happen to agree on some basic choices with regard to instruments, then the extensive use of those instruments may not be a signal of effective dominance of any single constituency. In this regard, environmental organizations are thought to have a number of their own reasons to prefer direct regulation. These include the philosophical or ethical objection that pollution taxes and tradeable permits constitute "licenses to pollute," the concern that taxes and permitting systems may be difficult to change in light of new evidence of pollution damage and the concern for toxic hot spots that certain incentive-based instruments may produce. In addition, some environmental organizations historically have been dominated by lawyers rather than economists, and so are less familiar with incentive-based instruments. That legal-training bias may be shared by legislators and their staffs, who are also much more likely to be lawyers than economists. As or more important, taxes are politically difficult for legislatures to support, and the visibility of the costs to consumers of taxes on polluting activities may be greater, and hence less attractive to politicians, than the more hidden costs of direct regulation. Direct regulation may also provide elected officials greater opportunities to influence important implementation decisions. Agencies may prefer direct regulation instruments because of their familiarity, and because such approaches require larger

administrative staff than incentive-based instruments do. For a review of the possible preferences of environmental groups, legislators and bureaucrats with regard to instrument choice, see Keohane, Revesz and Stavins (1999), pp. 107-113.

These hypotheses about the preferences of various constituents require verification, of course, and few empirical studies of them are available. Even casual observation indicates that they are at best generalizations with exceptions. For instance, one major environmental organization, the Environmental Defense Fund, has been a long standing advocate of incentive-based instruments. In 1989-1990, its support of the tradeable permit program through which the acid rain program was implemented was significant at the time for breaking with other environmental organizations, and the organization has continued to advocate incentive-based measures. EDF has always had a good number of economists on its staff, which may help explain its different view. In addition, this advocacy may help differentiate it from other organizations, giving it advantages in a niche of environmental advocacy that is useful in fund-raising.

Empirical studies of instrument choice are sparse. In one relevant study, Hamilton (1997) draws an important distinction between voting on the final bill for passage and preliminary votes on subsidiary issues such as instrument choice. He examines a series of votes on the 1985 Superfund amendments. These involved votes on a number of instrument choices, including a provision mandating disclosure of information, a tax on chemical and petroleum industries and a provision establishing liability for personal injury. Hamilton finds that broad constituent preferences and member ideology had greater effect on the more visible vote for final passage, while the influence of concentrated economic interests was greater on the less visible votes on the subsidiary issues. In a similar vein, Joskow and Schmalensee (1998) examine how some of the less visible details of allocating initial allowances under the acid rain program were significantly influenced by the preferences of special interests. Ackerman and Hassler's (1981) study of standard setting for coal-burning power plants, a rich case study, further illustrates one lesson that comes from the close study of instrument choice: the devil is in the details. Whereas a preference analysis of a generic policy instrument might predict opposition from a particular constituency, the details of the measure may turn opposition into support, and vice versa.

Just as the support of a firm with stable preferences for a regulatory instrument may vary according to the details of how the instrument is designed, it may be that firm evaluations of the same instrument may change over time in ways that affect support. This may be part of the explanation for why governments are selecting incentive-based instruments with increasing frequency. Economists still think there are fewer such instruments in place than ideal, and find that the ones that have been enacted often have cost-effectiveness-impairing defects. (Hahn 1989, Stavins 2003). Nonetheless, the list of existing incentive-based programs has been growing steadily, and is now fairly impressive. (Stavins 2003). Just as important, when governments consider costly new regulations, incentive-based measures are increasingly the approach of choice. In the United States, the Environmental Protection Agency has been an especially strong advocate of tradeable permit schemes, even before the successful acid rain program was

enacted in 1990, and continuing to this day. Since 1990, all the major programs that EPA has implemented to address interstate air pollution problems have included a cap-and-trade permit program. Similarly, it seems inevitable that the nation's approach to reducing greenhouse gases will include an incentive-based program. While the current overwhelming favorite in current legislative proposals is a cap-and-trade program, in January, 2009, Rex Tillerson, the CEO of Exxon Mobil, publicly endorsed a tax on carbon, with an initial rate "somewhere north" of \$20/ton, which is about the price that carbon allowances are trading for in the EU's cap-and-trade program for greenhouse gases. (Stilson 2009)

The conviction that regulation firms prefer direct regulation over incentive-based instruments have long been a staple in the public choice analysis of instrument choice. If those preferences are now shifting, then the public choice analysis of instrument choice needs to be substantially rethought. This is an area that would benefit greatly from additional research. Suggested explanations include greater familiarity with such instruments; increased pollution reduction costs, which puts pressure on parties to seek cost-effective measures; and a general political shift toward a trust in markets. (Keohane, Revesz and Stavins 1997, p. 45) All of these fall short of fully explaining support by a major oil company for the specific instrument of a tax instead of a cap-and-trade program with some grandfathering of initial allocation of allowances. That support is a long way from Buchanan and Tullock's initial prediction.

VI. Conclusion

This review began by outlining some of the interconnections and commonalities between market theory's study of environmental problems and public choice's study of environmental policies. While the parallelism between the two remains imperfect, the developments in public choice reviewed here have served to bring the two enterprises closer together. The shift from thick rationality to thin rationality assumptions about the behavior of voters, legislators and bureaucrats better aligns public choice's behavioral assumptions with those that market theory applies to market actors. Acknowledging the possibility that political actors can be motivated by the prospect of solidary or purposive benefits and by principled commitments in addition to material self interest also complicates the analysis. Simpler models that assume material self-interest drives all relevant actors have the virtue of permitting more definitive predictions, but they also suffer from the greater vices of not squaring with the observed facts about the actors they seek to model and, consequently, of producing poor predictions. Once the stricter assumption of thick rationality is relaxed, the relative influence of potentially competing benefits needs to be assessed, and this must be done without the benefit of a comprehensive theory to explain their respective roles. The question has been shown to be an empirical one, leading to increasing use of reduced-form analyses that study revealed preferences. Until the empirical data becomes more robust, generalizations from specific results must be made with caution. Environmental policy making, with its multiple decisions and decision making institutions, will continue to provide a fertile ground for the discipline's empirical work.

Even cautiously interpreted, however, the body of empirical work confirms that the more benign predictions of government behavior that thin rationality models generate are often times more reliable than the grim results of the simpler models. Self-interest and self-dealing have clearly not been disproven as powerful motivators, but at the same time the research shows that the influence of broad-based interests and ideological commitments can be effective. The possibility that government can work better than the grim theory predicts should prompt a greater research emphasis going forward on identifying institutional design features within public decision making structures that increase the odds for better public decisions. That emphasis would make the parallelism between public choice and market theory still stronger. Market theory has developed a well analyzed toolkit of instruments designed to correct for different market failures, including the externalities that typify most major environmental issues. Market theory proposes taxes, subsidies, markets for pollution allowances and better defined property rights as measures that can internalize externalities. The analogous public choice literature, while growing, remains more rudimentary and fragmented. This relative lack of development may be partially attributable to the stress that the grim branch of the public choice literature has placed on abandoning government, rather than on improving it. Nonetheless, public choice as a field of inquiry has always contended that institutions matter, as evidenced by its extensive study of voting, chamber-committee structures and veto gates. Once the possibility of government producing decisions that advance the public interest has been acknowledged, the interest in how differently constituted institutions can transform the same preferences of actors into different outcomes should be convertible into an increasingly robust literature on methods for addressing various types of government failure.

This work will have to proceed incrementally, because a comprehensive theory of public environmental policy decision making would require combining a number of distinct components, each complex in their own right and each at this point incomplete. Such a comprehensive theory would provide an account of how the preferences of voters and constituents influence legislator's behavior; how the preferences of legislators, mediated by legislative rules and structure, influence agency behavior and how agency preferences, mediated by administrative rules and agency structure, legislative oversight, direction by the President and judicial review, produce regulatory outcomes that in turn influence the private behaviors that proximately cause most environmental problems. Lack of a comprehensive theory need not discourage research on each of its constituent parts; in fact, should a comprehensive theory develop, it will undoubtedly be as a result of prior success on individual parts. Already, the principal-agent theory that forms the dominant research paradigm for several of these parts has worked on a number of important questions of institutional design, with more work, both theoretical and empirical remaining to be done. Within the principal-agent relationship between legislature and agency, for instance, the question remains open whether Congress' structuring of administrative rules and procedures serves to increase legislative control of agency outcomes to increase agency autonomy or to achieve some mix of the two. (McCubbins, Noll, Weingast 1987, 1989; Bawn, 1995; Croley, 2008) There are both theoretical and empirical questions here. Typically, principal-agent theory examines how to maximize control of the agent by the principal, subject to constraints of asymmetric

information, monitoring costs and operational efficiency. In the context of legislative control of agencies, however, maximum control may not be theoretically desirable. Instead, a certain degree of agency autonomy may be preferable if that promotes decisions that are more technically sound; presumably, taking advantage of the greater technical expertise that agency's can acquire constitutes a significant reason for delegating to them. Should autonomous agencies also be better equipped to engage in the reasoned decision making to which theories of deliberative democracy give priority, as some have argued (Seidenfeld, 1992; Croley, 2008), greater agency autonomy may be further supported.

In the empirical realm, studies attempting to understand how specific features of institutional design influence agency behavior can usefully proceed independently of such theoretical debates, because improved instrumental understanding of how design affects outcomes can inform how to implement any normative theory. Existing environmental studies give rise to some suggestions worthy of further exploration. Agencies directing Superfund clean up, for instance, seem more responsive to the priorities of local communities when those communities are politically active (Hamilton and Viscusi 1999). Providing assistance to local communities so that they may participate in complex regulatory determinations also has statistically significant consequences for those determinations. (Daley 2007). On the other hand, less visible decisions seem more susceptible to influence by concentrated special interests, whether those decisions take place in the legislative chamber, in the form of votes on less visible amendments to bills before final passage (Hamilton 1997), or in administrative agencies, as in funding decisions for habitat protection, which are less visible than the initial listing decisions. (Metrick and Weitzman 1996; see also DeShazo and Freeman 2003). Notice-and-comment procedures have been studied to assess whether they provide an avenue for expanding the influence of broad-based interests in agency decision making, with mixed findings. Cropper et. al. (1992: 195) found that environmental interests were able to participate "quite effectively" in pesticide rulemaking. Magat, Krupnick and Harrington (1986), on the other hand, found that business comments submitted to EPA had little discernible influence on final effluent guidelines issued under the Clean Water Act, suggesting that notice-and-comment at least does not augment the influence of concentrated economic interests. Results similar to Magat et al. are reported by Golden (1998) and Nixon, Howard and DeWitt (2002) for non-environmental rules. In contrast, in a study of 40 non-environmental rules issued between 1994-2001, Yackee and Yackee (2006: 136) found that "business influence is enhanced when there are a high proportion of business comments submitted during the public comment period." These seemingly disparate findings could be consistent with the studies noted earlier in this paragraph that point out a difference between high and low visibility rules, because Yackee and Yackee's study "focus[es] on the low salience rulemakings that dominate most agencies' regulatory agendas." (Id., 137). Croley's (2008) study of some high-visibility rules lends further support to the supposition that broad-based interests fare better in more highly mobilized environmental decision. In detailed cases studies of the EPA's 1997 rules tightening the air quality standards for ozone and particulate matter, the FDA's 1996 rule regulating tobacco, and the Forest Service's 2001 "roadless rule" – all of them extremely high visibility, controversial rules that stimulated enormous volumes of notice and

comment – Croley finds in each that broad-based interests were advanced in the final rules, notwithstanding the concerted and organized opposition of highly organized economic forces arrayed against them, with no significant weakening of the rules emerging from the notice-and-comment process (id. 178, 195, 212). In each case, Croley concludes that participation by the diffuse beneficiaries strengthened the agencies' resistance to pressures to weaken the protections provided by the respective rules.

A major reason that public choice research on environmental policy making has evolved in the past forty years can be traced to the wave of significant environmental legislation enacted in the late 1960s and early 1970s to address problems of conventional pollutants, which could not be squared with the grim predictions of early contributions to the field. Currently, environmental policy making debates are dominated by the unresolved issues of global warming and climate change; it may well be that these issues will stimulate further public choice refinements. For one thing, the recent support by Exxon Mobil's CEO of a tax on carbon in excess of \$20/ton runs directly counter to the conventional wisdom on industrial preferences for regulatory instruments. The conventional wisdom insists that companies like Exxon Mobil will generally prefer direct regulatory controls over incentive based measures, and, if the possibilities are limited just to incentive-based measures, they will prefer markets with grandfathered allocations of allowances over auctioned allowances. In all cases, Pigouvian taxes are the least preferred option. If Tillerson's endorsement of a tax is more than cheap talk, it ought to stimulate a re-analysis of firm preferences for instrument choice. Perhaps at some point the price certainty of a tax becomes preferable to the alternatives. Identifying the conditions under which a firm would prefer a tax – which is often market theory's most preferred regulatory option – ought to be an important area for further exploration. More generally, Spence (2001) suggests that public choice may need to reconsider its assumptions about the preferences of firms at a basic level. He argues that contemporary firms are incorporating environmental responsibility into their preferences.

Even putting aside Exxon Mobil's support of a tax, the global warming debate domestically and throughout the world takes it as a foregone conclusion that some form of incentive-based instrument will be employed in both domestic legislation and international agreements – and in the United States, momentum is strongly tending toward carbon dioxide markets that auction a considerable percentage of allowances rather than grandfathering existing sources. Years ago, Stigler derided those who sought to effect regulatory improvements by “preaching” the virtues of market-based mechanisms. Is it possible that forty more years of preaching has actually re-shaped policy debate so that such mechanisms have become the default choice among both legislators and agencies? If so, public choice research may have to become yet more sensitive to the potential for ideological or principled commitments to shape regulatory outcomes.

Studying the role of broad-based support for innovative environmental policies in climate change policy may also stimulate further refinements in public choice. So far, most opinion polling indicates that the public has become convinced that climate change is occurring and that greenhouse gases from human sources are contributing substantially

to the phenomenon. The support for strong corrective measures, however, is quite thin, and not much changed from polls taken twenty years ago. (Schroeder, forthcoming) It will be well worth watching whether public support strengthens as the policy debate proceeds. If it does, public choice research can be helpful in studying the conditions under which that strengthening occurs, thereby contributing to our still rudimentary knowledge of how social movements successfully mobilize. In watching whether broad-based support contributes to passage of a bill, public choice can also bear in mind that numerous preliminary decisions on questions of regulatory design and detail will have to be resolved prior to enactment. Existing research strongly suggests that the influence of concentrated economic interests will be at its height with respect to these less visible decisions, rather than on final passage. Careful study of how these less visible decisions are made and what seems to be most influential in them can also contribute significantly to the existing work.

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