SPECIAL INTERESTS AND COMPARATIVE STATE POLICY: AN ANALYSIS OF ENVIRONMENTAL QUALITY EXPENDITURES

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INTRODUCTION

The adoption of the National Environmental Policy Act and the establishment of the Environmental Protection Agency (EPA) in 1970 marked a shift in control of environmental regulation from the state and local governments to the federal government. Federal involvement in environmental matters reached its zenith during the 1970s with several important legislative actions, most notably the Clean Air Act and the Clean Water Act. The EPA, which is responsible for implementing federal air and water pollution legislation, saw its budget increased by over 50 percent during this time period (in constant dollars). In contrast, the 1980s saw a return to relatively greater reliance on state and local government caused both by the Reagan administration's "New Federalism" policy and the need to implement the federal policies enacted during the 1970s and early 1980s. From 1980 to 1989, the EPA budget actually declined in real terms [Portney, 1990].

Shifts from state to federal control of environmental policy can have at least two important effects. First, they create more or less homogeneity among states in environmental regulation. Second, they fundamentally change the political economy of policy formation. Much research has sought to explain the formation of regulation policy in general and environmental policy in particular. Stigler [1971] and Peltzman [1976] have suggested that economic regulation acts to protect and enhance the regulated parties. In applications of this hypothesis, Yandle [1983] and Quinn and Yandle [1986] found that special interests, including regulated parties and citizen groups, influenced state air quality policy before and during the federal regulatory era of the 1970s; however, the relative influence of competing special interests changed over this period. Before increased federal involvement, groups that could organize more effectively at the state and local level had greater influence. With increased federal involvement, such groups had less influence.

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In a recent assessment of comparative state environmental policy research, Lester and Lombard [1990] concluded that state environmental policy can not be explained wholly by any one theory. Instead, they identified several major determinants of state environmental policy, such as the economic wealth, pollution severity, political partisanship, and the intergovernmental relations theories. Unfortunately, they did not consider the special interests theory.

Thus, lacking in the existing literature is a comprehensive empirical study of all the major theories of state air and water quality policy explored by Lester and Lombard [1990] as well as the special interests theory. Including all five theories of comparative state environmental policy in a single model reduces the potential specification error associated with omitted variables. We can then determine whether the special interests theory is overlapping or complementary to the other theories of state environmental policy.

While most comparative state policy empirical studies use cross-sectional data, Gray [1976] and Tucker [1982] found that cross-sectional results are not always stable over time and that time-series analysis of the same data often results in different conclusions about state policy. Our panel data set, a cross section of the 50 states from 1970 to 1980, allows investigation of whether the use of cross-sectional data analysis in comparative state policy research is misleading.[1] Pooling the yearly data to capture the dynamics involved in state environmental policy allows us to discover erroneous implications of the cross-sectional approach and facilitates a test of the intergovernmental relations theory.

THEORETICAL BACKGROUND

Economic research has emphasized the special interests theory as the primary determinant of state environmental policy. For example, in his analysis of state environmental expenditures during 1967, Yandle [1983] found support for a rent-seeking behavioral model. A later article by Quinn and Yandle [1986] examined state environmental expenditures during 1972, 1976 and 1979 and found that polluters who were able to gain less stringent air pollution control before the 1970 Clean Air Act sought to gain increased air pollution control during the 1970s in order to restrict output and earn scarcity rents.[2]

Political science research has focused on alternative theories of state environmental policy. The economic wealth theory argues that in order to spend money on environmental quality states must have the necessary economic resources [Game, 1979]. To the extent that state fiscal ability reflects the willingness and ability of the state's citizens to pay, this theory is also consistent with the economic argument that environmental protection is a normal good. The pollution severity theory, which deals with the pollution problem itself, argues that greater environmental damage leads to stricter environmental protection [Game, 1979].

Combining the wealth and severity theories, from an economic perspective, suggests that government responds to environmental problems by serving the public interest. That is, resources are allocated to their most highly valued uses. But explanations of government action need to recognize the political nature of the process, something which political scientists have emphasized. The political partisanship theory does so by emphasizing that party affiliation explains support for environmental policy. It argues that Democrats are more likely to support interventionist and redistributional governmental policies [Dunlap and Gale, 1974]. Confounding the partisanship argument, however, is the realization that American political parties are not strictly ideological. It is not uncommon to find conservative Democrats opposing and liberal Republicans supporting activist environmental policy [Kenski and Kenski, 1980].

Analysis of state policies should also explicitly incorporate the constraints imposed by federal environmental legislation. The intergovernmental relations theory argues that state level decisions will depend on decisions made at other levels of government [Quinn and Yandle, 1986]. For the period we study, consideration of intergovernmental relations is essential since Congress enacted both the Clean Air Act and the Clean Water Act as well as major amendments to both pieces of legislation.

EMPIRICAL MODELS

We employ regression analysis to estimate the relationship between state environmental policy and a set of explanatory variables representing each of the major theories of comparative state environmental policy presented above. One goal is to determine empirically whether the alternative theories are overlapping and competing, or separate and complementary.

Air Quality

For the air quality model we estimate the following linear regression equation with expected signs of explanatory variables in parentheses:

$$(1) \quad AQEXP = f\{INCOME\ (+), PERDEM\ (+), LCV\ (+), POPDENS\ (+), AQEMP\ (+), FEDLAND\ (+), CAA70\ (+), CAA77\ (+)\}.$$

The definitions of all variables used in this paper are given in Table 1. The 1970 Clean Air Act gave the states the role of monitoring and enforcing the goals stated in the federal legislation. For this reason, per capita state air quality regulatory expenditures (*AQEXP*) captures much of the pollution control activity during this time period.[3]

The wealth theory of state environmental policy is measured by per capita state income (*INCOME*) which is expected to have a positive effect on air quality expenditures. Increases in income could lead to increases in the willingness to pay for air quality regulation since air quality is generally considered a normal good. Also, a larger income provides a larger source of state revenue.

The political partisanship theory is captured by the percent of the state upper house which is Democratic (*PERDEM*), and ideology is controlled for with the League of Conservation Voters index (*LCV*). The percentage of Democrats in the upper house of state government is expected to have a positive effect on air quality expenditures.

TABLE 1
Explanation of Variables

I. Dependent variables
AQEXP = Per capita expenditure of state government for air quality control in 1982 dollars
WQEXP = Per capita expenditure of state government for water quality control in 1982 dollars.

II. Independent variables common to the air quality and water quality models
INCOME = Per capita state income in 1982 dollars.
PERDEM = Percentage of State upper house which is affiliated with Democratic Party.
LCV = Average value of the League of Conservation Voters Index for the United States Senators from that state.

III. Independent variables in air quality model only
FEDLAND = Percent of state land which is federally owned including National Parks, Forests, and Wilderness Areas.
AQEMP = Per capita number of employees in five air polluting industries (stone-clay-glass, primary metals, paper and allied products, chemical and allied products, and petroleum and coal products).
POPDENS = State population density (population divided by land area in square miles).
CAA70 = Number of years of 1970 Clean Air Act implementation.
CAA77 = Number of years of 1977 Clean Air Act Amendments implementation.

IV. Independent variables in water quality model only
PERFISH = Percentage of state population who purchased a fishing license.
WQEMP = Per capita number of employees in five water polluting industries (pulp, paper, and paperboard mills, alkalies and chlorine, industrial and organic chemicals, petroleum refining, blast furnaces and steel mills).
POPWATER = State population density relative to water area (state population divided by square miles of inland water area).
FWPCA72 = Number of years of 1972 Federal Water Pollution Control Act implementation.
CWA77 = Number of years of 1977 Clean Water Act implementation.

A data appendix fully describing the data is available from the authors upon request.

The larger the value of the *LCV* index, the more the United States Senators from the state favor environmental and conservationist policies; thus, we expect a positive effect of *LCV* on *AQEXP*.

Recognizing that the number of people per square mile (*POPDENS*) measures pressure on the assimilative capacity of the environment, we use *POPDENS* to represent the pollution severity argument. With increasing density and the accompanying environmental problems, air quality expenditures are expected to increase if the goal of environmental budgets is indeed to reduce environmental damage.

The special interest theory is measured by the per capita number of employees in heavy air polluting industries (*AQEMP*). Environmental regulations in the Clean Air Act are typically technology-based which increase costs of production and output prices. Further, the creation of new source performance standards in the Clean Air Act serves as an entry barrier that protects existing firms [Maloney and McCormick, 1982]. Since the ability of air polluting industry interests to organize and lobby for economic rents from technology-based regulation can be measured by employment in these industries, we expect greater employment will have a positive effect on air quality expenditures.[4]

The final theoretical argument which we capture with our model is the intergovernmental relations theory. We do so with three variables which measure implementation of federal regulations. The Clean Air Act variables, *CAA70* and *CAA77*, are expected to increase state expenditures. The 1970 Clean Air Act set uniform National Ambient Air Quality Standards primarily to protect human health, and secondarily to protect materials, agriculture, and forests. In order to achieve the federal air quality goals, each state was required to submit a state implementation plan to the EPA, set emissions standards for existing stationary sources, and monitor and enforce the standards. Implementation of the 1970 Clean Air Act (*CAA70*) is therefore expected to increase state air quality expenditures.

The 1977 Clean Air Act Amendments increased state monitoring and enforcement activities so *CAA77* is also expected to increase state air quality expenditures. The 1977 amendments also added the goals of prevention of significant deterioration in clean air areas and protection and enhancement of visibility in national parks and wilderness areas. We therefore include the percent of state land that is federally owned (*FEDLAND*) as another intergovernmental relations variable. While this variable should be positively correlated with state air quality expenditures, the magnitude of its effect should be greater after the 1977 CAA amendments.

Water Quality

We employ a similar linear regression model to explain state water quality policy. Specifically, we use

$$(2) \quad WQEXP = f\{INCOME\ (+), PERDEM\ (+), LCV\ (+), WQEMP\ (+), POPWATER\ (+), PERFISH\ (+), FWPCA72\ (+), CWA77\ (+)\}.$$

The 1972 Federal Water Pollution Control Act gave the states the role of monitoring and enforcing the goals stated in the federal legislation. For this reason, per capita state water quality regulatory expenditures (*WQEXP*) captures much of the pollution control activity during this time period.

Variables which appear in (1) and (2) have the same interpretation and expected signs in both equations. Of the remaining variables in equation (2), water polluting industry employment (*WQEMP*) and population density relative to water area (*POPWATER*) are analogous to the variables *AQEMP* and *POPDENS* in equation (1). Since the technology-based effluent standards of the Clean Water Act possibly provided economic rents to existing industries which polluted water, greater employment in water polluting industries is expected to positively affect expenditures. Hence, the variable *WQEMP* represents the special interests theory. Pollution severity (*POPWATER*) is also expected to be positively related to water quality regulatory expenditures.

In addition, the percentage of state residents who purchased a fishing license (*PERFISH*) is included as a measure of the special interests theory. Since recreational benefits are the largest portion of expected benefits from improved water quality [Freeman, 1990], increases in recreational demand as measured by license sales is expected to increase expenditures if recreational anglers are able to organize and lobby effectively at the national level.

The Federal Water Pollution Control Act of 1972 (and amendments) had as its goals attainment of "fishable and swimmable" water by 1983 and the elimination of all discharges of pollutants into navigable waters by 1985. Water quality standards were set based on "best available technology." The Clean Water Act of 1977 extended deadlines for water quality goals and increased control of toxic water pollutants. Otherwise, there were no significant changes established by the 1977 amendments. To capture the effects of the Clean Water Act and Amendments we use regulatory constraint variables (*FWPCA72* and *CWA77*) as measures of the intergovernmental relations theory. Since there were few significant changes with the 1977 amendments, except to postpone deadlines for attainment of pollution reduction goals, we expect the 1972 Act to have a greater effect on expenditures than the 1977 amendments.

EMPIRICAL RESULTS

The theoretical models of the previous section are tested in two ways. The first approach follows the practice of estimating cross-sectional state expenditure equations using ordinary least squares regression. We recognize, however, that cross-section analysis does not explicitly account for state policy formation dynamics and changes caused by the influence of federal regulations [Lester and Lombard, 1990]. By pooling the cross-sectional data over the eleven year period we are able to identify spurious static cross-section results and test the influence of the intergovernmental relations theory. Using ordinary least squares to estimate the determinants of state environmental expenditures with pooled data would downwardly bias the standard errors of the coefficient estimates. We therefore use the generalized least squares estimator of Fuller and Battese [1974] to obtain unbiased estimates of standard errors.

Cross Section Results

Air Quality. Fiscal year air quality regulatory expenditure equations are found in Table 2.[5] The yearly models explain a significant amount of state air quality expenditures according to the model F-statistics. Only the intergovernmental relations theory (*FEDLAND*), however, consistently performs as expected over the eleven years. The percentage of federal lands in each state positively affects expenditures; further, the magnitude of the effect is larger in later years as federal regulations were increased and were directed at improving visibility on federal lands.

For other theories, interpretation of empirical results is not straightforward. Neither wealth (*INCOME*) nor partisanship (*PERDEM*) theories are determinants of air quality expenditures. Pollution severity (*POPDENS*) is an important explanatory

Table 2
State Air Quality Expenditures: OLS Coefficient Estimates
(t-statistic in parentheses)

Variable	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
INTERCEPT	-15.36	2.76	-2.30	66.35	20.90	-6.87	49.62	99.38	98.18	148.28	132.03
	(-0.37)	(0.07)	(-0.05)	(0.94)	(0.42)	(-0.14)	(0.79)	(1.29)	(1.11)	(2.01)	(1.84)
INCOME	0.005	0.002	0.002	-0.002	-0.001	0.002	-0.005	-0.005	-0.004	-0.010	-0.007
	(1.05)	(0.58)	(0.37)	(-0.26)	(-0.21)	(0.48)	(-0.82)	(-0.71)	(-0.52)	(-1.56)	(-1.14)
FEDLAND	0.31	0.42	0.52	0.43	0.67	1.04	1.35	1.48	1.53	1.73	1.64
	(1.42)	(2.28)	(2.59)	(1.42)	(3.30)	(3.84)	(3.64)	(3.44)	(3.27)	(4.39)	(4.19)
PERDEM	-21.21	-12.31	0.16	-39.90	5.55	16.6	26.05	-39.33	-41.53	-40.94	-51.65
	(-0.99)	(-0.67)	(0.01)	(-1.06)	(0.19)	(0.51)	(0.67)	(-0.87)	(-0.91)	(-1.06)	(-1.39)
LCV	-9.95	1.78	14.40	11.70	30.82	30.75	33.44	24.65	41.75	85.41	70.95
	(-0.45)	(0.10)	(0.85)	(0.39)	(1.51)	(1.27)	(1.06)	(0.56)	(1.00)	(2.27)	(1.88)
AQEMP	159.91	77.75	97.49	4.93	82.83	98.28	72.36	72.89	29.34	6.53	-30.29
	(4.42)	(2.43)	(2.32)	(0.08)	(1.96)	(2.01)	(1.04)	(0.86)	(0.34)	(0.09)	(-0.56)
POPDENS	0.036	0.030	0.018	0.085	0.004	-0.002	0.017	0.03	0.026	0.02	0.059
	(1.35)	(1.37)	(0.72)	(2.28)	(0.15)	(-0.07)	(0.44)	(0.64)	(0.53)	(0.47)	(1.31)
F Value	4.82	2.56	2.39	1.92	2.69	4.01	2.62	2.51	2.63	4.48	4.25
ADJ R^2	0.32	0.16	0.15	0.10	0.17	0.27	0.17	0.16	0.17	0.30	0.29

variable in 1973 only. Ideology (*LCV*) has the expected effect for only 1979 and 1980. A researcher who chooses a cross-sectional approach and who happens to select these years would conclude that pollution severity or ideology is directly associated with air quality expenditures; however, one choosing a different year would conclude that pollution severity or ideology are unimportant theories. The choice of the study year for a cross-sectional model greatly influences results.

The special interests theory (*AQEMP*) has the expected positive relationship with expenditures for every year except 1980, but it is statistically significant for only one-half of those years. Comparing the results over the years does seem to suggest a pattern of importance early in the decade but not later in the decade as suggested by Quinn and Yandle [1986].

Water Quality. Water quality regulatory expenditure equations are found in Table 3. Results are not as robust as they were for air quality expenditures; the water quality model is significant at the ten percent level for only seven of the eleven years. Our study is the first to analyze state water quality policy in this way, and we find that this issue does not lend itself to cross-sectional modeling particularly well.[6]

Table 3
State Water Quality Expenditures: OLS Coefficient Estimates
(t-statistic in parentheses)

Variable	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
INTERCEPT	168.64	-161.72	-1364.77	810.96	-1797.61	-780.19	-1489.04	-2449.44	-398.27	-1176.2	-1241.2
	(0.51)	(-0.25)	(-1.02)	(0.82)	(-1.74)	(-1.29)	(-2.26)	(-2.04)	(-0.40)	(-1.37)	(-1.64)
INCOME	0.004	0.056	0.23	-0.013	0.16	0.097	0.19	0.22	0.13	0.15	0.17
	(0.15)	(0.92)	(2.01)	(-0.17)	(1.94)	(2.22)	(4.03)	(2.43)	(1.67)	(2.29)	(2.98)
PERFISH	-2.34	-1.04	-2.46	-4.87	9.80	1.67	-1.97	12.84	-4.01	3.55	2.30
	(-0.76)	(-0.20)	(-0.20)	(-0.60)	(1.13)	(0.26)	(-0.28)	(1.05)	(-0.40)	(0.40)	(0.34)
PERDEM	-168.56	-267.93	-559.95	-729.53	618.65	45.02	28.16	320.42	-709.98	-249.04	-68.93
	(-0.99)	(-0.83)	(-0.84)	(-1.47)	(1.07)	(0.11)	(0.07)	(0.44)	(-1.30)	(-0.55)	(-0.16)
LCV	276.84	422.68	413.31	784.11	668.30	491.96	517.19	975.99	631.30	554.79	14.69
	(1.67)	(1.44)	(0.90)	(2.23)	(1.85)	(1.92)	(1.80)	(1.65)	(1.45)	(1.51)	(0.04)
WQEMP	1803.23	3517.80	-2439.06	-2533.01	-2865.70	-1432.51	-4528.24	-1594.43	-109.23	-573.79	-898.21
	(1.41)	(1.36)	(-0.58)	(-0.93)	(-1.24)	(-1.17)	(-1.97)	(-0.34)	(-0.03)	(-0.20)	(-0.27)
POPWATER	-0.006	-0.013	0.004	0.002	0.000	0.009	0.011	-0.001	-0.016	-0.007	0.008
	(-1.18)	(-1.56)	(0.23)	(0.15)	(0.00)	(1.16)	(1.21)	(-0.04)	(-1.20)	(-0.59)	(-0.55)
F Value	1.04	1.23	2.48	2.41	2.07	3.36	5.94	1.96	1.63	2.03	1.82
ADJ R^2	0.01	0.03	0.15	0.15	0.12	0.22	0.38	0.10	0.07	0.11	0.09

The state wealth theory (*INCOME*) contributes fairly consistently and as expected to the explanation of water quality expenditures. States which are able to pay for regulation are more likely to make the expenditures. Pollution severity (*POPWATER*), partisanship (*PERDEM*), and special interests (*WQEMP* and *PERFISH*) theories are not important determinants of water quality expenditures. Ideology (*LCV*) is an important determinant for several years.[7]

Pooled Cross-Sectional, Time-Series Results

One conclusion that can be made from both cross-sectional analyses is that explanations of regulatory expenditures are not stable from year to year. Additionally, no structural breaks appear evident that would be consistent with any particular theory; that is, not only do results change from year to year, but there also appears to be no systematic pattern to the change. We assert that an ongoing dynamic relationship between alternative theories and regulatory expenditures is occurring, and single year, cross-section results could be misleading. These conclusions suggest the need for a dynamic empirical model.

Air Quality. Generalized least squares estimates are found in Table 4 for the air quality expenditure model. The results indicate that several, but not all, of the possible explanations of air quality regulatory expenditures are important. Over the

Table 4
State Environmental Quality Expenditures: GLS Coefficient Estimates
(t-statistic in parentheses)

Variable	Air Quality	Water Quality
INTERCEPT	-13.78	-987.26
	(-0.53)	(-4.16)
INCOME	0.0042	0.13
	(1.72)	(6.89)
FEDLAND	0.76	—
	(3.45)	
PERFISH	—	1.30
		(0.53)
PERDEM	-12.22	-119.19
	(-0.76)	(-0.86)
LCV	0.18	478.25
	(0.02)	(4.56)
AQEMP	41.72	—
	(1.80)	
WQEMP	—	-1068.7
		(-1.34)
POPDENS	0.02	—
	(0.87)	
POPWATER	—	-0.002
		(-0.69)
CAA70	4.84	—
	(3.23)	
CAA77	16.28	—
	(4.03)	
FWPCA72	—	33.82
		(2.13)
CWA77	—	-16.89
		(-0.56)
Degrees of Freedom	541	541

eleven year fiscal period and consistent with the cross-section analysis, the state wealth theory (*INCOME*) is a determinant of air quality expenditures. As expected, states with greater per capita income spend more on air quality.

The strongest result to emerge from the pooled analysis is the importance of the intergovernmental relations theory since each of the three measures of intergovernmental relations have the expected effects (*FEDLAND*, *CAA70*, and *CAA77*). Our results are consistent with the theory that state expenditures are constrained by increased federal government regulations. Such a result should not be surprising; federal legislation in the 1970s directed individual states to undertake action to improve environmental quality, and the increased state requirements undoubtedly required a commitment of financial resources.

The partisanship (*PERDEM*), ideology (*LCV*), and pollution severity (*POPDENS*) theories have no impact over the eleven year period. These may be important for other environmental decisions; alternatively, their effects could be manifest in state mandated private expenditures instead of public expenditures. But, after accounting

for the intergovernmental theory, our results are not consistent with similar studies that find that these theories are important for state air quality policy.

The special interests theory (*AQEMP*) has the expected effect on expenditures. This result indicates that an important special interest, businesses engaged in air polluting production, was able to influence state air quality expenditures. This result holds even after controlling for the intergovernmental relations constraint.

Water Quality. Table 4 also presents the pooled water quality expenditure model. Again, our results indicate that several, but not all, of the possible explanations of water quality expenditures are important. Of the political science theories, ideology (*LCV*) is an important determinant of water quality expenditures, while partisanship (*PERDEM*) is not. We find no support for the notion that Democrats support interventionist policies more than do Republicans. The pollution severity theory (*POPWATER*) also does not contribute to the explanation of state water quality expenditures. States with greater water pollution problems, at least as measured by our variable, did not spend more on environmental regulation.

The intergovernmental relations theory (*FWPCA72*) does help explain the level of water quality expenditures. Recall that the 1972 legislation imposed requirements on the states while the 1977 amendment did little to constrain state behavior. This is reflected in our results. The effect of the Clean Water Act Amendments (*CWA77*) is negligible while the original legislation (*FWPCA72*) does contribute to the explanation of state water quality expenditures.

Neither special interest variable (*WQEMP* and *PERFISH*[8]) influenced state regulatory spending on water quality. This result contrasts with the air quality model where special interests (*AQEMP*) did influence state spending. Industries with large amounts of air emissions were able to lobby for pollution control expenditures at the state level, but industries with large amounts of water emissions were not.

CONCLUSIONS

Several important results emerge from this study. First, the intergovernmental relations theory provides perhaps the strongest explanation of state air and water quality expenditures. Other factors discussed in both the economic and political science literatures contribute to the explanation of state air and water quality policy. Special interests, state wealth, and intergovernmental relations theories contribute to the explanation of state air quality expenditures while wealth, ideology, and intergovernmental relations theories have the expected effects on state water quality expenditures.

Our results further suggest that the state wealth and intergovernmental theories are complementary to, and not competing with, each other for state air and water quality policy. Several of the other theories of comparative state environmental policy, including the special interests theory for water quality expenditures, are competing with the wealth and intergovernmental relations theories. That is, if state expenditure equations are mis-specified by omitting variables which measure either

wealth, intergovernmental relations, or both theories, other theoretical arguments may appear to be important when, in fact, they are not.

The determinants of water quality expenditures are not the same as for air quality expenditures. For example, whereas the wealth theory is a determinant of both air and water quality expenditures, ideology is a determinant of water quality expenditures but is not a determinant of air quality expenditures. This result suggests that state air and water policy is formed differently and should be modeled as such.

Another, more technical, result is that cross-section analysis may generate misleading conclusions for comparative state policy research. For instance, several theories were found to be important for some years in the cross section models and unimportant in other years. For the pooled data, after controlling for intergovernmental relations, results are more consistent with prior expectations.

We recommend that further analysis of comparative state environmental policy focus on multiple determinants of policy and use data that incorporate a time element. Continued reliance on individual theories, whether economic or political science, and single year cross-section analyses may generate misleading and/or incomplete implications. Analysis of state environmental policy expenditures for more recent years would be most appropriate and could find differing results than those here. For instance, with increasing state involvement in environmental policy during the federal deregulatory period of the 1980s, special interests theories could have greater explanatory power relative to what we found for the 1970s.

NOTES

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1. Yearly data for post-1980, which would allow study of the Reagan deregulatory period, are currently unavailable [Lester and Lombard, 1990].
2. During the federal regulatory period, however, not all economic research finds that economic gain alone can explain environmental policy. Stanton [1989] finds that although economic variables are important, other factors influenced support for the Clean Air Act amendments of 1977.
3. As a referee noted, care should be employed when interpreting our results because of our choice of dependent variable. We are analyzing the state operation of an environmental program and not the demand for environmental protection per se. Analysis of total (public plus private mandated by government) expenditures might yield different results; however, our data set does not include private expenditures. Our results should be interpreted with this in mind.
4. We feel that the employment variables effectively capture the special interests argument embodied in the theoretical discussion of Maloney and McCormick [1982]. However, as suggested by a referee, polluting industry employment may also capture the pollution severity theory. Increasing employment may indicate increasing production and air pollution. With more pollution severity expenditures would be expected to increase.
5. We also tested the orginal Yandle [1983] model and the revised Quinn and Yandle [1986] models in which variables were entered as levels, not per capita. We also used a landowners special interests

variable (as did Yandle) that measured per capita gross assessed value of property subject to local general property taxation. Our results are consistent with theirs. As suggested by a referee, we chose not to report the specification including this additional variable because its operational definition differs greatly from state to state. These results are available upon request from the authors.

6. The Federal government, through regional EPA offices, had the task of setting effluent limits, issuing permits, and enforcing pollution regulations. If the state water pollution control agencies met certain conditions, the states had the option to take over these duties. By 1988, 39 states had taken over these duties [Freeman, 1990]; however, during the 1970s much of the regulatory decision making took place at the Federal level. This may explain the low explanatory power of the cross-section models.
7. Alternative ideology variables (a South regional dummy and the Americans for Democratic Action ideology index) produced results similar to those presented here in both air quality and water quality models. While the issue of choosing a proxy for ideology is difficult and controversial, our general results are not sensitive to choice of proxy. The alternative models are not presented here but are available upon request.
8. The 1950 Federal Aid in Sport Fish Restoration Act requires excise taxes to fund efforts to manage and restore freshwater sportfishing. The federal government collects revenue using excise taxes on sportfishing equipment and allocates this money to the states based on a state's geographic area and percentage of population that fish. The allocation formula is similar to our *PERFISH* variable. It can be expected that states will spend less on water quality as *PERFISH* increases if federal money acts as a substitute revenue source. In this sense, *PERFISH* may also act as an intergovernmental relations variable causing the overall effect to be zero.

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