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ALLOCATING POLLUTION LOAD REDUCTIONS BETWEEN STATES FAIRLY, EFFICIENTLY AND SUCCESSFULLY

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The successful implementation of pollution load reductions to clean up the Chesapeake Bay involves solving multiple ecological, economic, and political problems. While issues such as determining the environmental impact of particular load reductions or providing the appropriate economic incentives to agricultural producers have been discussed extensively, little attention has been given to how to consider the political realities of making decisions over load reductions in a representative democracy and federal system of governance.

Since Downs' (1957) seminal paper developing a spatial model of voting, political science researchers have developed increasingly sophisticated models of political decision making. Krehbiel (1988) or Ordeshook (1986) offer more thorough reviews of formal modeling of the political process. The objective of this article is to highlight how the political process might impact the ultimate implementation of pollution load reductions. By incorporating models of political decision making into the design of institutions governing these reductions, we may be better able to create an effective and efficient clean up of the Chesapeake Bay that survives the political realities in both Washington, D.C. and the various state capitols involved in the process.

The consideration of politics in the design of pollution load reductions for the Bay area watersheds faces two important challenges. First, given the current economic climate at both the federal and state level, there is unlikely to be substantial political support for regulatory policies that either hinder economic growth or adversely impact the fiscal position of either the states involved or the federal government. Indeed, the balanced budget requirements of most states and the increased interest in debt reduction at the federal level means that environmental regulations will not be able to rely upon substantial funding to encourage proenvironmental behavior. This may impact the success of environmental regulation in a number of ways. While efficient policies may be enacted using either transfers to or from states, both policies might faces significant fiscal hurdles at either the federal or state level. Further, the effectiveness of environmental regulation also depends upon substantial funding to monitor and encourage compliance. Limited budgets may constrain the funds available for the implementation of these policies.

Second, the United States' Federal system of government provides substantial autonomy to individual states. While the Federal government through the EPA and other agencies has the ability to impact policy decisions at the state level, they are also reliant upon the willingness of political leaders within the states to enact certain provisions. For example, while the Environmental Protection Agency (EPA) generally has the ability to regulate point source producers of pollution such as large factories or power generation facilities, the ability of the EPA to regulate the actions of nonpoint agricultural producers is dependent upon coordination at the state level. While fiscal issues cannot be denied, the focus here is on the second problem of navigating the complex political world of multiple political jurisdictions.

What Is Efficient?

The policy of designing pollution load reductions to clean up the Chesapeake Bay is essentially a public goods problem; the action of one state to reduce pollution on its waterways will impact other states by providing cleaner waterways and a cleaner Bay. Therefore, an efficient policy should be one that assigns load reductions to states in a manner such that the desired level of Bay cleanup is achieved at the lowest possible cost. Importantly, since the load

reductions of one state impact all other states, load reductions should consider the cumulative benefits and costs of such actions across states.

In this context, the efficient policy is likely to result in varying load reduction requirements across states. For example, while load reductions within one state may be highly effective from an ecological perspective, if the cost of enacting those reductions is extremely high, it might pay to ask for reductions from a less ecologically effective but economically cheaper region. Second, since states are not equidistant to the Chesapeake Bay but all states are likely to be required to make some load reductions in the efficient solution, the benefits of the overall policy is likely to be different among states. Expertise on the ecology and economics of these particular states will be needed to provide further details regarding efficient choices. The key, however, is to recognize that the substantial differences between states in geography and other factors is almost certain to mean that the benefits and costs of an efficient program will be highly asymmetric between states. The EPA's "Chesapeake Bay TMDL Executive Summary" provides a description of how load reductions in different regions would impact the Bay.

It is well known from the economics literature, that when an individual—or state in this context—does not face the full benefit or cost from the ecological improvement of the Bay and, they have an incentive to "free ride" or under-provide load reductions from the efficient amount. For example, an industrial facility that releases pollutants into the watershed in an unregulated system does not have an incentive to reduce those emissions because, while they must pay the full costs through increased costs of production, they do not receive the benefits received by downstream parties from an emissions reduction. Olmstead (2010) reviews regulation issues related to water quality. Sigman (2005) empirically validates such a result by showing that downstream pollution is generally higher.

However, it is possible to design a system of payments—or possibly charges—to provide each individual the appropriate incentives to take the efficient actions. In fact, in an unconstrained world, the federal government has access to a variety of different regulatory policies that may achieve the efficient outcome.

Hanley, Shogren, and White (2007) provide a review of economic issues related to environmental policies. As mentioned previously, fiscal constraints may limit the ability to rely on payment schemes to induce efficient load reductions. But, explicit taxes or subsidies are not absolutely necessary to achieve efficiency; Segerson and Wu (2006) show how efficiency can be achieved via the threat to punish noncompliant behavior. The second, and greater yet less studied, constraint is that any policy must rely on political acceptance and compliance by diverse states in a federal system of government.

How Politics Matter

The previous discussion of efficiency treats states as being the same as individual decision makers. Critically, with individuals, we typically assume that there is always some financial payment that can encourage them to take a desired activity. For example, to stop doing something deemed objectionable—such as smoking or polluting—all an individual would have to do is offer enough money. State decision making, however, may not be same as individual decision making. The difference comes from the fact that decision makers within a state—either legislators or governors—are elected officials who must acquire a majority of the votes from their electorate in order to remain in office. In order to win elections, state level politicians must support policies that are sufficiently amenable to these voters.

Downs (1957) provided a model of how electoral competition might impact policy making. Suppose that voters in a state only care about how proenvironment a particular candidate is. Some voters want a candidate who is very proenvironment whereas other voters prefer much less "green" candidates. Downs' theory predicts that the policy proposal of winning candidates—and eventually all candidates—will tend to the preferred stance of the median voter or the voter for whom exactly half of the electorate is more proenvironment and exactly half the electorate is less proenvironment. This median voter theorem comes from the fact that if a candidate does not support such a middle of the road policy then there will be room for a competing candidate to gain votes and win the election by offering a more centrist policy.

In this context, state level elected officials can only be expected to implement pollution load reductions that are at or near those of the median voter in their particular state. In the extreme, the preference of the median voter might be viewed as the ultimate amount of load reductions that can be implemented. In the least, the median voter in a state acts as a constraint on the level of acceptable reductions; states with a more proenvironmental median voter can be expected to support greater load reductions whereas states with less proenvironmental median voter will be loathe to support load reductions. The states involved in the Chesapeake Bay cleanup differ in their political attitudes toward

environmental policy. For example, states in the Chesapeake Bay region differ significant in the League of Conservation Voters' (2010) Environmental Scorecard. Most importantly, as long as the political preferences of the voters are different than what is efficient, it may be difficult to implement pollution load reductions that achieve full efficiency.

A single-issue, say environmental, view of the political process is both useful and highly simplified. The reality is that any pollution load reductions are likely to impact voters on a number of dimensions. For example, load reductions are likely to impact the environment as well as the economy of a particular state by making agricultural production more expensive. Further, by allocating load reduction requirements differently between point and nonpoint sources, the proposed policy can be more or less probusiness or more or less proagriculture. Voters are likely to care about these issues differently but still are assumed to vote for candidates who enact policies closest to their preferred stance on all the issues. When a policy decision impacts multiple-dimensions, the median voter result no longer generally applies; Plott (1967) shows that only under extremely limited conditions does an equilibrium exist. Instead, generally any policy proposal can be beaten—by attracting a majority of the voters—by another policy proposal. Since alternative policies can attract voters by changing the stance on multiple fronts, the political candidate has enough freedom to pull voters away from his/her rival. McKelvey (1976) shows that the problem can be quite severe in the sense that an agenda of successive competing proposals can be designed to lead to nearly any spot in the policy space. Since pollution load reductions actually touch on many voter relevant issues such as environmental, agricultural, and business policy this negative result may indeed provide an explanation for the continuing difficulty in finding a mutually acceptable implementation plan.

What Role for the EPA?

The EPA has choices over policies that vary in their level of centralization. For example, they could select a uniform load reduction standard that ignores state heterogeneity and spillover effects, or they could completely decentralize the load requirements to the states making state level free rider effects problematic. As Oates (2001) discusses, the issue of cross jurisdictional effects from proenvironmental behaviors suggests that a tricky middle ground approach is necessary where some central authority is required to obtain efficiency but standards or policies must be asymmetrically applied. While the previous discussion of the political process may seem to provide discouraging results for the ability of the EPA to design policy that is both efficient and politically palatable to the states, it also suggest how the EPA can play a constructive role within the constraints of the political system. For example, if the EPA's role is seen as setting the status quo level of pollution load reduction and allowing states to negotiate amongst themselves for changes from those amounts, then the EPA's load reduction requirements can serve to limit the policies that a state's politicians might support. Likewise, when policies impact multiple dimensions, it is known that the process or institutions that govern the decision-making process can have a dramatic impact on the final outcome. The only way out of the chaos of multiple issues is to create limits on the agenda or process. Shepsle and Weingast (1984) provide an example in this context for what is commonly referred to as a structure-induced equilibrium.

Another positive role for the EPA in this context may be to represent the interests of the states not directly impacted by load reductions. While six states and the District of Columbia may be asked to reduce emissions and are mostly likely to pay the brunt of the economic cost of the policy, presumably the whole nation benefits from a cleaner Chesapeake Bay. Thus, the efficient level of load reductions might account for benefits accrued outside these seven decision makers and the EPA may play a vital role in this process.

However, while this discussion has focused on how state politics may serve to move decisions away from what is efficient, the EPA will ultimately face similar constraints at the federal level. Since Congress determines EPA funding, it must enact policies that satisfy a majority within Congress. While there has been surprisingly little recent research on this area, papers such as Shepsle and Weingast (1984) and Romer and Rosenthal (1978) deal with the issue of how collective, public goods decisions are made within the political process and suggest that the outcome may be far from efficient.

Other Considerations

The political process is only the tip of the iceberg in thinking about how a group of independent states may arrive at a common policy decision. There are a number of other factors that might impact the ultimate outcome that have not traditionally been considered. A few are briefly mentioned here.

Economists increasingly recognize that even individuals fail to behave as rational as traditional economic models suggest. In particular, people care considerably about the perceived fairness of an outcome (Bolton and Ockenfels,

2000); individuals will typically reject profitable but highly inequitable offers. Since the efficient level of load reductions might entail highly asymmetric cost and benefits between states, the perceived inequality of this policy might be another roadblock. On the positive side, there is also ample evidence of pure altruism amongst individuals, which might ameliorate some of the negative feelings associated with costly pollution load reductions.

On the political side, while multiple dimensions clearly matter to voters, the most salient issues often rule the day. For example, it is clear that economic and fiscal issues are driving decisions today, whereas some social and environmental issues might be in the background. State and federal elected officials will in their attempt to get reelected follow the desires of the voters on the most salient issues. Thus, if awareness and concern for the Chesapeake Bay cleanup grows in importance, elected officials are more likely to be willing to enact favorable policies.

Finally, the concerns expressed here treat the makeup of the state electorate as static and unchanging. In reality, voters and business are likely to move over time to states with policies that are most favorable to them. Just as banks tend to locate in Delaware because of its favorable banking laws, agriculture and industry may move over time to states with the least restrictive pollution load reductions. It is has often been suggested that interstate competition for firms might create a race to the bottom where states offer more lax environmental standards (Oates and Schwab, 1988). To the contrary, some research (Wellish 1994) actually suggests that mobility of households will move states to efficiency by forcing them to respond to the desires of individuals. However, these models make a variety of assumptions that are not likely to hold in this setting and would move us away from efficiency. For example, Haavio (2005) shows that mobility frictions can move policies away from efficiency. Much of the regulation of pollution load reductions for the Bay is likely to fall on agricultural producers and capital intensive point producers who are unlikely to be particularly mobile. This might ultimately create further asymmetries between states that can result in political resistance to cleanup of the Chesapeake Bay. Wilson (1996) provides a review of some of the results of this fairly large literature, but there are also few models that interact mobility, voting and environmental regulation.

Concluding Comments

While some of the discussion above may seem negative and suggest that the political process will only move us away from the efficient cleanup of the Chesapeake Bay, understanding the political realities of the situation is necessary to avoid past frustrations associated with failed but well-intentioned policies. While today's political climate may require more modest goals, by selecting policies that recognize these limitations there is a hope for some forward progress. Further, in this situation, where multiple dimensions are likely to be impacted by the cleanup, the main gains can be had by intelligently designing the process and institutions to arrive at solution when the players are state and federal elected officials.

Finally, while there has been some research attempting to understand how public good decisions such as environmental policy are made by elected officials, there has been little research that focuses on the process when there are multiple layers of political processes to contend with. In this case, it is necessary to satisfy both state and federal elected officials. It might also be necessary to engage elected officials at a third, more local level, which would even further complicate the process. Research which incorporates this multi-level approach to collective action problems could greatly improve our understanding of the difficulties associated with not only pollution load reductions for the Chesapeake Bay but also the Kyoto Protocol and other international agreements that must engage sovereign, democratic governments.

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